

# **LBS COLLEGE OF ENGINEERING KASARAGOD**



**CURRICULA, SCHEME OF EXAMINATIONS & SYLLABI  
FOR  
COMBINED I & II SEMESTERS  
OF  
B.TECH DEGREE PROGRAMME  
WITH EFFECT FROM 2007 ADMISSIONS**

**Combined I & II Semesters (Common for all branches)**

Code	Subject	Hrs / Week			Sessional Marks	University Exam	
		L	T	P/D		Hrs	Marks

**THEORY**

2K6EN101	Engineering Mathematics I	2	1		50	3	100
2K6EN102	Engineering Physics	2			50	3	100
2K6EN103	Engineering Chemistry	2			50	3	100
2K6EN104	Engineering Mechanics	2	1		50	3	100
2K6EN105	Engineering Graphics	1		3	50	3	100
2K6EN106	Basic Civil Engineering	2	1		50	3	100
2K6EN107	Basic Mechanical Engineering	2	1		50	3	100
2K6EN108	Basic Electrical Engineering	2	1		50	3	100
2K6EN109	Basic Electronics and Computer Engineering	2	1		50	3	100

**PRACTICAL**

2K6EN110 P	Basic Engineering Laboratory (Surveying, Fitting, Carpentry, Foundry, Smithy, Welding & Sheet metal)			2	50	-	-
2K6EN111 P	Basic Electrical & Electronics Workshop (Wiring, Soldering & Study of Basic Computer Hardware)			2	50	-	-
<b>TOTAL</b>		<b>17</b>	<b>6</b>	<b>7</b>	<b>550</b>		<b>900</b>

**2K6 EN101: ENGINEERING MATHEMATICS I**

2 hours lecture and 1 hour tutorial per week

**Module I: Ordinary Differential Equations (16 hours)**

A brief review of the method of solutions first order equations – Separable, homogeneous and linear types – Exact equations – Orthogonal trajectories – General linear second order equations-homogeneous linear equation of the second order with constant coefficients- Fundamental system of solutions – Method of variation of parameters – Cauchy's equation.

**Module II: Laplace Transforms (17 hours)**

Gamma and Beta functions – Definition and simple properties – Laplace transform – Inverse transform – Laplace transform of derivatives and integrals – Shifting theorems – Differentiation and integration of transforms – Transforms of unit step function and impulse function – Transforms of periodic functions – Solutions of ordinary differential equations using Laplace transforms.

**Module III: Vector differential calculus (18 hours)**

Functions of more than one variable – Idea of partial differentiation – Euler's theorem for homogeneous functions – Chain rule of partial differentiation – application in errors and approximations. Vector function of single variable - differentiation of vector functions Scalar and vector fields – Gradient of a scalar field – Divergence and curl of vector fields – Their physical meanings – Relation between the vector differential operators.

**Module IV: Fourier series and harmonic analysis (15 hours)**

Periodic functions – Trigonometric series – Euler formulae – Even and odd functions – Functions having arbitrary period – Half range expansions – Numerical method for determining Fourier coefficients – Harmonic analysis.

**Reference Books:**

1. Piskunov N, Differential and Integral calculus, MIR Publishers
2. Wylie C R & Barrett L. C., Advanced Engineering Mathematics, Mc Graw Hill
3. Grewal B. S, Higher Engineering Mathematics, Khanna Publishers
4. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern.
5. Thomas G B, Calculus and Analytic Geometry, Addison Wesley
6. Spigel. , Vector analysis, Schume series, Mc Grawhill
7. Sastri. S. S. Engineering Mathematics, Prentice Hall of India.

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

- Q I - 8 short type questions of 5 marks, 2 from each module.
- Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.
- Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.
- Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.
- Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN102: ENGINEERING PHYSICS**

2 hours lecture per week

**Module I: (11 hours)**

Interference of light: Interference from plane parallel thin films – Colours of thin films by reflected light - Newton's rings - Measurement of wave length – Thin wedge shaped air film – Air wedge – Testing of optical planes of surfaces. Diffraction of light: Introduction to Fresnel and Fraunhofer diffraction – Distinction between the two diffractions – Simple theory of plane transmission grating. Polarization of light: Double refraction – Nicol prism – Quarter and half wave plates – Production and detection of elliptically and circularly polarized light – Rotatory polarization – Laurent's half shade polarimeter – Applications of polarized light.

