KURUKSHETRA UNIVERSITY KURUKSHETRA

SCHEME OF STUDIES & EXAMINATIONS

B.Tech. 1 ST YEAR (SEMESTER-I) COMMON FOR ALL BRANCHES (2010-2011 onwards)

Course No.	Course title	Teaching Schedule				Allotment of marks				Duration of Exams.
		L	T	P	Total	Sessional	Theory	Practical	Total	
MATH-101E	Mathematics-I	4	1	-	5	50	100	--	150	3
PHY-101E	Physics-I	3	1	-	4	50	100	--	150	3
BT-101E	Introduction to Biotechnology OR	3	1	-	4	50	100	--	150	3
HUM-101E	Communication skills in English	3	1	-	4	50	100	--	150	3
ME-101E / CE-101E / EL-101E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	3	1	-	4	25	75	--	100	3
ME-105E	OR Engg. Graphics and Drawing	-	--	3	3	50	100	---	150	3
ME-103E	Manufacturing Processes OR	4	--	--	4	50	100	--	150	3
CH-101E	Chemistry	3	1	-	4	50	100	--	150	3
CSE-101E	Fundamentals of Computer & Programming in c OR	3	2	-	5	50	100	--	150	3
EE-101E	Electrical Technology	3	2	-	5	50	100		150	3
ES-101E	Environmental Studies**	4	-	-	4	25	75	--	100	3
PHY-103E	Physics Lab.-I	-	-	2	2	25	--	25	50	3
ME-107E	Workshop Practice Or	--	--	3	3	25	--	25	50	3
CH-103E	Chemistry Lab.	--	--	2	2	25	--	25	50	3
CSE-103E	Computer Programming Lab. OR	--	--	2	2	25	--	25	50	3
EE-103E	Electrical Technology Lab.	--	--	2	2	25	--	25	50	3
ME-109E CE-109E EL-109E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	--	--	2	2	25	--	25	50	3
	Total	24/20	6/6	9/9	35/35	375/375	575/600	100/75	1050/1050	

Note:- 1.   Students will study either Group A (BT-101E, ME-101E/ CE-101E/ EL-101E, ME-103E, CSE-101E. ME107E, CSE-103E, ME-109E/ EL-109E/ CE-109E) OR Group B (HUM-101E, ME-105E, CH-101E, EE-101E, ES-101E, CH-103E, EE-103E)
SEMESTER-I/SEMESTER-II branches to be decided by the concerned institution.

2.   Students are allowed to use single memory, non-programmable scientific calculator during examination.

3.   Practical Examination will consist of 10 marks for viva-voce and 15 marks for Experiment.
*Institutes will offer one of these electives
**Subject is qualifying. It shall carry 25 sessional marks for field work (to be conducted by the institute) report.

KURUKSHETRA UNIVERSITY KURUKSHETRA

SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1 ST YEAR (SEMESTER -II) COMMON FOR ALL BRANCHES (2010-2011 onwards)

Course No.	Course title	Teaching Schedule				Allotment of marks				Duration of Exams.
		L	T	P	Total	Sessional	Theory	Practical	Total	
MATH-102E	Mathematics-II	4	1	-	5	50	100	--	150	3
PHY-102E	Physics-II	3	1	-	4	50	100	--	150	3
BT-101E	Introduction to Biotechnology OR	3	1	-	4	50	100	--	150	3
HUM-101E	Communication skills in English	3	1	-	4	50	100	--	150	3
ME-101E / CE-101E / EL-101E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. * OR	3	1	-	4	25	75	--	100	3
ME-105E	Engg. Graphics and Drawing	..	--	3	3	50	100	--	150	3
ME-103E	Manufacturing Processes OR	4	--	--	4	50	100	--	150	3
CH-101E	Chemistry	3	1	-	4	50	100	--	150	3
CSE-101E	Fundamentals of Computer & Programming in C OR	3	2	-	5	50	100	--	150	3
EE-101E	Electrical Technology	3	2	-	5	50	100	--	150	3
ES-101E	Environmental Studies**	4	-	-	4	25	75	--	100	3
PHY-104E	Physics Lab.-II	-	-	2	2	25	--	25	50	3
ME-107E	Workshop Practice Or	--	--	3	3	25	--	25	50	3
CH-103E	Chemistry Lab.	--	--	2	2	25	--	25	50	3
CSE-103E	Computer Programming Lab. OR	--	--	2	2	25	--	25	50	3
EE-103E	Electrical Technology Lab.	--	--	2	2	25	--	25	50	3
ME-109E CE-109E EL-109E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	--	--	2	2	25	--	25	50	3
	Total	20/16	6/6	9/9	35/35	375/375	575/600	100/75	1050/1050	

Note:- 1.   Students will study either Group A (BT-101E, ME-101E/ CE-101E/ EL-101E, ME-103E, CSE-101E. ME107E, CSE-103E, ME-109E/ EL-109E/ CE-109E) OR Group B (HUM-101E, ME-105E, CH-101E, EE-101E, ES-101E, CH-103E, EE-103E) SEMESTER-I/SEMESTER-II branches to be decided by the concerned institution.

2.   Students are allowed to use single memory, non programmable scientific calculator during examination.

3.   Practical Examination will consist of 10 marks for viva-voce and 15 marks for Experiment.

*Institutes will offer one of these electives

**Subject is qualifying. It shall carry 25 sessional marks for field work (to be conducted by the institute) report.

MATH-101E
MATHEMATICS-I
(COMMON FOR ALL BRANCHES)

L T P

4 1 -

Theory: 100 Marks
Sessional: 50 Marks
Total: 150 Marks
During of exam : 3 Hrs.

