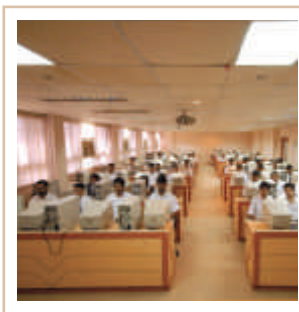


BHARATI VIDYAPEETH UNIVERSITY

Pune.

(Established under Section 3 of UGC ACT 1956)

COURSE STRUCTURE AND SYLLABUS



B. Tech. (All PROGRAMMES) (Sem. I & II)



COURSE STRUCTURE & SYLLABUS

BHARATI VIDYAPEETH UNIVERSITY, PUNE

B. Tech. (ALL PROGRAMS) (Sem. I & II)



HIGHLIGHTS

Bharati Vidyapeeth University College of Engineering (BVUCOE) is the largest Engineering College in Maharashtra with an intake of 700 students in each academic year. Imparting quality technical education from Under Graduate to Doctorate Level, BVUCOE is probably the only Engineering College in India with an accreditation from both NAAC as well as NBA. The faculty at BVUCOE boasts of highly qualified academicians, a quality that is further emphasized by the fact that 15 of them are presently pursuing their Ph.D. degree.

BVUCOE has been ranked 29th amongst the Top 50 Technical Schools of India in survey conducted by DATAQUEST-IDC. We have enjoyed a ranking in this list for the last 4 years. Research is of utmost importance in all our programs. A total of 113 research papers were published in the academic year 2007-2008.

Currently we have 12 ongoing research projects. The infrastructure of BVUCOE is state-of-the-art with 62 classrooms, 59 laboratories and a well-stocked library that currently holds 27,130 titles. The college has an international presence with MoUs signed with the North Carolina A&T State University (Greensboro, USA), University of Venice (Italy), Actel Corporation (USA). Corporate interaction is also inculcated in our programs through our association with Oracle India Ltd., Infosys Ltd. and Tata Consultancy Services.



STRUCTURE & EXAMINATION PATTERN

B. Tech - All Programs

Semester I									Total Duration : 31 Hrs/Week	
									Total Marks : 700	
Subject Code	Subject	Teaching Scheme (Hrs.)			Examination Scheme (Marks)			Total (Marks)	Duration of Theory Paper(Hrs)	
		L	P/D	T	Theory	Unit T.	TW			
K 70101	Engineering Mathematics- I	04	-	01	80	20	-	100	03	
K 70102	Engineering Science- I	04	02	-	80	20	25	125	03	
K 60103	Elements of Mechanical Engineering	04	02	-	80	20	25	125	03	
K 20104	Elements of Civil Engineering	03	02	-	80	20	25	125	03	
K 20105	Environmental Studies	03	-	-	80	20	25	125	03	
K 60106	Engineering Graphics - I	02	02	-	-	-	50	50	-	
K 60107	Workshop Practice - I	-	02	-	-	-	50	50	-	
Total		20	10	01	400	100	200	700		

Teaching Scheme			Examination Scheme			Total
Lectures	P / D	Tutorial	Theory	Unit Test	T. W.	
20	10	01	400	100	50	700

Semester II									Total Duration : 32Hrs/Week	
									Total Marks : 700	
Subject Code	Subject	Teaching Scheme (Hrs.)			Examination Scheme (Marks)			Total (Marks)	Duration of Theory Paper(Hrs)	
		L	P/D	T	Theory	Unit T.	TW			
K 70108	Engineering Mathematics- II	04	-	01	80	20	-	100	03	
K 70109	Engineering Science- II	04	02	-	80	20	25	125	03	
K 20110	Engineering Mechanics	04	02	-	80	20	25	125	03	
K 60111	Engineering Graphics - II	03	02	-	80	20	50	150	04	
K 40112	Elements of Electrical & Electronics Engineering	04	02	-	80	20	25	125	03	
K 30113	Computer Fundamentals & Information Technology	-	02	-	-	-	25	25	-	
K 60114	Workshop Practice - II	-	02	-	-	-	50	50	-	
Total		19	12	01	400	100	200	700		

Teaching Scheme			Examination Scheme			Total
Lectures	P / D	Tutorial	Theory	Unit Test	T. W.	
19	12	01	400	100	50	700



RULES FOR CONDUCTING TESTS

Mode of the test

In each semester for each subject three tests shall be conducted. The schedule for the same will be declared at the commencement of academic year in the academic calendar.

Each test shall carry 20 marks.

University examination pattern has given weightage of 20 marks for the tests.

To calculate these marks following procedure is followed:

- i) Out of the three tests conducted during the semester, the marks of only two tests in which the candidate has shown his/her best performance shall be considered, to decide the provisional marks in each subject.
- ii) Average marks obtained in two tests in which students have performed well, shall be considered as provisional marks obtained by the student in the tests.
- iii) If the candidate appears only for two tests conducted during the semester, he/ she will not be given benefit of the best performance in the tests.
- iv) If the candidate appears only for one test conducted during the semester, to calculate the marks obtained in the tests it will be considered that the candidate has got 0 (zero) marks in other tests.
- v) The provisional marks obtained by the candidate in class tests should reflect as proportional to theory marks. In cases of disparity of more than 15% it will be scaled down accordingly; These marks will be final marks obtained by the student. No scaling up is permitted.
- vi) If the candidate is absent for theory examination or fails in theory examination his final marks for tests of that subject will not be declared. After the candidate clears the theory, the provisional marks will be finalized as above.

Paper Pattern for Tests

- i) All questions will be compulsory with weightage as following

Question 1	-	7 marks
Question 2	-	7 marks
Question 3	-	6 Marks

- ii) There will not be any sub-questions.

For granting the term it is mandatory to appear for all the three tests conducted in each semester.

Roll numbers allotted to the students shall be the examination numbers for the tests.



SEMESTER - I



TEACHING SCHEME

Lectures : 04 Hrs/week

Tutorials : 01 Hr/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

Unit-I

(09 Hours)

Matrices:

Rank of a Matrix, Reduction to Normal Form, Consistency of Systems of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations, Eigen values and Eigen vectors, Cayley - Hamilton Theorem, Reduction of Quadratic Forms, Sylvester's Theorem (without proof) to find functions of a matrix, Application to problems in Engineering (Translation and Rotation of Matrix).

Unit-II

(08 Hours)

Complex Numbers and Applications:

Definition, Cartesian, Polar and Exponential Forms, Argand's Diagram, Demoiivre's Theorem and its applications, Hyperbolic Functions and Logarithms of Complex Numbers, Separation of Real and Imaginary Parts, Application to problems in Engineering.

Unit III

(09 Hours)

Differential Calculus:

Successive Differentiation, n^{th} Derivatives of Standard Functions, Leibnitz's Theorem.

Mean Values Theorems:

Rolle's Theorem, Lagrange's and Cauchy's Mean Value Theorems

Unit-IV

(09 Hours)

Infinite Series:

Infinite Sequences, Infinite Series, Alternating Series, Test for Convergence, Absolute and Conditional Convergence, Power Series, Range of Convergence

Expansion of Functions:

Taylor's and Maclaurin's Series

Unit-V

(09 Hours)

Differential Calculus:

Indeterminate Forms, L Hospital's Rule and Evaluation of limits.

