

difference equation using Z-transform, Stability in z domain - frequency response (applications to digital filters), Discrete Fourier Series & their properties Discrete Fourier transform & its properties.

EET 208: Communication (I), 3 (2, 2, -)

Introduction to pulse & digital communication techniques. Introduction to information theory Multiplexing techniques. Transmission of signals. Signal distortion over a communication channel, Digital communication systems including PCM & DM. Line coding techniques. Digital carrier systems ASK, FSK, QPSK, DPSK, MSK, and PSK.

PREREQUISITE: EET 204

EET 232: Wave Shaping Circuits, 3 (2, 2, -)

Linear wave shaping (Passive wave shaping (RC, LC, RLC Circuits), Active wave shaping (Op Amp circuits), Diode wave shaping: voltage clipper & voltage clamps, Oscillators (negative resistance oscillators, VNR & RL oscillators, Feed back oscillators (RC & RL oscillators, Op Amp RC oscillators, Wien bridge oscillators, Phase shift oscillators), Non-linear wave shaping (non-linear amplifiers, Precision rectifiers, Precision peak detectors, Precision clamping circuits.

PREREQUISITE: EET 205

EET 237: Antennas & Wave Propagation, 3 (2, 2, -)

Radiation & propagation of waves, Fundamental antenna parameters, Potential functions, Linear wire antennas, Loop antennas, Loop antennas, Arrays, Frequency independent antenna, Aperture antennas, Micro strip antennas, Slot Antennas, Reflector antennas.

PREREQUISITE: EET 112

EET 240: Communication (ii), 3 (2, 2, -)

Transmission media, Fundamentals of optical fiber communication system, Propagation in optical fibers, Optical sources, Optical detectors, Satellite communication system, Mobile communication systems, GSM system.

PREREQUISITE: EET 208

EET 244: Theory of Sampling, 2 (2, -, -)

Microwave frequencies, Main aspects of microwaves, Microwave applications, Transmission structures & resonators, Coaxial lines & micro strip lines, Design of microwave circuit elements. Waveguides: theory, modes and design. Microwaves tubes: klystron, traveling - wave tube, and magnetron.

Microwave semiconductor devices: BJT, MESFET, HEMT, HBT, IMPATT, and Gunn diode.

EET 253: Practical Circuits Design, 3 (2, 2, -)

Design, realization & measuring of electronic systems in the following fields: Communication, Computers, Control, & Information technology

ITR 101: Industrial Training (1), 5 (-, -, 30)

The student should study one or two electronic systems. The student must be able to write a technical report describing the main details of the system.

PREREQUISITE: ITR 001

ITR 102: Industrial Training (2), 5 (-, -, 30)

The student should study one electronic system, and should do detailed analysis and evaluation of the system.

PREREQUISITE: ITR 101

ITR 201: Industrial Training (3), 5 (-, -, 30)

The student should be trained in one of the following areas: Computer & information, Electronics, Communication, Control, & Software. The student must be able to show his ability of understanding a specific application.

PREREQUISITE: ITR 102

ITR 202: Industrial Training (4), 5 (-, -, 30)

The student should continue in this training in the same topic of specialization of ITR 201 with deep understanding of the topic, in addition to the realization & measurement of a selected project in the same field.

PREREQUISITE: ITR 201

DEPARTMENT OF ELECTRICAL ENGINEERING & COMPUTERS

Chairman : Hosny El-Motaafi

Staff Members : Tayel Dabous, Kamel Hassan, Abdu Allah Moselhi, Ahmed Hamdy, Mahmoud Soliman, Talat El-Garf, Mohamed Abdel Fattah, Hassan Hashad, Ashraf Afifi, Salah Saafan, Ali El-Moghazy, Ahmed El-Kassas, Ahmed Shalaan, Sameh No' man.

Department of Electrical Engineering & Computers

The Department offers a five - year undergraduate study leading to a B.Sc. degree in Electrical Engineering & Computers. The course of study is intended to provide a solid foundation in the basic principles, concepts & techniques underlying electronics & computer engineering. It prepares students for a career in electronics & computer engineering as it exists today & as it may be in the future.

The Department has modern electronics, communications & computers laboratories intended to keep students in line with current engineering practice.

Graduation Requirements

Engineering students need to complete 44 credits in the preparatory year consisting mainly of basic sciences, languages & introductory technical courses of general nature. The Electrical Engineering student is required to complete an additional 82.5 credit units to obtain a diploma or an additional 78.5 credit units to earn a Bachelor Degree in Electrical Engineering & Computers.

Laboratory (A)

This lab introduces the basic principles of electrical engineering to the students. These principles include estimating the resistance value & its tolerance by using the color rule, verifying Ohm's law, measuring AC voltage, determining the two port parameters of RC, RL & LC circuits, & measuring the characteristics of diodes.

Laboratory (B)

This lab is aimed at introducing the basic principles of

analog electronics. It includes the different amplifier configuration using the BJT, FET or MOSFET. It also introduces the Op Amp properties with simple applications.

Laboratory (C)

This is an advanced digital electronics lab for advanced academic work after the student passes the logic - B course. It deals with the different logic circuits including the combinational logic circuits, FFS counters and shift registers

Advanced Electronics Laboratory

This is an advanced microelectronics laboratory. It deals with different logic circuits such as decoders, multiplexers, exclusive OR, memories, A/D, and OP. amp applications.

