Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Electronic Circuits			
Course Code (according to the bylaw)**:**	MTE 141			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	3		4
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Ahmed Abu El -FADI			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Controlled sources, semiconductor circuits and operating points, low level signal descriptions and equivalent circuits, basic circuits with FETs and bipolar transistors, logic components, frequency attenuation circuits and Bode diagram, operation amplifier circuits, AD and DA converters, power amplifier.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A2,D2,D3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Define controlled sources and their applications in circuit analysis.
		LO2	Discuss semiconductor circuits and operating points identification.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO3**	Analyze low-level signal descriptions and equivalent circuits.
		LO4	Examine basic circuits using FETs and bipolar transistors.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	**LO5**	Develop logic components, frequency response circuits, and attenuation circuits.
		LO6	Construct and Bode diagrams interpreting
D3	Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.	**LO7**	Design operational amplifier circuits for various applications.
		LO8	Compare A/D converters, D/A converters, and power amplifiers in terms of performance and applications.

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√								

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Controlled sources	**4**	**1**	**-**	**3**	**-**
2	Semiconductor circuits	**4**	**1**	**-**	**3**	**-**
3	Operating points	**4**	**1**	**-**	**3**	**-**
4	Low level signal descriptions	**4**	**1**	**-**	**3**	**-**
5	Equivalent circuits	**4**	**1**	**-**	**3**	**-**
6	Bipolar transistors	**4**	**1**	**-**	**3**	**-**
7	**Revision and Mid Exam**					
8	MOSFET transistors and its small signal model	**4**	**1**	**-**	**3**	**-**
9	Common Source Amplifier circuits	**4**	**1**	**-**	**3**	**-**
10	Multistage MOSFET Amplifier and differential amplifier	**4**	**1**	**-**	**3**	**-**
11	Differential amplifier with current mirror circuits	**4**	**1**	**-**	**3**	**-**
12	Operational amplifier circuits and its Application	**4**	**1**	**-**	**3**	**-**

13	AD and DA converters	**4**	**1**	**-**	**3**	**-**
14	Frequency attenuation circuits and Power amplifier	**4**	**1**	**-**	**3**	**-**
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	BJT
2	PWM
3	MOSFET
4	JFET
5	Operational amplifiers
6	Differential amplifiers
7	Wheatstone bridge

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	٤	١٠	١٠%
2	Exam 2 written (Semester work)	١١	١٠	١٠%
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	١٢	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**WILLIAM H.HAYT," ENGINEERING CIRCUIT ANALYSIS", 2019**
	Other References	• R. Bolystad, and L. Nashelsky, "Electronic Devices and Circuit Theory", Prentice Hall
	Learning Platforms (Links must be added)	EKB - Microsoft office
	Devices/Instruments	**non**

Supportive facilities & equipment for teaching and learning *	**Supplies**	**non**
	Electronic Programs	**non**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	**Dr.Ahmed Abu El -FADl**	Dr. Ahmed Abdalbadia
Signature	*Ahmed fadl*	احمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	**Digital Logic Design**			
Course Code (according to the bylaw)**:**	**MTE 142**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	**1**		**4**
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr.Ahmed Abu El -FADI**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Introduction to Digital Concepts - Number systems, operations, and codes-Basic logic gates -Boolean Algebra and logic simplification - combinational circuits-sequential circuits flip-flops and related devices-Counters and Shift Registers- Memory and storage- Introduction to hardware description languages (HDL).

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A3,A10,D2,D3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**LO1**	Identify the requirements and problems of digital systems related to logic gates and numbering systems.
		LO2	Apply a systematic procedure to fulfill requirements of solving problems using logic simplification, codes, and Karnaugh map (K-map) techniques.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO3**	Design and digital circuits using logic gates implementation
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**LO4**	Search for information for developing the knowledge and skills that support life-long learning in combinational and sequential circuits.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	**LO5**	Design logic gate–based circuits and building blocks.
D3	Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on	**LO6**	Select suitable components, devices, and materials for digital system implementation.

	traditional and contemporary technological, professional, and computer-aided tools.	LO7	Select and apply appropriate design methods for conventional digital systems, including combinational and sequential circuits.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√								√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	• Introduction to digital concepts	4	1	2	1	-
2	Number systems	4	1	2	1	-
3	Boolean Algebra and operations	4	1	2	1	-
4	Codes-basic logic gates	4	1	2	1	-
5	• logic simplification	4	1	2	1	-
6	K-maph	4	1	2	1	-

7	**Revision and Mid Exam**					
8	• Combinational circuits Sequential circuits	4	1	2	1	-
9	Counters	4	1	2	1	-
10	Decoder	4	1	2	1	-
11	• Flip Flops latch logic gates and related devices	4	1	2	1	-
12	Shift registers	4	1	2	1	-
13	Introduction to: • Memory and storage • Ics hardware description language(HDL)	4	1	2	1	-
14	Revision part 2	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	Logic gates
2	Logic circuits
3	Seven Segment
4	Latches and counters

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	٤	١٠	١٠%
2	Exam 2 written (Semester work)	١١	١٠	١٠%
3	Midterm exam	**7**	**20**	**20 %**

4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Final Practical/Clinical/… Exam	**10**	**0**	**10%**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Sonali Singh, Digital Logic Design,2019
	Other References	Mano M. and Kime C.R., “Logic and Computer Design Fundamentals“, Prentece Hall, 3rd edition, 2004.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Non**
	Supplies	**Non**
	Electronic Programs	**Non**
	Skill Labs/ Simulators	**Non**
	Virtual Labs	**Non**
	Other (to be mentioned)	**Non**

	Course Coordinator	**Program Coordinator**
Name	**Dr.Ahmed Abu El -FADl**	Dr. Ahmed Abdalbadia
Signature	*Ahmed fadl*	أحمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	**Statistics and Probability Theory**			
Course Code (according to the bylaw)**:**	**MTH 105**			
Department/s that participated in the teaching:	**BASIC SCIENCES**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Ass. Prof. Tarek Nassar			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	7/26/2025			

2. Course Overview (Brief summary of scientific content):

Probability, conditional probabilities, Bayes' theorem. Tendency and Dispersion Measures: Introduction, different types of data, tendency measures, variability measures, frequency distributions. Random Variables: Discrete random variables, the Hyper - geometric distribution, Binomial distribution, the Poisson distribution, Poisson approximation of binomial probabilities, continuous random variables. Moments: central moments, Skewness measures, kurtosis measures, moment generating function. Sampling Theory and Inferences: the concept Of a sampling distribution, sampling distribution of the mean, central limit theorem, tests of hypothesis and Confidence intervals for the mean, tests of hypothesis and confidence intervals for the difference between two means, tests of hypothesis and confidence intervals for the population proportion, tests of hypothesis and confidence intervals for the difference between two proportions, tests of hypothesis and confidence intervals of sample variance, tests of hypothesis and confidence interval for ratio of sample variances. Simple regression and correlation: Simple linear regression by least square method, validation of the model, correlation coefficient.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
(A1, A2, A4, A5, A6)		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify and apply the different statistical measurements for analyzing data. Recognize the axioms of the probability	**LO1**	Apply the different statistical measurements for analyzing grouped and ungrouped data.
		LO2	Recognize the axioms of the probability to calculate the probability for any event.
A2	Apply techniques for calculate probabilities, expectation, and variance.	**LO3**	Apply several techniques of counting and calculus to calculate probabilities, mean, and variance for random variable.
A4	Represent the data and compute the strength of relation between variables and estimate the regression equation	**LO4**	Represent: box plot, stem&leaf, histogram, frequency polygon, and scatter diagram.
		LO5	Compute the relation strength between two variables, and predict one variable by anther with the regression equation.
A5	Classify random variables and density function.	**LO6**	Connect between a random variable and density function.
		LO7	Apply different type of probability distributions to solve probability problem.
A6	Utilize engineering probability, problems, for safety requirements and apply codes of practice and standards, quality guidelines.	**LO8**	Use the confidence interval method to compute the mean interval.
		LO9	Use the test of hypothesis method to predict the mean interval.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√		√			√	√			√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Lab / Practical
1	**Introduction of statistics - Organized and represent of ungrouped data**	4	2	2	
2	**Organized and represent of grouped data**	4	2	2	
3	**Determine the Spearman's and Pearson's coefficient correlation and compute the regression equation**	4	2	2	
4	**General revision and quiz (1)**	4	2	2	
5	**Introduction of probability: Sample space and Events – Counting Techniques**	4	2	2	
6	**Random variables Discrete and continuous and their probability distribution**	4	2	2	

7	**Mid Exam**				
8	**Probability distribution: Binomial , Poisson**	4	2	2	
9	**Probability distribution: normal, standard, student**	4	2	2	
10	**Relation between distributions**	4	2	2	
11	**Confidence interval to find the mean interval of the mean population**	4	2	2	
12	**Hypothesis Testing (The structure of a hypothesis test and testing the mean of population)**	4	2	2	
13	**General revision and quiz (2)**	4	2	2	
14	**Sheet and report**	4	2	2	
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	**4**	**15**	**15%**
2	Quiz 2 written (Semester work)	**13**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Final Practical/Clinical/... Exam		**0**	
6	Final Oral Exam		**0**	
7	Assignments / Project /Portfolio/ Logbook	**14**	**0**	**10%**
8	Field training		**0**	
9	Other (Mention)		**0**	

6- Learning Resources and Supportive Facilities *

Learning resources	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Introduction to Probability and Statistics for Engineers and Scientists, By Sheldon M.

(books, scientific references, etc.) *		Ross, 2021 Elsevier, ISN: 978-0-12-824346-6, **6th edition**.
	Other References	Probability and Statistics for STEM: A Course in One Semester, By E.N. Barron, J.G. Del Greco, 2022 Springer series, ISN: 978-3-031-02427-6
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	White board
	Supplies	Teaching aids and power point
	Electronic Programs	
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

	Course Coordinator	**Program Coordinator**
Name	Ass. Prof. Tarek Nassar	Prof. Ahmed Abd El-Gafar
Signature	*Ass. Prof. Tarek Nassar*	

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Communication & Presentation Skills**			
Course Code (according to the bylaw)**:**	**HUM 108**			
Department/s that participated in the teaching:	**BASIC SCIENCES**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Tutorial**	**Other (specify)**	**Total**
	2	**1**		**3**
Course Type:	Elective			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	DR. Ashraf selim			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	7/26/2025			

2. Course Overview (Brief summary of scientific content):

Course Aims to provide the student with the latest knowledge about the concepts, characteristics, and types of managerial and interpersonal communications, as well as the concepts and requirement of good listening and presentation, and Developing the student’s abilities and skills of effective communication, and good listening, as well as how to use the interpersonal and managerial communication methods and the presentation techniques in performance and dealing with others inside and outside the organization. Course Contents: Concept and nature of communication – Communication model – Formal and informal communications - Interpersonal and managerial communications – Body language – Written communications (Reports and memos) – Ten Communications of effective communication – Good listening – Elements of effective presentation model –Preparation of good presentation – Carrying out presentations – Discussion and dealing with.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A8, A9, A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO1**	formulate e interpersonal Communication
		LO2	embody languages communication
		LO3	Learn types of managerial and interpersonal communications
		LO4	Identify the main items of the of Communication technology
A9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations	**LO5**	Define the main items of the of of Presentation Skills
		LO6	presentation techniques in performance and dealing with others inside organization
A10	Acquire and apply new knowledge and practice self, lifelong and other learning strategies.	**LO7**	presentation techniques in performance and dealing with others and outside the organization

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√							√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Practical Lab /
1	Fundamental of definition concepts, characteristics and types of Communication.	3	1	2	0
2	managerial and interpersonal communications	3	1	2	0
3	concepts and requirement of good communications	3	1	2	0
4	Communication model – Formal and informal communications	3	1	2	0
5	Interpersonal and managerial communications	3	1	2	0
6	how to use the interpersonal and managerial communication methods	3	1	2	0
7	**Revision and Mid Exam**				
8	Elements of effective presentation	3	1	2	0
9	presentation techniques	3	1	2	0
10	presentation techniques in performance and dealing with others inside organization	3	1	2	0

11	presentation techniques in performance and dealing with others and outside the organization	3	1	2	0
12	Interpersonal communications	3	1	2	0
13	Body language skills	3	1	2	0
14	Elements of effective presentation technique	3	1	2	0
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10**
2	Exam 2 written (Semester work)	**11**	**10**	**10**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	presentation skills	**9,10**	**10**	**10**
6	Assignments	**11**	**10**	**10**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**HTI; Available Hard copy .** **Available Presentation (handed to students' part by part)**
	Other References	• **-Gary Johns and Alan M.Saks, Organization Behavior, Addison Wesley Longman, 2009.** • **-Scgermerhorn Jr., R. J., and Osborn, N. R., Organizational Behavior, John Wiley & Sons, Inc., New York, 10th Ed.,2008".** • **Lustberg, Arch: How To Sell Yourself: Winning Techniques For Selling Yourself, Your Ideas, Your Message. Franklin Lakes: The Career Press, 2002**

- **Bovee, Courtland L, John V. Thill & Barbara E. Schatzman. Business Communication Today: Tenth Edition. New Jersey: Prentice Hall, 2010**
- **Hasson, Gill. Brilliant Communication Skills. Great Britain: Pearson Education, 2012.**
- **Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Pubications, 2012.**
- **Bovee, Courtland L, John V. Thill & Barbara E. Schatzman. Business Communication Today: Tenth Edition. New Jersey: Prentice Hall, 2010.**
- **Lesikar, Raymond V and Marie E. Flatley. Basic Business Communication: Skills for Empowering the Internet Generation: Ninth Edition. New Delhi: Tata McGraw-Hill, 2002.**
- **-Henderson, Fiona, & Parkes, Geoff. (2023). "Improving Presentation Skills in Higher Education: A Case Study." Journal of Further and Higher Education, 47(2), 184-196**
- **-Graveline, Denise. (2023). "The Science of Effective Communication." Harvard Business Review, 101(3), 80-87.".**
- **Gallo, Carmine. (2022). Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds. St. Martin's Griffin**
- **Henderson, Fiona, & Parkes, Geoff. (2022). "Improving Presentation Skills in Higher Education: A Case Study." Journal of Further and Higher Education, 45(4), 510-523.**
- **Graveline, Denise. (2022). "The Science of Effective Communication." Harvard Business Review, 99(5), 92-99.**
- **Lesikar, Raymond V and Marie E. Flatley. Basic Business Communication: Skills for Empowering the Internet Generation: Ninth Edition. New Delhi: Tata McGraw-Hill, 2022.**
- **Gary Johns and Alan M.Saks, Organization Behavior, Addison Wesley Longman, 2009**
- **Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Pubications, 2012.**
- **Gallo, Carmine. (2022). Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Mind**
- **The Power of Saying No: The New Science of How to Say No That Puts You in Charge of Your Life" by Vanessa Patrick (2023)**
- **"Speaking with Strategic Impact: Reach, Connect, and Lead" by Kate Leavell (2023)**

		• **"The New Rules of Marketing and PR: How to Use Content Marketing, Podcasting, Social Media, AI, Live Video, and Newsjacking to Reach Buyers Directly" by David Meerman Scott (8th Edition, 2024)**
	Electronic Sources (Links must be added)	**https://cadreworks.org/resources/communication-skills**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show**
	Supplies	**data show equipped lecture room**
	Electronic Programs	**Microsoft power point**

	Course Coordinator	Program Coordinator
Name	**DR.Ashraf selim**	**PROF. Ahmed Abd El-Gafar**
Signature	Ashraf Selim	

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Strength of Materials**			
Course Code (according to the bylaw):	**ENG 146**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr.Saleh Sobhy**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Introduction, definitions, stress, strain, etc. Generalized Hooke's Law, torsion, bending, transverse loading, design of beams for strength, shearing force and bending moment diagram, yield and fracture criteria, elastic stress analysis.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1&A2&B1&B4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	LO1	Explain the concepts and types of stress and strain under different loading conditions.
		LO2	Identify statically determinate and unclassified problems
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	LO3	Apply stress analysis techniques for solving mechanical design issues.
B1	Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.	LO4	Explain methodologies for stress calculations.
B4	Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and	LO5	Design beams, shafts, and other mechanical elements for strength requirements.

	maintain mechanical equipment and systems		

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	/ Practical Lab	
1	Introduction, concept of stress, axial loading, normal stress	4	2	2	-	-
2	Shearing stress, bearing stress in connections.	4	2	2	-	-
3	Stress under general loading conditions.	4	2	2	-	-
4	Stress and strain – axial loading and normal strain	4	2	2	-	-
5	Hooke's law, deformation under axial loading.	4	2	2	-	-
6	Poisson's ratio, generalized Hooke's law, dilatation, Bulk modulus. Shearing strain	4	2	2	-	-

7	**Revision and Mid Exam**					
8	Torsion, stresses in shafts, deformation in circular shafts, angle of twist.	4	2	2	-	-
9	Statically indeterminate shafts, design of transmission shafts	4	2	2	-	-
10	Pure bending, prismatic members in pure bending	4	2	2	-	-
11	Deformation in pure bending, stresses and deformation in elastic range.	4	2	2	-	-
12	Transverse loading of prismatic members, distribution of normal stresses,	4	2	2	-	-
13	Shearing stresses in a beam, shearing stresses in thin walled members.	4	2	2	-	-
14	Design of beams for strength: shear and bending moment diagrams, relations among P,V & M	4	2	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**3**	**10**	**10 %**
2	Exam 2 written (Semester work)	**6**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**9**	**0**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	F.P..Beer and E.R. Johnston, Jr.: "Mechanics of materials "Mc Graw-Hill, 7th ed., 2018.
	Other References	

	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**non**
	Supplies	**non**
	Electronic Programs	MS.TEAMS
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	**Dr.Saleh Sobhy**	**Dr. Ahmed Abdalbadia**
Signature	*Saleh Sobhy*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Mechanical Vibration Analysis**			
Course Code (according to the bylaw)**:**	**ENG 148**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	**1**		**4**
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 1**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**DR HASSAN GASSOUR**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Free and damped vibrations, harmonically excited motion, rotating and reciprocating unbalance, Free and forced vibration of single degree of freedom, Vibration of multi degree of freedom system, vibration of continuous systems (beams), Approximate methods, Vibration measurements.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1,A2,B1,B2		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering Fundamentals, basic science, and mathematics.	**LO1**	Identify the different types of mechanical vibrations.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**LO2**	Explain the concept of natural frequency.
		LO3	Express the constitutive equations relating the different elements of vibrating system.
B1	Model, Analyze and Design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.	**LO4**	Describe complex vibration problems using equivalent system models.
		LO5	Derive solutions of differential equations for vibration systems.
		LO6	Analyze vibrating systems and determining their degrees of freedom.
B2	Plan, manage and carry out designs of mechanical systems and machine elements using appropriate both traditional means and computer-aided tools and software contemporary to the mechanical engineering field	**LO7**	Evaluate the equations of motion using Newton's second law and the energy method.
		LO8	Predict the required initial conditions to solve the differential equation of motion.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√			√	√			√	

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures)	Training		Other
				Tutorial	/ Practical Lab	
1	Revision to basic principles of dynamics	4	1	2	1	-
2	Basic concepts of mechanical vibrations	4	1	2	1	-
3	Modeling of SDOF systems	4	1	2	1	-
4	Free vibration of undamped SDOF systems	4	1	2	1	-
5	Free vibration of damped SDOF systems	4	1	2	1	-
6	Free vibration of damped SDOF systems (cont.)	4	1	2	1	-
7	**Revision and Mid Exam**					
8	Forced vibration of SDOF systems	4	1	2	1	-
9	Forced vibration of SDOF systems (cont.)	4	1	2	1	-

10	Modeling of 2DOF systems	4	1	2	1	-
11	Free vibration of 2DOF systems	4	1	2	1	-
12	Vibration of continuous systems	4	1	2	1	-
13	Vibration of continuous Systems (cont.)	4	1	2	1	-
14	Revision	4	1	2	1	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**2**	**8**	**8 %**
2	Exam 2 written (Semester work)	**4**	**8**	**8 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Exam 3 written (Semester work or quiz)	**6**	**8**	**8 %**
6	Exam 4 written (Semester work or quiz)	**9**	**8**	**8 %**
7	Exam 5 written (Semester work or quiz)	**12**	**8**	**8 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	-Mechanical Vibrations Theory and Applications, S. Graham Kelly, Cengage Learning, 2011. -Singiresu s. Rao, “Mechanical Vibrations”, 2018
	Other References	Mechanical Vibration - Theory and Applikation, S. Graham Kelly, Global Engineering: Christopher M. Shortt, 2012
	Electronic Sources (Links must be added)	**General | ENG 148 Mec Vibration | Microsoft Teams**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data show, PC, White board
	Supplies	**non**
	Electronic Programs	**non**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	**Dr Hassan Gassour**	**Dr. Ahmed Abdalbadia**
Signature		أحمد عبدالبديع

Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	**Principles of Thermodynamics**			
Course Code (according to the bylaw)**:**	**MEC 117**			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Ahmed Shabban**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. *Course Overview (Brief summary of scientific content):*

Covers the fundamentals of thermodynamics; thermodynamic properties, processes, reversible and irreversible processes, and first and second law of thermodynamics. Properties of pure substances, and gas laws are considered. Carnot and Rankine cycle is studied. Function and performance of measuring instruments, calibration. Temperature and heat flux measurements, boiling and evaporation,

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A2, D1		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.**	**LO1**	**Identify the different flow processes in power generation industries by applying the principles of thermodynamics.**
		LO2	**Differentiate between different types of energy that can be interchangeable in the system.**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.**	**LO3**	**Analyze and calculaing the rate of energy transfer using suitable correlations**
B1	**Design, Model and analyze mechanical/electronics/digital physical systems by applying the concepts of : Thermo-dynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material**	**LO3**	**Analyze and calculating different heating/cooling processes.**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√				√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*other*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	Describes the properties used to specify the state, or condition, of a substance, the units in which the property is measured and the usual symbol, e.g.: — pressure — temperature — volume — energy Explains what is meant by: — absolute quantities — specific quantities — intensive values — extensive values	4	1	2	1	-
2	-Explains that a substance can exist in three states, or phases. -Describes the energy required to change phase of liquid or a gaseous form. -States that "internal" or "intrinsic" energy (U) is related to the motions of the molecules like molecular, vibrational motions, and is dependent only on	4	1	2	1	-

	thermodynamic temperature. - States that the total energy stored in a body, or system, is termed enthalpy (H) Defines total stored energy the sum of internal energy and flow energy [the product of pressure(P) and volume (V)], i.e. H = U + PV.					
3	-Defines potential and kinetic energy. - Defines an "ideal" gas -States that an "ideal" gas cannot be liquefied by alteration of pressure alone -States the laws of Boyle and Charles and identifies the following statements with them: P x V = α constant ─ Boyle V/T = α constant Charles - Defines the specific ideal gas equation as: PV/T = R per unit mass of gas Explains that R will have a different numerical value for each ideal gas or mixture of Ideal gases. - Applies simple numerical calculations involving the elements of the above objectives. - States that energy in transition between bodies or systems can only be heat flow (or Heat transfer) (Q) and work flow (or work transfer) (W) - Defines the first law of thermodynamics.	4	1	2	1	-
4	-Defines the following conditions: ─ saturated vapour ─ dry vapour ─ wet vapour ─ dryness fraction ─ superheated vapour - Explains and uses the	4	1	2	1	-

	"corresponding" relationship that exists between pressure and temperature for a saturated liquid or saturated vapour Demonstrates the above objective, using tables of thermodynamic properties to determine different properties values defined in the above objective					
5	-Explains the calculations of work "work" by force × distance moved by -Sketches a P—V diagram relating the area of the diagram to the work done when a fluid exerts constant pressure on a piston in a cylinder. pressure at specific points in the process, in newtons/m2 V is the volume at the same points as for pressure, in m3 n is a	4	1	2	1	-
6	-States that the following processes are applicable to ideal gases and vapors: — heat transfer: heating and cooling — work transfer; compression and expansion. elements in the above objectives	4	1	2	1	-
7	Revision for part 1.	4	1	2	1	-
8	**Revision and Mid Exam**					
9	Analysis of steady state flow open systems: turbines, pumps/compressors,	4	1	2	1	-
10	Analysis of throttles, boilers, nozzles, diffusers, single Substance mixing chambers and heat exchangers.	4	1	2		-

11	Irreversibility and definition of entropy. ● - Quantification of entropy. Forms of the second law: entropy statement and logical equivalence with Clausius and Kelvin Planck statements	4	1	2	1	-
12	● Definition of cycle efficiency and comparison with theoretical limit (Carnot).	4	1	2	1	-
13	Revion part 2 and Quiz	4	1	2	1	-
14	Revion part 2 and Quiz	4	1	2	1	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**3**	**10**	**10%**
2	Exam 2 written (Semester work or quiz)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Assignments / Project /Portfolio/ Logbook	**1-14**	**20**	**20%**

6- Learning Resources and Supportive Facilities* *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Lecture notes uploaded on class materials – Microsoft teams. Y.A. Cengel, "Thermodynamics- An Engineering Approach",McGraw-Hill, New York, 2007 R.K.RAJPUT, A TEXTBOOK OF ENGINEERING THERMODYNAMICS, 2008

	Course Coordinator	**Program Coordinator**

Name	Dr. Ahmed Shabban	Dr. Mohamed Ashraf
Signature		احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Technical Report Writing**			
Course Code (according to the bylaw)**:**	**MNG 103**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	**2**	**--**	**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Mohamed Elsayed**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Essential elements of a technical report: Abstract - Summary - Contents - Objectives - Details of the report including figures, images, video ...etc, - Conclusions - Recommendations - References using a standard format and the different electronic sources. Report Classification: Technical (Requirement specification, Analysis, Design, and Implementation). Administrative (Directed to different operational and management levels). Levels of confidentiality for the different reports. Report Composition: Logical presentation of the report and coordination between its components. Importance of using correct grammar and punctuation. Enhancing communication effectiveness by the use of different media. Report Implementation: Use of the appropriate software packages including any graphics or multimedia packages.

3. ***Course Learning Outcomes CLOs:***

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A5, A8, A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5.	Practice research techniques and methods of investigation as an inherent part of learning.	**LO1**	Identify the purpose, characteristics, and structure of technical writing, and distinguish it from general writing.
		LO2	Differentiate between the key components of technical reports, CVs, letters, and technical presentations.
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO3**	Apply the principles of technical writing to produce structured technical documents such as reports, CVs, and presentations.
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**LO4**	Analyze examples of technical documents through independent research to enhance communication skills and promote lifelong learning.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Practical Lab /
1	Introduction of technical writing	**3**	**1**	**2**	**-**
2	Some Elements of Technical Reports (cover page, title page, abstract, acknowledgement, dedication and summary)	**3**	**1**	**2**	**-**
3	Some Elements of Technical Reports (tables of contents, list of figures, list of tables, Nomenclature, Abbreviation and Acronym)	**3**	**1**	**2**	**-**
4	Some Elements of Technical Reports (Introductory chapters(s), Literature Review, Central chapters,)	**3**	**1**	**2**	**-**
5	Some Elements of Technical Reports (Microstructure, Conclusions, Tables and Figures, Appendices)	**3**	**1**	**2**	**-**

6	Some Elements of Technical Reports (References (Harvard method))Bibliography, Plagiarism, Style)	**3**	**1**	**2**	**-**
7	Punctuation, Layout and Equations.	**3**	**1**	**2**	**-**
8	**Revision and Mid Exam**				
9	CV (Curriculum Vitae)	**3**	**1**	**2**	**-**
10	Letters	**3**	**1**	**2**	**-**
11	Technical Presentations	**3**	**1**	**2**	**-**
12	Submitting a technical report from the students and evaluating the report according to the explanation	**3**	**1**	**2**	**-**
13	Submitting a technical presentation from the students and evaluating the report according to the explanation	**3**	**1**	**2**	**-**
14	Submitting a technical presentation from the students and evaluating the report according to the explanation	**3**	**1**	**2**	**-**
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Technical Report (Semester work or quiz)	**9**	**15**	**15%**
2	Technical presentation (Semester work or quiz)	**11, 12**	**15**	**15%**
3	CV &letter	**10**	**10**	**10%**
4	Midterm Exam	**8**	**20**	**20 %**
5	Final Written Exam	**15, 16**	**40**	**40 %**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific	**The main (essential) reference** (must be written in full according to the scientific documentation method)	-The Oracle Corporation, "Corporate citizenship report 2023," Oracle, Redwood Shores, CA, USA, 2023. Accessed: Dec. 5, 2023. [Online]. Available: http://www.oracle.com/us/corporate/citizenship/corporate-citizenship-report-2563684

references, etc.) *		Research and Technical Writing for Science and Engineering, by Meikang Qiu, Han Qiu, Yi Zeng, 2022.
	Other References	M. Markel, Technical Communication, 11th ed. Boston, MA: Bedford/St. Martin's, 2017.
	Electronic Sources (Links must be added)	Microsoft teams
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data- show and laptop.
	Supplies	White board
	Electronic Programs	N/A
	Other (to be mentioned)	N/A

	Course Coordinator	Program Coordinator
Name	**Dr. Mohamed Elsayed**	**Dr. Mohamed Ashraf**
Signature		

المعهد التكنولوجي العالي – مدينة العاشر من رمضان	
قسم / العلوم الأساسية	
توصيف مقرر	
إسم المقرر: تاريخ مصر الحديث	**كود المقرر: HUM 102**

القسم القائم بتدريس المقرر	قسم العلوم الأساسية

1- معلومات أساسية :

نوع المقرر	إختياري			**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**	الفرقة/ المستوي الأول		
العام الأكاديمي الفصل الدراسي	**2026/2025**		أكتوبر	**عدد الساعات المعتمدة**	2		
ساعات الإتصال:	**المحاضرة:**	2	**التمارين:**	-	**المعامل:**	-	**إجمالي** 2
المتطلب السابق:	لا يوجد						
المعايير الأكاديمية	NARS 2018						
تاريخ الموافقة على اللائحة	2016						
منسق المقرر	أ.م.د.وليد رضوان						
تاريخ اعتماد توصيف المقرر	2025-7-26						
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**						

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمى) :

يشمل المقرر: مصر تحت الحكم العثماني (1517 – 1798) (الفتح – الحكم والإدارة – الأوضاع الاقتصادية والاجتماعية) – الغزو الفرنسي لمصر وآثاره (1798 – 1801) (الاحتلال –الحكم والإدارة – المقاومة الوطنية – فشل المشروع الاستعماري – نتائج الاحتلال) – نظام محمد علي (1805 – 1848) (الصراع السياسي وتولية محمد علي – بناء الدولة الحديثة – السياسة الخارجية -) – الحركة الوطنية والثورة العرابية (خلفاء محمد علي – عصر إسماعيل – الحركة الوطنية والثورة العرابية) – مصر في عهد الاحتلال البريطاني (1882- 1914) (سياسة الاحتلال – انبعاث الحركة الوطنية) – مصر في عهد الحماية البريطانية والحرب العالمية الأولي – تأليف الوفد وقيام ثورة 1919 – تصريح 28 فبراير 1922 – دستور 1923 – تطور القضية الوطنية ومعاهدة 1936- مصر خلال الحرب العالمية الثانية) – أزمات مصر السياسية والاجتماعية والطريق إلي ثورة يوليو – الثورة وتغير النظام السياسي – الجلاء البريطاني 1954 – العدوان الثلاثي 1956.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
(A2- A3- A9)		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A 2	تطوير وإجراء التجارب المعملية المناسبة أوالمحاكاة، وتحليل وتفسير وتقييم النتائج، واستخدام التحليلات الإحصائية والحكم الهندسي الموضوعي لاستخلاص النتائج	LO 1	استقراء أهداف القوى الاستعمارية وأن الوطن مستهدف.
		LO 2	إدراك أن التاريخ هو المعلم الأول للحكمة ولا بد من دراسته.
		LO 3	معرفة إيجابيات وسلبيات التجارب التي مرت بها مصر.
A 3	تطوير وإجراء التجارب المعملية المناسبة أوالمحاكاة، وتحليل وتفسير وتقييم النتائج، واستخدام التحليلات الإحصائية والحكم الهندسي الموضوعي لاستخلاص النتائج.	LO 4	تعريف دور الشعب في الكفاح الوطني، والإشادة بالحركة الوطنية ودورها في التصدي للاستعمار وظلم الحكام.
		LO 5	التمييز بين الحكام الإيجابيين والسلبيين وتقييم دور كل منهم.
A 9	استخدام التفكير الإبداعي والمبتكر والمرن واكتساب مهارات ريادة الأعمال والقيادة وتوقع المواقف الجديدة والاستجابة لها.	LO 6	الاستفادة مما اكتسبه من مهارات في حياته العملية.
		LO 7	الموضوعية في الحكم علي الأحداث في ضوء الظروف التي أحاطت بها.
		LO 8	القدرة علي التحليل والاستنتاج.
		LO 9	القدرة علي التوقع وتوظيف مهاراته في الحياة العملية.
		LO10	توخي السلوك الطيب والاقتداء بالقدوة الحسنة.

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الأصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
√	√			√	√			√	√	√	√		√		√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة			نواتج التعلم التي يحققها المقرر
			تدريس نظري	تدريب		
				تمارين	عملي	
1	أهمية دراسة التاريخ وخطة الدراسة.	2	2	0	0	LO 1
2	الاحتلال العثماني ومساوئه.	2	2	0	0	LO 2
3	الغزو الفرنسي وتصدي الشعب له.	2	2	0	0	LO 3
4	دور محمد علي في بناء الدولة الحديثة.	2	2	0	0	LO4
5	خلفاء محمد علي وإبراز دور الخديو اسماعيل.	2	2	0	0	LO 4
6	احتلال بريطانيا لمصر وسياستها الاستعمارية	2	2	0	0	LO 5
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	دور الحركة الوطنية في التصدي للاحتلال. (1)	2	2	0	0	LO 6
9	دور الحركة الوطنية في التصدي للاحتلال. (2)	2	2	0	0	LO 6
10	المظاهرات والثورات المناهضة للاحتلال وخاصة ثورة 1919 ونتائجها.	2	2	0	0	LO 7
11	نذر الحرب العالمية الثانية ومعاهدة 1936 والعدوان الثلاثي.	2	2	0	0	LO 8
12	الأحداث التي مهدت لثورة 23 يوليو 1952.	2	2	0	0	LO 9
13	تحليل أهداف ثورة 23 يوليو 1952.	2	2	0	0	LO 10
14	مراجعة عامة	2	2	0	0	LO 1
16-15	اختبارات الفصل الدراسي النهائية					

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	%10
2	امتحان 2 تحريري (أعمال سنة)	9	10	%10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	امتحان نهائي عملي	لا يوجد	----	------
6	امتحان نهائي شفهي	11	10	%10
7	تكليفات / مشروع / ملف الإنجاز /كتيب الانشطة	8	10	%10
8	تدريب ميداني	لا يوجد	-----	------
9	أخرى (تذكر)	لا يوجد	------	-------

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر	خالد الشربيني ، مرفت ذكي: تاريخ مصر الحديث، مذكرة للمعهد التكنولوجي العالي بالعاشر من رمضان
	المراجع الأخرى	1- إسماعيل مرسي: تاريخ مصر الحديث من الحملة الفرنسية حتى خلع فاروق، دار الكتب المصرية، 2020 2- جاد طه: معالم تاريخ مصر الحديث والمعاصر، دار الفكر العربي، 1985. 3- محمد عبد الرحيم مصطفى: تاريخ مصر الحديث..المطبعة الأميرية.. 2019 4- محمد سهيل طقوش: تاريخ مصر الحديث والمعاصر، دار النفائس، 2019. 5- محمد صبري: تاريخ مصر الحديث من محمد علي إلى اليوم، دار الكتب المصرية، 2008
	المصادر الالكترونية (لابد من إضافة الروابط)	1- https://ar.wikipedia.org/wiki 2- http://www.du.edu.eg/ 3- https://www.youtube.com/
	المنصة التعليمية (لابد من إضافة الرابط)	https://www.ekb.eg/ar/home
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	(داتا شو) وجهاز كمبيوتر محمول.
	المستلزمات	قاعة محاضرات مجهزة
	البرامج الالكترونية	---------------------
	معامل المهارات/ المحاكيات	---------------
	المعامل الافتراضية	------------------
	أخرى (تذكر)	---------------------

	منسق المقرر	منسق البرنامج
الإسم	أ.م.د.وليد رضوان	أ.د.أحمد عبد الغفار
التوقيع	وليد رضوان	أحمد عبد الغفار

	المعهد التكنولوجي العالي – مدينة العاشر من رمضان
	قسم / العلوم الأساسية
توصيف مقرر	
كود المقرر: HUM 103	**إسم المقرر:** الحضارة العربية والإسلامية

القسم القائم بتدريس المقرر	قسم العلوم الأساسية

1- معلومات أساسية :

نوع المقرر	إختياري			**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**		الفرقة/ المستوي الأول	
العام الأكاديمي الفصل الدراسي	**2026/2025**		أكتوبر	**عدد الساعات المعتمدة**		2	
ساعات الإتصال:	**المحاضرة:**	2	**التمارين:**	-	**المعامل:**	-	**إجمالي** 2
المتطلب السابق:	لا يوجد						
المعايير الأكاديمية	NARS 2018						
تاريخ الموافقة على اللائحة	2016						
منسق المقرر	أ.م.د.وليد رضوان						
تاريخ اعتماد توصيف المقرر	2025-7-26						
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**						

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

يشمل المقرر: أسس الحضارة الإسلامية (القرآن والسنة - الأمة العربية - اللغة - الإطار الجغرافي - الشعوب المفتوحة - التأثيرات الأجنبية) - النظام السياسي (الخلافة - الوزارة - الكتابة - الحجابة) - النظام الإداري (الإدارات المحلية - دواوين الجند والخراج والرسائل والبريد.......إلخ) - النظام المالي (موارد بيت المال - النفقات - السكة) - النظم العسكرية (الجيش: تكوينه وأسلحته وأساليبه - الأسطول) - التعليم والثقافة (العلوم الشرعية "علم الكلام والفقه...." - العلوم العقلية) - الفنون والآثار والعمارة - القضاء والتقاضي - المجتمع الإسلامي (عناصره وأجناسه - الطوائف الدينية والمذهبية - البناء الطبقي: الحكام والفقهاء والعلماء والتجار وأصحاب الحرف والصناعات....إلخ.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
(A2- A3- A7)		عند الانتهاء من المقرر سيكون الطالب قادرا على أن	
الكود	**النص**	**الكود**	**النص**
A 2	**تطوير وإجراء التجارب المعملية المناسبة أوالمحاكاة، وتحليل وتفسير وتقييم النتائج، واستخدام التحليلات الإحصائية والحكم الهندسي الموضوعي لاستخلاص النتائج**	LO 1	يستنتج مدى التأثير والتأثر بالأحداث التى مرت بها الحضارة العربية والإسلامية و معرفة مصادر تلك الحقبة الهامة .
		LO 2	يربط بين التأثير و التأثر بأحداث الحضارة العربية والإسلامية و بين إنجازات و إخفاقات كل حقبة.
		LO 3	يربط بين التأثير و التأثر بأحداث الحضارة العربية والإسلامية و بين إنجازات و إخفاقات كل حقبة.
		LO 4	يستخدم المنهج التاريخى لتناول الأحداث الهامة فى الحضارة العربية والإسلامية و مصادر تلك الفترة.
A 3	**تطبيق عمليات التصميم الهندسي لإنتاج حلول فعالة من حيث التكلفة، تلبي الاحتياجات النوعية مع مراعاة الجوانب العالمية والثقافية والاجتماعية والاقتصادية والبيئية والأخلاقية وغيرها من الجوانب المتسقة مع النظام والظروف، وضمن مبادئ وسياق التصميم والتنمية المستدامين.**	LO 5	يشرح المعلومات والأحداث التى تتعلق بالحضارة العربية والإسلامية .
		LO 6	يتعرف على أهم المؤثرات التي ساهمت في تكوين الحضارة العربية والإسلامية .
		LO 7	يلخص مصادر ومكانة الحضارة العربية والإسلامية.
A 7	**العمل بكفاءة كفرد وعضو في فرق متعددة التخصصات ومتعددة الثقافات.**	LO 8	تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق .
		LO 9	يظهر مهارات إدارة الوقت بكفاءة في مجال أى مهنة ترتبط بالحضارة العربية والإسلامية .
		LO10	يستخدم تكنولوجيا المعلومات بما يخدم الممارسة المهنية في مجال الحضارة العربية والإسلامية .

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكتروني	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميدانى	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
√	√			√	√			√	√	√	√		√		√

الجدول الدراسي للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة			نواتج التعلم التي يحققها المقرر
			تدريس نظري	تدريب		
				تمارين	عملي	
1	تعريف بالمقرر الدراسى ومقدمة عامه	2	2	0	0	LO 1
2	أسس الحضارة الإسلامية : (القرآن والسنة – الأمة العربية - اللغة – الإطار الجغرافى - الشعوب المفتوحة – التأثيرات الأجنبية).	2	2	0	0	LO 2
3	النظام السياسى : (الخلافة - الوزارة - الكتابة – الحجابة).	2	2	0	0	LO 3
4	النظام الإدارى : (الإدارات المحلية – دواوين الجند والخراج والرسائل والبريد ...... إلخ).	2	2	0	0	LO4
5	النظام المالى : (موارد بيت المال – النفقات – السكة)	2	2	0	0	LO 4
6	النظم العسكرية : (الجيش والأسطول : تكوينه وأسلحته وأساليبه)	2	2	0	0	LO 5
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	التعليم و الثقافة : (العلوم الشرعية "علم الكلام والفقه" – العلوم العقلية)	2	2	0	0	LO 6
9	الفنون والآثار والعمارة.	2	2	0	0	LO 6
10	القضاء والتقاضى .	2	2	0	0	LO 7
11	المجتمع الإسلامى : (عناصره و أجناسه – الطوائف الدينية والمذهبية)	2	2	0	0	LO 8
12	المجتمع الإسلامى، البناء الطبقى : الحكام والفقهاء والعلماء)	2	2	0	0	LO 9
13	التجار و أصحاب الحرف والصناعات......إلخ	2	2	0	0	LO 10
14	مراجعة عامة	2	2	0	0	LO 1
16-15	اختبارات الفصل الدراسي النهائية					

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	%10
2	امتحان 2 تحريري (أعمال سنة)	9	10	%10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	امتحان نهائي عملي	لا يوجد	----	------
6	امتحان نهائي شفهي	11	10	%10

7	تكليفات / مشروع / ملف الإنجاز /كتيب الانشطة	8	10	%10
8	تدريب ميداني	لا يوجد	-----	------
9	أخرى (تذكر)	لا يوجد	------	-------

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر	خالد الشربيني ، مرفت ذكي: تاريخ مصر الحديث، مذكرة للمعهد التكنولوجي العالي بالعاشر من رمضان
	المراجع الأخرى	1- أحمد عبد الرازق، الحضارة الإسلامية فى العصور الوسطى، القاهرة، 2004 . 2- غيداء عادل: دراسات في الحضارة العربية الإسلامية، المؤسسة العربية للدراسات واننشر، 2020. 3- سعيد عبد الفتاح عاشور وآخران:دراسات في تاريخ الحضار الإسلامية، دار المعرفة الجامعية، 2018. 4- شوقي أبو خليل: الحضارة العربية الاسلامية وموجز عن الحضارات السابقة، دار الفكر المعاصر، 2010
	المصادر الالكترونية (لابد من إضافة الروابط)	1- https://ar.wikipedia.org/wiki 2- http://www.du.edu.eg/ 3- https://www.youtube.com/
	المنصة التعليمية (لابد من إضافة الرابط)	https://www.ekb.eg/ar/home
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	(داتا شو) وجهاز كمبيوتر محمول.
	المستلزمات	قاعة محاضرات مجهزة
	البرامج الالكترونية	---------------------
	معامل المهارات/ المحاكيات	---------------
	المعامل الافتراضية	------------------
	أخرى (تذكر)	---------------------

	منسق المقرر	منسق البرنامج
الإسم	أ.م.د.وليد رضوان	أ.د.أحمد عبد الغفار
التوقيع	وليد رضوان	أحمد عبد الغفار

المعهد التكنولوجي العالي – مدينة العاشر من رمضان	
قسم / العلوم الأساسية	
توصيف مقرر	
اسم المقرر: التذوق الأدبي	**كود المقرر: HUM 104**

القسم القائم بتدريس المقرر	**العلوم الأساسية**

1- معلومات أساسية :

نوع المقرر	إختياري			**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**	الفرقة الثانية/المستوي الثاني			
العام الأكاديمي الفصل الدراسي	**2026/2025**		أكتوبر	**عدد الساعات المعتمدة**	2			
ساعات الاتصال: 1	**المحاضرة:**	2	**التمارين:**	0	**المعامل:**	0	**إجمالي**	2
المتطلب السابق:	لا يوجد							
المعايير الأكاديمية	NARS 2018							
تاريخ الموافقة على اللائحة	2016							
منسق المقرر								
تاريخ اعتماد توصيف المقرر	26/7/2025							
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**							

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

مفهوم النص الإبداعي وأشكال التعبير الوجداني - الأنواع الأدبية الشعرية والنثرية والمسرحية والقصصية - نظريات التلقي وتعدد قراءات الدارس للنص علي مستويات الفهم والتذوق والتحليل - أسس التشكيل الجمالي للنص من خلال تحليل : الماهية، الأدوات، الوظائف - أهمية التاريخ للنص والتجربة الأدبية من حيث علاقتها بالمبدع والمرحلة والمجتمع والبيئة - أركان النص الأدبي ومقوماته والنظريات النقدية حول أسس تحليله وتفسيره وتقويمه ونقده - النقد النظري والتطبيقي والنقد التأثري الانطباعي والنقد الموضوعي للنص قديماً وحديثاً - تطبيق إحدي نظريات التلقي واستكشاف أعماق النص علي أساس الوعي بالتحليل الجماعي للمفردات والأصوات والتراكيب والجمل وفضاءات تجارب الشعراء - دراسة آليات التذوق الأدبي وأسس تكوينه من خلال تعدد القراءات للظواهر النقدية والإبداعية - الدرس التطبيقي علي نصوص منتقاه من الشعر العربي القديم والمعاصر بما يعكس صوراً من ظاهرة الإبداع وظاهرة التلقي ومابينهما من علاقات (يمكن دراسة ظاهرة فن المعارضات الشعرية).

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A7,A10		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A7	العمل بكفاءة كفرد وعضو في فرق متعددة التخصصات ومتعدد الثقافات وذات صله بالتذوق الأدبي	LO1	إدراك مفهوم النص الإبداعي و أشكال التعبير الوجداني
		LO2	معرفة الأنواع الأدبية الشعرية والنثرية والمسرحية والقصصيه
		LO3	الإلمام بأسس التشكيل الجمالي للنص من خلال تحليل النصوص النثرية
		LO4	دراسة آليات التذوق الأدبي و تطبيقها علي بعض النصوص الشعرية أو النثرية الحديثة.
		LO5	الدرس التطبيقي علي نصوص منتقاه من الشعر العربي القديم والمعاصر
A10	اكتساب المعارف الجديدة وتطبيقها، وممارسة استراتيجيات التعلم الذاتي وغيرها مدى الحياة.	LO6	تطبيق إحدي نظريات التلقي و إستكشاف أعماق النص علي أساس الوعي بالتحليل الجماعي للمفردات.
		LO7	تحليل أسس النصوص التأثيرية و التطبيقية من خلال تعدد القراءات للظواهر النقدية و الإبداعية.
		LO8	تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق.
		LO9	إكتساب مهارات إدارة الوقت بكفاءة.
		LO10	إستخدام تكنولوجيا المعلومات ومواقع الإنترنت لإكتساب مهارات التعليم الذاتي.