**Module II: (11 hours)**

Quantum Mechanics: Newtonian Mechanics and quantum mechanics – Uncertainty principle – The wave functions – Shrodinger wave equation for free particle – Potentials in Shrodinger equation – Time independent Shrodinger equation - Time dependent Shrodinger equation – Expectation values – Derivation of Shrodinger equation – Application – Particle in a box (motion in one dimension). NMR and ESR: Basic principles of Nuclear Magnetic Resonance (NMR) and Electron Spin Resonance (ESR) – Experimental Method for detection of NMR and ESR – Applications.

**Module III: (11 hours)**

Laser Physics: Basic concepts of laser – Spontaneous and stimulated emission – Absorption – Population inversion – Optical pumping – Construction and components of laser – Ruby laser, Helium-Neon Laser and semiconductor laser – Applications – Basic principle of Holography and its application. Fibre Optics: Basic principles – Fiber construction – Fiber dimensions – Light propagation in fiber – Signal distortion in optical fibers and transmission losses (Brief ideas only) – Light Wave communication using optical fibers and its advantages – Fiber Amplifiers and EDFAs – Applications of optical fibers. Non Destructive Testing : X-rays – Properties and production – X-ray radiography – Stereo Radiography – CT scan – Ultrasonics – properties – NDT using ultrasonics – Electrical method – Magnetic method – Ultrasound scanning- MRI scan.

**Module IV: (13 hours)**

Electron Theory of Solids : Classical free electron theory – drift velocity – conductivity – relaxation time – mean free path – temperature dependence of resistivity – relation between thermal and electrical conductivities (Weidman – Frenz law) – Quantum free electron theory – density of states – Fermi distribution function – Fermi energy-Band theory of solids (Qualitative only) - Band structure of metals, semiconductors and insulators – Classifications of semiconductors on the basis of Fermi level and Fermi energy – Impurity levels in N-type and P-type semiconductors. Hall effect: Introduction – Measurement of Hall voltage and Hall coefficient – Importance of Hall effect. Super conductivity: Properties of superconductors – Josephson effect and tunneling (qualitative) – B.C.S Theory of superconductivity (qualitative) – Applications of superconductivity

**Reference Books:**

1. Brijlal & Subrahmanyam. N, "Text Book of Optics", S. Chand
2. Rajendran and Marikani : Applied Physics for Engineers 3 rd edition -TMH
3. A.S.Vasudeva S "Modern Engineering Physics", S. Chand
4. Jenkins F.A & White H.E. "Fundamentals of Optics", Mc Graw Hill.
5. M. Arumugam : Material science: Anuradha Publications
6. S.O. Pillai "Solid State Physics" New Age International
7. Srivastva . C.M & Sreenivasan. C. "Science Engineering Materials", New Age International

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.

Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.

Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.

Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN 103: ENGINEERING CHEMISTRY**

2 hours lecture per week

**Module I: High Polymers & Lubricants (13 hours)**

Classification of polymers. Polymerization – chain polymerization, condensation polymerization, copolymerization, coordination polymerization, electrochemical polymerization, metathetical polymerization, group transfer polymerization. Mechanism of polymerization. Polymerization technique- bulk polymerization, solution polymerization, suspension polymerization, emulsion polymerization, melt polymerization, solution polycondensation, interfacial condensation, solid and gas phase condensation, Structure- property relationship of polymers. Compounding and moulding of polymers. Important plastics – their production, properties and uses. Thermoplastic resins (PE, PP, PVC, PVA, PMMA, PS), thermosetting resins (Bakelite, Urea formaldehyde, Silicones), fibers (nylon 6, nylon 66, cellulose fibers, Dacron, Kevlar) Elastomers – Natural rubber – production, structure, properties, compounding & vulcanization. Synthetic rubbers- (Buna, neoprene, thiokols, polyurethane, silicon rubber) Lubricants: Theory of friction, mechanism of lubrication, classification of lubricants- liquid, semi solid, solid and synthetic lubricants. Properties of lubricants. (viscosity index, cloud point, pour point, flash point, fire point, corrosion stability, emulsification, aniline point). Additives and their functions.

