

**DEPARTMENT OF HUMANITIES AND SCIENCES**

**B.TECH.**

**ACADEMIC SESSION 2016-2017**



**YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY**



## **YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

### **VISION**

YMCA University of Science and Technology aspires to be a nationally and internationally acclaimed leader in technical and higher education in all spheres which transforms the life of students through integration of teaching, research and character building.

### **MISSION**

- To contribute to the development of science and technology by synthesizing teaching, research and creative activities.
- To provide an enviable research environment and state-of-the art technological exposure to its scholars.
- To develop human potential to its fullest extent and make them emerge as world class leaders in their professions and enthuse them towards their social responsibilities



## **DEPARTMENT OF HUMANITIES AND SCIENCES**

### **VISION**

A department that can effectively harness its multidisciplinary strengths to create an academically stimulating atmosphere; evolving into a well-integrated system that synergizes the efforts of its competent faculty towards imparting intellectual confidence that aids comprehension and complements the spirit of inquiry.

### **MISSION**

- To create well-rounded individuals ready to comprehend scientific and technical challenges offered in the area of specialization.
- To counsel the students so that the roadmap becomes clearer to them and they have the zest to turn the blueprint of their careers into a material reality.
- To encourage critical thinking and develop their research acumen by aiding the nascent spirit for scientific exploration.
- Help them take economic, social, legal and political considerations when visualizing the role of technology in improving quality of life.
- To infuse intellectual audacity that makes them take bold initiatives to venture into alternative methods and modes to achieve technological breakthroughs.

## **B.TECH (1<sup>st</sup> YEAR)**

### **PROGRAMME EDUCATIONAL OBJECTIVES**

- To provide students with a sound foundation in the mathematical, scientific and engineering concepts necessary to formulate, solve and analyze engineering problems
- To prepare students for successful careers in industry that meet the needs of local, Indian and multinational companies
- Students will demonstrate their ability to adapt to a rapidly changing environment equipped with new skills and technologies.
- To motivate students towards life-long learning and to introduce them to codes of professional practice, ethics and prepare them for higher studies

### **PROGRAM OUTCOMES**

After completion of the program, students will:

- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD**

**PROPOSED SCHEME OF STUDIES & EXAMINATIONS  
B.TECH 1<sup>ST</sup> YEAR (SEMESTER – I) CE/ IT/ MECH ENGINEERING (2016-2017)**

	Course No	Course Title	Teaching Schedule			Marks For Sessionals	Marks for End Term Examination		TOTAL MARKS	CREDITS
			L	P	TOTAL		THEORY	PRACTICAL		
BSC	HAS-101	Physics-I	4	0	4	40	60	-	100	4
	HAS-103	Mathematics-I	4	0	4	40	60	-	100	4
	HAS-105	Chemistry	4	0	4	40	60	-	100	4
	HAS-109	Physics Lab-I	0	2	2	30	-	20	50	1
	HAS 114	Chemistry Lab	0	2	2	30	-	20	50	1
AEC	MGMT-101	Fundamentals of Management	4	0	4	40	60	-	100	4
	HAS-107	Environmental Studies	4	0	4	40	60	-	100	4
BEC	E-101	Elements of Electronics Engineering	4	0	4	40	60	-	100	4
	MU-101A	Basics of Mechanical Engineering	4	0	4	40	60	-	100	4
	MU-102A	Basics of Mechanical Engineering Lab	0	2	2	30	-	20	50	1
	MU- 104	Workshop-I	0	8	8	60	-	40	100	4
		Total	28	14	40	430	420	100	950	35

**YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD**

**PROPOSED SCHEME OF STUDIES & EXAMINATIONS  
B.TECH 1<sup>ST</sup> YEAR (SEMESTER –II) CE/IT/ MECH ENGINEERING (2016-2017)**

	Course No	Course Title	Teaching Schedule			Marks For Sessionals	Marks for End Term Examination		TOTAL MARKS	CREDITS
			L	P	TOTAL		THEORY	PRACTICAL		
BSC	HAS-102	Physics-II	4	0	4	40	60	-	100	4
	HAS-104	Mathematics-II	4	0	4	40	60	-	100	4
	HAS-110	Physics Lab-II	0	2	2	30	-	20	50	1
AEC	HAS-111	English for Engineers	4	0	4	40	60	-	100	4
	HAS 112	Language lab	0	2	2	30	-	20	50	1
BEC	E-105	Electrical Technology	4	0	4	40	60	-	100	4
	CE-101	Fundamentals of Computer & Programming with C	4	0	4	40	60	-	100	4
	MU-103A	Engineering Drawing	0	4	4	60	40	-	100	2
	CE-103	Fundamentals of Computer & Programming with C Lab	0	2	2	30	-	20	50	1
	E-109	Electrical Technology Lab	0	2	2	30	-	20	50	1
	MU-105	Workshop- II	0	8	8	60	-	40	100	4
		Total	20	20	40	440	340	120	900	30

**YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD**

**PROPOSED SCHEME OF STUDIES & EXAMINATIONS  
B.TECH 1<sup>ST</sup> YEAR (SEMESTER – I) ECE/ EIC/ EL ENGINEERING (2016-2017)**

	Course No	Course Title	Teaching Schedule			Marks For Sessionals	Marks for End Term Examination		TOTAL MARKS	CREDITS
			L	P	TOTAL		THEORY	PRACTICAL		
BSC	HAS-101	Physics-I	4	0	4	40	60	-	100	4
	HAS-103	Mathematics-I	4	0	4	40	60	-	100	4
	HAS-109	Physics Lab-I	0	2	2	30	-	20	50	1
AEC	HAS-111	Essentials of Communication	4	0	4	40	60	-	100	4
	HAS-112	Language lab	0	2	2	30	-	20	50	1
BEC	E-105	Electrical Technology	4	0	4	40	60	-	100	4
	CE-101	Fundamentals of Computer & Programming with C	4	0	4	40	60	-	100	4
	MU-103A	Engineering Drawing	0	4	4	60	-	40	100	2
	CE-103	Fundamentals of Computer & Programming with C Lab	0	2	2	30	-	20	50	1
	E-109	Electrical Technology Lab	0	2	2	30	-	20	50	1
	MU-104	Workshop-I	0	8	8	60	-	40	100	4
		<b>Total</b>	20	18	38	410	300	140	900	30

**YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD**

**PROPOSED SCHEME OF STUDIES & EXAMINATIONS  
B.TECH 1<sup>ST</sup> YEAR (SEMESTER – II) ECE/ EIC/ EL ENGINEERING (2016-2017)**

	Course No	Course Title	Teaching Schedule			Marks For Sessionals	Marks for End Term Examination		TOTAL MARKS	CREDITS
			L	P	TOTAL		THEORY	PRACTICAL		
BSC	HAS-102	Physics-II	4	0	4	40	60	-	100	4
	HAS-104	Mathematics-II	4	0	4	40	60	-	100	4
	HAS-105	Chemistry	4	0	4	40	60	-	100	4
	HAS-110	Physics Lab-II	0	2	2	30	-	20	50	1
	HAS-114	Chemistry Lab	0	2	2	30	-	20	50	1
AEC	HAS-107	Environmental Studies	4	0	4	40	60	-	100	4
	MGMT-101	Fundamentals of Management	4	0	4	40	60	-	100	4
BEC	E-101	Elements of Electronics Engineering	4	0	4	40	60	-	100	4
	MU-101A	Basics of Mechanical Engineering	4	0	4	40	60	-	100	4
	MU-102A	Basics of Mechanical Engineering Lab	0	2	2	30	-	20	50	1
	MU-105	Workshop- II	0	8	8	60	-	40	100	4
		Total	28	12	40	400	420	80	950	35



**B. TECH. SEMESTER I**  
**CODE: HAS- 101**  
**SUBJECT NAME: PHYSICS I**  
**NO. OF CREDITS: 4**

L	T	P
4	0	0

SESSIONAL	: 40
THEORY EXAM	: 60
TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**COURSE OBJECTIVE**

An introduction to general optical physics with topics to include interference, diffraction, polarization, fiber optics, lasers. The second part consists of theory of relativity, electrostatics and superconductivity.