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√				√		√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة			نواتج التعلم التي يحققها المقرر
			تدريس نظري	تدريب		
				تمارين	عملي	
1	مقدمة عامة و معرفة مفهوم التذوق الأدبي	2	2	0	0	LO 1
2	مفهون النص الإبداعي و أشكال التعبير الوجداني	2	2	0	0	LO 1
3	الأنواع الأدبية الشعرية والنثرية و المسرحية و القصصية.	2	2	0	0	LO 1,2
4	نظريات التلقي و تعدد قراءات الدرس للنص علي مستويات الفهم والتذوق والتحليل .	2	2	0	0	LO 2
5	أسس التشكيل الجمالي للنص من خلال تحليل: الماهية–الأدوات–الوظائف – أهمية التاريخ للنص والتجربة الأدبية من حيث علاقتها بين المبدع والمرحلة والمجتمع و البيئة.	2	2	0	0	LO 5,6
6	أركان النص الأدبي و مقوماته و النظريات النقدية حول أسس تحليله وتفسيرة و تقويمه ونقده.	2	2	0	0	LO 4,8
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	النقد النظري و التطبيقي و النقد التأثيري الإنطباعي و النقد الموضوعي للنص قديما و حديثا.	2	2	0	0	LO 2,3
9	تطبيق إحدي نظريات التلقي و إستكشاف أعماق النص علي أساس الوعي بالتحليل الجماعي للمفردات و الأصوات والتراكيب و الجمل.	2	2	0	0	LO 2
10	دراسة آليات التذوق الأدبي و أسس تكوينه من خلال تعدد القراءات بالظةاهر النقدية و الإبداعية.	2	2	0	0	LO 2,6
11	الدرس التطبيقي علي نصوص منتقاه من الشعر العربي القديم والمعاصر.	2	2	0	0	LO 3,7,10
12	دراسة ظاهلرة فن المعارضات الشعرية	2	2	0	0	LO 4, 8
13	مراجعة عامة	2	2	0	0	LO 4, 8
14	إختبارات الفصل الدراسي النهائية					

-طرق تقييم الطلاب

النسبة المئوية من إجمالي درجة المقرر	درجات التقييم	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	طرق التقييم *	م
% 10	10	5	امتحان 1 تحريري (أعمال سنة)	1
% 10	10	12	امتحان 2 تحريري (أعمال سنة)	2
% 20	20	7	امتحان منتصف الفصل الدراسي	3
% 40	40	14	امتحان نهائي تحريري	4
% 20	20	طوال الفصل	تكليفات / تقارير	5

5- مصادر التعلم والتسهيلات المادية:

كتاب المقرر ويتم تسليمه للطلاب في بداية الفصل	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	مصادر التعلم (الكتب والمراجع العلمية وغيرها) *
عبد الله التطاوي، تقاطعات الحركة الشرعية بين الموروث والفردي ، الدار المصرية اللبنانية بالقاهرة، الطبعة الثانية.2020	المراجع الأخرى	
https://ar.wikipedia.org/wiki http://www.du.edu.eg/ https:// www.youtube.com/watch?=bnCua19 M E	المصادر الالكترونية (لابد من إضافة الروابط)	
EKB - Microsoft office	المنصة التعليمية (لابد من إضافة الرابط)	
	الأجهزة	التجهيزات التعليمية المساندة للتعليم والتعلم *
Data show, White board	المستلزمات	
Microsoft Teams	البرامج الالكترونية	
-------	معامل المهارات/ المحاكيات	
-------	المعامل الافتراضية	
-------	أخرى (تذكر)	

منسق البرنامج	منسق المقرر	
أ.د. أحمد عبدالغفار		الإسم
أحمد عبدالغفار		التوقيع

المعهد التكنولوجي العالي – مدينة العاشر من رمضان	
قسم / العلوم الأساسية	
توصيف مقرر	
اسم المقرر: التذوق الموسيقي	كود المقرر: HUM 105

القسم القائم بتدريس المقرر	العلوم الأساسية

1- معلومات أساسية :

نوع المقرر	إختياري				الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر		الفرقة الثانية/المستوي الثاني	
العام الأكاديمي الفصل الدراسي	2026/2025		أكتوبر		عدد الساعات المعتمدة		2	
ساعات الاتصال: 1	المحاضرة:	2	التمارين:	0	المعامل:	0	إجمالي	2
المتطلب السابق:	لا يوجد							
المعايير الأكاديمية	NARS 2018							
تاريخ الموافقة على اللائحة	2016							
منسق المقرر								
تاريخ اعتماد توصيف المقرر	26/7/2025							
جهة مناقشة واعتماد توصيف المقرر	(محضر الاعتماد من مجلس القسم)							

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمى) :

الاستماع لمجموعات الآلات الموسيقية الوركسترالية وهي مجموعة الآلات الوترية – مجموعة ألات النفخ الخشبي – مجموعة ألات النفخ النحاسي – الآلات الإيقاعية، والتعرف عليها من خلال الصور المرفقة مع الملزمة الخاصة بالمقرر الدراسي – الدراسة النظرية بطريقة مختصرة تشمل جوانب المعرفة الأساسية المطلوب دراستها للعصور الموسيقية المختلفة (عصر الباروك – العصر الكلاسيكي- العصر الرومانتيكي – نبذة عن موسيقي الجاز ونشأتها – نبذة عن الموسيقي العربية وألاتها المستخدمة) – الأهداف العامة للمقرر: بعد دراسة هذا المقرر يكون الطالب قادراً علي: التعرف بالاستماع علي الآلات الموسيقية المستخدمة في الاوركسترا – دراسة أنواع المعلومات الهامة عن موسيقي الجاز – دراسة الموسيقي العربية وألاتها – الإلمام الكامل بأنواع الموسيقي المختلفة – المهارات الذهنية: بعد دراسة هذا المقرر يكون الطالب قادراً علي: إدراك ومعرفة أنواع الآلات الموسيقية المختلفة – تمييز أنواع المؤلفات الموسيقية المختلفة (عالمية – عربية) – معرفة تكوين الاوركسترا الغربي والشرقي وفرق الجاز – المهالات العامة: بعد دراسة هذا المقرر يكون الطالب قادراً علي: التواصل بفاعلية من خلال المناقشة والحوار – توظيف المادة العلمية في خدمة الثقافة الموسيقية – الإلمام بثقافات علمية في غير مجال التخصص – الأساليب المستخدمة للتقويم: مناقشات وشرح المحاضرة – اختبارات شفوية وتحريرية – اختبار نهاية الفصل الدراسي)

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A3,A4, A5, A6,A10		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A3	تطبيق عمليات التصميم الهندسي إلنتاج حلول فعالة من حيث التكلفة تلبي االحتياجات النوعية مع مراعاة الجوانب العالمية والثقافية واالجتماعية واالقتصادية والبيئية واألخالقية وغيرها من الجوانب المتسقة مع النظام والظروف وضمن مبادئ وسياق التصميم والتنمية التطوير المستدامين.	LO1	معرفة مجموعة الآلات الوترية
		LO2	التعرف علي أصوات مجموعات الآت النفخ الخشبي ومجموعات الآت النفخ النحاسي والتعرف علي الآلات الموسيقية من خلال الصور
A4	الاستفادة من التقنيات المعاصرة، والممارسات والمعايير، وإرشادات الجودة، ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر.	LO3	معرفة تكوين الأوركسترا الغربي و الشرقي وفرق الجاز
		LO4	إدراك ومعرفة أنواع الآلات الموسيقيه المختلفة
		LO5	تمييز أنواع المؤلفات الموسيقية المختلفة(عالمية- عربية)
		LO6	التواصل بفاعلية من خلال المناقشة والحوار
		LO7	توظيف المادة العلمية في خدمة الثقافة الموسيقية
A5	ممارسة تقنيات البحث وأساليب التحقيق كجزء لايتجزأ من التعلم.	LO8	تعزيز العديد من السلوكيات و المهارات داخل وخارق نطاق العمل بحيث يعمل ضمن فريق
A6	التخطيط والإشراف والرقابة علي تنفيذ المشاريع الهندسية مع مراعاة متطلبات الحرف الأخري	LO9	الإلمام بثقافات علمية في غير مجال التخصص و إكتساب مهارات إدارة الوقت بكفاءة
A10	اكتساب المعارف الجديدة وتطبيقها، وممارسة استراتيجيات التعلم الذاتي وغيرها مدى الحياة.	LO10	إستخدام تكنولوجيا المعلومات ومواقع الإنترنت لإكتساب مهارات التعلم الذاتي

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√				√		√

الجدول الدراسي للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة: تدريس نظري	تدريب: تمارين	تدريب: عملي	نواتج التعلم التي يحققها المقرر
1	مقدمة عامة و معرفة مفهوم التذوق الموسيقي	2	2	0	0	LO 1
2	الموسيقي كإبداع إنساني	2	2	0	0	LO 2
3	أنواع الموسيقي الشرقية والعربية	2	2	0	0	LO 1,2
4	أنواع الآلات الوترية و تمايز نغماتها	2	2	0	0	LO 4
5	أنواع آلات النفخ الخشبي والنحاسي	2	2	0	0	LO 5,6
6	التعرف علي الآلات الموسيقية المختلفة من خلال الصور	2	2	0	0	LO 4,8
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	كيفية تكوين الأوركسترا الغربي و الشرقي	2	2	0	0	LO 2,3
9	موسيقي الجاز و نشأتها وآلاتها	2	2	0	0	LO 6
10	المقارنة بين أنواع المؤلفات الموسيقية المختلفة (عالمية و عربية)	2	2	0	0	LO 2,6
11	دراسة العصور الموسيقية المختلفة(غصر الباروك- العصر الكلاسيكي- العصر الرومانتيكي)	2	2	0	0	LO 3,7,10
12	توظيف المادة العلمية في خدمة الثقافة الموسيقية	2	2	0	0	LO 6, 8
13	مراجعة عامه	2	2	0	0	LO 4, 8
14	إختبارات الفصل الدراسي النهائية					

-طرق تقييم الطلاب

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	% 10
2	امتحان 2 تحريري (أعمال سنة)	12	10	% 10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	تكليفات / تقارير	طوال الفصل	20	% 20

5- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	كتاب المقرر ويتم تسليمه للطلاب في بداية الفصل
	المراجع الأخرى	عبد الحميد توفيق زكي:تاريخ المصريين: التذوق الموسيقي وتاريخ الموسيقي المصرية، الهيئة المصرية العامة للكتاب 2021.
	المصادر الالكترونية (لابد من إضافة الروابط)	https://ar.wikipedia.org/wiki http://www.du.edu.eg/ https:// www.youtube.com/watch?=bnCua19 M E
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	قاعة محاضرات مجهزة
	المستلزمات	**Data show, White board**
	البرامج الالكترونية	Microsoft Teams
	معامل المهارات/ المحاكيات	-------
	المعامل الافتراضية	-------
	أخرى (تذكر)	-------

	منسق المقرر	منسق البرنامج
الإسم		أ.د. أحمد عبدالغفار
التوقيع		

المعهد التكنولوجي العالي – مدينة العاشر من رمضان قسم / العلوم الأساسية	
توصيف مقرر	
اسم المقرر: التراث الأدبي المصري	**كود المقرر: HUM 106**

القسم القائم بتدريس المقرر	**العلوم الأساسية**

1- معلومات أساسية :

نوع المقرر		اختياري		**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**		الفرقة الثانية/المستوي الثاني		
العام الأكاديمي الفصل الدراسي		**2026/2025**	أكتوبر	**عدد الساعات المعتمدة**		2		
ساعات الاتصال: 1	**المحاضرة:**	**2**	**التمارين:**	**0**	**المعامل:**	**0**	**إجمالي**	2
المتطلب السابق:	لا يوجد							
المعايير الأكاديمية	NARS 2018							
تاريخ الموافقة على اللائحة	2016							
منسق المقرر								
تاريخ اعتماد توصيف المقرر	26/7/2025							
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**							

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

يهدف المقرر إلى تعريف الطالب بالتميز الإقليمي لمصر في العصور القديمة والوسطى والحديثة وأثر عبقرية المكان على الفكر والوعي المصري وتجلياته في التراث الأدبي شعراً ونثراً من خلال الدرس التاريخي والنصي للأدب المصري في مراحله المختلفة كما يحتوي المقررعلى التطورات الأدبية من منظور حضاري وإبداعي - المكتبة التراثية المصرية من منظور تاريخي متجدد - دراسة مفهوم وضعية العصور الوسطى في مصر والفرق بينها وبين العصور الوسطى في أوروبا - التراث الجغرافي المصري وأدب الرحلات في الكتابات المصرية - التأليف الموسوعي في مصر و الصياغة الأدبية في فن الموسوعات- الظواهر الأدبية الغالبة على الأدب المصري- مناهج دراسة التراث الأدبي المصري ودلالاته - مدارس التأليف والإبداع في تاريخ الفكر المصري- مجالات الإبداع في الشعر المصري(الطبيعة المصرية- أدب الحروب - الموضوعات الجديدة والبيئة المصرية) - مدارس الكتابة الفنية على المستوى الرسمي وغيرها - تتبع التطبيق على النص والتحليل من خلال أبرز شعراء وكتاب التراث المصري من أمثال إبن نبتة المصري وابن سناء الملك وصولا إلى أدوار الدكتور محمد كامل حسين والأستاذ أمين الخولي والدكتور جمال حمدان في تناول التراث الأدبي المصري بالتحرير والدراسة المنهجية حول عبقرية المكان.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنـامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A3,A4, A5, A6,A10		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A3	تطبيق عمليات التصميم الهندسي إلنتاج حلول فعالة من حيث التكلفة تلبي االحتياجات النوعية مع مراعاة الجوانب العالمية والثقافية واالجتماعية واالقتصادية والبيئية واألخالقية وغيرها من الجوانب المتسقة مع النظام والظروف وضمن مبادئ وسياق التصميم والتنمية التطوير المستدامين.	LO1	يتعرف على أهمية دراسة التراث الادبى المصرى..
		LO2	يتعرف على أهم المؤثرات التي ساهمت في تكوين التراث الحضارى.
A4	الاستفادة من التقنيات المعاصرة، والممارسات والمعايير، وإرشادات الجودة، ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر.	LO3	يلخص مصادرومكانة التراث الحضارى و تأثيره في مقومات بقاء وإستمرارالأمم وفقا لدورها الريادى والحضارى.
		LO4	يستنتج الدور الحيوى والرئيسى التراث الادبى المصرى..
		LO5	يربط بين التأثير والتأثر بين الحضارات القديمة و الحديثة.
		LO6	يقارن بين الحضارة العربية الاسلامية والحضارات الحديثة و يربط بين محتوات المنهج والأحداث التي يمر بها عالمنا العربى الإسلامى .
		LO7	يثمن قيمة العلم والمعرفة و يثمن دور العقول العربية الاسلامية التى أبدعت فى كافة الميادين.
A5	ممارسة تقنيات البحث وأساليب التحقيق كجزء لايتجزأ من التعلم.	LO8	يستخدم تكنولوجيا المعلومات بما يخدم الممارسة المهنية في مجال التراث الحضارى.
A6	التخطيط والإشراف والرقابة علي تنفيذ المشاريع الهندسية مع مراعاة متطلبات الحرف الأخري	LO9	يظهر مهارات إدارة الوقت بكفاءة في مجال أى مهنة ترتبط بالتراث الحضارى.
A10	اكتساب المعارف الجديدة وتطبيقها، وممارسة استراتيجيات التعلم الذاتي وغيرها مدى الحياة.	LO10	تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق يظهر مهارات التواصل مع الآخرين، و كذلك قدرات التعلم الذاتى .

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الإفتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميدانى	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√				√		√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة: تدريس نظري	تدريب: تمارين	تدريب: عملي	نواتج التعلم التي يحققها المقرر
1	تعريف بالمقرر الدراسى ومقدمة عامه	2	2	0	0	LO 1
2	زعم المتعصبين أن كل الإنجازات العلمية من إبداعات الحضارة الغربية.	2	2	0	0	LO 3
3	الأرقام من إبداعات العلماء العرب و المسلمين	2	2	0	0	LO 1,2
4	قيام الحضارات على العلم والدين	2	2	0	0	LO 5
5	الحضارة الفرعونية بين الإبداع و التشكيك.	2	2	0	0	LO 5,6
6	التراث الحضارى ذاكرة الامم .	2	2	0	0	LO 4,8
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	العلم تراث حضارى مشترك .	2	2	0	0	LO 2,3
9	لماذا شيد قدماء المصريين أكبر الاهرامات على هضبة صخرية صلبة	2	2	0	0	LO 7
10	الأندلس الباب الغربى الذى إنتقلت عبره علوم العرب والمسلمين الى اوروبا.	2	2	0	0	LO 2,6
11	أهمية دراسة التراث الحضارى	2	2	0	0	LO 3,7,10
12	أهمية دراسة المقررات الثقافية	2	2	0	0	LO 6, 8
13	مراجعة عامه	2	2	0	0	LO 4, 8
14	إختبارات الفصل الدراسي النهائية					

-طرق تقييم الطلاب

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	% 10
2	امتحان 2 تحريري (أعمال سنة)	12	10	% 10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	تكليفات / تقارير	طوال الفصل	20	% 20

5- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	كتاب المقرر ويتم تسليمه للطلاب في بداية الفصل
	المراجع الأخرى	1- عوض مرسي الغباري، دراسات في الأدب المصري، الدار الدولية للاستثمارات الثقافية، القاهرة الطبعة الأولى، 2017 2- أحمد عبد الرازق، الحضارة الإسلامية فى العصور الوسطى، القاهرة، 2020 . 3- عبد الرحمن بدوى:دور العرب فى تكوين الفكر الاوربى.الهيئة المصرية العامة للكتاب 2021
	المصادر الالكترونية (لابد من إضافة الروابط)	https://ar.wikipedia.org/wiki http://www.du.edu.eg/ https:// www.youtube.com/watch?=bnCua19 M E
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	قاعة محاضرات مجهزة
	المستلزمات	**Data show, White board**
	البرامج الالكترونية	Microsoft Teams
	معامل المهارات/ المحاكيات	-------
	المعامل الافتراضية	-------
	أخرى (تذكر)	-------

	منسق المقرر	منسق البرنامج
الإسم		أ.د. أحمد عبدالغفار
التوقيع		أحمد عبدالغفار

المعهد التكنولوجي العالي – مدينة العاشر من رمضان قسم / العلوم الأساسية	

توصيف مقرر

اسم المقرر: الإتجاهات الفنية المعاصرة	**كود المقرر: HUM 107**

القسم القائم بتدريس المقرر	**العلوم الأساسية**

1- معلومات أساسية :

نوع المقرر	إختياري				**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**		الفرقة الثانية/المستوي الثاني	
العام الأكاديمي الفصل الدراسي	**2026/2025**		أكتوبر		**عدد الساعات المعتمدة**		2	
ساعات الاتصال: 1	**المحاضرة:**	**2**	**التمارين:**	**0**	**المعامل:**	**0**	**إجمالي**	2
المتطلب السابق:	لا يوجد							

المعايير الأكاديمية	NARS 2018
تاريخ الموافقة على اللائحة	2016
منسق المقرر	
تاريخ اعتماد توصيف المقرر	26/7/2025
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

يهدف المقرر إلى: إكساب الطالب القدرة على التذوق الفني - إكساب الطالب مهارة قراءة الأعمال الفنية وذلك من خلال دراسة الفلسفات والاتجاهات المذاهب المعاصرة الحديثة وما بعد الحداثة.ويحتوي المقرر على الموضوعات التالية : التعريف بالفنون القديمة كمدخل للفلسفات الكلاسيكية - مدخل للفنون الكلاسيكية والأصول اليونانية - الكلاسيكية الجديدة(أهم المصورين و المثاليين) - الحداثة وحركة التأثيريين الفرنسيين (صالون الشباب) سيزان، مافية، مونييه – التكعيبية (باراك، بيكاسو) ، المستقبلية (بوتشيني) البعد الزمني- التجريديه (كاندنسكي- موندريان) - الاتجاه التعبيري(إدوارد مونخ ، فان جوخ) في ألمانيا الوحشية - التلقائية (بول كيلي- خوان ميرو) - الاتجاهات الحديثة والفن الحر- الاتجاهات الحديثة في الفنون المصرية (الحركة التشكيلية المصرية المعاصرة) - الفنانين المصريين المثاليين (محمود مختار- صبحي جرجس- السجيني – الوشاحى) – المصورين المصريين (محمود سعيد، يوسف كامل، راغب عياد، عبد العزيز درويش) فنانين مصريين عالميين (صلاح عبد الكريم، حامد ندى، ناجي شاكر) - ما بعد الحداثة وأهم اتجاهاتها.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A3,A4, A5, A6,A10		**عند الانتهاء من المقرر سيكون الطالب قادرا على**	
الكود	**النص**	**الكود**	**النص**
A3	**تطبيق عمليات التصميم الهندسي إلنتاج حلول فعالة من حيث التكلفة تلبي االحتياجات النوعية مع مراعاة الجوانب العالمية والثقافية واالجتماعية واالقتصادية والبيئية واألخالقية وغيرها من الجوانب المتسقة مع النظام والظروف وضمن مبادئ وسياق التصميم والتنمية التطوير المستدامين.**	**LO1**	**يتعرف على أهمية الفنون الحديثة المعاصرة خاصة (الابداع الرسومي)**
		LO2	**يتعرف على أهم المؤثرات التي ساهمت في إظهارالأعمال الفنية للرساميين العالميين .**
A4	**الاستفادة من التقنيات المعاصرة، والممارسات والمعايير، وإرشادات الجودة، ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر.**	**LO3**	**يلخص مصادرومكانة الأعمال الفنية للرساميين في أوربا القديمة والمعاصرة**
		LO4	**يستنتج الدور الحيوى والرئيسى للعمل الفني المعاصر**
		LO5	**يربط بين التأثير والتأثر بين الفنون الرسومية القديمة و الحديثة.**
		LO6	**يقارن بين الاعمال الفنية المصرية المعاصرة و الفنية المصرية القديمة ، و يربط بين الفلسفيات القديمة والمعاصرة في الاعمال الفنية.**
		LO7	**يثمن قيمة العلم والمعرفة و يثمن دور العقول المصرية التى أبدعت فى كافة الميادين.**
A5	**ممارسة تقنيات البحث وأساليب التحقيق كجزء لايتجزأ من التعلم.**	**LO8**	**يستخدم تكنولوجيا المعلومات بما يخدم الممارسة المهنية في مجال الفنون.**
A6	**التخطيط والإشراف والرقابة علي تنفيذ المشاريع الهندسية مع مراعاة متطلبات الحرف الأخري**	**LO9**	**يظهر مهارات إدارة الوقت بكفاءة في مجال أى مهنة ترتبط بالفنون .**
A10	**اكتساب المعارف الجديدة وتطبيقها، وممارسة استراتيجيات التعلم الذاتي وغيرها مدى الحياة.**	**LO10**	**تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق يظهر مهارات التواصل مع الآخرين، و كذلك قدرات التعلم الذاتى .**

4- <u>طرق التعليم والتعلم للمقرر:</u>

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√				√		√

<u>الجدول الدراسي للمقرر:</u>

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة			نواتج التعلم التي يحققها المقرر
			تدريس نظري	تدريب		
				تمارين	عملي	
1	التعريف بالفنون القديمة كمدخل للفلسفات الكلاسيكية	2	2	0	0	LO 1
2	مدخل للفنون الكلاسيكية والأصول اليونانية	2	2	0	0	LO 3
3	الكلاسيكية الجديدة (أهم المصورين و المثاليين) الحداثة وحركة التأثيريين الفرنسيين (صالون الشباب) سيزان، مافية، مونييه	2	2	0	0	LO 1,2
4	التكعيبية (باراك، بيكاسو) ، المستقبلية (بوتشيني).	2	2	0	0	LO 5
5	البعد الزمني- التجريديه (كاندنسيكي- موندريان)	2	2	0	0	LO 5,6
6	الاتجاه التعبيري(إدوارد مونخ ، فان جوخ) في ألمانيا الوحشية	2	2	0	0	LO 4,8
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	الاتجاهات الحديثة والفن الحر	2	2	0	0	LO 2,3
9	الاتجاهات الحديثة في الفنون المصرية (الحركة التشكيلية المصرية المعاصرة)	2	2	0	0	LO 7
10	الفنانين المصريين المثاليين (محمود مختار- صبحي جرجس- السجيني – الوشاحى)	2	2	0	0	LO 2,6
11	ألمصورين المصريين (محمود سعيد، يوسف كامل، راغب عياد، عبد العزيز درويش) فنانين مصريين عالميين (صلاح عبد الكريم، حامد ندى، ناجي شاكر)	2	2	0	0	LO 3,7,10
12	ما بعد الحداثة وأهم اتجاهاتها	2	2	0	0	LO 6, 8
13	مراجعة عامه	2	2	0	0	LO 4, 8
14	إختبارات الفصل الدراسي النهائية					

-طرق تقييم الطلاب

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	% 10
2	امتحان 2 تحريري (أعمال سنة)	12	10	% 10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	تكليفات / تقارير	طوال الفصل	20	% 20

5- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	كتاب المقرر ويتم تسليمه للطلاب في بداية الفصل
	المراجع الأخرى	محمود خالد بشايرة ، التربية الفنية وتنمية التفكير-اتجاهات حديثة في التدريس، عالم الكتب الحديث 25أبريل 2019
	المصادر الالكترونية (لابد من إضافة الروابط)	https://ar.wikipedia.org/wiki http://www.du.edu.eg/ https:// www.youtube.com/watch?=bnCua19 M E
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	قاعة محاضرات مجهزة
	المستلزمات	**Data show, White board**
	البرامج الالكترونية	Microsoft Teams
	معامل المهارات/ المحاكيات	-------
	المعامل الافتراضية	-------
	أخرى (تذكر)	-------

	منسق المقرر	منسق البرنامج
الإسم		أ.د. أحمد عبدالغفار
التوقيع		أحمد عبدالغفار

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	

Course Specification

Course name: French Language	**Course Code: LNG 101**

Department participating in delivery of the course	**Basic Sciences**

1. *Basic information:*

Course Type	**Elective**				**Academic level at which the course is taught**		**SENIOR 2**	
Term/ Academic year	**Oct.**		2025/2026		**Credit Hours:**		2	
Contact Hours	**Lecture:**	**2**	**Tutorial:**	0	**Lab.:**	0	**Total**	2
Pre-Requisite	---							

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	
Course Specification Approval Date	**7/26/2025**
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

An elementary French course. Drill in pronunciation, elementary principles of inflection and basic sentence patterns. Reading of easy texts. Review of grammatical patterns. Expansion of conversational and written skills and vocabulary.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
(A8,A10)		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	LO1	**Have a mix of skills in French Language.**
		LO2	**Study different grammatical Rules.**
		LO3	**Enhance students' abilities in expressing themselves.**
		LO4	**Apply the principle of grammatical rules in their usage of French.**
		LO5	**Apply the four skills of language freely.**
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies..	LO6	**Express themselves in French with confidence.**
		LO7	**Upgrade the capability of usage of the French language in various topics.**
		LO8	**Gain knowledge of general vocabulary that would help the students in various topics.**
		LO9	**Enhance the degree of awareness to participate professionally in their life.**
		LO10	**Work effectively in team of multi-disciplinary or multi-culture.**

4. *<u>Course Teaching and Learning Methods:</u>*

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	**Lecon 1: La Meteo.**	2	2	0	0	**LO3**
2	**Lecon 2: Hier et avant heir.**	2	2	0	0	**LO2**
3	**Lecon 3: Lettre d'une illettree**	2	2	0	0	**LO1**
4	**Lecon 4: Le recit de vie**	2	2	0	0	**LO4**
5	**Lecon 5: Comment ecrivez-vous?**	2	2	0	0	**LO2&LO7**
6	**Lecon 6: Dis-moi la verite!**	2	2	0	0	**LO2&LO5**
7	**Revision and Mid Exam**					
8	**Lecon 7: Quelle bonne odeur!**	2	2	0	0	**LO3 , LO4&LO5**
9	**Lecon 8: Va plus vite.**	2	2	0	0	**LO6**
10	**Supplementary Material and Quiz**	2	2	0	0	**LO5&LO6**
11	**Presentations**	2	2	0	0	**LO5**
12	**Supplementary materials and Quiz**	2	2	0	0	**LO9**
13	**Revision and Quiz**	2	2	0	0	**LO4**
14	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**4**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
5	Assignments (Report &Sheet)	**10,12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Available Presentation (handed to students' part by part).**
	Other References	**1-En Francais "; HTI; copie papier disponible.2021.** **2-Presentation disponible (remis aux etudiants partie par partie).2022** **3-Grammaire Francais en usage.2022** **4-Vocabulaire Francais utilise.2022**
	Electronic Sources (Links must be added)	• https://www.ecpi.edu/blog/what-is-business-administration-all-about
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Skill Labs/ Simulators	
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	Program Coordinator
Name		Prof. Ahmed Abd El-Gafar
Signature		[illegible]

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	
Course Specification	
Course name : German Language	**Course Code: LNG 102**

Department participating in delivery of the course	Basic Sciences

1. *Basic information:*

Course Type	Elective				Academic level at which the course is taught		SENIOR 1	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		2	
Contact Hours	Lecture:	2	Tutorial:	0	Lab.:	0	Total	2
Pre-Requisite								

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	Dr. Hoda Arafa
Course Specification Approval Date	7/26/2025
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

Beginner's course. Development of speaking ability and mastering of German basic structures. Reading and understanding of simple texts. Systematic discussion of grammatical difficulties. Oral practice and reading of more difficult texts. Practice in guided composition.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A8, A9, A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A8	Enhance and Develop the students' abilities and awareness for appropriate analysis and interpretation to all the scientific topics written in German words.	**LO1**	Have a mix of skills in German Language.
		LO2	Mastering basic German sentence structure, verb conjugations, articles, and essential vocabulary for every day communcation.
		LO3	Enhance students' abilities in expressing themselves
		LO4	Comprehending longer conversations and texts on familiar topics.
A9	Communicate effectively, verbally and in writing with a range of audiences.	**LO5**	Apply the four skills of language freely.
		LO6	Develop communicative competence, encompassing listening, speaking , reading and writing skills.
A10	Acquire and apply new knowledge and practice through German language.	**LO7**	Writing clear, coherent and well-structured essays, reports, and academic papers.

-

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√		√				√	√			√				√	

Course Schedule:

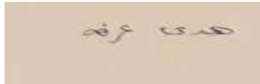
Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			*LOs covered by course*
			Theoretical teaching *(lectures)*	**Training**		
				Tutorial	**Lab / Practical**	
1	**Abschnitt 1:Der Artikel, die Konjugation der Verben.**	2	2	0	---	**LO 1**
2	**Abschnitt 1: Übungen, die Personal-pronomen, Negation, Alltagssituationen**	2	2	0	---	**LO 3**
3	**Abschnitt 2: Der Unterricht, das Nomen, der Akkusativ, das Verb "haben"**	2	2	0	---	**LO 4**
4	**Abschnitt 2: Übungen, die Fragepronomen "Wer, Wen, Was", Altagssituationen**	2	2	0	---	**LO 1**
5	**Quiz**	2	2	0	---	**LO 2, LO 7**
6	**Abschnitt 3: Die Zahlen, die Zeit**	2	2	0	---	**LO 2, LO 5**
7	**Midterm Exam.**					
8	**Abschnitt 4 : Eine Reise, starke Verben, trennbare und untrennbare Verben**	2	2	0	---	**LO 3, LO 4, LO 5**
9	**Abschnitt 4 : Übungen, Wortstellung, Präpositionen, Alltagssituationen**	2	2	0	---	**LO5**
10	**Abschnitt 5 : Ein Freund kommt, der Dativ ,Verben mit dem Dativ und dem Akkusativ**	2	2	0	---	**LO 5, LO 6**
11	**Abschnitt 5 : Übungen, die Possessivpronomen**	2	2	0	---	**LO 6**
12	**Zusätzliche Material und Quiz**	2	2	0	---	**LO 5**
13	**Projekt**	2	2	0	---	**LO 7**
14	**Wiederholung und Quiz**	2	2	0	---	**LO 6, LO7**
15	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**3**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**9**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
7	Assignments (Report &Sheet)	**12**	**20**	**20%**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Heinz Griesbach-Dora Schulz Deutsche Sprachlehre für Ausländer, 1995
	Other References	1- Friederike Jin & Ute Voβ Grammatik aktiv- Deutsch als Fremdspracshe 2. Aktualisierte Ausgabe, Aug. 2024 2- PONS Verben & Zeiten Trainieren Deutsch als Fremdsprache, Jan. 2020 3- Stephan Lübke Deutsche Grammatik in kleinen Schritten, Jun 2020 4- Julia Brodt Ein Semester in Hamburg: Roman – Deutsch leren mit Geschichten über das Leben in Deutschland, Dec. 2024
	Electronic Sources (Links must be added)	Deutsche Welle (DW)
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Skill Labs/ Simulators	**Lab Rroom**
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	Program Coordinator
Name	Dr. Hoda Arafa.	**Prof. Ahmed Abdel Ghafar**
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Principle of Fluid Mechanics			
Course Code (according to the bylaw):	MEC 127			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	JUNIOR			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr.Gamal Nada			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Covers fundamentals of fluid mechanics including basic physical laws governing the static and dynamics of fluids. It includes theory and applications of continuity, impulse-momentum, and Bernoulli equation principles. Fluid flow in piping systems, pneumatic, hydraulic and fluid measurements are covered. Introduction and types of fluid meters, velocity measurements, flow rate measurements.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	LO1	Relate fluid properties to the governing equations of fluid mechanics.
		LO2	Identify the laws of fluid statics and dynamics applicable to solving fluid mechanics problems.
A2	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	LO3	Apply appropriate correlations to calculate flow conditions such as pressure, velocity, and flow rate.
B1	Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.	LO4	Select appropriate devices for measuring specific flow conditions.
		LO5	Design piping flow systems using appropriate engineering methods.
D1	Integrate a wide range of analytical tools , techniques , equipment , and software package to design and develop mechatronics systems	LO6	Analyze applications involving flow measurements or calculations using analytical methods.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	-Introduction to fluid mechanics, units and dimensions. -Fluid properties.	4	1	2	1	-
2	-Fluid properties, continued - Problems	4	1	2	1	-
3	-Fluid statics: Pressure at a point, pressure variation in a static fluid (Pascal's law) and hydrostatic law of pressure - Pressure measurements, manometers and pressure gages	4	1	2	1	-
4	- Problems - Forces on plane surface areas	4	1	2	1	-
5	- Problems - Forces on curved surfaces	4	1	2	1	-

6	- Problems - Buoyant force and stability of floating bodies	4	1	2	1	-
7	**Revision and Mid Exam**					
8	-Fluid dynamics; Types of flow -Kinematics of flow, streamlines and streamtube	4	1	2	1	-
9	-Flow velocities, accelerations and continuity equation -Problems	4	1	2	1	-
10	-Equation of motion along a streamline -Different forms of Bernoulli equation and its modification for real flow	4	1	2	1	-
11	- Problems -Application of Bernoulli equation in measurements of flow rate: orifice and Venturi meters	4	1	2	1	-
12	- Flow through pipes, friction and local losses for both laminar and turbulent flow - Problems	4	1	2	1	-
13	-Pipe connections (pipe networks) -Problems	4	1	2	1	-
14	Revision	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics:

Serial	Experiment
1	Pressure measurement and calibration
2	Hydrostatic pressure force
3	Reynolds number
4	Verification of Bernoulli equation
5	Orifice near the bottom of the tank

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10 %**
2	Exam 2 written (Semester work)	**10**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook		**20**	**20 %**

6- Learning Resources and Supportive Facilities *

<table>
<tr><td rowspan="4">Learning resources (books, scientific references, etc.) *</td><td>The main (essential) reference
(must be written in full according to the scientific documentation method)</td><td>Robert W. Fox, Alan T. McDonald and John W. “Introduction to Fluid Mechanics”, 10th Edition, Mitchell, 2020.
Yunus A. Çengel and John M. Cimbala “Fluid Mechanics Fundamentals and Applications” 4th Edition, Mcgraw-Hill, New York, 2018</td></tr>
<tr><td>Other References</td><td>Yunus A. Çengel, John M. Cimbala and Afshin J. Ghajar, “Fundamentals of Thermal-Fluid Sciences” Sixth Edition, Mcgraw-Hill, New York, 2021.
Course Notes: Avilable as softcopy on Microsoft teams</td></tr>
<tr><td>Electronic Sources
(Links must be added)</td><td></td></tr>
<tr><td>Learning Platforms
(Links must be added)</td><td>EKB - Microsoft office</td></tr>
<tr><td rowspan="6">Supportive facilities & equipment for teaching and learning *</td><td>Devices/Instruments</td><td>Data- show and laptop</td></tr>
<tr><td>Supplies</td><td>White board</td></tr>
<tr><td>Electronic Programs</td><td>Microsoft teams</td></tr>
<tr><td>Skill Labs/ Simulators</td><td></td></tr>
<tr><td>Virtual Labs</td><td></td></tr>
<tr><td>Other (to be mentioned)</td><td>Library</td></tr>
</table>

	Course Coordinator	Program Coordinator
Name	**Dr.Gamal Nada**	**Dr. Ahmed Abdalbadia**
Signature	Dr. Gamal Nada	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Engineering Economics**			
Course Code (according to the bylaw):	**MNG 102**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**	**--**	**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Muhammad Tayssir**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Introduction to Economy: Basic Concepts, Varieties of Market Structure, The Law of Supply and Demand, Elasticity, Different Types of Economy, Accounting Income and Cash Flow, The Objectives of the Firms, Balance Sheet (BS). Introduction To Engineering Economy: Engineering Decision Making, Break - Even Analysis, Production Function, Payback Period Method, Payback Period Method. Time Value of Money: Simple Interest Rate, Compound Interest, Discreet cash flow and Economic Equivalence, Evaluating of the Projects (Present Worth, Annual worth, and Capitalized Cost), Nominal and Effective Interest Rate. Rate - Of Return ROR Computations: Rate of Return calculations using A Present worth PW, Rate of Return Calculation by Using Annual worth EAW, Rate of Return Evaluation for Multiple Alternatives. Depreciation Models: Nature of Depreciation,

Depreciation Conventional Methods, Methods Based on Asset Usage, Switching Between Depreciation Models.

3. *Course Learning Outcomes CLOs:*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Identify concepts of cost and revenue in engineering economic decisions.
		LO2	Explain the concept and purpose of breakeven analysis in evaluating economic viability.
		LO3	Classify cost elements as fixed or variable and justify the classification within project scenarios.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO4**	Apply breakeven analysis techniques to assess company profitability in realistic business cases.
		LO5	Analyze project data to evaluate profitability and identify potential financial risks.
		LO6	Apply nominal and effective interest rate formulas to solve engineering economic problems in case studies.
		LO7	Design a proposed project by identifying its cost elements and assessing its economic feasibility.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√								√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	/ Practical Lab
1	**Introduction**	3	2	1	
2	**Description and Role in Decision Making**	3	2	1	
3	**Simple Interest**	3	2	1	
4	**Cost Concepts and Behavior**	3	2	1	
5	**Cost Concepts and Behavior**	3	2	1	
6	**Life-Cycle Product Costing and Pricing**	3	2	1	
7	**Revision and Mid Exam**				
8	**Introduction to Use Spreadsheet**	3	2	1	
9	**Factors: How Time and Interest Affect Money**	3	2	1	
10	**PW, FW, EUAS / EUAC**	3	2	1	
11	**Net present value, rate of interest**	3	2	1	
12	**Payback period, benefit.**	3	2	1	

13	**Choosing among alternatives**	3	2	1	
14	**Introduction to Use Spreadsheet**	3	2	1	
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**4**	**10**	**10 %**
2	Exam 2 written (Semester work or quiz)	**6**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Assignments / Project /Portfolio/ Logbook	**10,12**	**20**	**20 %**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Engineering economy, le and blank, P.E Anthony, seventh edition,2018 build by Mc Grain
	Other References	• Engineering economy analysis, 9th edition, Donald G newman and Ted G., 2004 published by oxford university, press, Inc. • Jose A. Sepulveda, William E. Souder & Byron S. Gottfried, "Engineering Economics" ,Mc-Graw-Hill Book Company, NW,1984. • H. G. Thuesen, W. J. Fabrycky & G. J. Thuesen, "Engineering Economy", Prentice-Hall,Inc., NJ, 1971. • E. Paul DeGarmo, William G. Sullivan & James A. Bontadelli, "Engineering Economy", Macmillan publishing company,Nw,1990.
	Electronic Sources (Links must be added)	N/A
	Learning Platforms (Links must be added)	EKB - Microsoft office
	Devices/Instruments	Data Show

Supportive facilities & equipment for teaching and learning *	**Supplies**	N/A
	Electronic Programs	MS-Teams
	Skill Labs/ Simulators	N/A
	Virtual Labs	N/A
	Other (to be mentioned)	N/A

	Course Coordinator	Program Coordinator
Name	**Dr. Muhammad Tayssir**	**Dr. Mohamed Ashraf**
Signature	محمد تيسير	

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Electronics Lab			
Course Code (according to the bylaw):	MTE 152			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		3
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Assoc. Prof. Dr. Mona A. Younis			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. *Course Overview (Brief summary of scientific content):*

Safety Instructions - Junction Diode (Zener – voltage regulator –etc..) – Transistors – Using com3lab or any other equipment for studying and analysis of different electronics circuits.

3. ***Course Learning Outcomes CLOs :***

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A5&A6&A7&A8, D3&D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1.**	**Identify the semiconductor material, currents , types (n-type, p-type) and pn junction properties by research techniques.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2.**	**Plan for desiging electronic cirucits to studying the operation of BJT, JFET, diodes**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO3.**	**Collaborate effectively in diverse teams to complete Conducting different experiments using electronic electronic components.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4.**	**Apply measurement operations using probes in the kit to measure current and volt and documentation.**

D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO5.**	**Simulate electronics circuits using multi sim software.**
D4	**Estimate and measure the performance of an electrical/ electronic/ digital/ mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO6.**	**Conduct measuring instrument embedded in the kit to measuring the output voltage and current and display waveform. To be able to writing a report to describing the experiment steps and outcome**

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
	√	√	√			√	√					√	√		

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**		**others**
			Theoretical	**Training**	

			teaching *(lectures)*	Tutorial	/ Practical Lab	
1	Familiarizes with the ELVIS kit	**3**	0	0	**3**	-
2	Diode characteristics analysis	**3**	0	0	**3**	-
3	Diode application (half / full wave rectifier)	**3**	0	0	**3**	-
4	Limiting and clamping circuits	**3**	0	0	**3**	-
5	Zener diode characteristics analysis	**3**	0	0	**3**	-
6	Zener diode application (voltage regulation, load regulation)	**3**	0	0	**3**	-
7	**Revision and Mid Exam**					
8	BJT characteristics analysis	**3**	0	0	**3**	-
9	BJT as switch	**3**	0	0	**3**	-
10	BJT as amplifer	**3**	0	0	**3**	-
11	JFET characteristics and application	**3**	0	0	**3**	-
12	MOSFT characteristics and application	**3**	0	0	**3**	-
13	Revision for part 1.	**3**	0	0	**3**	-
14	Revision for part 2	**3**	0	0	**3**	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1st	Diode characteristics analysis
2nd	Diode application (half / full wave rectifier)
3rd	Limiting and clamping circuits
4th	Zener diode characteristics analysis
5th	Zener diode application (voltage regulation, load regulation)
6th	BJT characteristics analysis
7th	BJT as switch , BJT as amplifer
8th	JFET characteristics and application
9th	MOSFT characteristics and application

5- methods of student passements

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**4**	**15**	**15%**
2	Exam 2 written (Semester work or quiz)	**11**	**15**	**15%**
3	Midterm exam	**As scheduled**	**30**	**30%**
4	Final Written Exam	**AS scheduled**	**30**	**30%**
5	Assignments / Project /Portfolio/ Logbook	**AS scheduled**	**10**	**10 %**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Sedra, A. S., & Smith, K. C. (2021). *Microelectronic Circuits* (8th Edition).**
	Other References	**Boylestad, R. L., & Nashelsky, L. (2020). *Electronic Devices and Circuit Theory* (12th Edition). Pearson.**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**COM3Lab (or equivalent electronics lab kit) DC Power Supply Oscilloscope Multimeters**
	Supplies	**Breadboards and electronic components (diodes, Zener diodes, transistors, resistors, capacitors)**

	Course Coordinator	Program Coordinator
Name	Assoc. Mona A. Younis	**Dr. Ahmed abd el badii**
Signature	MONA A. YOUNIS	أحمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	Automatic control and application			
Course Code (according to the bylaw)**:**	MTE 156			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4	1		5
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Sara G.Seadby			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Modeling of system (transfer function, block diagram, state space, signal flow graphs, differential equation), System analysis (Laplace transform, time response, stability system, root locus), System design (compensation techniques, PID controller), and applications.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A2,A10,D2,D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.**	**LO1**	**Identify continuous and discrete signals using basic mathematical functions.**
		LO2	**Distinguish different types and shapes of signals.**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions..**	**LO3**	**Apply suitable mathematical methods in analyzing and evaluating the stability of digital systems.**
A10	**Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.**	**LO4**	**Analyze applications of signals by searching for information to develop knowledge and skills that support life-long learning.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**LO5**	**Model digital systems by formulating their mathematical difference equations.** .
		LO6	**Determine the transfer function of a system and test it using standard input signals.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechanical/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO7**	**Analyze system performance under standard input signals.**

		LO8	**Evaluate system responses and convergence behavior due to standard inputs.**

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√	√	√	√	√	√	√	√			√	√	√		√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to automatic control systems and applications	**3**	**2**	**1**	-	-
2	Transfer function	**3**	**2**	**1**	-	-
3	Block diagram	**3**	**2**	**1**	-	-
4	State space	**3**	**2**	**1**	-	-
5	Signal flow graphs	**3**	**2**	**1**	-	-

6	Differential equation	**3**	**2**	**1**	**-**	**-**
7	**Revision and Mid Exam**					
8	Time domain analysis	**3**	**2**	**1**	**-**	**-**
9	Frequency domain analysis	**3**	**2**	**1**	**-**	**-**
10	Root locus	**3**	**2**	**1**	**-**	**-**
11	Compensation techniques	**3**	**2**	**1**	**-**	**-**
12	Compensation techniques	**3**	**2**	**1**	**-**	**-**
13	PID controller, and applications	**3**	**2**	**1**	**-**	**-**
14	Revision	**3**	**2**	**1**	**-**	**-**
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	RICHARD C . DORF, MODERN 2017 CONTROL SYSTEMS,
	Other References	
	Electronic Sources (Links must be added)	

	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Non**
	Supplies	**Non**
	Electronic Programs	**Non**
	Skill Labs/ Simulators	**Non**
	Virtual Labs	**Non**
	Other (to be mentioned)	**Non**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Sara G.Seadby**	**Dr. Ahmed Abdalbadia**
Signature	***Sara G.Seadby***	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw):	**Analysis & Research Skills**			
Course Code (according to the bylaw):	**HUM 109**			
Department/s that participated in the teaching:	BASIC SCIENCE			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Tutorial**	**Other (specify)**	**Total**
	1	2		3
Course Type:	Elective			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	ALL ENGINEERING PROGRAMS			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:				
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	7/26/2025			

2. Course Overview (Brief summary of scientific content):

To Introduce Analysis & Research Skills this include studying the framework for analyzing engineering problems considering technical, economic, environmental, and ethical issues. Phases of problem solving (Understanding the problem and formulating it, Solution plan, implementation plan, Evaluation, and Revision). Role of creativity in the analysis for different alternatives. SWOT (strengths, Weaknesses, Opportunities, and Threats) analysis for different alternatives. Cost – Benefit analysis and Risk analysis. Role

of cooperation and team – work in analyzing large engineering problems. Importance of finding the relevant data, information, and knowledge. Basics Web search methods and how to formulate search engine queries using logical connectives (e.g. AND, OR, NOT). Phrase, title, domain, URL, and link search. Evaluating search results, choosing the appropriate search engine. Importance of evaluating the credibility of the different web sites.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A6,A8, A9, A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**LO1**	**Solving problems related to SWOT analysis, decision making, team work decision.**
		LO2	**Working in a team group.**
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO3**	**Describe the main concepts of basics Web search methods.**
		LO4	**Explain the main principle of Role of creativity in the analysis for different alternatives.**
		LO5	**Elucidate the main principal SWOT analysis for different alternatives.**
		LO6	**Clarify the main principal Cost – Benefit analysis and Risk analysis.**
A9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations	**LO7**	**Evaluating search results, choosing the appropriate search engine.**
		LO8	**Assess issues of Phases of problem solving (Understanding the problem and formulating it, Solution plan, Implementation plan, Evaluation, and Revision).**
A10	Acquire and apply new knowledge and practice self, lifelong and other learning strategies.	**LO9**	**Design the problems of role of cooperation and team – work in analyzing large engineering problems.**

		LO10	**Perform and explain the gained knowledge orally.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Practical Lab /
1	**Basics Web search methods Phrase, title, domain, URL, and link search.**	3	1	2	0
2	**How to formulate search engine queries using logical connectives (e.g. AND, OR, NOT).**	3	1	2	0
3	**Evaluating search results, choosing the appropriate search engine.**	3	1	2	0
4	**Importance of evaluating the credibility of the different web sites.**	3	1	2	0
5	**Framework for analyzing engineering problems considering technical, economic, environmental, and**	3	1	2	0

	ethical issues.				
6	**Phases of problem solving (Understanding the problem and formulating it, Solution plan, Implementation plan, Evaluation, and Revision).**	3	1	2	0
7	**Revision and Mid Exam**				
8	**Role of creativity in the analysis for different alternatives.**	3	1	2	0
9	**SWOT (strengths, Weaknesses, Opportunities, and Threats) analysis for different alternatives.**	3	1	2	0
10	**Cost – Benefit analysis and Risk analysis.**	3	1	2	0
11	**Role of cooperation and team – work in analyzing large engineering problems.**	3	1	2	0
12	**Importance of finding the relevant data, information, and knowledge**	3	1	2	0
13	**Revision**	3	1	2	0
14	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10**
2	Exam 2 written (Semester work)	**11**	**10**	**10**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	presentation skills	**9,10**	**10**	**10**
6	Assignments	**11**	**10**	**10**

6- Learning Resources and Supportive Facilities *

Learning resources (books,	**The main (essential) reference** (must be written in full according to the	**HTI; Available Hard copy .** **Available Presentation (handed to students' part by part)**

scientific references, etc.) *	scientific documentation method)	
	Other References	**1-G.R.Notess, Tesching Web Search Skills, information Today Inc., 2021.** **2-D.Newnan, T.Eshenbach, and J.Lavelle, Engineering Economic Analysis, Oxford University Press, fourteenth edition, 2019.** **3-Search skills for researchers "workshop", Engineering economic analysis by Donald G. Newnan .et., al, 2018.** **4-G.R.Notess, Tesching Web Search Skills, information Today Inc., 2021.** **5-D.Newnan, T.Eshenbach, and J.Lavelle, Engineering Economic Analysis, Oxford University Press, fourteenth edition, 2019.** **6-Murray, R. 2018: How to survive your viva. Maidenhead:Open University Press.** **7-Rugg, G. & Petre, M. 2021: The unwritten rules of PhD research. Maidenhead:Open University Press.** **8-Tinkler, P. & Jackson, C. 2021: The doctoral examination process: a handbook for students, examiners and supervisors. The Society for Research into Higher Education. Maidenhead:Open University Press.**
	Electronic Sources (Links must be added)	**http://www.scribd.com/anh_ch%C3%A2u_6/d/62390771-Change-Management- Best-Practice-Guide**>
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show**
	Supplies	**data show equipped lecture room**
	Electronic Programs	**Microsoft power point**

	Course Coordinator	Program Coordinator

Name		**PROF. Ahmed Abd El-Gafar**
Signature		أ احمد عبدالغفار

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Theory of machines (A)			
Course Code (according to the bylaw)**:**	ENG 172			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Mostafa Abd El-Galil Mohamed			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Kinematics of constrained rigid body. Planar &spatial transformation matrix. Transformation matrix between rigid bodies. Application of transformation matrices in linkages- Cams –Gears – Dynamics of linkages – Design of flywheel –Balancing of rigid rotors.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A3,A10,B1,B3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.**	**LO1**	**Identify the concepts of different mechanisms.**
		LO2	**Solve problems of kinematics in different mechanisms.**
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.**	**LO3**	**Apply suitable methods for calculating velocity and acceleration in mechanisms.**
A10	**Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.**	**LO4**	**Explain the practical aspects of the theory of machines and their applications.**
B1	**Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.**	**LO5**	**Analyze for mechanical engineering problems related to different Mechanisms.**
B3		**LO6**	**Estimate the performance of mechatronic systems.**

	Select conventional mechanical equipment according to the required performance.	LO7	**Evaluate mechatronic systems for specific applications.**

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√				√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	General principles about mechanisms.	4	1	2	1	-
2	General principles about mechanisms.	4	1	2	1	-
3	Velocity of mechanisms using relative velocity method	4	1	2	1	-
4	Velocity of mechanisms using relative velocity method	4	1	2	1	-
5	Acceleration in mechanisms	4	1	2	1	-
6	Simple and compound gear trains	4	1	2	1	-

7	**Revision and Mid Exam**					
8	Epicyclic gear trains	4	1	2	1	-
9	Epicyclic gear trains	4	1	2	1	-
10	Cams	4	1	2	1	-
11	Cams	4	1	2	1	-
12	Cams	4	1	2	1	-
13	Balancing of rotating masses	4	1	2	1	-
14	Balancing of rotating masses	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	General principles about mechanisms.
2	Velocity of mechanisms using relative velocity method.
5	Acceleration in mechanisms.
6	Simple, compound and reverted gear trains.
7	Epicyclic gear train.
8	Cams.
9	Balancing of rotating masses.

