

Or: Introduction to music, the main features include: .theoretical orientation, musical instruments, musical note, playing music, training on solo and choir singing.

PREREQUISITE: PHE 102

PHE 201: Physical Education & Activities (1), 0.5 (-, -, 3)

Sporting Engineering I: modern physical education equipment, movement analysis, evaluation, modern physiological measurement equipment and its relationship to selection of athletes. Water treatment and swimming pools. Conditions of selecting the right premises for physical activities. Dimensions of playgrounds. Physiological variations during physical activities and their relationship with sports' costumes.

PREREQUISITE: PHE 103

PHE 202: Physical Education & Activities (2), 0.5 (-, -, 3)

Sporting Engineering II: electrical circuits of sports equipment. Polymeric resins and manufacturing of sports equipment. Measurement of some physiological variations and their use in evaluation. Proper dimensions of covered sports playgrounds. Analysis of some activities' movements which are practiced in covered sports halls.

Single activities, group activities, and their relationship with costumes' designs.

PREREQUISITE: PHE 201

PHE 203: Physical Education & Activities (3), 0.5 (-, -, 3)

Introduction to sports psychology. Definition of sports psychology, motivation, anxiety, mental training, relaxation, mental perception, utilization of computers in measuring psychological condition, the relationship between sports psychology and sporting engineering.

Or: Introduction to music, the main features include: .theoretical orientation, musical instruments, musical note, playing music, training on solo and choir singing.

Or: Introduction to Plastic Arts : Appreciation of the artistic aspects of natural elements, studying the artistic effect of light and shadow, arts workshop woodwork practice, making simple original

color designs on glass material, metal and leather artistic creation.

PREREQUISITE: PHE 202

PHY 101: Physics, 3 (2, 2, -)

Physical optics: interference, diffraction, polarization, electro- and magneto-optical effects. Modern physics: basic constituents of matter, the atomic structure, the interaction of similar and dissimilar atoms, the interaction of photons and electrons, basic properties of atomic nuclei, radioactivity, lasers, ultrasonic.

PREREQUISITE: PHY 002

PHY 106: Physics (C), 2 (2, 2, -)

Physical optics: interference, diffraction, polarization, electro- and magneto-optical effects. Modern physics: basic constituents of matter, the atomic structure, the interaction of similar and dissimilar atoms, the interaction of photons and electrons, basic properties of atomic nuclei, radioactivity.

PREREQUISITE: PHY 002

PHY 107: Solid State Physics, 2 (2, -, -)

Crystal Structure, Crystalline and Amorphous solids, Ionic crystals, covalent crystals, van Der Waals Bond, Metallic Bond, Band theory of solids, Excitations, lattice vibrations, Electrons In Bonds, Imperfections In Crystals, the Optical properties of solids, semiconductor Devices, Energy Bands, superconductivity, bound Electron pairs.

PREREQUISITE: PHY 002

PHY 211: Solid State Physics (B), 3 (2, 2, -)

Free electron model – fermi dirac distribution – the mean free path in metal thermo ionic emission from metal. The contact potential between two metals. The electric conductivity of materials and their models. The Boltzmann transport equation. Electron phonon collision. The Hall effect. Dielectric and optical properties of insulators. Ferroelectric material. Diamagnetism, paramagnetism, ferromagnetism and anti ferromagnetism material

PREREQUISITE: PHY 107

DEPARTMENT OF BASIC SCIENCES

Chairman : Hussin El-Sayes

Staff Members : Medhat Metawee, Ahmed Sultan, Abdullallah Hussien, Salah Hafez, Magda Mansour, Yousria Abu Elnaga, and Afaf Radi



Department of Basic Sciences

Basic and Specialized Engineering courses depend on mathematics and physics. Hence it is the responsibility of the Department of Basic Sciences to offer graded and high-level courses to the students of all H.T.I. departments. Sixteen mathematics courses and six physics courses have so far been offered. The content of these courses are comparable to the same courses offered at Egyptian or European universities.

Physics Laboratories

These labs are used for teaching the experimental part of Physics 002 covering areas such as: mechanics, sound vibrations, properties of matter, electricity and magnetism, heat and thermodynamics, and optics.