**Module II: Electrochemistry (11 hours)**

Electrode potential and electromotive force. Nernst equation for electrode potential. Measurement of EMF and electrode potential. Types of electrodes. Primary and secondary reference electrodes. Electrochemical series. Galvanic cells and concentration cells. Determination of pH using glass electrode. Secondary cells- lead acid cells, Ni-Cd cell, Edison cell. Fuel cell- Hydrogen-oxygen fuel cell. Acid and bases. Lowry- Bronsted and Lewis concepts. Concept of pH- pH measurements. (instrumental details required) Dissociation constants- potentiometric titrations. Buffer solutions. Henderson equation for calculation of pH.

**Module III: Corrosion (11 hours)**

Corrosion and its control- Theories of corrosion. Different types of corrosion. Factors affecting corrosion. Protective coatings. Self protecting corrosion products. Pretreatment of surfaces. Coating- organic, inorganic coatings- galvanizing, tinning, electroplating, electroless plating, anodisation, passivation by chemical treatment, cathodic protection. Properties and functions of ingredients in paints, varnishes and enamels.

**Module IV: Fuels & Environmental Pollution (13 hours)**

Classification of fuels- solids, liquid & gaseous fuels, Determination of calorific value. Solid fuels- wood, peat, lignite, coal, Proximate analysis, Petroleum and its refining, fractions and their uses. Cracking and reforming. Petrol knock and octane number. Gaseous fuels- Natural gas, coal gas, acetylene. Combustion calculation. Air-fuel ratio. Pollution- Classification (global, regional and local with examples). Air pollution- Primary and secondary pollutants. Source, effects and control of air pollution. Water pollution- Pollutant classification- organic, inorganic, suspended, metals and their monitoring. Domestic sewage and industrial wastes. Control of water pollution. Hazardous wastes. Hard and soft water. Analysis of hardness. Quality of water for domestic use and boiler feed. Problem with hard water in boilers. Softening of water – internal and external conditioning of water.

**Reference Books:**

1. V. Raghavan (2000) Material Science and Engineering – A first course, Prentice Hall of India Pvt. Ltd. New Delhi.
2. J.C. Kuriakose & J. Rajaram. Chemistry of Engineering & Technology. Vol. I & II Tata McGraw Hill, New Delhi
3. A.K. De (1996) Environmental Chemistry. New Age International Pvt. Ltd. New Delhi.
4. B.R. Gowariker et al (2000) polymer science. New Age international Pvt. Ltd. New Delhi
5. S. Glasstone (1997) Textbook of physical Chemistry. MacMillan, New Delhi.
6. Shashi chawla A text book of Engineering Chemistry. Dhanpath Rai & Co. Pvt. Ltd. New Delhi

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

Q I - 8 short type questions of 5 marks, 2 from each module.

Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.

Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.

Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.

Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN104: ENGINEERING MECHANICS**

2 hours lecture and 1 hour tutorial per week

**Module I: (15 hours)**

Principles of statics – Free body diagrams – coplanar forces and force systems – Resultant and equilibrium conditions for concurrent, parallel and general system of forces – Solution of problems by scalar approach. Introduction to vector approach (Application to simple problems only) – Concurrent forces in space – Resultant – Equilibrium of a particle in space – Non-concurrent forces in space – Resultant of force systems.

**Module II: (17hours)**

Friction – Laws of friction – Simple contact friction problems – Wedge. Properties of surfaces – First moment and centroid of curve and area – Centroid of composite plane figures – Theorems of Pappus – guldinus – Second moments of plane figures and composite sections – Transfer theorems – Polar moment of area –Product of inertia and principal axes. Moment of inertia of a rigid body – M I of a lamina – M.I of 3 dimensional bodies (cylinder, circular rod, sphere).

**Module III: (17 hours)**

Introduction to structural mechanics – Different types of supports, loads and beams – Reactions at supports. Shear force and Bending moment in beams - Shear force and Bending moment diagrams for cantilever and simply supported beams (only for concentrated and uniformly distributed load cases). Plane trusses – Types of trusses (Perfect, Deficient and Redundant trusses) – Analysis of trusses – Method of joints – Method of sections.