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10 %**
2	Exam 2 written (Semester work)	**9**	**10**	**10 %**
3	Midterm exam	**8**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
6	Exam3 (Oral)	**--**	**10**	**10 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**10**	**10 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Theory of machines and mechanisms ,Uicker Jr, John J., Gordon R. Pennock, and Joseph E. Shigley. Cambridge University Press, 2023.
	Other References	The kinematics of machinery: outlines of a theory of machines.,Reuleaux, Franz. Courier Corporation, 2019.
	Electronic Sources (Links must be added)	Course notes are available to the students on the copy center of the Institute and Microsoft teams.
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data- show and laptop.
	Supplies	White board
	Electronic Programs	**------**
	Skill Labs/ Simulators	**------**
	Virtual Labs	**------**
	Other (to be mentioned)	**------**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Mostafa Abd El-Galil Mohamed**	**Dr. Ahmed Abdalbadia**
Signature		احمد عبدالبديع

المعهد التكنولوجي العالي – مدينة العاشر من رمضان	
قسم / العلوم الأساسية	
توصيف مقرر	
إسم المقرر: مقدمة في تاريخ الحضارات	**كود المقرر: HUM 101**

القسم القائم بتدريس المقرر	قسم العلوم الأساسية

1- معلومات أساسية :

نوع المقرر	إختياري			**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**		الفرقة/ المستوي الأول	
العام الأكاديمي الفصل الدراسي	**2026/2025**		أكتوبر	**عدد الساعات المعتمدة**		2	
ساعات الإتصال:	**المحاضرة:**	2	**التمارين:**	-	**المعامل:**	-	**إجمالي** 2
المتطلب السابق:	لا يوجد						
المعايير الأكاديمية	NARS 2018						
تاريخ الموافقة على اللائحة	2016						
منسق المقرر	أ.م.د.وليد رضوان						
تاريخ اعتماد توصيف المقرر	2025-7-26						
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**						

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

يتناول المقرر: مفهوم الحضارة (الثقافة والحضارة – التاريخ والحضارة) – أصول الحضارة الإنسانية في العصور القديمة (البدايات الحضارية الأولي – الثقافة والحضارة في الشرق القديم، وفي الغرب القديم "اليونان والرومان") – الحضارة والثقافة في العصور الوسطي (المسيحية – الإقطاع – العرب – العصور الإسلامية) – الحضارة في العصور الحديثة (النهضة – الإصلاح الديني – تقدم العلوم – الفلسفة والآداب والفنون).

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
(A2- A5- A7-A9)		**عند الانتهاء من المقرر سيكون الطالب قادرا على**	
الكود	**النص**	**الكود**	**النص**
A 2	**تطوير وإجراء التجارب المعملية المناسبة أوالمحاكاة، وتحليل وتفسير وتقييم النتائج، واستخدام التحليلات الإحصائية والحكم الهندسي الموضوعي لاستخلاص النتائج**	LO 1	يشرح المعلومات والأحداث التى تتعلق بمفهوم الحضارة وأصولها الإنسانية فى العصور المختلفة.
		LO 2	يتعرف على أهم المؤثرات التي ساهمت في الحضارة والثقافة فى العصور المتعاقبة .
		LO 3	يستنتج مدى التأثيروالتأثر بالأحداث التى مرت بها الحضارات ويبين الإنجازات والإخفاقات كل حقبة.
		LO 4	يقيس تطور وتأثير وتأثر الثقافة والحضارة فى العصور المختلفة .
		LO 5	يستخدم المنهج التاريخى لتناول الأحداث الحضارية الهامة فى كل عصر و مصادر تلك الفترة.
		LO 6	يستقرئ الربط بين تطور الأحداث و الملابسات الحضارية التى تتناول تلك العصور ومصادرها.
A 5	**ممارسة تقنيات البحث وأساليب التحقيق كجزء لا يتجزأ من التعلم.**	LO 7	يستخدم تكنولوجيا المعلومات بما يخدم الممارسة المهنية.
		LO 8	يظهر مهارات إدارة الوقت بكفاءة.
A 7	**العمل بكفاءة كفرد وعضو في فرق متعددة التخصصات ومتعدد الثقافات**	LO 9	تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق.
A 9	**إستخدام التفكير الإبداعي والمبتكر والمرن واكتساب مهارات ريادة الأعمال والقيادة لتوقع المواقف الجديدة والاستجابة لها.**	LO10	القدرة علي قيادة المهنين والعمل كفريق لانجاز المهام العملية.
		LO10	توخي السلوك الطيب والاقتداء بالقدوة الحسنة.

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية و التجارب	المحاضرات
√	√			√	√			√	√	√	√		√		√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة			نواتج التعلم التي يحققها المقرر
			تدريس نظري	تدريب		
				تمارين	عملي	
1	تعريف بالمقرر الدراسى ومقدمة عامه.	2	2	0	0	**LO 1**
2	مفهومي الحضارة والتاريخ والعلاقة بينهما.	2	2	0	0	**LO 2**
3	مفهوم الحضارة والتاريخ والعلاقة بينهما .	2	2	0	0	**LO 3**
4	أصول الحضارة الإنسانية فى العصور القديمة.	2	2	0	0	**LO4**
5	الحضارة الإنسانية حيث الثقافة والحضارة فى الشرق القديم.	2	2	0	0	**LO 4**
6	أصول الحضارة الإنسانية فى العصور القديمة،من حيث الثقافة و الحضارة فى الغرب القديم ، لا سيما عند اليونان والرومان .	2	2	0	0	**LO 5**
7	**مراجعة وامتحان منتصف الفصل الدراسي**					
8	دور الحركة الوطنية في التصدي للاحتلال. (1)	2	2	0	0	**LO 6**
9	دور الحركة الوطنية في التصدي للاحتلال. (2)	2	2	0	0	**LO 6**
10	المظاهرات والثورات المناهضة للاحتلال وخاصة ثورة 1919 ونتائجها.	2	2	0	0	**LO 7**
11	نذر الحرب العالمية الثانية ومعاهدة 1936 والعدوان الثلاثي.	2	2	0	0	**LO 8**
12	الأحداث التي مهدت لثورة 23 يوليو 1952.	2	2	0	0	**LO 9**

LO 10	0	0	2	2	تحليل أهداف ثورة 23 يوليو 1952.	13
LO 1	0	0	2	2	مراجعة عامة	14
اختبارات الفصل الدراسي النهائية						16-15

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	%10
2	امتحان 2 تحريري (أعمال سنة)	9	10	%10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	امتحان نهائي عملي	لا يوجد	----	------
6	امتحان نهائي شفهي	11	10	%10
7	تكليفات / مشروع / ملف الإنجاز /كتيب الانشطة	8	10	%10
8	تدريب ميداني	لا يوجد	-----	------
9	أخرى (تذكر)	لا يوجد	------	-------

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7- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر	خالد الشربيني ، مرفت ذكي: مقدمة في تاريخ الحضارات، مذكرة للمعهد التكنولوجي العالي بالعاشر من رمضان، 2019
	المراجع الأخرى	1- أحمد عبد الرازق، الحضارة الإسلامية فى العصور الوسطى، القاهرة، 2004. 2- بدر نبيل ملحم: تاريخ الحضارات القديمة، دار الإعصار العلمي للنشر والتوزيع، 2015. 3- رالف لينتون ، شجرة الحضارة ، ترجمة أحمد فخرى ، (3 أجزاء) ،المركز القومى للترجمة 2010 4- رمسيس رياض، جورج صليب: الحضارات القديمة، مصر والشرق. وكالة الصحافة العربية، 2020
	المصادر الالكترونية (لابد من إضافة الروابط)	1- https://ar.wikipedia.org/wiki 2- http://www.du.edu.eg/ 3- https://www.youtube.com/
	المنصة التعليمية (لابد من إضافة الرابط)	https://www.ekb.eg/ar/home
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	(داتا شو) وجهاز كمبيوتر محمول.
	المستلزمات	قاعة محاضرات مجهزة
	البرامج الالكترونية	---------------------
	معامل المهارات/ المحاكيات	---------------
	المعامل الافتراضية	------------------
	أخرى (تذكر)	---------------------

	منسق المقرر	منسق البرنامج
الإسم	أ.م.د.وليد رضوان	أ.د.أحمد عبد الغفار
التوقيع	وليد رضوان	أحمد عبد الغفار

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Field Training 2			
Course Code (according to the bylaw)**:**	FTR 161			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		18		18
Course Type:	Compulsory			
The level to which the course was introduced:	JUNIOR			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Assoc. Prof. Dr. Mona A. Younis			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Students should spend their training where they describe the processes they joined for training. Students should demonstrate the professional and practical skills they acquired during discussion with examination committee.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A4, A7, A8, A10, D1, B4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1.**	**Write a technical report for the field training.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO2.**	**Develop new skills and obtaining knowledge to handle unfamiliar tasks more effectively in the future.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools..**	**LO3.**	**Integrate academic knowledge with practical experience gained during training.**
A9	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO4.**	**Recognize the value of work, time, and teamwork, and professional attitudes revealing.**
B4	**Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems**	**LO5.**	**Identify the tools required for different mechatronics components examination.**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	**LO5.**	**Apply national and international standards and codes in engineering practice.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√				√	√		√	√	√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	Practical /Lab	
As scheduled	Train on the overall mechanical process	18				
	Train on reading overall flowsheet of the process Train on reading overall flowsheet of the process					
	Midterm Report and Oral Exam					
	Carry out research using granted internet sites for references related to student's 2 training process					
	Write technical report					
	Final Exam.					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Attendance		**10**	**10%**
2	End of term Oral exam		**30**	**30%**
3	Midterm Report (*Term Work*)	**As scheduled**	**20**	**20 %**
4	Final Report (*written*)	**AS scheduled**	**20**	**20 %**
5	Follow up		**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Depend on the case/ technical writing booking**
	Other References	**Hand out to students one by one**
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Assoc. Mona A. Younis**	**Dr. Ahmed Abdelbadea**
Signature	MONA A. YOUNIS	احمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Computer Graphics for Mechatronics**			
Course Code (according to the bylaw):	**MTE 117**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**DR.AHMED SHABAN**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Main features of the computer graphics software used such as, menus , drawing area ,function keys File (open, new , save, editing…..), Drawing tools (line, pline, polygen, arc, circle, splines, rectangle ,……),Modifying menu (erase ,move, Copy, mirror, break ,….), format exchange(import ,export) , file output (printing ,plotting) , surface and solid modeling in 3D , dimensions and inquiry.
Drawing exercises and assignments, Engineering drawing A&B problems but using computer graphics – Small course work project related to Mechatronics.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A5, A6, A7, A8, B2, D1		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Investigate CAD software features to create and refine engineering drawings through iterative exercises.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2**	**Plan and mini design project monitoring in a CAD environment, considering cross-disciplinary design constraints.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.**	**LO3**	**Collaborate effectively in diverse teams for CAD-based assignments and design tasks finalizing**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4**	**Use contemporary graphics software to smoothness communication engineering designs clearly through 2D/3D visuals and documentation.**
B2	**Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field**	**LO5**	**Design mechanical components and systems using advanced CAD tools and industry-standard drawing practices.**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	**LO6**	**Utilize CAD platforms for design, simulation, and modeling components for integration into mechatronic systems.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√	√	√	√	√	√					√	√		

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to CAD software interface, menus, file operations	3	0	0	3	-
2	Drawing tools: line, arc, polyline, spline, circle, rectangle	3	0	0	3	-
3	Use sketch orders with Extrude boss & Revolved boss	3	0	0	3	-
4	Sketch orders with Extruded cut & Revolved cut	3	0	0	3	-
5	Sketch orders with mirror – pattern – rib orders	3	0	0	3	-
6	External & Internal threads orders	3	0	0	3	-
7	**Revision and Mid Exam**					
8	Swept & Loft orders	3	0	0	3	-

9	Surface and solid modeling in 3D	3	0	0	3	-
10	. Modifying tools: move, copy, mirror, break, trim	3	0	0	3	-
11	format exchange	3	0	0	3	-
12	file output (printing ,plotting)	3	0	0	3	-
13	Small course work project development and documentation related to Mechatronics.	3	0	0	3	-
14	Final project presentation.	3	0	0	3	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	CAD Interface Exploration & Annotation
2	2D Shape Drawing and Modification
3	Dimensioning and Inquiry Commands
4	File Conversion and Output
5	3D Modeling – Mechanical Component
6	Investigation – Reverse Engineering Sketch to CAD
7	Team Drafting Project Plan

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**5**	**5%**
2	Exam 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**

7	Assignments / Project /Portfolio/ Logbook	**1-14**	**25**	**25%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Engineering Graphics with AutoCAD 2023 Author: James D. Bethune***
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**AutoCAD**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Ahmed Shabban**	**Dr. Ahmed abd el badii**
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Mathematics 3			
Course Code (according to the bylaw)**:**	MTH 101			
Department/s that participated in the teaching:	BASIC SCIENCES			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	ALL ENGINEERING PROGRAMS			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr/ Mahmoud Abu Zeid			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	7/26/2025			

2. Course Overview (Brief summary of scientific content):

Cartesian – Cylindrical – Spherical Coordinates – Multi integral (Double integral – Double integral in polar coordinates – Triple integral – Transformation between coordinates - Triple integral in cylindrical and spherical coordinates) – Position vector – The dot product – Cross product and its applications – Infinite integrals in vector functions – Derivative of vector function – Gradient fields – Conservative vector field – Divergence and Curl of vector field – Line integral – Green theorem in the plane – Surface integral – Flux of vector field – Gauss divergence theorem – Stokes's theorem.

3. *Course Learning Outcomes CLOs:*

Matrix of course learning outcomes CLOs with program outcomes Pos (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1, A2, A3, A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Define the main items of the vectors, lines and planes in space.
		LO2	Describe the main concepts of vectors and integral operations.
		LO3	Explain coordinate systems and the principals of Jacobian transformation and double and triple integrations and surfaces in space.
A2	Develop and conduct appropriate and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO4**	Analyze the Green, Gauss, and Stokes theorems to evaluate the applications.
		LO5	Implement the skills of vectors to estimate some mathematical modeling.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO6**	Analyze the life problem to create the mathematical problem.
		LO7	Classify the problems according to the suitable integral’s method (line integral, surface integral and volume integral).
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**LO8**	Describe and contrast between different lines and planes with sketching solids and planes
		LO9	Evaluate and assess the suitable method of the double and triple integrals in cylindrical and spherical coordinates.
		LO10	Manage time and apply the skills of Gradient field, divergence and curl of vector field.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial/Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	/ Practical Lab
1	**Vectors (The dot product- cross product- triple product)**	4	2	2	0
2	**The lines in the space**	4	2	2	0
3	**The plane in the space**	4	2	2	0
4	**Surfaces in the space**	4	2	2	0
5	**Coordinates in different systems**	4	2	2	0
6	**Multiple integrals (double and triple integral)**	4	2	2	0
7	**Revision and Mid Exam**				
8	**Triple integral in cylindrical and spherical coordinates**	4	2	2	0
9	**Gradient field, divergence and curl of vector field**	4	2	2	0
10	**Line integral of scalar field**	4	2	2	0
11	**Line integral of vector field**	4	2	2	0

12	**Green theorem**	4	2	2	0
13	**Gauss theorem**	4	2	2	0
14	**Stokes theorem**	4	2	2	0
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (Semester work)	**4,5**	**10**	**10%**
2	Exam 2 written (Semester work)	**10,11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20%**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Final Practical/Clinical/… Exam		**0**	
6	Final Oral Exam		**0**	
7	Assignments / Project /Portfolio/ Logbook	**8,9**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	1- **Erwin Kreyszig, Advanced Engineering Mathematics,Tenth Edition, JOHN WILEY & SONS, INC.**
	Other References	1- **Erwin Kreyszig, Advanced Engineering Mathematics** 2- **Advanced Calculus Theory and Practice, John Petrovic 2020** 3- **Advanced Calculus Fundamentals of Mathematics, Carlos Polanco** 4- **Advanced Engineering Mathematics by H. K. Dass.** 5- **Advanced Engineering Mathematics by K. A. Stroud and J. Booth, Fourth Ddition.** 6- **Calculus III Jerald Marsden and Alan Weinstein, Springer-Verlag 1985, Second Ddition.**

	Electronic Sources (Links must be added)	• https://math.fandom.com/wiki/Hypermathematics • https://github.com/AlexCharlton/hypermath • https://www.britannica.com/science/mathematics • https://www.khanacademy.org/math • https://animated-mathematics.net/
	Learning Platforms (Links must be added)	EKB- Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	
	Supplies	
	Electronic Programs	**MATLAB**
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

	Course Coordinator	Program Coordinator
Name	**Dr Mahmoud Abu Zeid**	Prof. Ahmed Abd El-Gafar
Signature	*Mahmoud Abu Zeid*	أ/ عبدالغفار

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Numerical Method**			
Course Code (according to the bylaw)**:**	**MTH 103**			
Department/s that participated in the teaching:	**BASIC SCIENCES**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Safinaz Ahmed			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**7/26/2025**			

2. Course Overview (Brief summary of scientific content):

Solutions of nonlinear equations in one Variable(The Bisection Algorithm, Fixed point Iteration - The Newton- Raphson Method- Secant method- Error Analysis for Iterative Methods - Interpolation and polynomial Approximation (The Taylor Polynomials, Lagrange Polynomials) - Divided Differences- curve fitting - Numerical Differentiation - Numerical Integration(Romberg Integration, trapezoidal rule, Simpson rule) - Initial value problems for Ordinary Differential Equations(Elementary Theory of Initial Value problems, Euler's Method) - Improved Euler method, Rung-Kutta method- Numerical solutions of partial differential equation

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A5, A10		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development	**LO1**	Define Mathematical Preliminaries.
		LO2	Describe the nonlinear equation in one variable.
		LO3	Apply the definition of interpolation data points to solve problems.
		LO4	Explain the curve fitting
A5	Practice research techniques and methods of investigation as an inherent part of learning	**LO5**	Calculate mathematical results using numerical integration and differentiation methods.
		LO6	Justify the initial value problems for ordinary and partial differential equations
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**LO7**	Solve problems of ordinary and partial differential equations
		LO8	Interpret graphically the initial value problems for ordinary and partial differential equations.
		LO9	Model various mathematical problems numerically, including interpolation, integration, and differential equations.
		LO10	Work under stress as leader of teamwork.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√			√		√				√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Lab / Practical
1	**Mathematical Preliminaries (Review of calculus, Round off Errors and computer Arithmetic**	4	2	2	0
2	**Taylor series**	**4**	**2**	**2**	**0**
3	**Solutions of nonlinear equations in one Variable (The Bisection Algorithm**	**4**	**2**	**2**	**0**
4	**The Newton- Raphson Method, False method.**	**4**	**2**	**2**	**0**
5	**Interpolation and polynomial Approximation (The Newton forward, Lagrange Polynomials, Newton Divided Differences)**	**4**	**2**	**2**	**0**
6	**Fitting Curve (Straight line, Exponential function)**	**4**	**2**	**2**	**0**
7	**Revision and Mid Exam**				

8	**Fitting the rational function, and spiel function**	**4**	**2**	**2**	**0**
9	**Numerical Integration (trapezoidal rule, Simpson rule**	**4**	**2**	**2**	**0**
10	**Numerical Differentiation.**	**4**	**2**	**2**	**0**
11	**Initial value problems for Ordinary Differential Equations**	**4**	**2**	**2**	**0**
12	**(Elementary Theory of Initial Value problems, Euler's Method)**	**4**	**2**	**2**	**0**
13	**Improved Euler method, Rung-Kutta method.**	**4**	**2**	**2**	**0**
14	**the initial value problems for partial differential equations**	**4**	**2**	**2**	**0**
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**3**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments	**13,14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**1.** Erwin Kreyszig, Advanced Engineering Mathematics, Tenth Edition, NewYork : Wiley, 2011. **2.** Steven C. Chapra, Raymond, P. Canal, Numerical Methods for Engineers, 4 Th, McGraw-Hill Education, New York, 2015. **3.** James F. Epperson, An Introduction to Numerical Methods for Engineers and Scientists, Thrid Hill Education, New York, 2021 **4.** Mikki Jaramillo, Numerical Methods for Differential Equations
	Electronic Sources	• https://math.fandom.com/wiki/Hypermathematics • https://github.com/AlexCharlton/hypermath

	(Links must be added)	• https://www.britannica.com/science/mathematics • https://www.khanacademy.org/math • https://animated-mathematics.net/
	Learning Platforms (Links must be added)	EKB - Microsoft office

	Course Coordinator	Program Coordinator
Name	**Dr. Safinaz Ahmed**	Prof. Ahmed Abd El-Gafar
Signature	Safinaz	

المعهد التكنولوجي العالي - بالعاشر من رمضان	
توصيف مقرر دراسي	

1- معلومات أساسية :

<table>
<tr><td>اسم المقرر: (تبعا لما ورد باللائحة)</td><td colspan="4">تربية رياضية 2</td></tr>
<tr><td>كود المقرر: (تبعا لما ورد باللائحة)</td><td colspan="4">PHE 101</td></tr>
<tr><td>القسم/الأقسام العلمية التي شاركت في التدريس:</td><td colspan="4">العلوم الاساسية</td></tr>
<tr><td rowspan="2">إجمالي عدد الساعات المعتمدة للمقرر: (تبعا لما ورد باللائحة)</td><td>إجمالي</td><td>اخري (تحدد)</td><td>عملي</td><td>نظري</td></tr>
<tr><td>1</td><td></td><td>1</td><td>2</td></tr>
<tr><td>نوع المقرر:</td><td colspan="4">اجباري</td></tr>
<tr><td>المستوى الدراسي الذي قدم فيه المقرر:</td><td colspan="4">SOPHOMORE</td></tr>
<tr><td>البرنامج الأكاديمي:</td><td colspan="4">البرامج الهندسية</td></tr>
<tr><td>المعهد:</td><td colspan="4">المعهد التكنولوجي العالي</td></tr>
<tr><td>اسم منسق المقرر:</td><td colspan="4">د/عصماء علي</td></tr>
<tr><td>جهة مناقشة واعتماد تقرير المقرر:</td><td colspan="4">مجلس القسم العلمي للبرنامج</td></tr>
<tr><td>تاريخ اعتماد تقرير المقرر:</td><td colspan="4">7/26/2025</td></tr>
</table>

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمى) :

المقرر يحتوى علي قوانين الحركة . الميكانيكا الحيوية : انواع الروافع، قواعد الدفع، الاجهاد العضلى، التربية البدنية والمجهود البدنى، نظم إنتاج الطاقة والمشروبات الرياضية، والظروف البيئية وتأثيرها على الأنشطة الرياضية.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A2_A4_A5_A7_A8		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A2	تحديد وصياغة وحل المشكلات الهندسية المعقدة من خلال تطبيق الاسس الهندسية والرياضيات والعلوم االاساسية	LO1	توظيف معارف ومهارات التربية الرياضية للتعامل مع إصابات
		LO2	اهم الاصابات التى يتعرض لها اللاعبون والافراد العاديين واهم طرق العلاج
A4	لاستفادة من التقنيات المعاصرة، والممارسات والمعايير، وإرشادات الجودة، ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر	LO3	التعرف على اهم اسباب الانحرافات القوامية وتجنب حدوثها
		LO4	شرح مفاهيم التربية والهندسة الرياضية ونظرياتها
		LO5	تنمية المعارف والمعلومات حول حقيقة ونطاق الاصابات الرياضية
A5	ممارسة تقنيات البحث وأساليب التحقيق كجزءلا يتجزأ من التعلم.	LO6	تنمية المعارف والمعلومات حول حقيقة ونطاق الاصابات الرياضية
		LO7	التعرف على مبادئ الاسعافات الأولية والوسائل المستخدمة إتجاه الإصابات الرياضية.
A7	لعمل بكفاءة كفرد وعضو في فرق متعددة التخصصات ومتعدد الثقافات	LO8	وتنمية المعارف والمعلومات حول الاصابات الرياضية التى يتعرض لها الرياضين داخل الملاعب وخارجها .
A8	التواصل بفعالية بيانياً وشفاهه وكتابة مع مجموعات من الجماهير باستخدام الادوات العصرية.	LO9	توظيف المعارف والمهارات التى حصل عليها فى مجال العمل

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√				√		√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة		
			تدريس نظري	تدريب	
				تمارين	عملي
1	**جسم الانسان (عظمى – عضلى – مفصلى – عصبى) وما هو تأثير ممارسات المشاركة الرياضية + نشاط رياضى**	**2**	**1**	**0**	**1**
2	**تعريف الاصابة- اسبابها –اعراضها – الاسعافات الاولية ومبادئها+ نشاط رياضي**	**2**	**1**	**0**	**1**
3	**اهداف واعراض الاسعافات الاولية والوسائل المستخدمه فى الاسعافات الاولية + نشاط رياضى**	**2**	**1**	**0**	**1**
4	**اصابات الجلد (الجروح – الحروق – كدمات الجلد) + نشاط رياضى**	**2**	**1**	**0**	**1**
5	**اصابات العضلات (الاجهاد العضلى – التقلص العضلى – التمزق العضلى) + نشاط رياضى**	**2**	**1**	**0**	**1**
6	**مراجعه عامه + تدريب على التقيم العملى**	**2**	**1**	**0**	**1**
7	**مراجعة وامتحان منتصف الفصل الدراسي**				
8	**مراجعه عامه + مناقشه ابحاث**	**2**	**1**	**0**	**1**
9	**اصابات الجهاز العصبى (الاغماء- الصدمه – كدمات الاعصاب –النزيف) + تقيم الجزءالعملى**	**2**	**1**	**0**	**1**
10	**ماهى القوام – تعريفه – مبادئ المحافظة على القوام + مناقشه الابحاث و التقارير**	**2**	**1**	**0**	**1**
11	**الانحرافات القوامية (انواعها – اسبابها**	**2**	**1**	**0**	**1**
12	**مراجعه عامه**	**2**	**1**	**0**	**1**
13	**إختبارات الفصل الدراسي النهائية عملي**				

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	**بحث تقيمي للعملي**	**9_8**	**20**	**%20**
2	**امتحان منتصف الفصل الدراسي**	**7**	**20**	**% 20**
3	**امتحان نهائي تحريري**	**14**	**30**	**% 30**
4	**امتحان نهائي عملي**	**13**	**30**	**%30**

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	مدخل في التربية الرياضية
	المراجع الأخرى	ابو العلاعبد الفتاح : الرياضه و انقاص الوزن ، دار الفكر العربي 2023 الهام شلبي : بانورما الصحه العامه للريا ضيين القاهرة 2022
	المصادر الالكترونية (لابد من إضافة الروابط)	
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office
التجهيزات التعليمية المساندة للتعليم والتعلم *	1	قاعة محاضرات مجهزة والجيم
	2	المكتبات المركزية والفرعية
	3	الوسائل التعليمية (داتا شو (وجهاز كمبيوتر محمول.)
	4	مُذكرة لتدريس المقرر وكشوف متابعة للطلاب

	منسق المقرر	منسق البرنامج
الإسم	د/عصماء علي	ا.د/ أحمد عبد الغفار
التوقيع	عصماء علي	أ/ أحمد عبد الغفار

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Modern Physics**			
Course Code (according to the bylaw):	**PHY 101**			
Department/s that participated in the teaching:	**BASIC SCIENCES**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Elective			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Asst. Prof. Mohamad Abd El-Aziz			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**7/26/2025**			

2. Course Overview (Brief summary of scientific content):

The modern Physics course is a fundamental course for diploma level students. After completion of this course, the students should have the knowledge and skills that enable them to recognize some of the light wave's phenomena e.g., interference and diffraction and enumerate the methods of polarization. In addition, they will utilize the fundamentals of photons theory of light to explain some of the quantized phenomena such as photoelectric effect and Compton effect. Also, they will employ the Bohr rules to solve and analyze the energy levels of hydrogen atom. Moreover, they study the basics of nuclear physics.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Recognize, articulate, and resolve intricate engineering challenges through the application of engineering principles, fundamental sciences, and mathematics.**	**LO1**	**Enumerate the fundamental physical concepts and rules covered in the course.**
		LO2	**Formulate the physical laws that related to the syllabus course.**
		LO3	**Derive the fundamental principles of contemporary and quantum physics pertinent to this course.**
		LO4	**Discuss the course's issues.**
A2	**Develop and execute pertinent experiments and/or simulations, appraise and review outcomes, and provide statistical analyses along with objective engineering judgment to assess the findings.**	**LO5**	**Utilize simulation software to effectively demonstrate various experiments virtually.**
A5	**Employ research strategies and methodologies, as well as investigative approaches, as an integral part of learning.**	**LO6**	**Write scientific reports based on the foundational concepts outlined in the course syllabus.**
A7	**Effectively collaborate with teams composed of individuals from diverse cultural backgrounds and academic disciplines.**	**LO7**	**Develop the capacity for collaborative teamwork**
A8	**Apply coeval tools to communicate with a diverse audience in writing, verbally, and graphically.**	**LO8**	**Convey the acquired knowledge verbally, in written form, and visually.**
A10	**Attain and implement novel knowledge while employing self-directed, lifelong, and alternative learning methodologies.**	**LO9**	**Acquire the capacity for autonomous learning in application engineering physics.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	--	--	✓	✓	✓	--	--	✓	--	--	✓	--	--

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours		
			Theoretical teaching (lectures)	Training	
				Tutorial	Lab / Practical
1	Theories of light - energy of light waves.	4	2	2	0
2	Light pressure- Interference- Young's experiment	4	2	2	0
3	Interference of thin film– Newton's rings	4	2	2	0
4	Michelson interferometer	4	2	2	0
5	Diffraction – rectangle single, circular slit diffraction	4	2	2	0
6	Diffraction from a double slit - diffraction grating	4	2	2	0
7	Revision and Mid Exam				
8	Introduction of polarization- methods of polarization	4	2	2	0

9	Photon and photoelectric effect-Compton effect- black body radiation	4	2	2	0
10	Atomic structure- Bohr's model of hydrogen atom	4	2	2	0
11	Spectrum of (H) & hydrogenic and mesic atom	4	2	2	0
12	The nuclear terminology-nuclear radii- binding energy	4	2	2	0
13	Nuclear models- nuclear energy level- the nuclear force	4	2	2	0
14	Radioactive decay – decay process- radioactive dating – radioactive dosimeter	4	2	2	0
15,16	Final Exam.				

5- Methods of students' assessment:

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	2	10	10%
2	Exam 2 written (Semester work)	4	10	10%
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	40	40 %
5	Assignments / Project /Portfolio/ Logbook	9	20	20%

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.)	The main (essential) references	1- D. Halliday, R. Resnick, and J. Walker, Fundamentals of Physics, 12th ed. Wiley, 2022. 2- Raymond A. Serway, Chris Vuille, J. Hughes. College Physics Global Edition, 11th ed. Cengage Learning, 2018.
	Other References	1- I. Lyublinskaya et al., College Physics for AP Courses OpenStax. XanEdu Publishing Inc, 2022.

		2- **W. Sears Richards, Mark W. Zemansky, and Hung D. Young, University Physics, 6th edition, Addison – Wesley 2020**
	Electronic Sources (Links must be added)	• http://hyperphysics.phy-astr.gsu.edu/hbase/index.html • https://www.physicsclassroom.com/ • https://en.wikipedia.org/wiki/Physics • https://physicsworld.com/
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Whiteboard—whiteboard color pens—eraser**
	Other	**Scientific Videos**

	Course Coordinator	**Program Coordinator**
Name	Ass. Prof. Mohamad Abd El-Aziz	Prof. Ahmed Abd El-Gafar
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Computer Programming			
Course Code (according to the bylaw):	CSC 101			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	3		4
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Prof. Dr. AMAL NASSER			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2- Course Overview (Brief summary of scientific content):

Principles of designing a simple program - The basic ideas of uses of the computer in programming - The basic ideas of C++ language - How to write a complete program with high level language C++ - How to design, code,debug, and document program laboratory assignments - The syntax of writing any program by C++ language

1. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2,A٩,D1		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	LO1	Simulate and analyzing problems using flowchart
		LO2	Develop software experiments to solve problems
A9	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies	LO 3	Acquire new syntax and writing more complex computer expressions
		LO 4	Apply new knowledge in thinking and solving problems
D1	Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems	LO5	Apply C++ programming concepts, development tools, and debugging techniques to design, implement, and document computer programs that support the design and development of mechatronics systems

2. *Course Teaching and Learning Methods:*

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√					√						√			

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*other*
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	
1	Introduction to computer language, flowcharts. Some examples. What is a computer program	4	1	-	3	-
2	Some examples on flowcharts. Creating simple program that print a message with high level programming language. The Simple C++ Data Type.	4	1		3	-

3	Writing a simple code for some elementary examples to create a complete program that accept input(s) and result outputs(s).	4	1		3	-
4	Writing a complete program that can perform any simple mathematical operations. Writing a simple code for some elementary examples	4	1		3	-
5	Decisions: The if statement. The if – else statement. The select statement.	4	1		3	-
6	Loops: The for Next loop. The DO and Loop Until. The do while loop	4	1		3	-
7	**Revision and Mid Exam**					
8	Examples on loop and Decisions	4	1		3	-
9	Revision	4	1		3	-
10	Matrices: Inserting an array. Inserting Matrices. How to print arrays. How to print matrices. Some examples on arrays and matrices	4	1		3	-

11	Methods: What do methods do? Calling a method. Some examples on methods.	4	1		3	-
12	Methods: What do methods do? Calling a method. Some examples on methods	4	1		3	-
13	Example on the overall course especially on function and procedure	4	1		3	-
14	Lab Exam	4	1		3	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**2**	**10**	**10%**
2	Exam 2 written (Semester work or quiz)	**4**	**10**	**10%**
3	Midterm exam	**7**	**30**	**30 %**
4	Final Written Exam	**15**	**30**	**30 %**
5	Final Practical/Clinical/… Exam	**9**	**10**	**10%**
7	Assignments	**6**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Stroustrup, B. (2019). *The C++ programming language* (4th ed.). Addison-Wesley
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	• Personal computers or laptops with: • Minimum 4 GB RAM, dual-core processor • Operating system: Windows, Linux, or macOS • Data show (projectors) and smartboards for instructor demonstrations • External storage devices (USBs) for code backup and transfer • Networked printers for assignments and reports
	Supplies	• Printed lab manuals and C++ programming guides • Whiteboard markers and flowcharting sheets for algorithm planning

		• Lab logbooks or notebooks for manual recording of code outputs • Backup power supplies (UPS) and power extension cables

	Skill Labs/ Simulators	• Computer Programming Lab equipped with:
		  • Individual student terminals or workstations
		  • Real-time programming assignments and code execution practice
		
		• Simulated environments for:
		  • Code tracing and logic building
		  • Algorithm visualization tools (e.g., c++ Tutor,)

	Virtual Labs	• **Integrated Development Environments (IDEs):**
		  • Code::Blocks
		  • Dev C++
		  • Microsoft Visual Studio
		  • Eclipse CDT
		
		• **Compilers**:
		  • GCC (GNU Compiler Collection)
		  • Clang
		
		• **Text Editors**:
		  • Notepad++
		  • Visual Studio Code
		
		• **Version Control**:
		  • Git, GitHub

		Tools and performance profilers
	Other (to be mentioned)	

	Course Coordinator	Program Coordinator
Name	Amal Nasser	**Dr. Ahmed Abdalbadia**
Signature	*Amal Nasser*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Basics of Materials Science & Engineering			
Course Code (according to the bylaw)**:**	ENG 116			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Assoc. Prof. Dr. Manal Amin			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Atomic structure of matter, X-ray diffraction, crystallography, solidification, crystalline imperfections, diffusion, theory of alloys, binary and ternary alloys, iron carbon diagram, TTT diagrams, heat treatments, deformation and strain hardening , mechanical properties of metals , physical properties of materials , corrosion and wear.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1&A2&B1&B2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.**	**LO1**	**Select appropriate materials based on engineering requirements.**
		LO2	**Explain different types of bonding and describe the basic crystal structures in metallic materials.**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.**	**LO3**	**Develop and running experiments for identifying the structure of materials, alloys, and their phase transition behavior.**
		LO4	**Solve problems related to crystal structures, diffusion processes, and phase diagrams as applications of materials science.**
B1	**Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.**	**LO5**	**Investigate conventional and advanced technologies for improving the mechanical properties of metals.**
		LO6	**Analyze diffusion processes, imperfections in solids, solidification, and phase diagrams of engineering materials, and relate them to basic properties and applications.**

B2	**Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field.**	LO7	**Identify different types of materials and evaluating their applications based on structure–properties relationships.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√				√				√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	**Other**
1	Introduction of Mechanical Properties of metals , physical properties of materials	4	1	2	1	-
2	Interatomic Bonding	4	1	2	1	-
3	Atomic structure (Atomic structure of matter).	4	1	2	1	-

4	Atomic structure (Atomic structure of matter).	4	1	2	1	-
5	Atomic structure (crystallography)	4	1	2	1	-
6	Atomic structure (X-ray diffraction).	4	1	2	1	-
7	**Revision and Mid Exam**					
8	Diffusion in engineering Materials.	4	1	2	1	-
9	Solidification of metallic Materials	4	1	2	1	-
10	Crystalline imperfections	4	1	2	1	-
11	Diffusion in engineering Materials	4	1	2	1	-
12	Phase Diagram (theory of alloys, binary and ternary alloys	4	1	2	1	-
13	Iron carbon diagram, TTT diagrams, heat treatments, deformation and strain hardening)	4	1	2	1	-
14	Corrosion and Wear	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	**Prepare and Examine Microstructures using Optical Microscopy** – To study solidification processes and crystalline imperfections.
2	**Heat Treatment of Metal Samples** – Including annealing, quenching, and tempering to understand phase transformations using the iron-carbon diagram and TTT curves.
3	**Compare Microstructures Before and After Heat Treatment** – To observe changes in phases and properties due to thermal processes.

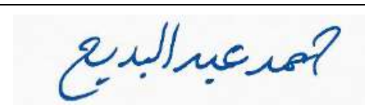
5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing	Marks/ Scores	Percentage of

		(Week Number)		total course Marks
1	Exam 1 written (Semester work)	**6**	**10**	**10%**
2	Exam 2 written (Semester work)	**9**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**According to schedule**	**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Callister, William D. Materials Science and Engineering: An Introduction. John Wiley & Sons Australia, Ltd, 2021.
	Other References	- L.Francisc: "Materials Processing", 2015. William F. Smith, "Principles of materials science and engineering "; McGraw-Hill, Third Edition, 1996.
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Optical Microscope-Polishing device - Heat treatment furnace-Wear device**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Assoc. Prof. Dr. Manal Amin**	**Dr. Ahmed Abd-ELbadei**
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Engineering Mechanics (3)			
Course Code (according to the bylaw):	ENG 101			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	4	0		4
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Gamal Nada			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. *Course Overview (Brief summary of scientific content):*

Kinematics of rigid bodies in plane motion: Translation motion, rotation about fixed axis and general plane motion - Geometrical properties of rigid body; center of gravity and mass moment of inertia - Kinetics of rigid body in translation, rotation and general plane motion (equation of motion based on Newton's second law, work, energy and momentum).

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1 & A3& B1)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.**	**LO1**	**Identify the different types of plane motion of rigid bodies (translation, rotation or general plane motion)**
		LO2	**Formulate the equations of kinematics of rotation motion of rigid body.**
		LO3	**Solve problems of kinematics of general plane motion of rigid body.**
		LO4	**Identify the geometrical properties of rigid bodies.**
		LO5	**Formulate the equations of kinetics of plane motion of rigid body.**
		LO6	**Solve problems of kinetics of plane motion of rigid body (translation, rotation, or general).**
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.**	**LO7**	**Relate between the motions of the bodies to obtaining the requirements for a certain dynamic design.**

B1	**Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.**	**LO8**	**Investigate the given system (mechanism) by applying the laws of solid mechanics, material properties and laws of dynamics.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√			√					√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*other*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	-Introduction to the dynamics of rigid body. - Kinematics of rotation of rigid body.	4	2	2	---	-
2	- Motion of a point on a rotating rigid body.	4	2	2	---	

	- Problems					
3	- Problems, continued - Kinematics of general plane motion of rigid body	4	2	2	---	
4	- Problems - Kinematics of general plane motion of rigid body, rolling without slipping (or without sliding)	4	2	2	---	-
5	- Kinematics of general plane motion of rigid body, rolling with slipping or with sliding - Problems	4	2	2	---	-
6	- Geometrical properties of rigid body: mass center of simple body - Mass center of composite body	4	2	2	----	-
7	**Revision and Mid Exam**					
8	- Mass moment of inertia for simple and composite body - Problems	4	2	2	-	-
9	- Kinetics of general plane motion of rigid body, General approach	4	2	2	-	-
10	- Kinetics of translation of rigid body - Problems	4	2	2	-	-
11	- Problems, continued - Kinetics of rotation of rigid body, centroidal rotation	4	2	2	-	-
12	- Problems - Kinetics of rotation of rigid body, non-centroidal rotation	4	2	2	-	-
13	- Problems - Kinetics of general plane motion of rigid body	4	2	2	-	-
14	- Problems - Revision	4	2	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**5**	**10**	**10 %**
2	Midterm exam	**7**	**20**	**20 %**
3	Exam 2 written (Semester work or quiz)	**10**	**10**	**10 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Assignments / Sheets	Through Semester	**10**	**10 %**
6	In-Class questions	Through Semester	**10**	**10 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	R. C. Hibbler "Engineering Mechanics: Dynamics", 15th Edition, Published by Pearson, 2021.
	Other References	-Andrew Pytel and Jaan Kitselas "Engineering Mechanics: Dynamics", 4th Edition, Published by CL Engineering, 2016 **-Course Notes a**vailable as softcopy on Microsoft teams
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data-show and laptop.
	Supplies	White board
	Electronic Programs	Microsoft teams
	Other (to be mentioned)	Library

	Course Coordinator	Program Coordinator
Name	**Dr. Gamal Nada**	**Dr. Ahmed Abdalbadia**
Signature	Dr. Gamal Nada	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Circuits theory**			
Course Code (according to the bylaw)**:**	**MTE 111**			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Ahmed Abu El -FADl**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. *Course Overview (Brief summary of scientific content):*

Fundamental laws, direct current, networks analysis, electrical and magnetic fields, induction andflow laws, field parameters and interactions, alternating current, single and multi-phase systems.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2&D2&D3 •		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.**	**LO1**	**Identify fundamental laws and direct current by conducting sample ciruits.**
		LO2	**Analyze electrical circuits**
		LO 3	**Develop field parameters and interactions.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**LO 4**	**Model single and multi- phase systems.**
		LO 5	**Calculate alternatingcurrent.**
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO 6**	**Determine induction and flow laws.**
		LO 7	**Compare between single and multi-phase systems in alternating current systems.**

4. *Course Teaching and Learning Methods:*

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√								

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*other*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	Basic concepts of electric circuits	4	1	2	1	-
2	Circuit elements, Ohm's Law, Kirchhoff's law, dependent and independent sources	4	1	2	1	-
3	Series, parallel, and star-delta connections and transformations.	4	1	2	1	-
4	Circuit theories: Node voltage analysis method	4	1	2	1	-
5	Mesh current analysis method, Source Transformations (voltage & current)	4	1	2	1	-
6	Thevenin's Theorem, Norton's Theorem	4	1	2	1	-
7	**Revision and Mid Exam**					
8	Superposition method; Maximum power transfer	4	1	2	1	-

9	Capacitors and Inductors	4	1	2	1	-
10	Introduction to AC sinusoidal steady state analysis	4	1	2	1	-
11	The Phasor Relationships for The Basic Circuit Elements,	4	1	2	1	-
12	AC circuit analysis: single Phase	4	1	2	1	-
13	Multi-phase systems	4	1	2	1	-
14	Applications	4	1	2	1	-
15 ,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	Kirchhoff's Laws verification
2	Node voltage method
3	Mesh current method
4	Thevenin's Theorem

5- Methods of students' assessment:

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

ourse Title (according to the bylaw)**:**	**Circuits theory**			
ourse Code (according to the bylaw)**:**	**MTE 111**			
epartment/s that participated in the aching:	Mechanical Engineering			
otal number of credit hours of the course:	**Theoretical**	**Practical**	**Other (specify)**	**Total**

(according to the bylaw)	3	1		4

Course Type:	Compulsory
The level to which the course was introduced:	**SOPHOMORE**
Academic Program:	**Mechatronics Engineering**
Institute:	**Higher Technological Institute**
Name of Course Coordinator:	**Dr. Ahmed Abu El -FADl**
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department
Course Specification Approval Date:	**8/12/2025**

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**4**	**10**	**10%**
2	Exam 2 written (Semester work or quiz)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	12	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**WILLIAM H.HAYT," ENGINEERING CIRCUIT ANALYSIS", 2019**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Non**
	Supplies	**Non**
	Electronic Programs	**Non**
	Skill Labs/ Simulators	**Non**
	Virtual Labs	**Non**
	Other (to be mentioned)	**Non**

	Course Coordinator	**Program Coordinator**

Name	Dr.Ahmed Abu El -FADl	Dr. Ahmed Abdalbadia
Signature	*Ahmed fadl*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Applied mechanics**			
Course Code (according to the bylaw)**:**	**ENG 102**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2	--	4
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Prof. Iman Nassar**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Deflection of beam, general equations of elasticity leading to solutions for thick and thin cylindrical structures, Introduction to energy methods of analysis, superposition and dynamic loading effects. Introduction to instability and buckling, the behavior of thin-walled beams, struts and columns.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1, A2)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Solve internal force problems in statically determinate and indeterminate beams using fundamental engineering principles.
		LO2	Apply energy-based methods such as virtual work and force method to solve structural mechanics problems.
		LO3	Analyze the behavior of thin and thick cylindrical structures under internal pressure.
		LO4	Evaluate the buckling of columns and identify critical loads using theoretical models.
		LO5	Analyze the deformation of initially curved beams using elasticity and mechanics principles.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO6**	Interpret results of structural analysis techniques and validate with theoretical models.
		LO7	Assess the effects of dynamic loads and instability in mechanical systems.
		LO8	Evaluate stress and strain distribution in thin-walled structures based on engineering judgment.
		LO9	Interpret and compare mechanical behavior of complex systems using combined theoretical and applied methods.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√			√				√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	/ Practical Lab
1	Introduction to Internal Forces in Beams (Support Reactions & Free-Body Diagrams	4	2	2	
2	Applications and Problems on Internal Force Analysis	4	2	2	
3	Energy Methods: Principle of Virtual Work in Structures	4	2	2	
4	Statically Indeterminate Structures: Force Method (Theory)	4	2	2	
5	Statically Indeterminate Structures: Force Method (Problem Solving)	4	2	2	
6	Mechanics of Thin-Walled Pressure Vessels	4	2	2	
7	**Revision and Mid Exam**				

8	Stress Analysis in Thick Cylindrical Structures	4	2	2	
9	Introduction to Initially Curved Beams	4	2	2	
10	Analysis of Curved Beams: Stress and Deflection Methods	4	2	2	
11	Buckling and Instability of Slender Columns	4	2	2	
12	Friction Effects in Mechanical Systems	4	2	2	
13	Spatial Kinematics of Rigid Bodies	4	2	2	
14	Gyroscopic Motion: Introduction and Engineering Applications .	4	2	2	
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**4**	**15**	**15%**
2	Exam 2 written (Semester work or quiz)	**6**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Assignments	**9**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Beer, F.P, (2022)," Mechanics of Material ", McGraw-HILL Book Co, USA
	Other References	Khurmi, R.S.and Gupta, J.K, (2023),"Theory of Machines", Eurasia pub
	Electronic Sources (Links must be added)	**https://books.google.com.eg/books?id=6FZ9UvDgBoMC&printsec=copyright&redir_esc=y#v=onepage&q&f=false**
	Learning Platforms (Links must be added)	EKB - Microsoft office

Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data-show and Laptop
	Supplies	White board
	Electronic Programs	Microsoft teams
	Skill Labs/ Simulators	**NA**
	Virtual Labs	**NA**
	Other (to be mentioned)	**NA**

	Course Coordinator	**Program Coordinator**
Name	**Prof. Iman Nassar**	**Dr. Mohamed Ashraf**
Signature	ايمان ابراهيم محمد علي نصار	محمد أشرف

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. *Basic information:*

Course Title (according to the bylaw)**:**	**Principles of Design & Manufacturing Engineering**			
Course Code (according to the bylaw)**:**	**ENG 103**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**	**--**	**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Assoc. Prof. Dr. Said Zoalfakar**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. *Course Overview (Brief summary of scientific content):*

Mechanical components, Motion and power transmission elements, Standard machine elements (threads, fasteners, locking devices, keys, splines, gears, pulleys, bearings, pipe connections, etc.), Welding and riveting conventions, Basics of Machine elements design, Stress analysis, Basic machining processes, Applications of robotics technology.