PREPARATORY PROGRAM (44 UNITS)

1) Basic Courses (22 Units):

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
CHM 001	Industrial Chemistry		2	2	-	-
CHM 002	Chemistry Laboratory		1	-	-	3
ENG 005	Production Technology (A)		3	2	2	-
ENG 021	Mechanics (A)		2	2	2	-
ENG 022	Mechanics (B)	ENG 021	2	2	2	-
MTH 001	Mathematics (A)		3	2	2	-
MTH 002	Mathematics (B)	MTH 001	3	2	2	-
PHY 001	Physics (I)		3	3	-	2
PHY 002	Physics (II)	PHY 001	3	3	-	2

2) Engineering Courses (3 Units):

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
CS 001	Introduction to Computer		1	-	-	2
CS 002	Computer Programming	CS 001	2	1	-	2

3) Technological Courses (10 Units):

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ENG 003	Engineering Drawing (A)		2	1	-	4
ENG 004	Engineering Drawing (B)	ENG 003	2	1	-	4
ENG 006	Production Technology (B)	ENG 005	3	2	2	-
ENG 009	Pro. Tech. Workshop (A)		1	-	-	6
ENG 010	Pro. Tech. Workshop (B)	ENG 009	1	-	-	6
ENG 011	Technological Concepts		1	2	-	-

4) Humanities and Language Courses (4 Units):

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
HUM 001	Civil Heritage		1	2	-	-
LNG 001	English Language (A)		1	-	-	3
LNG 002	English Language (B)	LNG 001	1	-	-	3
PHE 001	Physical Education and Activities (A)		0.5	-	-	3
PHE 002	Physical Education and Activities (B)	PHE 001	0.5	-	-	3

5) Industrial Training (5 Units):

Code	Course Title	Pre. Req.	Units	Lec.	Ex.	Lab.
ITR 001	Introduction to Industrial Training		5	-	-	30



PREPARATORY COURSE DESCRIPTION

CHM 001: Industrial Chemistry, 2 (2, -, -)

Kinetic molecular theory of gases, ideal gases. Boyle's law, Charles's law, Avogadro's law, ideal gas equation, some useful forms derived from ideal gas equation, Dalton's law, Graham's law and its practical application, deviation of gases from ideal behavior, real gases, Van Der Waal's equation, liquefaction of gases and Joule-Thomson effect and its application, Liquid state. Electrochemistry and corrosion. Environmental chemistry. Petroleum

CHM 002: Preparatory Chemistry Lab, 1 (-, -, 3)

Qualitative analysis: identification of a simple salt. Quantitative analysis, volumetric analysis (neutralization, titration, oxidation, reduction, complex formation, precipitation).

ENG 005: Production Technology (A), 3 (2, 2, -)

Introduction to production, manufacturing elements, properties of engineering materials, classification according to machinability, cast-ability. Principles of cutting & forming properties. Tools and tool geometry, machine tools simplified analysis, forming machines simplified analysis, wood working, timber kinds and properties, tools, equipment, machines, types of joints, finessing, safety, costing. Sheet metal working, developing of surfaces. Shearing bending seam joints, safety, costing. Bench works, marking sawing, chiseling, filing, etc.

Casting of metals, the foundry, foundry sands, molding technology, melting in the foundry, cleaning, finishing and inspection. Powder metallurgy, rolling, forging process, wire drawing, extrusion, cupping and deep drawings.

ENG 021: Mechanics (A), 2 (2, 2, -)

Introduction to engineering mechanics. Vector analysis. Forces on particles and rigid bodies, equilibrium of particles and rigid bodies, forces and moments, applications on beams. Analysis of simple structures.

ENG 022: Mechanics (B), 2 (2, 2, -)

Kinematics of particles. Displacement, velocity and acceleration using scalar and vectorial methods, kinetics of particles. Newton's law, work and energy, impulse and momentum.

PREREQUISITE: ENG 021

MTH 001: Mathematics (A), 3 (2, 2, -)

Functions, limits of functions, techniques for finding limits, limits involving infinity, continuous functions, the derivative, techniques of differentiation, differentials, the chain rule, implicit differentiation applications of the derivatives, extreme of functions, the mean value theorem, optimization problems, Newton's method, anti derivative and indefinite integration, the definite integral, the fundamental theorem of calculus.