UNIT-I

Applications of Differentiation : Taylor's & Maclaurin's series, Expansion by use of known series, Expansion by forming a differential equation, Asymptotes, Curvature, Radius of Curvature for Cartesian, Parametric & polar curves, Centre of curvature & chord of curvature, Tracing of Cartesian & polar curves (standard curves).

UNIT - II

Partial Differentiation & its Applications : Functions of two or more variables Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, change of variables.

Homogeneous functions, Euler's theorem, Jacobian, Taylor's & Maclaurin's series for functions of two variables (without proof), Errors and approximations, Maxima-minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign.

UNIT - III

Multiple Integrals and their Applications : Double integral, change of order of integration Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variables0, Beta and gamma functions and relationship between them.

UNIT - IV

Vector Calculus : Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations, Del applied twice to point functions, Del applied to product of point functions.

Integration of vectors, line integral, surface integral, volume integral, Green's, Stoke's and Gauss divergence theorems (without proof), and their simple applications.

TEXT BOOKS:
1. Advanced Engineering Mathematics : F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.

REFERENCE BOOKS:
1. Engineering Mathematics Part-I : S.S. Sastry.
2. Differential and Integral Calculus : Piskunov.
3. Advanced Engineering Mathematics : R.K. Jain and
   S.R.K. Iyengar
4. Advanced Engg. Mathematics : Michael D. Greenberg

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

PHY-101E
PHYSICS-I
(COMMON FOR ALL BRANCHES)

L T P   Theory: 100 marks
3 1   Sessional: 50 marks
                                                          Total: 150 marks
                                                          Time: 3 Hrs.

UNIT-I

PHYSICAL OPTICS
Interference: Division of wave front-Fresnel's biprism, Division of amplitude-Newton's rings, Michelson interferometer, applications.
Diffraction: Difference between Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a slit.   Plane transmission diffraction grating, its dispersive and resolving powers.
Polarization: Polarised and unpolarized   light, double refraction; Nicol   prism, quarter and half wave plates, Polarimetry; Biquartz and Laurent's half-shade polarimeters, Simple concepts of photoelasticity.

UNIT-II

LASER: Spontaneous and stimulated emissions, Laser action, characteristics of laser beam-concepts of coherence,   He-Ne   and semiconductor lasers (simple ideas), applications.
FIBRE OPTICS: Propagation of light in fibres, numerical aperture, single mode and multi mode fibres, applications.

UNIT-III

WAVE AND OSCILLATIONS: Simple concepts of Harmonic Oscillator, resonance, quality factor. E.M. wave theory-review of basic ideas, Maxwell's equations, simple plane wave equations, simple concepts of wave guides and co-axial cables, Poynting vector.
DIELECTRICS: Molecular theory, polarization, displacement, susceptibility, dielectric coefficient, permitivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field. Behavior of dielectrics in a.c. field-simple concepts, dielectric losses.

UNIT-IV

SPECIAL THEORY OF RELATIVITY: Michelson-Moreley experiment, Lorentz transformations, variation of mass with velocity, mass energy equivalence.
NUCLEAR PHYSICS: Neutron Cross-section, Nuclear fission, Moderators, Nuclear reactors, Reactor criticality, Nuclear fusion. Interaction of radiation with matter-basic concepts, radiation detectors-ionisation chamber, G.M. Counter, Scintillation and solid state detectors, cloud chamber and bubble chamber.

TEXT BOOKS:
1. Physics of the Atom - Wehr, Richards & Adair (Narosa)
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics - A.S. Vasudeva (S. Chand)
REFERENCE BOOKS:
1. Electricity and Magnetism - F.W. Sears (Narosa)
2. Physics Vol-I & II - Resnick & Halliday (Wiley Eastern)
3. A Text Book of Optics - Brij Lal & Subramanyam

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit.   All questions will carry equal marks.

Ist YEAR B.TECH
INTRODUCTION TO BIOTECHNOLOGY
(BT-101 E)

L T P/D   Theory: 100 marks
3 1   Sessional : 50 marks
                                                   Total: 150 marks
                                                   Time: 3 Hrs.

UNIT - I

Introduction to life: Characteristics of living organisms. Hierarchy of organisation and factors responsible for regulating different levels of organisations. Structure of Prokaryotic and Kukaryotic cell. Basic concept of State and Homeostasis.

Introduction to Biomolecules: Definition, general classification and important functions of carbohydrates, lipids, proteins, nucleic acids and vitamins.

Enzymes as biocatalysts: General characteristics, nomenclature and classification of Enzymes. Effect of temperature, pH, enzyme and substrate concentrations on the activity of enzymes. Elementary concept of cofactors and coenzymes.

UNIT - II

Biodiversity :

    (i)   **Plant System :** Basic concepts of plant growth, nutrition, photosynthesis and nitrogen fixation. Types of Growth regulators and their physiological effects.

    (ii)   **Animal System :** Elementary Study of Digestive, Respiratory, Circulatory, Excretory systems and their functions.

    (iii)   **Microbial System :** History of Microbiology, types of microbes and properties. Economic importance and control of microbes.

UNIT - III

Evolution: Theories of evolution. Mendel's laws of inheritance. Variation and speciation.

Genetic: Cell division - Mitosis and Meiosis. Evidence of nucleic acids as a genetic material. Central Dogma.

Genetic Engineering : Elementary knowledge of Recombinant DNA Technology, Bio-informatics and Genomics.

UNIT - IV

Introduction to Biotechnology : Definition, scope and achievements. Tools used in biotechnology.