3. ***Course Learning Outcomes CLOs :***

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1,A2&A3)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Identify standardized and customized machine elements used in mechanical design.
		LO2	Describe the basic principles of materials science, mechanical strength, and fatigue, and explain common manufacturing technologies for machine components.
A2	Develop and conduct appropriate experimentation and/or simulation, analyse and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**LO3**	Use mathematical modeling and SolidWorks software to design mechanical elements.
		LO4	Design and select machine elements to satisfy the function of the machine for desired applications.
		LO5	Analyze and perform required calculations to select suitable standard machine components.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development	**LO6**	Explain the fundamentals of engineering technologies and techniques in designing basic automation and robotic systems.
		LO7	Select appropriate mechanical components using manufacturers' catalogs to meet design criteria.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√		√			√					√

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours		
			Theoretical teaching (lectures)	Training	
				Tutorial	/ Practical Lab
1	Material and their properties, manufacturing technology	**3**	**2**	**1**	**-**
2	Modes of fractures	**3**	**2**	**1**	**-**
3	Failure Theories	**3**	**2**	**1**	**-**
4	Design of fasteners	**3**	**2**	**1**	**-**
5	Power screw	**3**	**2**	**1**	**-**
6	Shaft design	**3**	**2**	**1**	**-**
7	**Revision and Mid Exam**				
8	Complex stress on the shafts	**3**	**2**	**1**	**-**

9	Gear design	**3**	**2**	**1**	**-**
10	Gear design	**3**	**2**	**1**	**-**
11	Rolling bearings selection	**3**	**2**	**1**	**-**
12	Sliding bearing design	**3**	**2**	**1**	**-**
13	flat pulley transmission	**3**	**2**	**1**	**-**
14	V-belt and pulley transmission	**3**	**2**	**1**	**-**
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**6**	**5**	**5%**
2	Exam 2 written (Semester work or quiz)	**10**	**5**	**5%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Final Practical/Clinical/… Exam	**--**	**--**	**--**
6	Final Oral Exam	**--**	**--**	**--**
7	Assignments / Project /Portfolio/ Logbook	**30**	**0**	**30%**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Khurmi, R. S., and J. K. Gupta. *A Textbook of Machine Design (LPSPE)*. S. Chand publishing, 2019.
	Other References	• Jonathan Wickert, An Introduction to Mechanical Engineering, CL - Engineering, 2nd' Ed., 2005. • D.K. Singh, Fundamentals of Manufacturing Engineering, CRC Press, 2008. • Robert L Mott, Machine Elements in Mechanical Design, Prentice Hall, 4th' Ed., 2003.
	Electronic Sources (Links must be added)	**NA**

	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data-show and Laptop
	Supplies	White board
	Electronic Programs	Microsoft teams
	Skill Labs/ Simulators	**NA**
	Virtual Labs	**NA**
	Other (to be mentioned)	**NA**

	Course Coordinator	**Program Coordinator**
Name	**Assoc. Prof. Dr. Said Zoalfakar**	**Dr. Mohamed Ashraf**
Signature	Said Zoalfakar	

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Principles of Biomedical Engineering**			
Course Code (according to the bylaw)**:**	MDE 101			
Department/s that participated in the teaching:	Biomedical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	1		3
Course Type:	Elective			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	ALL ENGINEERING PROGRAMS			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Ass. Prof. Amal EL Dosoky			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

History of biomedical engineering, examples of biomedical engineers contributions and research fields classification of biomedical engineering, the interrelation between systems and biomedical engineering, examples of physiological systems and medical instruments – General overview about different biomedical devices and hospital departments from point of view of device name, function, and its place in the hospital.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A5, A8, A10		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**LO1**	Supports understanding of how biomedical devices solve physiological problems.
A5	Practice research techniques and methods of investigation as an inherent part of learning.	**LO2**	**investigate** recent innovations in biomedical engineering using appropriate research methods.
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO3**	collaboration to create a presentation on a biomedical engineering topic.
		LO4	**demonstrate** effective communication skills through presentations and reports on biomedical devices, systems, and case studies.
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**LO5**	Acquire a knowledge about vital sign and Medical device.
		LO6	**explore** current trends and new developments in biomedical engineering independently.

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√	√					√	√				√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**		
			Theoretical teaching *(lectures)*	**Training**	
				Tutorial	**Lab / Practical**
1	An overview: general idea about the concepts of Biomedical Engineering and its applications in the field.	3	2	1	
2	Introduction to Human anatomy and physiology.	3	2	1	
3	Cardiovascular and Respiratory Systems with Related Devices	3	2	1	
4	Nervous and Muscular Systems with Related Devices	3	2	1	
5	Classification of Biomedical Engineering and Fields Introduction to Bio-signal	3	2	1	
6	Introduction to Bio-Imaging	3	2	1	
7	**Revision and Mid Exam**				
8	Introduction to Bio-Instrument	3	2	1	
9	Introduction to Bio-mechanics	3	2	1	
10	Hospitals and its Organization	3	2	1	
11	Hospital Departments and Devices – Part 2 and Quiz	3	2	1	
12	Biomedical Engineering: Innovations (future trends) and Opportunities	3	2	1	
13	Student Presentations / Mini-Projects	3	2	1	
14	Student Presentations / Mini-Projects	3	2	1	
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz	**11**	**10**	**10%**
2	Midterm exam	**7**	**20**	**20 %**
3	Final Written Exam	**15, 16**	**40**	**40 %**
4	Assignments / Mini-Projects /Sheets	Across the term and According to the schedule	**30**	**30%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	S.A.BERGER (1996). INT.TO BIOENGINEERING. N.YORK: OXFORD. ANDREW G. WEBB (2018). PRINCIPLES OF BIOMEDICAL. NEW YORK: CAMBRIDGE
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	
	Supplies	
	Electronic Programs	
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

	Course Coordinator	Program Coordinator
Name	Ass. Prof. Amal EL Dosoky	Dr. Ghada Karim
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Monitoring & Quality control systems**			
Course Code (according to the bylaw):	**MNG 101**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	**--**	**--**	**1**
Course Type:	Compulsory			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr.Radwa A. Ghazalla**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Introduction: history of quality, the dimensions of quality. Quality Control Concepts: quality assurance, total quality management. Control systems: objectives of control systems, quality systems, top management communication. Hazard Analysis: high -quality recommendations, commitment monitoring, follow up Systems, the base line of hazard analysis critical point (HACCP). Sampling and Inspection: Sample size, sampling error, sampling designs and inspection, acceptance sampling plans. Quality Control Tools and Techniques: tools for creating new concepts, tools for organization and analysis of data, tools for determining and solving problems (Control Charts for Variables - Control Charts for Attributes - PRE - control - analysis - flow charts). International Standards Accreditation: Accreditation meaning, ISO requirements and recommendations, Audit program, Certification body. Analyzing Process Capability:

Process capability indices, process performance indices.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A4, A8, A9		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**LO1**	Apply appropriate statistical methods to evaluate operational or quality performance according to industry standards.
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO2**	Optimize the use of graphical data and visual tools to effectively communicate performance outcomes.
A9	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations	**LO3**	Compare and evaluate different quality management systems to support continuous improvement and innovation.
		LO4	Apply modern quality theories to optimize resource utilization and enhance organizational effectiveness.

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education

√	√	√		√		√	√								√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**		
			Theoretical teaching *(lectures)*	**Training**	
				Tutorial	**Lab / Practical**
1	Introduction, Dimensions, Concepts, Objectives, Characteristics	2	1	1	
2	Leaders of Quality	2	1	1	
3	Quality systems, Costs and measures, Quality assurance	2	1	1	
4	Quality Control Tools	2	1	1	
5	Total Quality Management	2	1	1	
6	Review	2	1	1	
7	**Revision and Mid Exam**				
8	Hazard Analysis	2	1	1	
9	Hazard Analysis	2	1	1	
10	Sampling and Inspection	2	1	1	
11	Iso Definitions and tools	2	1	1	
12	Analyzing Process Capability	2	1	1	
13	Case study discussion and submission	2	1	1	
14	Review and case study discussion	2	1	1	
15,16	**Final Exam.**				

No.	**Assessment Methods ***	**Assessment Timing (Week Number)**	**Marks/ Scores**	**Percentage of total course Marks**
1	Exam 1 written (Semester work or quiz)	**4**	**10**	**10%**
2	Exam 2 written (Semester work or quiz)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**

5	Case study	**13**	**10**	**10%**
6	Assignments / Project /Portfolio/ Logbook	**9**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Project Management: a systems approach to planning, scheduling, and controlling. Kerzner, Harold. (2020).
	Other References	**Montgomery, D. C.**, *"Introduction to Statistical Quality Control"*, 8th Edition, Wiley, **2020**.
	Electronic Sources (Links must be added)	MIT OpenCourseWare – Quality Control and Process Improvement https://ocw.mit.edu **ISO Official Website** (Standards & Certification) https://www.iso.org NIST – Process Capability & Quality Metrics https://www.nist.gov/services-resources/software/process-capability-analysis
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data Show
	Supplies	N/A
	Electronic Programs	MS-Teams
	Skill Labs/ Simulators	N/A
	Virtual Labs	N/A
	Other (to be mentioned)	N/A

	Course Coordinator	Program Coordinator
Name	**Dr. Radwa A. Ghazalla**	**Dr. Mohamed Ashraf**
Signature	رضوى غزاله	

1. Basic information:

Course Title (according to the bylaw):	Principles of Mechatronics Engineering			
Course Code (according to the bylaw):	MTE 101			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		
Course Type:	Elective			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr.Ahmed Abu El -FADL			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Definitions of Mechatronics Engineering, Mechatronics Engineer skills & responsibilities. A typical Mechatronics system (Target system, Sensors, I/O signal conditioning, Control unit, Actuator, &Monitoring). Methodology of analysis and design of Mechatronics system. Examples of, sensors, control unit, electro-mechanical and electromagnetic actuators, shape memory alloys (SMA), artificial muscles using SMA, piezoelectric actuators. Pneumatic actuator, electro- Pneumatic systems- Introduction and hands on a software package used in Mechatronics system analysis and design

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A3, A10		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics	**LO1**	Identify principles of any mechatronics system (sensors, I/O signal conditioning, Control unit, Actuator).
		LO2	Identify methodology of analysis . Of mechatronics system
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO3**	Design for the needed mechatronics system,simulation, materials and components selection, mechanical implementation,control implementation, signalconditioning and interfacing consideration, software building and full system testing and tuning.
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**LO4**	Acquire new knowledge for the structure of electro-mechanical and electromagnetic actuators, Shape memory alloys (SMA), Artificial muscles using SMA.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√						√		√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Definitions of the Mechatronics Engineering	4	2	1	1	**LO 1**
2	Mechatronics Engineer skill & responsibility	4	2	1	1	**LO1**
3	A typical Mechatronics system (Target system, Sensors, I/O signal conditioning)	4	2	1	1	**LO2**
4	A typical Mechatronics system (Control unit, Actuators, & Monitoring)	4	2	1	1	**LO2**
5	Methodology of analysis and design of Mechatronics system	4	2	1	1	**LO2**
6	Examples of Sensors	4	2	1	1	**LO1**
7	**Revision and Mid Exam**					
8	Control unit	4	2	1	1	**LO 1 , LO3**

9	Electro-mechanical and electromagnetic actuators	4	2	1	1	**LO4**
10	Shape memory alloys (SMA)	4	2	1	1	**LO4**
11	Artificial muscles using SMA	4	2	1	1	**LO4**
12	Piezoelectric actuators	4	2	1	1	**LO4**
13	Pneumatic actuators and electro-pneumatic systems	4	2	1	1	**LO4**
14	Introduction and hands on Software Package used in Mechatronics systems analysis and design	4	2	1	1	**LO3**
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	Connection of mechatronics a system components .
2	Mechanical design for mechatronics system using software program
3	Electrical wiring component with electrical circuits
4	Programming of mechatronics system to acquire the required task.

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	٤	١٠	١٠%
2	Exam 2 written (Semester work)	١١	١٠	١٠%
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	40	40 %
5	Final Practical/Clinical/… Exam		0	
6	Final Oral Exam		0	

7	Assignments / Project /Portfolio/ Logbook	**According to schedule**	**20**	**20%**
8	Field training		**0**	
9	Other (Mention)		**0**	

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	W. Bolton; “Mechatronics – Electronic Control Systems in Mechanical & Electrical Engineering.”, Longman, seventh edition,2019
	Other References	Alciator & Histand, “Introduction to Mechatronics & Measurements Systems"; McGraw-Hill, Second,
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Elvis LabVIEW- Breadboard –power supply**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Dr.Ahmed Abu El -FADl**	**Dr.Ahmed Abd El badii**
Signature	*Ahmed fadl*	احمدعبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	Electronics			
Course Code (according to the bylaw)**:**	MTE 121			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	1		3
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Prof. Mahmoud El-Dabah			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Introduction - Semiconductor physics as the basis of understanding electronics, Junction diode, Zener diode Voltage regulator, Optoelectronic diodes, Diode circuits, BJT physics, Common emitter transistor circuit, BJT switch, Darlington transistor, Phototransistor and Field effect transistor

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1, A2, D1, D3		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	LO1	Define semiconductor physics as the basis for understanding electronics.
		LO2	Discuss the characteristics and applications of junction diodes.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	LO3	Analyze the operation and applications of Zener diodes.
		LO4	Examine voltage regulator.
D1	Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems	LO5	Develop optoelectronic diodes and diode-based circuits.
		LO6	Develop knowledge of BJT physics, and implementation of common-emitter transistor circuits, and BJT switches.
D3	Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.	LO7	Design Darlington transistor configurations.
		LO8	Compare the characteristics of phototransistors and field-effect transistors (FETs).

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	semiconductor physics as the basis of understanding electronics and PN Junction	4	1	2	1	-
2	Junction diode	4	1	2	1	-
3	Zener diode	4	1	2	1	-
4	Voltage regulator	4	1	2	1	-
5	Optoelectronic diodes	4	1	2	1	-
6	Diode circuits	4	1	2	1	-
7	**Revision and Mid Exam**					
8	BJT physics	4	1	2	1	-

9	Common emitter transistor circuit	4	1	2	1	-
10	BJT switch	4	1	2	1	-
11	Darlington transistor	4	1	2	1	-
12	Phototransistor	4	1	2	1	-
13	Junction Field Effect transistor	4	1	2	1	-
14	MOS-Field effect transistor	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	Diode Characteristic
2	HWR
3	FWR
4	**Zener**
5	**BJT Characteristic**
6	**BJT switch**
7	**MOSFET**

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	٤	١٠	١٠%
2	Exam 2 written (Semester work)	١١	١٠	١٠%
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	40	40 %
7	Assignments / Project /Portfolio/ Logbook	According to schedule	20	20%

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	• Adel S. Sedra and Kenneth C. Smith.,“Microelectronic Circuits”, Seventh Edition • Floyd, T.L. , “Electronic Devices”, Prentice Hall, 2022.
	Other References	A. Prof. Mahmoud El-Dabah, "Electronics"; HTI, 2024.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**BREAD BOARD**
	Supplies	**POWER SUPLLY**
	Electronic Programs	**PROTUS**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	Prof. Mahmoud El-Dabah	**Dr. Ahmed Abdalbadia**
Signature	MAHMOUD	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Computer Aided Mechanical Drafting			
Course Code (according to the bylaw)**:**	MTE 127			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		3
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	DR.AHMED SHABAN			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Fits and tolerance, Review of the CADr software used. Use of both hand sketch and the CADr software for, Construction drawing, working drawing, threads, fasteners, locking devices, drawing representation of welding, rivets gears, pulleys and bearings- Different types of keys and splints- Application for Mechatronics.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A5, A6, A7, A8, B2, D1		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Investigate standards of fits, tolerances, and mechanical components (e.g., gears, pulleys, bearings) using references and CAD software in design decisions.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2**	**Develop complete sets of mechanical working drawings, including welds, threads, and fasteners, while considering cross-disciplinary needs in mechatronics applications.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.**	**LO3**	**Collaborate in diverse teams in production of comprehensive CAD drafting projects that integrate locking devices, keys, splines, and assemblies relevant to mechatronics systems.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4**	**Present mechanical drafting work effectively using both hand sketches and CAD software, clearly communicating design intent, assembly details, and standards.**
B2	**Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field**	**LO5**	**Produce technical drawings and three-dimensional models of mechanical parts using computer-aided design tools and software.**

D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	LO6	**Utilize CAD software with analytical design principles to model, simulate, and document components and assemblies essential for mechatronics applications.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√					√	√	√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Introduction to Mechanical Drafting and Standards	3	0	0	3	-
2	Review of CAD Software Tools and Interface	3	0	0	3	-
3	Sketching Techniques and Graphic Standards	3	0	0	3	-
4	Fits and Tolerances (Types and Applications)	3	0	0	3	-
5	Drawing Threads, Fasteners, and Locking Devices	3	0	0	3	-

6	Welding Symbols and Rivet Representation	3	0	0	3	-
7	**Revision and Mid Exam**					
8	Bearings, Keys, Gears, and Splines	3	0	0	3	-
9	Assembly Drawings and BOM Preparation	3	0	0	3	-
10	Drawing Review and Error Analysis	3	0	0	3	-
11	Collaborative Design Planning and Role Assignments	3	0	0	3	-
12	Group Project Development and Monitoring	3	0	0	3	-
13	Design Documentation and Report Writing	3	0	0	3	-
14	Final Project Presentations	3	0	0	3	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	CAD Modeling of Fasteners and Locking Devices
2	Create an Assembly Drawing with BOM
3	Technical Drawing Review and Design Correction
4	Fits and Tolerances Application
5	Sectional and Auxiliary Views in CAD
6	Drafting Pulleys and Gear Mechanisms
7	Drawing Representation of Welding and Riveting
8	Reverse Engineering Drafting Exercise
9	Planning a Multi-Part Mechanical System
10	Design Evaluation & Integration in Mechatronics System

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**

3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Engineering Drawing and Design (7th Edition, 2020)*** ***Authors: David A. Madsen & David P. Madsen***
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**SolidWorks**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Dr. Ahmed Shabban**	**Dr. Ahmed abd el badii**
Signature		احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Mathematics 4**			
Course Code (according to the bylaw)**:**	**MTH 102**			
Department/s that participated in the teaching:	BASIC SCIENCES			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 2**			
Academic Program:	ALL ENGINEERING PROGRAMS			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Afaf Hatem Syam			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**7/26/2025**			

2. Course Overview (Brief summary of scientific content):

Differential Equation of the first order (Separable differential equations – Homogeneous differential equations – Exact differential equations – Integrating factor – Linear differential equations) Higher order differential equations – The differential operators – The complementary solution – Evolution of particular solution (Inverse operator Lagrange's method Reduction of order – Cauchy Eular Type differential equations) - system of Differential equations - Special Functions (Gama – Beta – Lagender- Bessel) –Laplace Transform – Solution of ordinary differential equations using Laplace methods.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A5, A10		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**A1. Identify, formulate, and solve complex engineering problems by using differential equations techniques.**	**LO1**	**Apply the the technique which is approviate the given problem.**
		LO2	**Describe the required conditions for solving the D.E. by the given method.**
		LO3	**Solve D.E. by available methods.**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO5**	**Distinguish the type of the given one which with constants or variables coefficients.**
		LO4	**Identify the number of solutions according to the given equation.**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO6**	**Assess the special functions for solving problems.**
		LO7	**Access the special functions for solving some integrations.**
		LO8	**Evaluate the laplace transform for solving engineering problems.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√			√		√				√				√	

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours		
			Theoretical teaching (lectures)	Training	
				Tutorial	/ Practical Lab
1	**Types and order of the differential equations (D.Es)**	**4**	**2**	**2**	**0**
2	**First D.Es**	**4**	**2**	**2**	**0**
3	**Separation and Homogenous D.Es**	**4**	**2**	**2**	**0**
4	**Exact and not Exact D.Es**	**4**	**2**	**2**	**0**
5	**Linear and Bernoulli D.Es**	**4**	**2**	**2**	**0**
6	**Homogenous Higher order D.Es**	**4**	**2**	**2**	**0**
7	**Revision and Mid Exam**				
8	**Lagrange method for D.Es**	**4**	**2**	**2**	**0**
9	**Cauchy Euler for D.Es with Variable coefficients**	**4**	**2**	**2**	**0**

10	**Laplace transform for D.Es**	**4**	**2**	**2**	**0**
11	**Gamma function**	**4**	**2**	**2**	**0**
12	**Betta function**	**4**	**2**	**2**	**0**
13	**Applications of Gamma function and Betta function**	**4**	**2**	**2**	**0**
14	**Lagrange method for D.Es**	**4**	**2**	**2**	**0**
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**3**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments	**13,14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**1.** Schaum's Outline of Differential Equations, 5th Edition, ISBN: 9781264258826, 2022McGraw Hill. **2.** Erwin Kreyszig, Advanced Engineering Mathematics, Edition 10 (2011), Wiley. **3.** Earl W. Swokowski, "Calculus". **4.** Thomas' Calculus: Early Transcendentals **5.** Richard Bronson (Author), Gabriel B. Costa, Schaum's Outline of Differential Equations, Fifth Edition **6.** Erwin Kreyszig, Advanced Engineering Mathematics

		7. Richard Bronson, Schaum's Outline of Differential Equations **8.** *Lawrence Perkom '* Differential Equations and Dynamical Systems', Third Edition
	Electronic Sources (Links must be added)	https://www.cuemath.com/trigonometry/inverse-trigonometric-functions/ https://www.cuemath.com/trigonometry/inverse-trigonometric-functions/
	Learning Platforms (Links must be added)	EKB - Microsoft office

	Course Coordinator	**Program Coordinator**
Name	**Dr. Afaf Hatem Syam**	Prof. Ahmed Abd El-Gafar
Signature	AH Syam	أ عبدالغفار

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	**Mathematical Analysis**			
Course Code (according to the bylaw)**:**	**MTH 104**			
Department/s that participated in the teaching:	**BASIC SCIENCES**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Elective			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	D. Hanan M. Ahmed			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**7/26/2025**			

2. Course Overview (Brief summary of scientific content):

Complex numbers – Polar form of complex numbers – Powers and roots – Curve and regions in the complex plan – Complex functions – Polynomials – Exponential function – Trigonometric functions – Hyperbolic function – Logarithm – General power mapping by special functions- Limits – Continuity - Derivative – Analytic functions – Cauchy Rieman equations – Harmonic function – Line integral in complex plane – Two integration methods – The method of use of the path- Cauchy integral theorem – Path independent – Existence of indefinite integral – Cauchy integral formula – Derivative of analytic function - Practical method of obtaining power series – Uniform convergence – Laurent series – Application - Zeroes and singularities – Residues – Cauchy residue theorem - Evolution of real integral.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1, A2)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO1**	Identify the complex numbers and the polar form of complex numbers .
		LO2	Formulate the theorems of Limit Derivative and analytic Function, also the elementary functions.
		LO3	Apply Cauchy-Riemann equations and harmonic functions on complex functions to the differentiation and the concept of analytic function
A2	Develop and conduct appropriate experimentation or simulation ,analyze and interpret data , assess and evaluate findings , and use statistical analysis and objective engineering judgment to draw conclusions..	**LO4**	Explain the residues of the complex function with creative thinking in their applications
		LO5	Assess issues of the mathematical results
		LO6	Study the concepts of the line integrals and the Cauchy-Riemann formula
		LO7	Explain the infinite series in the complex plane (power series, Taylor's series, Laurent's series).Discuss integrations in the complex plane
		LO8	Apply the residues theorem to handle complex functions with applications.
		LO9	Communication skills.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√				√	√	√			√	√				√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	/ Practical Lab
1	**Complex numbers. Polar form of complex numbers. Powers and roots. Curves and regions in the complex plane**	4	2	2	-
2	**Limit, Derivative, Analytic Function, Cauchy Riemann Equation, Exponential function**	4	2	2	-
3	**Trigonometric functions, Hyperbolic functions, Logarithm, General power, Mapping by Special function**	4	2	2	-
4	**Complex functions. Polynomials. Exponential function. Trigonometric functions**	4	2	2	-
5	**Hyperbolic function. Logarithm. General power. Mapping by special functions**	4	2	2	
6	**Mapping by special functions**				

7	**Revision and Mid Exam**				
8	**Line integral in the complex plane. Two integration methods.**				
9	**Cauchy integral theorem. Path independence. Existence of indefinite integral.**				
10	**Cauchy integral formulas. Derivative of analytic function. Power series Taylor series**				
11	**Practical methods of obtaining power series. Uniform convergence.**				
12	**Laurent series, Applications, Zeros and Singularities. Residues.**				
13	**Cauchy residue theorem.**				
14	**Evaluation of real integrals**				
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)		**10**	
2	Exam 2 written (Semester work)		**10**	
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Final Practical/Clinical/… Exam		**0**	
6	Final Oral Exam		**0**	
7	Assignments / Project /Portfolio/ Logbook		**20**	
8	Field training		**0**	
9	Other (Mention)		**0**	

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**"Engineering Mathematics", zill,2013**
	Other References	Complex Analysis with Applications to Number Theory (Infosys Science Foundation Series) 1st ed. 2020 Edition. **Mathews, Russell W. Howell.**
	Electronic Sources (Links must be added)	• https://math.fandom.com/wiki/Hypermathematics • https://github.com/AlexCharlton/hypermath https://www.britannica.com/science/mathematics
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	
	Supplies	
	Electronic Programs	
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

	Course Coordinator	**Program Coordinator**
Name	**Hanan M. Ahmed**	Prof. Ahmed Abd El-Gafar
Signature	Hanan M. Ahmed	[illegible]

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Arts and Architecture**			
Course Code (according to the bylaw)**:**	**ARE 101**			
Department/s that participated in the teaching:	**Architectural Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	**2**	**0**	**3**
Course Type:	Elective			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Assoc. Prof. Sahar Ezz El Arab Ramadan**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/10/2025**			

2. Course Overview (Brief summary of scientific content):

History of fine arts (ornamental - sculpture - drawing.....) Art movements in the twentieth century: cubism, expressionism, surrealism, art collections such as De Steele and Bauhaus and their new ideas on the interconnectedness of arts, architecture, design, art education and art trends across historical times and architectural and parallel trends, contemporary artistic trends and their effects on architecture, structural values in artwork (contrast, balance, color, rhythm, movement........) Artistic metrics and design foundations in architecture

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1, A5, A9, A10		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying basic science and mathematics engineering fundamentals.	**LO1**	Identify art and architecture with their concepts throughout the ages
		LO2	Solve complex problems in art forms in buildings.
A5	Practice research techniques and methods of investigation as an inherent part of learning.	**LO3**	Practice research techniques in painting-sculpture-photography-interior design related to architecture.
A9	Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.	**LO4**	Express effectively with audiences by different techniques of art direction in various buildings.
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies	**LO5**	Apply new knowledge from various art schools of architecture and arts.
		LO6	Practice design ideas by special application of art forms in different architectural styles.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√			√	√			√	

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours		
			Theoretical teaching (lectures)	Training	
				Tutorial	Lab / Practical
1	Trends of art and architecture across different historical eras.	3	2	1	0
2	Fine Arts (Sculpture - Drawing - Photography - Interior Design.....) Its relationship to architecture	3	2	1	0
3	Artistic movements of the twentieth century and their influence on architecture art	3	2	1	0
4	Modern School Trends (De Steel - Bauhaus _ and Their Impact on Architecture Arts).	3	2	1	0
5	**Quiz 1 &** practicing of analyze School Trends (De Steel - Bauhaus _ and Their Impact on Architecture Arts).	3	2	1	0
6	Aesthetic features in architectural art formations that complement different design ideas	3	2	1	0
7	**Revision and Mid Exam**				
8	The foundations of the aesthetics of artistic architectural formations of (variation, poise, rhythm..........)	3	2	1	0
9	Analyze horizontal projection of formations of architectural forms that fulfill the principle of design	3	2	1	0
10	The relationship between creativity in arts and architectural design	3	2	1	0
11	Aesthetic features in contemporary and future architecture arts	3	2	1	0
12	Revision.	3	2	1	0
13	semi final	3	2	1	0
14	Final project+general discussion	3	2	1	0
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	**5**	**10**	**10 %**
2	Midterm exam	**7**	**20**	**20 %**
3	Final Written Exam	**15, 16**	**40**	**40 %**
4	Final Oral Exam	**14**	**5**	**5 %**
5	Assignments / Project /Portfolio/ Logbook	**1,2,3,4,5,6,8,9,10,11,12,13,14**	**25**	**25 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Abdel-Gawad, T. A. (1955).** ***History of Architecture and Arts in the*** ***Early Ages*** **(in Arabic). Cairo: Supreme Council of Antiquities**Cruickshank, D. **(1999).** ***A History of Architecture*****. New Delhi: CBS Publisher**
	Other References	• **White, Edward T (1975):** A Vocabulary of Architectural Forms, Architectural Media. • **William (Author) (2010):** The Art of Drowings, Madison Books; Revised ed. Edition. • Architecture, Form, Space, and Order by Frank Ching • **Francis D.K. Ching (2007)**: Architecture: Form. Space & Order, Van Nostrand • **Reinhold, New York. Paul Zelenski, Mary Pat Fisher (2006):** Shaping Space: The Dynamics of Three-Dimensional Design, (3rd edition). www.amazon.com • **Stephen Luecking (2002)**: Principles of Three-Dimensional Design: Objects, Space and Meaning, www.amazon.com • **Wucius Wong (1977)**: Principles of Three-Dimensional Design, Van Nostrand Reinhold Company, New York • **The Architecture of Happiness" by Alain de Botton (2006):** Examines the relationship between architecture and human well-being, combining philosophy and design. • **The Future of Architecture in 100 Buildings" by Marc Kushner**

		(2015): Explores innovative and groundbreaking architectural designs from around the world. • **Bauhaus: A Conceptual Model" by Boris Friedewald (2019):** A comprehensive look at the Bauhaus movement and its impact on architecture and design • **The Art of Looking Up" by Catherine McCormack (2019)**: A visual feast exploring the diverse world of ceilings in significant buildings worldwide. • **The Hare with Amber Eyes" by Edmund de Waal (2010):** Though not the latest, it's a notable work exploring the history of a collection of Japanese netsuke through generations. • **Norman, D. (2023).** ***Design for a better world:*** Meaningful, sustainable, humanity centered. The MIT Press. • **Peters, S. (2024).** ***Architectural material systems:*** Conceptual design strategies. Birkhäuser. • **Fowkes, M., & Fowkes, R. (2023).** ***Art and climate change:*** A concise *history*. Thames & Hudson.
	Electronic Sources (Links must be added)	• http://www.sagradafamilia.org/en/ • https://www.skyscrapercity.com/ • http://www.design-theory.com/
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data show (projector) Laptop or desktop computer

	Course Coordinator	Program Coordinator
Name	**Assoc. Prof. Sahar Ezz El Arab Ramadan**	**Dr.Maysa Ali Selim**
Signature		maysa selim

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw):	Manufacturing Technology			
Course Code (according to the bylaw):	ENG 173			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	JUNIOR			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Abdou Abdallah Hassan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Fundamental of mechanical behavior of material, Structure and manufacturing properties of metal-Phase diagrams and heat treatment, Casting processes, Bulk deformation processes, forging, drawing, rolling, and extrusion. Sheet metal forming processes, blanking, piercing. Metal removal processes, Turning, drilling, milling, shaping, broaching.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A3,A4,B2,B3		Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	LO1	Identify the different types of machining, sand casting, and metal forming processes.
		LO2	Distinguish between the different methods of manufacturing.
		LO3	Formulate forces for various manufacturing methods and examination of force uses in metal forming.
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	LO4	Distinguish analytically between manufacturing methods and production defects.
B2	Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field	LO5	Analyze manufacturing processes and production faults classification
		LO6	Determine the dimensions of a gating system.
B3	Select conventional mechanical equipment according to the required performance.	LO7	Select the suitable type of gating system

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to machining	4	1	2	1	-
2	Traditional methods of machining	4	1	2	1	-
3	Non-traditional method of machining	4	1	2	1	-
4	Introduction to metal forming	4	1	2	1	-
5	Sheet metal forming	4	1	2	1	-
6	Bulk forming, deep drawing	4	1	2	1	-
7	**Revision and Mid Exam**					
8	Bulk forming, wire drawing	4	1	2	1	-
9	Introduction to casting	4	1	2	1	-

10	Expandable mould casting	4	1	2	1	-
11	Permanent mould casting	4	1	2	1	-
12	Gating system design	4	1	2	1	-
13	Feeding system	4	1	2	1	-
14	Revision	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

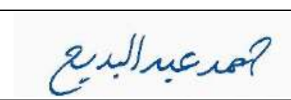
Serial	Experiment
1	Machining workshop (turning, shaping, milling and grinding)
2	Non-traditional methods of machining (video lab.)
3	Flow curve determination (compression and tension test)
4	Design of punch and die for blanking and piercing
5	Bulk forming, wire drawing and rolling (Video lab.)
6	Casting workshop, prepare a mould for pouring
7	Testing of sand casting, (Tension, compression and shear test of sand)

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	4	10	10 %
2	Exam 2 written (Semester work)	9	10	10 %
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	40	40 %
5	Final Practical/Clinical/… Exam	13	10	10 %
6	Assignments / Project /Portfolio/ Logbook	6 & 10	10	10 %

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	• Groover, M. P. "Fundamentals of modern manufacturing: materials, processes, and systems". John Wiley & Sons, 7th edition (2019)
	Other References	• Campbell, JS "Principles of Manufacturing Materials and Processes", McGraw Hill, New York, (2018). •
	Electronic Sources (Links must be added)	• P. N. Rao, "Manufacturing Technology", McGraw-Hill, (2005)
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**Machining and Metal forming workshops, Casting foundry and sand Lab..**

	Course Coordinator	**Program Coordinator**
Name	**Dr Abdou Abdallah**	**Dr. Ahmed Abdalbadia**
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw):	Material Lab			
Course Code (according to the bylaw):	ENG 171			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		3
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Asso. prof. Marwa Elmahdy			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Safety Instructions- Mechanical properties of metals, tensile, compression, bending, torsion, shear, hardness, and impact tests.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2,A4,B2,D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO1**	Explain basic concepts of mechanical properties of metals and alloys.
		LO2	Identify the various forms of material testing and its related terminology.
		LO3	Perform standard laboratory/field tests according to established procedures
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**LO4**	Analyze testing results using appropriate engineering methods.
B2	Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field	**LO5**	Design different samples for testing applications.
D4	Estimate and measure the performance of an electrical/electronic/digital/mechanical/mechatronics system under specific input excitation and evaluate its suitability for a specific application.	**LO6**	Evaluate different materials testing techniques.
		LO7	Conduct practical experiments in the laboratory

			following standard procedures

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√			√		√			

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Safety Instructions	**3**	**0**	**0**	**3**	-
2	Mechanical properties of metals	**3**	**0**	**0**	**3**	-
3	The tensile test	**3**	**0**	**0**	**3**	-
4	Stress-strain diagram	**3**	**0**	**0**	**3**	-
5	Fracture of metals	**3**	**0**	**0**	**3**	-
6	Compression Test	**3**	**0**	**0**	**3**	-

7	**Revision and Mid Exam**					
8	Hardness	**3**	**0**	**0**	**3**	-
9	Hardness and hardness testing	**3**	**0**	**0**	**3**	-
10	Impact tests	**3**	**0**	**0**	**3**	-
11	Torsion, shear	**3**	**0**	**0**	**3**	-
12	Fatigue test	**3**	**0**	**0**	**3**	-
13	Fatigue test	**3**	**0**	**0**	**3**	-
14	Revision for part 2	**3**	**0**	**0**	**3**	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	Tensile test
2	Compression Test
3	Hardness Test
4	Impact tests
5	Torsion tests
6	Shear Test
7	Fatigue Test

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing	Marks/ Scores	Percentage of

		(Week Number)		total course Marks
1	Exam 1 written (Semester work)	**6**	**12.5**	**12.5 %**
2	Exam 2 written (Semester work)	**14**	**12.5**	**12.5 %**
3	Midterm exam	**7**	**30**	**30 %**
4	Final Written Exam	**15, 16**	**30**	**30 %**
7	Assignments	**2,3,4,5,10,12**	**5**	**5 %**
8	Sheets	**13**	**10**	**10 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Strength of Materials (Mechanics of Solids) | Author by S K Duggal and Arjun Prasad | Latest Edition (2024)
	Other References	Callister, William D. Materials Science and Engineering: An Introduction. John Wiley & Sons Australia, Ltd, 2021.
	Electronic Sources (Links must be added)	Microsoft Team
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data show- Laptops
	Supplies	White boards
	Electronic Programs	**NoN**
	Skill Labs/ Simulators	**NoN**
	Virtual Labs	**NoN**
	Other (to be mentioned)	**NoN**

	Course Coordinator	**Program Coordinator**
Name	**Asso. prof. Marwa Elmahdy**	**Dr Ahmed Abd elbadie**
Signature	[illegible]	احمد عبدالبديع

المعهد التكنولوجي العالي - بالعاشر من رمضان	
توصيف مقرر دراسي	

1- معلومات أساسية :

<table>
<tr><td>اسم المقرر: (تبعا لما ورد باللائحة)</td><td colspan="4">مبادئ هندسة التشييد والبناء</td></tr>
<tr><td>كود المقرر: (تبعا لما ورد باللائحة)</td><td colspan="4">مدن 101</td></tr>
<tr><td>القسم/الأقسام العلمية التي شاركت في التدريس:</td><td colspan="4">قسم الهندسة المدنية</td></tr>
<tr><td rowspan="2">إجمالي عدد الساعات المعتمدة للمقرر: (تبعا لما ورد باللائحة)</td><td>إجمالي</td><td>اخري (تحدد)</td><td>عملي</td><td>نظري</td></tr>
<tr><td>3</td><td></td><td>1</td><td>2</td></tr>
<tr><td>نوع المقرر:</td><td colspan="4">اختياري</td></tr>
<tr><td>المستوى الدراسي الذي قدم فيه المقرر:</td><td colspan="4">SOPHOMORE</td></tr>
<tr><td>البرنامج الأكاديمي:</td><td colspan="4">الهندسة المدنية</td></tr>
<tr><td>المعهد:</td><td colspan="4">المعهد التكنولوجي العالي</td></tr>
<tr><td>اسم منسق المقرر:</td><td colspan="4">أ.د / شريف الترساوى</td></tr>
<tr><td>جهة مناقشة واعتماد تقرير المقرر:</td><td colspan="4">مجلس القسم العلمي للبرنامج</td></tr>
<tr><td>تاريخ اعتماد تقرير المقرر:</td><td colspan="4">مجلس القسم شهر أغسطس</td></tr>
</table>

2- الوصف العام للمقرر (ملخص موجز للمحتوي العلمى) :

لمحة عن عملية البناء، الأحمال على المباني، مقاومة الأحمال، الخصائص الإنشائية للمواد، الأنظمة الإنشائية، الخصائص الحرارية للمواد، الخصائص المتعلقة بالحريق، مبادئ البناء المستدام. المواد وأنظمة البناء و المواد الإنشائية ، الجير، الأسمنت والخرسانة ، التربة؛ إنشاء الأساسات ، الأسقف، السلالم، أغطية الأرضيات.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
(A1, A4, A9, A10)		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A1	تحديد وصياغة وحل المشكلات الهندسية المعقدة من خلال تطبيق أساسيات الهندسة والعلوم الأساسية والرياضيات	LO1	التعرف على أنواع المباني ومبادئ البناء المستدام وأنواع الرسومات المدنية والمعمارية.
		LO2	التعرف على دور الأساسات السطحية والعميقة، وأساليب فحص التربة وتصريف المياه الجوفية.
		LO3	وصف أنواع حديد التسليح وأنواع الأسمنت والخرسانة وأنواع تغطيات الأرضيات.
		LO4	دراسة أنواع البلاطات المختلفة، وحساب الأحمال المؤثرة عليها وسمكها
		LO5	التعرف على أنواع الطوب المختلفة وحساب الكميات المطلوبة للبناء.
A4	الاستفادة من التقنيات المعاصرة وقواعد الممارسة والمعايير وإرشادات الجودة ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر	LO6	تطبيق الأكواد لاختيار نوع الأساس بناءً على الأحمال ونوع التربة، وتصميم وتنفيذ المنشآت الخرسانية.
		LO7	تطبيق الإرشادات المعمارية في تصميم السلالم طبقًا للمواد والمساحات المتاحة.
A9	استخدام التفكير الإبداعي والمبتكر والمرن واكتساب مهارات تنظيم المشاريع والقيادة لتوقع المواقف الجديدة والاستجابة لها	LO8	تخطيط الموقع وتجهيزه لأعمال التنفيذ ما في ذلك تنفيذ الشدّات للعناصر الإنشائية و استلامها
A10	اكتساب وتطبيق المعرفة و التعلم الذاتي وغيرها من استراتيجيات التعلم	LO9	التعامل مع العطاءات والعقود والقضايا المالية للمشروعات

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	ميكروسوفت تيم	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتي	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهني	التمارين العملية	المحاضرات
	√							√	√					√	√

الجدول الدراسي للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة			
			تدريس نظري	تدريب		أخرى (تحدد)
				تمارين	عملي	
1	مقدمة	3	2	1		
2	خطوات البناء والرسومات المدنية والمعمارية والمواد الخرسانية	3	2	1		
3	حساب الكميات وأنواع الرسومات الهندسية	3	2	1		
4	العطاءات والتخطيط والإعداد للموقع	3	2	1		
5	طرق فحص التربة، الأساسات (الأساسات السطحية)	3	2	1		
6	أنواع الأساسات (الأساسات العميقة)	3	2	1		
7	مراجعة وامتحان منتصف الفصل الدراسي					
8	التخلص من المياه الجوفية	3	2	1		
9	الشدات و إستلام الأساسات	3	2	1		
10	الشدات و إستلام الأعمدة	3	2	1		
11	الشدات و إستلام البلاطات	3	2	1		
12	نواع البلاطات وتوزيع الأحمال عليها وحساب السمك	3	2	1		
13	أنواع الطوب وحساب كميات المواد للبناء	3	2	1		
14	التصميم المعماري للسلالم	3	2	1		
16-15	إختبارات الفصل الدراسي النهائية					

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	3	10	%10
2	امتحان 2 تحريري (أعمال سنة)	12	10	%10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	15 و 16	40	% 40
5	تمارين و أبحاث	إسبوعيا	20	%20

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	**-الكود المصري لميكانيكا التربة، اللجنة الدائمة للكودالمصرى، مركز بحوث الإسكان والبناء، القاهرة، 2024** **-الكود المصرى لتصميم وتنفيذ المنشآت، اللجنة الدائمة للكود المصرى، مركز بحوث الإسكان والبناء القاهرة،2024**
	المراجع الأخرى	**-الموسوعة الحديثة فى تكنولوجيا تشييد المبانى3م، فاروق عباس حيدر، منشاة المعارف،2006** **-موسوعة التنفيذ المعمارى والانشائى، حسين محمد جمعة، اللجنة الدائمة، القاهرة،2005**
	المصادر الالكترونية (لابد من إضافة الروابط)	**https://books-library.website/files/download-** pdf-ebooks.org-1544385031Kk6O6.pdf **-الملحق الثانى للكود المصرى**
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office www.researchgate.net www.engineeringcivil.com http://ocw.mit.edu/ General | تشيد ترم الصيفي | Microsoft Teams
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	**سبورة بيضاء** **ب- جهاز عرض**

	منسق المقرر	منسق البرنامج
الإسم	أ.د/ شريف حسين الترساوى	د. غادة نشأت محمد
التوقيع		غادة نشأت

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Principles of engineering electrical**			
Course Code (according to the bylaw)**:**	**EEC 101**			
Department/s that participated in the teaching:	**Electrical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**		**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr.Eslam Mansour			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/11/2025**			

2. Course Overview (Brief summary of scientific content):

Basic Concepts: Voltage, current, power, and energy, Independent and dependent voltage and current sources. DC Circuits Analysis: Ohms law, Kirchhoff's current and voltage laws. Series and parallel DC circuit's analysis, nodal analysis, and mesh analysis. Superposition, source transformation, and maximum power transfer theorems, Thevenin's and Norton's theorems. Capacitance and Inductance: series and parallel connections of capacitors and inductors. AC Circuits Analysis: Sinusoidal sources, r. m. s. value, phasor representation, complex impedances, Kirchhoff's laws in the phasor domain, parallel and series AC circuits. Experiments will be conducted to support the course including the use of computer software for circuit analysis.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		Course Learning Outcomes	
(A1, A2, A3)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO.1**	Calculate the voltage difference and current intensity through any device in a complex circuit.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO.2**	Ability to use Spice simulator to calculate the current and voltage drop through any element.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO.3**	Determine the optimal load of a two-terminal circuit (that absorbs the maximum power).
		LO.4	Choose the suitable load for a predefined phase shift between the AC voltage and current.
		LO.5	Check the ability of a circuit component to be connected in a circuit without be overheated.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	/ Practical Lab
1	Basic Concepts: Voltage, current, power, and energy, Independent and dependent voltage, and current sources.	3	2	1	
2	Ohms law, Kirchhoff's current and voltage laws. Series and parallel DC circuit's analysis.	3	2	1	
3	Nodal analysis, and mesh analysis.	3	2	1	
4	Superposition, and source transformation.	3	2	1	
5	Maximum power transfer theorems, Thevenin's and Norton's theorems.	3	2	1	
6	Capacitance and Inductance: series and parallel connections of capacitors and inductors.	3	2	1	
7	**Revision and Mid Exam**				

8	Phasor representation, complex impedances.	3	2	1	
9	Kirchhoff's laws in the phasor domain.	3	2	1	
10	Parallel and series AC circuits.	3	2	1	
11	Parallel and series AC circuits.	3	2	1	
12	Parallel and series AC circuits.	3	2	1	
13	Parallel and series AC circuits.	3	2	1	
14	General Revision.	3	2	1	
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Final Exam (*written*)	15th	**40**	**40 %**
2	Midterm written Exam (*Term Work*)	7th	**20**	**20 %**
5	Quizzes/reports/presentation (*Term Work*)	6th &11th/ during the semester	**40**	**40 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Electric Circuits", James W. Nilsson, Susan Riedel, Eleventh edition, Global Edition-Pearson 2019
	Other References	Fundamentals of electric circuits", Charles K. Alexander, Matthew N. O. Sadiku, fifth edition, McGRAW-HILL, 2013.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office

Supportive facilities & equipment for teaching and learning *	**Supplies**	White board, Projector and Microsoft teams .
	Skill Labs/ Simulators	

	Course Coordinator	**Program Coordinator**
Name	Dr. Eslam Mansour	**Ass.Prof.Dr. Taghreed Saied**
Signature	eslam mansour	taghreed said

1. Basic information:

Course Title (according to the bylaw)**:**	**Principles of Electronics Engineering**			
Course Code (according to the bylaw)**:**	**EEC 102**			
Department/s that participated in the teaching:	**Electrical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**		**3**
Course Type:	Elective			
The level to which the course was introduced:	**JUNIOR**			
Academic Program:	**ALL ENGINEERING PROGRAMS**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Eslam Samy El-Mokadem**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/11/2025**			

2. Course Overview (Brief summary of scientific content):

Revisions on: Semiconductor physics. P-n junction; I-V characteristics, Reverse saturation current depletion layer capacitance, Diffusion capacitance, Diode applications. half-and full-wave rectifier, Peak rectifier, Voltage doublers, Other two-terminal devices; Zener diodes, Metal-semiconductor junction, heterojunction and Ohmic contacts, Schottky barrier diodes, Bipolar Junction transistor (BJT), Static and dynamics characteristics, Field effect transistors, JFET models and biasing, FET application; MOSFET principles of operation, MOSFET as a resistance. Verification of transistor Characteristics – Verification of different configurations of the transistor amplifiers (common emitter – common base – common collector)- Verification of MOSFET configuration and measuring the different parameters.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1, A2, A3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Use the principles of semiconductor materials, PN junction, diode theory and diode equivalent circuit in calculating voltages and currents in circuits.
A2	A2. Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO2**	Analyze the performance of half and full wave rectifier circuits from points of Efficiency and ripple factor
		LO3	Construct clipping and clamping circuits using diodes and Zener diodes to use it in wave shaping
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with	**LO4**	Design voltage regulator circuits using Zener diodes under different conditions.

	consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development	**LO5**	Design power supply circuit
		LO6	Recognize transistor parameters and characteristics to make DC analysis for transistor circuits

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√	√	√	√		√	√	√			√		√		√	

Course Schedule:

Week No.	***Scientific content of the course (Course Topics)***	***Total Weekly Hours***	**Expected number of the Learning Hours**		
			Theoretical teaching *(lectures)*	**Training**	
				Tutorial	**Lab / Practical**
1	Semiconductor Materials	3	2	1	0
2	P.N Junction	3	2	1	0
3	Diode Theory	3	2	1	0
4	Diode circuits application (Half wave rectifiers)	3	2	1	0
5	Diode circuits application (Full wave rectifiers)	3	2	1	0

6	Diode circuits application (Clippers circuits)	3	2	1	0
7	**Revision and Mid Exam**				
8	diodes characteristics and Zener applications	3	2	1	0
9	Principles of operation for Bipolar junction transistors (BJT)	3	2	1	0
10	Principles of operation for Bipolar junction transistors (BJT)	3	2	1	0
11	BJT common modes	3	2	1	0
12	for operation of Principles JFET transistor	3	2	1	0
13	Principles of operation for MOSFET	3	2	1	0
14	Principles of operation for MOSFET	3	2	1	0
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**4,6,11,12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Microelectronic Circuits-Oxford "Adel Sedra, , 8th-Edition,2020."University Press
	Other References	Electronic-"Robert Boylestad,Louis Nashelsky , ,11th-Edition,2014. "Devices-and-Circuit-Theory
	Electronic Sources (Links must be added)	Available Presentation (handed to students part by part on the Microsoft teams course class .
	Learning Platforms (Links must be added)	EKB - Microsoft office

Supportive facilities & equipment for teaching and learning *	**Supplies**	White board, Projector and Microsoft teams .
	Skill Labs/ Simulators	Proteus or Multisim.