MTH 002: Mathematics (B), 3 (2, 2, -)

Applications of the definite integral, area, solids of revolution, arc length and surfaces of revolution, logarithmic and exponential functions and their derivatives, inverse trigonometric and hyperbolic functions and their derivatives and integrals, techniques of integration, integration by parts, trigonometric integrals, integrals of rational functions, reduction formulae, indetermined forms and improper integrals.

PREREQUISITE: MTH 001

PHY 001: Physics (I), 3 (3, -, 2)

Properties of Matter: physical quantities, standard units, dimensions, oscillations. Gravitation. Fluid statics, surface tension, fluid dynamics, viscosity. Elasticity, waves in elastic media, sound waves.

Heat: temperature and temperature measurement, thermal expansion, heat transfer, the first law of thermodynamics, kinetic theory of gases, entropy and the second law of thermodynamics.

PHY 002: Physics (II), 3 (3, -, 2)

Electricity and Magnetism: charge and matter, the electric field, Gauss law, electric potential, capacitors and dielectrics, current, resistance and electromotive force, the magnetic field, Ampere's law, Biot-Savart law, Faraday's law of induction, inductance, magnetic properties of matter. Maxwell's equations in integral form.

PREREQUISITE: PHY 001

CS 001: Introduction to Computer Science, 1 (-, -, 2)

Computer terminology and concepts. The history, state of the art and future of data processing Basic hardware and software concepts. The computer's effect on society, Operating Systems, DOS as an example.

CS 002: Computer Programming (A), 2 (1, -, 2)

Structured programming with the high level language PASCAL. The techniques of good programming style and how to design, code, debug, and document program laboratory assignments. Topics progress from basic PASCAL syntax and semantics to sequential non-text files. The control features, data structures, standard I/O libraries and the operators of the language.

PREREQUISITE: CS 001

ENG 003: Engineering Drawing (A), 2 (1, -, 4)

Drawing practice, graphics geometry and tangency construction, projection of bodies of simple geometric, pictorial representation and technical sketching, orthographic projection, pictorial drawing and sectioned views.

ENG 004: Engineering Drawing (B), 2 (1, -, 4)

Types of sectioned views, assembly drawing, familiarity with specifications, reading of blue prints, and interpretation of various symbols commonly used, interpretation of material lists and bills of materials.

PREREQUISITE: ENG 003

ENG 006: Production Technology (B), 3 (2, 2, -)

Welding: Joining of metals, mechanical joining, metallurgical joining, fusion welding, oxyacetylene welding and cutting, electric arc welding. power sources, TIG and MIG, argon welding, coated electrodes classifications, standards, coding systems, CO2 welding, carbon arc welding. Cold welding cladding. forge welding, electric resistance welding, diffusion welding, ultrasonic welding. Brazing, soldering, welding defects, safety, costing.

Machining processes: Theory of metal cutting, tool geometry, cutting speeds, feeds, cutting fluids, tool materials, work piece materials and properties, machinability. Machine tools classification, the lathe, description of mechanisms, turning processes. cam turning, NC & CNC machines. Shaping and planning, boring, milling.

PREREQUISITE: ENG 005

ENG 009: Production Technology Workshop (A), 1 (-, -, 6)

Practical training on the basic workshops like, machining (lathe, milling, shaping, drilling, and grinding machines). Identification of the main parts of each machine and how to select the cutting variables on each machine performance of simple exercises. Wood working; hand tools, types of wood and machines, filing. Welding; simple joints on arc welding and oxyacetylene welding. Length and angle measurements using micrometer, vernier and protractors. Sheet metal works; Cutting, Rolling, Binding and making joints on sheets. Casting; recognition of the main elements and tools used in casting and how to make a mold using a core and a pattern for a simple casting.

ENG 010: Production Technology Workshop (B), 1 (-, -, 6)

Machining: Practical training on metal cutting, operations on center lathe, milling m/c, shaper and drilling m/c, gear cutting on milling m/c. hand press and mechanical press of different capacities, shearing (blanking, piercing and deep drawing processes).