Partial Differentiation and Applications:

Partial Derivatives, Euler's Theorem on Homogeneous Functions, Composite Function, Total Derivatives, Differentiation of Implicit Functions, Change of Independent Variables.

Unit-VI

(08 Hours)

Jacobian:

Jacobians and their applications, Chain Rule, Functional Dependence, Errors and Approximations.

Maxima and Minima:

Maxima and Minima of Functions of two variables, Lagrange's Method of Undetermined Multipliers.

Text Books/References

Advanced Engineering Mathematics, 5e, by Peter V O'Neil (Thomson Learning)

Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)

Advanced Engineering Mathematics by Wylie C.R. and Barrett L.C. (McGraw-Hill)

Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education)

Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi)

Applied Mathematics (Volume I & II) by P. N. Wartikar and J. N. Wartikar (Pune Vidyarathi Griha Prakashan)

A Text Book of Engineering Mathematics - I by P. N. Wartikar and J. N. Wartikar

Syllabus for Unit Test

Unit Test 1	Unit III & IV
Unit Test 2	Unit I & V
Unit Test 3	Unit II & VI



TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

TW : 25 Marks

PHYSICS

Unit-I

(08 Hours)

Optics - I:

Interference: Interference of waves. Visibility of fringes, interference due to thin film of uniform and nonuniform thickness, Newton's rings, Michelson's interferometer, Engineering applications of interference (optical flatness, interference filter, non-reflecting coatings, multi-layer ARC, gravitational sensors using interference (for detection of mineral deposits.)

Diffraction: Classes of diffraction, diffraction at a single slit (geometrical Method), condition for maximum and minimum, Diffraction at a circular aperture (Result only), Plane diffraction grating, Conditions for principal maximum and minimum, Rayleigh's criterion for resolution, Resolving power of grating and telescope, Fresnel's zone plate, Gabor's zone plate.

Unit-II

(08 Hours)

Optics - II:

Polarisation: Introduction, Polarisation by reflection, Law of Malus, Brewster's law, Double refraction and Huygen's theory, Positive and negative crystals Nicol prism, Dichroism, Polaroids, Elliptical and circular polarisation, Quarter and half wave plates, Production of polarised light, Analysis of polarised light, Photoelasticity.

Lasers: Spontaneous and stimulated emission, Population inversion, Ruby laser, Helium-Neon laser. Semiconductor laser, Properties of lasers, Applications of lasers (engineering / industry, medicine, communication, computers). Holography, Compton effect, Compton shift.

Unit-III

(08 Hours)

Acoustics and Ultrasonics:

Elementary acoustics, Reverberation and reverberation time, Sabine's formula, Intensity level, Sound intensity level, Threshold of hearing, Audibility curve, Limits of audibility, Ultrasonic waves, Production of ultrasonic waves by piezo-electric oscillator and magnetostrictive oscillator, Application of ultrasonic waves.

Superconductivity and Spectroscopy:

Introduction, Properties of a super conductor, Meissner's effect, Critical, Field, Type of superconductors, BCS theory, High temperature superconductors. Application of superconductors, Effect of magnetic field on spectral lines - Zeeman effect (normal and anomalous), Raman effect.

Term Work

Experiment

Any five experiments from the following:

Wavelength by diffraction grating

Newton's rings

Ultrasonic interferometer

Sound intensity level measurement

Wavelength of laser by diffraction

Determination of refractive index for O-ray and E-ray

Brewster's law

Assignment

Any two of the following:

Laser interferometry

Different spectroscopic methods - a comparison (IR, Zeeman, UVR, etc.)

Acoustic grating - principle, working and applications

Crystal structure - powder method

Text Books/References

Fundamentals of Optics - Jenkins and White, McGraw Hill International Book Company Ltd.

Optics - Subramanyam and Brij Lal, S. Chand & Company Ltd.
Modern Physics - J. B. Rajam, S. Chand & Company Ltd.
Modern Physics - B. L. Thereja, S. Chand & Company Ltd.
Introduction to Solid State Physics - C. Kittel, Wiley Eastern Ltd.
Engineering Physics - Sen, Gaur and Gupta, Dhanpat Rai & Sons

CHEMISTRY

Unit-IV

(08 Hours)

Water:

Structure of water, Effects of hard water on boilers and heat exchangers

- (a) corrosion (b) caustic embrittlement (c) scales and sludges
- (d) priming and foaming.

Water softening methods for industrial purpose:

- (a) Permutit or zeolite process (b) Phosphate conditioning.

Water softening for drinking purpose:

Drinking water or Municipal water and purification of water for domestic use

- (a) Removal of suspended impurities: screening, sedimentation, filtration (b) Removal of microorganism-by boiling, by adding bleaching powder, by chlorination, by using chloramine tablets, by using Ozone gas

Toxic elements in water and their adverse effects:

Toxic effects of the elements like Arsenic, cadmium, lead and Mercury etc,

Numericals based on the Zeolites.

Unit-V

(08 Hours)

Electrochemistry:

Introduction, Arrhenius Ionic theory, Kohlrausch's law of conductivity of electrolytes, Law of independent migration of ions, Laws of electrolysis, Ostwald's dilution law, Acids and Base, concept of pH and pOH, Buffer solutions, Solubility Product, Redox Reactions.

Electrode Potential, electrochemical cell, concentration cell, reference Electrodes, Polarization, Decomposition Potential, Overvoltage, and

Conductometric Titrations.

Batteries, Fuel cells, Aluminium-Air Battery, Lead Acid Storage Cell, numericals based on the above articles.

Unit-VI

(08 Hours)

Fuels:

Classification of fuels, calorific value of fuels, NCV and GCV, Determination of calorific values using Bomb calorimeter and Boys' gas calorimeter, Theoretical calculation of calorific value of a fuel, Analysis of coal: a) proximate b) ultimate analysis of coal, Pulverized coal metallurgical coke, Petroleum cracking synthetic Petrol, Refining of gasoline, Reforming knocking Non Petroleum fuels like natural gas and oil gas, Analysis of fuel gas, Petrochemicals, Numericals based NCV, GCV

Term Work

Experiments

Any five experiments of the following

Determination of total residual chlorine in water

To find out the strength of given hydrochloric Acid solution by titrating against standard NaOH solution using pH-meter

Determination of coefficient of viscosity by Ostwald's Viscometer

Estimation of Moisture and Ash content in a given sample of coal

Determining the strength of hydrochloric Acid conductometrically

Determination of equivalent of calorimeter

To set up Daniel Cell

Text Books/References

Engineering Chemistry by Jain and Jain, Dhanpat Rai Company (P) Ltd, New Delhi

Chemistry of Engineering Materials, Agarwal C.V, Rata Publication Varanasi, 6th edition (1979)

Chemistry in Engineering and Technology, Volume W, Tata McGraw Hill Publishing Company Ltd, New Delhi (1988)

Applied Chemistry, O. P. Vidyankar, J. Publications, Madurai, (1955)

Engineering Chemistry, S. N. Chand and Co., Jalandhar, 31st Edition (1990)

Engineering Chemistry by Dara S. S. Chand Publications

Fundamentals of Electrochemistry, V.S. Bagotsky (Ed) Wiley NY (2006)

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI





K60103: ELEMENTS OF MECHANICAL ENGINEERING

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

TW : 25 Marks

Unit-I

(08 Hours)

Thermodynamic Concepts and Laws:

Fundamental Concepts and Definitions: Thermodynamic system, Surroundings and boundary, Thermodynamic properties, Thermodynamic processes and cycles, Energy, Power, Work and heat. Zeroth law of Thermodynamics, Temperature and Temperature scale, Pressure and its measurement, Macro and microscopic approach.

