

**P.D.M. COLLEGE OF ENGINEERING**

**Sarai Aurangabad**



**SYLLABUS**

**Bachelor of Engineering**

**FIRST YEAR  
(COMMON FOR ALL BRANCHES)**

**M.D UNIVERSITY, ROHTAK**  
**SCHEME OF STUDIES & EXAMINATIONS**

**B.E I-YEAR (COMMON FOR ALL BRANCHES) SEMESTER – I 2003-2004**

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Exam. Schedule		Total Marks	Duration of Exam.
		L	T	P	Total		Theory	Practical		
HUM-101-E	ESSENTIALS OF COMMUNICATION	3	1	-	4	50	100	-	150	3
MATH-101-E	MATHEMATICS-I	3	2	-	5	50	100	-	150	3
PHY-101-E	PHYSICS-I	3	1	-	4	50	100	-	150	3
ME-103-E	MANUFACTURING PROCESSES	4	-	-	4	50	100	-	150	3
	OR									
CH-101-E	CHEMISTRY	3	1	-	4	50	100	-	150	3
CSE-101-E	FUNDAMENTALS OF COMPUTER & PROGRAMMING IN C	3	1	-	4	50	100	-	150	3
	OR									
EE-101-E	ELECTRICAL TECHNOLOGY	3	1	-	4	50	100	-	150	3
ME-101-E	ELEMENTS OF MECHANICAL ENGINEERING OR	3	1	-	4	50	100	-	150	3
ME-105-E	ENGINEERING GRAPHICS AND DRAWING	1	-	4	5	50	-	100	150	3
PHY-103-E	PHYSICS LAB – I	-	-	2	2	25	-	25	50	3
ME-107-E	WORKSHOP PRACTICE	-	-	4	4	25	-	25	50	3
	OR									
CH-103-E	CHEMISTRY LAB	-	-	2	2	25	-	25	50	3
EE-103-E	ELECTRICAL TECHNOLOGY LAB	-	-	2	2	25	-	25	50	3
	OR									
CSE-103-E	COMPUTER PROGRAMMING LAB	-	-	2	2	25	-	25	50	3
ME-109-E	ELEMENTS OF MECH. ENGINEERING LAB	-	-	2	2	25	-	25	50	3
<b>TOTAL</b>		19/16	6/6	10/12	35/34	400/375	600/500	100/175	1100/10	

Note : 1. Students will study either GROUP A (ME-101-E,ME-103-E,CSE-101-E,ME-107-E,CSE-103-E,ME-109-E) OR GROUP B(ME-105-E,CH-101-E,EE-101-E,CH-103-E,EE-103-E) Semester I/Semester II in branches to be decided by the concerned institution.

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

**M.D UNIVERSITY-ROHTAK**  
**SCHEME OF STUDIES & EXAMINATIONS**  
**BE I-YEAR (COMMON FOR ALL BRANCHES) SEMESTER – II 2003-2004**

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Exam. Schedule		Total Marks	Duration of Exam.
		L	T	P	Total		Theory	Practical		
HUM-102-E	COMMUNICATION SKILLS IN ENGLISH	3	1	-	4	50	100	-	150	3
BT-102-E	OR BASICS OF BIOTECHNOLOGY	3	1	-	4	50	100	-	150	3
MATH-102-E	MATHEMATICS-II	3	2	-	5	50	100	-	150	3
PHY-102-E	PHYSICS-II	3	1	-	4	50	100	-	150	3
ME-103-E	MANUFACTURING PROCESSES	4	-	-	4	50	100	-	150	3
	OR									
CH-101-E	CHEMISTRY	3	1	-	4	50	100	-	150	3
CSE-101-E	FUNDAMENTALS OF COMPUTER & PROGRAMMING IN C	3	1	-	4	50	100	-	150	3
	OR									
EE-101-E	ELECTRICAL TECHNOLOGY	3	1	-	4	50	100	-	150	3
ME-101-E	ELEMENTS OF MECH. ENGINEERING	3	1	-	4	50	100	-	150	3
ME-105-E	OR ENGINEERING GRAPHICS AND DRAWING	1	-	4	5	50	-	100	150	3
PHY-104-E	PHYSICS LAB – II	-	-	2	2	25	-	25	50	3
ME-107-E	WORKSHOP PRACTICE	-	-	4	4	25	-	25	50	3
	OR									
CH-103-E	CHEMISTRY LAB	-	-	2	2	25	-	25	50	3
EE-103-E	ELECTRICAL TECHNOLOGY LAB	-	-	2	2	25	-	25	50	3
	OR									
CSE-103-E	COMPUTER PROGRAMMING LAB	-	-	2	2	25	-	25	50	3
ME-109-E	ELEMENTS OF MECH. ENGINEERING LAB	-	-	2	2	25	-	25	50	3
GP-102-E	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	
<b>TOTAL</b>		19/16	6/6	10/12	35/34	425/450	500/600	175/100	1100/150	