**SYLLABUS**

**Part –A**

**INTERFERENCE**

Coherent sources, conditions for sustained interference. Division of Wave-Front - Fresnel's Biprism, Division of Amplitude- Wedge-shaped film, Newton's Rings, Michelson Interferometer, applications (Resolution of closely spaced spectral lines, determination of wavelengths), Elastic property of glass by Newton rings method

**DIFFRACTION**

Difference between interference and diffraction Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a single slit, Plane transmission diffraction grating, application of grating as a device, absent spectra, dispersive power, resolving power and Rayleigh criterion of resolution.

**Part- B**

**POLARISATION**

Polarised and unpolarised light, Uniaxial crystals double refraction, Nicol prism, quarter and half wave plates, Detection and Production of different types of polarized light, Polarimetry; Optical and specific rotation, Biquartz and Laurent's half shade polarimeter.

## **LASER AND FIBRE OPTICS**

Spontaneous and Stimulated emission, Laser action, characteristics of laser beam-concept of coherence, spatial and temporal coherence , He-Ne and semiconductor lasers (simple ideas), applications

Propagation of light in optical fibres, numerical aperture, V-number, single and multimode fibres, attenuation, dispersion, applications

### **Part -C**

## **ELECTROSTATICS AND ELECTRODYNAMICS**

Dielectric polarization, dielectric relaxation process, types of polarization, relation between E,P and D, Gauss's law in the presence of a dielectric, Energy stored in a uniform electric field, dielectric losses and variation with frequency.

### **Part-D**

## **SPECIAL THEORY OF RELATIVITY**

Galilean transformations, Michelson's Morley Experiment, Postulates of Special Theory of Relativity, Lorentz transformations, Consequences of LT (length contraction and time dilation), addition of velocities, variation of mass with velocity, mass energy equivalence.

## **SUPERCONDUCTIVITY**

Introduction (Experimental survey), Meissner effect, London equations, Hard and Soft superconductors, Elements of BCS Theory, Applications of superconductors

## **COURSE OUTCOMES**

- Knowledge of the Fundamentals of optical Physics
- Explain wave propagation of light, interference, diffraction, and polarization of light waves, and the electromagnetic nature of light.
- Proficiency in solving problems in Special theory of Relativity.
- Developing interest in the field of superconductivity.
- Understand the Utilization of laser technology in various disciplines and also understand the concept of optical fiber and its applications.

## **TEXT BOOKS**

- Perspectives of Modern Physics - Arthur Beiser (TMH)
- Optics - AjoyGhatak (TMH)
- Modern Physics for Engineers – S.P.Taneja (R. Chand)
- Engineering Physics – SatyaPrakash (PragatiPrakashan)
- Modern Engineering Physics – A.S.Vasudeva (S. Chand)
- Engineering Physics (vol-1)- S.L. Gupta

## REFERENCES

- Fundamentals of Physics – Resnick & Halliday (Asian Book)
- Introduction to Electrodynamics – D.J. Griffith (Prentice Hall)

### B. TECH. SEMESTER II

CODE: HAS- 102

SUBJECT NAME: PHYSICS II

NO. OF CREDITS: 4

L	T	P	SESSIONAL	: 40
4	0	0	THEORY EXAM	: 60
			TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

### COURSE OBJECTIVE:

This course introduces basic principles of crystal structure along with the defects. Emphasis is placed on the shortcoming of classical physics at the turn of the century leading to the discoveries of the modern era. The concepts of quantum mechanics and solid state serve as the foundation stone for the course. Extensions of these topics will include the modern view of the atom, wave particle duality of light, distribution of atoms, magnetism, and conductivity. Through this course students will able to know the overview about Nanotechnology

### SYLLABUS

#### PART A

#### CRYSTAL STRUCTURE

Space lattice, unit cell and translation vector, Miller indices, simple crystal structure, Laue's treatment to Bragg's law, powder method, Point defects in solids – Schottky and Frenkel defects. Bonding in solids- Ionic and covalent bonds, Introduction to liquid crystals and applications.

#### QUANTUM PHYSICS

Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts. Black Body radiations Discovery of Planck's constant, phase velocity and group velocity. Schrodinger

wave equations-time dependent and time independent, Expectation value, Ehrenfest Theorem, particle in a one-dimensional box. Quantum Statistics (Bose-Einstein and Fermi-Dirac Statistics).

## **PART B**

### **NANOMATERIALS AND APPLICATIONS**

Nanomaterials: Introduction , synthesis of nanoparticles,, properties of nanoparticles-Mechanical, optical, magnetic and electronic; Carbon nanotubes-types of nanotubes , synthesis and uses of nanotubes; Applications of nanotechnology.

### **FREE ELECTRON THEORY**

Elements of classical free electron theory and its limitations. Drude's theory of conduction, quantum theory of free electrons. Fermi level, density of states. Fermi-Dirac distribution function. Concept of thermionic emission.

## **PART C**

### **BAND THEORY OF SOLIDS**

Origin of energy bands, Kronig-Penny model (qualitative), E-K diagrams, Brillouin Zones, concept of effective mass and holes. Classification of solids into metals, semiconductors and insulators, Fermi energy and its variation with temperature, Hall Effect and its applications

### **PHOTOCONDUCTIVITY&PHOTOVOLTAICS**

Photoconductivity in insulating crystal, variation with illumination, effect of traps, application of photoconductivity, photovoltaics cells, solar cell and its characteristics, storage of solar energy

## **PART D**

### **ELEMENTARY REACTOR TECHNIQUES**

Radiation detectors: cloud chamber, bubble chamber, Operation and working of nuclear reactor, Reactor safety measures, nuclear cross-section, fission, fusion, impact parameter, reactor fuels

### **Program Outcomes:**

At the completion of this course, students will be able to:

- Describe the behavior of and make predictions regarding the phenomena of the physical world.
- Apply fundamental principles of physics to solve problems related to quantum mechanics, solid state, magnetism and photoconductivity.

- Be able to know about the fundamental concepts of nano technology and its applications in various field.

**Text Books:**

1. Perspectives of Modern Physics - Arthur Beiser (TMH)
2. Optics - Ajoy Ghatak (TMH)
3. Modern Physics for Engineers – S.P.Taneja (R. Chand)
4. Engineering Physics – SatyaPrakash (Pragati Prakashan)
5. Modern Engineering Physics – A.S.Vasudeva (S. Chand)
6. Engineering Physics (vol-1)- S.L. Gupta

**Reference Books:**

1. Fundamentals of Physics – Resnick & Halliday (Asian Book)
2. Introduction to Electrodynamics – D.J. Griffith (Prentice Hall)
3. Nuclear Physics- D.C. Tayal(Himalaya Publishing House)

**B. TECH. SEMESTER I**

**CODE: HAS- 103**

**SUBJECT NAME: MATHEMATICS I**

**NO. OF CREDITS: 4**

L	T	P
4	0	0

SESSIONAL	: 40
THEORY EXAM	: 60
TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**COURSE OBJECTIVES**

To gain knowledge about: Laplace Transform, Vector Calculus, Double Integral, Triple Integral, Infinite series and partial differential equation.

**SYLLABUS**

**PART-A**

**MATRICES AND ITS APPLICATIONS**

Rank of Matrix, Normal form, Inverse using Gauss-Jordon method, Consistency of linear system of equations using Rank method, Linear and Orthogonal transformation, Linear-dependence and Linear- Independence of Vectors, Eigen-Values and its properties, Eigen-Vectors, Cayley-Hamilton theorem & its applications, Diagonalisation of Matrices, Similar Matrices ,Quadratic Forms.

## **PART-B**

### **APPLICATIONS OF DERIVATIVES**

Taylor's & Maclaurin's Series for one variable, Asymptotes, Curvature, Radius of Curvature for Cartesian, Parametric and Polar-curves, Radius of curvature at the Origin (by using Newton's method, by method of Expansion), Center of curvature.

### **PARTIAL DIFFERENTIATION AND ITS APPLICATIONS**

Functions of two or more variables, Partial derivatives of 1st and higher order, Total differential and differentiability, Euler's theorem for Homogeneous functions, Derivatives of Composite and Implicit functions, Jacobians, Taylor's series for functions of two variables, Maxima-Minima of functions of two variables. Lagrange's Method of undetermined multipliers, Differentiation under the integral sign (Leibnitz rule).