Welding: Oxyacetylene; different techniques used in oxyacetylene welding, fluxes, welding and cutting torches, prepare and make some joints, safety during welding operations. Arc welding; the main elements, different coatings, welding methods, prepare and make some joints, safety. Resistance welding; main elements, joints of different shapes. Soldering and brazing; the main differences between them and the tools used, joints by soldering.

PREREQUISITE: ENG 009



ENG 011: Technological Concepts, 1 (2, -, -)

Industry and technology. Engineering materials, standardization and interchange-ability. Material handling and storage. Energy. Pollution and waste disposal. Information systems. Report writing. Selected industries (textiles, garment, plastics, refrigeration, pumps, electric, etc.).

HUM 001: Civil Heritage, 1 (2, -, -)

Definition of Cultural heritage, its source, ups and downs, objectives and motivations. Surveying some of the scientific facts brought about by human civilization.

LNG 001: English Language (A), 1 (-, -, 3)

Cambridge English course, developing reading and listening skills. Basic technical English, from current course books and other authentic materials. English grammar in use.

LNG 002: English Language (B), 1 (-, -, 3)

Headway intermediate course, developing reading skills, authentic reading, writing skills, task listening through English material. English for technical communication.

PREREQUISITE: LNG 001

PHE 001: Physical Education and Activities (A), 0.5 (-, -, 3)

General physical education concepts and theoretical topics. Contribution to several subjects in the field including spare time uses, recreation activities, steps of building recreation activities programs in industry.

PHE 002: Physical Education and Activities (B), 0.5 (-, -, 3)

Introduction to playground injuries, and their medical treatment.

Or: Introduction to music, the main features include: .theoretical orientation, musical instruments, musical note, playing



music, training on solo and choir singing.

Or: Introduction to Plastic Arts: Appreciation of the artistic aspects of natural elements, studying the artistic effect of light and shadow, arts workshop woodwork practice, making simple original color designs on glass material, metal and leather artistic creation.

PREREQUISITE: PHE 001

ITR 001: Introduction to Industrial Training (A), 5 (-, -, 30)

The student learns to identify the various production units and the way they inter-connect in the production process. The student is also trained to operate the various pieces of machinery in order to recognize his technical inclinations as a prelude to his selection of a specialization within the institute. The student is also trained to identify the raw materials, as well as the handling, processing & machining of materials to obtain intermediate & final products.

The course Descriptions of Subjects located in different departments are located according to the following table:

Course Code	Located in
AE	Mechanical Department (Automotive)
ARE	Architectural Department
ATT	Textile Department
CHE	Chemical Department
CS	Common Subjects
CSM	Biomedical Department
CT	Civil Department
DDP	Architectural Department
EE	Electrical Department
EEC	Electrical Department
EEL	Electrical Department
EEM	Biomedical Department
EEP	Electrical Department
EET	Electrical Department
ENG	Mechanical Department
HUM	Common Subjects
LNG	Common Subjects
MDE	Biomedical Department
MDS	Biomedical Department
ME	Mechanical Department
MEE	Biomedical Department
MET	Mechanical Department
MNG	Mechanical Department
MTE	Mechanical Department (Mechatronics)
MTH	Common Subjects
PHE	Common Subjects
PHY	Common Subjects

COMMON SUBJECTS COURSE DESCRIPTION

CS 101: Computer Programming (B), 2 (1, -, 3)

This course introduces students to C++ syntax and various programming techniques such as decisions, loops, arrays, pointers, functions, file processing. The course also covers basic object-oriented concepts such as data abstraction, classes, objects, overloading, and inheritance. Students are required to complete lab assignments using a computer.

PREREQUISITE: CS 002

CS 102: Computer Aided Graphics, 1 (-, -, 3)

An introduction to computer graphics, including hardware. Programming concepts, and a survey of applications. The interactive Graphics Software will be developed in projects using the microcomputer. A component of the course will be a graphics project utilizing the BASIC programming language and AutoCAD.