Computer Laboratory

This is utilized to increase the student's skill in programming, The students start by getting acquainted with Ms-Windows included in "ICDL", & then developing capabilities in high - level programming languages.

Communication Laboratory

This lab is equipped with educational training kits, measuring equipment & communication systems. The main function of this lab is the demonstration of the fundamental communication techniques (Analog & Digital). It is also used to enhance the measuring skills of the students as well as improve their trouble shooting capabilities with communication circuits & systems. The lab covers the areas of Telephony, TV, & Digital & Analog Communication.

ELECTRICAL ENGINEERING & COMPUTERS DEPARTMENT PROGRAM

DIPLOMA STAGE (82.5 UNITS)

I) Compulsory Courses (59.5 Units)

1) Basic Courses: (5 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 101	Mathematics (C)	MTH 002	3	2	2	-
PHY 106	Physics (C)	PHY 002	2	2	2	-

2) Engineering Courses: (22 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 110	Logic Circuits		2	2	-	-
EEC 111	Data Structure & Algorithms	EEC 110	2	2	-	-
EET 113	Electrical Circuits		3	2	2	-
EET 114	Electronic Components		3	2	2	-
EEC 116	Intro. to Micro Processor	EEC 110	2	2	-	-
EEC 117	Electronic Circuits	EET 114	3	2	2	-
EEL 118	Electric Measurements	EET 113	3	2	2	-
EEL 120	Control System Components		3	2	2	-
EEL 121	Elect. Eng. Lab (1)		1	-	-	3

3) Technological Courses: (18 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 130	Advanced Programming (1)		2	2	-	-
EEL 132	Practical Training (1)		2	1	-	3
EEL 133	Practical Training (2)	EEL 132	2	1	-	3
EET 139	Communication Systems		3	2	2	-
EEC 161	Digital Control Systems		2	2	-	-
EET 162	Transmission Lines		2	2	-	-
EEC 163	Analog Control Systems		2	2	-	-

EEL 122	Elect. Eng. Lab. (2)	EEL 121	1	-	-	3
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4) Humanities and Language Courses: (4.5 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
LNG 101	English Language (C)	LNG 002	1	-	-	3
PHE 101	Physical Education and Activities (C)	PHE 002	0.5	-	-	3
PHE 102	Physical Education and Activities (D)	PHE 101	0.5	-	-	3
PHE 103	Physical Education and Activities (E)	PHE 102	0.5	-	-	3
MNG 101	Principles of Management		1	-	2	-
ENG 151	Engineering Economy		1	2	-	-

5) Industrial Training: (10 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ITR 101	Industrial Training (1)	ITR 001	5	-	-	30
ITR 102	Industrial Training (2)	ITR 101	5	-	-	30

II) Elective Courses (23 Units)

1) Basic Courses: (6 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ENG 121	Mechanics (C)	ENG 022	3	2	2	-
MTH 102	Mathematics (D)	MTH 101	3	2	2	-
MTH 103	Numerical Methods	MTH 101	3	2	2	-
MTH 105	Statistical Methods	MTH 101	2	2	2	-
PHY 107	Solid State Physics	PHY 002	2	2	-	-

2) Engineering Courses: (8 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 112	File Organization	EEC 110	2	2	-	-
EEC 115	Software Eng.	EEC 112	2	2	-	-
EEL 119	Advanced Meas.	EEL 118	3	2	2	-
EEL 121	Feed Back Control Systems	EEL 120	3	2	2	-
EEL 170	Electrical Machines		2	2	-	-
EEL 171	Industrial Electronics		3	2	2	-
EEL 172	Non Linear Automatic Control Systems		3	2	2	-

EET 111	Electromagnetic Fields (A)		3	2	2	-
EEI 175	Optimal Control		3	2	2	-
EEL 176	Control Lab. (1)	EEI 121	1	-	-	3
EET 112	Electromagnetic Fields (B)	EET 111	3	2	2	-

3) Technological Courses: (6 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 131	Advanced Programming (2)	EEC 130	2	2	-	-
EEI 137	Industrial Systems (Electric Application)	EEC 115	3	3	-	-
ENG 141	Material Technology (A)		2	1	-	3
EEI 180	Controllers	EEI 120	2	2	-	-
EEI 181	Industrial Engineering		2	2	-	-
EEL 182	Control Lab. (2)	EEL 176	1	-	-	3
EEI 182	Industrial Safety		2	2	-	-
EEI 183	Technological Calculations		2	2	-	-
EEI 184	Advanced Electronic Circuits	EEC 117	3	2	2	-
EEI 185	Non Electrical Measurements		3	2	2	-
EEI 186	Logic Circuits (2)		2	2	-	-
EEL 187	Electronic Eng. Lab (c)	EEL 122	1	-	-	3
EET 190	Practical Communication Systems	EET 139	2	2	-	-
EEI 191	Adaptive Control	EEI 175	2	2	-	-
EEI 192	Industrial Electronics (2)	EEI 171	3	2	2	-
EEC 193	Network Analysis		3	2	2	-
EEC 194	Computer Aided Design (1)		2	2	-	-
EEL 182	Control Lab.(2)	EEL 176	1	-	-	3