## **PART-C**

### **DOUBLE AND TRIPLE INTEGRATIONS**

Double integral, Change of Order of Integration, Double integral in Polar co-ordinates, Applications of double integral to find (i) Area enclosed by plane curves (ii) Volume of solids of revolution, Triple Integral, Change of variables, Volume of solids, Beta & Gamma functions and relation between them.

### **VECTOR CALCULUS**

Differentiation of vectors, Scalar and Vector-point functions, Gradient of a scalar field and directional derivatives, Divergence and Curl of a vector field and their physical interpretations, Integration of vectors, line integral, Surface integral, Volume integral, Green's theorem, Stoke's theorem, Gauss-Divergence theorem with their simple applications.

### **COURSE OUTCOMES:**

- Apply the knowledge of Mathematics in Physical sciences and Engineering.
- Identify, formulate and solve Engineering problems.
- Modeling of Physical Problems to Mathematical problems.
- Acquire knowledge of Matrix Algebra, Determinants and their applications in engineering subjects.
- Acquire knowledge about Advance Calculus.
- Acquire knowledge about Series solution of Differential equations.
- Acquire knowledge about orthogonal polynomials and their Properties.
- Acquire knowledge about Gamma and Beta function, error function.

### **TEXT BOOKS**

- B.S.Grewal, Higher Engg. Mathematics, Khanna Publications.
- Reena Garg, R S Goel, Deepankar Sharma, Engg. Mathematics-I, Khanna Publications

## REFERENCES

- Advanced Engineering Mathematics, Erwin Kreyzig
- Advanced Engineering Mathematics, Dr. Babu Ram, Pearsons publications

## B. TECH. SEMESTER II

CODE: HAS- 104

SUBJECT NAME: MATHEMATICS II

NO. OF CREDITS: 4

L	T	P
4	0	0

SESSIONAL	: 40
THEORY EXAM	: 60
TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

### COURSE OBJECTIVES:

To gain knowledge about: Ordinary Differential Equations, Laplace Transform, Partial Differential Equations, and Vector Calculus

## SYLLABUS

### PART-A

#### ORDINARY DIFFERENTIAL EQUATION AND ITS APPLICATIONS

Exact differential equation of first order, Equations reducible to exact differential equation, differential equation of second and higher order, Complete solutions = Complementary Function + Particular Integral, Method of variation of parameter to find Particular Integral, Cauchy's and Legendre's linear Equation, Simultaneous linear equations with constant co-efficient, Application of linear differential equations to Electric circuits, Newton's law of cooling, Heat flow , Orthogonal trajectory.

#### Part B

#### LAPLACE-TRANSFORMS AND ITS APPLICATIONS

Laplace-transforms of elementary functions, Elementary properties of Laplace-transforms, Existence conditions, transforms of derivatives, Transforms of Integrals, Multiplications by  $t^n$ , division by  $t$ , Evaluation of integrals by Laplace –transforms, Laplace-transforms of Unit-step function, unit-impluse function and periodic function, Second shifting Theorem , Inverse transforms, Convolution theorem, Applications to linear differential equations to solve boundary value problems with constants coefficients and simultaneous linear differential equations with constant coefficients.

## **PARTIAL DIFFERENTIAL EQUATION**

Formation of partial-differential equations. Lagrange's linear partial –differential equations. First order non-linear partial differential. equations, Charpit's method. Homogeneous Partial-differential equation of second and higher order.

### **Part C**

#### **INFINITE SERIES**

Convergence and divergence of infinite series, Comparison Test , D'Alembert's Ratio Test, Gauss Test, Raabe's test, Logarithmic Test, Cauchy's Root Test, Alternating series, Conditional convergence & absolute convergence.

#### **Text Books:**

- B.S.Grewal - Engg. Mathematics
- H.C.Taneja - Engg. Mathematics
- R.S. Goyal - Engg. Mathematics
- Babu Ram -Engg. Mathematics

#### **Course Outcome:**

- Acquire knowledge about Differential Equations( Ordinary and Partial)
- Acquire knowledge about solving Differential Equations.
- Acquire knowledge Vector Calculus.
- Acquire knowledge about Laplace Transform.

### **B. TECH. SEMESTER I/II**

**CODE: HAS -105**

**SUBJECT NAME: CHEMISTRY**

**NO. OF CREDITS: 4**

L    T    P  
4    0    0

SESSIONAL            : 40  
THEORY EXAM        : 60  
TOTAL                    : 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

L T P  
4 0 0

Sessional: 40 Marks  
Theory : 60 Marks  
Total : 100 Marks



To apply the fundamental knowledge of Chemistry in engineering and technology and to analyze it with experiments.

#### **UNIT-1: POLYMERS AND POLYMERIZATION:**

Introduction & Classification of polymers. effect of structure on properties of polymers, Bio degradable polymers, preparation, properties and technical application of thermo-plastics ( PVC, PE, Teflon ) & thermosets ( PF,UF), elastomers (SBR,BUNA-N), Silicones, Introduction to polymeric composites.

#### **UNIT-2:PHASE RULE:**

Terminology, Derivation of Gibb's phase rule. One component system ( H<sub>2</sub>O system, Sulphur system), two components systems: Simple eutectic system (Pb – Ag), system with congruent melting point (Zn – Mg), Cooling curves.

#### **UNIT-3:WATER AND ITS TREATMENT Part – I:**

Sources of water, impurities in water, hardness of water and its determination, (EDTA method) units of hardness, alkalinity of water and its determination, Related numerical problems, Problems associated with boiler feed water: scale and sludge formation, Priming and foaming, Boiler corrosion & Caustic embrittlement.

#### **UNIT-4:WATER AND ITS TREATMENT Part – II:**

Treatment of water for domestic use: coagulation, sedimentation, filtration and disinfection. Water softening : Lime-Soda treatment, Zeolite, Ion – exchange process, Mixed bed demineralization, Eutrophication, Desalination (Reverse Osmosis, Electrodialysis).

#### **UNIT-5:CORROSION AND ITS PREVENTION:**

Mechanism of Dry and wet corrosion (rusting of iron), types of corrosion, galvanic corrosion, differential aeration corrosion, stress corrosion. Factors affecting corrosion, preventive measures (proper design, Cathodic and Anodic protection, Protective coatings), Soil corrosion, Microbiological Corrosion.

#### **UNIT-6-LUBRICATION AND LUBRICANTS:**

Introduction, mechanism of lubrication, classification of lubricants. Additives for lubricants. Properties of lubricants ( Flash & Fire point, Saponification number, Iodine value, Acid value, Viscosity and Viscosity index Aniline point, Cloud point and pour point ).

#### **UNIT-7-: FUELS**

Definition and characteristics of a good fuel, Classification of fuels with suitable examples, Definition and determination of calorific value of a fuel with the help of bomb calorimeter, Proximate and Ultimate analysis of a fuel and its importance, Merits and demerits of gaseous fuel over other varieties of fuel, Composition properties and uses of (i) Water gas (ii) Oil gas (iii) Biogas (iv) LPG (v) CNG

## **UNIT-8: INSTRUMENTAL METHODS OF ANALYSIS :**

Principle and application of Thermal methods of Analysis. (TGA, DTA, DSC), Basic concepts of spectroscopy, Absorption and Emission spectroscopy Different spectroscopic Techniques ( UV-Visible and IR spectroscopy ) elementary discussion on Flame photometry.

### **Course Outcomes:**

After successful completion of this course, the student would be able to :

- Illustrate the basic parameters of water, different water softening processes and effect of hard water in industries.
- Describe the basic properties and application of various polymers as an engineering material.
- Demonstrate the mechanism, physical and chemical properties of lubricants and their applications.
- Apply instrumental techniques of chemical analysis.