**Module IV: (17 hours)**

Kinetics of rectilinear motion – Newton's second law – D'Alembert's principle – Motion in horizontal and inclined surfaces- Analysis of lift motion – Motion of connected bodies. Curvilinear motion – Equation of motion – Tangential and normal acceleration – Centripetal and centrifugal forces – Motion of vehicles on circular path. Work, power and energy – Work done by a force – Work of the force of gravity and force of spring – Work-energy equation – Transformation and conservation of energy- Applications to problems. Kinematics of rotation – Rigid body rotation about a fixed axis – Rotation under the action of constant moment. Introduction to mechanical vibrations – Simple harmonic motion – free vibration – Oscillation of spring – Torsional vibration.

**Text Books:**

1. Timoshenko and Young, "Engineering Mechanics", McGraw Hill Publishers
2. Hibbler, Engineering Mechanics, Vol I statics, Vol II Dynamics, Pearson

**Reference Books:**

1. Beer, F.P. and Johnson, E.R., "Mechanics for Engineers- Statics and Dynamics", McGraw Hill
2. Shames, I.H., "Engineering Mechanics- Statics and Dynamics", Prentice Hall of India
3. Merriam J.L and Kraige L.G., Engineering Mechanics- vol 1 and 2, John Wiley

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

- Q I - 8 short type questions of 5 marks, 2 from each module.  
 Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.  
 Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.  
 Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.  
 Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.



**2K6 EN105: ENGINEERING GRAPHICS**

1 hours lecture and 3 hours drawing practice

**Module 0: (12 hours – 2 drawing exercises) (No questions in the university exam: Questions should be included in the class test)**

Introduction to engineering graphics- drawing instruments and their uses – types of lines – lettering – dimensioning – BIS code for practice for engineering drawing – construction of conics, spirals, cycloids, involutes and helix.

**Module I: (14 hours – 2 drawing exercises)**

Introduction to orthographic projection. Projection of points – projection of lines – parallel to one plane and inclined to the other- lines inclined to both the planes – true length and inclination with reference planes – traces. Trapezoidal and rotating line method. Projections of planes.

**Module II: (14 hours – 2 drawing exercises)**

Orthographic projection of solids in simple position-projections of frustum and truncated solids-projection of solids with axis inclined to one or both the planes- projections on auxiliary planes-primary and secondary auxiliary projections- projections of solids in combination.

**Module III: (18 hours – 3 drawing exercises)**

Sections of solids by horizontal, vertical or inclined planes- true shape of section. Development of surface of solids, sectional solids, solids having hole. Intersection of surfaces- intersection of prism in prism, cylinder in cylinder and cylinder in cone.

**Module IV: (12 hours – 2 drawing exercises)**

Introduction to isometric projection- isometric scale – isometric view- isometric projections of solids, frustums & truncated solids and their combinations. Conversion of pictorial projection to orthographic projection.

**Module V: (16 hours – 3 drawing exercises)**

Introduction to machine drawing- screwed fastening- bolts and nuts-cap screw-machine screw-set screw-locking arrangements-foundation bolts. Graphic symbols used in engineering. Simple and Sectional views of Knuckle joint-protected type flanged coupling, bushed bearing-socket and spigot pipe joint.

**Note:** All drawing exercises mentioned above are for class work. Additional exercises whenever necessary may be given as home assignments.

**Reference Books:**

1. John K C, Engineering Graphics, JET Publishers
2. Varghese P I, Engineering Graphics, VIP Publishers
3. Bhatt N D, Elementary Engineering Drawing, Charotar Publishing House
4. Narayana K L & Kannaiah P, Engineering Graphics, Tata McGraw Hill
5. Luzadder W J, Fundamentals of Engineering Drawing, Prentice Hall of India
6. K Venugopal, Engineering Graphics, New Age International (P) Ltd
7. K N Anilkumar, Engineering Graphics, Adhyuth Publishers Kottayam
8. Varghese P I, Machine Drawing, VIP Publishers
9. Bhatt N D, Machine Drawing, Charotar Publishing House
10. S.B.Mathur, A Text Book of Engineering Graphics, Vikas Publishing house

**Sessional work assessment**

Drawing Exercises	= 20
Class tests (min:2)	= 25
Attendance	= 5
Total marks	= 50

**University Examination Pattern** (Each questions carries 20 marks)

- Q I - 2 questions from module I with choice to answer any one.
- Q II - 2 questions from module II with choice to answer any one.
- Q III - 2 questions from module III with choice to answer any one.
- Q IV - 2 questions from module IV with choice to answer any one.
- Q V - 2 questions from module V with choice to answer any one.