4) Humanities and Language Courses: (3 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
HUM 102	Modern Egyptian History		1	2	-	-
HUM 103	Islamic Civilization (I)		1	2	-	-
HUM 104	Arabic Literature		1	2	-	-
LNG 102	Technical English (A)	LNG 101	1	-	-	3
LNG 103	German Language (A)		1	-	-	3
LNG 104	French Language (A)		1	-	-	3

BACHELOR STAGE (78.5 UNITS)

I) Compulsory Courses (54.5 Units)

1) Basic Courses: (6 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 205	Mathematical Analysis	MTH 101	3	2	2	-
MTH 206	Advanced Calculus	MTH 101	3	2	2	-

2) Engineering Courses: (18 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 201	Organization of Microprocessor		2	2	-	-
EEC 203	Operating Systems		2	2	-	-
EET 204	System Analysis		3	2	2	-
EET 205	Switching Circuits		3	2	2	-
EET 208	Communication (I)	EET 204	3	2	2	-
EEC 210	Computer Networks		2	2	-	-
EET 237	Antennas & Wave Propagation	EET 112	3	2	2	-

3) Technological Courses: (17 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 220	Computer Graphics		2	2	-	-
EEC 222	Advanced Industrial Electronics	EEL 192	3	2	2	-
EEL 212	Advanced Electronics Lab.		1	-	-	3
EEC 230	Computer Interfacing		2	2	-	-
EET 232	Wave Shaping Circuits	EET 205	3	2	2	-
EEP 233	Practical Training (3)		2	1	-	3
EEP 234	Graduation Project	EEP 233	3	-	-	6
EEL 235	Communication Lab.	EEL 212	1	-	-	3

4) Humanities and Language Courses: (3.5 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MNG 201	Project Management		1	2	-	-
LNG 201	English Language (D)	LNG 101	1	-	-	3
PHE 201	Physical Education and Activities (1)	PHE 103	0.5	-	-	3

PHE 202	Physical Education and Activities (2)	PHE 201	0.5	-	-	3
PHE 203	Physical Education and Activities (3)	PHE 202	0.5	-	-	3

5) Industrial Training: (10 Units)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ITR 201	Industrial Training (3)	ITR 102	5	-	-	30
ITR 202	Industrial Training (4)	ITR 201	5	-	-	30

II) Elective Courses (24 Units)

1) Basic Courses: (4 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
MTH 210	Selected Topic in Math	MTH 206	3	2	2	-
PHY 211	Solid State Physics (B)	PHY 107	3	2	2	-
MTH 203	Numerical Analysis	MTH 103	3	2	2	-
MTH 207	Num. sol. of Diff. Equation	MTH 102	3	2	2	-

2) Engineering Courses: (10 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 202	Computer System Analysis	EEC 201	2	2	-	-
EET 207	Sample Data Systems		3	2	2	-
EEC 209	Advanced Micro Processors		2	2	-	-
EET 240	Communication (II)	EET 208	3	2	2	-
EEC 242	Shaping Circuits	EET 232	3	2	2	-
EET 244	Theory of Sampling		2	2	-	-

3) Technological Courses: (3 Units Required)

