Curriculum and Scheme for combined First and Second Semesters B.TECH

(effective from 2007 admissions)

Code	Subject	Hrs / week			Sessional Marks	University Exam	
		L	T	P		Hrs	Marks
2K6 EN101	Engineering Mathematics I	2	1		50	3	100
2K6 EN102	Engineering Physics	2			50	3	100
2K6 EN103	Engineering Chemistry	2			50	3	100
2K6 EN104	Engineering Mechanics	2	1		50	3	100
2K6 EN105	Engineering Graphics	1		3	50	3	100
2K6 EN106	Basic Civil Engineering	2	1		50	3	100
2K6 EN107	Basic Mechanical Engineering	2	1		50	3	100
2K6 EN108	Basic Electrical Engineering	2	1		50	3	100
2K6 EN109	Basic Electronics and Computer Engineering	2	1		50	3	100
2K6 EN110 P	Basic Engineering Laboratory (Surveying, Fitting, Carpentry, Foundry, Smithy, Welding & Sheet metal)			2	50		
2K6 EN111 P	Basic Electrical & Electronics Work shop (Wiring, Soldering & Study of Basic Computer Hardware)			2	50		
		17	6	7	550		900

2K6 EN101: ENGINEERING MATHEMATICS I
(3 hrs/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., *Advanced Engineering Mathematics*, McGraw-Hill
3. B.S Grewal., *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. Sastry S.S. Engineering Mathematics, Prentice Hall of India

University Examination Pattern

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.

Q V- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6 EN102 : ENGINEERING PHYSICS
(2 hrs/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 semi conductors.

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 super-conductivity.

Reference Books:

1. Brijlal & Subrahmanyam. N. "Text Book of Optics", S. Chand
2. Rajendran and Marikani : Applied Physics for Engineers 3rd 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 of Engineering Materials", New Age International.

University Examination Pattern

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.

Q V- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	–	30 marks
Assignment (min: 2) –		15 marks
Attendance	–	5 marks
Total	–	50 marks

2K6 EN 103: ENGINEERING CHEMISTRY
(2 hrs/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, semisolid, 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, Edisson 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: (11 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, NewDelhi
3. A.K De(1996) Environmental Chemistry. NewAge International Pvt.Ltd. New Delhi
4. B.R Gowariker etal (2000) Polymer science. New Age international Pvt.
   Ltd. New Delhi
5. S.Glasstone(1997) Text book of Physical Chemistry.MacMillian, New Delhi.
6. Shashi chawla A text book of Engineering Chemistry. Dhanpath Rai & Co.Pvt. Ltd. New Delhi

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.
Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.
Q V- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6EN104 : ENGINEERING MECHANICS
(3 hrs/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 (17 hours)
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 on 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. Hibbeler, 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 Publishers.
2. Shames, I.H., "Engineering Mechanics- Statics and Dynamics", Prentice Hall of India.

3. Merriam J.L and Kraige L.G., *Engineering Mechanics - Vols.1 and 2*, John Wiley.

University Examination Pattern

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.

Q V- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6 EN105 ENGINEERING GRAPHICS
(1 hour lecture & 3 hours drawing practice)

Module 0 (12 hours- 2 drawing exercise) (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 of 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 (14 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.

ModuleV (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 & spigot pipe joint.

Note: All drawing exercises mentioned above are for class work. Additional exercises wherever 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 Marks:

Drawing exercises   - 20 marks
Class tests(min:2)   - 25 marks
Attendance   - 5 marks
Total marks   - 50 marks

University examination pattern

Q1-Two questions from Module I with choice to answer any one.
Q2-Two questions from Module II with choice to answer any one
Q3-Two questions from Module III with choice to answer any one
Q4-Two questions from Module IV with choice to answer any one
Q5-Two questions from Module V with choice to answer any one

Each question carries 20 marks.

2K6 EN106: BASIC CIVIL ENGINEERING
(3hrs/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(14 hours)
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 making partition-plywood, particle boards and glass. Doors, windows-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(18 hours)
CONCRETE: Ingredients- cement, aggregates and water. Qualities of ingredients.
Test for determining the qualities of fine aggregate-fineness modulus and grading curves.
IS Specifications. Cement-mortar-IS Specification for preparation and determination of mortar strength.
Plain Cement Concrete(PCC) preparation- Test on fresh concrete- 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 Consrtuction", Charoter Publishing House
4. B.C Punmia, "Building Consrtuction" , 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

University Examination Pattern

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.

Q V- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6 EN107: BASIC MECHANICAL ENGINEERING
(3 hrs/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 (16 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-definition of terms-Principles of air conditioning-comfort and industrial air conditioning.

Module IV (14 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 machining operations- Concepts of CNC machining systems.

Reference Books:

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

Text Books:

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

University Examination Pattern

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with
choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with
choice to answer any one.

Q IV- 2 questions (covering entire module)of 15 marks each from module III with
choice to answer any one.

Q V-   2 questions (covering entire module) of 15 marks each from module IV
with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6 EN108: BASIC ELECTRICAL ENGINEERING
(3 hrs/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-Φ and 3- Φ - Power factor – economics of power factor improvement.(Derivation not required)

Tariff - Types of tariff.

Transformer - Construction-different types -1-Φ and 3- Φ - 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-Φ and 3- Φ - Construction- characteristics & applications

Special machines – stepper motor - universal motor.