Laws of Thermodynamics:

Principles of conservation of mass and energy, continuity equation, First law of Thermodynamics, Joule's experiment. Application of first law to non flow processes and cycles. Concept of internal energy, flow energy and enthalpy. Application of steady flow energy equation to nozzles, turbines, heat exchangers and pumps.

Unit-II

(08 Hours)

Power Conversion Devices:

Power Producing Devices: Boilers and Steam turbines, reciprocating I. C. Engines, Gas turbines, Hydraulic turbines, Compressed air motor (Theoretical study using schematic diagrams)
Power Absorbing Devices: Reciprocating pumps and compressors, Centrifugal pumps and rotary compressors. Study of Household refrigerators and window air conditioners using schematic diagrams (Elementary treatment only. No Numericals)

Unit-III

(08 Hours)

Energy Sources and Heat Transfer:

Sources of Energy: Thermal, Hydraulic, Nuclear, Wind, Solar, Tidal,

Biogas, ocean thermal energy (Schematic of plant layout)

Heat Transfer: Basic modes of heat transfer, conduction, convection and radiation. Statement and explanation of Fourier's law of heat conduction, Newton's law of cooling, Stefan-Boltzman's law of radiation. Conducting and insulating materials and their properties. Description and types of heat exchangers.

Unit-IV

(08 Hours)

Processes of Ideal Gases and Steam:

Ideal gas and Processes: Ideal gas definition, Gas Laws, The characteristic equation of ideal gas, Universal gas constant, Relationship between C_p and C_v . Non flow processes using ideal gas.

Properties and Processes of Steam: Formation of steam, phase changes, properties of steam. Use of steam tables, Workdone and heat transfer during constant pressure, constant volume, isothermal, hyperbolic, adiabatic, polytropic and throttling processes on steam.

Unit-V

(08 Hours)

Manufacturing Process:

Metal Cutting Machine Tools: Lathe Machine - Centre lathe (Basic elements, working principle and types of operations). Drilling Machine - Pillar drilling machine (operation only) Introduction to NC, CNC machines, classification, principles and explanation with block diagram, Sheet metal working, piercing and blanking operations on punching press. Non-traditional machining processes like electro-discharge machining and electro-chemical machining.

Metal Joining Processes: Welding, soldering, brazing methods and applications.

Unit-VI

(08 Hours)

Mechanical Devices and Machine Elements:

Individual and group drives, belt drive, rope drive, chain drive, gear drive and friction clutches (types and applications only). Power transmission shafts, axles, Keys, couplings, bush and ball bearings (Types

and applications only).

Description and application of ON-OFF valves, Non return valves, pressure regulating valves, throttle valves and butterfly valves.

Term- work

The term work shall consist of the study and demonstration on any five from the first six and any three from remaining list

Water tube boiler or smoke tube boiler

Reciprocating air compressor

Internal combustion engine

Household refrigerator / window air conditioner

Heat exchangers

Water turbines

Power transmission devices

Lathe and drilling machine

Valves

NC / CNC Machine

Text Books/References

Thermodynamics and Heat Engines by Domkundwar and Kothandaraman, Publisher Dhanpatrai & Co. Ltd, Educational and Technical Publisher

Elements of Workshop Technology Vol- I and II by Choudhary, Hajara S. K., Media Promoters & Publishers (Pvt) Ltd.

Basic Engineering Thermodynamics by Reyner, Joel, Publisher - Addison Wesley Longman Limited

Thermodynamics and Engineering Approach by Y. A. Cengal and M. A. Boles, Tata Mc Graw Hill Publishing Ltd., New Delhi

Vickers Industrial Hydraulic Manual

Design of Machine Elements, V. B. Bhandari, Tata Mc Graw Hill Publishing Company Ltd.

Theory of Machines- S. S. Rattan, Tata Mc Graw Hill Publishing Company Ltd.

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI



TEACHING SCHEME

Lectures : 03 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. : 25 Marks

Unit-I

(07 Hours)

Introduction and Linear Measurements:

Branches of Civil Engineering, applications of Civil Engineering to other disciplines in Engineering, role of Civil Engineer in various construction activities. Principles of surveying, classification of surveys, scale and Representative fraction, linear measurement - instruments used, direct ranging.

Unit-II

(06 Hours)

Angular Measurement:

Study of prismatic compass, types of bearings and reference meridians, measurement of bearing and angles, local attraction and its adjustment, adjustment of closing error, dip and declination, open and closed traverse.

Unit-III

(07 Hours)

Vertical Measurements and Modern Equipments:

Study and use of auto and dumpy level and leveling staff, temporary adjustment of dumpy level, types of bench marks, reduction of levels by collimation plane and rise and fall method. Contours - uses and characteristics. Modern equipments - Electronics Distance Meter - principle and basic functions, Total Station and its field applications, study of Global Positioning System, measurement of area by mechanical and digital planimeter.

Unit-IV

(07 Hours)

Building Planning, Construction and Materials:

Building Planning: Site selection, building plans, elevation, and principles

of planning. Building byelaws-necessity, Floor Space Index, heights, open space requirement, set back distances, ventilation and lighting, concept of carpet and built up area. Constructions: types of structures-load bearing, framed and composite structures, building components. Construction materials: concrete and its ingredients, cement, reinforcement steel, bricks.

Unit-V

(08 Hours)

Foundations:

Building foundation- necessity and functions, concept of bearing capacity of soil and rock, foundation settlement, differential settlement, types of foundation - shallow and deep, and causes of foundation failure. Earthquake, causes of earthquake, Definition of terms- focus, epicenter, isoseismal lines, seismograph, seismogram, intensity, magnitude of earthquake, earthquake zones as per IS codes, effect of earthquake on civil structures.

Unit-VI

(08 Hours)

Infrastructure::

Roads- types of roads and their suitability, cross section of roads; meaning of terms: width of road, super elevation, camber, gradients, sight distance; materials used in construction of roads. Railways- advantages types of gauges, section of railway track, components of railway track. Bridges-necessity, components of bridges - sub structures and super structure.