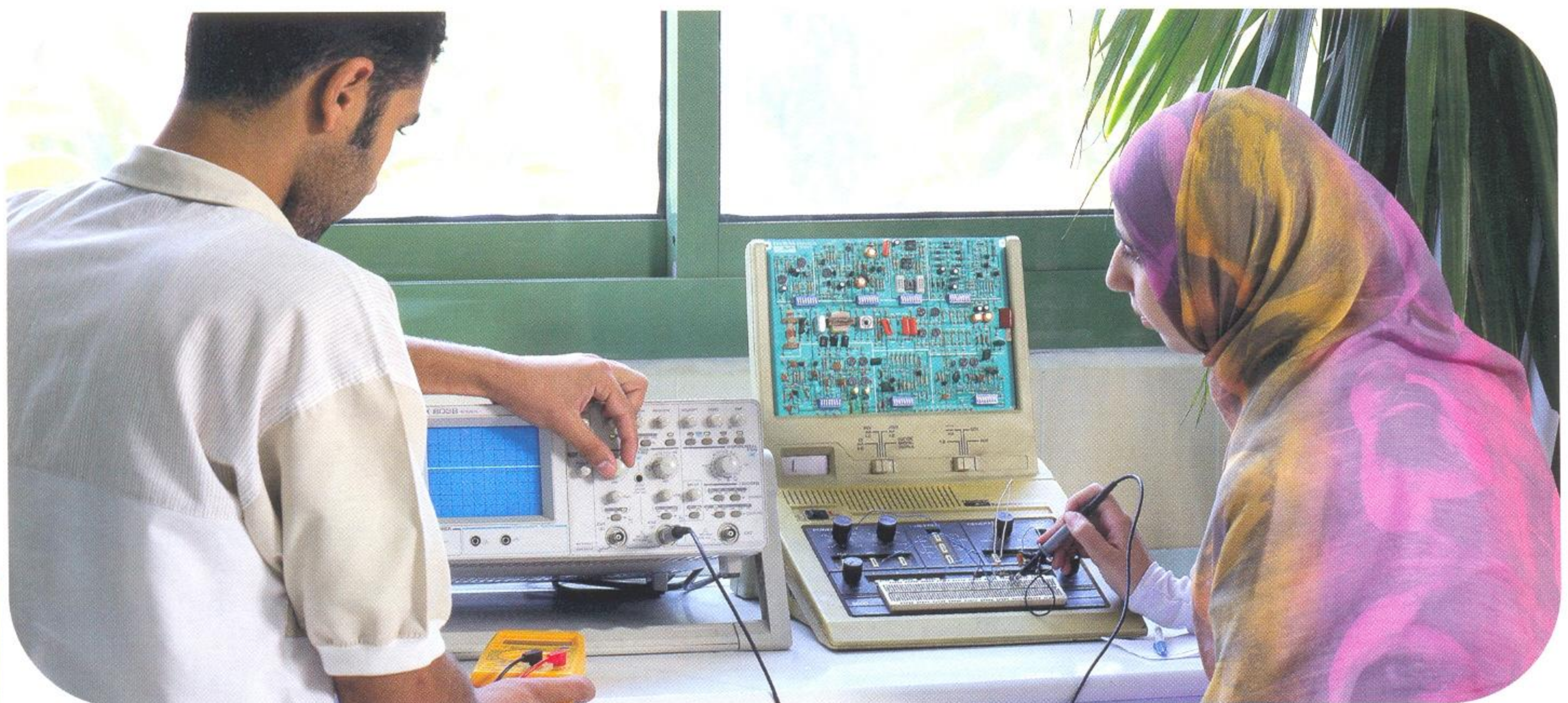
Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
EEC 221	Computer Applications		2	2	-	-
EEC 223	Introduction to Database Systems		2	2	-	-
EEC 224	Compiler Design	EEC 194	3	3	-	-
EEC 225	Artificial Intelligence		2	2	-	-
EET 250	Logic Circuits (2)	EEC 110	3	2	2	-
EET 251	Integrated Electronics Fabrications		3	3	-	-
EET 253	Practical Circuits Design		3	2	2	-
EET 231	Stochastic Control	EET 207	3	2	2	-



EEI 260	Computer in Industry	3	3	-	-
EEI 271	Computer in Communication	3	3	-	-
EEC 272	Design Using Computer	3	3	-	-

4) Humanities and Language Courses: (7 Units Required)

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
HUM 202	English Literature	LNG 201	1	-	-	3
LNG 202	Technical English (B)	LNG 102	1	-	-	3
LNG 203	German Language (B)	LNG 103	1	-	-	3
LNG 204	French Language(B)	LNG 104	1	-	-	3
HUM 203	Trade Law		1	2	-	-
HUM 204	Industrial Psychology		1	2	-	-
HUM 205	Islamic Civilization (II)		1	2	-	-
HUM 206	Islamic Studies		1	2	-	-
MNG 221	Engineering Economy (II)		1	2	-	-
MNG 222	Behavior Discipline		1	2	-	-
MNG 223	Economics of Management		1	2	-	-



ELECTRICAL ENGINEERING & COMPUTERS ENGINEERING COURSE DESCRIPTION

EE 101: Electrical Engineering Principles, 3 (2, -, 3)

Introduction, linear circuits, resistive circuits, capacitance, inductance & impedance. AC circuits, electronic devices and circuits, transistors and integrated circuits. Digital logic.

PREREQUISITE: PHY 002

EE 102: Electrical Machines, 3 (2, -, 3)

Transformers, losses, tests, efficiency and auto transformer. DC machines, DC generator, DC motor, losses & efficiency. AC machine, induction machines, synchronizer machines.

PREREQUISITE: EE 101

EE 191: Principles of Electrical Engineering, 3 (2, -, 3)

Introduction, linear circuits, resistive circuits, capacitance, inductance & impedance. AC circuits, electronic devices and circuits, transistors and integrated circuits. Digital logic.

PREREQUISITE: PHY 002

EE 192: Electrical Machines, 3 (2, -, 3)

Transformers, losses, tests, efficiency & auto transformer. DC machines, DC generator, DC motor, losses & efficiency. AC machine, induction machines, synchronizer machines.

PREREQUISITE: EE 191

EE 201: Electrical Machinery & Controls, 2 (1, -, 3)

Topics covered include AC & DC machines, transformers, feedback control, polyphase circuits, distribution & instrumentation.

PREREQUISITE: EE 192

EE 203: Applications of Industrial Computers, 2 (1, -, 3)

Computer applications in CAD/CAM, Robotics. Computer applications in control of industrial processes, flow, pressure, temperature. Computer applications in automobile industry.

PREREQUISITE: EE 191

EEC 110: Logic Circuit, 2 (2, -, -)

Binary numbers, Boolean algebra, systematic reduction of Boolean expression, Karnough maps, Decoders, Multiplexers, Design for combinational circuits.

EEC 111: Data Structures & Algorithms, 2 (2, -, -)

Concepts of data and data processing & structures, Algorithms and sub-algorithms structures, Definitions of arrays records & pointers, Data structures lists, Linked lists, stacks, Queues, Graphs, Trees, Algorithms of: sorting, deleting, validation, coding and how to implement them in C++.