### **Books recommended**

1. Engineering Chemistry , P.C. Jain, Monica Jain ( Dhanpat Rai & Co )
2. Chemistry in Engineering & Tech , Vol. I & II , Kuriacose ( TMH)
3. Instrumental methods of Chemical analysis, MERITT & WILLARD( EAST -WEST press)
4. Physical Chemistry , P.W Atkin ( ELBS, OXFORD Press)
5. Physical Chemistry W.J.Moore ( Orient Longman )

**B. TECH. SEMESTER I/II  
CODE: HAS- 107**

**SUBJECT NAME: ENVIRONMENTAL STUDIES**

**NO. OF CREDITS: 4**

L	T	P	SESSIONAL	: 40
4	0	0	THEORY EXAM	: 60
			TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**COURSE OBJECTIVES:**

The prime objective of the course is to provide the students a detailed knowledge on the threats and challenges to the environment due to developmental activities. The students will be able to identify the natural resources and suitable methods for their conservation and sustainable development. The focus will be on awareness of the students about the importance of ecosystem and biodiversity for maintaining ecological balance. The students will learn about various attributes of pollution management and waste management practices. The course will also describe the social issues both rural and urban environment and environmental legislation.

**SYLLABUS**

**UNIT 1: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

Definition, scope and importance. Need for public awareness.

**UNIT 2: NATURAL RESOURCES**

**Renewable and non-renewable resources:**

Natural resources and associated problems.

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- Mineral resources: Use and exploitation, environmental effects of extracting and mineral resources, case studies.  
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources. Case studies.

- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

### **UNIT 3: ECOSYSTEMS**

- Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers.
- Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:
  - a) Forest ecosystem
  - b) Grassland ecosystem
  - c) Desert ecosystem
  - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

### **UNIT 4: BIODIVERSITY AND ITS CONSERVATION**

- Introduction – Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels.
- India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

### **UNIT 5: ENVIRONMENTAL POLLUTION**

#### Definition

- Causes, effects and control measures of :Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

## **UNIT 6: SOCIAL ISSUES AND THE ENVIRONMENT**

- From Unsustainable to Sustainable development Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products.
- Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation
- Public awareness.

## **UNIT 7: HUMAN POPULATION AND THE ENVIRONMENT**

- Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.

## **UNIT 8: FIELD WORK**

- Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc.

## **COURSE OUTCOMES**

Upon completion of this course, a fully-engaged student will be able to:

- Understand / evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development.
- Introduce the thinking about environmental issues from an interdisciplinary perspective.
- Identify and relate about the renewable and non-renewable resources, their importance and ways of conservation to sustain human life on earth.
- Know about the concepts of ecosystem and its function in the environment, the need for protecting the producers and consumers in various ecosystems and their role in the food web.
- Recognize, relate and become sensitive to the effects of pollution and will be able to contribute his learning's towards their prevention or mitigation.

- Describe the social issues along with the trends of human population growth and the possible means to combat the challenges.

**TEXT BOOKS:**

- Perspectives in Environmental Studies by A. Kaushik and C. P. Kaushik, New age international publishers.
- Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi

**REFERENCE BOOKS:**

- Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
- Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt Ltd.
- Environmental Science by Daniel B. Botkin& Edwards A. Keller, Wiley INDIA edition.
- Fundamentals of Ecology by Odum, E.P., Barrick, M. and Barret, G.W.Thomson Brooks/Cole Publisher, California, 2005.

**B. TECH. SEMESTER II**

**HAS- 109**

**PHYSICS LAB – I**

**NO. OF CREDITS: 1**

L	T	P	SESSIONAL	: 30
0	0	2	THEORY EXAM	: 20
			TOTAL	: 50

**Course Objective:**

A physics lab reinforces the theory class with required physics lab experiments to stress the fundamental concepts of physics. Optical experiments, which will establish the fundamental interference, diffraction phenomena which will be clearly visualized with the experiment mentioned the syllabus.

**LISTS OF EXPERIMENTS:**

1. To find the wavelength of sodium light by Newton's rings experiment.
2. To find the wavelength of sodium light by Fresnel's biprism experiment.

3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To find the refractive index and Cauchy's constants of a prism by using spectrometer.
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the pitch of a screw using He-Ne laser
8. To find the specific rotation of sugar solution by using a polarimeter.
9. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.
10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor.
11. To study the photo-conducting cell and hence to verify the inverse square law.
12. To find the temperature co-efficient of resistance by using platinum resistance thermometer and Callender and Griffith bridge.
13. To find the frequency of A.C. mains by using Sonometer.
14. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.

**Note :**

- (i) The experiments in Ist semester will be based mainly upon Optics, Electrostatics,
- (ii) Students will be required to perform at least 10 experiments out of the list.

**Course Outcomes:**

- The students can able to determine the wavelength of different colour using different instruments.
- The students can able to find the frequency using different apparatus and handle other fundamental apparatus.

**Recommended Book:**

1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan)

**B. TECH. SEMESTER II**

**HAS- 110**

**PHYSICS LAB – II**

**NO. OF CREDITS: 1**

L	T	P	SESSIONAL	: 30
0	0	2	THEORY EXAM	: 20
			TOTAL	: 50

**COURSE OBJECTIVE:**

To develop the domain knowledge in the fields of physics and to extend knowledge and processes used by physics have produced new and exciting technologies that are in everyday use.

**CONTENT:**

- To find the low resistance by Carey - Foster's bridge.
- To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box.
- To find the value of high resistances by Substitution method.
- To find the value of high resistances by Leakage method.
- To study the characteristics of a solar cell and to find the fill factor.
- To find the value of  $e/m$  for electrons by Helical method.
- To find the ionization potential of Argon/Mercury using a thyratron tube.
- To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
- To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
- To find the value of Planck's constant by using a photo electric cell.
- To find the value of coefficient of self-inductance by using a Rayleigh bridge.
- To find the value of Hall Co-efficient of semi-conductor.
- To study the V-I characteristics of a p-n diode.
- To find the band gap of intrinsic semi-conductor using four probe method.
- To calculate the hysteresis loss by tracing a B-H curve.

**PROGRAMME OUTCOME:**

On successful completion of this course, students should be able to



- To demonstrate competency and understanding of the basic concepts found in core physics courses mechanics, quantum mechanics, magnetic properties, photoconductivity and modern physics.
- To utilize the scientific method for formal investigation and to demonstrate competency with experimental methods that are used to discover and verify the concepts related to content knowledge

**RECOMMENDED BOOKS :**

- Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
- Practical Physics – S.L.Gupta& V.Kumar (Pragati Prakashan).
- Advanced Practical Physics Vol. I& II – Chauhan & Singh (Pragati Prakashan).

**B. TECH. SEMESTER I/II**

**CODE: HAS -111**

**SUBJECT NAME: English for Engineers (EE)**

**NO. OF CREDITS: 4**

L	T	P	SESSIONAL	: 40
4	0	0	THEORY EXAM	: 60
			TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**Objective:**

It aims to inculcate interest towards literary pursuits and creative writing in students. Their imaginative faculties will be harnessed for the purpose of originality and ability to think independently. Furthermore, the aim is to enhance their critical thinking and develop aptitude for formal writing and oral discussions. They are guided and given exercises to improve their vocabulary during the course, simultaneously through classroom and lab exercises the students gain confidence in their own ability to express their thoughts and articulate ideas.

**Unit –I- COMPREHENSION & COMPOSITION**

Excerpt from John Updike's *Cosmic Gall*; Paragraphs/Essays; Unseen Passage & Comprehension exercises derived from features, articles and editorials; exercises in creative writing and impromptu/extempore speech; Anecdotes/stories; Deconstructing & Re-framing Quotes; Verse composition; Dialogue-writing; Story-building and storyboards; travelogue.

## **Unit-II-TECHNICAL WRITING**

Format of Long Reports, Interoffice Memorandum, Format and layout of a typical business letter; Covering letter and Resume; Analytical and Descriptive writing.

## **Unit –III- SEMANTICS & SYNTAX**

One-word substitutes, Idioms & Proverbs, Vocabulary building; Crosswords, Sentence Correction/Editing.

## **Unit-IV: CORPORATE INTERACTION & COMMUNICATION**

Presentations; drafting and creating effective presentations; drafting speeches ; taking interviews; preparing for interviews; brainstorming for Group Discussions, declamations and debates; , Corporate Dialogue: Conflict-Resolution exercises; Role Play.

### **COURSE OUTCOMES:**

- Students are equipped with a better vocabulary, confidence to express themselves and must show remarkable interest in conveying their ideas by the end of the course.
- Students will learn creative writing.
- Students will learn basic formal writing.
- ‘Student-centric’ exercises with the emphasis on interpersonal communication skills will give the students greater confidence in their ability to communicate and persuade.