Term Work

Any eight practical exercises from those given below should be carried out and record to be submitted in the field book and drawings which will form part of term work

Study and use of prismatic compass and measurement of bearings and determination of included angles

Measurement of bearings of a polygon and plotting on drawing sheet and adjustment of closing errors by Bowditch method

Study and use of dumpy level and leveling staff, simple leveling

Differential leveling and reduction of levels by collimation plane and rise and fall method

Measurement of areas of irregular figures by mechanical planimeter
Study and use of Electronic Distance Meter and digital planimeter
Drawing plan and elevation of a single storied residential building with minimum 60 sq. meter built up area, preparing schedule of openings
Study and use of hand held GPS
Reading of Morphological features from topographical Maps

Text Books/References

Introduction to Surveying - M. Anderson, McGraw Hill Publication
Surveying for Engineers - W. Uren, J. Price, Macmillan Publication
Surveying and Leveling - T. P. Kanetkar and S. V. Kulkarni, PVG Publication, Pune
Building Construction - S. P. Bindra and S. P. Arrora, Dhanpatrai Publication, New Delhi
Building Design and Drawing - Shah, Kale, Patki. Tata McGraw Hill Publication
Foundation Engineering- Dr. B. J. Kasmalkar, PVG Publication, Pune
Principals of Geotechniocal Engineering -B. M. Das, Thomson Brooks
Text Book of Engineering Geology - Dr. R. B. Gupte, PVG Publication, Pune
Transportation Engineering - R. Paquette, John Wiley and Sons
Highway Engineering - Khanna Justo, Khanna Publishers, New Delhi

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



TEACHING SCHEME

Lectures : 03 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks
Duration : 03 Hours
Unit Test : 20 Marks
TW : 25 Marks

Unit-I

(02 Hours)

The Multi-disciplinary nature of Environmental Studies:

Definition, Scope and Importance
Need for public awareness

Unit-II

(08 Hours)

Natural Resources:

Renewable and non-renewable resources

Natural resources and associated problems

- a) Forest resources: Use and over-exploitation, deforestation case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflict's over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- f) Land resources: Land as a resource, land degradation, man induced land slides, soil erosion and desertification.

Role of individual in conservation of natural resources.

Equitable use of resources for sustainable lifestyles.

Unit-III

(06 Hours)

Ecosystems:

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

Unit-IV

(08 Hours)

Biodiversity and its Conservation:

- Introduction : Definition: genetics, species and ecosystem diversity
- Biographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, national and local level.
- India as a mega - diversity nation.
- Hot spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife conflict, man wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit-V

(07 Hours)

- Definition, causes, effects and control measures of :
 - a) 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, cyclone and landslides.

Unit-VI

(07 Hours)

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.

Waste land 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-VII

(06 Hours)

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-VIII

(04 Hours)

Field Work/Term 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 simple ecosystems- pond, river, hill slope, etc.

The core module syllabus for Environmental studies includes class room teaching and field work. The syllabus is divided into 8 units, covering 48 lectures. The first 7 units, which cover 44 lectures, are class room teaching based and intended to enhance knowledge skills and attitude to environment. Unit 8 is based on field activities, to be covered over 4 lecture hours, and would provide students with first hand knowledge on various local environmental aspects.

Text Books/References

- Agrawal. K. C., 2001 Environmental Biology, Nidi Publ. Ltd., Bikaner
- Dr. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahemedabad- 380013, India. E.mail:mapin@icnet.net(R)
- Brunner R. C. - 1989 Hazardous Waste Incineration. McGraw Hill Inc-480p
- Clark R. S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham W. P. Cooper, T. H. Gorhani, E&Hepworth M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai 1196 p
- De A. K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Center for Science and Environment (R)
- Gleick, H. P., 1993 Water in Crisis, Pacific Institute for Studies in Dev, Environmental & Security, Stockholm Env. Institute Oxford Univ Press 473p
- Hawkins R. E., Encyclopedia of India Natural History, Bombay Natural History Society, Bombay(R)

Heywood, V .H & Watson. R.T. 1995, Global Biodiversity Assessment Cambridge, Univ. press 1140 p

Jadhav H. & Bhosale V. M., 1995, Environmental Protection and Laws, Himalayas

Syllabus for Unit Test

Unit Test 1	Unit I, II & III
Unit Test 2	Unit IV & V
Unit Test 3	Unit VI & VII



123



TEACHING SCHEME

Lectures : 02 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

T. W. : 50 Marks

Unit-I

(08 Hours)

Orthographic Projections and Missing Views:

Quadrants, 1st and 3rd angle method of orthographic projections. Concept of horizontal, vertical and end vertical planes. Sectional views. Interpretation of an object from the given orthographic projections. Drawing of the third view from the two views. Dimensioning of the views.

Unit-II

(06 Hours)

Isometric Projection, Geometrical Curves, Link Mechanisms, CAD:

To draw isometric projection or isometric view from given orthographic projections of an object. Isometric scale. To draw Ellipse, Cycloid, Spiral, Involute and Helix. To find the locus of points in simple mechanisms. To write commands in order to get / draw the figures of simple objects using Auto-CAD.

Term work

Term work shall consist of five half-imperial size or A2 size (594 mm x 420 mm) sheets and one assignment on Auto-CAD.

SHEETS

Types of lines, Dimensioning practice, Free hand lettering, 1st and 3rd angle methods symbol.

Orthographic Projections

Missing views

Isometric views

Curves and loci of points

Assignment

Drawing of simple figures using AutoCAD and writing the required commands in order.

Text Books/References

- M. B. Shah and B. C. Rana, "Engineering Drawing", 1st Ed, Pearson Education, 2005
- P. S. Gill, "Engineering Drawing (Geometrical Drawing)", 10 Edition, S. K. Kataria and Sons, 2005
- N. D. Bhatt and V M. Panchal, "Engineering Drawing (Plane and Solid Geometry)", 42th Edition, Charotar Publishing House, 2000
- Warren J. Luzadder and Jon M. Duff, "Fundamentals of Engineering Drawing", Prentice Hall of India Pvt. Ltd., 11 Edition, 1995
- P. J. Shah, "Engineering Drawing", C. Jamnadas and Co., 1 Edition, 1988
- P. Nageswara Rao, "AutoCAD 14 for Engineering Drawing Made Easy", Tata McGraw Hill Co. Ltd., 1A Edition, 2000
- C. R. Shrock, "Exercise Workbook for Beginning AutoCAD", New Age International Publishers, 1 Edition, 2006





TEACHING SCHEME

Practical : 02Hrs/week

EXAMINATION SCHEME

T. W. : 50 Marks

Term work of Workshop Practice I and Workshop Practice II shall consist of two sets viz. SET A and SET B. Students are required to complete any one set in first semester for term work of Workshop Practice I and the remaining set shall be completed as term work of Workshop Practice II in second semester.

Set A shall consist of

Jobs:

- 1) Wood Working- one job involving joint, wood turning, use of filler materials and adhesives
- 2) Welding- one job with edge preparation and simple joint using gas or arc welding.
- 3) Soldering- Fabrication of at least 5 electronic components on a PCB.
- 4) Demonstration on a centre lathe and CNC lathe.

OR

a suitable combination of above operations to make a composite job either individually or in a group.