PREREQUISITE: EEC 110

EEC 112: File Organization, 2 (2, -, -)

Design and Specifications of file Structure, Fundamentals of file processing operations, Secondary storage and system software, File structure concepts, Organizing, Indexing files.

PREREQUISITE: EEC 110

EEC 115: Software Engineering, 2 (2, -, -)

Software life cycle-Introduction to system analysis, Work flow and data flow, Design of computer, Program implementation cycles, Creation of user manual and programmer manual.

PREREQUISITE: EEC 112

EEC 116: Introduction to Microprocessor, 2 (2, -, -)

Computer structure, internal organization of CPU, Internal and external buses, The fetch, decode, execute cycle. Instruction set and addressing modes of a microprocessor, Introduction to programming using assembly language.

PREREQUISITE: EEC 110

EEC 117: Electronic Circuits, 3 (2, 2, -)

Operational Amplifier: Ideal Op Amp application frequency response of open loop gain. Non-ideal Op Amp parameters. Bipolar junction transistor amplifier, DC and AC analysis of common emitter, common base, common collector amplifier, and multistage amplifier. MOSFET amplifiers: Analysis of common source, common gate and common drain amplifier. MOSFET active load.

PREREQUISITE: EET 114

EEC 130: Advanced Programming (1), 2 (2, -, -)

Basic Concepts of C++ language, Creation of file execution, Data input and output operations, Simple printing arithmetic, Assignment operators, Incrementing and decrementing, Conditional statement, looping, Arrays, Strings.

EEC 131: Advanced Programming (2), 2 (2, -, -)

Programming using C++ including: Sub programs - Functions - Arrays - Matrices - Graphics.

PREREQUISITE: EEC 130

EEC 161: Digital Control Systems, 2 (2, -, -)

Z transform, Block diagram, Signal flow graph, Gain formula, Stability, Bilinear transformation, Time domain analysis, Digital PID controller, State feedback and observers, Introduction to state variables.

EEC 163: Analog Control Systems, 2 (2, -, -)

Impulse response, transfer function, Block diagram, Mathematical modeling, Stability, Time domain analysis, Transient response, Steady state error analysis, Root locus, PID controller.

EEC 193: Network Analysis, 3 (2, 2, -)

Sinusoidal steady state analysis: Kirchhoff's laws in phasor domain, series parallel and Delta-to-wye simplifications. Source transformation, Node voltage method, mesh current method. Power calculations, Types of powers. Maximum power transfer

EEC 194: Computer Aided Design, 2 (2, -, -)

Introduction to CAD – Network topology matrices topology matrices - Formulation of node-voltage and loop current methods for linear network – Computer methods for solution of system of linear algebraic equations – Introduction to modeling using Spice – Introduction to VLS

EEC 201: Organization of Microprocessor, 2 (2, -, -)

Internal organization of practical microprocessor. Addressing modes, assembly language, and executable and non-executable instructions. Design for microprocessor control circuit.

EEC 202: Computer System Analysis, 2 (2, -, -)

Basic Understanding of the development of information systems by analyzing the origins, Activities, and major considerations of systems analysis & design, Techniques for data gathering / feasibility study, Data analysis, System design, System programming are covered with specific business activity examples.

PREREQUISITE: EEC 201

EEC 203: Operating Systems, 2 (2, -, -)

Understanding supervisory and control software for contemporary multi-programmed computer systems.

Mastering Processes, synchronization, inter process communication, scheduling, memory management, security, system performance evaluation, and visual machines overview on object-oriented system, and case study.

EEC 209: Advanced Microprocessors, 2 (2, -, -)

Recent trends in CPU, Registers, Memory, ALU, Distributed data processing.

PREREQUISITE: EEC 201



EEC 210: Computer Networks, 2 (2, -, -)

This Course introduces the basic concepts and principles of computer Networks. It presents an overview of networks terminology, examines different network topologies and architectures, discusses the physical components of computer networks, and reviews the principles of network connectivity. Understanding the Networks principles (components, standards, protocols and parameters); describing the features and functions of different Networks architectures; extension of the local area network (LAN) and network protocols including: OSI, TCP/IP, and IEEE802.x.

EEC 220: Computer Graphics, 2 (2, -, -)

Description of: computer graphics objectives, Two-dimensional transformations, Viewing transformation, Graphics hardware, CAD/CAM macromedia and GIS packages, Case studies.

EEC 221: Computer Applications, 2 (2, -, -)

Computer in business and government - Computer integrity, privacy & security - Information services for computer - computers & electronics - Computer & education - Computer & national

development - Computer & social power - Practical project using MATLAB

EEC 222: Advanced Industrial Electronics, 3 (2, 2, -)

Controlled Rectifiers, Review of single phase controlled rect., 3 Phase rectifying circuits (uncontrolled and controlled)

AC Choppers: Integral cycle control and phase delay angle control, DC choppers: Buck regulators + Boost regulators, Inverters: Square wave + PWM voltage source inverters + 3 Phase inverters and constant V/F AC motor control.

PREREQUISITE: EEI 192

EEC 223: Introduction to Database Systems, 2 (2, -, -)

Data models, defining the elements of DB, schema definition and use, the realization of DB model, calculus on relational algebra, non-relational database.