	Course Coordinator	**Program Coordinator**
Name	**Dr. Eslam Samy EL-Mokadem**	**Assistant Prof. Taghreed Saied**
Signature	*Dr. Eslam Samy EL-Mokadem*	*taghreed said*

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Principles of Electric Machines**			
Course Code (according to the bylaw):	EEC 103			
Department/s that participated in the teaching:	Electrical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	1		3
Course Type:	Elective			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	ALL ENGINEERING PROGRAMS			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Assoc. Prof. Dr. Taghreed Said			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/11/2025			

2. Course Overview (Brief summary of scientific content):

Elements of Electric Drives, DC motor drives including conventional, brushless and modern permanent magnet motors; AC motor drives including induction and synchronous motors. Magnetic Circuits: Magnetic equivalent circuit, analogy with electric circuits, losses, linear and non-linear magnetic circuits calculations. Transformers: Single phase transformers, principle of operation, equivalent circuit, equivalent parameters determination, three phase transformers, connections of transformers, autotransformers, harmonics, Principles of operation of DC machines.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1, A2, A3)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.**	**LO1**	**Identify concepts of magnetic circuit analysis and electromechanical energy conversion principles.**
		LO2	**Recognize operation Principles of electrical transformers and DC machines.**
		LO3	**Conclude the equivalent circuit parameters of transformers and DC machines.**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.**	**LO4**	**Illustrate performance curves of transformer and DC machines**
		LO5	**Select the analysis methods of transformer and DC machines problems.**
		LO6	**Assess and evaluate the performance characteristics of electrical machines.**
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development**	**LO7**	**Apply the acquired knowledge and modern tools to develop modern-day applications out of these machines according to their unique characteristics**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Lab / Practical
1	Magnetic circuit analysis	3	2	1	0
2	Magnetic circuit analysis	3	2	1	0
3	single-phase transformers construction, theory of operation, transformation ratios of voltage and current.	3	2	1	0
4	single-phase transformers equivalent circuit.	3	2	1	0
5	phasor diagram and voltage regulation of single-phase transformer.	3	2	1	0
6	losses, efficiency, and daily efficiency of single-phase transformer.	3	2	1	0
7	**Revision and Mid Exam**				

8	single-phase transformer tests	3	2	1	0
9	single-phase transformer classification, and applications.	3	2	1	0
10	Electromechanical energy conversion principles.	3	2	1	0
11	DC generators construction, types, and the theory of operation	3	2	1	0
12	DC generators equivalent circuit, EMF equations, Power flow, efficiency and applications.	3	2	1	0
13	DC motors construction, types, EMF and torque equations and the theory of operation.	3	2	1	0
14	DC motor characteristics, starting, types of starters, speed control, braking and testing of all types of DC machines)	3	2	1	0
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	**4**	**10**	**10%**
2	Quiz 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
5	Final Practical/Clinical/… Exam		**0**	
6	Final Oral Exam		**0**	
7	Assignments / Project /Portfolio/ Logbook	**During Semester**	**20**	**20%**
8	Field training		**0**	
9	Other (Mention)		**0**	

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference** (must be written in full according to the scientific documentation method)	1- Fitzgerald & Kingsley's Electric Machinery, 7th Edition, Stephen Umans,2014 **2-** B. L. Theraja and A. K. Theraja " Text Book of Electrical Technology " volume-1, S. CHAND & COMPANY LTD, New Delhi, 2014 .

references, etc.) *		**3-** U.A. Bakshi and V. U. Bahshi " Electrical Technology", Technical Publications , Pune, India, 2020.
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Data Show
	Supplies	White board
	Electronic Programs	
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

	Course Coordinator	**Program Coordinator**
Name	**Assoc. Prof. Dr. Taghreed Said**	**Assoc. Prof. Dr. Taghreed Said**
Signature	taghreed said	taghreed said

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. *Basic information:*

Course Title (according to the bylaw)**:**	**Principles of Power Mechanical Engineering**			
Course Code (according to the bylaw)**:**	**ENG 104**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**	**--**	**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**SOPHOMORE**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Asso. Prof. Dr. Amr Hassaan**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. *Course Overview (Brief summary of scientific content):*

First Law of Thermodynamics - Energy conversion - Power cycles - principles of fluid mechanics – Prime movers(Gasoline & Diesel Engines) - Pumps & Turbines Principles of heat transfer - Simple steam plants - Refrigerators.

3. ***Course Learning Outcomes CLOs :***

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1, A2, A3)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**LO1**	Identify common gauges used in fluid mechanics, such as barometers, manometers, Bourdon gauges, and flowmeters.
		LO2	Describe representative engineering problems and explain the working principles of relevant mechanical systems.
A2	Develop and conduct appropriate experimentation and/or simulation, analyse and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO3**	Demonstrate the application of Bernoulli's equation and analyze the effect of a jet on a stationary plate.
		LO4	Analyze the physical properties and practical behavior of fluids through experimentation.
		LO5	Distinguish between various applications involving fluid machinery using fundamental fluid mechanics principles.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO6**	Select the appropriate type of flowmeter based on application requirements.
		LO7	Apply fluid mechanics principles to the design of pressure vessels, such as circular cylinders and spheres, used in industry.
		LO8	Demonstrate logical, creative, and comparative thinking to solve unfamiliar engineering problems.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√	√								√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	/ Practical Lab
1	-Introduction to power mechanical engineering.	**3**	**2**	**1**	**-**
2	-Short summary of the basics.	**3**	**2**	**1**	**-**
3	-Heat energy and modes of heat transfer	**3**	**2**	**1**	**-**
4	Thermal expansion types	**3**	**2**	**1**	**-**
5	Describes fluid pressure, together with buoyancy and hydrostatic stability. Define Archimedes principles	**3**	**2**	**1**	**-**
6	Know gauges used in fluid mechanics, such as barometers, manometers.	**3**	**2**	**1**	**-**
7	**Revision and Mid Exam**				
8	Bourdon pressure and vacuum gauges.	3	2	1	-
9	Categories of flowmeters.	**3**	**2**	**1**	**-**

10	Demonstrates Bernoulli's equation and the impact of a jet on a stationary plate.	**3**	**2**	**1**	**-**
11	Identify relationships that exist between pressure, volume and temperature in a gas are given in a set of laws called the gas laws.	**3**	**2**	**1**	**-**
12	States the types of combustion engines and names the components of internal combustion engines.	**3**	**2**	**1**	**-**
13	Identify how the steam power plant works.	**3**	**2**	**1**	**-**
14	Basic refrigeration cycle.	**3**	**2**	**1**	**-**
15,16	**Final Exam.**				

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**5**	**20**	**20 %**
2	Exam 2 written (Semester work or quiz)	**10**	**20**	**20 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	-Bird & Carl Ross , " Mechanical Engineering Principles " Routledge 4^{th} Ed., 2019.
	Other References	• B.R. Munson, D.F. Young, T.H. Okiishi, and W.W. Huebsch, Fundamentals of Fluid Mechanics, John Wiley and Sons Inc., $9^{th'}$ Ed., 2021. • R. E. Sonntag, C. Borgnakke and G. J. Van Wylen, Fundamentals of thermodynamics, John Wiley and sons Inc., 2009.
	Electronic Sources (Links must be added)	**NA**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities &	**Devices/Instruments**	Data-show and Laptop
	Supplies	White board

equipment for teaching and learning *	**Electronic Programs**	Microsoft teams
	Skill Labs/ Simulators	**NA**
	Virtual Labs	**NA**
	Other (to be mentioned)	**NA**

	Course Coordinator	**Program Coordinator**
Name	**Associate Prof. Amr Hassaan**	**Dr. Mohamed Ashraf**
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Field Training 1			
Course Code (according to the bylaw)**:**	FTR 131			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		18		18
Course Type:	Compulsory			
The level to which the course was introduced:	SOPHOMORE			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Assoc. Prof. Dr. Mona A. Younis			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

This is specialized training in which the students spend their training period in any engineering institution, firms or training centers. Students should demonstrate the professional and practical skills they acquired during discussion with examination committee

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A4, A7, A8, A10, D1, B4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1.**	**Write a technical report for the field training.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO2.**	**Develop new skills and obtaining knowledge to handle unfamiliar tasks more effectively in the future.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools..**	**LO3.**	**Integrate academic knowledge with practical experience gained during training.**
A9	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO4.**	**Recognize the value of work, time, and teamwork, and professional attitudes revealing.**
B4	**Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems**	**LO5.**	**Identify the tools required for different mechatronics components examination.**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	**LO5.**	**Apply national and international standards and codes in engineering practice.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√				√	√		√	√	√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		
				Tutorial	Practical /Lab	
	Train on the overall mechanical process					
	Train on reading overall flowsheet of the process Train on reading overall flowsheet of the process					
As scheduled	Midterm Report and Oral Exam	18				
	Carry out research using granted internet sites for references related to student's 2 training process					
	Write technical report					
	Final Exam.					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Attendance		**10**	**10%**
2	End of term Oral exam		**30**	**30%**
3	Midterm Report (*Term Work*)	**As scheduled**	**20**	**20 %**
4	Final Report (*written*)	**AS scheduled**	**20**	**20 %**
5	Follow up		**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Depend on the case/ technical writing booking**
	Other References	**Hand out to students one by one**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Assoc. Mona A. Younis**	**Dr. Ahmed Abdelbadea**
Signature	MONA A. YOUNIS	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Automotive Engineering			
Course Code (according to the bylaw)**:**	AUT E73			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4	0	0	4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Hossam ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Introduction, mechanics of pneumatic tires performance of road vehicles (tractive effort, road resistance, AUTrodynamic resistance, other motion resistance, acceleration, speeding up distance &time, grad, ability, fuel economy, braking, ABS), vehicle handling (controllability & stability), vehicle ride.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2& A4& A10 & D2 & D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	**LO1**	**Develop appropriate experimental setups and/or simulations to assess automotive systems such as vehicle dynamics, braking, and fuel efficiency.**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**	**LO2**	**Explain the fundamentals of vehicle dynamics including tire-road interaction**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO3**	**Evaluate advancements and best practices in ride comfort and dynamic performance.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.**	**LO4**	**Compute tractive effort, resistance forces, acceleration, grade ability, and fuel economy of vehicles.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO5**	**Assess braking dynamics including ABS operation and performance characteristics.**

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	/ Practical Lab	
1	Introduction, (types of automobiles, layout of automobile aggregates)	3	1	2	-	-
2	transmission system (Friction clutches, and torque converter)	3	1	2	-	-
3	transmission system (manual FWD, RWD and automated manual transmission)	3	1	2	-	-
4	Dual mass flywheel and dual manual transmission, power shafts, joints, final drive, and differential	3	1	2	-	-
5	transmission system (automatic and continuous variable transmission)	3	1	2	-	-
6	automobile frames (classifications and construction)	3	1	2	-	-
7						
8	Vehicle wheels and tire types and construction	3	1	2	-	-
9	Suspension systems and axles (different types and construction (rigid & independent)	3	1	2	-	-
10	Steering system (automobile steering mechanism types, transmission	3	1	2	-	-
11	brakes systems (hydraulic & air brakes), components and operation.	3	1	2	-	-
12	Advanced technologies of suspension, steering, braking systems.	3	1	2	-	-

13	Front wheel angles.	3	1	2	-	-
14	Revision.	3	1	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**6**	**10**	**10%**
2	Exam 2 written (Semester work)	**10**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**5**	**15**	**15%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Road and Off-Road Vehicle System Dynamics Handbook* (2022)** **Author: Gianpiero Mastinu, Manfred Ploechl**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**non**
	Electronic Programs	**MATLAB/Simulink (Vehicle Dynamics Toolbox)** **MS-Excel-based computation model**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	*Hossam Ramadan*	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Automotive Technology			
Course Code (according to the bylaw)**:**	AUT E71			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4	0	0	4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Hossam ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Introduction, automobile engine, transmission layout, classification of heat engines, operating cycle's of I.C.E, basic terms and definitions construction of engine parts, fuels system of spark ignition engines, fuel system of compression engines, lubrication system, and cooling system. Battery, charging system, starting systems, ignition systems (classical, transistorized, electronic, computer controlled; etc.), lighting and signaling systems - modern trends. (types of automobiles, layout of automobile aggregates), transmission system (clutch, gear box, power shafts & joints, final drive and differential.), frame (types and construction of automobile frames.), suspension & axles (different types and construction (rigid & independent), wheel and tires), steering system (automobile steering mechanism types, transmission &operation, Front wheel angles, definition and function), brakes (hydraulic &air brakes), construction and operation).

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	**LO1**	**Identify electrical systems such as starting, charging, lighting, and electronic ignition systems.**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**	**LO2**	**Explain the construction, functions, and operating cycles of internal combustion engine systems.**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO3**	**Investigate and report on recent developments and trends in automotive technologies.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.**	**LO4**	**Demonstrate knowledge of chassis components including transmission, suspension, and steering mechanisms.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO5**	**Analyze different fuel, lubrication, ignition, and cooling systems used in automobiles.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√					√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Introduction to Automotive Systems and Vehicle Layouts	4	2	2	0	-
2	Classification and Operating Cycles of Heat Engines	4	2	2	0	-
3	Engine Components and Construction	4	2	2	0	-
4	Fuel Systems in SI and CI Engines	4	2	2	0	-
5	Lubrication and Cooling Systems	4	2	2	0	-
6	Battery, Charging, and Starting Systems	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Ignition Systems (Conventional and Modern)	4	2	2	0	**LO1**
9	Lighting and Signaling Systems	4	2	2	0	-
10	Clutch, Gearbox, Power Shafts & Differential	4	2	2	0	-

11	Automobile Frame, Suspension, and Axles	4	2	2	0	-
12	Steering Systems and Front Wheel Geometry	4	2	2	0	-
13	Braking Systems: Hydraulic & Air Brakes	4	2	2	0	-
14	Modern Trends in Automotive Technology	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**13**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***"Automotive Technology: A Systems Approach"* (7th Edition, 2020) Authors: Jack Erjavec, Rob Thompson**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**GT-Power, AVL Cruise, or Simulink models for ICE**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	*Hossam Ramadan*	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Theory of Internal Combustion Engine			
Course Code (according to the bylaw)**:**	AUT E72			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4	0	0	4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Hossam ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	AUG.2025			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Thermodynamics of ideal cycles, thermodynamics analysis of actual cycle, thermal calculation of I.C.E., parameters characterizing the work cycle and economy, thermal balance of I.C.E., mixture formation in S.I. engine, combustion in S.I. engines, combustion in C.I. engines, mixture creation in C.I. engines, engines performance characteristics.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2&A4&A10&D2&D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	**LO1**	**Analyze thermodynamic cycles useingin internal combustion engines, both ideal and actual.**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**	**LO2**	**Explain the physical processes of mixture formation and combustion in SI and CI engines**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO3**	**Investigate emerging technologies and researching trends in combustion and engine thermal systems**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.**	**LO4**	**Evaluate and comparing performance characteristics of various types of I.C. engines.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO5**	**Perform thermal calculations and evaluating engine performance parameters (efficiency, power, losses)**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√					√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction and Thermodynamics of Ideal Cycles (Otto, Diesel, Dual)	4	2	2	0	-
2	Thermodynamic Analysis of Actual Engine Cycles	4	2	2	0	-
3	Deviations from Ideal Cycles & Loss Mechanisms	4	2	2	0	-
4	Thermal Calculations of I.C. Engines	4	2	2	0	-
5	Parameters Characterizing Engine Work & Economy	4	2	2	0	-
6	Thermal Balance of I.C.E. (input/output energy analysis)	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Mixture Formation in Spark Ignition (SI) Engines	4	2	2	0	-
9	Combustion Process in SI Engines	4	2	2	0	-
10	Combustion Process in Compression Ignition (CI) Engines	4	2	2	0	-
11	Mixture Formation in CI Engines (Injection & Atomization)	4	2	2	0	-

12	Performance Characteristics and Engine Testing	4	2	2	0	-
13	Efficiency Maps, BSFC, Torque and Power Curves	4	2	2	0	-
14	Modern Trends in Combustion Technology (e.g., GDI, HCCI, EGR, etc.)	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**13**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Internal Combustion Engines: Applied Thermosciences* (3rd Edition, 2021) Authors: Colin R. Ferguson, Allan T. Kirkpatrick**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**MS Excel or Python for engine data analysis** **MATLAB/Simulink for cycle modeling**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	*Hossam Ramadan*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Manufacturing Automation			
Course Code (according to the bylaw)**:**	ENG E03			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr.Ahmed Abu El Fadl			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

The role of automation in manufacturing. Mechanization and automation. Robot types and configuration control systems, drive systems, programming methods, vision systems, identifying opportunities for reboting, specification, safety for robotic installation, economic factors and quality on machine performance.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A3,A9,D1,D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.**	**LO1**	**Apply sustainable engineering design concepts to provide cost-effective and environmentally friendly automation solutions in production.**
A9	**Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.**	**LO2**	**Demonstrate creative problem-solving and entrepreneurial thinking in identifying and implementing automation opportunities in industrial settings.**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	**LO3**	**Use programming and simulation tools in modeling, controlling, and analyzing robotic and automated manufacturing systems.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO4**	**determine the effectiveness and acceptability of automated systems and robotic setups, assess their performance under various operating scenarios.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√		√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	**Other**
1	Introduction to Manufacturing Automation	4	2	2	0	-
2	Mechanization vs Automation	4	2	2	0	-
3	Types of Industrial Robots and Configurations	4	2	2	0	-
4	Robot Drive Systems (Electric, Pneumatic, Hydraulic)	4	2	2	0	-
5	Control Systems and Architectures	4	2	2	0	-
6	Robot Programming Methods	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Vision Systems in Manufacturing	4	2	2	0	-

9	Safety Considerations for Robotic Installations	4	2	2	0	-
10	Identifying Opportunities for Robotic Automation	4	2	2	0	-
11	Cost Analysis and Economic Factors in Automation	4	2	2	0	-
12	Quality and Machine Performance Considerations	4	2	2	0	-
13	Case Studies and Emerging Trends	4	2	2	0	-
14	Final Presentations – Innovative Automation Solutions	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**15**	**15%**
2	Exam 2 written (Semester work)	**12**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**10**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Automation, Production Systems, and Computer-Integrated Manufacturing* (5th Ed., 2023)** **Author: Mikell P. Groover**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**MATLAB/Simulink** **Automation Studio** **PLC programming software**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Dr.Ahmed Abu El -FADl**	**Dr. Ahmed Abdalbadia**
Signature	*Ahmed fadl*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Design of Machine Elements			
Course Code (according to the bylaw)**:**	ENG 271			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	5			5
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr.Saleh Sobhy			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Introduction , material and their properties ,manufacturing technology , modes of fractures - Design of fasteners (riveting , welding ,screwed joints) , power screw ,levers, shaft design, coupling- Gear design (Spur, Helical, Bevel, & worm), rolling bearings selection , sliding bearing design , flat and V-belt and pulley transmission.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A3,A10, B 1, B 3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic mechanics of materials**	**LO1**	**Identify key relationships in stress analysis calculations by applying the basics of machine design.**
		LO2	**Distinguish between different types of stresses.**
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.**	**LO3**	**Apply suitable theories of mechanical design**
A10	**Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.**	**LO4**	**Analyze cost-related applications by searching for information to develop knowledge and skills that support life-long learning.**
B1	**Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and**	**LO5**	**Evaluate applications involving simultaneous operations and cost considerations using basic design concepts.**
		LO6	**Determine design requirements for machine elements.**

	Analysis, Dynamics and Vibrations.		
B3	**Select conventional mechanical equipment according to the required performance.**	**LO7**	**Select appropriate materials and design theories for machine elements.**
		LO8	**Select material processing methods according to the required performance.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√		√	√		√	√		√	√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Material and their properties, manufacturing technology	**5**	**2**	**3**	-	-
2	Modes of fractures	**5**	**2**	**3**	-	-
3	Failure Theories	**5**	**2**	**3**	-	-

4	Design of fasteners	**5**	**2**	**3**	-	-
5	Power screw	**5**	**2**	**3**	-	-
6	Shaft design	**5**	**2**	**3**	-	-
7	**Revision and Mid Exam**					
8	Complex stress on the shafts	**5**	**2**	**3**	-	-
9	Gear design	**5**	**2**	**3**	-	-
10	Gear design	**5**	**2**	**3**	-	-
11	rolling bearings selection	**5**	**2**	**3**	-	-
12	Sliding bearing design	**5**	**2**	**3**	-	-
13	flat pulley transmission	**5**	**2**	**3**	-	-
14	V-belt and pulley transmission	**5**	**2**	**3**	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10 %**
2	Exam 2 written (Semester work)	**10**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Robert L. Mott, "MachineElementsinMechanicalDesign", 6thEdition,Pearson,2018
	Other References	
	Electronic Sources (Links must be added)	**MS.TEAMS**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	**Dr.Saleh Sobhy**	Dr. Ahmed Abdalbadia
Signature	***Saleh Sobhy***	احمدعبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	**Machinery Diagnosis & Condition Monitoring**			
Course Code (according to the bylaw)**:**	**ENG 277**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			**4**
Course Type:	Elective			
The level to which the course was introduced:	**SENIOR 1**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Assoc. Prof. Dr. Mona A. Younis**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Study of periodic and random signals, statistical properties, auto and cross correlation and power spectral density- functions of commonly found systems, spectral analysis, Fourier transforms and fast Fourier transform algorithm; real time analyzers and discrete signals. Introduction to condition monitoring of machinery; vibration standards and monitoring procedures, use and selection of measurements, analysis procedures and instruments. Applications to rotating machinery, oil debris analysis, temperature analysis, Acoustic emission.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A3 , A5, B1,B3		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.**	**LO1**	**Describe the different types of maintenance.**
		LO2	**Identify the differences between maintenance and repair.**
		LO3	**Classify the various types of maintenance.**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO4**	**Explain the duties of a maintenance engineer.**
		LO4	**Demonstrate maintenance planning and administration.**
B1	**Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.**	**LO5**	**Identify the challenges of vibration monitoring.**
B3	**Select conventional mechanical equipment according to the required performance.**	**LO6**	**Classify different types of vibration transducers.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√			√	√				√	√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to maintenance	4	2	2	-	-
2	Preventive maintenance	4	2	2	-	-
3	Types of preventive maintenance	4	2	2	-	-
4	Types of preventive maintenance	4	2	2	-	-
5	Types of preventive maintenance	4	2	2	-	-
6	Duties and responsibilities of production manager and production engineer.	4	2	2	-	-
7	**Revision and Mid Exam**					
8	Duties and responsibilities of production manager and production engineer.	4	2	2	-	-

9	Duties and responsibilities of production manager and production engineer.	4	2	2	-	-
10	introduction to vibration	4	2	2	-	-
11	Vibration monitoring	4	4	2	2	-
12	Data acquisition vibration sensors	4	4	2	2	-
13	Handheld vibration instruments	4	4	2	2	-
14	revision	4	4	2	2	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**10**	**10%**
9	Other (presentation)	**12**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**1- R.C.MISHRA, „RELIABILITY AND MAINTENANCE", 2008**
	Other References	**2- GANG SHEN CHEN," HANDBOOK OF FRICTION VIBRATION INTERACTION, 2026**
	Electronic Sources (Links must be added)	**Non**
	Learning Platforms (Links must be added)	**Non**
Supportive facilities & equipment	**Devices/Instruments**	**Non**
	Supplies	**Non**
	Electronic Programs	**Non**

for teaching and learning *	**Skill Labs/ Simulators**	**fault diagnosis equipment available in lab.**
	Virtual Labs	**Non**
	Other (to be mentioned)	**Non**

	Course Coordinator	**Program Coordinator**
Name	Assoc. Mona A. Younis	Dr. Ahmed Abdelbadea
Signature	MONA A. YOUNIS	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Renewable Energy
Course Code (according to the bylaw):	MEC 257
Department/s that participated in the teaching:	Mechanical Engineering
Total number of credit hours of the course: (according to the bylaw)	Theoretical: 4; Practical: ; Other (specify): ; Total: 4
Course Type:	Elective
The level to which the course was introduced:	SENIOR 1
Academic Program:	Mechatronics Engineering
Institute:	Higher Technological Institute
Name of Course Coordinator:	Dr. Mohamed Salah
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department
Course Specification Approval Date:	8/12/2025

2. Course Overview (Brief summary of scientific content):

Introduction, Renewable energies; Solar, wind, Biomass, geothermal, Tidal, Oceans wave, hydrogen. The sun structure, solar constant, collectors, collector performance, Heat removal factor. Applications, Design consideration of wind energy, site selection, available wind power, Applications, Biomass conversion to fuel, storage of energy. Economics.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	LO1	Identify a broad range of renewable energy interventions to address specific energy requirements, particularly related to solar, wind and hydro sources.
		LO2	Evaluate the sustainability challenges of different renewable energy interventions.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	LO3	Utilize industry-standard modelling tools to develop basic renewable energy system models.
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	LO4	Analyze applications of renewable energy operations through independent information search to develop knowledge and life-long learning skills.
B1	Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements,	LO5	Distinguish renewable energy applications analytically by applying fundamental concepts.
		LO6	Design practical renewable energy systems using appropriate methods and tools.

	Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.		
B3	Select conventional mechanical equipment according to the required performance.	**LO7**	Select appropriate components for renewable energy systems based on performance requirements.
		LO8	Apply suitable design methods for conventional solar collectors according to performance requirements.

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√	√	√	√	√	√	√				√	√				√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	**/ Practical Lab**	
1	Introduction to the course. Sources of renewable energy.	4	2	2	-	-
2	Available solar energy and solar constant.	4	2	2	-	-
3	Types of solar collectors.	4	2	2	-	-

4	Flat plate solar collector performance.	4	2	2	-	-
5	Solar heating systems.	4	2	2	-	-
6	Solar heating systems.	4	2	2	-	-
7	**Revision and Mid Exam**					
8	Photovoltaic technology.	4	2	2	-	-
9	PV panel's structure.	4	2	2	-	-
10	PV system components.	4	2	2	-	-
11	PV system design.	4	2	2	-	-
12	Available wind energy.	4	2	2	-	-
13	Applications of wind energy.	4	2	2	-	-
14	Applications of wind energy.	4	2	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10 %**
2	Exam 2 written (Semester work)	**11**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**0**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Sørensen, B. (2017) Renewable Energy: Physics, Engineering, Environmental Impacts, Economics and Planning. 5th edn. London: Academic Press.

references, etc.) *		Duffie, J.A., Beckman, W.A. and Blair, N. (2020) Solar Engineering of Thermal Processes, Photovoltaics and Wind. 5th edn. Hoboken, NJ: John Wiley & Sons.
	Other References	Le Gourieres, D. (1982) Wind Power Plants: Theory and Design. Oxford: Pergamon Press. S. P. Sukhatme, Solar Energy, Tata McGraw-Hill.(2008) A. E. Dixon, J. D. Leslie, Solar Energy Conversion, eBook (1797), ISBN: 9781483189284. G.Tully, Solar heating systems: Analysis and design with the Sun-Pulse method (An Energy learning systems book).(1981) Farah Ejaz Ahmed, Raed Hashaike, Nidal Hilal, Solar powered desalination – Technology, energy and future outlook, . Desalination 453 (2019) 54-76. John R. Howell, Richard B. Bannerot, Gary C. Vliet, Solar Thermal Energy Systems, eBook (1982), New York : McGraw-Hill, c1982.
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	None
	Supplies	None
	Electronic Programs	None
	Skill Labs/ Simulators	None
	Virtual Labs	None
	Other (to be mentioned)	None

	Course Coordinator	Program Coordinator
Name	**Dr. Mohamed Salah**	**Dr. Ahmed Abdalbadia**
Signature	M. Salah	أحمد عبدالبديع

1. Basic information:

<table>
<tr><td>Course Title (according to the bylaw):</td><td colspan="4">Sensors and Actuators</td></tr>
<tr><td>Course Code (according to the bylaw):</td><td colspan="4">MTE 211</td></tr>
<tr><td>Department/s that participated in the teaching:</td><td colspan="4">Mechanical Engineering</td></tr>
<tr><td rowspan="2">Total number of credit hours of the course:
(according to the bylaw)</td><td>Theoretical</td><td>Practical</td><td>Other (specify)</td><td>Total</td></tr>
<tr><td>2</td><td>2</td><td></td><td>4</td></tr>
<tr><td>Course Type:</td><td colspan="4">Compulsory</td></tr>
<tr><td>The level to which the course was introduced:</td><td colspan="4">SENIOR 1</td></tr>
<tr><td>Academic Program:</td><td colspan="4">Mechatronics Engineering</td></tr>
<tr><td>Institute:</td><td colspan="4">Higher Technological Institute</td></tr>
<tr><td>Name of Course Coordinator:</td><td colspan="4">Dr. Ahmed Abu El Fadl</td></tr>
<tr><td>Course Specification Approval
(Attach the decision/minutes of the department /committee/council ....)</td><td colspan="4">The division council minute of department</td></tr>
<tr><td>Course Specification Approval Date:</td><td colspan="4">8/12/2025</td></tr>
</table>

2. Course Overview (Brief summary of scientific content):

Introduction- sensors& transducers – Error analysis – Measurement s of displacement – Speed- Acceleration_ Force – Strain _ Heat _etc. Selection of sensors _ Signal conditioning- Actuators (Mechanical – Hydraulic _ pneumatics_ Electro-hydraulic _ Electro-pneumatic _ Electrical actuators- Selection of actuators). Example of a Mechatronics system (small course project).

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2,A4,A10,D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO1**	Identify the requirements and challenges of mechatronics systems related to sensors, actuators, and signal conditioning units.
A4	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO2**	Select appropriate sensors, actuators, and signal conditioning systems for specific applications based on functionality, performance, compatibility, and cost.
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.	**LO3**	Acquire knowledge of the structure and operation of various actuators, including mechanical, hydraulic, pneumatic, electro-hydraulic, electro-pneumatic, and electrical actuators, and apply selection criteria.
D4	Estimate and measure the performance of an electrical/electronic/digital/mechanical/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.	**LO4**	Estimate the performance of mechatronics systems using different sensors and conduct error analysis.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√				√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction of sensors, actuators, signal conditioning	4	1	1	2	-
2	Sensors and Transducers	4	1	1	2	-
3	Sensor Terminology and Error Analysis	4	1	1	2	-
4	Measurements of Displacements, speed, acceleration, strain, heat.	4	1	1	2	-
5	Measurements of Temperature, light, force, and pressure.	4	1	1	2	-
6	Selection of sensors	4	1	1	2	-
7	**Revision and Mid Exam**					
8	Introduction of sensors, actuators, signal conditioning	4	1	1	2	-
9	Sensors and Transducers	4	1	1	2	-
10	Sensor Terminology and Error Analysis	4	1	1	2	-

11	Measurements of Displacements, speed, acceleration, strain, heat.	4	1	1	2	-
12	Measurements of Temperature, light, force, and pressure.	4	1	1	2	-
13	Selection of sensors	4	1	1	2	-
14	Introduction of sensors, actuators, signal conditioning	4	1	1	2	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	Experiment
1	Introduction of temperature control system components
2	How to select temperature sensor , Dc motor actuator
3	Desin of small temperature control system with small structure
4	Connect temperature sensor and d.c motor with small fan to structure
5	Apply signal conditiong approporate for sensor
6	Complete temperature control system

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**10**	**0**	**10%**
2	Exam 2 written (Semester work)	**10**	**0**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference** (must be written in full according to the scientific documentation method)	• Alciator & Histand, "Introduction to Mechatronics & Measurements Systems"; McGraw-Hill, Second Edition, 2003

references, etc.) *	**Other References**	• W. Bolton; "Mechatronics – Electronic Control Systems in Mechanical & Electrical Engineering.", Longman, latest edition ,2019.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NI ELVIES-SENSORKIT**
	Supplies	**POWER SUPPLY**
	Electronic Programs	**LABVIEW**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	Dr. Ahmed Abu El Fadl	**Dr. Ahmed Abd El badii**
Signature	Ahmed fadl	احمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Programmable logic controller			
Course Code (according to the bylaw)**:**	MTE 212			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	DR.AHMED SAMIR			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Structure and functions of PLCs, PLC H.W. components (center components, data processing, IOs, data communication,)- Review of logic fundamentals – Developing of fundamental PLC wiring diagrams and ladder diagrams- Basics of PLC programming languages - PLC programming, latching, internal relays, interlocking, Sequencing, Timers and counters, Shift registers, Master and jump controls, Data handling, Math instructions, & Analogue input / output., IEC 1131-3 programming languages- Basics of control safety and availability – Applications

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A3,A5,D1,D2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**LO1**	Identify the appropriate equations required for the design and calculation of mechatronics systems.
		LO2	Distinguish between different types of PLC systems and their applications.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO3**	Apply suitable methods in the design of PLC systems.
A5	Practice research techniques and methods of investigation as an inherent part of learning.	**LO4**	Analyze mechatronics system design applications by researching and integrating knowledge and skills.
D1	Integrate a wide range of analytical tools , techniques , equipment , and software package to design and develop mechatronics systems	**LO5**	Distinguish analytically between applications involving mechatronics systems by applying fundamental concepts.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	**LO6**	Design PLC systems to meet specific functional requirements.
		LO7	Select appropriate PLC system components for different applications.
		LO8	Select the suitable design methodology for PLC systems according to required performance criteria.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√								

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to PLC system design	**4**	**2**	**2**	**-**	**-**
2	Introduction to PLC system design	**4**	**2**	**2**	**-**	**-**
3	PLC system components	**4**	**2**	**2**	**-**	**-**
4	Analysis of PLC system components	**4**	**2**	**2**	**-**	**-**
5	Selection hardware system components	**4**	**2**	**2**	**-**	**-**
6	Design of a hardware system	**4**	**2**	**2**	**-**	**-**
7	**Revision and Mid Exam**					
8	Basics of software	**4**	**2**	**2**	**-**	**-**

9	Timers	**4**	**2**	**2**	**-**	**-**
10	Counters	**4**	**2**	**2**	**-**	**-**
11	Design of PLC system	**4**	**2**	**2**	**-**	**-**
12	Expermimental performance of PLCs system	**4**	**2**	**2**	**-**	**-**
13	Comparison of design aspects of different PLCs systems	**4**	**2**	**2**	**-**	**-**
14	Review of design aspects of different PLCs systems	**4**	**2**	**2**	**-**	**-**
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**15**	**15%**
2	Exam 2 written (Semester work)	**10**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**10**	**12**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Programmable logic controllers W.Bolton .6th edition.
	Other References	Mechatronics the science of Intelligent machines . An International journal
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities &	**Devices/Instruments**	**NON**
	Supplies	**NON**

equipment for teaching and learning *	**Electronic Programs**	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	DR.AHMED SAMIR	Dr. Ahmed Abdalbadia
Signature	AHMED	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Mechatronics Workshop			
Course Code (according to the bylaw)**:**	MTE 213			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	3		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	PROF.DR.EMAN NASSER			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Safety Instructions - This workshop aims at building the ability to design, choose the necessary components, and implement small real tasks – Emphasis is on hand skill on preparing printed circuit boards (PCB)- drilling – Soldering –Checking – Use of CAD programs is highly encouraged – Example of the tasks, Power supply – H-Bridge – 555 timers - Schmitt Trigger – Small practical project – Introduction of Mechatronics applications in real life may be introduced (Automobiles, Air conditioning, or any other field).

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A3,A6,A9,D1,D2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO1**	Apply the design of electronic circuits (e.g., a stable 555 timer for LED alarm) with focus on minimizing cost.
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**LO2**	Plan the process of designing electronic circuits.
A9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**LO3**	Develop flexible thinking and problem-solving skills by completing multiple mini-projects.
D1	Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems	**LO4**	Design power supply circuits using EAGLE software.

D2	Design, model and analyze an mechatronics system or component for a specific application; and identify the tools required to optimize this design	**LO5**	Design H-bridge circuits for directional control in various mechatronics subsystems.

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√	√	√	√			√	√					√			

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	**/ Practical Lab**	
1	Introduction to PCB design and etching method.	4	1	-	3	-
2	Power supply stages Power supply complete circuit. Power supply calculations.	4	1	-	3	-
3	Power supply circuit design using CAD software.	4	1	-	3	-

4	Power supply design Deliverables (schematic & layout)	4	1	-	3	-
5	Power supply design Deliverables (PCB)	4	1	-	3	-
6	Power supply design Deliverables (Complete PCB)	4	1	-	3	-
7	**Revision and Mid Exam**					
8	H-bridge Based on Relay	4	1	-	3	-
9	H-bridge Based on transistor and MOSFET	4	1	-	3	-
10	H-bridge Based on L 298 IC.	4	1	-	3	-
11	555 timer (A stable circuit application)	4	1	-	3	-
12	555 timer (Mono- stable circuit application) And simple Mechatronics systems	4	1	-	3	-
13	H-bridge Based on Relay	4	1	-	3	-
14	H-bridge Based on Relay	4	1	-	3	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
3	Midterm exam	**7**	**30**	**30 %**
4	Final Written Exam	**15, 16**	**30**	**30 %**
7	Assignments / Project /Portfolio/ Logbook	**2,4,8,10**	**40**	**40 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books,	**The main (essential) reference** (must be written in full according to the scientific documentation method)	• Alciator & Histand, "Introduction to Mechatronics & Measurements

scientific references, etc.) *		systems"; McGraw-Hill, Second Edition, 2023.
	Other References	• Savant, C. J., Roden, M. S., Carpenter, G. L., & Savant, C. J. (2024). Electronic design: circuits and systems.Undeland, M. N., Robbins, W. P., & Mohan, N. (2024). Power electronics. Converters, Applications, and Design, 763.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Soldering station, multimeter, oscilloscope, PCB drilling tools, power supply unit
	Supplies	Electronic components (resistors, capacitors, ICs, wires, breadboards, PCBs)
	Electronic Programs	
	Skill Labs/ Simulators	Mechatronics Workshop Lab (Equipped for PCB manufacturing and circuit testing)
	Virtual Labs	Simulation software (e.g., Eagle CAD, Multisim, Proteus)
	Other (to be mentioned)	Access to EKB platform, AI learning tools, Microsoft Office tools, Projector

	Course Coordinator	Program Coordinator
Name	**Prof. Dr. Eman Nasser**	**Dr. Ahmed Abdalbadia**
Signature	ايمان ابراهيم محمد علي نصار	احمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	Microcontrollers			
Course Code (according to the bylaw)**:**	MTE 214			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Mina Raafat			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Basics of Computing and digital design- Microprocessor architectures - Microcontroller architectures -Microcontroller Programming using assembly and a high level language (Basic or C...)-I/O Port programming -Addressing modes -Arithmetic and logic - Timer and serial port programming- Interrupts programming – Small course project.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A4,A6,A9,A10,D1,D2,D3		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles**	**LO1**	**Use assembly and C programming languages for various practice projects codes creation.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements** **.**	**LO2**	**Monitor and clarification of program outputs using an LCD display.**
A9	**Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations**	**LO3**	**Design alternative codes for the same project for enhancing flexible thinking and innovation.**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies**	**LO4**	**simulate microcontroller-based projects to gain new knowledge for self-learning skills improvement**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software packages to design and develop mechatronics systems**	**LO5**	**Design a temperature control circuit using different programming languages.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**L06**	**Design electronic systems using PIC microcontroller concepts and tools.**

D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	L07	**Carry out the design of different programming codes by applying knowledge of computer-aided tools and PIC C software.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Introduction to computing	4	1	2	1	-
2	Microcontroller architecture, memorytypes	4	1	2	1	-
3	Assembly language programming	4	1	2	1	-
4	Branch, Call and time delay	4	1	2	1	-
5	Continue to assembly language programming	4	1	2	1	-
6	Microcontroller Stack & Interrupt	4	1	2	1	-

7	**Revision and Mid Exam**					
8	Introduction to Microcontroller programming in C	4	1	2	1	-
9	Microcontroller External and InternalInterrupts	4	1	2	1	-
10	Microcontroller LCD & Keyboardinterfacing	4	1	2	1	-
11	Microcontroller Timers	4	1	2	1	-
12	Microcontroller ADC	4	1	2	1	-
13	Final Project	4	1	2	1	-
14	Continue to final project	4	1	2	1	-
15,16	**Final Exam.**					

Experiment Topics:

Serial	Experiment
1	Led o/p (assembly code)
2	Change led state using push button at input (assembly code)
3	Led flashing (delay in assembly code)
4	Change led flashing sequence using push button (assembly code)
5	Experiment 1&2&3&4 in C code
6	Counting and display on 7 segments
7	ADC using variable resistance as an input
8	Final project (e.x temp measurement, car garage, elevator, safe)

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**

4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**14-12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	"Programming PIC Microcontrollers with XC8: Mastering Classical Embedded Design (Maker Innovations Series) ",Armstrong Subero Second Edition(2024)
	Other References	"PIC Microcontrollers Programming in C" Author: Milan Verle
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Laptop, PIC microcontroller programmer
	Supplies	Breadboard & El electronic component (resistors, capacitors, jumpers, crystal,…)
	Electronic Programs	Mikro C pro IDE , PROTUS
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Mina Raafat**	Dr. Ahmed Abdalbadia
Signature	*Mina Raafat*	احمد عبدالبديع

المعهد التكنولوجي العالي - بالعاشر من رمضان

توصيف مقرر دراسي

1- معلومات أساسية :

اسم المقرر: (تبعا لما ورد باللائحة)	تربية رياضية 3			
كود المقرر: (تبعا لما ورد باللائحة)	PHE 201			
القسم/الأقسام العلمية التي شاركت في التدريس:	العلوم الاساسية			
إجمالي عدد الساعات المعتمدة للمقرر: (تبعا لما ورد باللائحة)	إجمالي	اخري (تحدد)	عملي	نظري
	1		1	2
نوع المقرر:	اجباري			
المستوى الدراسي الذي قدم فيه المقرر:	SENIOR 2			
البرنامج الأكاديمي:	البارمج الهندسية			
المعهد:	المعهد التكنولوجي العالي			
اسم منسق المقرر:	د\خلود فاروق حامد			
جهة مناقشة واعتماد تقرير المقرر:	مجلس القسم العلمي للبرنامج			
تاريخ اعتماد تقرير المقرر:	7/26/2025			

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

الهندسة الرياضية:المعدات الحديثة للتربية البدنية وعلاقتها باختيار الرياضيين ،تحليل الحركة والتقييم والقياس الفسيولوجي ،المعدات الحديثة وعلاقتها باختيار الرياضيين، معالجة مياه حمامات السباحة، أبعاد الملاعب ، الاختلافات الفسيولوجية خلال مزاولة الرياضة وتأثيرها على الملابس الرياضية. مقدمة في علم النفس الرياضي ،تعريف علم النفس الرياضي، والدافع، والقلق، والتدريب العقلي، والاسترخاء، التصور العقلي، واستخدام أجهزة الكمبيوتر في قياس الحالة النفسية، العلاقة بين علم النفس الرياضي والهندسة الرياضية

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A4_A5_A7_A8_A9		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	النص	الكود	النص
A4	الاستفادة من التقنيات المعاصرة، والممارسات والمعايير، وإرشادات الجودة، ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر.	LO1	التعرف علي الكفاءه الهوائيه وقدراتها وانواعها
		LO2	معرفة بعض الاسس الخاصة بالكفاءة الهوائية
		LO3	تنمية المعرفة ببعض المصطلحات الخاصة بالهندسة والرياضه
A5	ممارسة تقنيات البحث وأساليب التحقيق كجزء لايتجزأ من التعلم.	LO4	معرفة الاختبارات والمعايير الخاصة بالكفاءة الهوائية
		LO5	التعرف علي العمل العضلي اللاهوائي وانواع القدرات الخاصة به
A7	العمل بكفاءة كفرد وعضو في فرق متعددة التخصصات ومتعدد الثقافات	LO6	التعرف علي العجز الاكسجيني والدين الاكسجيني وانواعهما
		LO7	التعرف علي الهندسة الرياضية واهميتها واهدافها
A8	لتواصل بفعالية بيانياً وشفاهه وكتابة مع مجموعات من الجماهير باستخدام الادوات العصرية.	LO8	تنمية المعرفه بانواع العضلات والانقباض العضلي
A9	إستخدم التفكيرالابداعي والمبتكر والمرن واكتساب مهارات ريادة الاعمال والقيادة لتوقع المواقف الجديدة والاستجابة لها	LO9	زيادة معرفة الطالب بالاجهزة الرياضية الحديثة واستخداماتها
		LO10	تطوير الاجهزة بما يتناسب مع التقنيات الحديثة

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنو لوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الإفتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√				√	√	√

الجدول الدراسى للمقرر:

رقم الأسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	تدريس نظري	عدد ساعات التعلم المتوقعة - تدريب - تمارين	عملي
1	المقدمة ومفهوم عن علم الهندسه الرياضيه اهدافها اهميتها + تدريبات على اللياقة البدنية	2	1	0	1
2	الكفاءة الهوائية واختباراتها + تدريبات على اللياقة البدنية	2	1	0	1
3	اسس تنمية الكفاءة الهوائية + تدريبات على اللياقة البدنية	2	1	0	1
4	الكفاءة اللاهوائية واختباراتها + تدريبات على اللياقة البدنية	2	1	0	1
5	شروط تنمية التحمل اللاهوائي + تدريبات على اللياقة البدنية	2	1	0	1
6	علم البيوميكانيك(البيوميكانيك الرياضي بعض المفاهيم والمصطلحات الخاصة بالحركة) + التدريب على اختبارات اللياقه	2	1	0	1
7	مراجعة وامتحان منتصف الفصل الدراسي				
8	الجهاز الحركي(تركيب العضلة/انواع العضلات)+ تدريبات على اللياقة البدنية	2	1	0	1
9	الاعتبارات الخاصة باختيار الموقع (المنشاة الرياضية) + تدريبات على اختبارات اللياقة البدنية	2	1	0	1
10	الاشتراطات العامة لتصميم المنشات الرياضية + تدريبات على اختبارات اللياقة البدنية	2	1	0	1
11	التقنيات الحديثة في معالجة المياه + تدريبات على اللياقة البدنية	2	1	0	1
12	علم النفس الرياضي (الاجهزة الحديثة للتدريب العقلي) + تدريبات على اللياقة البدنية	2	1	0	1
13	**إختبارات الفصل الدراسي النهائية عملي**				

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	بحث تقييمي للشق العملي	4	20	%20
2	امتحان منتصف الفصل الدراسي	7	20	% 20
3	امتحان نهائي تحريري	13_14	30	% 30
4	امتحان نهائي عملي	13	30	%30

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	التطور التقني ودوره في المجال الرياضي صبري عمر_زكي حسن دار المعرفه2020م
	المراجع الأخرى	طبيقات البيوميكانيك في التدريب والاداء صريح عبد الكريم دار دجلة الطبعة الاولي 2019م
	المصادر الالكترونية (لابد من إضافة الروابط)	• https://ar.wikipedia.org/wiki • https://ar.wikipedia.org/wiki
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office
التجهيزات التعليمية المساندة للتعليم والتعلم *	1	قاعة محاضرات مجهزة .
	2	المكتبات المركزية والفرعية.
	3	الوسائل التعليمية (داتا شو) وجهاز كمبيوتر محمول.
	4	مّذكرة لتدريس المقرر وكشوف متابعة للطلاب

	منسق المقرر	منسق البرنامج
الإسم	د/خلود فاروق حامد	ا.د/ أحمد عبد الغفار
التوقيع	خلود فاروق حامد	

	المعهد التكنولوجي العالي - بالعاشر من رمضان
	توصيف مقرر دراسي

1- معلومات أساسية :

اسم المقرر: (تبعا لما ورد باللائحة)	مبادئ التفاوض			
كود المقرر: (تبعا لما ورد باللائحة)	HUM 204			
القسم/الأقسام العلمية التي شاركت في التدريس:	العلوم الاساسية			
إجمالي عدد الساعات المعتمدة للمقرر: (تبعا لما ورد باللائحة)	إجمالي	اخري (تحدد)	عملي	نظري
	2			2
نوع المقرر:	اختياري			
المستوى الدراسي الذي قدم فيه المقرر:	SENIOR 2			
البرنامج الأكاديمي:	البارمج الهندسية			
المعهد:	المعهد التكنولوجي العالي			
اسم منسق المقرر:	د/ سلوى محمد عبد المحسن			
جهة مناقشة واعتماد تقرير المقرر:	مجلس القسم العلمي للبرنامج			
تاريخ اعتماد تقرير المقرر:	7/26/2025			

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمي) :

يهدف المقرر إلي تزويد الطالب بالمعرفة الحديثة حول مفهوم وطبيعة المبادئ وخصائص التفاوض الفعال، وكذلك استراتيجياته وتكتيكاته المختلفة، وتنمية مهارات الطالب الخاصة بالإعداد الجيد للتفاوض وممارسته في المجالات المختلفة في منظمات المعاصرة. ويتناول المقرر الموضوعات التالية: مفهوم وخصائص ومبادئ التفاوض – الطبيعة الديناميكية للتفاوض – العلاقات الاعتمادية – أخلاقيات التفاوض – الجوانب النفسية والاجتماعية للتفاوض الجيد – التفاوض التعاوني والتفاوض التنافسي – الإعداد الجيد للتفاوض – استراتيجيات وتكتيكات التفاوض – الجوانب التنظيمية للجلسة التفاوضية – النفوذ والتأثير في التفاوض – استخدام الأسئلة والرد علي الاعتراضات – التعامل مع المواقف الصعبة وحالات فشل التفاوض – أفضل الممارسات في التفاوض (حالات عملية).