Applications of Biotechnology in Agriculture, Medicine and Environment - an elementary knowledge.

Prospects and public perception of Biotechnology.

Text/ Reference Books:

1. Cell Biology and Genetics. 9th edition. Starr, C. and Taggard; R. (2001) Thomson Learning USA.
2. Life Science of Biology 6 th edition Purves W.K.; Sadava, D.; Orians, G.H. and Heller, H.C. (2001). W.H. Freeman & company, USA.
3. Basic Biotechnology. Ratledge, C. and Kristiansen, B. (2001) Cambridge University Press.
4. Basic Biotechnology. Ignacimuthu, S.J. (2002) Tata McGraw-Hill Pub., New Delhi
5. Genes VII Lewis Benjamin (2002). Oxford Univ. Press Oxford.
6. Biotechnology 3 rd Edition. Smith, J.E. (2003) Cambridge University Press.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

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HUM-101-E
COMMUNICATION SKILLS IN ENGLISH
B.Tech. Semester-I

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L T P   **Theory: 100 marks**
3   1   **Sessional: 50 marks**
                                                                 Total: 150 marks
                                                                 Time: 3 Hrs.

This course is designed for the students of Engineering and Technology who need English for specific purposes in specific situations. It aims at imparting the communication skills that are needed in their academic and professional pursuits. This is achieved through an amalgamation of traditional lecture-oriented approach of teaching with the task based skill oriented methodology of learning.

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Unit-I

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Communicative Grammar:
Part A : Spotting the errors pertaining to nouns, pronouns, adjective and adverbs; Concord - grammatical concord, notional concord and the principle of proximity between subject and verb.
Part B : Changing the voice : from Active to Passive and Passive to Active.

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Unit-II

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Lexis: Idioms and phrases; Words often confused; One-Word Substitutes; Formation of words (suffixes, prefixes and derivatives);

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Unit-III

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Oral Communication:
Part-A: Introduction to principal components of spoken English - Transcription, Word-accent, Intonation, Weak forms in English
Part-B: Developing listening and speaking skills through various activities, such as (a) role play activities, (b) Practising short dialogues (c) Group discussion (d) Debates (e) Speeches (f) Listening to news bulletins (g) Viewing and reviewing T.V. programmes etc.

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Unit-IV

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Written Communication: Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises, dialogue writing, interpreting pictures/cartoons.

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Unit-V

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(For Internal Evaluation Only):
Book Review - Herein the students will be required to read and submit a review of a book (Literary or non-literary) of their own choice. This will be followed by a presentation of the same in the class

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Unit-VI

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Technical Writing:
(a) Business Letters, Format of Business letters and Business letter writing
(b) E-mail writing
(c) Reports, Types of Reports and Format of Formal Reports
(d) Press Report Writing

SUGGESTED READING:
1. *Language in Use (Upper intermediate Level,* Adrian Doff Christopher Jones, Cambridge University Press
2. *Common Errors in English,* Abul Hashem, Ramesh Publishing House, new Delhi.

3. *Objective English*, Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.
4. *Spoken English for India,* R.K. Bansal & J.B. Harrison, Orient Longman, Delhi.
5. *The sounds of English,* Veena Kumar, Makaav Educational Software, New Delhi.
6. *English Phonetics & Phonology*, P. Roach, Cambridge University Press, London.
7. *English for Engineers and Technologists: A Skill Approach*, Vol. 2, Orient Longman, Delhi.
8. *Business Communication,* M.S. Ramesh and C.C. Pattanshetti, R.Chand and Company, Delhi
9. *Group Discussion,* Sudha Publications/Ramesh Publishing House, New Delhi.
10. English Grammar & Composition. By Rajinder Pal & Prem Lata Suri, Sultan Chand Pub. New Delhi.

SCHEME OF EXAMINATION:

All questions will be compulsory and will cover all the aspects of the syllabus **except unit V**. There will be sufficient internal choice.

Unit-I: 20 Marks

Questions No. 1 will require the students to carefully read the sentences given and trace the errors, if any, and then supply the correct alternatives/answers.

Unit-II: 20 Marks

Question No. 2 may have four or five parts testing knowledge of different items of vocabulary.

Unit-III: 20 Marks

Question No. 3 will have four parts of 5 marks each from part A of the unit.

Note: Speaking and listening skills of part B will primarily be tested orally through internal assessment.

Unit-IV: 20 Marks

Question No. 4 may have many parts. The questions will be framed to test students' composition skills on the elements prescribed in the unit. For example, the students may be required to develop a hypothetical situation in a dialogue form, or to develop an outline, key expression etc.

Unit-V is for internal assessment only.

Unit-VI: 20 Marks

Question No. 5 may have two parts. While the one part may require the students to frame either a press/news report for the print media or write the given business letter, or e-mail a message, the second part will have a theory question on the format of formal report and business letter.

ME-101E
ELEMENTS OF MECHANICAL ENGINEERING

L T P
3 1

Theory: 75 marks
Sessional: 25 marks
Total: 100 marks
Time: 3 Hrs.

Unit-I

Properties of Steam & Boilers: Formation of steam at constant pressure, Thermodynamics properties of steam, Condition of steam, Steam tables, Measurement of dryness fraction by throttling calorimeter, Classification of boilers, Comparison of water and fire tube boilers mounting and accessories with their functions, Constructional and operational details of Cochran and Babcock and Wilcox boilers, Problems.

Steam Turbines and Condensers: Classification of turbines, Working principle of impulse and reaction turbine, Compounding of impulse turbine, Comparison of impulse and reaction turbines, Types of condensers, Cooling ponds and cooling towers, Condenser and vacuum efficiencies.