### **References:**

- National dailies like *Hindu*, *HT*, *TOI*, *Tribune* (e-versions available)
- Magazines like *NatGeo*, *Outlook*, *India Today*
- Raman, Meenakshi and Sangeeta Sharma. *Technical Communication*. Oxford: 2011
- Wehmeier, Sally .*Oxford Advanced Learner’s Dictionary*. Oxford UP.8<sup>th</sup> edition.
- Ghosh, BN. *Managing Soft Skills for Personality Development*. Tata McGraw-Hill 2012
- Rizvi, M Ashraf. *Effective Technical Communication*. Tata Mc Graw-Hill.2005
- Bretag, Crossman and Bordia. *Communication Skills*. Tata Mc Graw-Hill.2009
- Blogs: Eng\_lessons\_dj.blogspot.com
- Renaissanceymcaust.blogspot.com

**B. TECH. I / II SEMESTER**  
**HAS- 112**  
**LANGUAGE LAB**  
**NO. OF CREDITS: 1**

L	T	P	SESSIONAL	: 30
0	0	2	THEORY EXAM	: 20
			TOTAL	: 50

**Objective:** To guide the students to improve their conversational and linguistic skills including better command over spoken English. Introduce students to various scenarios to help them opt for appropriate responses on interpersonal level.

**CORPORATE INTERACTION & COMMUNICATION**

- I. Presentations
- II. Listening Skills & Language Lab (Practical) Interviews of Isaac Asimov, Richard Feynman, Steve Jobs and other scientists and technocrats. Other inspiring speeches on social issues as well as related to the corporate world and industry; Audio/Video Lessons and Observation
- III. Group Discussions, Corporate Dialogue: Conflict-Resolution exercises; Role Play; Mock-interviews.
- IV. Internal Assessment: based on participation, short presentation & performance in interactive exercises: competence gauged through participation in various events organized in the classroom and at university level throughout the semester.

**Outcome:**

- The students will be trained to respond better to new scenarios that demand good communication skills.
- The students will be able to resolve potential conflicts by avoiding communication gaps and overcoming barriers.
- Students will learn to use skills effectively for enhancing performance and even improving upon their power to persuade.

**References:**

- Language Lab Software(subject to availability)
- PPTs

**B. TECH. SEMESTER I/II**  
**HAS- 114**  
**CHEMISTRY LAB**  
**NO. OF CREDITS: 1**

L	T	P	SESSIONAL	: 30
0	0	2	THEORY EXAM	: 20
			TOTAL	: 50

**Course Objectives:**

To apply fundamental knowledge of practical chemistry to engineering and technology

**LIST OF EXPERIMENTS**

1. Determination of Ca<sup>++</sup> and Mg<sup>++</sup> hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen ( DO) in the given water sample
4. To find the eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by Red Wood Viscosity ( No. 1 & N0. 2 )
6. To determine flash point & fire point of an oil by Pensky Marten's flash point apparatus.
7. To Prepare Phenol formaldehyde and Urea formaldehyde resin.
8. To find out saponification no. of Oil
9. To determine TDS of Water samples of different sources.
10. Determination of concentration of KMnO<sub>4</sub> solution spectrophotomererically
11. Determination of strength of HCl solution by titrating against NaOH solution conductometrically.
12. To determine amount of sodium and potassium in a, given water sample by flame photometer.
13. Estimation of total iron in an iron alloy

**Course Outcomes:**

- After successful completion of this course, the student would be able to :
- Find out hardness of water quantitatively.
- Analyse sample of water for many parameters
- Analyse sample of lubricating oil for many parameters
- Prepare polymeric resins in the laboratory

**Books recommended**

- Advanced practical organic chemistry, O P Agarwal, (Krishna publishing).
- Advanced practical inorganic chemistry, Gurdeep Raj, (Krishna publishing).
- Advanced practical physical chemistry, J B Yadav, (Krishna publishing).

**B. TECH. SEM I/II**

**CODE: MGMT-101**

**SUBJECT NAME: FUNDAMENTALS OF MANAGEMENT**

**NO. OF CREDITS: 4**

L	T	P	SESSIONAL	: 40
4	0	0	THEORY EXAM	: 60
			TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**Course Objectives:**

The course takes a general management perspective, with emphasis on skills and concepts essential to successful management careers. The course seeks to explain basic concepts, principles and processes in HR/Marketing/Finance/Operations, with an idea to acquaint the students with these disciplines, to suit the industry needs. To improve their communication skills; help them examine the complexity of business scenario in the changing global context; and give exposure to several models of leadership. Prepare assignments on case-study to understand the dynamics of the corporate world- the past history or present practices of a company.

## **SYLLABUS**

### **Unit I**

Concept and significance of Management, Functions of management and their interrelationship, levels of Management and skills required at various levels, Management vs. Administration, Management as art, science or profession.

### **Unit II**

Human Resource Management- Functions of HRM; Source of recruitment and selection process, Training needs and types, Motivation Theories – Maslow's need Hierarchy theory, Mc Gregor's Theory X and Y, Herzberg Theory.

### **Unit III**

Marketing- Evolution of modern marketing concept, Functions of marketing management, Advertisement- Importance, choice of Media and criticism, Marketing mix, Marketing Research Process.

### **Unit IV**

Production Management- Functions and scope of production management, Production Planning and Control- Stages of PPC, Meaning and methods of inventory control, Concept of TQM (In brief)

### **Unit V**

Financial Management- Functions of Financial Management, Sources of finance, Factors effecting Capital Structure of a company.

### **Unit VI**

Case Study (For Assignment Only)

### **Course Outcomes:**

- The students will develop a knowledge framework with diverse perspectives and disciplines within management.
- They will have capacity to go beyond theoretical knowledge, demonstrate an ability to apply general management knowhow in practical business situations.
- They will be expected to develop an understanding of concepts in a rapidly changing global business context.
- Develop skills in time management and planning work assignments. The soft skills will be help gain confidence and develop personality.

## Books

- Gupta R. S., Sharma B.D., Bhalla N. S., Principle and Practices of Management, Kalyani Publishers
- Chhabra T. N., Principles and Practices of Management, Dhanpat Rai & Co.
- Prasad L. M., Principles and Practices of Management, Sultan Chand & Sons
- Gupta C. B., Management (Theory and Practice), Sultan Chand & Sons

## B. TECH. SEM I/II

CODE: MU-101A

## BASICS OF MECHANICAL ENGINEERING

NO. OF CREDITS: 4

L	T	P	SESSIONAL	: 40
4	0	0	THEORY EXAM	: 60
			TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

### Course Objective

To study various concepts of thermodynamics, refrigeration and IC engines. To study principles and application of manufacturing processes. To study the power transmission devices such as belt, gears, clutches and brakes.

### Unit I

**Basic Concepts of Thermodynamics and Refrigeration:** Introduction, Systems, Work, Heat, Temperature, Zeroth, 1<sup>st</sup>, 2<sup>nd</sup> laws of Thermodynamics, Concept of internal energy, Problems. Introduction to Refrigeration & Air conditioning, units of refrigeration, Coefficient of performance, Difference between a Heat engine refrigerator and heat pump, simple refrigeration vapour compression cycle, simple problems on Coefficient of performance

## **Unit II**

**I.C.Engines:** Introduction, classification, Constructional details and working of 2 stroke & 4 stroke petrol engine & diesel engine, Otto, diesel and dual cycles, simple problems on Otto & diesel cycles.

## **Unit III**

**Power Transmission Methods and Devices:** Introduction to Power transmission, Belt drive, Rope drive, Chain drive, Gear drive, Types of gears, Clutches, Types and function of clutches, Types and function of brakes.

## **Unit IV**

**Simple Lifting Machines:** Definition of machine, velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, Double and Triple start worm and worm wheel, single and double purchase winch crabs, Simple and differential screw jacks, Problems.

## **Unit V**

**Stresses and Strains:** Introduction, Concept & types of Stresses and Strains, Poisons ratio, stresses and Strains in simple and compound bars under axial loading, Stress– Strain diagrams, Hook's law, Elastic constants and Mechanical Properties of metals like mild steel and cast iron.

## **Unit VI**

**Manufacturing Processes:** Brief introduction to classification of different manufacturing processes: Primary shaping processes, metal cutting processes, joining processes, finishing processes and processes bringing change in properties , Welding: Introduction to EAW, Gas welding, Soldering and Brazing.