EEC 224: Compiler Design, 3 (3, -, -)

Comparison of programming languages – Algorithms and data structures, Compiler definition, meaning, and classification, Code generation and optimization, Compiler Design.

PREREQUISIT: EEC 194

EEC 225: Artificial Intelligence, 2 (2, -, -)

Computational methods for automated problem solving, heuristic search, planning, Inference, natural language processing, and machine learning. using prolog, knowledge representation, and introduction to Fuzzy logic and its applications.

EEC 230: Computer Interfacing, 2 (2, -, -)

Microprocessor pins, Memory

interfacing, I/O interfacing. Introduction to Parallel and Serial interfacing. Interrupt.

EEC 242: Shaping Circuits, 3 (2, 2, -)

Passive filters, Active filters, Oscillators, Modulators & demodulators circuits, Phase, Locked-loop circuit & its applications.

PREREQUISITE: EET 232



EEC 272: Design Using Computer, 3 (3, -, -)

Introduction to computer usage in design process, Network topology, Formulation of node voltage method, Formulation of loop current method System of Linear algebraic equations, State space approach tolerance analysis, Review of Spice, Input file and analysis, Semiconductors in Spice, Types of subcircuits & digital applications, Transmission line in Spice, Other control lines in Spice.

EEl 118: Electric Measurements, 3 (2, 2, -)

Electrical units and dimensions, Error in measurements, Measurement of resistance (low-high), Measuring of capacitance & inductance (self and mutual), Dc and Ac bridges, Measuring instruments, Ammeters and voltmeters (moving iron, moving coil, electrostatic and induction types), Wattmeter and power measurements, Electronic measuring instruments, Oscilloscopes, Digital instruments, Measurement of non electrical quantities.

PREREQUISITE: EET 113

EEl 119: Advanced Measurements, 3 (2, 2, -)

Circuit constants in systems involving distributed parameters, Waveform & time interval measurements, & amplifier measurement. Receiver measurements.

PREREQUISITE: EEl 118

EEl 120: Control System Components, 3 (2, 2, -)

Open and closed loop systems, Impulse response, Step response, Transfer function, Signal flow graph, Gain formula, State diagram, Operational amplifier realization, State and output differential equations, State space representation, Stability, Nyquist Criterion, Bode Plot, Controllability and observability.

EEl 121: Feedback Control Systems, 3 (2, 2, -)

Principles of closed loop feedback control systems, General feedback theory, Transfer functions approach, criteria for design, Nyquist criteria, Routh criteria, and Root Locus theory. Methods of Compensation.

PREREQUISITE: EEl 120

EEl 132: Practical Training (1), 2 (1, -, 3)

Familiarization with basic tools used in Electrical Workshop, Identification of electric and electronic components, Printed Circuit Board (PCB), PCB production, Layout, etching, Basic measuring Instruments, Practical Implementation of several projects.

EEl 133: Practical Training (2), 2 (1, -, 3)

Several applications project in analog circuits, and analog to digital circuits including: Sensor signal conditioning, Using Op Amp to control temperature, Using transistors to control direction an speed of DC motor, Optical counter circuit and implementation of digital voltmeter. At the end of semester each group of students should design and implement a practical project based on what they learned.

PREREQUISITE: EEl 132

EEl 137: Industrial Systems, 3 (3, -, -)

Measuring systems. Controlling systems, Telemetry, Transfer of information, Safety systems, & Watching systems.

PREREQUISITE: EEC 115

EEl 164: Industrial Process Control, 2 (2, -, -)

Introduction to measuring systems and sensors. Modeling of dynamical systems. Noise & error analysis. Applications including: linear variable differential transducers LVDT, potentiometers, variable inductance transducers, strain gauges thermocouples, resistance temperature detectors, piezoelectric sensors, & thermistors. Applications to liquid level, fluid flow, temperature pressure, & angular rotation, signal conditioning. Actuators & Controllers, relays, timers, control valves.

EEl 170: Electrical Machines, 2 (2, -, -)

Introduction to electrical machines, basics operation of electrical machines, Magnetic Circuits, DC Machines: construction and types, DC generators: Types and characteristics, DC Motors, Transformers, AC Machines: Construction and types, 3-phase Induction Motors, Wound rotor induction motors, Squirrel cage Induction motors.



EEI 171: Industrial Electronics, 3 (2, 2, -)

Power Diode, Power Transistor, Power MOSFET Thyristor, Triac single phase rectifying circuit, Triggering circuits, Dc motor controller, Temperature controller.

EEI 175: Optimal Control, 3 (2, 2, -)

Review of linear and nonlinear systems, concepts of optimal control, Objective function, Linear quadratic control problem, Riccati equation, Optimal control for partially observed systems.



EEI 172: Non-Linear Automatic Control Systems, 3 (2, 2, -)

Nonlinear systems, Nonlinear differential equations, Completely and partially observed systems, Application of nonlinear systems, Stability analysis using Lyapunov first and second methods, Stability analysis using Describing functions.

EEI 180: Controllers, 2 (2, -, -)

Classification of controllers, Direct action controllers, on/off controllers, I and P controllers Electric controllers with feedback, Pneumatic controllers, Program controllers.