Unit-II

I.C. Engines and Gas Turbines: Introduction, Classification, Constructional details and working of two-stroke and four-stroke diesel and petrol engines, Otto, Diesel and Dual cycles, Working principle of gas turbine, Constant pressure gas turbine cycle.

Water Turbines, Pumps and Hydraulic Devices: Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Specific speed and selection of turbines, Classification of water pumps and their working, Hydraulic jack and lift.

Unit-III

Simple Lifting Machines: Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, double and triple start worm and worm wheel, Single and double purchase winch crabs, Simple and compound screw jacks. Problems.

Power Transmission Methods and Devices: Introduction to Power transmission, Belt drive, Rope drive, Chain drive, Pulley, Gear drive, Types of gears, Gear train, Clutches, Types and function of clutches, Types and function of brakes, Power measurement by dynamometer, Types of dynamometers.

Unit-IV

Stresses and Strains: Introduction, Concept & types of Stresses and strains, Poison's ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooks law, Elastic constants & their relationships, Principle stresses & strains and principal- planes, Mohr's circle of stresses. Numerical problems.

Bending Moment & Shear Force: Definitions, SF and BM diagrams for cantilever and simply supported beam. Calculation of maximum SF, BM and point of contra-flexure under the loads of (i) concentrated load (ii) uniformly distributed load (iii) combination of concentrated and uniformly distributed loads. Problems.

Text Books:
1. Strength of Materials - G.H. Ryder, Pub.- ELBS.
2. Hydraulic and Fluid Mechanics - Modi and Seth, Pub. - Standard Book House, New Delhi
3. Engineering Thermodynamics - C.P. Arora, Pub. - TMH, New Delhi
4. Thermal Engineering - A.S. Sarad, Pub. - Satya Prakashan, New Delhi.

5. Engineering Mechanics - K.L. Kumar, Pub. - TMH, New Delhi.
6. Theory of Machines - S.S. Rattan, Pub. - TMH, New Delhi.

Reference Books:

1. Strength of Materials - Popov, Pub. - PHI, New Delhi.
2. Hydraulic Machines - Jagdish Lal, Pub.- Metropolitan, Allahbad.
3. Thermal Science and Engineering - D.S. Kumar, Pub. - Kateria & Sons, New Delhi.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

CE101E
ELEMENTS OF CIVIL ENGINEERINGS

L T P   Sessional: 25 Marks
3 1 -   Exam.:   75 Marks
                                                           Total: 100 Marks
                                                           Time: 3 Hrs.

UNIT-I

Building Materials & Construction: Cement, sand, aggregate, bricks, reinforcing bars, structural steel sections.

Brick masonry: Bonds in brick work, reinforced brick work, load bearing walls, damp-proofing and water proofing, doors and windows

Making of concrete, reinforced concrete: columns, beams, lintels, floors and roofs, staircases, water retaining structures, foundations.

UNIT-II

Structural Steel: Properties, design of tension and compression members, beams and roof Trusses, constructions- rewetted bolted and welded, industrial buildings and towers

UNIT-III

Soils and Foundations: Types of soils, bearing capacity of soils, improving the bearing capacity, earth pressure, foundation for walls, columns, machines and transmission towers, pile foundation.

UNIT-IV

Water supply and treatment: Water needs, estimation of water demand, impurities in water and their sanitary significance, water quality standards, water treatment systems, distribution systems- gravity, pumping and dual system, need for sanitation, systems of sanitation-water borne and conservancy methods of sanitation, sewerage systems-partial, combined and separate systems.

References:
1. Building Construction by Sushil Kumar, Standard Pub., New Delhi.
2. Reinforced Concrete by I.C.Syal & A.K.Goyal, A.H Wheeler & Co., Delhi
3. Design of steel Structures by A.S.Arya & J.L.Ajonani Nem Chand & Bros.
4. Basics & Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age Int. Pub., New Delhi
5. Water Supply Enggi. By S.K. Garg.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

EL-101E
ELEMENTS OF ELECTRONICS ENGINEERING

L T P   Sessional: 25 Marks
3 1 -   Exam.:   75 Marks
                                                               Total: 100 Marks
                                                               Time: 3 Hrs.

UNIT-I

Semiconductors p-type, n-type, pn junction diodes, pn junction as a circuit element, its characteristics, half wave and full wave and bridge type rectifier circuits basic filter circuits, Doide as voltage multiplier, clipper & clamper circuit. Zener diode as a voltage regulator. LED its characteristics construction & applications

UNIT-II

Characteristics of transistors in different configuration. Concept of d.c. and a.c. load line and operating point selection. Various amplifiers configurations their h-parameter equivalent circuits determination of voltage gain current gain input resistance and output resistance & power gain. Concept of feedback in amplifiers, different oscillators circuits (without analysis)

UNIT-III

Differential amplifier and its transfer characteristics. IC Op-Amps, its ideal & practical specifications and measurement of parameters. Op-Amp in different modes as inverting amplifier non inverting amplifier scale changer, differentiator & integrator.

UNIT-IV

Characteristics of JFET, MOSFET, Various amplifier configurations using FET. Characteristics and Construction of SCR, TRIAC, UJT. Their basic areas applications.

Reference :

1. Electronic Devices & Circuits - Boylstad & Nashelsky.
2. Integrated Electronics By Millman & Halkias.
3. Electronic Principles - Malvino
4. Principles of Electronics - V.K. Mehta, Shalu Melta.
5. Electronic Circuits - Donald L. Shilling & Charles Belowl

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

ME-105E

ENGINEERING GRAPHICS AND DRAWING

L T P
  - 3

Examination : 100 marks
Sessional: 50 marks
Total: 150 marks
Time: 3 Hrs.