Note : 1. Students will study either GROUP A (HUM-102-E,ME-101-E,ME-103-E,CSE-101-E,ME-107-E,CSE-103-E,ME-109-E) OR GROUP B(BT-102-E,ME-105-E,CH-101-E,EE-101-E,CH-103-E,EE-103-E) Semester I/Semester II in branches to be decided by the concerned institution.

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

HUM-101-E

**ESSENTIALS OF COMMUNICATION**  
**B.E. Semester-I**  
**(COMMON FOR ALL BRANCHES)**

L T P  
3 1 -

Class Work : 50 Marks  
Exam. : 100 Marks  
Total : 150 Marks  
Duration of Exam: 3 Hrs

The course aims at inculcating a minimum level of language proficiency among students of Engineering and Technology. The purpose is to sensitise them to the nuances of English and its applications for various communication needs.

**COURSE CONTENT:**

**Unit-I**

**Semantics:** Synonyms, Antonyms, Homophones, Homonyms, Form and function of words

**Unit-II**

**Syntax:** Sentence structures, Verb patterns and their usage

**Unit-III**

**Phonetics:** Basic Concepts - Vowels, Consonants, Phonemes, Syllables; Articulation of Speech Sounds - Place and Manner of Articulation; Transcription of words and simple sentences, using International Phonetic Alphabet.

**Unit-IV**

**Comprehension:** Listening and Reading comprehension - Note taking, Reviewing, Summarising, Interpreting, Paraphrasing and Précis Writing.

**Unit-V**

**Composition:** Descriptive, Explanatory, Analytical and Argumentative Writing - description of simple objects like instruments, appliances, places, persons, principles; description and explanation of processes and operations; analysis and arguments in the form of debate and group discussion

**Unit-VI**

**Text:** *English for Students of Science* by A.Roy and P.L. Sharma (Orient Longman)

**Chapters for Study:**

- i) "The year 2050" by Theodore J. Gordon.
- ii) "The Mushroom of Death" by A. Bandhopadhyay.
- iii) "The Discovery" by Herman Ould.

The prescribed text will be used as a case study for various components of the syllabus.

### **Unit-VII (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.

#### **TEXT BOOKS:**

1. *English for Students of Science* edited by A. Roy and P.L. Sharma, Orient Longman.
2. *Spoken English for India* by R.K. Bansal and J.B. Harrison, Orient Longman.
3. *Intermediate Grammar, Usage and Composition* by M.L. Tickoo and A.E. Subramanian, Orient Longman.

#### **SUGGESTED READING:**

1. *English Grammar, Composition and Correspondence* by M.A. Pink and S.E. Thomas, S. Chand and Sons Pvt. Ltd., Delhi.
2. *A Practical English Grammar* by Thomson and Martinet, OUP, Delhi.
3. *Guide to Patterns and Usage in English* by A.S. Hornby, OUP, Delhi.
4. *A Textbook of English Phonetics for Indian Students* by T. Balasubramanian, MacMillan, Chennai.
5. *Better English Pronunciation* by J.D.O'Connor, Cambridge Univ. Press, London.
6. *English Vocabulary in Use* by McCarthy, Foundation Books (Cambridge University Press), Delhi.
7. *Assessing Listening* by Buck, Foundation Books (Cambridge University Press), Delhi.
8. *Reading Between the Lines* by McRae, Foundation Books (Cambridge university Press), Delhi.