PREREQUISITE: EEI 120

EEI 181: Industrial Engineering, 2 (2, -, -)

Concepts of Optimization, Linear Programming & Simplex Method, Nonlinear programming problems & their solution, Brief review of Probability theory, Queuing Theory, Models of Queuing systems.

EEI 182: Industrial Safety, 2 (2, -, -)

Introduction, General definitions, Types of injuries, hazardous area, general causes of accidents, Safety organization. Function and qualifications of safety, Economics of safety, Calculations of the cost of an accident, Plant safety policy, In planning, Design, Erection, & operation, Kinds of hazards, Fire, explosion, Radiation, Noise, Overheating-Accident investigation & analysis, Measure of safety, Fire protection & prevention. Prevention wears, Head, Eye, & face.

EEI 183: Technical Calculations, 2 (2, -, -)

Introduction to project planning, Cost calculation of components, Labors and total project.

EEI 184: Advanced Electronic Circuits, 3 (2, 2, -)

Differential amplifier, Current sources and current mirrors, BJT differential Amplifier with active load, MOSFET differential amplifier with Active load, Frequency response of oscillators circuits, Active RC filters and Power amplifiers.

Prerequisite: EEC 117

EEI 185: Non-Electrical Measurements, 3 (2, 2, -)

A study of the methods and techniques used to monitor industrial processes, Analysis of sensing devices for detecting changes in pressure, temperature, humidity, sounds, light. Velocity, Acceleration, and Strain Measurements.

EEI 186: Logic Circuits, 2 (2, -, -)

Adders, comparators, decoders, encoders, multiplexers, de-multiplexers, digital system applications; flip-flops, shift registers, binary codes and coding systems, counters, memories organization - Rams, ROMs and Proms - other type of memories.

EEI 191: Adaptive Control, 2 (2, -, -)

Problem formulation of adaptive control, Identification Problem, Real-time Parameter Identification, Self-Tuning Regulators, Model Reference Adaptive Control, Auto-tuning, Robustness study. PREREQUISITE: EEI 175

EEI 192: Industrial Electronics (2), 3 (2, 2, -)

Higher power electronics. Thyristors, The silicon control switch. Single-phase control of DC. Motors, Phase control of triac circuits, thyristor protection. PREREQUISITE: EEI 171

EEI 231: Stochastic Control, 3 (2, 2, -)

Brief review of probability theory, stochastic integral & stochastic differential equations, stability, control of completely observed systems, linear filtering, & linear quadratic regulators. PREREQUISITE: EET 207

EEI 250: Logic Circuits (2), 3 (2, 2, -)

Advanced logic circuit analysis and design including: Adders, comparators, decoders, encoders, multiplexers, de-multiplexers, digital system applications; flip-flops, shift registers, binary codes and coding systems, counters, memories organization. Design using FPGA technology. PREREQUISITE: EEC 110

EEI 251: Integrated Electronics Fabrication, 3 (3, -, -)

Physics of semiconductors, Devices layout (PN Junction, BJT, FET), Simulation and modeling of electronic devices, Very Large Scale IC (VLSI) design and tools.

EEI 260: Computers in Industry, 3 (3, -, -)

Introduction to real time (RT) sensors and computers, RT requirements, RT operating system, RT implementation of control algorithms for special case studies.

EEL 271: Computers In Communications, 3 (3, -, -)

Serial communication, Modems, RS standards, Routing, Session control, File transfer, E-mail, virtual terminals, TCP/IP protocol models.

EEL 121: Electrical Eng. Lab. (1), 1 (-, -, 3)

Calculation of the resistance value by using the color code, Verification of Ohm's law, Verification of KVL & KCL, Verification of simple resistive circuit (series, parallel circuits), Verification of superposition theorem, Verification of max. power transfer, Using Oscilloscope, Measuring AC Circuits, Measuring the Characteristic of diode, Diode Applications.

EEL 122: Electronic Eng. Lab. (2), 1 (-, -, 3)

Verification of transistor Characteristic, Verification of different configurations of the transistor amplifiers (common emitter, common base, Common collector), Design & implementation of 2-stage amplifier using PSpice. Verification of MOSFET configuration & measuring the different parameters. Measuring the different parameters of practical Op Amp & its applications.

PREREQUISITE: EEL 121

EEL 176: Control Lab (1), 1 (-, -, 3)

Basic components of a control system. Interfacing, Temperature Rig., variable Resistance Transducers, capacitive Transducers, Inductive Transducers, Strain Gauges, Operational Amplifiers, Realization of System using Operational Amplifiers. PID - Controllers. Using MATLAB to implement & simulate control systems.

PREREQUISITE: EEI 121

EEL 182: Control Lab (2), 1 (-, -, 3)

Applications of Control Systems to solve real industrial problems. Tuning PID - Controllers, Speed control of DC - Motors, Washing Machine Installation, Frequency Response, and their applications, 6800 Microprocessor programming, Microprocessor applications.

PREREQUISITE: EEL 176

EEL 187: Electronic Lab (c), 1 (-, -, 3)

It is an advanced digital electronic lab, It deals with different logic circuits including the combinational logic circuits, Flip-Flops, Counters and shift registers.