Unit-I

Introduction of Engineering equipments, Elements of engineering drawing, Types of Lines, Types of scales.
Various types of projections, First and Third angle systems of orthographic projections.
Projections of points in different quadrants.

Unit-II

Projections of straight lines - parallel to one or both reference planes, contained by one or both planes, perpendicular to one of the planes, inclined to one plane but parallel to the other plane, inclined to both the planes, true length of a line and its inclinations with reference planes, traces of a line.
Introduction, Types of planes, Projection of plane by change of position method only Projection of plane Perpendicular to both the reference planes, Perpendicular to one plane and parallel to the other plane Projection of plane Perpendicular to one plane and inclined to the other plane.

Unit-III

Projections of Polyhedra Solids and solids of Revolution - in simple positions with axis perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane and inclined to the other.
Development of surface of various simple solids such as cubes, cylinders, prisms, pyramids etc. And orthographic views,

Unit-IV

Three orthographic views of Solids, Profiles of Screw threads, Orthographic views of Nuts and Bolts.
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 NOTE: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks. Some simple exercise may be attempted with AUTOCAD
Text Book
1. Engineering Graphics using AUTOCAD 2000 : T. Jeyapoovan, Vikas Publishing House.
2. Engineering Drawing Plane and Solid Geometry : N.D.Bhatt and V.M.Panchal, Forty-
     Fourth Edition 2002, Charotar Publishing House.

Reference Books
1. Engineering Graphics and Drafting : P.S. Gill, Millennium Edition, S.K. Kataria
     and Sons.
2. A Text Book of Engineering Drawing : S.B. Mathur, Second Revised and
     Enlarged Edition 2000, Vikas Publishing House.
3. A Primer on Computer Aided Engineering Drawing-2006, Published by VTU, Belgaum.

ME- 103E
MANUFACTURING PROCESSES

L T P   Theory   : 100 marks
4   Sessional : 50 marks
                                                           Total: 150 marks
                                                           Time: 3 Hrs.

Unit-I

Introduction: Introduction to Manufacturing Processes and their Classification. Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, First Aid.

Engineering Materials: General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron.

Unit-II

Foundry: Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern Allowances, Risers, Runners, Gates, Moulding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies.

Unit-III

Cold Working (Sheet Metal Work): Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining Advantages and Limitations.

Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing. Plant Layout, Objectives of Layout, Types of Plant Layout and their Advantages.

Unit-IV

Introduction to Machine Tools: Specifications and   Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear. Mechanics of Chips Formations, Type of Chips , Use of Coolants in machining.

Welding: Introduction to   Welding, Classification of   Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding; Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing.

Text Books :
1. Workshop Technology Vol. I &II - Hazra & Chaudhary, Asian Book Comp., New Delhi.
2. Process and Materials of Manufacture-Lindberg, R.A. Prentice Hall of India, New Delhi.
3. Principles of Manufacturing Materials and Processes- Campbell, J.S.- McGraw-Hill.

Reference Books:
1. Manufacturing Science-Amitabha Ghosh & Ashok Kumar Malik, - East-West Press.
2. Manufacturing Process and Systems - Ostwald, Munoz , John Wiley.
3. Workshop Technology, Vol. 1, 2 & 3 - Chapman, WAJ, Edward Arnold.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit.   All questions will carry equal marks.

CH-101E
CHEMISTRY
(COMMON FOR ALL BRANCHES)

L T P   **Sessional : 50 Marks**
3 1 -   **Exam.:   100 Marks**
                                                            Total: 150 Marks
                                                            Time: 3 Hrs.

Unit-1

Thermodynamics - Second law, concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change, Chemical Potential, Gibb's Helmholtz equation, Clausius - Clapeyron equation, Related numerical problems with above topics. Phase-Rule - Terminology, Derivation of Gibb's Phase Rule Equation, One Component System (H_2O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

Unit-2

Water & its treatment : Part I - Sources of water, impurities in water, hardness of water and its determination, units of hardness, alkalinity of water and its determination, Related numerical problems, scale and sludge formation (composition properties and methods of prevention). Water and its treatment : Part II - Treatment of water for domestic use, coagulation, sedimentation, filtration and dis-infection, water softening, Ion-exchange process, mixed bed demineralisation, Desalination (reverse osmosis) (electrodialysis).

Unit-3

Corrosion and its prevention - Galvanic & concentration cell, Dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, pitting corrosion, water-line corrosion, differential aeration corrosion, stress corrosion, factors affecting corrosion, Preventive measures (proper design, Cathodic protection, protective coatings). Lubrication and Lubricants-Friction, mechanism of lubrication, classification and properties of lubricants, Additives for lubricants, synthetic lubricants, Greases - Preparation & properties (consistency, drop point) and uses.

Unit-4

Polymers and Polymerization-Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermo-plastics (PVC,PVA), thermosets (PF,UF), and elastomers (SBR,GR-N), Silicones, Introduction to polymeric compsites. Analytical methods;its needs and different methodes;Spectroscopy; its defination and scope;salient features of spectrophotometer,brief introduction of titrimetric methodes,Elementry discussion on flame photometry

TEXT BOOKS:
1. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai & Co.).
2. Chemistry in Engineering & Tech., Vol.I & II, Rajaram, Kuriacose (TMH).

REFERENCE BOOKS:
1. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
2. Physical Chemistry, P.W. Atkin (ELBS, Oxford Press).
3. Physical Chemistry, W.J. Moore (Orient-Longman).