**2K6 EN106: BASIC CIVIL ENGINEERING**

2 hours lecture and 1 hour tutorial per week

**Module I: (16 hours)**

Measurement of distance- Direct measurement – tape & chain only- Ranging out survey lines- Taking measurement of a sloping ground – Errors – Tape correction problems. Levelling instruments (Dumpy level, Tilting level and Auto levels ).Levelling Staff (folding type only)- How to make measurements- temporary adjustment- holding the staff, reading the staff, principles of levelling – recording measurements in the field book- deduction of level- height of collimation method only, examples. Introduction to total station (description only) - linear and angular measurements using total station, Brief description of contour maps.

**Module II: (14hours)**

Selection of site for buildings- types of buildings- Components of buildings. Exposure to various building byelaws. Fire resistance characteristics of buildings- General classification as per National Building Code Earth quake zoning – disaster mitigation methods.

**Module III: (18 hours)**

FOUNDATION: different types (description only) .Spread footing, Isolated Footing, Combined Footing- Mat foundation- Pile foundation. Safe bearing capacity of soil, importance of the safe bearing capacity of soil. SUPER STRUCTURE: Masonry-stone masonry,brick masonry.Partition- Materials used for the construction of doors and windows- wood, Steel, Aluminium. Flooring- using mosaic, ceramic tiles, marble, granite and synthetic materials. Roofing- Selection of type of roof, sloping roof- Concrete roof, tiled roof, timber roof, GI sheet, AC sheet, PVC Sheet. Selection of roof covering materials.

**Module IV: (17 hours)**

CONCRETE: Ingredients- cements,aggregates and water. Qualities of ingredients.Test for determining the qualities of fine aggregate- fineness modules and grading curves. IS Specifications, Cement – mortar- IS Specification for preparation and determination of mortar strength. Plain Cement Concrete(PCC) preparation- Test on Hardened Concrete. IS specification for the compressive strength of concrete. Steel- common types used in construction – Mild steel, HYSD steel and their properties. Reinforced Cement Concrete (RCC)- advantages of RCC over PCC. Elementary ideas on pre-cast and pre-stressed concrete constructions.

**Reference Books:**

1. T.P. Kenetker & S.V Kulkarny, “Surveying & Levelling Vol: 1”, Vidyarthi Griha prakashen
2. Rangwala, “Building Materials”, Charotar Publishing House
3. Rangwala, “Building Construction”, Charotar Publishing House
4. B.C Punmia, “Building Materials”, Lakshmi Publication (p) Ltd.
5. S.K.Roy, “Fundamentals of Surveying” Prentice -Hall of India, New Delhi
6. National Building Code
7. A.M Chandra, “Higher Surveying”, New Age International (p) Ltd. Publishers.

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

- Q I - 8 short type questions of 5 marks, 2 from each module.  
 Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.  
 Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.  
 Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.  
 Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN107: BASIC MECHANICAL ENGINEERING**

2 hours lecture and 1 hour tutorial per week

**Module I: (18 hours)**

Thermodynamics: Definitions and basic concepts- systems, properties, state, process and cycle-work and heat- thermodynamic equilibrium, Zeroth law of thermodynamics, concepts of temperature and temperature scales, first law of thermodynamics, concepts of internal energy and enthalpy, second law of thermodynamics- Clausius and Kelvin-Planck statements, concept of entropy, thermodynamic processes- constant volume, constant pressure, adiabatic, isentropic, polytropic processes- P-V and T S diagrams. (Simple problems only).

**Module II: (18 hours)**

Air cycles: Carnot, Otto and Diesel cycles- air standard efficiency. (Simple problems only) I C Engines: Working and comparison of two stroke and four stroke petrol and diesel engines. Pumps and Turbines: Working principles of reciprocating, centrifugal and rotary pumps. Principles of operation of Pelton, Francis and Kaplan turbines. (Elementary ideas with simple sketches only).