Journal:

Journal shall consist of write-up about materials, equipments used in above processes, specific procedures followed, and safety precautions.

Set B shall consist of

Jobs:

- 1) Fitting- One job with one joint along with drilling, tapping, hacksaw cutting
- 2) Tinsmithy- One job including riveting/soldering
- 3) Black Smithy- One job with at least two different operations
- 4) Plastic moulding- One plastic component on injection moulding machine.

OR

a suitable combination of above operations to make a composite job either individually or in a group.

Journal:

Journal shall consist of write-up about materials, equipments used in above processes, specific procedures followed, and safety precautions.

At the end of each semester students are required to submit the completed jobs and journal for assessment of work done in workshop.



SEMESTER - II



TEACHING SCHEME

Lectures : 04 Hrs/week

Tutorials : 01 Hr/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

Unit-I

(09 Hours)

Differential Equations:

Differential Equations of First Order and First Degree, Exact Differential Equations and Reducible to Exact form, Linear Differential Equations, Reducible to Linear types, Method of Substitution and Miscellaneous Types, Differential Equations of First and Higher degree.

Unit-II

(08 Hours)

Applications of Differential Equations (of First Order and First Degree):

Orthogonal Trajectories, Atmospheric Pressure, Newton's Law of Cooling, Motion Under Gravity and Rectilinear Motion, L-R, R-C and L-C Circuits, Applications to Mass-Spring System, One Dimensional Conduction of Heat Applications to Chemical Engineering.

Unit-III

(09 Hours)

Solid Geometry:

Cartesian, Spherical Polar and Cylindrical Coordinate systems, Relation between coordinate systems. Sphere, Tangent Plane of the Sphere, Sphere through a Circle, Orthogonal Spheres, Cone and Cylinder, Quadratic surfaces.

Unit-IV

(09 Hours)

Fourier Series:

Definition and Dirichlet's Conditions, Full range Fourier series on $c - x$ to $c + 2L$ and $c - x$ to $c + 2L$, Expansions of even and odd Periodic functions

on $-L$ to L and $-L$ to L , Half Range Fourier Expansions Harmonic Analysis and Application to problems in Engineering

Integral Calculus (Single Integral):

Reduction formulae for Trigonometric functions, Beta and Gamma functions.

Unit-V

(08 Hours)

Integral Calculus (Single Integral):

Differentiation Under the Sign of Integration, Error functions.

Curve Tracing:

Tracing of Cartesian, Polar and Parametric curves, Rectification of curves

Unit-VI

(09 Hours)

Multiple Integrals and their Application:

Double and Triple Integrations, Application of Multiple Integral to Areas and Volumes, Mean and RMS Values, Mass, Centre of Gravity and Moment of Inertia.

Text Books/References

Advanced Engineering Mathematics, 5e, by Peter V. O'Neil (Thomson Learning)

Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)

Advanced Engineering Mathematics by Wylie C.R. and Barrett L. C. (McGraw-Hill)

Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education)

Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi)

Applied Mathematics (Volume I & II) by P. N. Wartikar and J. N. Wartikar (Pune Vidyarthi Griha Prakashan)

A Text Book of Engineering Mathematics - II by P. N. Wartikar and J. N. Wartikar

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hr/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. : 25 Marks

PHYSICS

Unit-I

(09 Hours)

Modern Physics:

Motion of a charged particle in electric and magnetic fields, Electrostatic and Magnetostatic focusing, Wavelength and resolution. Specimen limitation, Depth of field and focus. Electron microscope. Positive rays, Separation of isotopes by Bainbridge mass spectrograph.

Nuclear Physics:

Nuclear fission, Liquid drop model of nucleus, Nuclear fission in natural uranium. Fission energy, Critical mass and size. Reproduction factor, Chain reaction and four factor formula. Nuclear fuel and power reactor, Nuclear fusion and thermonuclear reactions. Merits and demerits of nuclear energy, Particle accelerators, Cyclotron, Betatron, Microtron.

Unit-II

(08 Hours)

Quantum Mechanics:

Wave nature of matter, De-Broglie waves. Wavelength of matter waves. Electron diffraction, Davisson and Germer's experiment, Heisenberg's uncertainty principle with illustrations, Schrodinger's time dependant and time independent wave equation, Physical significance of wave function. Application of Schrodinger's time independent wave equation to the problems of (1) Electron gas, (2) Step potential (3) Potential barrier, (4) Particle in a rigid box (5) Particle in a non-rigid box (Boundary condition and result).

Unit-III

(07 Hours)

Electrical Properties:

Band theory of solids. Band structures of Lithium, Sodium, Beryllium, Silicon and Diamond, Classification of solids on the basis of band theory,

Fermi-Dirac probability function and position of Fermi level in intrinsic semi-conductors (with derivation) and in extrinsic semiconductors. Band structure of p-n junction diode under forward and reverse biasing, Conductivity in semi-conductor, Hall effect and Hall coefficient, Photovoltaic effect, Solar cell and its characteristics.

Term Work

Experiments:

Any five experiments from the following:
Determination of band gap of semi-conductor
Solar cell characteristics
 e/m by Thomson's method
Uses of CRO for measurement of phase difference by Lissajous figures
Hall effect and Hall coefficient
Conductivity by four probe method
Diode characteristics (Zener diode. Photo diode. LED, Ge/Si diode)
Plank's constant by photodiode

Assignments:

Any **two** of following:
Harmonic oscillator
Nuclear radiation detectors
Scanning electron microscope and scanning tunneling microscope
Advanced opto-electronic devices

Text Books/References

Physics for Engineers - Srinivasan M. R., New Age International (P) Ltd.
Atomic Physics - Weher and Richards, Narosa Publishing House
Modern Physics - B. L. Thereja, S. Chand & Company Ltd.
Atomic Physics - J. B. Rajam, S. Chand & Company Ltd.
Principle of Electronics - V. K. Mehta, S. Chand & Company Ltd.
Electronics Principles - A. P. Molvino, McGraw Hill International Book Company Ltd.

CHEMISTRY

Unit-IV

(08 Hours)

Corrosion And Its Control:

Definition, dry or Chemical corrosion, wet or Electrochemical corrosion, mechanism of wet or electrochemical corrosion, Galvanic Corrosion, concentration cell corrosion passivity, underground or soil corrosion, pitting corrosion, inter granular corrosion, stress corrosion, microbiological corrosion.

Electrochemical and galvanic series, Factors influencing corrosion and corrosion control.

Unit-V

(08 Hours)

Polymers:

Definition and Classification based on origin and thermal behavior, Polymerisation reactions, Functionality, Degree of Polymerization, tacticity. Types of Polymerization - Addition and condensation, Thermo-softening and Thermosetting Plastics, Polymerisation reactions, properties and uses of some polymers such as Polyethylene, Polypropylene, Polyvinyl Acetate, Polystyrene, Teflon, Melamine Formaldehyde, PMMA, SBR. Polymers in Medicine and surgery, Polymer blends and Alloys, Engineering Plastics.