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

CSE -101E
FUNDAMENTALS OF COMPUTERS & PROGRAMMING IN C

L T P
3 2

Theory: 100 marks
Sessional : 50 marks
Total: 150 marks
Time: 3 Hrs.

Unit-1

An Overview of Computer System: Anatomy of a digital Computer, Memory Units, Main and Auxiliary Storage Devices, Input Devices, Output Devices, Classification of Computers. Radix number system: Decimal, Binary, Octal, Hexadecimal numbers and their inter-conversions; Representation of information inside the computers. Operating System Basics: Introduction to PC operating Systems: DOS, Unix/Linux, Windows 2000.

Unit-2

Programming Languages: Machine-, Assembly-, High Level- Language, introduction to Assembler, Compiler, Interpreter, Debuggers, Linker and Loader. Programming fundamentals: problem definition, algorithms, flow charts and their symbols.
Internet basics: How Internet works, Major features of internet, Emails, FTP, Using the internet.

Unit-3

C Programming language: C fundamentals, formatted input/ output, expressions, selection statements, loops and their applications; Basic types, arrays, functions, including recursive functions, program organization: local and external variables and scope & arrays.

Unit-4

Strings: strings literals, string variables, I/O of strings, arrays of strings; applications. Structures, Unions and Enumerations: Structure variables and operations on structures; Structured types, nested array structures; unions; enumeration as integers, tags and types. Standard library: Input / output; streams, file operations, formatted I/O, character I/O, line I/O, block, string I/O, Library support for numbers and character data, error handling:

Text Books:
1.   Using Information Technology, 5 Edth, Brian K Williams & Stacey C. Sawyer, 2003, TMH
2.   The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
3.   C Programming - A modern approach by K.N. King, 1996, WW Norton & Co.

Reference Books:
1.   Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH
2.   Theory and problem of programming with C, Byron C Gottfried, TMH
3.   Teach yourself all about computers by Barry Press and Marcia Press, 2000, IDG Books India.
4.   Using Computers and Information by Jack B. Rochester, 1996, Que Education & Training.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

EE-101E
ELECTRICAL TECHNOLOGY

L T P
3 2

Theory: 100 marks
Sessional : 50 marks
Total: 150 marks
Time: 3 Hrs.

UNIT-I

D.C. CIRCUITS: Ohm's Law, Kirchoff's Laws, D.C. Circuits, Nodal and Loop methods of analysis. A.C. CIRCUITS: Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar & rectangular, exponential and trigonometric representations; R,L and C components, behaviors of these components in A.C. circuits. Concept of complex power, power factor.

UNIT-II

TRANSIENT RESPONSE: Transient response of RL, RC and RLC Circuits with step input.   NETWORK THEOREMS: Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, Star to Delta & Delta to Star transformation. SERIES AND PARALLEL A.C. CIRCUITS: Series and parallel A.C. circuits, series and parallel resonance, Q factor, cut-off frequencies and bandwidth.

UNIT-III

THREE PHASE CIRCUITS: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method, Importance of earthing. TRANSFORMERS: Principle, construction & working of transformer, Efficiency and regulation.

UNIT-IV

ELECTRICAL MACHINES: **D.C. Machine**: Principle, construction, EMF equation, Torque Equation, Types of Machine, internal & external characterstics, speed control. **Induction motor:** Principle, construction, EMF equation, Types of motors, slip concept, **Synchronous motor:** Principle, construction, Types of motors

TEXT BOOKS:
1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarath, TMH
2. Electrical Technology (Vol-I) : B.L Theraja & A K Theraja, S.Chand

REFERENCE BOOKS:
1. Electrical Engineering Fundamentals : Deltoro, PHI
2. Network Analysis :Valkenburg, PHI

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

ENVIRONMENTAL STUDIES
(For Under-Graduate Students)

Unit 1 : The Multidisciplinary nature of environmental studies
Definition, scope and importance.
Need for public awareness.

Unit 2 : Natural Resources

Renewable and non-renewable resources :
Natural resources and associated problems.

a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources : Use and exploitation, environmental effects of extracting and 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 landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3 : Ecosystems

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

Unit : 4 Biodiversity and its conservation

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

Unit 5 : Environmental Pollution

Definition

- Causes, effects and control measures of :
  - 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, earthquake, cyclone and landslides.

Unit 6 : Social Issues and the Environment

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

Unit 7 : Human Population and the Environment

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

Unit 8 : Field Work

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

<u>Examination Pattern</u> : The question paper should carry 100 marks
The structure of the question paper being.

PART - A	:	Short Answer Pattern	25 Marks
PART - B	:	Essay type with inbuilt choice	50 Marks
PART - C	:	Field Work	25 Marks

INSTRUCTIONS FOR THE EXAMINERS

Part - A   Question 1 is compulsory and will contain ten short-answer type question of 2.5 marks each covering the entire syllabus.

Part - B   Eight essay type questions (with inbuilt choice) will be set from the entire syllabus and the candidates will be required to answer, any four of them. Each essay type question will be of the 12½ marks.

The examination will be conducted by the college concerned at its own level earlier than the annual examination and each student will be required to score minimum of 35% marks each in theory and Practical. The marks obtained in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree. However, these will be shown in the detailed marks certificate of the student.

PHY-103E
PHYSICS LAB.-I
(COMMON FOR ALL BRANCHES)

L T P   **Sessional Work:25 Marks**
-   -   2   **Examination: 25 Marks**
                                               Total: 50 Marks
                                               Duration of Exam: 3 Hrs.