PREREQUISITE: ENG 111

CS 103: Computer Applications, 2 (1, -, 3)

Computers and Chemical Engineering made new developments in the applications of computing and systems technology to chemical engineering problems. Several major areas of chemical engineering study are including:

- Process and product synthesis, analysis and design.
- Dynamic analysis and control of chemical processes.
- Design methods for chemical engineering equipment, including chemical reactors, staged separation units, chromatographic and membrane separations, etc.
- Development of novel numerical methods and applications of computational analysis for transport problems involving fluid flow, heat transfer, reaction and/or mass transfer.
- Process operations (e.g. supply chain management, integrated manufacturing systems, reliability, safety, scheduling).

CS 199: Computer Programming For Civil Eng., 2 (1, -, 4)

Principles of Programming: operating systems, storage devices and methods, organization of data, management of files, advanced applications in programming, Basic, FORTRAN.

PREREQUISITE: CS 002

CS 201: Computer Applications in Engineering, Industry, 1 (-, -, 3)

A study of the commercially available spreadsheet project management, Database and Work Processing programs as problem solving tools in an industrial Engineering Technology environment. The course should be taken early in the student's program of study so that the skills and techniques learned will be available in subsequent courses. Laboratories are scheduled on an individual self-paced basis with extensive use being made of microcomputers.

PREREQUISITE: ENG 213

CS 123: Computer Applications (I), 1 (-, -, 3)

Principle of preparing electronic drawing - methods of drawing by computers - drawing packages - numerical control machines programming - principles of PLC - overview of networks and services - Applications of LAN, WAN in engineering enterprise - overview of simulation and modeling in engineering - simulation tools in engineering - Computer aided engineering packages in different areas of mechanical engineering.

PREREQUISITE: CS 001

CS 231: Database Applications, 1 (-, -, 3)

An overview of database, what are database systems, operational data, data independences, relational systems - Architecture of database systems, the three levels of architectures, the external, conceptual and internal levels - indexing and mapping - Database administration - database management systems. Commercial database engineering packages in different fields of mechanical engineering.

CS 232: Representation of Technical Database, 1 (-, -, 3)

Technical reports specifications using spreadsheets to build chart, tables, statistical analysis. Matrix representation and homogeneous coordinates.

Introduction of computer graphics software, two dimensional drawing, transformation from 2D electronic drawing to 3D electronic drawing and vice versa, scaling, zooming and rotation – Displaying mechanical system drawing – displaying animated mechanical system – Combining text, sound, image, video and animation skills.

HUM 102: Modern Egyptian History, 1 (2, -, -)

Particular attention is given to important events determining the life of Egyptian in the twentieth century. The appearance development and growth of Egyptian middle class and its role in the national movement.

HUM 103: Islamic Civilization (I), 1 (2, -, -)

Difference between culture and civilization, Ibn Khaldun's concept of civilization, the foundation of Islamic civilization. The decline of Islamic civilization.

HUM 104: Arabic Literature, 1 (2, -, -)

Introduction to Arabic literature, students are introduced to various Arabic literature forms selected readings from representative contemporary literary figures.

HUM 201: History of Egypt Tech. Development, 1 (-, 2, -)

The development of the social, political and economic systems. The rise and development of the national movement and its role in achieving independence and democracy.

HUM 202: English Literature, 1 (-, -, 3)

Introduction to the forms of literature, short story, novel, drama and poetry. Developing students' critical ability through carefully selected sample literary texts.

PREREQUISITE: LNG201

HUM 203: Trade Law, 1 (2, -, -)

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.

HUM 204: Industrial Psychology, 1 (2, -, -)

An introduction to the history, methods and the major theories, concepts of industrial psychology. The course provides non-majors with an overview of the field of industrial psychology, while majors gain a foundation for further study.

HUM 205: Islamic Civilization (II), 1 (2, -, -)

Intellectual aspect of Islam prominent Arab and Muslim scholars and their contribution to various scientific fields mathematics, astronomy, chemistry, medicine.....etc.

HUM 206: Islamic Studies, 1 (2, -, -)

Traditions of prophet Mohamed, Islamic society in Madina, Muslims treatment of non Muslims. The role of the mosque in Islamic society.

LNG 101: English Language (C), 1 (-, -, 3)

Headway upper intermediate, developing reading --- authentic materials, ideas for a story. English for communication. Grammar.

PREREQUISITE: LNG 002

LNG 102: Technical English (A), 1 (-, -, 3)

Practice in reading technical texts related to students major. Emphasis is given to expansion of scientific terms and writing of technical reports.