## **Unit VII**

**Manufacturing Systems and Machine Tools:** Introduction to Manufacturing Systems, Principal and parts of commonly used machine tools in Workshop such as Lathe, Shaper and Milling. Fundamentals of Numerical Control (NC), Advantage of NC systems, Classification of NC and CNC.

### **Course Outcomes:**

- At the end of the course, the student shall be able to:
- Understand the basic principles of internal combustion engines.
- Understand the principles and applications of various manufacturing processes.
- Understand the concept of strain and strain for the strength of materials.
- Grasp the concepts of power transmission devices.



- Understand methods of thermodynamics, refrigeration & air conditioning in mechanical system.

### **Text Books**

1. Basics of Mechanical Engineering- R.K Rajput Laxmi Pub, Delhi.
2. Elements of Mechanical Engineering- D.S Kumar, S.K Kataria and Sons.
3. Engineering Thermodynamics- P.K Nag TMH, New Delhi.
4. Refrigeration & Air conditioning- Arora & Domkundwar, Dhanpat Rai & Co. Pvt. Ltd.
5. Workshop Technology Vol I &II –Hazra & Chaudhary, Asian Book Comp., New Delhi.

### **Reference Books**

1. Strength of Materials– Popov, Pub. - PHI, New Delhi.
2. Strength of Materials– G.H Ryder, Pub-ELBS.
3. Engineering Thermodynamics- C.P Arora, Pub- TMH, New Delhi.
4. Refrigeration & Air conditioning- C.P Arora, Pub- TMH, New Delhi.
5. Manufacturing Science- Amitabha Ghosh & Ashok Kumar Malik, - East- West Press.
6. Manufacturing Process & Systems- Oswald, Munoz, John Wiley.
7. Workshop Technology Vol I, II & III- Chapman, WAJ, Edward Arnold.
8. Basics of Mechanical Engineering – Vineet Jain, Dhanpat Rai Publications

## **B. TECH. I/II SEM**

**CODE: MU-103A**

## **ENGINEERING DRAWING**

**NO. OF CREDITS: 4**

L	T	P
4	0	0

SESSIONAL	: 40
THEORY EXAM	: 60
TOTAL	: 100

### **Course Objective**

To study various concepts of orthographic and isometric projection. To study projection of points, planes, lines, solids and development of surfaced. To study lettering, dimensioning , first angle and third angle projection methods.

## **Unit 1**

**Introduction:** Importance and scope of Engineering Drawing, Instruments, Lettering, Types of lines, Dimensioning, Scales, Different methods of projections, B.I.S Specifications.

## **Unit 2**

**Projection of Points :**Introduction to plane of projection, reference & auxiliary planes, projection of points in different quadrants, traces, true inclinations & true lengths of the lines, projections on auxiliary plane.

## **Unit 3**

**Projection of Lines:** Projection of lines parallel to reference planes, perpendicular to reference planes, inclined to one reference plane and parallel to the other, inclined to both the reference planes, traces, true inclinations & true lengths of the lines.

## **Unit 4**

**Projection of Planes:** Parallel to one reference plane, inclined to one plane but perpendicular to the other, inclined to both reference planes.

## **Unit 5**

**Projection of Solids:** Projection of Polyhedra, solids of revolution-in simple positions with axis perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane and inclined to the other.

## **Unit 6**

**Projection of Section of Solids:** Projection of section of prisms, pyramids, cylinders and cones with axis perpendicular to one reference plane and parallel to the other reference plane.

## **Unit 7**

**Development of Surfaces:** Development of simple object with and without sectioning.

## **Unit 8**

**Isometric Projection:** Introduction, Isometric scale, Isometric projections/ view of plane figures like prisms, pyramids, cylinders and cones.

## **Unit 9**

**Orthographic Projections:** Orthographic projections of machines components and Nuts, Bolted Joints, Screw threads, Screw joints

**Course Outcomes (CO's):** At the end of the course, the student shall be able to:

- Understand the basic principles of projections.
- Understand and draw orthographic and isometric view of an object.
- Grasp the concepts of development of surfaces.
- Understand methods of drawing nuts, bolts and screw threads.
- Understand projection of points, lines, planes and solids.

### ***Reference Books***

1. Machine Drawing - N D Bhatt and V M Panchal, Charotar Publishing House.
2. A Text Book of Machine Drawing - P S Gill Pub.: S K Kataria & Sons.
3. Engineering Graphics with Auto CAD 2002 - James D.Bethune, Pearson Education.
4. A Text Book of Machine Drawing Laxmi Narayana and Mathur, M/s. Jain Brothers, New Delhi.
5. Machine drawing by N Sidheshwar, Kannaieh, V S Sastry, TMH., New Delhi.
6. Fundamentals of Engineering Drawing by Luzaddder: PHI.
7. Fundamentals of Engineering Drawing by French and Vierk; Mc Graw H

**B. TECH. SEM I/II**

**CODE: MU-102A**

**BASICS OF MECHANICAL ENGG. LAB**

**NO. OF CREDITS: 1**

L T P Total  
0 0 2 2

Sessional: 30 Marks  
Practical: 20 Marks  
Total : 50 Marks  
Duration of Exam: 2 Hours

**List of Experiments:**

1. To study the Cochran and Babcock and Wilcox boilers.
2. To study the working and function of mounting and accessories in boiler.
3. To study 2 stroke & 4 stroke diesel engine.
4. To study 2 stroke & 4 stroke petrol engine.
5. To study the vapour compression Refrigeration System and determination of its Coefficient of performance.
6. To study the functioning of Window Room Air Conditioner.
7. To calculate the Mechanical Advantage, Velocity Ratio and efficiency of Single start, Double start and Triple start worm wheel.
8. To calculate the Mechanical Advantage, Velocity Ratio and efficiency of Single Purchase, Double Purchase winch crabs and plot graphs.
9. To study Simple screw jacks and compound screw jacks and determine their efficiency.
10. To find the Mechanical Advantage, Velocity Ratio and efficiency of a Differential Wheel and Axle.
11. To perform tensile test, plot the stress- strain diagram and evaluate the tensile properties of a given metallic specimen.

**B. TECH. SEM I/II**  
**CODE: E-105**  
**ELECTRICAL TECHNOLOGY (ET)**  
**NO. OF CREDITS: 4**

L	T	P	SESSIONAL	: 40
4	0	0	THEORY EXAM	: 60
			TOTAL	: 100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**UNIT-I-**

**DC CIRCUITS** Introduction of electric circuit, ohm's law, limitations of ohm's law, ideal, Practical and dependent sources and their characteristics, Source transformation, Voltage and Current division, Kirchhoff's Voltage law and Kirchhoff's Current law; Mesh and Nodal analysis

**UNIT-II-**

**AC FUNDAMENTAL** Production of alternating voltage or current, phasor representation of alternating quantity, Instantaneous, Peak, Average and RMS values of periodic waveforms; Peak factor, Form factor; pure R,L & C in AC circuit, j notation and concept of phasor, active, reactive and apparent power, Power factor

**UNIT-III-**

**MAGNETIC CIRCUITS** Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses.

**UNIT-IV**

**NETWORK THEOREMS** Superposition, Thevenin's and Norton's, Reciprocity, Compensation, Maximum Power transfer, Tellegan's and Millman's theorems, Application of theorems to dc and ac circuits

**UNIT-V-**

**AC CIRCUITS** AC series circuit RL, RC, and RLC, AC parallel circuits, combination of series and parallel circuits, Series and Parallel resonance, selectivity, bandwidth and Q factor, earthing

#### **UNIT-VI**

**POLYPHASE SYSTEMS** Advantages of 3-phase systems, generation of 3-phase voltages; phase sequence; star & delta connections; interconnection of 3-phase sources and loads; voltage, current & power in star & delta connected systems, analysis of 3-phase balanced circuits, measurement of 3-phase power- 2 wattmeter method, effect of power factor on wattmeter reading

#### **UNIT-VII**

**ELECTRICAL MACHINES** Introduction to transformer, DC machines, induction motor, synchronous machines; Principle, construction and working

#### **COURSE OUTCOMES:**

- 1 Analyze and solve AC & DC electric networks using different techniques.
- 2 An understanding of the construction and working principle of DC & AC machines.
- 3 Identify the type of electrical machines for a given application
- 4 An understanding of various types of measuring instruments.
- 5 An understanding of single phase and 3 phase systems.