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
(A3,A4,A5,A7,A8)		عند الانتهاء من المقرر سيكون الطالب قادرا على	
الكود	**النص**	**الكود**	**النص**
A3	تتطبيق عمليات التصميم الهندسي لانتاج حلول فعالة من حيث التكلفة تلبي الاحتياجات المحددة مع مراعات الجوانب العالمية والثقافية والاجتماعية والاقتصادية والبيئية والأخلاقية وغيرها من الجوانب حسب الاقتضاء للانضباط وضمن مبادئ وسياقات التصميم والتنمية المستدامين.	LO1	يفهم أهمية التفاوض
		LO2	يتعرف علي مبادئ واسس التفاوض
		LO3	اكتساب مهارات الحوار والنقاش البناء
A4	الاستفادة من التقنيات المعاصرة وقواعد الممارسة والمعايير وارشادات الجودة ومتطلبات الصحة والسلامة والقضايا البيئية ومبادئ إدارة المخاطر.	LO4	اكتساب مهارات المعرفة من خلال الانترنت
		LO5	اكتساب مهارات التواصل الجيد مع الاخرين
		LO6	اكتساب مهارات العمل مع فريق
		LO7	التعاون والتعامل مع الاخرين
A5	ممارسة تقنيات البحث وطرق التحقيق كجزء متأصل من التعلم.	LO8	اكتساب مهارات التواصل الجيد مع الاخرين
A7	العمل بكفاءة كفرد وكعضو في فرق متعددة التخصصات ومتعددة الثقافات.	LO9	القدرة علي قيادة المهنيين والعمل كفريق لانجاز المهام العملية
A8	التواصل الفعال -بيانيا ولفظيا وخطيا – مع مجموعة من الجماهير باستخدام الأدوات المعاصرة.	LO10	القدرة علي قيادة المهنيين والعمل كفريق لانجاز المهام العملية

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الإفتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات

√	√			√	√			√	√	√		√			√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة		
			تدريس نظري	تدريب	
				تمارين	عملي
1	تعريف بالمقرر الدراسى ومقدمة عامه	2	2	0	0
2	أهمية التفاوض واهدافه	2	2	0	0
3	أنواع المفاوضات	2	2	0	0
4	العناصر الأساسية لعملية التفاوض	2	2	0	0
5	مراحل العملية التفاوضية	2	2	0	0
6	إجراءات التفاوض	2	2	0	0
7	مراجعة وامتحان منتصف الفصل الدراسي				
8	مهارات التفاوض	2	2	0	0
9	مباريات التفاوض	2	2	0	0
10	استراتيجيات حل النزاع	2	2	0	0
11	خطوات عملية التفكير التفاوضي	2	2	0	0
12	كيفية التفاوض بفاعلية	2	2	0	0
13	تكتيكات التفاوض	2	2	0	0
14	مراجعة عامة	2	2	0	0
16-15	إختبارات الفصل الدراسي النهائية				

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	3	10	% 10
2	امتحان 2 تحريري (أعمال سنة)	10	10	% 10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	15 و 16	40	% 40
5	تكليفات / مشروع / ملف الإنجاز /كتيب الانشطة	طوال الفصل	20	% 20

6- مصادر التعلم والتسهيلات المادية:

	منسق المقرر	منسق البرنامج
الإسم	د/ سلوي محمد عبد المحسن	ا.د/ أحمد عبد الغفار
التوقيع	Dr. Salwa	أ أحمد عبد الغفار

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. ***Basic information:***

Course Title (according to the bylaw)**:**	**Project Management**			
Course Code (according to the bylaw)**:**	**MNG 201**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**	**--**	**3**
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 1**			
Academic Program:	**Mechanical Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Asmaa Ahmed Soliman**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. ***Course Overview (Brief summary of scientific content):***

Project management overview, organizational structures, assessing success, planning, learning curves, network scheduling techniques, CPM analysis, precedence networking, resource allocation and constraints, cost management, risk management, project performance measurement and control.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A7, A9 & A10		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	**LO1**	Identify the fundamental concepts and phases of project management.
		LO2	Explain the role of organizational strategy in project selection and prioritization.
		LO3	Describe how an organization's mission, vision, and strategy influence project planning.
A9	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**LO4**	Develop project network schedules using techniques such as Critical Path Method (CPM) and Program Evaluation Review Technique (PERT).
		LO5	Apply core project management principles to minimize project duration and mitigate risks.
		LO6	Analyze the impact of risk management processes on project outcomes.
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**LO7**	Schedule project resources and associated costs using appropriate tools.
		LO8	Recognize the different methods for project resource allocation.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	-	-	-	√	-	-	-	-	-	-	-	-	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours		
			Theoretical teaching *(lectures)*	Training	
				Tutorial	Practical Lab /
1	Introduction for project management	3	2	1	0
2	Organization strategy and project selection	3	2	1	0
3	Work Breakdown structure (WBS), Organization Breakdown Structure (OBS), Activity & Scope, Planning Process and Time management Project Planning	3	2	1	0
4	Activities Duration, Activities Sequence, Project Networks. Gantt Chart (Bar Chart) and Solved Examples on Bar chart (Gant Chart(	3	2	1	0
5	Activity On Arrow (AOA) and Solved Examples on Activity on Arrow (AOA)	3	2	1	0
6	Activity On Node (AON) and Solved Examples on Activity on Node	3	2	1	0
7	**Revision and Mid Exam**				
8	Managing Project Risk	3	2	1	0
9	Scheduling Resources and Costs	3	2	1	0

10	Applicable Examples on Scheduling Resources	3	2	1	0
11	Reducing Project Duration	3	2	1	0
12	Cost–Duration Trade-off examples	3	2	1	0
13	Cost–Duration Trade-off examples	3	2	1	0
14	Revision	3	2	1	0
15,16	**Final Exam.**				

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	3	10	10 %
2	Exam 2 written (Semester work or quiz)	5	10	10 %
3	Exam 3 written (Semester work or quiz)	10	10	10 %
4	Midterm exam	7	20	20 %
5	Final Written Exam	15, 16	40	40 %
6	Assignments / Project /Portfolio/ Logbook	12	10	10 %

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	1. Ravi V. Industrial Engineering and Management. PHI Learning Pvt. Ltd.; 2015 Aug 31. 2. Baudin, M., & Netland, T. (2022). Introduction to manufacturing: An industrial engineering and management perspective. Routledge.
	Other References	1. Cardona-Meza LS, Olivar-Tost G. Modeling and simulation of project management through the PMBOK® standard using complex networks. Complexity. 2017;2017(1):4791635.
	Electronic Sources (Links must be added)	N/A
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching	**Devices/Instruments**	**Data show- Dashboard**
	Supplies	N/A
	Electronic Programs	**Microsoft teams**
	Skill Labs/ Simulators	N/A
	Virtual Labs	N/A
	Other (to be mentioned)	N/A

and learning *		

	Course Coordinator	**Program Coordinator**
Name	**Dr. Asmaa Ahmed Soliman**	**Dr. Mohamed Ashraf**
Signature	أسماء سليمان	

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Measurement Lab			
Course Code (according to the bylaw):	MTE 221			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	-	٣		٣
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Assoc. Mona A. Younis			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Safety Instructions - Hands on Experiments for measurements, Measurement principles – Error analysis – Whetstone bridge – Operational amplifier - A/D & D/A - Data transfer, serial and parallel ports. Transducers for displacement, velocity, temperature, pressure, and light are to be covered.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A5&A6&A7&A8, D3&D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1.**	**Identify the sensitivity of wheastone bridge and application of different sensors by research techniques.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2.**	**Select the appropriate sensors/actuators/signal conditioning systems for any application based on functions, performance, compitibility and cost**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO3.**	**Collaborate effectively in diverse teams to complete Conducting different experiments using electronic electronic components.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4.**	**Apply measurement operations using probes in the kit to measure current and volt and documentation.**
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO5.**	**Implement designs of operational amplifier using NI Elvis kit**

D4	**Estimate and measure the performance of an electrical/ electronic/ digital/ mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	LO6.	**Measure sensitivity of whetstone bridge circuit.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√		√		√	√	√			√		√			

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			other
			Theoretical teaching (lectures)	Training		
				Tutorial	/ Practical Lab	
1	Introduction –Wheatstone bridge.	3	-	-	3	-
2	Balance condition for Wheatstone bridge.	3	-	-	3	-

3	Sensitivity of Wheatstone bridge.	**3**	-	-	**3**	-
4	Sensitivity of Wheatstone bridge.	**3**	-	-	**3**	-
5	Operational Amplifiers	**3**	-	-	**3**	-
6	Revision for part 1 & Quiz	**3**	-	-	**3**	-
7	**Revision and Mid Exam**					
8	The effect of operational amplifier on the sensitivity of Wheatstone bridge.	**3**	-	-	**3**	-
9	Temperature Sensors (Thermocouple Sensor)	**3**	-	-	**3**	-
10	Temperature Sensors (Thermocouple Sensor)	**3**	-	-	**3**	-
11	NI Elvis Kit sensors (Strain gauge, Sonar, In fared, pressure sensor, Magnetic field sensor, .etc.)	**3**	-	-	**3**	-
12	NI Elvis Kit sensors (Strain gauge, Sonar, In fared, pressure sensor, Magnetic field sensor, .etc.)	**3**	-	-	**3**	-
13	NI Elvis Kit sensors (Strain gauge, Sonar, In fared, pressure sensor, Magnetic field sensor, .etc.)	**3**	-	-	**3**	-
14	Revision for part 2	**3**	-	-	**3**	-
15,16	**Final Exam.**					

Experiment Topics: (If any)

Serial	**Experiment**
1st	Balance condition for Wheatstone Bridge
2nd	Effect of sensitivity on Wheatstone Bridge (Resistance of the ratio arms)
3rd	Effect of sensitivity on Wheatstone Bridge (Ratios of the arms)
4th	Effect of sensitivity on Wheatstone Bridge (Source voltage)
5th	Operational Amplifier apllications
6th	The sensitivity effect of wheatstone bridge on op-amp
7th	Thermistor sensor
8th	Thermocouple sensors
9th	NI Elivs (strain gauge, sonar,infared, presure sensor,Magnetic filed,.etc)

5- methods of student passements

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**4**	**15**	**15%**
2	Exam 2 written (Semester work or quiz)	**11**	**15**	**15%**
3	Midterm exam	**As scheduled**	**30**	**30%**
4	Final Written Exam	**AS scheduled**	**30**	**30%**
5	Assignments / Project /Portfolio/ Logbook	**AS scheduled**	**10**	**10 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Thomas L. Floyd; "Digital Fundamentals", 8th Edition. Prentice Hall, 2003.
	Other References	**Hand out to students one by one**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NI ELVIS, Oscilloscopes, multimeters**
	Supplies	**Wheatstone bridge circuits & resistive sensors Operational amplifier kits A/D and D/A converters Serial & parallel communication modules Transducers: LVDT (displacement), tachometer/encoder (velocity), thermocouples (temperature), pressure sensors, photodiodes/LDRs (light)**
	Electronic Programs	**LABVIEW**

	Course Coordinator	Program Coordinator
Name	Assoc. Mona A. Younis	**Dr. Ahmed Abdelbadea**
Signature	MONA A. YOUNIS	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Digital System Lab**			
Course Code (according to the bylaw):	**MTE 223**			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	-	٣		٣
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Assoc. Mona A. Younis			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. *Course Overview (Brief summary of scientific content):*

Safety Instructions - The aim of the lab is to introduce to the student all basic components of digital design.Taking this lab will enable the student to understand and utilize digital components such as counter, registers, memories, multiplexers and decoders in order to implement logic functions. In addition, microprocessors and microcontrollers are introduced – Different languages (assembly and at least one high level) are to be practiced.

3. ***Course Learning Outcomes CLOs :***

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A5&A6&A7&A8, D3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Design digital circuit using research technique on PLD software**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2.**	**Implement cirucit to studying the operation decoder,MUX,and Flipflops.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO3.**	**Collaborate effectively in diverse teams to complete Conducting different experiments using digital electronic components.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4.**	**Apply measurement operations using instrument embedded in the kit to measure the truth table and documentation.**
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO5.**	**Implement designs of different digital circuits using LabVIEW Software.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√			√	√	√						√		√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*other*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	Decoder and MUX circuits	**3**	0	0	**3**	-
2	SR,D,JK flipflops	**3**	0	0	**3**	-
3	Counter Circuits	**3**	0	0	**3**	-
4	Introduction to PLD	**3**	0	0	**3**	-
5	Logic Gates with PLD	**3**	0	0	**3**	-
6	Decoder PLD	**3**	0	0	**3**	-
7	**Revision and Mid Exam**					
8	MUX with PLD	**3**	0	0	**3**	-

9	7- segment with PLD	**3**	0	0	**3**	-
10	Flipflops circuits with PLD	**3**	0	0	**3**	-
11	Flipflops circuits with PLD	**3**	0	0	**3**	-
12	Counter with PLD	**3**	0	0	**3**	-
13	Shift Register with PLD	**3**	0	0	**3**	-
14	Revision	**3**	0	0	**3**	-
15,16	**Final Exam.**					

5- methods of student passements

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**4**	**15**	**15%**
2	Exam 2 written (Semester work or quiz)	**11**	**15**	**15%**
3	Midterm exam	**As scheduled**	**30**	**30%**
4	Final Written Exam	**AS scheduled**	**30**	**30%**
5	Assignments / Project /Portfolio/ Logbook	**AS scheduled**	**10**	**10 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Thomas L. Floyd; "Digital Fundamentals", 8th Edition. Prentice Hall, 2003.
	Other References	**Hand out to students one by one**
Supportive facilities & equipment for	**Devices/Instruments**	**NI trainer kits** **Logic probes and oscilloscopes**
	Supplies	**Breadboards and IC components**

teaching and learning *		(counters, registers, decoders, multiplexers, memories)
	Electronic Programs	LABVIEW Programming software (MPLAB X, Arduino IDE, Keil uVision, Proteus)

	Course Coordinator	Program Coordinator
Name	Assoc. Mona A. Younis	**Dr. Ahmed abd el badii**
Signature	MONA A. YOUNIS	احمدعبدالبديع

1. Basic information:

<table>
<tr><td>Course Title (according to the bylaw):</td><td colspan="4">Robotics</td></tr>
<tr><td>Course Code (according to the bylaw):</td><td colspan="4">MTE 224</td></tr>
<tr><td>Department/s that participated in the teaching:</td><td colspan="4">Mechanical Engineering</td></tr>
<tr><td rowspan="2">Total number of credit hours of the course:
(according to the bylaw)</td><td>Theoretical</td><td>Practical</td><td>Other (specify)</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td></tr>
<tr><td>Course Type:</td><td colspan="4">Compulsory</td></tr>
<tr><td>The level to which the course was introduced:</td><td colspan="4">SENIOR 1</td></tr>
<tr><td>Academic Program:</td><td colspan="4">Mechatronics Engineering</td></tr>
<tr><td>Institute:</td><td colspan="4">Higher Technological Institute</td></tr>
<tr><td>Name of Course Coordinator:</td><td colspan="4">Dr Mina Raafat</td></tr>
<tr><td>Course Specification Approval
(Attach the decision/minutes of the department /committee/council ....)</td><td colspan="4">The division council minute of department</td></tr>
<tr><td>Course Specification Approval Date:</td><td colspan="4">8/12/2025</td></tr>
</table>

2. Course Overview (Brief summary of scientific content):

Industrial robots, robot systems, kinematics of robots, Forward Kinematics, Inverse Kinematics, control of robots, robot programming languages, applications, tools to use with robots, software-tools.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2,A9,D3,D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.**	**LO1**	**Develop and conducting appropriate experiments for artificial robots, and simulate them using various simulation tools.**
A9	**Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams**	**LO2**	**Work effectively both individually and collaboratively in multi-disciplinary and multi-cultural teams to design an artificial manipulator.**
D3	**Plan, Manage and Carry out designs of Mechatronics systems , sub-system, modules ,elements and machines elements based on the knowledge of Traditional, Technological, Professional , Computer Aided and Software tools contemporary to the field of Mechatronics engineering**	**LO3**	**Design an arm robot by applying knowledge of traditional, technological, professional, computer-aided, and contemporary software tools in the field of Mechatronics Engineering.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO4**	**Evaluate the performance of an artificial manipulator and assess the stability of its operation.**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	**/ Practical Lab**	
1	Robotics, robot types, components, configurations, and applications.	4	2	2	0	-
2	Robot Degree of Freedom (DOF) and robot workspace. Simulate different robots' workspaces.	4	2	2	0	-
3	Spatial descriptions and homogeneous transformations Computing position and orientation.	4	2	2	0	-
4	Parameterization of Rotations and MATLAB robotics toolbox.	4	2	2	0	-
5	Introduction to Robot kinematics, forward kinematics, Denavit-Hartenberg Convention (DH-Parameters), and assignment of coordinate frames.	4	2	2	0	-
6	Introduction to Robot kinematics, forward kinematics, Denavit-Hartenberg Convention (DH-Parameters), and assignment of coordinate frames.	4	2	2	0	-

	DH parameters using robotic toolbox					
7	**Revision and Mid Exam**					
8	Inverse kinematics. Inverse kinematics using robotic toolbox	4	2	2	0	-
9	Inverse kinematics. Inverse kinematics using robotic toolbox	4	2	2	0	-
10	Velocity kinematics. Jacobian using robotic toolbox	4	2	2	0	-
11	Velocity kinematics. Jacobian using robotic toolbox	4	2	2	0	-
12	Robot dynamic analysis. dynamic using robotic toolbox	4	2	2	0	-
13	Robot dynamic analysis. dynamic using robotic toolbox	4	2	2	0	-
14	Revision	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference** (must be written in full according to the scientific documentation method)	"INTRODUCTION TO ROBOTICS MECHANICS AND CONTRO" JIM YOHANNAN(2023)
	Other References	"MODERN ROBOTICS:MECHANICS PLANNING AND CONTRO" VIJAY KAUSHAL(2023)

references, etc.) *		
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Laptop
	Supplies	**non**
	Electronic Programs	MATLAB
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Mina Raafat**	**Dr. Ahmed Abd Elbade**
Signature	***Mina Raafat***	احمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	CAD/CAM for Mechatronics			
Course Code (according to the bylaw)**:**	MTE 226			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	3		6
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Hossam Ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Product cycle, collecting of relevant information of design part, Geometric modeling of the component using graphic software(wireframe, surface, solid) ,mechanism analysis of the assembly- Parts, Force and stress analysis of designed Part, Optimum design and graphical evaluation of the model ,documentation of the designed part (views ,sectional views , 2d draw). Computer aided manufacturing (CNC Computer numerical control coded program, computer Aided process planning CAPP, Robotics)- Mechatronics applications- Future Developments.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2,B4,D1,D3		Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	LO1	Demonstrate an understanding of the various types of CNC machines and programming methods used in generating G-code.
B4	Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems.	LO2	Apply G-code programming to perform required machining tasks and create multiple designs to enhance practical skills.
D1	Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems	LO3	Utilize different software tools for design and implementation, and develop proficiency in writing and interpreting code, as well as understanding the relationship between design and programming.
D3	Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.	LO4	Compare and contrasting the different programming methods using appropriate analytical approaches.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√		√	√		√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	**Training** Tutorial	**Training** / Practical Lab	**Other**
1	Basic Terms Used in NC, CNC Machines.	6	1	2	3	-
2	Programming Systems and Types of Motion Control.	6	1	2	3	-
3	Computer Numerical Control Machines	6	1	2	3	-
4	Features of CNC Machines and Machine Control Unit of CNC	6	1	2	3	-
5	Positioning system and Applications of NC & CNC with Adv., Disadv.	6	1	2	3	-
6	NC Coded Program.	6	1	2	3	-
7	**Revision and Mid Exam**					
8	Format of Part Program, Preparatory Commands and Miscellaneous functions	6	1	2	3	-
9	NC part program	6	1	2	3	-
10	Cont. NC part program	6	1	2	3	-

11	CNC application program	6	1	2	3	-
12	Cont. CNC application program	6	1	2	3	-
13	Cont. CNC application program	6	1	2	3	-
14	Cont. CNC application program	6	1	2	3	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**6**	**10**	**10 %**
2	Exam 2 written (Semester work)	**12**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**14**	**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**-Mikell P. Groover, "Automation, Production System, and Computer-integrated Manufacturing", Prentice Hall. (2021).**
	Other References	**-Mikell P. Groover, Emory W. Zimmers, Jr, " CAD/CAM Computer-Aided Design and Manufacturing", Prentice Hall., (1984).** **-Ibrahim Zeid — Practical CAD/CAM in Industry‖ Macraw – Hill Publishing Company Limited ,(1995).**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching	**Devices/Instruments**	**BOXFORD CNC LATHE and MILLER MACHINE**
	Supplies	
	Electronic Programs	
	Skill Labs/ Simulators	**BOXFORD V.10**

and learning *	**Virtual Labs**	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	***Hossam Ramadan***	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Vision Systems And Sensors In Robotics**			
Course Code (according to the bylaw)**:**	**MTE E01**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4	**-**	**-**	**4**
Course Type:	Elective			
The level to which the course was introduced:	**SENIOR 1**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Mina Raafat**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Knowledge about the possibilities and applications of vision systems and sensors in a production environment- Image processing, optical systems, camera systems, illumination, data processing and analysis, sensor technologies and their applications, object recognition.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2,A4,A10,D1,D2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO1**	Conduct experiments and simulations using vision and sensor data in robotics.
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles. .	**LO2**	Apply current vision and sensing technologies in robotics, considering relevant industry standards and safety practices.
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**LO3**	Explore recent advancements in computer vision and sensor technologies, and their reflection on their potential applications in robotics through independent learning.
D1	Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems.	**LO4**	Utilize image processing libraries and sensor integration tools for functional vision-based robotic development
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.	**LO5**	Analyze a vision-based sensing subsystem for robotic applications using appropriate modeling and optimization tools.

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√					√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to Vision and Sensor Systems in Robotics	4	2	2	0	-
2	Camera Models and Optics	4	2	2	0	-
3	Lighting and Illumination Techniques	4	2	2	0	-
4	Image Acquisition and Preprocessing	4	2	2	0	-
5	Feature Extraction and Edge Detection	4	2	2	0	-
6	Sensors in Robotics I: Proximity and Range Sensors	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Sensors in Robotics II: Vision-Integrated Sensors	4	2	2	0	-
9	Object Detection and Recognition	4	2	2	0	-
10	Motion Detection and Tracking	4	2	2	0	-
11	Vision-Guided Robotics and Control	4	2	2	0	-
12	Sensor Fusion and Data Processing	4	2	2	0	-

13	Applications and Case Studies	4	2	2	0	-
14	Project Presentations and Review	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**13**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**"ROBOTICS VISION AND CONTROL FUNDAMENTALS ALG."** GELAR CLARK(2024)
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**Project sensors and actuators**
	Electronic Programs	**MATLAB**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Mina Raafat**	**Dr. Ahmed Abd Elbade**
Signature	*Mina Raafat*	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Theory Of Integrated Systems			
Course Code (according to the bylaw)**:**	MTE E02			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr.Ahmed Abu El -FADl			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Basics of atom-, molecular- and solid state physics, basis technologies, function layers, volume micro mechanics, surface micro mechanics, thick-film technology, layout and joining techniques, LIGA techniques, applications, design, simulation, maximum utilization of the chip surface, processing speed.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A4,A10,D1,D2,D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	LO1	Explain the foundational principles of atomic, molecular, and solid-state physics relevant to integrated systems
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies	LO2	Explore recent applications and developments in integrated microsystems through independent learning.
D1	Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems	LO3	Simulate chip design for efficient area usage and processing speed
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	LO4	Evaluate micro fabrication technologies, including volume/surface micromechanics, thick-film processes, and LIGA.
D4	Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application	LO5	Analyze interconnection methods

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction: Scope of Integrated Systems	4	2	2	0	-
2	Atomic & Molecular Physics in Semiconductor Systems	4	2	2	0	-
3	Solid-State Physics Fundamentals (Bands, Carriers, Doping)	4	2	2	0	-
4	Volume Micromechanics (Bulk Etching, Silicon Micromachining)	4	2	2	0	-
5	Surface Micromechanics (Thin Films, Deposition Techniques)	4	2	2	0	-
6	Thick-Film Technology & Materials	4	2	2	0	-
7	**Revision and Mid Exam**					
8	LIGA & Advanced Fabrication Techniques	4	2	2	0	-
9	Layout, Layer Stacking & Joining Technologies	4	2	2	0	-
10	Design Rules and Layout Optimization	4	2	2	0	-
11	Simulation of Microsystems (COMSOL, ANSYS, etc.)	4	2	2	0	-

12	Maximizing Chip Area & Processing Efficiency	4	2	2	0	-
13	Applications: MEMS, Sensors, Biochips, SoC	4	2	2	0	-
14	Student Presentations + Modern Trends	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	*Design and Fabrication of MEMS with Applications to Microelectronics* (2021) Author: Shubham Tayal
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**non**
	Electronic Programs	**COMSOL Multiphysics / CoventorWare / ANSYS MATLAB for modeling physics-based structures**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr.Ahmed Abu El -FADl**	Dr. Ahmed Abdalbadia
Signature	Ahmed fadl	احمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Selected Topics in Automotive Engineering**
Course Code (according to the bylaw)**:**	**AUT E74**
Department/s that participated in the teaching:	**Mechanical Engineering**
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**: 4 / **Practical**: 0 / **Other (specify)**: 0 / **Total**: 4
Course Type:	Elective
The level to which the course was introduced:	**SENIOR 2**
Academic Program:	**Mechatronics Engineering**
Institute:	**Higher Technological Institute**
Name of Course Coordinator:	**Dr. Hossam ramadan**
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department
Course Specification Approval Date:	8/12/2025

2. Course Overview (Brief summary of scientific content):

To be updated with modern trends in automotive engineering and / or real problems in automotive industry and automobile maintenance – Suitable search assignment(s) may be considered.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2& A4& A10& D2& D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	**LO1**	**Investigate a real problem or challenge in the automotive industry**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**	**LO2**	**Apply contemporary automotive technologies, industry standards, and codes of practice to evaluate vehicle systems.**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO3**	**Identify recent advances in automotive systems and technologies.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.**	**LO4**	**Use cutting-edge technologies and methodologies to mimic complex automobile systems**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO5**	**Propose viable engineering solutions based on research, design tools, and technical standards.**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	History of Electric Vehicles	4	2	2	0	-
2	History of Hybrid Electric Vehicles	4	2	2	0	-
3	Configurations of Electric Vehicles	4	2	2	0	-
4	Performance of Electric Vehicles Traction Motor Characteristic	4	2	2	0	-
5	Tractive Effort and Transmission Requirement.	4	2	2	0	-
6	Vehicle Performance.	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Tractive Effort in Normal Driving. Energy Consumption.	4	2	2	0	-
9	Hybrid Electric Vehicles Concept of Hybrid Electric Drive Trains.	4	2	2	0	-
10	Architectures of Hybrid Electric Drive Trains Series Hybrid Electric Drive Trains.	4	2	2	0	-
11	Parallel Hybrid Electric Drive Trains	4	2	2	0	-
12	Torque-Coupling Parallel Hybrid Electric	4	2	2	0	-

	Drive Trains					
13	Speed-Coupling Parallel Hybrid Electric Drive Trains	4	2	2	0	-
14	Torque-Coupling and Speed-Coupling Parallel Hybrid Electric Drive Trains.	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**8**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***"Automotive Systems and Emerging Technologies* (2021)** **Editor: Philippa A. Benson**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**non**
	Electronic Programs	**MATLAB/Simulink** **Engineering Design Tools (SolidWorks)**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	*Hossam Ramadan*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Hybrid and Electric Vehicles			
Course Code (according to the bylaw)**:**	AUT E76			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4	0	0	4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Hossam ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Principles of analysis, and design of, Power sources in automobiles, ICE, Electric Motors, Fuel cells, Batteries, Different Configurations of modern power trains (Hybrid – Electrical), modern trends.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2&A4&A10&D2&D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	LO1	Analyze the characteristics and roles of power sources used in HEVs and EVs
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	LO2	Explain the integration and functionality of electric motors, batteries, ICEs, and fuel cells in modern vehicle systems.
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	LO3	Investigate current and emerging trends in hybrid and electric vehicle technologies.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.	LO4	Simulate energy flows and efficiency in hybrid-electric systems using appropriate tools.
D4	Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.	LO5	Model different hybrid and electric powertrain configurations.

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√				√				√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to HEVs and EVs – Motivation and Challenges	4	2	2	0	-
2	Overview of Automotive Power Sources	4	2	2	0	-
3	Internal Combustion Engine Review for Hybrid Applications	4	2	2	0	-
4	Electric Motors: Types, Characteristics, and Selection	4	2	2	0	-
5	Battery Technologies: Lithium-ion, NiMH, Management Systems	4	2	2	0	-
6	Fuel Cells: Operation, Types, Applications in EVs	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Powertrain Architectures: Series, Parallel, Series-Parallel	4	2	2	0	-
9	Electric-Only Powertrains and Regenerative Braking	4	2	2	0	-
10	Energy Management and Control Strategies	4	2	2	0	-
11	Performance Metrics and Efficiency Analysis	4	2	2	0	-

12	Design Considerations and Component Sizing	4	2	2	0	-
13	Emerging Trends: Smart Charging, V2G, Autonomous EVs	4	2	2	0	-
14	Project Presentations	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**8**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Hybrid and Electric Vehicles: Principles and Applications with Practical Perspectives*** **(2nd Edition, 2021) Author: Gianfranco Pistoia, Boryann Liaw**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**NON**
	Electronic Programs	**MATLAB/Simulink (Simscape, SimDriveline). MS Excel**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	Hossam Ramadan	أحمد عبدالبديع

المعهد التكنولوجي العالي - بالعاشر من رمضان
توصيف مقرر دراسي

1- معلومات أساسية :

اسم المقرر: (تبعا لما ورد باللائحة)	حقوق الإنسان			
كود المقرر: (تبعا لما ورد باللائحة)	HUM 205			
القسم/الأقسام العلمية التي شاركت في التدريس:	العلوم الاساسية			
إجمالي عدد الساعات المعتمدة للمقرر: (تبعا لما ورد باللائحة)	إجمالي	اخري (تحدد)	عملي	نظري
	1			1
نوع المقرر:	اختياري			
المستوى الدراسي الذي قدم فيه المقرر:	SENIOR 2			
البرنامج الأكاديمي:	البارمج الهندسية			
المعهد:	المعهد التكنولوجي العالي			
اسم منسق المقرر:	أ.م.د.وليد رضوان			
جهة مناقشة واعتماد تقرير المقرر:	مجلس القسم العلمي للبرنامج			
تاريخ اعتماد تقرير المقرر:	7/26/2025			

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمى) :

الالمام بأهمية حقوق الانسان والنشأة التاريخية لتلك الحقوق والمدارس الفقهية لتأصل تلك الحقوق وأحكام الاتفاقيات الدولية الخاصة بحقوق الانسان ، والمنظمات الدولية العالمية والاقليمية القائمة على حماية تلك الحقوق ، وموقف الدستور المصرى من حقوق الانسان ، والحماية القانونية لها على الصعيد الوطنى والصعيد الدولى ، بالاضافة الى حقوق الانسان فى الشريعة الاسلامية – الاصول التاريخية الفلسفية لحقوق الانسان – المصادر الدولية لحقوق الانسان (العالمية والاقليمية) – المصادر الوطنية لحقوق الانسان – الاجهزة العالمية القائمة على حماية حقوق لآنسان (أجهزة الامم المتحدة) – الحماية الوطنية لحقوق الانسان – حقوق الانسان فى الشريعة الاسلامية – عرض لبعض طوائف الانسان – مراجعة عامة

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		**نواتج التعلم للمقرر**	
(A3- A8- A10)		**عند الانتهاء من المقرر سيكون الطالب قادرا على**	
الكود	**النص**	**الكود**	**النص**
A 3	**تطبيق عمليات التصميم الهندسي لإنتاج حلول فعالة من حيث التكلفة تلبي الإحتياجات النوعية مع مراعاة الجوانب العالمية والثقافية والاجتماعية والاقتصادية والبيئية والأخلاقية وغيرها من الجوانب المتسقة مع النظام والظروف وضمن مبادئ وسياق التصميم والتنمية المستدامين.**	LO 1	معرفة الحقوق الأساسية للإنسان والتي لا يحيا بدونها.
		LO 2	معرفة ماله من حقوق وما عليه من واجبات.
		LO 3	معرفة دوره في بناء مجتمعه.
		LO 4	المقارنة بين المراحل المختلفة لتطور حقوق الإنسان في الديانات السماوية والنظم الوضعية.
A 8	**التواصل بفعالية بيانيا وشفاهة وكتابة، مع مجموعات من الجماهير باستخدام الأدوات العصرية.**	LO 5	معرفة حقوق المواطنة وحقوق الوطن على المواطن.
		LO 6	معرفة حقوق البيئة وضرورة الحفاظ عليها وعلاقتها بحقوق الإنسان.
		LO 7	معرفة أنواع الفساد ودوره في إهدار حقوق الإنسان.
A 10	**اكتساب المعارف الجديدة وتطبيقها، وممارسة استراتيجيات التعلم الذاتي وغيرها مدى الحياة.**	LO 8	معرفة دور الشباب في مقاومة الفساد وطرق مقاومته.
		LO 9	الممارسة الصحيحة لما له من حقوق وما عليه من واجبات.
		LO10	تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل في ضوء معرفته لمنظومة الحقوق والواجبات.

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				**التدريس الغير مباشر**										**التدريس المباشر**	
الذكاء الإصطناعي في التعليم	التعلم الالكترونى	المعامل الإفتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
√	√			√	√			√	√	√	√		√		√

الجدول الدراسي للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة: تدريس نظري	تدريب: تمارين	تدريب: عملي
1	تقديم عن المقرر وتعريف أهميته في حياة الطالب.	1	1	0	0
2	حقوق نفسك عليك، ما هي؟ وكيف تؤديها؟	1	1	0	0
3	- تعريف حقوق الإنسان وخصائصها. - أنواع حقوق الإنسان.	1	1	0	0
4	التطور التاريخي لحقوق الإنسان وحرياته.	1	1	0	0
5	- حقوق الإنسان في الشرائع السماوية. - إهدار حقوق الإنسان في الولايات المتحدة الأميركية.	1	1	0	0
6	حقوق الأبناء على الآباء.	1	1	0	0
7	**مراجعة وامتحان منتصف الفصل الدراسي**				
8	- حقوق الأزواج والزوجات وتأسيس أسرة صالحة. - حقوق الآباء على الأبناء.	1	1	0	0
9	حقوق الوطن.	1	1	0	0
10	- الانتماء للوطن. - حقوق البيئة.	1	1	0	0
11	- حقوق اللغة العربية. - الفساد وإهدار حقوق الإنسان. (1)	1	1	0	0
12	- الفساد وإهدار حقوق الإنسان. (2) - دور الشباب في مكافحة الفساد. (1)	1	1	0	0
13	دور الشباب في مكافحة الفساد. (2)	1	1	0	0
14	مراجعة عامة.	1	1	0	0
16-15	**اختبارات الفصل الدراسي النهائية**				

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	%10
2	امتحان 2 تحريري (أعمال سنة)	9	10	%10
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	14	40	% 40
5	امتحان نهائي عملي	لا يوجد	----	------
6	امتحان نهائي شفهي	11	10	%10
7	تكليفات / مشروع / ملف الإنجاز /كتيب الانشطة	8	10	%10

8	تدريب ميداني	لا يوجد	-----	------
9	أخرى (تذكر)	لا يوجد	------	-------

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر	وليد رضوان، حقوق الإنسان، مذكرة للمعهد التكنولوجي العالي بالعاشر من رمضان.
	المراجع الأخرى	1- خديجة النبراوي: موسوعة حقوق الإنسان في الإسلام، دار السلام للطباعة والنشر والتوزيع، القاهرة. 2015 2- محمد الغزالي: حقوق الإنسان بين تعاليم الإسلام وإعلان الأمم المتحدة، القاهرة، دار الكتب الإسلامية، 1984 3- محمد عمارة: الإسلام وحقوق الإنسان، الكويت، سلسلة عالم المعرفة، عدد مايو 1985 4- محي شوقي أحمد: الجوانب الدستورية لحقوق الإنسان (رسالة دكتوراة، جامعة عين شمس، 1986)
	المصادر الالكترونية (لابد من إضافة الروابط)	1- https://ar.wikipedia.org/wiki 2- http://www.du.edu.eg/ 3- https://www.youtube.com/
	المنصة التعليمية (لابد من إضافة الرابط)	https://www.ekb.eg/ar/home
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	(داتا شو) وجهاز كمبيوتر محمول.
	المستلزمات	قاعة محاضرات مجهزة
	البرامج الالكترونية	---------------------
	معامل المهارات/ المحاكيات	--------------
	المعامل الافتراضية	-----------------
	أخرى (تذكر)	---------------------

	منسق المقرر	منسق البرنامج
الإسم	أ.م.د.وليد رضوان	ا.د/ أحمد عبد الغفار
التوقيع	وليد رضوان	أحمد عبد الغفار

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Thermodynamics and Heat Transfer			
Course Code (according to the bylaw):	MEC 271			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 1			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Ahmed Abd EL Badie			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Thermodynamic analysis of power and reversed cycles, and an application to internal combustion engines, gas turbines. Compressors, refrigeration and air conditioning. Fundamentals of gas dynamics, adiabatic, fanno and Rayleigh one dimensional flow. Function and performance of measuring instruments, calibration.- Introduction to heat transfer.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**LO1**	Formulate the entropy change relations for both of pure substance and ideal gases.
		LO2	Solve problems related to entropy change for pure substances and ideal gases.
		LO3	Calculate heat transfer rates in different applications using the principles of heat transfer.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO4**	Distinguish different cases of one-dimensional heat conduction (steady and unsteady).
		LO5	Distinguish different cases of convection heat transfer (forced and natural).
B1	Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of : thermodynamics, heat transfer, fluid mechanics, solid mechanics, material processing, material properties, measurements, instrumentation, control theory and system, mechanical engineering filed	**LO6**	Analyze the performance of vapor power cycles and vapor compression cycles by applying thermodynamics and heat transfer concepts.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√								

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Introduction to Entropy. The Increase of Entropy Principle.	4	2	2	-	-
2	Entropy Change of Pure Substance.	4	2	2	-	-
3	The Entropy Change of Ideal Gases.	4	2	2	-	-
4	Introduction to Gas Power Cycles.	4	2	2	-	-
5	Otto cycle.	4	2	2	-	-
6	Diesel Cycle	4	2	2	-	-
7	**Revision and Mid Exam**					
8	**Mid Exam**					
9	Brayton Cycle.	4	2	2	-	-

10	Rankine Cycle.	4	2	2	-	-
11	Vapor-Compression Refrigeration Cycle.	4	2	2	-	-
12	Introduction to Heat Transfer, conduction heat transfer.	4	2	2	-	-
13	Introduction to convection heat transfer.	4	2	2	-	-
14	Revision for part 2.	4	2	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10 %**
2	Exam 2 written (Semester work)	**10**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Yunus A. Cengel and Michael A. Boles "THERMODYNAMICS: An Engineering Approach" McGraw-Hill, New York.2019.
	Other References	Yunus A. Cengel and Robert H.Turner "Fundamentals of Thermal-Fluid Sciences" McGraw-Hill, 4th Education,2018.
	Electronic Sources (Links must be added)	NON
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	NON
	Supplies	NON
	Electronic Programs	NON
	Skill Labs/ Simulators	NON
	Virtual Labs	NON
	Other (to be mentioned)	NON

	Course Coordinator	Program Coordinator
Name	Dr. Ahmed Abd EL Badie	Dr. Ahmed Abd EL Badie
Signature	احمد عبد البديع	احمد عبد البديع

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	Refrigeration and Air Conditioning.			
Course Code (according to the bylaw)**:**	MEC 256			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr/Moataz Mohamed Abd El-Raouf			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Refrigeration cycle analysis, refrigerants, equipment design and selection, cold stores, cryogenics and liquefaction of gases. Refrigeration cycle, performance, coefficient of performance. A study of the design of heating and cooling systems for residential and industrial applications. System components and analysis, heating and cooling load estimates, detailed design calculations are conducted for the sizing of fail, ducts, pumps and piping. Air conditioning systems, performance, coefficient of performance.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	**LO1**	Analyze ideal thermodynamical cycles via recalling its performance relationships.
A3.	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	**LO2**	Estimate cooling capacity of refrigeration and air conditioning systems.
		LO3	Design air duct systems
A10.	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**LO4**	Describe the significance of energy-saving classes and inverter technology in domestic and industrial sectors, which supports the sustainability of refrigeration and air conditioning systems.
B1.	Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems,	**LO5**	Compare the performance of Various refrigeration and air conditioning systems via common criteria.
		LO6	Analyze thermal analysis via analytical formulas necessary to completing the design process of refrigeration and air conditioning systems.
		LO7	Determine the power and flow rate of thermodynamically open systems

	Mechanical Design and Analysis, Dynamics and Vibrations.		involved in refrigeration and air conditioning systems.
B3.	Select conventional mechanical equipment according to the required performance.	**LO8**	Clarify the significance of each component and accessory in terms of performance stability before categorizing and choosing them for usage in refrigeration and air conditioning systems.
		LO9	Classify air conditioning systems and choose the suitable techniques on the bases of zone characteristics and the overall cooling capacity needed in all the targeted spaces.
B4.	Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to : design, build, operate, inspect and maintain mechanical equipment and systems.	**LO10**	Demonstrate "ASHRAE" as the most widely used international standard in the field of air conditioning.

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
√	√	√			√		√			√				√	

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures)	Training		Other
				Tutorial	/ Practical Lab	
1	*Revision on: Heat transfer modes-Energy vs Power(units) + Electricity bill calculation criteria. *Introduction to basic thermal cycles+ Air refrigeration systems.	4	2	2	-	-
2	Ideal Vapor compression refrigeration system +refrigerant Properties.	4	4	-	-	-
3	Modified Vapor compression refrigeration system + Online Quiz	4	2	2	-	-
4	Actual Vapor compression refrigeration systems	4	2	2	-	-
5	Classification of basic components of vapor compression systems + Inverter Compressors criterion.+ Online Quiz	4	4	-	-	-
6	Accessories of VCC+ Vapor absorption cycle.	4	4	-	-	-
7	**Revision and Mid Exam**					
8	Introduction to HVAC (Heating, ventilation, and air conditioning) systems + Classification of air conditioning systems. (I. Unitary)	4	4	-	-	-
9	Classification of air conditioning systems. (II. Central) + Air psychometry.	4	4	-	-	-
10	Single and combined air conditioning processes using	4	2	2	-	-

	psychrometric chart. + Online Quiz					
11	Building Survey and human comfort + Heat Gain and Thermal load estimation.	4	4	-	-	-
12	Cooling load Calculation sequence .	4	2	2	-	-
13	Air Duct design.+ Online Quiz	4	2	2	-	-
14	Revision	4	4	-	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**3**	**10**	**10 %**
2	Exam 2 written (Semester work or quiz)	**5**	**10**	**10 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Exam 3 written (Semester work or quiz)	**10**	**10**	**10 %**
5	Exam 4written (Semester work or quiz)	**13**	**10**	**10 %**
6	Final Written Exam	**15, 16**	**40**	**40 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	*Khurmi, R. S., & Gupta, J. K. (2006). *Textbook of refrigeration and air conditioning*. S. Chand Publishing. *Dossat, R. J., & Horan, T. J. (2001). *Principles of refrigeration* (5th ed.). Prentice Hall. *Arora, R. C. (2012). *Refrigeration and air conditioning*. PHI Learning.
	Other References	ASHRAE. (2023). ASHRAE handbook: Fundamentals. American Society of Heating, Refrigerating and Air-Conditioning Engineers.
	Electronic Sources (Links must be added)	• https://www.ashrae.org/ • https://www.youtube.com/c/danfoss

	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**non**
	Supplies	**non**
	Electronic Programs	**non**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Moataz Mohamed Abdel-Raouf**	**Dr. Ahmed Abdalbadia**
Signature		احمد عبدالبديع

Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	**Field Training 3**			
Course Code (according to the bylaw)**:**	**FTR 231**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		18		18
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 1**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Assoc. Prof. Dr. Mona A. Younis**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

This is specialized training in which the student studies; the integrated systems of the various production units, as well as the considerations of industrial safety within the factory. The duration of the industrial training is eighteen hours per week spread over a minimum of five days for one academic term.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A5, A7, A8, A9, B4, D3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Write a technical report for the field training.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.**	**LO2**	**Develop new talents while gaining new knowledge in order to manage unknown challenges more wisely in the future.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools..**	**LO3**	**Integrate academic knowledge with practical experience gained during training.**
A9	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO4**	**Demonstrate the importance of work, time management, and teamwork, and maintaining professional attitudes.**
B4	**Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems.**	**LO5**	**Apply national and international standards and codes**
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological,**	**LO6**	**Measure the performance of different systems under specific input excitations using appropriate measurement tools.**

	professional, and computer-aided tools.		

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	**Tutorial / Practical**	**Brain Storming**	**Project based learning**	**Case Study**	**Problem Base Learning**	**Reports & Research**	**Discussion**	**Field Training**	**Site Visit**	**Self-Learning**	**Discovery Learning**	**Simulation Programs**	**Virtual labs**	**E-Learning**	**AI in Education**
	√	√				√	√		√	√	√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			*LOs covered by course*
			Theoretical teaching *(lectures)*	**Training**		
				Tutorial	**Practical /Lab**	
As scheduled	Train on the overall mechanical process	18				
	Train on reading overall flowsheet of the process Train on reading overall flowsheet of the process					
	Midterm Report and Oral Exam					

	Carry out research using granted internet sites for references related to student's 2 training process					
	Write technical report					
	Final Exam.					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Attendance		**10**	**10%**
2	End of term Oral exam		**30**	**30%**
3	Midterm Report (*Term Work*)	**As scheduled**	**20**	**20 %**
4	Final Report (*written*)	**AS scheduled**	**20**	**20 %**
5	Follow up		**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Depend on the case/ technical writing booking**
	Other References	**Hand out to students one by one**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Assoc. Mona A. Younis**	**Dr. Ahmed Abdelbadea**
Signature	MONA A. YOUNIS	احمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	Vehicle Testing & Evaluation			
Course Code (according to the bylaw)**:**	AUT E78			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Hossam Ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Vehicle testing (road, lab), lab tests (dynamometers for engines& vehicles, C.G. location, tire, road characteristics, tire stiffness, etc.), road tests (acceleration, braking, fuel consumption, etc.), durability tests, evaluation of performance.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2, B3, D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering	LO1	Select appropriate equipment based on the requirements of engine systems and component performance.
		LO2	Analyze the causes of faults in engine mechanical components and engine systems.
B3	Select conventional mechanical equipment according to the required performance.	LO3	Evaluate the performance of engine mechanical components and engine systems.
D4	Estimate and measure the performance of an electrical/ electronic/ digital/ mechatronics system under specific input excitation, and evaluate its suitability for a specific application.	LO4	Explain the concepts of maintenance and testing of engine mechanical components and engine systems.

4. Course Teaching and Learning Methods:

Direct Instructio n	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√								

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures)	Training		Other
				Tutorial	/ Practical Lab	
1	Thermal Engineering	4	2	2	-	-
2	Thermal Engineering	4	2	2	-	-
3	Basics of Automobile-II	4	2	2	-	-
4	Basics of Automobile-II	4	2	2	-	-
5	Workshop Technology	4	2	2	-	-
6	Workshop Technology	4	2	2	-	-
7	**Revision and Mid Exam**					
8	Vehicle Testing	4	2	2	-	-
9	Vehicle Testing	4	2	2	-	-
10	Driving Training	4	2	2	-	-
11	Driving Training	4	2	2	-	-
12	Vehicle Maintenance	4	2	2	-	-
13	Vehicle Maintenance	4	2	2	-	-

14	Revision	4	2	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**3**	**10**	**10%**
2	Exam 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**N.DELHI, "AUTOMOTIVE TECHNOLOGY"**
	Other References	Pacejka,,H.B., (2006), " Tyre and Vehicle Dynamics ", Elsevier. Jazav,R.N., (2008), "Vehicle Dynamics theory and applications",Springer.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	**Dr. Hossam Ramadan**	Dr. Ahmed Abdalbadia
Signature	***Hossam Ramadan***	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic Information

<table>
<tr><td colspan="1">Course Title (according to the bylaw):</td><td colspan="4">Environmental Impacts of Projects</td></tr>
<tr><td>Course Code (according to the bylaw):</td><td colspan="4">MNG 202</td></tr>
<tr><td>Department/s that participated in the teaching:</td><td colspan="4">Chemical Engineering Dept.</td></tr>
<tr><td rowspan="2">Total number of credit hours of the course:
(according to the bylaw): 1</td><td>Theoretical</td><td>Practical</td><td>Other (Tutorial)</td><td>Total</td></tr>
<tr><td>1</td><td>-</td><td>-</td><td>1</td></tr>
<tr><td>Course Type:</td><td colspan="4">Compulsory</td></tr>
<tr><td>The level to which the course was introduced:</td><td colspan="4">SENIOR 2</td></tr>
<tr><td>Academic Program:</td><td colspan="4">All Programs</td></tr>
<tr><td>Institute:</td><td colspan="4">Higher Technological Institute</td></tr>
<tr><td>Name of Course Coordinator:</td><td colspan="4">Ass Prof / Soad Abdel Aziz El Metwaly</td></tr>
<tr><td>Course Specification Approval
(Attach the decision/minutes of the department /committee/council ....)</td><td colspan="4">The updated course specification has been reviewed and approved by the chemical Engineering department council No. (11). Please find attached the corresponding minute confirming the course approval.</td></tr>
<tr><td>Course Specification Approval Date:</td><td colspan="4">8/5/2025</td></tr>
</table>

2. Course Overview (Brief summary of scientific content):

Introduction: Availability of natural resources, Natural cycles of some basic elements (carbon, oxygen, nitrogen, sulfur, Phosphorous) Conflicts between developments, Economics and environments. Defining emissions sources, impacts, standards and precautions. Water, air and soil pollution and measurements. Historical development for recognizing the need for environmental impact assessment. Assessing the impacts on health, social, cultural and economic activities. Procedures of the environmental impact assessment: screening, scoping, defining impacts, comparing alternatives, plans for mitigation and alleviation, environmental auditing and public participation. Environmental impact statement and reporting, contents and forms. Examples for assessing the impacts of water resources projects on the environment and impacts of different activities on the water environment

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (NARS).