PREREQUISITE: LNG 101

LNG 103: German Language (A), 1 (-, -, 3)

Beginner's course. Development of speaking ability and

mastering of German basic structures. Reading and understanding of simple texts.

LNG 104: French Language (A), 1(-, -, 3)

An elementary French course. Drill in pronunciation, elementary principles of inflection and basic sentence patterns. Reading of easy texts.

LNG 201: English (D), 1 (-, -, 3)

Language power, discovering discourse, writing academic English, Technical English.

PREREQUISITE: LNG 101

LNG 202: Technical English (B), 1 (-, -, 3)

Further development and expansion of scientific vocabulary. More emphasis is given to one writing skill, style, note-taking, outlines, summary, exposition, etc...

PREREQUISITE: LNG 102

LNG 203: German Language (B), 1 (-, -, 3)

Systematic discussion of grammatical difficulties. Oral practice and reading of more difficult texts. Practice in guided composition.

PREREQUISITE: LNG 103

LNG 204: French Language (B), 1 (-, -, 3)

Continuation of LNG 104 of intensive elementary French. Review of grammatical patterns. Expansion of conversational and written skills and vocabulary.

PREREQUISITE: LNG 104

MTH 101: Mathematics (C), 3 (2, 2, -)

Sequences, convergent or divergent series, positive terms series, convergence tests, alternating series and absolute convergence, power series, Maclaurin and Taylor series, conic

sections, rotation of axes, polar coordinates, integrals in polar coordinates, polar equations of conics, functions of several variables, limits and continuity, partial derivatives, chain rule, directional derivatives, extreme, double integrals, area and volume, double integrals in polar coordinates, change of variables and Jacobians.

PREREQUISITE: MTH 002

MTH 102: Mathematics (D), 3 (2, 2, -)

First order differential equations, separable and exact differential equations, linear differential equations, homogenous differential equations with constant coefficients, nonhomogenous differential equations, the method of undetermined coefficients, the method of variation of parameters, series solutions of differential equations, Legendre polynomials, Bessel functions, Laplace transformation, convolution theorem inverse Laplace transformation solution of initial and boundary value problems using Laplace transformation.

PREREQUISITE: MTH 101

MTH 103: Numerical Methods, 3 (2, 2, -)

Types of errors, algorithms and convergence, solutions of equations in one variable, interpolation and polynomial approximation, divided differences, central differences, inverse interpolation, numerical differentiation and integration, composite integration, Romberg integration, numerical solution of ordinary differential equations, initial value problems, Euler's method, Runge - Kutta methods, multi step methods.

PREREQUISITE: MTH 101

MTH 104: Mathematical Analysis, 3 (2, 2, -)

Complex numbers, regions in the complex plane, limits, continuity, derivative, analytic functions, Cauchy - Riemann conditions, elementary functions and mapping by them definite integral, line integrals in the complex plane, Cauchy's theorem, Cauchy's integral theorem, derivatives of analytic functions, power series, Taylor series, Laurent series, poles, singularities, residue theorem evaluation of real integrals, conformal mapping.

PREREQUISITE: MTH 002



MTH 105: Statistical Methods, 2 (2, 2, -)

Definition of statistics, frequency tables and histograms, cumulative frequency, basic statistical concepts, probability, conditional probability and independence, rules of probability, random variables and their expected values, discrete probability distributions, continuous probability distributions, bivariate & marginal probability distribution expected values of functions of random variables.

PREREQUISITE: MTH 101

MTH 110: Medical Mathematics (C), 3 (2, 2, -)

Topics include complex numbers functions of several variables. Partial derivatives. Multiple integrals vector analysis and Introduction to differential equations.