Note: Students will be required to perform atleast   10 experiments out of the list in a semester.

LIST OF EXPERIMENTS

The experiments in Ist semester will be based mainly upon optics, electrostatics, wave and oscillations which are the parts of the theory syllabus of Ist semester.

1. To find the wavelength of sodium light by Newton's rings experiment.
2. To find the wavelength of sodium light by Fresnel's biprism experiment.
3. To   find   the wavelength of various colours of   white   light   with the help of a plane transmission diffraction grating.
4. To verify Newtons formula and hence to find the focal lenth of convex lens
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the specific rotation of sugar solution by using a polarimeter.
8. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.
9. To find the frequency of A.C. mains by using sonometer.
10. To find low resistance by carrey foster Bridge
11. To find the resistance of a galvenometer by Post office Box
12. To Find Value of high Resistance by substitution method
13. To Find the value of high resistance by leakage method
14. To Convert a galveno meter in to an Ammeter of given range.

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

ME-107E
WORKSHOP PRACTICE

L T P   **Sessional Work:25 Marks**
-   -   3   **Examination: 25 Marks**
                                                   Total: 50 Marks
                                                   Duration of Exam: 3 Hrs.

NOTE :

1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.

2. At least 8 experiments/ jobs should be performed / prepared from the above list, remaining two may either be performed/ prepared from the above list or   designed & set by the concerned institution as per the scope of the syllabus of Manufacturing Processes   and facilities available in the Institute.

List of Experiments / Jobs

1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.

2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)

3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.

4. To study different types of fitting tools and marking tools used in fitting practice.

5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.

6. To prepare joints for welding suitable fo r butt welding and lap welding.

7. To perform pipe welding.

8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.

9. To prepare simple engineering components/ shapes by forging.

10. To prepare mold and core   assembly, to put metal   in the mold and fettle the casting.

11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or   V-grooves on a shaper/ planner.

12. To prepare a job involving side and face milling on a milling machine.

B.E. I/II Semester
CH-103E
CHEMISTRY LAB
(COMMON FOR ALL BRANCHES)

L   T   P   **Sessional Work:25 Marks**
-   -   2   **Examination: 25 Marks**
                                                      Total: 50 Marks
                                                      Duration of Exam: 3 Hrs.

Note: At least ten experiments are to be performed by the students.

LIST OF EXPERIMENTS
1. Determination of Ca^{++} and Mg^{++} hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting & eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
6. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.
8. To find out saponification No. of an oil.
9. Estimation of calcium in lime stone and dolomite.
10. 10. Determination of concentration of $KMnO_4$ solution spectrophotomet- erically.
11. Determination of strength of HCl solution by titrating it against NaOH solution conductometerically.
12. To determine amount of sodium and potassium in a, given water sample by flame photometer.
13. Estimation of total iron in an iron alloy.

SUGGESTED BOOKS :
1. A Text Book on Experimental and Calculation - Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
2. Essential of Experimental Engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company.
3. Theory & Practice Applied Chemistry - O.P. Virmani, A.K. Narula (New Age)

EE-103E
ELECTRICAL TECHNOLOGY LAB

L	**T**	**P**		**Sessional Work:25 Marks**
-	**-**	**2**		**Examination: 25 Marks**
				Total: 50 Marks
				Duration of Exam: 3 Hrs.

 LIST OF EXPERIMENTS

1. To verify KCL and KVL.

2. To verify Thevenin's & Norton's Theorems.

3. To verify Superposition theorems.

4. To study frequency response of a series R-L-C circuit and determine resonant frequency& Q- factor for various Values of R,L,C.

5. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R,L,C.

6. To perform direct load test of a transformer and plot efficiency Vs load characteristic.

7. To perform O.C. and S.C. tests on transformer.

8. To perform speed control of DC motor.

9. To perform O.C. and S.C. tests of a three phase induction motor.

10. Measurement of power in a 3 phase system by two watt meter method.

CSE-103E

COMPUTER PROGRAMMING LAB.

L	T	P		**Sessional Work:25 Marks**
-	-	2		**Examination: 25 Marks**
				Total: 50 Marks
				Duration of Exam: 3 Hrs.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

Representative programming problems:-

1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average mail height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices
7. Write a program to read a string and write it in reverse order
8. Write a program to concatenate two strings
9. Write a program to sort numbers using the Algorithm.
10. Represent a deck of playing cards using arrays.
11. Write a program to check that the input string is a palindrome or not.

EL-109E
ELEMENTS OF ELECTRONICS ENGINEERING LAB.

L T P   **Sessional Work:25 Marks**
- - 2   **Examination: 25 Marks**
                                           Total: 50 Marks
                                           Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS:

1. To study the half wave & full wave rectifier.

2. To study t5he effect of various filters circuits.

3. To study the characteristics of pnp & npn transistor in common amitter & determine H-parameter from characteristics

4. To study the characteristics of pnp & npn transistor in CB & determine h-parameter from characteristics

5. To determine the Av, Ai of RC coupled CE transistor amplifier

6. Determine the frequency of oscillation in herteley oscillator

7. Determine the frequency of oscillation in phase shift oscillator

8. Determine the effect of negative feedback on bandwidth & gain in CE, RC coupled amplifier

9. Study TC Op-Amp as a inverting amplifier & scale changer

10. Study IC Op-Amp as a non inverting amplifier

11. Study IC Op-Amp as an integrator

12. Study IC Op-Amp as a differentiator

ME-109E

ELEMENTS OF MECHANICAL ENGINEERING LAB.