PREREQUISITE: EEL 122

EEL 212: Advanced Electronic Lab., 1 (-, -, 3)

Shift registers, Decoders, multiplexers. Project 1: (Design & realization of 4-digits counter), Project 2: (Redesign & realization of project 1 with Semiconductor Memories, Project 3: (Display of a message of characters stored on a memory chip). Flip-Flop, Shift register, & memory.

EEL 235: Communication Laboratory, 1 (-, -, 3)

It is a modern communication lab, It emphasizes the communication principles through experimental work an analog & digital trainers, It deal with different comm. trainers (Microwave, Fiber optics, Telephone exchange, Antenna, Mobile trainers, TV set with troubleshooting facility).

PREREQUISITE: EEL 212

EEP 233: Practical Training (3), 2 (1, -, 3)

Microprocessor architecture, Interfacing basics, Assembly language, Projects: including microprocessor interfacing & control.

EEP 234: Graduation Project, 3 (-, -, 6)

Design, realization, & measurement of an electronic system in communication, electronics, control on computers.

PREREQUISITE: EEP 233

EET 111: Electromagnetic Fields (A), 3 (2, 2, -)

Electric charge. Charge distributions, Coulomb's law, The Field concept, Electric field, The field for different charge distributions, Electric flux & flux density, Gauss's law & the divergence theorem, Work done in moving a point charge, Potential difference, Potential of a point charge, Potential of different charge distributions. Potential gradient. Relationship between electric field and Potential, The electric dipole, The energy in electrostatic field, Dielectrics, The

nature of dielectrics materials, The field in a dielectric, Boundary conditions, Capacitance, Current & Current density, Conductors, Resistance, Continuity equation. Relaxation time Laplace's equation & Poisson's equation, Solution of Laplace's in one variable, two variables & three variables.

EET 112: Electromagnetic Field (B), 3 (2, 2, -)

Magnetic field in Vacuum. The Biot-Savart Law. Basic laws of magnetic field. Gauss's theorem for the magnetic field. Ampere's circuital law. Curl & curl of the magnetic field. Vector magnetic potential. Stock's theorem. Maxwell's equations for static fields. Magnetic forces & torques. The Lorentz force. Electron motion under the action of different fields. The cyclotron. Ampere's force. Torque & magnetic moment. Motors. Magnetic materials and its nature. Magnetization & permeability. Classification of magnetic materials. Electromagnetic induction. Relation between electricity & magnetism. Lenz's law. Production of induced voltage and current. Faraday's law of electromagnetic induction. Generators. Inductance. Neumann's formulas. The betatron. Energy of a system of current loops. Time-varying fields & Maxwell's equations. Displacement current. Maxwell's equations: differential & integral forms, Material equations. Properties of Maxwell's equation, Wave equation and its solution in different media, Scalar & vector potential, Equations of electrodynamics in the 4-d form.

PREREQUISITE: EET 111

EET 113: Electrical Circuits, 3 (2, 2, -)

Dc circuits, Resistors in parallel, series and delta-star. Voltage, current, power, Kirchhoff's laws. Methods of solutions. Mesh current method, node voltage method. Network theorems; Thévenin's theorem, Superposition theorem, Maximum power transfer theorem, Introduction to Ac circuits, Concept of impedance and phase in Ac circuits, Balanced 3-phase circuit.

EET 114: Electronic Components, 3 (2, 2, -)

Semiconductor theory, P.N Junction, Semiconductor diodes types and applications, Special purpose diodes, Bipolar junction transistor, MOSFET transistor.

EET 139: Communication Systems, 3 (2, 2, -)

Analog and continuous time signals. Analog signal

transmission. Analog modulation techniques (AM, SSB, PM, FMNB, FMWB). Phase locked loop (PLL). Super heterodyne receivers. Analog Demodulators. Frequency Division multiplexing using signal bandwidth, and channel bandwidth noise classification and analysis-effect of noise on analog communication systems.

EET 162: Transmission Lines, 2 (2, -, -)

Lumped and distributed parameters of transmission lines. Main parameters of transmission lines. Effect of frequency on transmission line. Incident and reflected waves. Standing wave ratio, Reflection coefficient matching of resistive load to the transmission line. Stub matching reactive parts of the load, Smith chart and its application in transmission line.

EET 190: Practical Communication Systems, 2 (2, -, -)

Communication networks, Transmission systems, Switching systems, Signaling techniques, Packet communication, ISDN, Broadband telecom, ATM communication, High speed data communication, Broadband video communication, Synchronous, digital transmission.

PREREQUISITE: EET 139

EET 204: System Analysis, 3 (2, 2, -)

Signals and their representation & System classification & representation. Convolution & impulse response, Correlation, Fourier series, Fourier transform. Spectrum of temporal and special signals response and application of linear filters.

EET 205: Switching Circuits, 3 (2, 2, -)

Pulse fundamentals, Resistive capacitive circuits (RC), Transistor switching, ICs Op-Amp switching circuits, Schmitt trigger circuits and voltage comparator, Monostable & astable multivibrators, Timers IC.

EET 207: Sampled Data Systems, 3 (2, 2, -)

Types of discrete signals, Properties of discrete systems (linear, Time invariance, Causality, Memory, Impulse response, Convolution sum, Convolution techniques for discrete systems, Difference equations & their classical solutions, Z- Transform (definition-properties-mapping between s-z planes). Solutions of