PREREQUISITE: MTH 002

MTH 111: Medical Mathematics (D), 3 (2, 2, -)

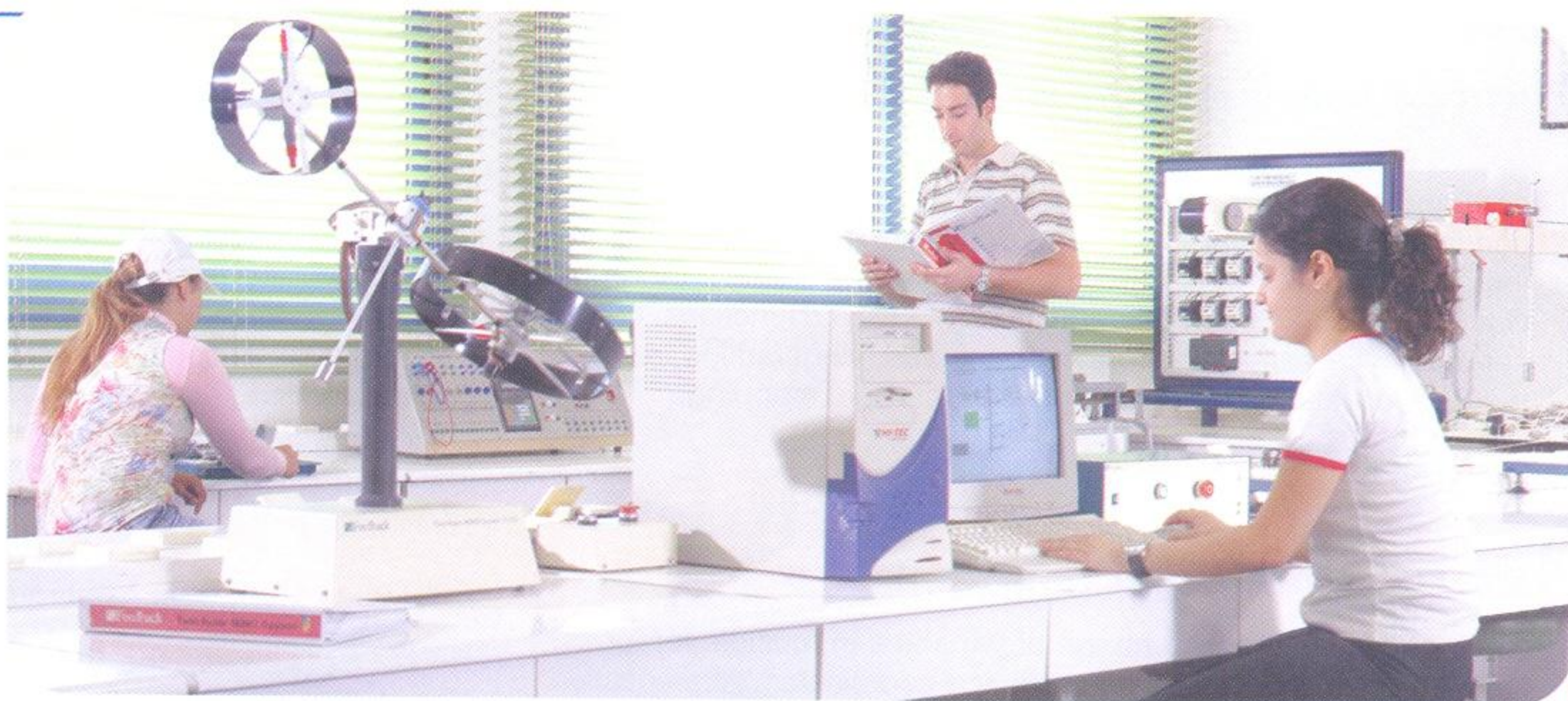
The topic includes Laplace Transform, Fourier series, and special functions and partial differential equations curve fitting and interpolation- solution of O.D.E

PREREQUISITE: MTH 110

MTH 201: Mathematics (E), 3 (2, 2, -)

Complex numbers, regions in the complex plane, limits, continuity, derivative, analytic functions, Cauchy-Riemann conditions, elementary functions and mapping by them, definite integral, line integrals in the complex plane, Cauchy's theorem, Cauchy's integral theorem, derivatives of analytic functions, power series, Taylor series, Laurent series, Poles, singularities, residue theorem, evaluation of real integrals, conformal mapping.

PREREQUISITE: MTH 102



MTH 202: Mathematics (F), 3 (2, 2, -)

Fourier series, even & odd functions, half range expansions, quarter range expansions, Fourier transformation, basic concepts of partial differential equations, D'Alembert's solution of one dimensional wave equation, method of separation of variables, heat & wave equations, Laplace's equation, Laplace transformation and Fourier transformation applied to partial differential equations.