#### **Text Book:**

1. Basic Electrical Engineering by Kothari & Nagrath TMH
2. Principle of electrical Engg. By V. Del Toro Printice Hall
3. Electrical Technology by B L Thereja S.Chand

## B. TECH. SEM I/II

CODE: E-109

### ELECTRICAL TECHNOLOGY LAB

NO. OF CREDITS: 1

L T P Total  
0 0 2 2

SESSIONAL : 30  
THEORY EXAM : 20  
TOTAL : 50

1. To study various type of meters.
2. To verify KCL and KVL.
3. To verify Thevenin's theorem.
4. To Verify Maximum Power Transfer theorem.
5. To verify Superposition theorems.
6. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q-factor for various values of R,L,C.
7. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q-Factor for various values of R,L,C.
8. To find inductance of coil without core and with U & I shape iron core.
9. To measure power and power factor in a 3-phase system by two wattmeter method.
10. To perform polarity test and find turn ratio of single phase transformer.

Course Outcome :

CO1 : Study and analyse Network Theorems

CO2: Understand frequency response of series and parallel R-L-C circuit

CO3: Study various types of meters

CO4: Understand to measure power and power factor in a 3-phase system.

Cours e outco me	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	-	-	-	-	-	-	-	-	1
CO2	3	2	-	-	-	-	-	-	-	-	-	1
CO3	2	3	1	-	-	-	2	-	-	-	1	-
CO4	1	-	-	2	-	2	-	-	1	-	-	3

**B. TECH. SEM I/II**

**CODE: CE-101**

**Fundamentals of Computer & Programming with C**

**NO OF CREDITS: 4**

L	P	SESSIONAL:	40
4	0	THEORY EXAM:	60
		TOTAL:	100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**Course Objectives**

1. To understand the major components of computer system.
2. To learn about different Number Systems and their conversion.
3. To understand the types and functions of OS.
4. To learn about different programming languages and their corresponding Translators.
5. To learn about the basic concepts of Networking.
6. To understand the building blocks of C language like variables, data types, managing I/O etc.

**UNIT-I :**

**AN OVERVIEW OF COMPUTER SYSTEM AND OPERATING SYSTEMS**

Fundamentals: Evolution of computers, Hardware organization of a computer. Introduction to microprocessors, generation of microprocessors, commonly used CPUs.

Input/Output Devices, Input/output ports and connectors.

Different Number Systems:- Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, and their inter- conversions.

Operating System Basics: Introduction to Operating system, Functions of an Operating Systems, Classification of Operating Systems, Basic introduction to DOS, UNIX/LINUX OS, Windows XP, working with Windows. Introduction to computer viruses.

**UNIT-II :**

**BASIC INTRODUCTION TO PROGRAMMING LANGUAGES**

Machine Language, Assembly Languages, High level Languages, Types of high level languages, Compiler, Interpreter, Assembler, Loader, Linker, Relationship between Compiler, Loader and Linker.



### **UNIT-III :**

#### **BASIC INTRODUCTION TO COMPUTER NETWORKS**

Data Communication, modulation, Network devices, LAN, LAN topologies, WAN, OSI Reference model Introduction to Internet and protocols: TCP/IP ref. model, Backbone network, Network connecting devices. Hypertext documents, HTTP, DNS, Network Security.

### **UNIT-IV :**

#### **AN OVERVIEW OF C**

Constants, Variables and Data types, operators and Expressions, managing I/O operations, Decision Making and branching, Decision Making and looping, Arrays, Character Arrays and Strings, User Defined Functions

### **UNIT-V :**

#### **STRUCTURE AND UNION IN C**

Defining structure, declaring variables, Accessing structure members, structure initialization, copying and comparing structures variables, operations on individual members, Array of structure, structure with structure, unions, size of structure.

### **UNIT-VI :**

#### **POINTERS IN C**

Introduction, Understanding Pointers, Accessing the address of a variable, Declaring Pointer Variables, Initialization of Pointer Variables, Accessing a variable through its pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factors, pointers and Arrays, Pointer and Character Strings, Arrays of Pointers, Pointers as Function Arguments, Functions Returning Pointers, Pointers to Functions

### **UNIT-VII :**

#### **DYNAMIC MEMORY ALLOCATION AND FILE MANAGEMENT IN C**

Introduction, Dynamic memory allocation, allocating a block of memory: Malloc, allocating multiple blocks of memory: Calloc. Releasing the used space: Free, Altering the size of block: Realloc, Defining and opening file, closing file, I/O operation on files, error handling during I/O operations, Random Access to files and command line arguments.

### **Course Outcomes**

- The students will understand computer system components in detail.
- The students will know the types of format in which data can be stored in computer system's memory.
- The students will be familiar with various types of OS and also compare them.
- The students will be able understand various functions of OS
- The students will be able to understand how with the help of translators computer understand human language.
- The students will be able to understand and use the concept of networking in labs.

**B. TECH. SEM I/II**  
**ELEMENTS OF ELECTRONICS ENGINEERING**

**E- 101**

**NO OF CREDITS: 4**

L T P Total  
4 0 0 4

Sessional: 40  
Theory : 60  
Total : 100

**Course objective**

Fundamental knowledge in electronic aspects will be provided in this course through the emphasis of basic active components, i.e. diodes, BJTs, Oscillators and Op-Amps. Such different types of circuitry components/circuits and their applications are introduced so as to complete the theoretical and practical basis on analog circuit design.

**Part- A**

**SEMICONDUCTOR PHYSICS:**

Basic concepts, Intrinsic and extrinsic semiconductors, diffusion and drift currents, p-n junction under open-circuit, reverse bias and forward-bias conditions, p-n junction in the breakdown region, Ideal diode, terminal characteristics of junction diode.

**AMPLIFIERS:**

Introduction of different types of amplifiers and their characteristics, Principle of amplification, Frequency response of RC coupled amplifiers, amplifier bandwidth and Concept of Cascaded Amplifiers, Feedback amplifiers, Effect of positive and negative feedback on amplifier gain and bandwidth.

**Part-B**

**OSCILLATORS:**

Criteria for oscillations, Qualitative analysis of LC, RC and Crystal Oscillators, Study of Wein Bridge Oscillators

**OPERATIONAL AMPLIFIERS:**

Op-amps, its characteristics and its applications.

**POWER SUPPLIES**

Introduction and Working of Switched Mode Power Supply (SMPS), Voltage Regulator, Introduction to Inverters and UPS.

**Part-C**

**DIGITAL ELECTRONICS:**

Binary, Octal and Hexadecimal number systems and conversions, Boolean Algebra, Truth tables

of logic gates (AND, OR, NOT), NAND, NOR as universal gates, Difference between combinational circuits and sequential circuits, Introduction to flip-flops (S-R & J-K).

### **ELECTRONICS INSTRUMENTS:**

Role, importance and applications of general-purpose test instruments viz Multimeter Digital & Analog, Cathode Ray Oscilloscope (CRO), Function/Signal Generator.

### **Part-D**

#### **DISPLAYS :**

Seven segment display, Fourteen segment display, Dot matrix display

#### **LED DISPLAY :**

Introduction, Construction, Advantage of LEDs in electronics display

#### **LCD DISPLAY :**

Introduction; Types of LCD display:- Dynamic scattering and field effect type;

#### **TYPES OF LIQUID CRYSTAL CELLS :**

Transmitting type and reflective type; Advantage & disadvantage of LCD display common applications.

### **Books Recommended:**

1. Sedra A S and Smith K C, "Microelectronic Circuits" 4th Ed., New York, Oxford University Press, New York (1997).
2. Tocci R J and Widmer N S, "Digital Systems – Principles and Applications", 8th Ed., Pearson Education India, New Delhi (2001).
3. Cooper and Helfrick, "Modern Electronic Instrumentation and Measuring Techniques", 4th print Prentice Hall of India, New Delhi (1996)
4. Boylestad and Nashelsky, "Electronic Devices and Circuit Theory", 8th Ed, Pearson Education India, New Delhi (2002).
5. Millman and Grabel, "Microelectronics", 2nd Ed. Tata McGraw-Hill (1999).