Program Outcomes (NARS) (according to the matrix in the program specs)		Course Learning Outcomes	
(A3, A4, A6)		Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development	LO1	Define the steps of EIA study and its objectives, also the structure of the final EIA report
		LO2	Explain the different types of pollution and environmental component analysis
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles	LO3	Realize the natural cycles of essential elements and the conflicts between development, economics, and the environment
		LO4	Recognize qualitative and quantitative methods of impact analysis.
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	LO5	Predict EIA for different projects

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√				√		√	√								

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures)	Training		Other (Tasks/ Assignments/ Projects/ ...)
				Tutorial	Practical / Lab	
1	Course Introduction Natural cycles of some elements	1	1	-	-	
2	Types of pollution and measurements.	1	1	-	-	
3	Emissions sources	1	1	-	-	
4	EIA process	1	1	-	-	
5	Quiz 1- EIA Report	1	1	-	-	
6	EIA Report (continued)	1	1	-	-	
7	**Revision and Mid Exam**					
8	Impact Identification	1	1	-	-	

9	Impact Identification	1	1	-	-	
10	Review and licensing	1	1	-	-	
11	Quiz 2 - Review and licensing (continued)	1	1	-	-	
12	Monitoring and Auditing	1	1	-	-	
13	Monitoring and Auditing (continued)	1	1	-	-	
14	Case Study	1	1	-	-	
15,16	**Final Exam.**					

5. Methods of Students' Assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	According to schedule	15	15%
2	Exam 2 written (Semester work)	According to schedule	15	15%
3	Midterm exam	7	20	20%
4	Final Written Exam	15, 16	40	40%
5	Assignments / Reports /case study	According to schedule	10	10%

6. Learning Resources and Supportive Facilities: *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	• **John Glasson, Riki Therivel and Andrew Chadwick, Introduction to Environmental Impact Assessment, 4th edition, 2012.**
	Other References	• **Thom B. Fischer, "Strategic Environmental Assessment in Transport and Land Use Planning", 1st edition, 2023,** • **Barbara Carroll, Josh Fothergill, Jo Murphy, and Trevor Turpin, "Environmental Impact Assessment Handbook: A practical guide for planners, developers and communities", Third edition, 2019**

		• **Peter Morris and Riki Therivel, Methods of Environmental Impact Assessment,Third edition,2009**
	Electronic Sources (Links must be added)	**--**
	Learning Platforms (Links must be added)	**EKB - Microsoft Office**

Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Data show, laptop,**
	Supplies	**Essential Supplies**
	Electronic Programs	**--**
	Skill Labs/ Simulators	**--**
	Virtual Labs	**--**
	Other (to be mentioned)	**Library Usage**

	Course Coordinator	Program Coordinator
Name	Ass. Prof. Soad Abd El.aziz El Metwally	Dr. Noha Fawzy M. El Husseiny
Signature	Soad Abdel Aziz Awad	Noha ElHoseny

المعهد التكنولوجي العالي – مدينة العاشر من رمضان **قسم / الهندسة الطبية**	
توصيف مقرر	
إسم المقرر: اخلاقيات مهنية	**كود المقرر: MNG 203**

القسم القائم بتدريس المقرر	**الهندسة الطبية**

1- معلومات أساسية :

نوع المقرر	إجباري			**الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر**	الفرقة الخامسة			
العام الأكاديمي **الفصل الدراسي**	**2026/2025**	مايو		**عدد الساعات المعتمدة**	1			
ساعات الإتصال:	**المحاضرة:**	**1**	**التمارين:**	**0**	**المعامل:**	**0**	**إجمالي**	1
المتطلب السابق:	لا يوجد							
المعايير الأكاديمية	NARS 2018							
تاريخ الموافقة على اللائحة	2016							
منسق المقرر	ا.م.د/ امل الدسوقي							
تاريخ اعتماد توصيف المقرر	2016							
جهة مناقشة واعتماد توصيف المقرر	**(محضر الاعتماد من مجلس القسم)**							

2- الوصف العام للمقرر (ملخص موجز للمحتوى العلمى) :

رؤية عالمية حول علم الهندسة ووظيفة المهندس: لطالما كان علم الهندسة نبراسًا لأي حضارة. - تُعدّ مهنة الهندسة من أرقى وأسمى المهن (وظيفة هندسية قائمة على الإبداع والابتكار والتطوير من وحي خيال المهندس - خدمة البشرية جمعاء والسعي إلى الجودة في حياة الإنسان). مسؤولية المهندس على الصعيدين الوطني والدولي: الدور الحيوي للمهندس وفقًا لعقود الهندسة الدولية (فيديك). - مسؤولية المهندس وفقًا للقوانين المصرية. أخلاقيات وآداب المهنة: رؤية عالمية حول قانون نقابة المهندسين رقم 66.

3- نواتج التعلم للمقرر:

اتساق نواتج التعلم للمقرر مع مخرجات البرنامج (المعايير المتبناة)

مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)		نواتج التعلم للمقرر	
A9, A10		**عند الانتهاء من المقرر سيكون الطالب قادرا على**	
الكود	**النص**	**الكود**	**النص**
A9	استخدم التفكير الإبداعي والمبتكر والمرن، واكتسب مهارات ريادة الأعمال والقيادة لتوقع المواقف الجديدة والاستجابة لها. استخدم التفكير الإبداعي والمبتكر والمرن، واكتسب مهارات ريادة الأعمال والقيادة لتوقع المواقف الجديدة والاستجابة لها.	**LO1**	**يوضح** طبيعة وظيفة المهندس كدور مهني يجمع بين الإبداع والمسؤولية الاجتماعية.
A10	اكتسب وطبّق معارف جديدة، ومارس استراتيجيات التعلم الذاتي، والتعلم مدى الحياة، وغيرها.	**LO2**	**يميز** بين المسؤوليات المهنية للمهندس في السياق المحلي والدولي، بما في ذلك عقود الفيديك والقوانين المصرية.

4- طرق التعليم والتعلم للمقرر:

استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات				التدريس الغير مباشر										التدريس المباشر	
الذكاء الاصطناعي في التعليم	التعلم الالكترونى	المعامل الافتراضية	برامج المحاكاة أو النمذجة	التعلم بالإكتشاف	التعلم الذاتى	الزيارات الميدانية	التدريب الميداني	الحوار والمناقشة	كتابة التقارير /الأبحاث	حل المشكلات	استراتيجية دراسة الحالة	التعلم القائم على المشروعات الجماعية	العصف الذهنى	التمارين العملية والتجارب	المحاضرات
	√				√			√	√	√		√	√		√

الجدول الدراسى للمقرر:

رقم الاسبوع الدراسي	المحتوى العلمي للمقرر (موضوعات المقرر)	إجمالي عدد الساعات الأسبوعية	عدد ساعات التعلم المتوقعة: تدريس نظري	تدريب: تمارين	تدريب: عملي	نواتج التعلم التي يحققها المقرر
1	رؤية عالمية حول علوم الهندسة ومهنة المهندس.	1	1	0	0	LO.1
2	رؤية عالمية حول مهنة المهندس.	1	1	0	0	LO.1
3	وظيفة هندسية قائمة على الإبداع والابتكار.	1	1	0	0	LO.1
4	وظيفة هندسية قائمة على التطوير.	1	1	0	0	LO.1
5	دور المهندس الحيوي في العقود الهندسية الدولية.	1	1	0	0	LO.1
6	مسؤولية المهندس في القوانين المصرية.	1	1	0	0	LO.1
7	**مراجعة وامتحان منتصف الفصل الدراسي**					
8	معرفة بالاتحاد الدولي للمهندسين الاستشاريين (فيديك).	1	1	0	0	LO.2
9	أخلاقيات وآداب المهنة: رؤية عالمية حول قانون نقابة المهندسين رقم 66 لسنة 1974 - تأكيد.	1	1	0	0	LO.2
10	مراجعة واختبار قصير.	1	1	0	0	LO.2
11	معرفة بالاتحاد الدولي للمهندسين الاستشاريين (فيديك).	1	1	0	0	LO.2
12	أخلاقيات وآداب المهنة: رؤية عالمية حول قانون نقابة المهندسين رقم 66 لسنة 1974 - تأكيد.	1	1	0	0	LO.2
13	**مناقشة التقارير**	1	1	0	0	LO.1 LO.2
14		1	1	0	0	
16-15	**إختبارات الفصل الدراسي النهائية**					

5- طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	10	20	% 20
3	امتحان منتصف الفصل الدراسي	7	20	% 20
4	امتحان نهائي تحريري	15 و 16	40	% 40
7	تكليفات / مشروع / ملف الإنجاز /كتيب الانشطة	13 و 14	20	% 20

*** الطرق المذكورة هي أمثلة استرشادية، ويجوز الإضافة والحذف**

6- مصادر التعلم والتسهيلات المادية:

مصادر التعلم (الكتب والمراجع العلمية وغيرها) *	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	**Mappes, Thomas A. Biomedical Ethics. 1st ed., Butterworth, 1999.**
	المراجع الأخرى	**السامرائي، مهدي صالح مهدي. أخلاقيات العمل. دار صفاء للنشر والتوزيع، 2021.**
	المصادر الالكترونية (لابد من إضافة الروابط)	**اخلاقيات العمل - د.مهدى صالح مهدى السامرائى - Google Books**
	المنصة التعليمية (لابد من إضافة الرابط)	EKB - Microsoft office
التجهيزات التعليمية المساندة للتعليم والتعلم *	الأجهزة	**داتا شوه**
	المستلزمات	
	البرامج الالكترونية	
	معامل المهارات/ المحاكيات	
	المعامل الافتراضية	
	أخرى (تذكر)	

*** القائمة المذكورة هي أمثلة استرشادية ، ويجوز الإضافة والحذف تبعا لطبيعة المقرر (المراجع محدثة – بحد أقصى أخر 10 سنوات) مع إضافة أحد المراجع المتاحة بمكتبة المعهد.**

	منسق المقرر	منسق البرنامج
الإسم	ا.م.د/ امل الدسوقي	د/ غادة كريم
التوقيع		غادة

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Power Electronics			
Course Code (according to the bylaw)**:**	MTE 222			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	1		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Mohamed Ahmed Hamdy Hassan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Basics of power electronics, multi-phase systems, pointer diagrams, power semiconductors, centre circuits, bridge circuits, commutation procedures, load versions, power converter transformations, direct converters, reverse converters, net controlled converters, single and multi-quadrant controllers, current and voltage indirect converters, control theories, EMC problems

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,A3,D2,D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Identify the construction, operation, V-I characteristics, commutation, firing, and protection methods of various power semiconductor devices.
		LO2	Model electrical circuits by formulating mathematical equations and analyzing the converter response.
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development	**LO3**	Distinguish between different types and characteristics of power semiconductor devices.
		LO4	Analyze applications of power electronics by researching and developing knowledge and skills that support life-long learning.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	**LO5**	Model of electrical circuits by writing its mathematical equation and analyzing the converter response.
		LO6	Determine the output waveforms of converters under different input conditions.
D4	Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.	**LO7**	Study the performance of converters with standard input waveforms.
		LO8	Evaluate the response and convergence of converters under standard input conditions.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	**Other**
1	Introduction To Power Electronics	**2**	**1**	**2**	**1**	-
2	Sinusoids and Phasors	**2**	**1**	**2**	**1**	-
3	Power Semiconductor Devices	**2**	**1**	**2**	**1**	-
4	Single Phase Uncontrolled Half – Wave Rectifiers	**2**	**1**	**2**	**1**	-
5	Single Phase Uncontrolled Full – Wave Rectifiers	**2**	**1**	**2**	**1**	-
6	Three Phase Uncontrolled Rectifiers	**2**	**1**	**2**	**1**	-
7	**Revision and Mid Exam**					

8	Single - Phase Controlled Rectifiers	**2**	**1**	**2**	**1**	-
9	Three - Phase Controlled Rectifiers	**2**	**1**	**2**	**1**	-
10	DC-DC Converters	**2**	**1**	**2**	**1**	-
11	DC-DC Converters	**2**	**1**	**2**	**1**	-
12	Single - Phase AC-AC Converters	**2**	**1**	**2**	**1**	-
13	Three - Phase AC-AC Converters	**2**	**1**	**2**	**1**	-
14	Inverters	**2**	**1**	**2**	**1**	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**According to schedule**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Rashid, M. H., " Power Electronics, Circuits, Devices and Applications ", Prentice Hall, Fourth Edition, 2018.
	Other References	1- Ned Mohan, "Power Electronics , Converters, Applications, and Design" , Mc Graw Hill Pub ,Third Edition, 20020.

		2- Cyril W. Lander, "Power Electronics " , John Wiley & Sons, Inc, Third Edition, 1993.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	Dr. Mohamed Ahmed Hamdy Hassan	Dr. Ahmed Abdalbadia
Signature	MOHAMED	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**B.Sc. Project 1**			
Course Code (according to the bylaw)**:**	**MTE** 240			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	3		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Prof.Dr.EMAN Ibrahim**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. *Course Overview (Brief summary of scientific content):*

In phase One of the Graduation Project, The student should attach himself to one or more faculty members as advisor(s). A topic for the project related to Mechatronics Engineering is to be chosen in accordance with the interest of both the student and the faculty. The selected topic is to be approved by the department committee for projects. It is preferred to be linked with real problem in industry. During this phase, the following tasks are to be fulfilled, Planning phase including a proposal with a suggested time plan –Search on previous work in the related subjects and Design phase (Material – components- design calculations – documentations)

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
•		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Conduct literature review and applying research methodologies to identifying state-of-the-art solutions in the chosen project domain.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2**	**Develop a project proposal with a detailed timeline, considering design constraints and interdisciplinary requirements.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO3**	**Work effectively as an individual and as a team member to share responsibilities in project planning and design**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4**	**Prepare and presenting technical reports and project documentation effectively using contemporary tools.**
A9	**Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.**	**LO5**	**Demonstrate creativity and leadership in proposing innovative project ideas and responding to challenges with flexible solutions.**

B2	**Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field**	**LO6**	**Develop preliminary mechanical designs using appropriate materials and both traditional and computer-aided tools**
B4	**Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems**	**LO7**	**Apply relevant engineering standards, codes, and basic economic considerations in the preliminary project design and documentation**
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO8**	**Plan and implementing the initial design of a mechatronic system, subsystem, or module using appropriate tools and methods.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO9**	**Estimate and assessing the expected performance under defined operating conditions**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
		√	√	√		√	√			√	√	√			

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	Introduction to graduation project requirements & advisor selection	4	1	0	3	-
2	Defining project topics, problem identification, industry linkage	4	1	0	3	-
3	Proposal writing guidelines and time plan preparation	4	1	0	3	-
4	Literature review methods & database search	4	1	0	3	-
5	Review and approval of proposals by department committee	4	1	0	3	-
6	Research on state-of-the-art methods and tools	4	1	0	3	-
7	**Revision**					
8	Material and component selection (initial stage)	4	1	0	3	-
9	Introduction to design calculation methods	4	1	0	3	-
10	CAD and simulation tools for preliminary design	4	1	0	3	-
11	Documentation techniques and standards	4	1	0	3	-

12	Mid-project review with advisors (oral presentation)	4	1	0	3	-
13	**Finalization of design phase: materials, components, calculations**	4	1	0	3	-
14	Submission of Phase 1 report	4	1	0	3	-
15,16	**Final presentation.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Proposal & Time Plan	**4**	**15**	**15%**
2	Literature Review Report	**6**	**20**	**20%**
3	Mid-Project Presentation & Progress Evaluation	**12**	**15**	**15 %**
5	Preliminary Design, Calculations & Standards Integration	**13**	**25**	**25%**
6	Final Report & Oral Presentation	**14,15**	**25**	**25%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Pahl, G., Beitz, W., Feldhusen, J., & Grote, K. H. (2019). *Engineering Design: A Systematic Approach* (3rd Edition).**
	Other References	**Ulrich, K. T., & Eppinger, S. D. (2020). *Product Design and Development* (7th Edition).**
	Electronic Sources (Links must be added)	**Egyptian Knowledge Bank: https://www.ekb.eg/ar/home**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Electronic Programs	**SolidWorks, AutoCAD MATLAB/Simulink, ANSYS, Proteus MS Word**

	Course Coordinator	Program Coordinator
Name	Prof. Dr. Eman Nassar	Dr. Ahmed Abdalbadia
Signature	[illegible]	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Signal Processing & Digital Control			
Course Code (according to the bylaw)**:**	MTE 241			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	2		3
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Associate Prof. Dr. Alaa Abdelwahab Saleh			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Representation, analysis, and design of discrete time signals and systems, Z-transforms and the discrete Fourier transform. Difference equations - Digital control systems - The fast Fourier transform (FFT) algorithm- High speed convolution – Time – and frequency domain design techniques for recursive and non – recursive systems. Finite word length effects. Additional topics may include Homo – morphic signal processing, Hilbert transforms, parametric signal modeling, and power spectrum estimation – applications.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

<table>
<tr><th colspan="2">Program Outcomes (ARS)
(according to the matrix in the program specs)</th><th colspan="2">Course Learning Outcomes</th></tr>
<tr><th colspan="2">A1,A2,A10,D2,D4</th><th colspan="2">Upon completion of the course, the student will be able to:</th></tr>
<tr><th>Code</th><th>Text</th><th>Code</th><th>Text</th></tr>
<tr><td rowspan="2">A1</td><td rowspan="2">Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.</td><td>LO1</td><td>Identify continuous and discrete signals also formulation them using basic mathematical functions.</td></tr>
<tr><td>LO2</td><td>Distinguish the different forms and shapes of various types of signals.</td></tr>
<tr><td>A2</td><td>Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions..</td><td>LO3</td><td>Conduct simulations for discrete signals, including sampling and system response.</td></tr>
<tr><td>A10</td><td>Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.</td><td>LO4</td><td>Analyze signal processing applications by researching information for developing knowledge and skills that support life-long learning.</td></tr>
<tr><td rowspan="2">D2</td><td rowspan="2">Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.</td><td>LO5</td><td>Model digital systems by formulating their mathematical difference equations and system stability analyzation</td></tr>
<tr><td>LO6</td><td>Determine the transfer function of a system and its behavior under standard input signals.</td></tr>
<tr><td rowspan="2">D4</td><td rowspan="2">Estimate and measure the performance of an electrical/electronic/digital/mechanical/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.</td><td>LO7</td><td>Assess the performance of systems subjected to standard inputs.</td></tr>
<tr><td>LO8</td><td>Evaluate system response and its convergence due to standard input conditions.</td></tr>
</table>

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√								√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to signals and systems and its classification	**3**	**1**	**1**	**1**	-
2	Continuous and discrete signals	**3**	**1**	**1**	**1**	-
3	Continuous signals and processing on it	**3**	**1**	**1**	**1**	-
4	Digital (discrete) signals and standard signals with variant processing	**3**	**1**	**1**	**1**	-
5	Digital (discrete) signals and standard signals with variant processing	**3**	**1**	**1**	**1**	-
6	Variant types of system and LTI system.	**3**	**1**	**1**	**1**	-
7	**Revision and Mid Exam**					
8	Z transform and its application.	**3**	**1**	**1**	**1**	-

9	Z transform and its application.	**3**	**1**	**1**	**1**	-
10	Z transform and its application.	**3**	**1**	**1**	**1**	-
11	Properties of Z- transform	**3**	**1**	**1**	**1**	-
12	Inverse Z	**3**	**1**	**1**	**1**	-
13	Inverse Z	**3**	**1**	**1**	**1**	-
14	Writing difference equation and studying digital system stability.	**3**	**1**	**1**	**1**	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work or quiz)	**5**	**15**	**15%**
2	Exam 2 written (Semester work or quiz)	**10**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Discrete-Time Signal Processing (Prentice Hall Signal Processing) 3rd Edition, 2019
	Other References	Hwei P. Hsu :" Signals and Systems " McGraw Hill 2005 Vinay K. Ingle, John G. Proakis , Digital Signal Processing Using MATLAB: Third Edition, 2012
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office

Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Non**
	Supplies	**Non**
	Electronic Programs	**Non**
	Skill Labs/ Simulators	**Non**
	Virtual Labs	**Non**
	Other (to be mentioned)	**Non**

	Course Coordinator	**Program Coordinator**
Name	Associate Prof. Dr. Alaa Abdelwahab Saleh	Dr. Ahmed Abdalbadia
Signature	alaa	أحمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	Design of Mechatronics system			
Course Code (according to the bylaw)**:**	MTE 242			
Department/s that participated in the teaching:	Mechanical s Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	2		4
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	PROF. DR. AMAL NASSAR			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

The components and the structure of Mechatronics systems, General Diagram of Mechatronics System. Using a Software Package for Application of Modeling & Simulation of Mechatronics Systems. Different Control Methods for Mechatronics System (hardware based & Software based). Interfacing Systems & Electronics Connections. Design and implementation of a course Project Including: Mechanical system, Sensors, Actuators, and a Control unit. A proposal with time plan, follow up report, final report, and presentation of the project (May be using power point) are required for the course project.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2,D1,D3		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions	**LO1**	Identify the principles of mechatronics system design, including element-level design (mechanical parts, sensors, control units, signal conditioning, and actuators), the design process, and the integration of the whole system.
		LO2	Recognize modern engineering technologies in the areas of sensors, control units, and actuators through instruction and self-directed learning.
D1	use a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems .	**LO3**	Differentiate between the fundamentals of modeling, system identification, and simulation in mechatronics systems.
D3	Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools	**LO4**	Illustrate the design cycle based on recognition of needs and the market feedback loop to achieve sustainable design.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√			√		√	√	√				√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction – Course information – Project information and planning – Elements of project proposal.	5	2	----	3	--
2	Mechatronics Systems – Mechatronics key elements – Mechatronics versus multidisciplinary	5	2	----	3	--
3	Design flow chart – Project Proposal approval	5	2	----	3	--
4	Selection of sensors & Actuators- Project progress follow up.	5	2	----	3	--
5	Control Units (Hardware based solutions)- Project progress follow up	5	2	----	3	--
6	Control Units (Microprocessor based solutions)- Project progress follow up	5	2	----	3	--

7	**Revision and Mid Exam**					
8	Simulation of Mechatronics Systems using MATLAB. - Project progress follow up.	5	2	----	3	--
9	Simulation of Mechatronics Systems using SIMULINK Project progress follow up	5	2	----	3	--
10	Control of Mechatronics Systems using MATLAB.	5	2	----	3	--
11	Introduction to Robots & Project progress follow up	5	2	----	3	--
12	Flexible Manufacturing Systems	5	2	----	3	--
13	Modern trends in Mechatronics systems – Final Report and power point presentation	5	2	----	3	--
14	Course project	5	2	----	3	--
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**10**	**0**	**10%**
2	Exam 2 written (Semester work)	**5**	**0**	**5%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**25**	**0**	**25%**

Experiment Topics: (If any)

Serial	Experiment
1	SOLIDWORK OF MECHANICAL PAART OF PROJECT
2	Carry out design of mechanical part of project
3	Setup pcb and controller and motor selection
4	Wiring of electrical part of the project
5	Start manual project work

6	Setup an select the suitable controller
7	Carry out programing of the controller
8	Complete the project

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**JOHN BILLINGSLEY, CONTROL BASICS 2024 FOR MECHATRONICS,**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**non**
	Supplies	**non**
	Electronic Programs	**non**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**PROF. DR. AMAL NASSAR**	Dr. Ahmed Abdalbadia
Signature	**AMAL NASSAR**	احمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Modeling and Simulation**			
Course Code (according to the bylaw)**:**	**MTE 243**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	3	**1**		**4**
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 1**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr.Ahmed Abu El -FADl**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Relevance of simulations, mathematic background, numerical methods, description using differential equations, block diagrams, system identification, display of mechanical and electrical components, modeling, subsystems, enclosure of systems –Use of the available software for simulation (Examples, MATLAB – SIMULINK- LABVIEW ..etc...)

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1,A2,D1,D2		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, andmathematics. Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	LO1	**Apply mathematical methods to derive input-output equations for different systems and analyze first- and second-order responses.**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	LO2	**Simulate mathematical models of different systems.**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	LO3	**Design mechatronics systems using software tools.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	LO4	**Model mechanical, electrical, and mixed systems using MATLAB.**

4. Course Teaching and Learning Methods:

Direct Instructio n	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√	√		√	√	√					√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction of Modelling	4	1	2	1	-
2	Modeling of Translation mechanical system	4	1	2	1	-
3	Modeling of rotational mechanical systems	4	1	2	1	-
4	Modeling of electrical system	4	1	2	1	-
5	Modeling of Mixed system	4	1	2	1	-
6	Simulate of mechanical system	4	1	2	1	-
7	**Revision and Mid Exam**					
8	Simulate of electrical and mixedsystems	4	1	2	1	-
9	Modeling of fluid system	4	1	2	1	-
10	Simulate of fluid system	4	1	2	1	-
11	First order response	4	1	2	1	-

12	Second order response	4	1	2	1	-
13	Second order response	4	1	2	1	-
14	Revision	4	1	2	1	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**O. PIRONNEAN, NUMERICAL SIMULATION OF UNSTEADY FLOWS,2022**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**LAPTOPS**
	Supplies	
	Electronic Programs	**MATLAB**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr.Ahmed Abu El -FADl**	Dr. Ahmed Abdalbadia
Signature	Ahmed fadl	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Electrical Machines Lap**			
Course Code (according to the bylaw)**:**	**MTE 244**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		3
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 2**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**DR.AHMED SAMIR**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Safety Instructions - This lab course will introduce the theory in addition to hands on electrical machines. The topics may include, Introduction to energy conversion - Single phase transforms, construction, theory, operation and testing - D.C Motors, types and applications, construction, theory, and (torque – speed characteristics). - A.C Motors, types and applications, construction, and theory. - Single phase induction motors -Three phase induction motors - Stepper Motor , construction, operation and control& applications. and theory. - Single phase induction motors

-Three phase induction motors - Stepper Motor , construction, operation and control& applications.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A5&A6&A7&A8&D1&D2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	Practice research techniques and methods of investigation as an inherent part of learning	**LO1**	Describe the construction of D.C. machines, different windings, and their merits and demerits.
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**LO2**	Analyze different types of D.C. generators, their characteristics, industrial applications, and the effect of armature reaction with its assessment.
A7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams	**LO3**	Explain the principle of D.C. motors, their electrical characteristics, and industrial applications while working as a member of a team. .
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO4**	Simulate the various losses in D.C. machines and their efficiency using MATLAB.
D1	Integrate a wide range of analytical tools , techniques , equipment , and software package to design and develop mechatronics systems	**LO5**	Analyze the circuits of different types of D.C. motors and power and speed calculation.
		LO6	Identify transformers and the explanation of how they transfer energy.

D2	Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.	**LO7**	Recognize the different types of tests performed on transformers, and the explanation of their purposes, also demonstration of how to apply these tests in practice.

4. Course Teaching and Learning Methods:

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√	√		√	√	√		√	√			√	√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Principle of Electromechanical Energy Conversion.	3	0	0	3	-
2	Principle of operation for dc machines.	3	0	0	3	-
3	D.C. Generators: Introduction and Principle of operation.	3	0	0	3	-
4	Construction of D.C. Generator and E.M.F. Equation of a D.C. Generator.	3	0	0	3	-

5	Types of D.C. Generators and Losses in a D.C. Machine.	3	0	0	3	-
6	Power Stages and efficiency for dc generators with solved examples.	3	0	0	3	-
7	**Revision and Mid Exam**					
8	D.C. Motors: Introduction and Principle of operation.	3	0	0	3	-
9	Construction of D.C. Motors and back E.M.F. Equation of a D.C. Motors.	3	0	0	3	-
10	Types of D.C. Motors, Power Stages and efficiency for dc motors with solved examples	3	0	0	3	-
11	Maximum Power Transfer of D.C Motors, Armature Torque and speed in D.C Motor.	3	0	0	3	-
12	Transformer: Introduction, Construction, Principle of Operation, E.M.F Equation.	3	0	0	3	-
13	Theory for an Ideal and actual Transformer, Practical and test transformer with solved examples.	3	0	0	3	-
14	D.C. Motors: Introduction and Principle of operation.	3	0	0	3	-
15,16	**Final Exam.**					

Experiment Topics:

Serial	**Experiment**
1	Energy conversion principles using a basic electromechanical setup
2	Study of D.C Motors: construction, types, and torque-speed characteristics
3	Single Phase Induction Motors: starting methods and applications
4	Three Phase Induction Motors: construction and performance analysis
5	Testing and operation of Single Phase Transformers

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	4	10	10 %
2	Exam 2 written (Semester work)	11	10	10%
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	40	40 %
7	Assignments / Project /Portfolio/ Logbook	20	20	20 %

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Krause, Paul C., and Thomas C. Krause. Introduction to modern analysis of electric machines and drives. John .Wiley & Sons, 2022**
	Other References	**-De Doncker, Rik W., Duco WJ Pulle, and André Veltman. *Advanced electrical drives: analysis, modeling, control*. Springer Nature, 2020.** **3-Murakami, Akim, and Sergey Edward Lyshevski. *Electromechanical systems, electric machines, and applied mechatronics*. CRC press, 2018.**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**DC Motors, AC Motors, Three-Phase Induction Motors, Transformers, Multimeters, Tachometers**
	Supplies	**Wires, Connectors, Switches, Circuit Boards, Fuses, Safety Gloves**
	Electronic Programs	**MATLAB/Simulink,**
	Skill Labs/ Simulators	**Electrical Machine Training Kits, Motor Control Panels, Load Test Benches**
	Virtual Labs	**Online simulation platforms**
	Other (to be mentioned)	

	Course Coordinator	Program Coordinator
Name	DR.AHMED SAMIR	Dr. Ahmed Abdalbadia
Signature	AHMED SAMIR	احمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Image Recognition			
Course Code (according to the bylaw):	MTE E04			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Sara Sedaby			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Introduction – Computer Vision versus biological vision – Cameras- Recognition – Identification – Detection - Content-based image retrieval - Pose estimation -Optical Character Recognition (OCR) - Applications.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2,A10,D1,D2,D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	**LO1**	**Implement OCR systems using suitable computer vision libraries.**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies**	**LO2**	**Distinguish between biological vision and computer vision.**
D1	**Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems**	**LO3**	**Apply digital imaging tools and techniques for recognition, identification, and object detection.**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**LO4**	**Apply algorithms for content-based image retrieval and pose estimation.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application**	**LO5**	**Analyze real-world applications of image recognition in automation, security, and intelligent systems**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to Image Recognition and Computer Vision	4	2	2	0	-
2	Biological Vision vs Computer Vision	4	2	2	0	-
3	Digital Cameras and Image Acquisition	4	2	2	0	-
4	Image Preprocessing and Feature Extraction	4	2	2	0	-
5	Object Recognition and Identification Techniques	4	2	2	0	-
6	Detection and Classification of Visual Objects	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Content-Based Image Retrieval (CBIR)	4	2	2	0	-
9	Pose Estimation and Object Tracking	4	2	2	0	-
10	Optical Character Recognition (OCR) Techniques	4	2	2	0	-
11	Tools and Libraries: OpenCV, Tesseract, TensorFlow	4	2	2	0	-

12	Performance Evaluation of Image Recognition Systems	4	2	2	0	-
13	Applications: Robotics, Surveillance, Smart Devices	4	2	2	0	-
14	Project Presentations and Future Trends	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Programming Computer Vision with Python: Tools and algorithms for analyzing images*** **(Updated Edition, 2020)** **Author: Jan Erik Solem**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**OpenCV (Python or C++)** **Tesseract OCR** **MATLAB (Image Processing Toolbox)**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	Dr. Sara	Dr. Ahmed Abdalbadia
Signature	***Sara***	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Microcontroller Applications			
Course Code (according to the bylaw)**:**	MTE E05			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Dr. Mina Raafat			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Software development tools (simulators) -Interfacing common peripherals --ADC, DAC, and sensor interfacing -Interfacing with external memory -Motor Control – Relay – PWM - DC and stepper motor -Design & Implement of a microcontroller based Mechatronics system (Small course project).

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2,A4,A10,D1,D2		Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	LO1	Use simulation tools and embedded programming environments for microcontroller development
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	LO2	Utilize contemporary microcontroller development platforms while considering safety, quality, and reliability
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies	LO3	Demonstrate independent learning through a microcontroller-based project
D1	Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems.	LO4	Use simulation tools and embedded programming environments for applying knowledge of sensors, ADC/DAC, and memory interfacing in microcontroller-based systems.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design.	LO5	Apply knowledge of sensors, ADC/DAC, and memory interfacing in microcontroller-based systems.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√			√		√			√

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures)	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to Microcontroller Applications & Architecture Overview	4	2	2	0	-
2	Microcontroller Development Tools and Simulators	4	2	2	0	-
3	Digital I/O and Bit Manipulation Programming	4	2	2	0	-
4	ADC/DAC Interfacing – Analog Sensor Applications	4	2	2	0	-
5	Interfacing with External Memory (EEPROM, Flash)	4	2	2	0	-
6	Display Interfacing (LCD/Seven Segment)	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Relay Control & Switching Circuits	4	2	2	0	-
9	PWM Concepts and Generation Using Microcontrollers	4	2	2	0	-

10	DC Motor Control using PWM and Relays	4	2	2	0	-
11	Stepper Motor Control – Sequencing & Speed Control	4	2	2	0	-
12	System Design: Microcontroller-Based Mechatronics System	4	2	2	0	-
13	Project Development and Testing	4	1	1	2	-
14	Project Presentations	4	1	1	2	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**13**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-14**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	"PROGRAMMABLE MICROCONTROLLERS" CEM UNSALAN(2018)
	Other References	"Programming PIC Microcontrollers with XC8: Mastering Classical Embedded Design (Maker Innovations Series) ",Armstrong Subero Second Edition(2024)
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**Project components**
	Electronic Programs	**MPLAB, Proteus**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Mina Raafat**	**Dr. Ahmed Abd Elbadie**
Signature	*Mina Raafat*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Artificial Intelligence**			
Course Code (according to the bylaw)**:**	**MTE E06**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			**4**
Course Type:	Elective			
The level to which the course was introduced:	**SENIOR 2**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Sara G. Seadby**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Introduction to machine intelligence, neural networks, expert systems, fuzzy logic, robotics control, image processing, industrial applications, and emerging trends in AI.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1,A2,A10,D2,D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO1**	Analyze AI paradigms and their mathematical foundations
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO2**	Design neural networks and fuzzy logic systems.
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	**LO3**	Discover current and upcoming AI trends.
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	**L04**	Implement robotic control using AI.
D4	Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.	**LO5**	Assess AI applications in image processing and automation.

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√			√	√	√		√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	**Expected number of the Learning Hours**			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	/ Practical Lab	
1	introduction to AI & Intelligent Agents	4	2	2	0	-
2	introduction to AI & Intelligent Agents	4	2	2	0	-
3	introduction to AI & Intelligent Agents	4	2	2	0	-
4	Search Algorithms (BFS, DFS, A*)	4	2	2	0	-
5	Search Algorithms (BFS, DFS, A*)	4	2	2	0	-
6	Machine Learning Fundamentals	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Neural Networks & Deep Learning	4	2	2	0	-
9	Neural Networks & Deep Learning	4	2	2	0	-
10	Neural Networks & Deep Learning	4	2	2	0	-
11	Machine Vision & Robotics	4	2	2	0	-
12	Machine Vision & Robotics	4	2	2	0	-

13	Machine Vision & Robotics	4	2	2	0	-
14	Machine Vision & Robotics	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**10**	**10%**
2	Exam 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Primary:** Russell & Norvig, *Artificial Intelligence: A Modern Approach*
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**non**
	Supplies	**non**
	Electronic Programs	**non**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	**Program Coordinator**
Name	Dr. Sara G.Seadby	Dr. Ahmed Abdalbadia
Signature	*Sara*	احمدعبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	Automotive Hydraulic and Pneumatic			
Course Code (according to the bylaw):	AUT E77			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4
Course Type:	Elective			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Hossam Ramadan			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Hydraulic basics, pumps, motors, valves, cylinders, accumulators, automotive hydraulic systems (power steering, transmission, hydrodynamic drive of fan, etc.), pneumatic systems (air valves, air brakes, etc.), air cushioned vehicles.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2, A4, A10, D1, D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions**	**LO1**	**Conduct simulations and analyzing performance data of hydraulic and pneumatic systems in automotive applications.**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**	**LO2**	**Apply safety, quality, and environmental standards when analyzing or designing automotive fluid power systems.**
A10	**Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.**	**LO3**	**Explore modern advancements in hydraulic and pneumatic automotive technologies through independent study**
D1	**Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems**	**LO4**	**Use simulation tools to model and testing automotive hydraulic and pneumatic circuits.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO5**	**Evaluate the performance of fluid power components under variable input conditions to assess application suitability.**

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√		√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to Automotive Hydraulics and Pneumatics	4	2	2	0	-
2	Hydraulic Fluid Properties and Basic Concepts	4	2	2	0	-
3	Hydraulic Pumps and Motors	4	2	2	0	-
4	Valves and Hydraulic Control Components	4	2	2	0	-
5	Hydraulic Cylinders and Accumulators	4	2	2	0	-
6	Hydraulic Circuits: Analysis and Design	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Power Steering and Hydraulic Transmission Systems	4	2	2	0	-
9	Hydrodynamic Fan Drives and Couplings	4	2	2	0	-
10	Pneumatic Systems and Air Valves	4	2	2	0	-
11	Air Brakes and Vehicle Pneumatic Circuits	4	2	2	0	-
12	Air-Cushioned Vehicles and Suspension Concepts	4	2	2	0	-

13	Performance Evaluation and Fault Diagnosis	4	2	2	0	-
14	Modern Trends and Future Technologies in Automotive Fluid Power	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***"Automotive Hydraulic and Pneumatic Systems"* Author: R. K. Rajput(2021)**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	
	Electronic Programs	**FluidSIM for circuit simulation, MATLAB/Simulink for pressure/flow analysis**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Hossam Ramadan**	**Dr. Ahmed Abdalbadia**
Signature	Hossam Ramadan	أحمد عبدالبديع

The Higher Technological Institute (HTI) – 10th of Ramadan City

Higher Technological Institute (HTI) – 10th of Ramadan City

Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	**B.Sc. Project 2**			
Course Code (according to the bylaw)**:**	**MTE** 250			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1	6		7
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Prof.Dr.EMAN Ibrahim			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

1. *Course Overview (Brief summary of scientific content):*

Based on the results obtained from the phase (1) of the project , the student(s) complete(s) the assigned task. This includes: Realization phase , and finishing and testing phase. A final report, a presentation, and a model (Hardware and/or software) are required in addition to oral defense on front of an examination board.

The student should show how the following are considered in his work,

a) The economic justification of the project.

b) Quality aspect.
c) Safety
d) Environment.

The fulfillment of the project should prove that the student has satisfactorily achieved the following:-

- Understanding of both theoretical and practical aspects of the problem in his project;
- Ability to search for references and to survey modern technology in relation to Mechatronics Engineering;
- Ability to suggest solution for the problem and the acceptable and useful conclusions of his work.
- Ability to express his ideas and present his project in the acceptable form.

2. ***Course Learning Outcomes CLOs :***

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
•		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Investigate modern technologies and reference materials to guide testing and validation of the project.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements**	**LO2**	**Supervise and monitoring the realization, testing, and integration phases of the project within planned timeframes**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.**	**LO3**	**Collaborate effectively in multi-disciplinary teams to implement, test, and finalize the project**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO4**	**Produce a professional technical report, oral presentation, and defensing with clear graphical and verbal communication**

A9	**Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.**	**LO5**	**Demonstrate creativity and leadership in addressing challenges during implementation and proposing innovative improvements.**
B2	**Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field**	**LO6**	**Execute mechanical design elements using CAD and traditional tools, ensuring feasibility in construction and testing**
B4	**Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems**	**LO7**	**Apply economic justification, quality assurance, safety, and environmental considerations in the realization of the project**
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO8**	**Implement and integrating mechatronics system components (mechanical, electrical, digital/software) into a working prototype**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO9**	**Test and evaluating the performance of the realized system under defined conditions, drawing meaningful conclusions**

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
		√	√	√	√	√	√			√	√	√	√	√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*OTHERS*
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	
1	Review of approved design and project scope (from B.Sc. Project 1)	7	1	0	6	-
2	Planning realization phase: allocation of tasks, procurement of components	7	1	0	6	-
3	Implementation of mechanical elements	7	1	0	6	-
4	Implementation of electrical/electronic/digital modules	7	1	0	6	-
5	System integration workshop	7	1	0	6	-
6	Testing methodologies and experimental planning	7	1	0	6	-
7	**Revision**					
8	Economic justification of the project	7	1	0	6	-
9	Quality aspects: applying standards and codes	7	1	0	6	-
10	Safety and environmental considerations in project realization	7	1	0	6	-
11	Performance evaluation and data analysis	7	1	0	6	-

12	Drafting the final report (structure, formatting, results)	7	1	0	6	-
13	Oral presentation and defense rehearsal	7	1	0	6	-
14	Final submission: report,	7	1	0	6	-
15,16	Final presentation, prototype, oral defense					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Project Implementation & Realization	**15**	**25**	**25%**
2	Testing & Performance Evaluation	**15**	**20**	**20%**
3	Economic, Safety, Quality & Environmental Considerations	**15**	**15**	**15%**
4	Final Written Report	**14**	**20**	**20%**
5	Oral Presentation & Defense	**15**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Pahl, G., Beitz, W., Feldhusen, J., & Grote, K. H. (2019). *Engineering Design: A Systematic Approach* (3rd Edition)**
	Other References	**Ullman, D. G. (2021). *The Mechanical Design Process* (7th Edition).**
	Electronic Sources (Links must be added)	**Egyptian Knowledge Bank: https://www.ekb.eg/ar/home**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop Oscilloscopes, multimeters, sensors**
	Supplies	**Project components**
	Electronic Programs	**SolidWorks, AutoCAD, MATLAB/Simulink, ANSYS MS Word**

	Course Coordinator	Program Coordinator
Name	Prof. Dr. Eman Nassar	Dr. Ahmed Abdalbadia
Signature	ايمان ابراهيم محمد على نصار	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Automotive Maintenance and Planning**			
Course Code (according to the bylaw):	**AUT E79**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			**4**
Course Type:	Elective			
The level to which the course was introduced:	**SENIOR 2**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Hossam Ramadan**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Planning and management of a modern automobile service center, planned based preventive maintenance and conditioned based maintenance, plan of fleet utilization, plan of preventive maintenance, plan of repair, workshop planning (layout, norms of production rates, repair capacity of workshop, planning for spare parts).

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2, B1, B3, D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess, and evaluate findings, and use statistical analyses and objective engineering**	**LO1**	Select appropriate equipment based on the requirements of engine systems and component performance.
		LO2	Analyze the causes of faults in engine mechanical components and engine systems.
B1	**Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field Plan, manage and carry out designs of mechanical systems and machine elements using appropriate materials both traditional means and computer-aided tools and software contemporary to the mechanical engineering field**	**LO3**	Evaluate performance of engine mechanical component, and engine systems.
B3	**Select conventional mechanical equipment according to the required performance.**	**LO4**	Explain the concepts of maintenance and testing of engine mechanical components and engine systems.
D4	**Estimate and measure the performance of an electrical/ electronic/ digital/ mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO5**	Apply maintenance and testing procedures to engine mechanical components and engine systems.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√								

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Engine mechanical component maintenance, and diagnostics	4	2	2	-	-
2	Engine mechanical component maintenance, and diagnostics	4	2	2	-	-
3	Engine mechanical component maintenance, and diagnostics.	4	2	2	-	-
4	Fuel system (petrol) maintenance, and diagnostics.	4	2	2	-	-
5	Fuel system (petrol) maintenance, and diagnostics.	4	2	2	-	-
6	Fuel system (petrol) maintenance, and diagnostics	4	2	2	-	-
7	**Revision and Mid Exam**					
8	Cooling system maintenance, and diagnostics.	4	2	2	-	-
9	Lubricating system maintenance, and diagnostics.	4	2	2	-	-

10	Ignition system maintenance, and diagnostics.	4	2	2	-	-
11	Ignition system maintenance, and diagnostics.	4	2	2	-	-
12	Diagnostics of engine faults.	4	2	2	-	-
13	Diagnostics of engine faults.	4	2	2	-	-
14	Revision	4	2	2	-	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**3**	**10**	**10%**
2	Exam 2 written (Semester work)	**10**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**As Scheduled**	**20**	**20 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**N.DELHI, "AUTOMOTIVE TECHNOLOGY", 2019**
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**

for teaching and learning *	Skill Labs/ Simulators	NON
	Virtual Labs	NON
	Other (to be mentioned)	NON

	Course Coordinator	Program Coordinator
Name	**Dr. Hossam Ramadan**	**Dr. Ahmed Abdalbadia**
Signature	*Hossam Ramadan*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	**Mechatronics Applications in Automobiles**			
Course Code (according to the bylaw)**:**	**AUT E80**			
Department/s that participated in the teaching:	**Mechanical Engineering**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			**4**
Course Type:	Elective			
The level to which the course was introduced:	**SENIOR 2**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Dr. Mina Raafat**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	**8/12/2025**			

2. Course Overview (Brief summary of scientific content):

Introduction, sensors & actuators, control systems, modern control systems, engine control systems, transmission control systems, braking system control (ABS,), drive management systems (management of ABS, ASR, and differential lock applications), suspension &steering control, other systems (door looking electric control, etc), diagnostic systems – Modern trends – Small course project.
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3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A2, A4, D1, D2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A2	**Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.**	**LO1**	**Analyze and interpreting data from automotive mechatronic systems using simulation or real-time input.**
A4	**Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.**	**LO2**	**Apply appropriate sensor/actuator technologies and safety standards in automotive control applications**
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	**LO3**	**Demonstrate knowledge of modern trends in automotive mechatronics through independent learning**
		LO4	**Use tools such as MATLAB/Simulink or automotive-specific software to modeling and simulating vehicle subsystems**
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**LO5**	**Design control strategies for key automotive systems such as braking, suspension, and engine management.**

4. Course Teaching and Learning Methods:

Direct Instruction	**Indirect Instruction**	**Information Technology-Assisted Learning**

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√			√	√	√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	**Training**		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to Mechatronics in Automobiles	4	2	2	0	-
2	Automotive Sensors: Types and Functions	4	2	2	0	-
3	Automotive Actuators: Solenoids, Motors, Valves	4	2	2	0	-
4	Basics of Automotive Control Systems	4	2	2	0	-
5	Modern Control Architectures (ECUs, CAN, LIN)	4	2	2	0	-
6	Engine Management Systems (EMS)	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Transmission Control Systems (e.g., CVT, DCT)	4	2	2	0	-
9	ABS and Braking System Control	4	2	2	0	-
10	Drive Management: ABS + ASR + Differential Lock	4	2	2	0	-
11	Suspension & Steering Control Systems	4	2	2	0	-

12	Diagnostic Systems (OBD-II, CAN sniffing)	4	2	2	0	-
13	Modern Trends: ADAS, EVs, Autonomous Features	4	2	2	0	-
14	Project Presentation	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***"Mechatronics and Control of Electromechanical Systems* "(2nd ed.) Author: Sergey Edward Lyshevski(2022)**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**Arduino / Raspberry Pi (for real-world simulation)**
	Electronic Programs	**MATLAB/Simulink**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	**Dr. Mina Raafat**	**Dr. Ahmed Abd Elbade**
Signature	*Mina Raafat*	أحمد عبدالبديع

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	
Course Specification	
Course name: Introduction to Accounting	**Course Code: HUM 201**

Department participating in delivery of the course	**Basic Sciences**

1. *Basic information:*

Course Type	**Elective**			**Academic level at which the course is taught**		**SENIOR 2**	
Term/ Academic year	**Oct.**		2025/2026	**Credit Hours:**		2	
Contact Hours	**Lecture:**	**2**	**Tutorial:** 0	**Lab.:**	0	**Total**	2
Pre-Requisite	---						

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	
Course Specification Approval Date	**7/26/2025**
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

The scientific frame of accounting: accounting concept & objectives, acceptable principles of accounting, accounting branches, types of institutions - financial statement: balance sheet, income statement, ownership proprietary statement, cash flows statement - double entry & analysis of financial transactions: accounting continuous balance of the financial position formula, debit & credit items financial position formula – the accounting cycle: business documents, the journals the ledgers' commercial documents according to the Egyptian laws. Journalizing & recording the commercial transactions of the firm, transactions of the owner of the firm, commercial papers & documents different types of revenues & expenditure. Trail Balance: Trail balance concept & objectives, its balance & imbalance corrections in the imbalance cases. A brief presentations of accounting in the types of companies as partnerships, limited partnerships & corporation.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A6,A8, A9, A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	**LO1**	**Design the presentations of accounting in she types of companies as partnerships, limited partnerships & corporation.**
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO2**	**Interpret the main concepts of basic financial accounting.**
		LO3	**Infer the main principle of basic financial statements.**
		LO4	**Elucidate the principal of balance sheet, income statement, ownership proprietary statement, cash flows statement - double entry & analysis of financial transactions.**
A9	Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	**LO5**	**Clarify the accounting continuous balance of the financial position formula, debit & credit items financial position formula.**
		LO6	**Evaluate the accounting cycle: business documents, the journals the ledgers' commercial documents according to the Egyptian laws.**
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies..	**LO7**	**Assess the trail balance concept & imbalance corrections in the imbalance cases.**
		LO8	**Record the commercial transactions of the firm, transactions of the owner of the firm, commercial papers & documents different types of revenues & expenditure.**
		LO9	**Mange as member in a teamwork .**
		LO10	**Illustrate the gained knowledge orally.**

4. ***Course Teaching and Learning Methods:***

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	**Basic concepts of financial accounting in individual projects.**	2	2	0	0	**LO5**
2	**Budget equation.**	2	2	0	0	**LO9**
3	**Basic financial statements.**	2	2	0	0	**LO1**
4	**Double cod theory.**	2	2	0	0	**LO4**
5	**Posting for the ledger**	2	2	0	0	**LO2&LO7**
6	**Inventory adjustments**	2	2	0	0	**LO2&LO5**
7	**Revision and Mid Exam**					