Unit-VI

(08 Hours)

Instrumental Methods Of Chemical Analysis:

Infrared Spectroscopy, Visible Spectroscopy, Ultraviolet Spectroscopy. Introduction, Principle, Instrumentation (Schematic Diagram) and Engineering Applications of the above Techniques.

Term Work

Experiments:

Any **five** of the following:

To Determine the Molecular Weight of a polymer

Estimation of Copper from brass sample solution Iodometrically

Estimation of percentage of Iron in Plain Carbon Steel by Volumetric Method

To find the Radius of Macro Molecule by Viscometer

To Determine Surface Tension of a liquid by Stalagmometer

Determination of the strength of unknown liquid by using the colorimeter

Text Books/References

Fundamentals of Engineering Chemistry - Theory and Practice by S. K. Singh, New International Publishers

A Textbook of Engineering Chemistry by S. S. Dara, S. Chand and Company Ltd., New Delhi

Instrumental Methods of Chemical Analysis by Chatwal and Anand, Himalaya Publishing House

Engineering Chemistry by Jain and Jain

Nace Corrosion Engineers R. B. by R. Baboian, C. G. Munger

Corrosion Engineering by Mars G. Montana & Norbert D. Green

Polymer Handbook Edited by Brandrup, J. Immergut, Edmund H., etc.

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. : 25 Marks

Unit-I

(08 Hours)

Force System in a Plane:

Types of forces, Classification of a force system, Resolution of forces, Resultant of a force system in a Plane - Analytical and Graphical approach, Moment of a force, Couple, Force and Couple system about a point. Equilibrant, Free Body Diagram, Types of Supports, Conditions of Equilibrium, Equilibrium of a force system in a Plane.

Unit-II

(08 Hours)

Force System in a Space and Moment of Inertia:

Resultant and Equilibrium of a force system in a space, Moment of a force about a point and about a line. Centroid of a line element, plane areas and volume, Centre of gravity, Moment of Inertia.

Unit-III

(08 Hours)

Application of Static Equilibrium:

Analysis of Perfect Trusses - Method of Joint, Method of Section and Graphical Method, Analysis of Pin Jointed Frames, Analysis of Cables subjected to Concentrated Loads. Coefficient of Static Friction, Impending motion of Blocks, Ladder and Wedges, Belt friction & Band-brake system.

Unit-IV

(08 Hours)

Kinematics of a Particle:

Kinematics of Rectilinear motion of Particles - Equations of motion, Motion Curves, Relative motion, Dependent motion. Kinematics of Curvilinear motion of Particles - Equations of motion in Cartesian, Polar and Path variable co-ordinate system, Motion of Projectile.

Unit-V

(08 Hours)

Kinetics of a Particle:

Kinetics of Rectilinear Motion of Particles: Newton's second law of motion, D'Alemberts Principle, Work-Energy Principle, Impulse-Momentum Principle, Direct Central Impact, Coefficient of Restitution, Spring Force.

Kinetics of Curvilinear motion of Particles: D'Alemberts Principle, Work-Energy Principle, Impulse - Momentum Principle, Oblique Central Impact.

Unit-VI

(08 Hours)

Rigid Body Motion:

Kinematics of Rigid bodies: Translation and Rotation about a fixed axis, General Plane motion, Concept of Instantaneous Center of Rotation.

Kinetics of Rigid bodies: General Plane motion, D'Alemberts Principle, Work-Energy Principle.

Term Work

Experiments:

A) The term-work shall consist of total SIX experiments. (Minimum THREE from each section)

Section - I

Determination of reactions of Simple and Compound beam

Study of equilibrium of concurrent force system in a space

Determination of coefficient of friction for Flat Belt and Rope

Verification of Law of Polygon of forces

Study of Simple Lifting Machine

Section - II

Study of Curvilinear motion

Determination of Coefficient of Restitution

Determination of gravitational acceleration using Compound Pendulum

Determination of Moment of Inertia of Fly wheel

Determination of Moment of Inertia of Irregular shape body using Torsional Pendulum

B) The term-work shall also consist of minimum SIX graphical solutions of the problems on different topics. (Minimum THREE from each section)

Text Books/References

- Beer F.P. and Johnston E.R., "Vector Mechanics for Engineers- Vol.- I and Vol.-II (Statics and Dynamics)", Tata McGraw Hill Publication
- Timoshenko S. P. and Young D. H., "Engineering Mechanics (Statics and Dynamics)", McGraw Hill Publication
- Singer E. L., "Engineering Mechanics (Statics and Dynamics)", Harper and Row Publication
- Meriam J. L. and Craigie, "Engineering Mechanics (Statics and Dynamics)", John Wiley and Sons Publication
- Shames I. H., "Engineering Mechanics (Statics and Dynamics)", Prentice Hall of India (P) Ltd.
- Bhavikatti S. S. and Rajashekarappa K. G., "Engineering Mechanics", New Age International (P) Ltd.
- Tayal A. K., "Engineering Mechanics (Statics and Dynamics)", Umesh Publication
- Mokashi V. S., "Engineering Mechanics-I and II (Statics and Dynamics)", Tata McGraw Hill Publication
- Hibbeler R. C., "Engineering Mechanics (Statics & Dynamics)", McMillan Publications

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



TEACHING SCHEME

Lectures : 03 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 04 Hours

Unit Test : 20 Marks

T. W. : 50 Marks

Unit-III

(12 Hours)

Projections of Lines and Projections of Planes:

Projections of points. Projections of lines situated in 1st quadrant only
Horizontal trace (HT) Vertical trace (VT) Applications of lines.
Auxiliary inclined plane (AIP), Auxiliary vertical plane (AVP), distance
between skew lines, distance of a point from a line.
Projections of planes, True shape of plane, Angle between two planes,
distance of a point from a plane.

Unit-IV

(12 Hours)

Projections of Solids and Sections of Solids:

Projections of solids such as prisms, pyramids, cylinder, cone and sphere.

Projections of solids in combination.

Sections of above solids by AIP and AVP True shape of section

Unit-V

(09 Hours)

Development of Surfaces of Solids:

To draw the development of the lateral surfaces of cut prism, pyramid,
cylinder and cone.

To draw orthographic projections from the given developed surface of
solid.

Unit-VI

(09 Hours)

Intersection of Surfaces of Solids:

To draw the lines or the curves of intersection of the surfaces of solids
excluding following combination.

Pyramid-pyramid, Pyramid-cone, Cone-cone, Sphere-cone, Sphere-
pyramid.

Term Work

Term work shall consists of six half-imperial size or A2 size (594mm x 420mm) sheets.