Module III (17hours)
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 vapour, mercury vapour, halogen - energy efficient lamps

Traction - traction equipment and functions.

Batteries - Different types - Charging methods - Applications.

Electrolysis - 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, force, torque, humidity and moisture.

Text Books

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

Reference Books

1. M.L. Soni, PV Gupta, U.S. Bhatnagar and A. Chakrabarthy- A textbook of Power System Engineering-Dhanpath Rai & Sons, New Delhi.
2. Nagrath I.J. & Kothari D.P. – Electric Machines – Tata Mc.graw 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, Dhanpath Rai &   Sons, New Delhi
   a)

University Examination Pattern

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.

Q V- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6 EN109: BASIC ELECTRONICS AND COMPUTER ENGINEERING

(3 hrs/week)

PART A -ELECTRONICS & COMMUNICATION ENGINEERING

Module I: INTRODUCTION TO ELECTRONIC COMPONENTS AND DEVICES(16 hours)

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 I C's. Microprocessors-8085: Internal architecture (block diagram only) – applications. Electronic Instruments: Strain gauge, Thermistor, Condensor microphone, Moving coil Loud-speaker, principles of CRT, CRO block diagram and working. Signal generators, regulated power supplies.

Module II: PRICIPLES OF ELECTRONIC COMMUNICATION ENGINEERING (17 hours)

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. Block diagram 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 principles of cellular communication, concepts of cells- Frequency reusage, advantage of cellular communication.

PART B – COMPUTER ENGINEERING

Module III: INTRODUCTION TO COMPUTERS, TROUBLESHOOTING AND MAINTANANCE (16 hours)

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: COMPUTER PROGRAMMING & NETWORK FUNDAMENTALS(17 hours)

Computer Programming - - High level and low level languages- steps involved in computer programming- Developing algorithms and flow charts- 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, Web server, 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", 6th Ed., Tata McGraw Hill, 2006
4. Pradeep K Sinha and Priti Sinha, "Computer Fundamentals: Concepts, Systems and Application", BPB Publicatios , 2003
5. T F . Bogart, " Electronic Devices and Circuits" Universal Bookstall New Delhi .
6. Santi ram Kal, " Basic Electronics " PHI Publications.
7. George Kennedy, "Electronic Communication Systems", Mc Graw Hill
8. V. Rajaraman, "Fundamentals of Computers" Prentice Hall of India, 2002.
9. Hans-Peter Messmer, "The Indispensable PC hardware book" 3rd Ed., Addison Wesley.
10. Allen B. Tucker, " Fundamentals of Computing ",Tata Mc Graw Hill New Delhi, 1998
11. Stephen J Bigelow " Troubleshooting Maintaining & Repairing PCs", 5th Ed. Tata McGraw Hill
12. Andrew S Tanenbaum, "Computer Network", 3rd Ed., Pearson Education, 2003

University Examination Pattern

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

PART A

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

Q II- 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III- 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

PART B

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

Q V- 2 questions (covering entire module)of 15 marks each from module III with choice to answer any one.

Q VI- 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)   –   30 marks
Assignment (min: 2) –   15 marks
Attendance   –   5 marks
Total   –   50 marks

2K6 EN110 P: BASIC ENGINEERING LABORATORY
(2 hrs/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 for 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.

Leveling – Fly leveling.

<u>Sessional Requirements</u>

Total Attendance :5 marks

Part-A Mechanical Engineering Workshops
Workshop Practical and Record :25 marks

Test :10 marks

Part – B Civil Engineering Workshop

Workshop Practical and Record : 5 marks

Test : 5 marks

Total : 50 marks

2K6 EN111P BASIC ELECTRICAL AND ELECTRONICS WORKSHOP

(2 Hrs / 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 – measurements 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 HDDfor 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

SCHEME AND SYLLABUS OF PHYSICAL EDUCATION, HEALTH AND FITNESS

Introductory Lectures

Unit 1. Health and Fitness: Modern concept of health and fitness, meaning , scope, need and importance of health, fitness and wellness

Unit II. Exercise and Fitness: Means and methods of developing fitness. Importance of physical activities and exercises in developing and maintaining good health, Physical fitness and well being.

Unit III. Sports and Physical education: Meaning and scope, role and importance of sports and games in the development of physical fitness and personality. Social values of sports. Rules of major games.

Practical Sessions

(all classes will be conducted after the normal working hours of the college)

50 sessions of minimum 1hour duration each are envisaged (including Theory and Practical). The student can opt for one of the following activities in line with the specific programme/ schedule announced by the faculty.

Athletics, Badminton, Basketball, Cricket, Football, General Fitness, Hockey, Kabaddi,

Table Tennis, Ball Badminton, Archery, Volley ball, Yoga (not all activities may be offered in a particular semester. More disciplines will be offered based on the availability of infrastructure and expertise.)

In addition, health and fitness assessment such as Height, Weight, Resting Pulse Rate and Blood Pressure will be carried out.

Objective

a) Basically to inculcate awareness of health, general fitness and attitude to voluntary physical involvement.

b) To promote learning of basic skills in sports activities and secondarily to pave the way for mastering some of the skills through continued future involvement.

Scheme of assessment

The student will be continuously assessed on his performance on the field of play . There will not be minimum mark for pass or fail. Total 50 marks will be given assessing their attendance, regularity, punctuality and performance for 50 hours of activity from1st semester to 7th semester.