### **Course Outcomes:**

At the end of the program the students acquired knowledge about:

- basics of digital electronics.
- solving problems related to number systems and Boolean algebra.
- Various flip flops
- the semiconductors and diodes.
- Transistors, amplifiers and their applications

- the different types of oscillators  
operational amplifiers and their applications.
- Display devices like LCDs, LEDs, Seven segment and dot matrix display.
- Electronic instruments like CRO, function generator and multimeter etc.
- Power supply units like UPS, inverters etc..

## REFERENCES

1. Fundamental of Information Technology by A.Leon&M.Leon.
2. UNIX Concepts and Application(4/e) by Sumitabha Das
3. Programming Languages (4th Edition) by Pratt IW
4. Fundamentals of Computers and Programming with C by A. K. Sharma Dhanpat Rai publications
5. Computer Networks (4th Edition) by Andrew S. Tanenbaum
6. Digital Principles and Application by Donald Peach, Albert Paul Malvino
7. Operating System Concepts, (6th Edition) by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne

## **B.TECH. COMPUTER /ELECTRONICS ENGINEERING B.TECH**

### **SEMESTER III**

**CODE: HAS-203**

**SUBJECT NAME: MATHS III**

**NO OF CREDITS: 4**

L	P	SESSIONAL:	40
4	0	THEORY EXAM:	60
		TOTAL:	100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

### **Course Objectives:**

Course is designed to develop appreciation of the scope, usefulness and elegance of mathematics. Students will learn Fourier series, transforms and use these concepts for solving problems in physics , electronics and computer science.

It will give them knowledge of the basics of operations research, including the students ability to formulate problems and to think creatively and synthesize information. It will develop in them the skills for problem solving when a complex variable is involved.

## **SYLLABUS**

### **Part-A**

Fourier Series and Fourier Transforms: Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, , half range sine and cosine series. Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, Fourier integrals.

Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem. application of Fourier transform to solve standard equations/boundary value problems. Applications of Fourier transform for solution of standard equations/boundary value problems.

### **Part-B**

Functions of Complex Variable: Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions, Limit and Continuity of a function, Differentiability and Analyticity.

Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, Milne Thomson Method to find harmonic conjugate of a function. application to flow problems. Integration of complex functions. Cauchy- Integral theorem and formula.

Power series, radius and circle of convergence, Taylor's, Maclaurin's and Laurent's series.

Zeros and singularities of complex functions, Residues. Cauchy's residue theorem, Evaluation of real integrals using residues (around unit and semi circle only).

### **Part-C**

Probability Distributions : Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

Linear Programming: Linear programming problems formulation, solving linear programming problems using (i) Graphical method(corner point, iso cost/iso profit) (ii) Simplex method (iii) BIG M method (iv) Duality concept and Dual simplex method.

**Course Outcomes:**

After completion of course, students will have

- Ability to derive pleasure while using the mathematical skills for problem solving in various subjects.
- Ability to formulate various OR problems and solve them.
- Ability to solve problems involving complex variables.
- Ability to use fourier series and transforms for solving problems in various subjects.

**TEXT BOOKS :**

1. Higher Engg. Mathematics : B.S. Grewal.
2. Advance Engg. Mathematics : R.K. Jain, S.R.K.Iyenger

**REFERENCE BOOK**

1. Advanced Engg. Mathematics : F Kreyszig.
2. Advanced Engg. Mathematics : Michael D. Greenberg.
3. Operation Research : H.A. Taha.
4. Probability and statistics for Engineers : Johnson. PHI

**B.TECH. SEMESTER IV**

**CODE: EIC- 406**

**SUBJECT NAME: OPERATIONS RESEARCH**

**NO OF CREDITS: 4**

L	P	SESSIONAL:	40
4	0	THEORY EXAM:	60
		TOTAL:	100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**Course Objective:**

To enable the students to use quantitative methods and techniques for effective decisions-making; model formulation and applications that are used in solving business decision problems.

**PART – A**

The origin of OR, Phases of an OR study, Impact of OR, Formulation of Linear Programming Model, Graphical Solution. Converting the linear programming problem to standard form, Simplex method, Big-M method, Two-Phase method, Degeneracy, Alternate optima, unbounded and infeasible solution. Definition of Dual problem, Primal-dual relationship, Dual simplex method.

## **PART – B**

Assignment problem, mathematical formulation, solution of assignment problem (Hungarian method), Travelling salesman problem. Transportation problem, mathematical formulation. Initial basic feasible solution of transportation problem by North-west corner rule, Lowest-cost Entry method and Vogel's approximation method, Optimal solution of transportation problem. Project of scheduling by PERT, CPM Critical path calculations. Construction of the time chart and resource leveling,

## **PART – C**

Network models, minimal spanning tree algorithm, Shortest route problem (Floyd's Algorithm and Dijkstars algorithm), Maximal flow problem. Integer programming-examples, method of and algorithms [cutting plane algorithm only] Dynamic Programming- Examples of D.P. models. Bellman's Principle of optimality and method of recursive optimization [simple problems only involving up to one constraint]

### **Course Outcomes:**

- Ability to Solve linear programming problems using simplex methods and its modified types.
- Ability to design solution for solving transportation problem and assignment problem.
- Be able to design new simple models, like: CPM, PERT to improve decision –making and develop critical thinking and objective analysis of decision problems.
- Be able to optimization of networks.
- Ability to solve operational problems like budgeting using dynamic programming
- Be able to obtain an optimum integer solution to an “all integer programming problem”.

### **SUGGESTED BOOKS:**

1. Operations Research by S.D. Sharma
2. Operations Research by Hamdy A. Taha
3. Introduction to Operations Research by Hiller and Dieherman, TMH
4. Optimization Theory and Application: S.S.Rao, John Wiley

**B.TECH. SEMESTER IV**

**CODE: CE 212**

**SUBJECT NAME: OPERATIONAL RESEARCH**

**NO OF CREDITS: 4**

L	P	SESSIONAL:	40
4	0	THEORY EXAM:	60
		TOTAL:	100

*NOTE: Question paper has two parts. Part-1 has 10 questions each of 2 marks. It covers the entire syllabus. Attempt any four questions out of six from Part-2.*

**Course Objective:** To enable the students to use quantitative methods and techniques for effective decisions-making; model formulation and applications that is used in solving business decision problems.

**PART – A**

The origin of OR, Phases of an OR study, Impact of OR, Formulation of Linear Programming Model, Graphical Solution. Converting the linear programming problem to standard form, Simplex method, Big-M method, Two-Phase method, Degeneracy, Alternate optima, unbounded and infeasible solution. Definition of Dual problem, Primal-dual relationship, Dual simplex method.

**PART – B**

Assignment problem, mathematical formulation, solution of assignment problem (Hungarian method), Transportation problem, mathematical formulation. Initial basic feasible solution of transportation problem by North-west corner rule, Lowest-cost Entry method and Vogel's approximation method, Optimal solution of transportation problem. Project of scheduling by PERT, CPM Critical path calculations.

**PART – C**

Network models, minimal spanning tree algorithm, Shortest route problem (Floyd's Algorithm and Dijkstra's algorithm), Maximal flow problem. Dynamic programming, Decision tree and Bellman's principle of optimality, solution of problem with finite number of stages, Model I: Minimum path problem, Model II: Single additive constraint, Multiplicative separable return, Model III: Single additive constraint, Additively separable return. Elements of queuing model, Pure birth and death models, Generalized Poisson queuing, specialized Poisson queues.



Program outcomes:

- Ability to Solve linear programming problems using simplex methods and its modified types
- Ability to design solution for solving transportation problem and assignment problem.
- Be able to design new simple models, like: CPM, PERT to improve decision –making and develop critical thinking and objective analysis of decision problems.
- Ability to solve operational problems like budgeting using dynamic programming
- Ability to solve problem related to queueing using appropriate queueing models.
- Be able to optimization of networks.

**SUGGESTED BOOKS:**

5. Operations Research by S.D. Sharma
6. Operations Research by Hamdy A. Taha
7. Introduction to Operations Research by Hiller and Dieherman, TMH
8. Optimization Theory and Application by S.S.Rao, John Wiley