Projections of lines

Projections of planes

Projections of solids

Sections of solids

Development of surfaces

Intersections of surfaces

Text Books/References

M. B.Shah and B. C. Rana, "Engineering Drawing", 1st Edition, Persian Education, 2005

P. S. Gill, "Engineering Drawing(Geometrical Drawing)", 10th Edition, S. K. Kataria and Sons,2005

N. D. Bhatt and V. M. Panchal, "Engineering Drawing (Plane and Solid Geometry)" 42nd Edition, Charotar Publishing House,2000

Warren J. Luzadder and Jon M. Duff, "Fundamentals of Engineering Drawing", Prentice Hall of India Pvt. Ltd.,11 Edition, 1995

P. J. Shah, "Engineering Drawing", C. Jamnadas and Co., 1- Edition, 1988

P. Nageswara Rao, "Auto CAD 14 for Engineering Drawing Made Easy", Tata McGraw Hill Co. Ltd. 1- Edition, 2000

C. R. Shrock, "Exercise Workbook for Beginning AutoCAD, New Age International Publishers, 1st Edition, 2006

Note:

Paper shall be based on the topics covered in the syllabus of Engineering Graphics-I and Engineering Graphics-II

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI



K40112: ELEMENTS OF ELECTRICAL & ELECTRONICS ENGINEERING

TEACHING SCHEME

Lectures : 04 Hrs/week

Practical : 02 Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. : 25 Marks

Unit-I

(08 Hours)

Basic Concepts in Electrical Circuits:

Fundamental electrical quantities : Potential difference (voltage), Current, Power, Energy, Circuit elements - Resistance, Inductance, Capacitance, Laws for DC circuit analysis- Kirchoff's voltage and current law, Superposition theorem, Thevenin's theorem, Maximum power transfer theorem.

Unit-II

(08 Hours)

AC Circuits:

Graphical, Mathematical and Phasor representation of ac voltage and currents, Instantaneous, Average and RMS value, Peak factor, Form factor, Periodic Time, Frequency, Phase difference, Power factor and Complex power, Analysis of series and parallel single phase ac circuits consisting of R, L, C combinations and Resonance phenomenon.

Concept of 3-phase ac supply, Supply specifications, Phase sequence, Star and delta connection and their line and phase values, Current, voltage and power relationship for balanced 3-phase star & delta connected loads (with phasor representation).

Unit-III

(08 Hours)

Magnetic circuits and Transformer:

Magnetic effects of an electric current, Magnetic Circuit Concepts terms MMF, Flux density, Field intensity, Permeability, Reluctance, Composite series and parallel magnetic circuits, Magnetization and Hysteresis curve, Hysteresis and Eddy current loss.

Introduction to 1- phase transformer, Function, Principle of operation, Types (Constructional), Specifications, EMF equation, Ideal and Practical transformer (Phasor diagram), Operation on no load and load conditions,

losses, efficiency, regulation, Determination of efficiency and regulation by direct loading, Introduction to auto transformer and instrument transformers.

Unit-IV

(08 Hours)

Electrical Power Systems:

Generation, transmission and distribution system layout (Schematic diagram with standard ratings), Types of supply system 3 phase-3 wire, 3 phase - 4 wire ac systems. Rectifiers (Single phase)-Half wave, Full wave, Bridge wave with relevant wave forms, UPS, SMPS, Stabilisers (Basic block diagram). Electrical safety, Necessity of earthing - safety and first aid measures against electric shock.

Unit-V

(08 Hours)

Electrical and Electronic Components, Devices and Integrated Circuits:

Basic principles and applications of D. C. Machines, Connection diagram, Load characteristics and Applications, Three phase induction motor - construction and working principle.

Types of Resistors (Fixed, Variable, Precision-Carbon film, metal film, wire wound) their standard values, specifications and applications. Classification of capacitors based on dielectrics(Electrolytic, Ceramic, Polyester), their standard values, specifications and applications, study of different core materials depending on range of frequencies for inductors and transformers.

Flat package, SMD's, Pin configuration and cooling of LC's, Mounting of LC's. Basic block diagram and its explanation along with specifications of Mobile phones, Fax machines, Microwaves, Personal computers.

Unit-VI

(08 Hours)

Electrical and Electronic Measuring Instruments:

Salient constructional features, operating principle, specifications of PMMC and MI voltmeter and ammeter, Dynamometer- wattmeter, Induction type single phase energy meter. Basic block diagram, its explanation, specification and applications of Digital multimeter, Function generator, CRO.

List of Practicals to be performed in the laboratory

- Verification of Kirchoff's current and voltage laws for D. C. network
- Verification of superposition theorem for a given D. C. network
- Experimental verification of current flowing through a branch of D. C. circuit using Thevenin's theorem
- Verification of maximum power transfer theorem for D. C. circuit
- Performance of 1-phase a. c. R-L-C circuit and developing phasor diagram
- Verification of relationship between star and delta connection (balanced)
- Efficiency and regulation of a given 1-phase transformer by direct loading
- Testing and operation of domestic appliances
- Use of CRO for obtaining wave forms of electrical quantities
- Load characteristics of different rectifiers

Note

The termwork shall be the record of minimum eight experiments performed from the above list.

Text Books/References

- Electrical Technology - Edward Huges (Pearson)
- Basic Electrical Engineering - D. P. Kothari, J Nagarath (TMC)
- Electrical power system technology - S. W. Fordo, D. R. Patric (Prentice Hall)
- Principles of Electronics-Dr. H. M. Rai (Satya Prakashan)
- Electronic Devices and Circuit Theory- R. L. Boylestad and L. Nashelsky (PHI)
- Electrical, Electronics Measurements and Instruments - (Satya Prakashan)
- Principles of Communication Engineering - Anokh Singh, A. K. Chhabra (S Chand)

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI



K30113: COMPUTER FUNDAMENTALS & INFORMATION TECHNOLOGY

TEACHING SCHEME

Practical : 02 Hrs/week

EXAMINATION SCHEME

T. W. : 25 Marks

Two hours per week are allocated for the term work of the said subject. The respective teacher should take the theory lecture for 1 hour and remaining 1 hour should be utilized for practicals based on the theory taught. Following are the units for the units for theory parts to be taught.

Unit-I

Computer Fundamentals:

Computer basics, data representation, number system. Computer architecture, Microcomputer PC hardware: CPU, Memory, Disks, Cards, Slots, Floppy And Modem.

Unit-II

Input/Output/Storage Devices:

Input devices: function, typical examples of input devices with their installation such As keyboard, mouse, scanners, bar code readers, MICR readers, Audio and Video input Devices.

Output devices: Typical examples of output devices with their installation such as VDU, printers, TFT, Audio and Video output devices.

Storage devices: Primary storage such as RAM, ROM, secondary storage such as floppy disk, hard disk, CD ROM, ZIP drives tape drives, DAT etc.

Unit-III

Software:

Software characteristics, Types of software's files, Introduction to OS with DOS Commands. Operating environment such as windows. Programming language with High level and low-level programming. Utility packages such as MS office with MS- Word, Power Point, Excel, CAD and their typical applications in engineering.

Unit-IV

MS-Window:

Introduction, Installation, Utilization, Features, and Accessories-notepad, paint, and word pad. Communication, Entertainment, System tools: disk cleaning, scan disk, Formatting disk, disk defragmentation etc. System setting. Control panel, desktop.

Internet: Modem Types, Connectivity, TCP/IP, ISP, ISDN, Getting connected, and WWW. Browsers such as IE-5, Email, Newsgroups, Chatting, and Internet security. Search engines such as yahoo, google, info seek, Alta Vista, hot boat etc.