PREREQUISITE: MTH 201

MTH 203: Numerical Analysis, 3 (2, 2, -)

Linear system of equations, Gauss elimination method, matrix inversion, norms of vectors & matrices, iterative techniques for solving linear systems, boundary value problems for ordinary differential equations, the shooting methods for linear & nonlinear problems, finite difference methods for linear & nonlinear problems, numerical solutions to partial differential equations, elliptic, parabolic & hyperbolic types.

PREREQUISITE: MTH 103

MTH 204: Statistical Analysis, 3 (2, 2, -)

Statistics and sampling distributions, the sample mean & variance, the normal approximation to the binomial distribution Hypothesis testing, two sided test of the mean, testing the variance, the chi - square test, testing of randomness, testing for goodness of fit, simple regression, probabilistic models, acceptance sampling.

PREREQUISITE: MTH 101

MTH 205: Mathematical Analysis, 3 (2, 2, -)

Complex numbers, regions in the complex plane, limits, continuity, derivative, analytic functions, Cauchy - Riemann conditions, elementary functions and mapping by them definite integral, line integrals in the complex plane, Cauchy's theorem, Cauchy's integral theorem, derivatives of analytic functions, power series, Taylor series, Laurent series, poles, singularities, residue theorem evaluation of real integrals, conformal mapping.

PREREQUISITE: MTH 101

MTH 206: Advanced Calculus, 3 (2, 2, -)

Triple integrals, change of variables in multiple integrals, triple integrals in cylindrical and spherical coordinates, differentiation of vector functions, surfaces, tangents and normal, gradient's fields, divergence and curl of vector fields, line integrals, Green's theorem, surface integrals, flux of a vector field, Gauss divergence theorem, stoke's theorem.

PREREQUISITE: MTH 101

MTH 207: Numerical Solution of Differential Equations, 3 (2, 2, -)

Numerical Solution of ordinary differential equations, methods for first order differential equations, multi step methods, methods for second order differential equations, numerical methods for elliptic partial differential equations, Neumann and mixed problems, irregular boundary, stability of the solutions, methods for parabolic equations, methods for hyperbolic equations.

PREREQUISITE: MTH 102

MTH 210: Selected Topics In Math., 3 (2, 2, -)

One or more of the following topics may be offered:

- 1) Mathematical modeling via differential & difference equations.
- 2) Discrete - Event system simulation.
- 3) Mathematical models of operations research.
- 4) Discrete mathematics.
- 5) Linear algebra.

PREREQUISITE: MTH 206

MTH 219: Pattern Recognition, 2 (2, 1, -)

Bayes decision theory: two category classification, minimum error rate classification, classifiers, discriminant function and decision surfaces, discriminant function for the normal density, Bayesian decision theory- the discrete case, nonparametric technique, density estimation, Parzen windows, k-nearest neighbor estimation- Fisher linear discriminant analysis. Linear discriminant function: generalized linear discriminant function, minimizing the perceptron criterion function, relaxation procedure, minimum squared error procedure, linear programming procedure.

MTH 284: Statistical Analysis, 2 (2, 1, -)

Probability theory: probability, conditional and joint probability, probability density distribution functions, stationary & non-stationary random variables, ergodic random variables, auto & cross correlation statistics mean and variance, histograms, hypothesis, analysis of variance, discriminate analysis, decision making, regression analysis and curve fitting .

PREREQUISITE: MTH 111

PHE 101: Physical Education & Activities (C), 0.5 (-, -, 3)

Movement laws. Bio-mechanic: kinds of elevators, motivation rules, muscle stress.

PREREQUISITE: PHE 002

PHE 102: Physical Education & Activities (D), 0.5 (-, -, 3)

Physical education and physical effort: the energy production systems, sports drinks, the environmental conditions and its effect on sports activities.

PREREQUISITE: PHE 101

PHE 103: Physical Education & Activities (E), 0.5 (-, -, 3)

Physical education and technology. The use of modern technology in physical education systems, and premises.

Or: Introduction to Dramatic Arts: Origin and development of dramatic art vocal training and oral performance character representation dealing with the audience study of different dramatic forms play acting.