**Module III: (18 hours)**

Properties of steam- saturation temperature, dryness fraction, degree of superheat, specific volume, enthalpy and entropy T-S diagram. Steam Boilers: Classification- Cochran boiler, Babcock and Wilcox boiler, list of boiler mountings and accessories- applications. Refrigeration and Air conditioning: Refrigerants, properties of refrigerants, working principles of vapour compression refrigeration & vapour absorption refrigeration systems. Psychrometry- definitions of terms- Principles of air conditioning – comfort and industrial air conditioning.

**Module IV: (17 hours)**

Classification of manufacturing processes- elementary ideas with simple sketches of moulding, sand casting, die casting, forging, rolling, extrusion, wire drawing, punching and blanking, stamping, coining, surfacing, welding, soldering, and brazing. Production machines- elementary ideas with simple sketches of centre lathe, milling machine, drilling machine, grinding machine and shaper. basic machine operations- Concepts of CNC machine systems.

**Text Books:**

1. S. Tryambaka Murthy, Elements of Mechanical Engineering, Vikas Publishing House Private Ltd.
2. S. Benjamin, A Text Book of Basic Mechanical Engineering, Pentex Publishers and Distributors, Kollam-5

**Reference Books:**

1. S. K. Hajra Choudhury, Elements of Mechanical Engineering, Media Promoters and Publishers
2. P. K. Nag, Engineering Thermodynamics, Tata McGraw Hill Publishing Company
3. Dr. R.K. Bansal, Fluid Mechanics and Hydraulic machines, Laxmi Publications (P) Ltd., New
4. M.L. Mathur and F.S. Meha, Thermal Engineering, Jain Brothers, New Delhi
5. K. Venugopal, Basic Mechanical Engineering, New Age International (p) Ltd.

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

- Q I - 8 short type questions of 5 marks, 2 from each module.  
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.  
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.  
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.  
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN108: BASIC ELECTRICAL ENGINEERING**

2 hours lecture and 1 hour tutorial per week

**Module I: (16 hours) Generation, Transmission and Distribution of electric power**

Conventional methods of generation of electric power- thermal- hydro- nuclear. Non-conventional energy sources- solar-wind-tidal-geothermal-photovoltaic-fuel cells. General outline of power transmission & distribution system- substation equipment- circuit breakers- isolators, lightning arrestors- wave traps-(Functions only) Electrical wiring- different types- switchboards- earthing- protective devices- relays- MCB's, ELCB's

**Module II: (17 hours) Transformers and Electrical machines**

AC Fundamentals- 1- $\phi$  and 3- $\phi$ - Power factor- economics of power factor improvement.(Derivation not required) Tariff- Types of Tariff. Transformers- Construction- different types-1- $\phi$  and 3- $\phi$ - theory-emf equation-methods of cooling. DC Machines- Construction- generators and motors- types – characteristics & applications. AC Machines- Alternators- Construction- voltage regulation (definition only). Synchronous motors- Applications. Induction motors- 1- $\phi$  and 3- $\phi$ - construction-characteristics & applications Special machines- stepper motor- universal motor.

**Module III: (17 hours) Utilization of Electric Power**

Electric heating- resistance heating-Induction heating-dielectric heating-arc furnaces-principle & applications. Electric welding-resistance welding-arc welding-ultrasonic welding-electron beam welding- laser beam welding. Illumination- different types of lamps- fluorescent, incandescent, sodium vapor, mercury vapour, halogen-energy efficient lamps.Traction- traction equipment and functions. Batteries- different types- Charging methods- Applications. Electrolytes- Basic principles- Extraction of metals- Electro deposition- Electroplating.

**Module IV: (16 hours) Instrumentation**

Measuring instruments-Ammeter, voltmeter, Wattmeter, Energy meter, Meggar- basic principle of operation, measurement of power by 2- wattmeter method. Transducers- measurement of strain, acceleration, altitude, flow, torque, humidity and moisture.