8	**Journalizing & recording the commercial transactions of the firm, transactions of the owner of the firm, commercial papers & documents different types of revenues & expenditure**	2	2	0	0	**LO3 , LO4&LO5**
9	**Preparing financial statements (final accounts and budget).**	2	2	0	0	**LO6**
10	**Trail Balance: Trail balance concept & objectives, its balance & imbalance corrections in the imbalance cases.**	2	2	0	0	**LO5&LO6**
11	**A brief presentation of accounting in the types of companies as partnerships, limited partnerships & corporation**	2	2	0	0	**LO5**
12	**Supplementary Material and Quiz**	2	2	0	0	**LO6**
13	**Presentations**	2	2	0	0	**LO6**
14	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**4**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
5	Assignments (Report &Sheet)	**10,12**	**20**	**20%**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Available Presentation (handed to students' part by part).**

	Other References	**Mohamed Sabri El Attar, Mansoura Hamed& Ahmed El-Sabagh, Principles of financial Accounting, Cairo University.2020**
	Electronic Sources (Links must be added)	• https://www.oreilly.com/library/view/financial-accounting-in/9780470635292/ch03sec3.html • https://www.coursera.org/learn/financial-accounting • https://open.umn.edu/opentextbooks/textbooks/640/
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Skill Labs/ Simulators	
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	Program Coordinator
Name		Prof. Ahmed Abd El-Gafar
Signature		

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	

Course Specification

Course name : English Literature	**Course Code: HUM 202**

Department participating in delivery of the course	**Basic Sciences**

1. *Basic information:*

Course Type	**Elective**				**Academic level at which the course is taught**		**SENIOR 2**	
Term/ Academic year	**Oct.**		2025/2026		**Credit Hours:**		2	
Contact Hours	**Lecture:**	**2**	**Tutorial:**	0	**Lab.:**	0	**Total**	2
Pre-Requisite	English (1)							

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	Dr. Mai Abouzaid
Course Specification Approval Date	**7/26/2025**
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

Introduction to the forms of literature, short story, novel, drama and poetry. Developing students' critical ability through carefully selected sample literary texts.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
(A8, A9, A10)		Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
A8	Enhance and Develop the students' abilities and awareness for appropriate analysis and interpretation to all the scientific topics written in English words.	LO1	Enhance students' abilities in reading English Literature
		LO2	Developing reading stratgies for different purposes.
		LO3	Study different types and geners of English Literature(poetry, novel, drama and short stories).
		LO4	Work effectively in team of multi-disciplinary or multi-culture.
A9	Communicate effectively, verbally and in writing with a range of audiences.	LO5	Apply the four skills of language freely with particular emphasis on dealing with literary works.
A10	Acquire and apply new knowledge and practice through English language.	LO6	Express themselves in English with confidence, especially while evaluating and criticizing the literary work.
		LO7	Comprehening various texts, including literary and informational materials.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	**Introduction to Literature, Poetry and Short Stories**	2	2	0	0	**LO1**
2	**The Necklace by Guy de Maupassant**	2	2	0	0	**LO3**
3	**Nice Girl by Sherwood Anderson**	2	2	0	0	**LO4**
4	**Anton Chekov's Small Fry.**	2	2	0	0	**LO1**
5	**Earnest Hemingway's The Old Man at the Bridge**	2	2	0	0	**LO2&LO7**
6	**Vendetta by Guy de Maupassant**	2	2	0	0	**LO2&LO5**
7	**Revision and Mid Exam**					
8	**Sir Walter Raleigh's poems.**	2	2	0	0	**LO3 , LO4&LO5**
9	**Shakespeare's Poems**	2	2	0	0	**LO6**
10	**Christopher Marlowe's Poems**	2	2	0	0	**LO5&LO6**
11	**Supplementary Material and Quiz**	2	2	0	0	**LO6**
12	**Supplementary Material and Quiz**	2	2	0	0	**LO5**
13	**Presentations**	2	2	0	0	**LO7**
14	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**4**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
5	Assignments (Report &Sheet)	**10,12**	**20**	**20%**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**"English Literature"; HTI; Available Hard copy.** **Available Presentation (handed to students' part by part).**
	Other References	**1- History of English Literature by Edward Albert. London: Routledge, 2019.** **2- Arabic Literature in Translation. Cairo: The American University in Cairo, 2022.** **3-The Complete Works of William Shakespeare. London: Canterbury Classics, 2023.** **4- The Norton Anthology of World Literature. London: Norton, 2023.**
	Electronic Sources (Links must be added)	**https://englishworld.com/**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	Program Coordinator
Name	Dr. Mai Abouzaid	Prof. Ahmed Abd El-Gafar
Signature	*Mai Abouzaid*	

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	
Course Specification	
Course name: Trade Law	**Course Code: HUM 203**

Department participating in delivery of the course	Basic Sciences

1. *Basic information:*

Course Type	Elective				**Academic level at which the course is taught**		SENIOR 2	
Term/ Academic year	**Oct.**		2025/2026		**Credit Hours:**		2	
Contact Hours	**Lecture:**	**2**	**Tutorial:**	0	**Lab.:**	0	**Total**	2
Pre-Requisite	---							
Academic standards	NARS 2018							
Bylaw Approval	2016							
Course Coordinator								
Course Specification Approval Date	**7/26/2025**							
Course Specification Approval	The division council minute of department							

2. *Course Overview (Brief summary of scientific content):*

Kinds of contracts, contract constituents, contract administration, the limitations as imposed by law, disputes, claims, arbitration, the legal variables encountered in business and commercial transactions.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A7,A8,A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	**LO1**	**Assess issues of the latest knowledge about the concepts, characteristics, and types of contracts, contract constituents**
		LO2	**Explain the main principle of Role of contracts: concept, attributes, and principles**
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO3**	**Elucidate the main principal Dynamic nature of contract administration,**
		LO4	**Clarify the main principal-of limitations as imposed by law,**
		LO5	**Design the , the legal variables encountered in business**
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies..	**LO6**	**Solving problems related to commercial transactions.**
		LO7	**Evaluating search results, the limitations as imposed by law,**
		LO8	**Describe the main concepts of the basics of the legal variables encountered in business and commercial transactions.**
		LO9	**Working in a team group**
		LO10	**Presentation techniques in performance and dealing with others and outside the organization**

4. ***Course Teaching and Learning Methods:***

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	
1	Fundamental of definition concepts, characteristics **Trade Law**- Dynamic nature and Kinds of contracts	2	2	0	0	**LO5**
2	Continued…	2	2	0	0	**LO4**
3	Concepts and requirement of contract constituents,- concepts and requirement of contract administration	2	2	0	0	**LO3**
4	Continued	2	2	0	0	**LO4**
5	Cooperative and competitive negotiations- how to use the limitations as imposed by law	2	2	0	0	**LO2&LO7**
6	Continued…	2	2	0	0	**LO2&LO5**
7	**Revision and Mid Exam**					

8	Good preparation of disputes, claims- the legal variables - the legal variables encountered in business	2	2	0	0	**LO3 , LO4&LO5**
9	Continued…	2	2	0	0	**LO6**
10	Commercial transactions- the legal variables encountered in commercial transactions	2	2	0	0	**LO5&LO6**
11	Continued…	2	2	0	0	**LO5**
12	The limitations as imposed by, disputes, claims, arbitration	2	2	0	0	**LO6**
13	**Supplementary materials and Quiz**	2	2	0	0	**LO2**
14	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**4**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
5	Assignments (Report &Sheet)	**10,12**	**20**	**20%**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Available Presentation (handed to students' part by part).**
	Other References	محمد عبد الكريم يوسف-"الصياغة القانونية للعقود التجارية, 2021
	Electronic Sources (Links must be added)	https://www.edx.org/learn/business-administration
	Learning Platforms (Links must be added)	EKB - Microsoft office

Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Skill Labs/ Simulators	
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	**Program Coordinator**
Name		Prof. Ahmed Abd El-Gafar
Signature		أ/ احمد عبدالغفار

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	
Course Specification	
Course name: Entrepreneurship	**Course Code: HUM 206**

Department participating in delivery of the course	Basic Sciences

1. *Basic information:*

Course Type	Elective				**Academic level at which the course is taught**		SENIOR 2	
Term/ Academic year	**Oct.**		2025/2026		**Credit Hours:**		2	
Contact Hours	**Lecture:**	**2**	**Tutorial:**	0	**Lab.:**	0	**Total**	2
Pre-Requisite	---							

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	
Course Specification Approval Date	**7/26/2025**
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

Preparation of students to consider his own small business project: Introduction to entrepreneurship, Definition of different project scales, characteristics of small project, planning of small project, small project organization, small project control, performance evaluation. Application course project

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

<table>
<tr><th colspan="2">Program Outcomes (NARS/ARS)
(according to the matrix in the program specs)</th><th colspan="2">Course Learning Outcomes</th></tr>
<tr><th colspan="2">(A6,A8,A10)</th><th colspan="2">Upon completion of the course, the student will be able to:</th></tr>
<tr><th>Code</th><th>Text</th><th>Code</th><th>Text</th></tr>
<tr><td rowspan="2">A6</td><td rowspan="2">Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.</td><td>LO1</td><td>Evaluate the financing a business; costs and pricing, accounting; bookkeeping, and financial reporting; the role of the government in business; regulations, and laws; working with others; and successfully managing employees.</td></tr>
<tr><td>LO2</td><td>Working in a team group.</td></tr>
<tr><td rowspan="3">A8</td><td rowspan="3">Communicate effectively – graphically, verbally and in writing – with a range of audiences
using contemporary tools.</td><td>LO3</td><td>Describe the basics of planning and launching a business</td></tr>
<tr><td>LO4</td><td>Recognize the real-life tools for entrepreneurs, characteristics of successful entrepreneurs, pros, and cons of self-employment, and how to attract investors and manage expenses.</td></tr>
<tr><td>LO5</td><td>Learn how to generate business ideas; create a business plan, mission, and vision; and promote and market a company.</td></tr>
<tr><td rowspan="5">A10</td><td rowspan="5">Acquire and apply new knowledge; and practice self, lifelong and other learning strategies..</td><td>LO6</td><td>Exploring factors of business success and failure, core business concepts, economic systems, competition, production, and the global economy.</td></tr>
<tr><td>LO7</td><td>Apply the skills and key business concepts students need to know to plan and launch a business.</td></tr>
<tr><td>LO8</td><td>Discovering the setting personal visions and goals, sales stages, opportunities, and strategies, planning and budgeting, and interpersonal communication in the workplace</td></tr>
<tr><td>LO9</td><td>Maintain the high ethical standards of business work.</td></tr>
<tr><td>LO10</td><td>Explain the gained knowledge orally.</td></tr>
</table>

4. ***Course Teaching and Learning Methods:***

Direct Instruction		**Indirect Instruction**										**Information Technology-Assisted Learning**			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	**The Role of the Entrepreneur: Learn about products and services, capitalism, competition, and entrepreneurship.**	2	2	0	0	**LO5**
2	**Entrepreneurship as a Career: Learn about reasons for entrepreneurship, self-employment, and entrepreneurial characteristics.**	2	2	0	0	**LO9**
3	**Economic Principles: Learn about gross and net profit, types of competition, factors of production, scarcity, and the Law of Supply and Demand.**	2	2	0	0	**LO1**
4	**Production and Delivery: Learn about fields of business activity, consumer goods, services, distribution, economic utility, economies and diseconomies of**	2	2	0	0	**LO4**

	scale, market saturation, and the product life cycle.					
5	**Small Business Basics: Learn about parts of a business, factors that contribute to success and failure, business ethics, and conflicts of interest**	2	2	0	0	**LO2&LO7**
6	**Business Ideas and Opportunities: Learn about business ideas, the role of small business in the global economy, and the importance of matching a business idea with the entrepreneur's personality and ability.**	2	2	0	0	**LO2&LO5**
7	**Revision and Mid Exam**					
8	**Defining Your Business: Learn about business plans, mission and vision, and reasons to focus products and services.**	2	2	0	0	**LO3 , LO4&LO5**
9	**Business Organization: Learn about legal forms of business ownership, franchising, DBA names, trademarks, licenses/permits, taxes, organizing a business, records, and inventory control.**	2	2	0	0	**LO6**
10	**Marketing Basics: Learn about brand image factors, marketing messages, the five Ps of the marketing mix, and market research.**	2	2	0	0	**LO5&LO6**
11	**Promoting Your Company: Learn about promotional methods, advertising media's strengths and weaknesses, and marketing plan components. Identify features and benefits. Use emotions, desires, fears, and needs in advertising.**	2	2	0	0	**LO5**
12	**Sales: Learn about the principles of selling, the stages of selling, selling opportunities, and sales strategies.**	2	2	0	0	**LO6**
13	**Presentations**	2	2	0	0	**LO6**
14	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**4**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
5	Assignments (Report &Sheet)	**10,12**	**20**	**20%**

*6- Learning Resources and Supportive Facilities **

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Available Presentation (handed to students' part by part).**
	Other References	**1-Eamonn Butler; "An Introduction to Entrepreneurship"; 2020, London Publishing Partnership** **2-Teresa Chahine; Introduction to Social Entrepreneurship; 2021, CRC Press**
	Electronic Sources (Links must be added)	• https://www.oreilly.com/library/view/financial-accounting-in/9780470635292/ch03sec3.html • https://www.coursera.org/learn/financial-accounting • https://open.umn.edu/opentextbooks/textbooks/640/
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Skill Labs/ Simulators	
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	Program Coordinator
Name		Prof. Ahmed Abd El-Gafar
Signature		

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Science	
Course Specification	
Course name : Scientific Thinking	Course Code: HUM 207

Department participating in delivery of the course	Basic Science

1. *Basic information:*

Course Type	Elective			Academic level at which the course is taught	SENIOR 2		
Term/ Academic year	Oct.	2025/2026		Credit Hours:	2		
Contact Hours	Lecture:	2	Tutorial:	0	Lab.:	0	Total	2
Pre-Requisite	----						

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	Dr./ Mustafa Muhammad Fadel
Course Specification Approval Date	**7/26/2025**
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

The course trains students to think logically and critically and helps them to adapt and integrate in an academic environment. The student is familiarized with methods of researching and accessing information through the library or the Internet and is trained to assess the content and sources of information, reporting, and citing scientific literature, and how to maintain high ethical standards.

3. ***Course Learning Outcomes CLOs :***

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A1, A4,A5,A7,A8)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.	**LO 1**	Identify the main steps of logically and critically scientific thinking.
		LO 2	Formulate the principal methods of researching and accessing
		LO 3	Rationalize the logic scientific thinking and unlogic scientific thinking.
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles.	**LO 4**	Utilize the principal methods of researching and accessing information through the library.
		LO 5	Evaluate the environmental issues, and risk management principles.
		LO 6	Assess the standard rules of researching and its quality guidelines for health and safety requirements.
A5	Practice research techniques and methods of investigation as an inherent part of learning.	**LO 7**	Implement scientific reports depending on the scientific foundations of his study.
		LO 8	Control the time planning and team integration.
A7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	**LO 9**	Transfer the gained knowledge orally, written, and graphically.
		LO 10	Acquire the ability to self-learn in engineering applications related to scientific thinking.
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO 1**	Obtain the steps of logically and critically scientific thinking.
		LO 2	acquaint the methods of researching and accessing information through the library or the Internet.
		LO 3	assess the content and sources of information, reporting, and citing scientific literature

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√		√	√	√	√	√	√	√	√			√	√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	**The main steps of logically and critically scientific thinking**	2	2	0	0	**LO 1,5**
2	**Factors that affect scientific and innovative thinking, such as the surrounding environment.**	2	2	0	0	**LO 1,9**
3	**The principal methods of researching and accessing information through the library.**	2	2	0	0	**LO 1,5**
4	**The techniques of researching through the Internet.**	2	2	0	0	**LO 1,5**
5	**Evaluating the information and results with academic environment research.**	2	2	0	0	**LO 5,6**
6	**The methods of presentations to show the findings of scientific research**	2	2	0	0	**LO 6,7**

7	**Revision and Mid Exam**					
8	**Scientific analysis and linking between variables**	2	2	0	0	**LO 2**
9	**Suggest scientific solutions to practical problems**	2	2	0	0	**LO 3,10**
10	**levels of thinking and scientific thinking techniques**	2	2	0	0	**LO 4**
11	**Ethical standards of scientific research.**	2	2	0	0	**LO 8,9**
12	**The impact of innovative thinking on management in organizations and change management**	2	2	0	0	**LO 5**
13	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)		**10**	**10 %**
2	Exam 2 written (Semester work)		**10**	**10 %**
3	Midterm exam		**20**	**20 %**
4	Final Written Exam		**40**	**40 %**
5	Final Oral Exam		**10**	**10 %**
6	Assignments / Project /Portfolio/ Logbook		**10**	**10 %**

6- Learning Resources and Supportive Facilities*

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Available Presentation (handed to students' part by part).**

	Other References	• **Michael E Gorman; "Scientific and Technological Thinking" 2005 by Lawrence Erlbaum Associates** • **Richard Paul, Linda Elder: The Miniature Guide to Scientific Thinking; 2023**
	Electronic Sources (Links must be added)	• https://www.youtube.com/watch?v=pOb_jKqy_s0&ab_channel=Flippin%27ScienceVideos • https://study.com/learn/lesson/scientific-thinking-process-examples.html
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	
	Supplies	
	Electronic Programs	
	Skill Labs/ Simulators	x
	Virtual Labs	x
	Other (to be mentioned)	x

	Course Coordinator	Program Coordinator
Name	**Dr./ Mustafa Muhammad Fadel**	**PROF. Ahmed Abdel Ghafar**
Signature	*Mustafa Muhammad Fadel*	أ عبدالغفار

The Higher Technological Institute (HTI) – 10th of Ramadan City	
Department of Basic Sciences	

Course Specification

Course name: Business Administration	Course Code: HUM 208

Department participating in delivery of the course	Basic Sciences

1. *Basic information:*

Course Type	Elective				Academic level at which the course is taught		SENIOR 2	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		2	
Contact Hours	Lecture:	2	Tutorial:	0	Lab.:	0	Total	2
Pre-Requisite	---							

Academic standards	NARS 2018
Bylaw Approval	2016
Course Coordinator	
Course Specification Approval Date	7/26/2025
Course Specification Approval	The division council minute of department

2. *Course Overview (Brief summary of scientific content):*

Nature, scope, importance & characteristics of business administration, development of the managerial thought, business external & internal environments, types of institutions, the managerial process. Functions of management: planning: planning concepts & importance, types of plans, characteristics & contents of the plan, planning stages, budgeting for planning. Organization: organization concepts & importance, characteristics of good & effective organization, types of organization structures, centralization & decentralization, span of supervision, delegation of authority, integration among the different units in the organization. Direction & supervision: Motivation, communications leadership & its different types. Control: concept & importance of control, control steps, objectives, actual performance, the deviation, reasons of the deviation, the corrective actions, types of control, internal & external control. Decision -

Making: Types of administrative decisions, decision -making process & steps, importance of information of decision making. Major functions in different companies: production, marketing, finance, human resources.

3. *Course Learning Outcomes CLOs :*

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS).

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
(A7,A8,A10)		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams.	**LO1**	**Describe the main steps of strategic plans using marketing information**
		LO2	**Understand the role of information technology systems (IT) in supporting business operations..**
A8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.	**LO3**	**Elucidate the principal of Functions of management: planning: planning concepts & importance, types of plans, characteristics & contents of the plan, planning stages, budgeting for planning.**
		LO4	**Explicate the fundamentals of organization work: organization concepts & importance, characteristics of good & effective organization, types of organization structures, centralization & decentralization, span of supervision, delegation of authority, integration among the different units in the organization.**
		LO5	**Evaluating between Direction & supervision: Motivation, communications leadership & its different types.**
A10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies..	**LO6**	**Assess the Control: concept & importance of control, control steps, objectives, actual performance, the deviation, reasons of the deviation, the corrective actions, types of control, internal & external control.**
		LO7	**Evaluate the decision Making: Types of administrative decisions, decision -making process & steps, importance of information of decision making.**
		LO8	**Identify the major functions in different companies: production, marketing, finance, human resources.**
		LO9	**Maintain the high ethical standards of business work.**
		LO10	**Explain the gained knowledge orally.**

4. *Course Teaching and Learning Methods:*

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√			√				√	

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	/ Practical Lab	
1	**An overview of the administrative process.**	2	2	0	0	**LO5**
2	**The nature of the projects and their objectives**	2	2	0	0	**LO9**
3	**An overview of management functions and facility functions.**	2	2	0	0	**LO1**
4	**Factors affecting the performance of the facility.**	2	2	0	0	**LO4**
5	**Planning function**	2	2	0	0	**LO2&LO7**
6	**Regulation function**	2	2	0	0	**LO2&LO5**
7	**Revision and Mid Exam**					

8	**Orientation function**	2	2	0	0	**LO3 , LO4&LO5**
9	**Control function.**	2	2	0	0	**LO6**
10	**Management levels and skills required for each level.**	2	2	0	0	**LO5&LO6**
11	**Administrative communication process.**	2	2	0	0	**LO5**
12	**Supplementary materials and Quiz**	2	2	0	0	**LO6**
13	**Presentations**	2	2	0	0	**LO6**
14	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	QUIZ 1 written (Semester work)	**4**	**10**	**10%**
2	QUIZ 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15**	**40**	**40 %**
5	Assignments (Report &Sheet)	**10,12**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Available Presentation (handed to students' part by part).**
	Other References	**1-Mohamed Abdallah Abd El Rehim, Fundamental of Management & Organization, Cairo University.2022** **2-El Desouky Hamed Abou Zeid, the Scientific Fundamentals of Management, Cairo University.2022**
	Electronic Sources (Links must be added)	• https://www.ecpi.edu/blog/what-is-business-administration-all-about https://www.edx.org/learn/business-administration

	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Notebook and data show equipped lecture room.**
	Supplies	**Teaching aids and computers.**
	Skill Labs/ Simulators	
	Other (to be mentioned)	**Notebook and data show equipped lecture room.**

	Course Coordinator	**Program Coordinator**
Name		Prof. Ahmed Abd El-Gafar
Signature		

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Thermo Fluid Lab for Mechatronics			
Course Code (according to the bylaw)**:**	MEC 272			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		3
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	Higher Technological Institute			
Name of Course Coordinator:	Dr. Ahmed Shabban			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Safety Instructions -Introduction and types of fluid meters, velocity measurements, flow rate measurements. Types of tests and measuring instruments in ICE. Ignition timing measurements, compression pressure test. Exhaust gas analysis, engine analyzer. Refrigeration cycle, performance, coefficient of performance. Air conditioning systems, Performance, coefficient of performance.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	**LO1**	Conduct experiments related to fluid mechanics, including pressure, velocity, and flow rate measurements.
		LO2	Design and conducting experiments to evaluate the performance of pumps and turbines.
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	**LO3**	Apply health, safety, and environmental rules during laboratory experiments.
B1	Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.	**LO4**	Analyze the performance of a refrigeration cycle by applying concepts of thermodynamics, heat transfer, and fluid mechanics.
		LO5	Analyze the performance of internal combustion engines (ICE) by applying concepts of thermodynamics, heat transfer, and fluid mechanics.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to the laboratory: Health and safety instructions.	3	--	--	3	-
2	Experiment of hydrostatic pressure force	3	--	--	3	-
3	Experiment of pressure measurement and calibration	3	--	--	3	-
4	Experiment of Extended surface area (Fins).	3	--	--	3	-
5	Experiment of tubular Heat Exchanger.	3	--	--	3	-
6	Experiment of the plunger Pump.	3	--	--	3	-
7	**Revision and Mid Exam**					
8	Revision for part 1. (Mini Project)	3	--	--	3	-

9	Experiment of the gear Pump.	3	--	--	3	-
10	Experiment of refrigeration unit.	3	--	--	3	-
11	Experiment of refrigeration unit.	3	--	--	3	-
12	Experiment of internal Combustion Engine	3	--	--	3	-
13	Experiment of internal Combustion Engine	3	--	--	3	-
14	Revision for part 2. (Mini Project)	3	--	--	3	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**11**	**10**	**10%**
2	Midterm exam	**7**	**30**	**30 %**
4	Final Written Exam	**15, 16**	**30**	**30 %**
7	Assignments / Project /Portfolio/ Logbook	**Through semester**	**30**	**30 %**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Yunus A. Çengel, John M. Cimbala and Afshin J. Ghajar, "Fundamentals of Thermal-Fluid Sciences" Sixth Edition, Mcgraw-Hill, New York, 2021.
	Other References	Yunus A. Cengel and Michael A. Boles "THERMODYNAMICS: An Engineering Approach" McGraw-Hill, New York., Eighth Edition, 2015 **Course Notes:** Available as soft copy on Microsoft teams
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
	Devices/Instruments	Data show and laptop

Supportive facilities & equipment for teaching and learning *	**Supplies**	White board
	Electronic Programs	Microsoft teams
	Skill Labs/ Simulators	non
	Virtual Labs	non
	Other (to be mentioned)	Library

	Course Coordinator	**Program Coordinator**
Name	**Dr. Ahmed Shabban**	**Dr. Ahmed Abdalbadia**
Signature		أحمد عبدالبديع

<table>
<tr><td>Higher Technological Institute (HTI) – 10th of Ramadan City</td><td rowspan="2"></td></tr>
<tr><td>Course Specification</td></tr>
</table>

1. Basic information:

<table>
<tr><td>Course Title (according to the bylaw):</td><td colspan="4">Fluid Power Control</td></tr>
<tr><td>Course Code (according to the bylaw):</td><td colspan="4">MTE 251</td></tr>
<tr><td>Department/s that participated in the teaching:</td><td colspan="4">Mechanical Engineering</td></tr>
<tr><td rowspan="2">Total number of credit hours of the course:
(according to the bylaw)</td><td>Theoretical</td><td>Practical</td><td>Other (specify)</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td></tr>
<tr><td>Course Type:</td><td colspan="4">Compulsory</td></tr>
<tr><td>The level to which the course was introduced:</td><td colspan="4">SENIOR 2</td></tr>
<tr><td>Academic Program:</td><td colspan="4">Mechatronics Engineering</td></tr>
<tr><td>Institute:</td><td colspan="4">Higher Technological Institute</td></tr>
<tr><td>Name of Course Coordinator:</td><td colspan="4">Dr. Radwa A. Ghazalla</td></tr>
<tr><td>Course Specification Approval
(Attach the decision/minutes of the department /committee/council ....)</td><td colspan="4">The division council minute of department</td></tr>
<tr><td>Course Specification Approval Date:</td><td colspan="4">8/12/2025</td></tr>
</table>

2. Course Overview (Brief summary of scientific content):

Introduction to fluid power. Physical properties of hydraulic fluids. Energy & Power in Hydraulic systems. Fluid power control systems. Basics of hydraulic flow in pipelines. Source of hydraulic Power (Pumps). Hydraulic actuators and motors. Valves and other Control components in hydraulic systems. Hydraulic circuit design and analysis. Introduction to pneumatic systems. Component, circuits and applications- Fluid logic control systems. Electrical control for fluid power circuits

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A1,D1,D2		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics**.	**LO1**	Identify the different flow processes in power generation industries by applying governing equations.
		LO2	Differentiate between common hydraulic and pneumatic components (pumps, actuators, motors, valves, etc.), including their uses, symbols, and performance characteristics.
		LO3	Apply the fundamentals of mathematics, science, and engineering to solve problems related to fluid power and energy systems.
D1	**Integrate a wide range of analytical tools , techniques , equipment , and software pacakage to design and develop mechatronics systems**	**LO4**	Analyze engineering problems using modern techniques, skills, and tools necessary for professional engineering practice.
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**LO5**	Design projects that familiarize students with actual components and fluid power circuits commonly used in industrial applications.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√			√		√			

Course Schedule:

Week No.	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures)	Training		Other
				Tutorial	/ Practical Lab	
1	Introduction to fluid power; History, applications, advantages and limitations; General components of fluid power systems	4	1	2	1	-
2	Physical properties of hydraulic fluids;	4	1	2	1	-
3	Introduction to hydraulic systems design; Energy and power in hydraulic systems;	4	1	2	1	-
4	Frictional losses in hydraulic pipelines	4	1	2	1	-
5	Hydraulic Pumps; pumping theory, gear	4	1	2	1	-
6	Hydraulic Pumps; vane, and piston pumps; pump specifications, performance and selection;+ Quiz	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Hydraulic Cylinders, Motors, and Rotary Actuators.	4	1	2	1	-

9	Control Components: directional control valves, pressure control valves, flow control valves, servo valves, proportional valves	4	1	2	1	-
10	circuit components: reservoirs, accumulators, conductors and fittings; Hydraulic fluids, contamination and filtration	4	1	2	1	-
11	Hydraulic circuit design and analysis	4	1	2	1	-
12	Hydraulic circuit design and analysis + Quiz	4	2	2	0	-
13	Simulation for circuits and discussion for practical scenarios	4	1	0	3	-
14	Revision for part 1 and 2	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**6**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
6	Oral Discussions during the lectures (participating)	**Through out the semesster**	**10**	**10%**
7	Assignments / Project /Portfolio/ Logbook	**14**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	Anthony Esposito ,"Fluid Power with Applications"; 7th Edition,2020
	Other References	**James A. Sullivan and David M. Mazurek**, *"Fluid Power: Theory and Applications"*, 6th Edition, Cengage Learning, **2022**

		Rory S. McLaren, *"Hydraulics and Pneumatics: A Technician's and Engineer's Guide"*, 3rd Edition, Elsevier, **2021**.
	Electronic Sources (Links must be added)	**Festo Didactic – Fluid Power Training Resources** https://www.festo-didactic.com/int-en/learning-systems/hydraulics Hydraulics & Pneumatics Magazine (Articles & Case Studies) https://www.hydraulicspneumatics.com
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Lab tops**
	Supplies	**non**
	Electronic Programs	**Automation Studio and Festo (Fluid Sim)**
	Skill Labs/ Simulators	**Mechatronics Actuator Lab and PLC Lab**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	Dr. Radwa A. Ghazalla	Dr. Ahmed Abdalbadia
Signature	***Radwa***	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City

Course Specification

1. Basic information:

<table>
<tr><td>Course Title (according to the bylaw):</td><td colspan="4">Mechatronics & Smart Materials</td></tr>
<tr><td>Course Code (according to the bylaw):</td><td colspan="4">MTE 257</td></tr>
<tr><td>Department/s that participated in the teaching:</td><td colspan="4">Mechanical Engineering</td></tr>
<tr><td rowspan="2">Total number of credit hours of the course:
(according to the bylaw)</td><td>Theoretical</td><td>Practical</td><td>Other (specify)</td><td>Total</td></tr>
<tr><td>2</td><td></td><td></td><td>2</td></tr>
<tr><td>Course Type:</td><td colspan="4">Compulsory</td></tr>
<tr><td>The level to which the course was introduced:</td><td colspan="4">SENIOR 1</td></tr>
<tr><td>Academic Program:</td><td colspan="4">Mechatronics Engineering</td></tr>
<tr><td>Institute:</td><td colspan="4">Higher Technological Institute</td></tr>
<tr><td>Name of Course Coordinator:</td><td colspan="4">Dr. Hossam Ramadan</td></tr>
<tr><td>Course Specification Approval
(Attach the decision/minutes of the department /committee/council ....)</td><td colspan="4">The division council minute of department</td></tr>
<tr><td>Course Specification Approval Date:</td><td colspan="4">8/12/2025</td></tr>
</table>

2. Course Overview (Brief summary of scientific content):

Selected topics on commonly used special materials, Fundementals of Materials Engineering, Smart Materials, Shape Memory Materials and Its Applications, Piezoelectric Materials and Its Applications, Magnetostrictive Materials and Its Applications.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1,A6,B1,B3		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.**	**LO1**	**Identify the key concepts of smartness in relation to smart materials and smart systems.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO2**	**Recognize the differences between various smart material effects.**
B1	**Model, analyze and design physical systems applicable to the specific discipline by applying the concepts of: Thermodynamics, Heat Transfer, Fluid Mechanics, solid Mechanics, Material Processing, Material Properties, Measurements, Instrumentation, Control Theory and Systems, Mechanical Design and Analysis, Dynamics and Vibrations.**	**LO3**	**Analyze the effects and responses of smart materials.**
B3	**Select conventional mechanical equipment according to the required performance..**	**LO4**	**Explain the concept, manufacturing technologies, properties, types, and applications of selected smart materials.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√					

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Revision on Fundamentals of Materials Engineering.	**2**	**1**	**1**	**-**	**-**
2	Introduction to Smart Materials.	**2**	**1**	**1**	**-**	**-**
3	Shape Memory Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
4	Shape Memory Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
5	Shape Memory Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
6	Piezoelectric Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
7	**Revision and Mid Exam**					
8	Piezoelectric Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
9	Piezoelectric Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
10	Piezoelectric Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**

11	Magnetostrictive Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
12	Magnetostrictive Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
13	Magnetostrictive Materials and Its Applications.	**2**	**1**	**1**	**-**	**-**
14	Revision.	**2**	**1**	**1**	**-**	**-**
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**11**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**According to schedule**	**20**	**20%**

6-

7- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**JULIE BARKER, FOUNDATIONS OF MATERIALS SCIENCE AND ENGINEER,2023**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	Dr. Hossam Ramadan	Dr. Ahmed Abdalbadia
Signature	*Hossam Ramadan*	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw)**:**	Micro-Mechatronics Systems
Course Code (according to the bylaw)**:**	MTE E07
Department/s that participated in the teaching:	Mechanical Engineering

Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	4			4

Course Type:	Elective
The level to which the course was introduced:	SENIOR 1
Academic Program:	Mechanical Engineering
Institute:	**Higher Technological Institute**
Name of Course Coordinator:	Dr. Mina Raafat
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department
Course Specification Approval Date:	8/12/2025

2. Course Overview (Brief summary of scientific content):

Introduction to MMS, Physical background – Manufacturing – Applications - Modern trends.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A2,A4,A10,D1,D2		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	LO1	Conduct simulations of parameters of micro-mechatronic components and systems
A4	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles	LO2	Apply modern manufacturing and fabrication techniques in micro-system design with awareness of safety, quality, and environmental considerations
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies	LO3	Research current trends and future technologies in MMS through independent learning
D1	Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems	LO4	Use modeling tools for simulation of MMS's behavior components
D2	Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design	LO5	Design micro-scale sensors/actuators and application suitability

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√			√	√	√			√					√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to Micro-Mechatronics Systems	4	2	2	0	-
2	Fundamentals of Micro-scale Physics (fluidics, thermal, electrical, mechanical)	4	2	2	0	-
3	Overview of MMS Architecture and Components (sensors, actuators, control)	4	2	2	0	-
4	MEMS Materials and Material Properties	4	2	2	0	-
5	MMS Manufacturing Techniques: Lithography, Bulk/SOI Micromachining	4	2	2	0	-
6	Micro-Fabrication Case Studies (Accelerometers, Micro-pumps)	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Integration with Electronics (ASIC, SOC, Hybrid Packaging)	4	2	2	0	-
9	System Modeling and Simulation (e.g. ANSYS, COMSOL, CoventorWare)	4	2	2	0	-
10	Control in Micro-Mechatronics (feedback, nonlinearities, system response)	4	2	2	0	-

11	Applications in Biomedical, Automotive, Aerospace	4	2	2	0	-
12	Testing, Reliability, and Performance Evaluation of MMS	4	2	2	0	-
13	Emerging Trends: Soft Micro-Robotics, Micro-assembly, AI Integration	4	2	2	0	-
14	Student Projects + Presentations	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**4**	**10**	**10%**
2	Exam 2 written (Semester work)	**12**	**10**	**10%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**1-13**	**20**	**20%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***"Mechatronics: Concepts, Tools, Applications, and New Trends"*** **Authors: Ajay Kumar, Parveen Kumar, Sarita Rathee, Brijesh Kumar(2025)**
	Other References	***"Mechatronics: Fundamentals and Applications"*** **Editors: Mizanur Rahman, Farhan Mahbub, Rumana Tasnim, Rezwan Us Saleheen(2024)**
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**laptop**
	Supplies	**Project components**
	Electronic Programs	**ANSYS**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr. Mina Raafat**	**Dr. Ahmed Abd Elbade**
Signature	*Mina Raafat*	احمد عبدالبديع

1. Basic information:

Course Title (according to the bylaw)**:**	Actuators & drivers
Course Code (according to the bylaw)**:**	MTE E08
Department/s that participated in the teaching:	Mechanical Engineering
Total number of credit hours of the course: (according to the bylaw)	Theoretical: 4; Practical: ; Other (specify): ; Total: 4
Course Type:	Elective
The level to which the course was introduced:	SENIOR 2
Academic Program:	Mechatronics Engineering
Institute:	Higher Technological Institute
Name of Course Coordinator:	Dr. Ahmed Abu El -FADl
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department
Course Specification Approval Date:	8/12/2025

2. Course Overview (Brief summary of scientific content):

Power electronics, electric drives, electrical models, dimensioning, pneumatic & hydraulic actuators, sensors & circuits, control design, circuit diagram design, thermal initiated actuators, piezoelectric actuators, micro actuators.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A1,A3,D2,D3.D4		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A1	**Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science, and mathematics.**	**LO1**	Identify power electronics elements, electric drives, and electrical models.
A3	**Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.**	**LO2**	Design and selection of sensors and accompanying circuitry.
		LO3	Carry out designs of sensors and actuators.
D2	**Design, model and analyze an electrical/electronic/digital/mechatronics system or component for a specific application; and identify the tools required to optimize this design**	**LO4**	Analyze the electrical, hydraulic, and pneumatic actuators.
D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO5**	Model of the thermal, piezoelectric, and micro-actuators
D4	**Estimate and measure the performance of an electrical/ electronic/ digital/ mechatronics system under specific input excitation, and evaluate its suitability for a specific application.**	**LO6**	Estimate control resolution.

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√				√	√								

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training: Tutorial	Training: / Practical Lab	Other
1	Power electronics	4	2	2	0	-
2	Electric drives	4	2	2	0	-
3	Electrical models	4	2	2	0	-
4	Dimensioning	4	2	2	0	-
5	Electrical actuators	4	2	2	0	-
6	Pneumatic actuators	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Hydraulic actuators	4	2	2	0	-
9	Sensors & circuits	4	2	2	0	-
10	Control design	4	2	2	0	-
11	Circuit diagram design	4	2	2	0	-
12	Thermal initiated actuators	4	2	2	0	-

13	Piezoelectric actuators	4	2	2	0	-
14	Micro actuators	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**15**	**15 %**
2	Exam 2 written (Semester work)	**10**	**15**	**15 %**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	• Robert H. Bishop, "Mechatronic systems, sensors and actuators ",CRC press.
	Other References	• David H.Staelin,"Electromagnetics and applications",Libretexts.
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**non**
	Supplies	**non**
	Electronic Programs	**non**
	Skill Labs/ Simulators	**non**
	Virtual Labs	**non**
	Other (to be mentioned)	**non**

	Course Coordinator	Program Coordinator
Name	**Dr.Ahmed Abu El -FADl**	**Dr. Ahmed Abdalbadia**
Signature	Ahmed fadl	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City

Course Specification

1. Basic information:

<table>
<tr><td>Course Title (according to the bylaw):</td><td colspan="4">Selected Topics in Advanced Mechatronics Systems</td></tr>
<tr><td>Course Code (according to the bylaw):</td><td colspan="4">MTE E09</td></tr>
<tr><td>Department/s that participated in the teaching:</td><td colspan="4">Mechanical Engineering</td></tr>
<tr><td rowspan="2">Total number of credit hours of the course:
(according to the bylaw)</td><td>Theoretical</td><td>Practical</td><td>Other (specify)</td><td>Total</td></tr>
<tr><td>4</td><td></td><td></td><td>4</td></tr>
<tr><td>Course Type:</td><td colspan="4">Elective</td></tr>
<tr><td>The level to which the course was introduced:</td><td colspan="4">SENIOR 2</td></tr>
<tr><td>Academic Program:</td><td colspan="4">Mechatronics Engineering</td></tr>
<tr><td>Institute:</td><td colspan="4">Higher Technological Institute</td></tr>
<tr><td>Name of Course Coordinator:</td><td colspan="4">DR.AHMED SAMIR</td></tr>
<tr><td>Course Specification Approval
(Attach the decision/minutes of the department /committee/council ....)</td><td colspan="4">The division council minute of department</td></tr>
<tr><td>Course Specification Approval Date:</td><td colspan="4">8/12/2025</td></tr>
</table>

2. Course Overview (Brief summary of scientific content):

Modern applications of Mechatronics, Modern trends in Mechatronics Engineering and/or a real problem in industry related to Mechatronics.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes	
A3,A9,A10,D1		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A3	Apply engineering design processes to produce cost-effective solutions that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development	LO1	Apply sustainable and cost-effective design approaches to propose solutions for real mechatronics system problems in industry.
A9	Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations	LO2	Demonstrate creativity and innovation in addressing emerging challenges in advanced mechatronics systems
A10	Acquire and apply new knowledge, and practice self, lifelong and other learning strategies.	LO3	Research and evaluation of cutting-edge technologies and trends in mechatronics through independent study.
D1	Integrate a wide range of analytical tools, techniques, equipment, and software packages to design and develop mechatronics systems.	LO4	Develop innovative mechatronic system concepts using current modeling, simulation, and prototyping technologies.

4. Course Teaching and Learning Methods:

Direct Instruction	Indirect Instruction	Information Technology-Assisted Learning

Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√		√	√	√	√	√	√			√		√			√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		**Other**
				Tutorial	/ Practical Lab	
1	Introduction to Advanced Mechatronics	4	2	2	0	-
2	Overview of Emerging Mechatronics Technologies	4	2	2	0	-
3	Smart Sensors and Intelligent Actuators	4	2	2	0	-
4	AI and Machine Learning in Mechatronics	4	2	2	0	-
5	Mechatronic System Integration & Cyber-Physical Systems	4	2	2	0	-
6	Mechatronics in Automotive / Medical / Aerospace Fields	4	2	2	0	-
7	**Revision and Mid Exam**					
8	Industrial Case Studies (Problem Exploration)	4	2	2	0	-
9	Sustainable and Cost-Aware System Design	4	2	2	0	-
10	Creativity and Innovation in Mechatronics	4	2	2	0	-
11	Ideation Workshop: Solving Real Industry Problems	4	2	2	0	-
12	Tools for Modeling and Simulation (MATLAB, Simulink, CAD/CAE)	4	2	2	0	-

13	Project Review and Feedback	4	2	2	0	-
14	Final Presentations + Trends Summary	4	2	2	0	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**15**	**15%**
2	Exam 2 written (Semester work)	**10**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
4	Final Written Exam	**15, 16**	**40**	**40 %**
7	Assignments / Project /Portfolio/ Logbook	**12**	**10**	**10%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	***Advanced Mechatronics Systems: Modeling, Design and Control*** **(2021) Author: Tao Zheng, Ahmad Taher Azar, Sundarapandian Vaidyanathan**
	Other References	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Laptop**
	Supplies	**NON**
	Electronic Programs	**MATLAB/Simulink** **SolidWorks** **Arduino** **Ansys / COMSOL (for multiphysics simulation)**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	**Program Coordinator**
Name	**DR.AHMED SAMIR**	**Dr. Ahmed Abdalbadia**
Signature	**AHMED SAMIR**	أحمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City	
Course Specification	

1. Basic information:

Course Title (according to the bylaw):	**Actuators Lab**			
Course Code (according to the bylaw):	**MTE 252**			
Department/s that participated in the teaching:	**Mechanical Engineering Dept.**			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		3		3
Course Type:	Compulsory			
The level to which the course was introduced:	**SENIOR 2**			
Academic Program:	**Mechatronics Engineering**			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	**Assoc. Prof. Dr. Mona A. Younis**			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

Safety Instructions – Introduction Mechanical actuators – Hydraulic & Pneumatic actuators – Electrical actuators – A.C. motors- Servo motors – stepper motors – PLC Control of the actuators.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
		Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1.**	**Analyze some industrial problems and design the suitable circuit.**
		LO2.	**Distinguish the different types of actuators and thier functions and the working theory of each.**
A6	**Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.**	**LO3.**	**Get general knowledge about actuators field and how they can be used safely.**
		LO4.	**Determine the mechanical and electrical loads in designed circuit to apply it physically.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.**	**LO5.**	**Select the suitable actuators and sensors.**
		LO6.	**Select the design method if it classical or digital by means of PLC.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.**	**LO7.**	**Apply exiperiments using hardware components to validating the design and making sure that goes well and documentation.**

D3	**Plan, manage, and implement designs of mechatronics systems, subsystems, modules, and machine elements based on traditional and contemporary technological, professional, and computer-aided tools.**	**LO8.**	**Apply experiments using software to testing different circuit designs and exporting cad design for control circuit.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√	√		√	√	√						√		√

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			
			Theoretical teaching *(lectures)*	Training		Other
				Tutorial	/ Practical Lab	
1	Safety Instructions.	3	-	-	3	-
2	-Introduction to Mechanical actuators -Hydraulic and Pneumatic actuators	3	-	-	3	-
3	Electrical actuators (AC, DC, Servo and stepper motor).	3	-	-	3	-

4	Introduction to classic control.	3	-	-	3	-
5	Design of control circuits using software.	3	-	-	3	-
6	Implementing designs into hardware components	3	-	-	3	-
7	**Revision and Mid Exam**					
8	Introduction to PLC	3	-	-	3	-
9	PLC GIO & Ladder logic	3	-	-	3	-
10	PLC GIO & Ladder logic	3	-	-	3	-
11	PLC Timers & Counters	3	-	-	3	-
12	-PLC Analog input (Analog sensors)	3	-	-	3	-
13	PID	3	-	-	3	-
14	PID	3	-	-	3	-
15,16	**Final Exam.**					

5- Methods of students' assessment:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	**5**	**15**	**15%**
2	Exam 2 written (Semester work)	**10**	**15**	**15%**
3	Midterm exam	**7**	**20**	**20 %**
5	Final Practical/Clinical/… Exam	**15,16**	**30**	**30%**
7	Assignments / Project /Portfolio/ Logbook	**12**	**25**	**25%**

6- Learning Resources and Supportive Facilities *

Learning resources (books, scientific	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Bolton, W. (2021). *Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering* (7th Edition).**

references, etc.) *	**Other References**	**Mikell P. Groover (2020). *Automation, Production Systems, and Computer-Integrated Manufacturing* (5th Edition).**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Hydraulic trainer kit (cylinders, pumps, valves) Pneumatic trainer kit (cylinders, compressors, air valves) DC motors, AC motors, servo motors, stepper motors PLC kits**

	Course Coordinator	**Program Coordinator**
Name	Assoc. Mona A. Younis	**Dr. Ahmed abd el badii**
Signature	MONA A. YOUNIS	احمد عبدالبديع

Higher Technological Institute (HTI) – 10th of Ramadan City
Course Specification

1. Basic information:

Course Title (according to the bylaw)**:**	Field Training 4			
Course Code (according to the bylaw)**:**	FTR 261			
Department/s that participated in the teaching:	Mechanical Engineering			
Total number of credit hours of the course: (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
		18		18
Course Type:	Compulsory			
The level to which the course was introduced:	SENIOR 2			
Academic Program:	Mechatronics Engineering			
Institute:	**Higher Technological Institute**			
Name of Course Coordinator:	Assoc. Prof. Dr. Mona A. Younis			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	The division council minute of department			
Course Specification Approval Date:	8/12/2025			

2. Course Overview (Brief summary of scientific content):

The student operates an integrated system or part of it, within a production unit in his area of specialization and participates in system maintenance and fault diagnosis. He also studies the techniques and tests required for the quality control of the product. Duration of the industrial training is eighteen hours per week over a minimum of five days for one academic term.

3. Course Learning Outcomes CLOs :

Matrix of course learning outcomes CLOs with program outcomes POs (ARS).

Program Outcomes (ARS) (according to the matrix in the program specs)		**Course Learning Outcomes**	
A5, A7, A8, A9, B4, D4		**Upon completion of the course, the student will be able to:**	
Code	**Text**	**Code**	**Text**
A5	**Practice research techniques and methods of investigation as an inherent part of learning.**	**LO1**	**Write a technical report for the field training.**
A7	**Function efficiently as an individual and as a member of multi-disciplinary and multi- cultural teams.**	**LO2**	**Develop new skills and obtaining knowledge to handle unfamiliar tasks more effectively in the future.**
A8	**Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools..**	**LO3**	**Integrate academic knowledge with practical experience gained during training.**
A9	**Use creative, innovative, and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.**	**LO4**	**Demonstrate the value of work, time management, and teamwork, and practice professional attitudes.**
B4	**Adopt suitable national and international standards and codes; and integrate legal, economic and financial aspects to: design, build, operate, inspect and maintain mechanical equipment and systems**	**LO5**	**Apply national and international standards and codes in engineering practice.**
D4	**Estimate and measure the performance of an electrical/electronic/digital/mechatronics system under specific input excitation,**	**LO6**	**Design mechatronics systems using appropriate tools and software.**

4. Course Teaching and Learning Methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	√	√				√	√		√	√	√				

Course Schedule:

Week No.	*Scientific content of the course (Course Topics)*	*Total Weekly Hours*	Expected number of the Learning Hours			*LOs covered by course*
			Theoretical teaching *(lectures)*	Training		
				Tutorial	Practical /Lab	
As scheduled	Train on the overall mechanical process	18				
	Train on reading overall flowsheet of the process Train on reading overall flowsheet of the process					
	Midterm Report and Oral Exam					
	Carry out research using granted internet sites for references related to student's 2 training process					
	Write technical report					
	Final Exam.					

<u>5- Methods of students' assessment:</u>

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Attendance		**10**	**10%**
2	End of term Oral exam		**30**	**30%**
3	Midterm Report (*Term Work*)	**As scheduled**	**20**	**20 %**
4	Final Report (*written*)	**AS scheduled**	**20**	**20 %**
5	Follow up		**20**	**20 %**

<u>6-</u> <u>Learning Resources and Supportive Facilities</u> *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference** (must be written in full according to the scientific documentation method)	**Depend on the case/ technical writing booking**
	Other References	**Hand out to students one by one**
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	EKB - Microsoft office
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**NON**
	Supplies	**NON**
	Electronic Programs	**NON**
	Skill Labs/ Simulators	**NON**
	Virtual Labs	**NON**
	Other (to be mentioned)	**NON**

	Course Coordinator	Program Coordinator
Name	Assoc. Mona A. Younis	**Dr. Ahmed Abdelbadea**
Signature	MONA A. YOUNIS	أحمد عبدالبديع