Computer Network

Network, Basic concept. Layers, Topologies, Introduction to Networking. Types of LAN, WAN, MAN, Internet working. Wireless networks, Satellite links.

Unit-V

Database Management Systems (DBMS):

File concepts. Database, logical and physical databases. Data modeling: hierarchical, Network, relational, and object oriented. Concept of normalization: database creation And modification using SQL. Sample queries. Multi Media System: Introduction to Multimedia System, Multimedia components, Text, audio, video, etc.

Unit-VI

Latest trends in Information Technology:

Study of MIS, BIS, GIS, OOP Concepts: Comparison of structured and object oriented Programming language, object structures. Object classes. Inheritance, Object identity. Encapsulation, Polymorphism.

Term Work

Term work will consist of ten assignments based on above syllabus out of which four assignments will be based on C programming language.

Assignment List:

Study of various Input and Output devices like Keyboard, Mouse, Scanner, Monitor, Printer etc.

Software Installation: Install any Office suite for study purpose

Study of any Office suite: Features make new documents, save documents, edit documents.

Study of various data representation & conversion techniques (Decimal to Octal, Decimal to binary, Decimal to hexadecimal)

Study of an operating system and list its features like I/O processing, memory management, process management.

Study basic of basic UNIX OS Commands (directory, file maintenance commands)

Compare the basic features of Windows OS with Linux or UNIX OS

Design a Spreadsheet for a given application

Study of Search Engines (like Google, Yahoo, AltaVista, Info Seek) and its features & WWW technologies.

Design a 3-D structure using any design tool

List and study database driven software

Create a Database in any suitable application and perform add, delete and modify operations on it

Write a C++ program to compare 3 integer and display the greatest number

Write a C++ program to perform arithmetic operations on two complex numbers using operator overloading

Write a C++ program to study the concept of Inheritance

Required Software for above assignments:

UNIX / Linux

MS Windows

Open Office / MS Office / Star Office

3D Studio MAX / Maya

Turbo C++

Text Book/References

Dr. V Rajaraman: Computer Fundamentals

Peter Norton: Inside IBM PC, (TMH)

Tannanbaum: Computer Networks, (TMH)

Korth: Database Management Systems, (TMH) 5. Yashwant Kanitkar: C-Primer

C Programming Language : Reference and Users Manuals, Microsoft Press

Steven Alter: Information Systems, Addison Wesley

Stroutstrup: Programming in C, (TMH)



TEACHING SCHEME

Practical : 02 Hrs/week

EXAMINATION SCHEME

T. W. : 50 Marks

Students are required to complete the remaining set as the Term Work of Workshop Practice - II

Set A shall consist of

Jobs:

- 1) Woodworking-one job involving joint, woodtuning, use of filler materials and adhesives
- 2) Welding- one job with edge preparation and simple joint using gas or arc welding.
- 3) Soldering- Fabrication of at least 5 electronic components on a PCB.
- 4) Demonstration on a centre lathe and CNC lathe.

OR

a suitable combination of above operations to make a composite job either individually or in a group.

Journal:

Journal shall consist of write-up about materials, equipments used in above processes, specific procedures followed, and safety precautions.

Set B shall consist of

Jobs:

- 1) Fitting- one job with one joint along with drilling, tapping, hacksaw cutting
- 2) Tin smithy- One job including riveting/ soldering
- 3) Black Smithy- One job with at least two different operations
- 4) Plastic moulding- one plastic component on injection moulding machine.

OR

a suitable combination of above operations to make a composite job either individually or in a group.

Journal:

Journal shall consist of write-up about materials, equipments used in above processes, specific procedures followed, and safety precautions

At the end of each semester students are required to submit the completed jobs and journal for assessment of work done in workshop.





RULES REGARDING ATKT, CONTINUOUS ASSESSMENT AND AWARD OF CLASS

A. T. K. T.

A candidate who is granted term for B.Tech. Semester-I will be allowed to keep term for his/her B.Tech. Semester-II examination even if he/she appears and fails or does not appear at B.Tech. Semester-I examination.

A candidate who is granted term for B. Tech. Semester - III will be allowed to keep term for his/her B.Tech. Semester-IV examination even if he/she appears and fails or does not appear at B.Tech. Semester-III examination.

A candidate who is granted term for B.Tech. Semester-V will be allowed to keep term for his/her B.Tech. Semester-VI examination if he/she appear and fails or does not appear at B.Tech. Semester-V examination.

A candidate who is granted term for B.Tech. Semester-VII will be allowed to keep term for his/her B.Tech. Semester-VIII examination if he/she appears and fails or does not appear at B.Tech. Semester-VII examination.

A student shall be allowed to keep term for the B.Tech. Semester-III course if he/she has a backlog of not more than 3 Heads of passing out of total number of Heads of passing in theory examination at B.Tch. Semester-I & II taken together.

A student shall be allowed to keep term for the B.Tech. Semester-V of respective course if he/she has no backlog of B.Tech Semester-I & II and he/she has a backlog of not more than 3 Heads of passing in theory examination and not more than 3 heads of passing in termwork and practical examination or termwork and oral examination.

A student shall be allowed to keep term for the B.Tech. Semester-VII course if he/she has no backlog of B.Tech. Semester-III & IV and he/she has a backlog of not more than 3 Heads of passing in theory examination and not more than 3 Heads of passing in termwork and practical examination or termwork and oral examination.

CONTINUOUS ASSESSMENT

In respect of Term work at B.Tech. Semester-I & II, B.Tech. Semester- III & IV and B.Tech. Semester-V & VI, target date shall be fixed for the completion of each job, project experiment or assignment as prescribed in the syllabus and the same shall be collected on the target date and assessed immediately at an affiliated college by at least one pair of the concerned teachers for the subject and the marks shall be submitted at the end of each term to the Principal of the college.

Termwork and performance of Practical/Oral examination shall be assessed on the basis of the depth of understanding of the principles involved, correctness of results and not on ornamental or colorful presentation.

For B.Tech. Semester-VII & VIII, termwork assessment will be done by external and internal examiners jointly during the examination schedule declared by the university. The record of continuous assessment shall be made available to the examiners during Term work and practical and Term work and oral examinations. Examiner shall use this record for overall assessment of the performance of the student. Every practical/termwork assignment shall be assessed on the scale of 20 marks and weightage of 20 marks shall be distributed as follows:

Sr. No.	Activity	Marks
1	Timely Submission	04
2	Presentation	06
3	Understanding	10

Marks obtained out of 20 for all assignments together will be converted on scale of marks assigned to term work of respective subject in the structure of the course.

CLASS

The class should be awarded to the student on the basis of aggregate marks obtained together in both the semesters of the respective year by him. The award of class shall be as follows.

A	Aggregate 66% or more marks	First Class with Distinction
B	Aggregate 60% or marks but less than 66%	First Class
C	Aggregate 55% or more marks but less than 60%	Higher Second Class
D	Aggregate 50% or more marks but less than 55%	Second Class
E	Aggregate 40% or more marks but less than 50%	Pass Class