**Text Books:**

1. Jain & Jain, "ABC of Electrical Engineering (Electrical Science)", Dhanpat Rai & Son's publishing company, New Delhi

**Reference Books:**

- 1.M.L. Soni, P V Gupta, U.S> Bhatnagar and A. Chakrabarthy- A Textbook of Power System Engineering- Dhanpat Rai & Son's, New Delhi
2. Nagarath I.J. & Kothari D.P.- Electric Machines- Tata McGraw Hill
3. J.B. Gupta- Utilization of electric power & Electric traction – S.K. Kataria & Sons, New Delhi
4. Sawhney A.K. A Course in Electrical & Electronic Measurement and Instrumentation, Dhanpat Rai & Son's, New Delhi

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

- Q I - 8 short type questions of 5 marks, 2 from each module.  
 Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.  
 Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.  
 Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.  
 Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN109: BASIC ELECTRONICS AND COMPUTER ENGINEERING**

2 hours lecture and 1 hour tutorial per week

**PART A- ELECTRONICS & COMMUNICATION ENGINEERING****Module I: (16 hours) Introduction To Electronic Components & Devices**

Electronic Devices: Passive components, Active components. PN Junction Diodes: Characteristics and applications. Types of Diodes: Zener Diode, LED, LCD, Photodiode, varactor diode- principles of operation and applications. Bipolar Junction Transistors- construction- npn, pnp- working-configuration- characteristics- properties- applications. Amplifiers: RC Coupled amplifier – working. JFET: construction-characteristics, parameters- applications. Oscillators: principle, RC Phase shift oscillator, crystal oscillator. Integrated circuits: classification-advantages-analog and digital ICs. Microprocessors-8085: Internal architecture(block diagrams only)-applications. Electronic Instruments: Strain gauge, Thermistor, condensor microphone, Moving coil Loud- speaker, principles of CRT,CRO block diagram and working. Signal generators, regulated powersupplies.

**Module II: (17 hours) Principles of Electronic Communication Engineering**

Analog modulation- Different types-AM,FM,PM-principles and comparison. Block diagram of AM and FM Transmitters and superhetrodyne receiver (brief explanation only). Principle of TV systems: interlaced scanning, general simplified block diagram of TV Transmitter and receiver, Yagi antenna, Basic principles of cable TV. Principles of pulsed RADAR: Block diagram, application. Satellite communication- Concept of Geostationary satellites- simplified block diagram of earth station, Transmitter, Receiver. Blockdiagram of optical communication systems, Concept of optical fibre, source(LED), detector (phototransistor), advantage of optical communication. Frequency bands in microwave communication and their uses, simplified block diagram of microwave link. Basic principle of cellular communication, concepts of cells- Frequency reuse, advantage of cellular communication.

**PART B- COMPUTER ENGINEERING****Module III: (16 hours) Introduction to Computers, Troubleshooting & Maintenance**

Introduction- Characteristics of computers- Classifications of Computers- Basic computer organizations- Computer software- Types of software. Components of Standard PC: Familiarization of motherboard, Processor & Memory, Graphics adapters & Monitors, Drive controllers & Drives, Buses, Network adapters, Power supply- Boot process: BIOS,POST- Installation of operating systems- Troubleshooting and Maintenance : common problems in Motherboard, Memory, Monitor, Plug& Play Devices and their Troubleshooting.

**Module IV: (17 hours) Computer Programming & Network Fundamentals**

Computer programming- High level and low level languages- steps involved in computer programming- Developing algorithms and flowcharts- Efficiency of algorithms- Running, debugging and testing of programs. Computer Network: Topologies- Types, Basic components, Media: Wireless & wired. Internet Basics: Applications & impact on Society. WWW, Email, Search Engine, Webserver, Web browser- Future Internet applications. Application software packages- Word processing-Spread sheet- Graphics-Personal Assistance

**Reference Books:**

1. N.N. Bhargava. "Basic Electronic and Linear Circuits" TMH Publications
2. A Kumar. "Communication Engineering" mesh publication New Delhi
3. Peter Norton, "Introduction to Computer", 6 th Ed., Tata McGraw Hill, 2006
4. Pradeep K Sinha and Priti Sinha, "Computer Fundamentals: Concepts, Systems and Application", BPB Publications, 2003.
5. T F Bogart, "Electronic Devices ans Circuits" Universal Bookstall New Delhi
6. Santi ram Kal. "Basic Electronics" PHI Publications.
7. George Kennedy, "Electronic Communication Systems", McGraw Hill
8. V. Rajaraman, "Fundamentals of Computers" Prentice Hall of India, 2002
9. Hans-Peter Messmer, "The Indispensable PC hardware book" 3 rd Ed., Addison Wesley

10. Allen B. Tucker, "Fundamentals of Computing", Tata McGraw Hill, New Delhi, 1998
11. Stephen J Bigelow "Troubleshooting Maintaining & Repairing PCs", 5 th Ed., Tata McGraw Hill
12. Andrew S Tanenbaum, "Computer Network", 3 rd Ed., Pearson Education, 2003

**Sessional work assessment**

Assignments	2x10	= 20
2 tests	2x15	= 30
Total marks		= 50

**University Examination Pattern**

(Part A and Part B to be answered in separate answer books)

**Part A**

Q I - 4 short type questions of 5 marks, 2 from each module.

Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.

Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.

**Part-B**

Q IV - 4 short type questions of 5 marks, 2 from each module.

Q V - 2 questions A and B of 15 marks from module III with choice to answer any one.

Q VI - 2 questions A and B of 15 marks from module IV with choice to answer any one.

**2K6 EN110 P: BASIC ENGINEERING LABORATORY**

2 hours practical per week

**Part A- Mechanical Engineering workshops**

**Fitting Practice (10 Hours)**

Study of metal cutting and measuring tools. Fabrication Exercises involving cutting and chiseling

**Welding (5 Hours)**

Study of arc and gas welding equipments. Exercises involving preparation of lap and butt joints.

**Carpentry (10 Hours)**

Wood and its processing- measuring and marking tools. Wood working hand tools- Wood working machinery. Preparation of joints like dove tail, mortise & tenon.

**Sheet metal practice (5 Hours)**

Study of machines and tools used in sheet metal work. Development and fabrication of simple sheet metal components like cylindrical dish, rectangular duct.

**Foundry (5 Hours)**

Study of foundry tool appliances. Preparation of sand molding, making green sand molds for simple objects. Demonstration of melting, pouring and production of casting.

**Smithy (5 Hours)**

Study of hand forging tools. Hand forging exercises to make components of simple Geometry.

**Part-B- Civil Engineering Workshop**

**Surveying (10 Hours )**

Chain survey- Traversing and plotting of details. Plane Table Surveying- method of radiation, intersection and traversing. Levelling- Fly leveling.

**Sessional Requirements**

Total Attendance	: 5 marks
<i>Part-A Mechanical Engineering Workshops</i>	
Workshop Practical and Record	: 25 marks
Test	: 10 marks
<i>Part-B Civil Engineering Workshop</i>	
Workshop Practical and Record	: 5 marks
Test	: 5 marks
Total	: 50 marks



**2K6 EN111 P: BASIC ELECTRICAL AND ELECTRONICS WORKSHOP**

2 hours practical per week

**A. Electrical Wiring (total 15 Hours)**

- a. Familiarization of various types of service mains- wiring and installations- accessories and household electrical appliances.
- b. Earthing – measurement of earth resistances- testing of Electrical installations- precautions and care from Electrical shocks.
- c. wiring practices of a circuit to control :
  - i) one lamp by SPST switch
  - ii) two lamps by SPST switch.
  - iii) two lamps in series and parallel
  - iv) stair case wiring
- d. Familiarization of various parts and assembling of Electrical Motors and wiring practices of connecting a 3 phase- 1 phase motor with starter.

**B. Electronics Workshop (total 15 hours)**

1. Familiarization of various Electronic components such as resistors, capacitors, transformers, inductors, diodes, transistors and IC's.
2. Assembling and soldering practice of a single phase full wave rectifier circuit with capacitor filter.
3. Assembling and soldering practice of common emitter amplifier circuits.
4. Assembling a timer circuit using IC555, phase shift oscillator using transistor and op-amp and JK flip-flop using NAND gates on the bread board.

**C. Computer Hardware Lab (total 20 hours)**

1. Identification of components/ cards – PC assembling from components.
2. Installation of motherboard, processor, memory and child hard disk.
3. Installation of peripherals such as FDD and a CD drive.
4. BIOS setup.
5. Preparation of HDD for installation – formatting partitioning and basics of file system.
6. Installation of different operating systems and managing application software.
7. Troubleshooting of standard PC.

**Sessional Requirements:**

Total Attendance	: 5 marks
Workshop Practical and Record:	10 marks each for A, B and C
Test	: 5 marks each for A, B and C
Total	: 50 marks