L T P   **Sessional Work:25 Marks**
-   - 2   **Examination: 25 Marks**
                                                Total: 50 Marks
                                                Duration of Exam: 3 Hrs.

Note:

1. Total ten experiments are to be performed in the Semester.
2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

LIST OF EXPERIMENTS

1. To study Cochran & Babcock & Wilcox boilers.
2. To study the working & function of mountings & accessories in boilers.
3. To study 2-Stroke & 4-Stroke diesel engines.
4. To study 2-Stroke & 4-Stroke petrol engines.
5. To calculate the V.R., M.A. & efficiency of single, double & triple start worm & worm wheel.
6. To calculate the V.R., M.A. & efficiency of single & double purchase winch crabs.
7. To find the percentage error between observed and calculated values of stresses in the members of a Jib crane.
8. To draw the SF & BM diagrams of a simply supported beam with concentrated loads.
9. To study the simple & compound screw jacks and find their MA, VR & efficiency.
10. To study the various types of dynamometers.
11. To the constructional features & working of Pelton/Kaplan/Francis.
12. To prepare stress-strain diagram for mild steel & cast iron specimens under tension and compression respectively on a Universal testing machine.
13. To determine the Rockwell / Brinell /Vickers hardness no. of a given specimen on the respective machines.

MATH-102E
MATHEMATICS-II
(COMMON FOR ALL BRANCHES)

L T P
4 1

Theory   : 100 marks
Sessional   : 50 marks
Total   : 150 marks
Duration of exam   : 3 Hrs.

UNIT-I

Matrices & its Applications : Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and in dependence of vactors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley - Hamilton theorem and its applications.

UNIT-II

Ordinary Differential Equations & its Applications : Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legender's linear equations, simultaneous linear equations with constant co-efficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

UNIT-III

Laplace Transforms and its Applications : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivaties, transforms of integrals, multiplication by t^n, division by t. Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

UNIT-IV

Partial Differential Equations and Its Applications : Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

TEXT BOOKS:
1. Advanced Engg. Mathematics F Kreyszig
2. Higher Engg. Mathematics B.S. Grewal

REFERENCE BOOKS :
1. Differential Equations - H.T.H. Piaggio.
2. Elements of Partial Differential Equations - I.N. Sneddon.
3. Advanced Engineering Mathematics - R.K. Jain, S.R.K.Iyengar.
4. Advanced Engg. Mathematics - Michael D. Greenberg.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

PHY-102E
PHYSICS-II
(COMMON FOR ALL BRANCHES)

L T P
3 1

Theory: 100 marks
Sessional: 50 marks
Total: 150 marks
Time: 3 Hrs.

UNIT-I

CRYSTAL STRUCTURE: Space Lattice, unit cell and translation vectors, Miller indices, simple crystal structure, Bonding in solids, Experimental X-ray diffraction method, Laue method, powder Method, Point defects in solids, Elementary idea of quarks and gluons.

UNIT-II

QUANTUM PHYSICS: Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant, Group velocity and phase velocity, Schrodinger wave equations - time dependant and time independent Schrodinger equations, Elementary ideas of quantum statistics.

FREE ELECTION THEORY: Elements of classical free electron theory and its limitations, Drude's Theory of Conduction, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

UNIT-III

BAND THEORY OF SOLIDS: Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature. Hall effect and its Applications.

UNIT-IV

PHOTOCONDUCTIVITY AND PHOTOVOLTAICS: Photoconductivity in insulating crystals, variation with illumination, effect of traps, applications of photoconductivity, photovoltaic cells and their characteristics.

MAGNETIC PROPERTIES OF SOLIDS: Atomic magnetic moments, orbital diamagnetism, Classical theory of paramagnetism, ferro magnetism - molecular fields and domains.

SUPER CONDUCTIVITY: Introduction (experimental survey), Meissner effect, London equation.

TEXT BOOKS:
1. Introduction to Solid State Physics (VII Ed.) - Charles Kittel (John Wiley).
2. Quantum Mechanics - Powell and Crasemann (Oxford & IBH)
3. Fundamentals of Solid State Physics - B.S.Saxena, R.C.Gupta and P.N.Saxena (Pragati Prakashan).

REFERENCE BOOKS:
1. Sold State Physics - Pillai (New Age).
2. A text book of Engg. Physics - Avadhanulu and Kshirsagar (S.Chand)
3. Quantum Mechanics - Ghatak & Loknathan.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

PHY-104E
PHYSICS LAB.-II
(COMMON FOR ALL BRANCHES)

L T P

- - 2

Sessional Work:25 Marks
Examination: 25 Marks
Total: 50 Marks
Duration of Exam: 3 Hrs.

Note: Students will be required to perform at least10 experiments out of the list in a semester.

LIST OF EXPERIMENTS

The   experiments in Second semester will be based upon electricity, Magnetism, Modern Physics and Solid State Physics, which are the parts of theory syllabus.

1. To study He Ne laser
2. Tofind the frequency of ultrasonic waves by piezo eletric methods
3. To find the value of e/m for electrons by Helical method.
4. To find the ionisation potential of Argon/Mercury using a thyratron tube.
5. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
6. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
7. To find the value of Planck's constant by using a photo electric cell.
8. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
9. To find the value of Hall Co-efficient of semi-conductor.
10. To study the V-I characteristics of a p-n diode.
11. To find the band gap of intrinsic semi-conductor using four probe method.
12. To calculate the hysteresis loss by tracing a B-H curve.
13. To verify richerdson thermionic equation
14. To find the flashing and quenching potential of Argon and to find the cap. of unknown capacitor
15. To find the temp coeff. of resistance by using Pt resistance therometer by post office box

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