#### **SCHEME OF EXAMINATION:**

There will be seven questions in all covering all the units, except Unit VII which (besides other modes of internal evaluation) is for internal assessment only.

All questions will be compulsory and will have sufficient internal choice.

#### **Unit-I: 15 Marks**

The question will be set so as to evaluate the following: Usage of the words given, Changing the grammatical quality and function of the words, One word Substitutes, synonyms, antonyms, homophones, homonyms.

#### **Unit-II: 20 Marks**

There will be one question having different parts. The question should test students' knowledge of sentence structures and verb patterns. The question can be in the nature of 'Do as directed', 'Tracing and rectifying structural Errors', 'Elucidating patterns through sentences and vice-versa', 'Changing the word-order', 'Synthesizing the sentences' and 'Completing the sentences', etc.

**Unit-III: 15 Marks**

There will be two questions from this Unit. Question one will be in the nature of short notes testing the basic concepts and articulation of speech sounds. The second question would require transcription of individual words and simple sentences.

**Unit-IV: 15 Marks**

Comprehension and Interpretation of a passage given (Literary or non-literary, newspaper article, story, extract from a speech etc.), will be judged for its vocabulary, general understanding and interpretation of the content in the form of question answer exercise, culling out important points, suggesting a suitable topic/title, summarising and précis writing etc.

**Unit-V: 15 Marks**

The question will require the definition, description, analysis, explanation of various objects and processes. Besides, a topic of contemporary relevance may be given for writing a paragraph in any one of the writing forms prescribed in the unit.

**Unit-VI: 20 Marks**

There will be two questions from the text prescribed. The first question will evaluate the comprehension of the text through short answer questions or a long answer question.

The second question will judge the linguistic aspect of the text such as using a particular word in its various syntactic forms like noun, adjective, verb etc.; matching the lists of words and their explanation; providing opposite/similar meanings, adding suffixes and prefixes etc.

**MATH-101-E**

**MATHEMATICS-I**  
**(COMMON FOR ALL BRANCHES)**

L	T	P	Class Work	:	50 Marks
3	2	-	Exam.	:	100 Marks
			Total	:	150 Marks
			Duration of exam.	:	3 Hours

**Part-A**

Infinite series : Convergence and divergence, Comparison, D' Alembert's ratio, Integral, Raobes, Logrithmic and Cauchy root tests, Alternating series, Absolute and conditional convergence.

Applications of Differentiation : Taylor's and Maclaurin's series, Asymptotes, Curvature Asymptotes.

Partial Differentiation & its Applications : Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives.

Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign.

**Part-B**

Applications of Single & Multiple Integration : Applications of single integration to find volume of solids and surface area of solids of revolution. 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 variables, Beta and gamma functions and relationship between them.

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.

Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Gauss 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: Examiner will set eight questions, taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking at least two from each part.

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

L	T	P	Sessional	:	50 Marks
3	1	-	Exam.	:	100 Marks
			Total	:	150 Marks
			Duration of exam.	:	3 Hrs.

**PART-A**

**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.

**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.

**PART-B**

**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, permittivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field.

Behaviour of dielectrics in a.c. field-simple concepts, dielectric losses.

## **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 four from each part. The students will be required to attempt five questions in all selecting at least two from each part. All questions will carry equal marks.

**ME- 103 E    MANUFACTURING PROCESSES**

L    T    P  
4    -    -

Class Work                : 50 Marks  
Examination              : 100 Marks  
Total                        : 150 Marks  
Duration of Exam         : 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.

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

**Unit III**                   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 IV**                   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..

**Unit V**                    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.

**Unit VI**                    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.

**Unit VII**                   Plant Layout, Objectives of Layout, Types of Plant Layout and their Advantages.

**Text Books :**

1. Workshop Technology Volt.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 : Eight questions will be set by the examiner, taking at least one question from each unit. Students will be required to attempt five questions.

**B.E. I/II Semester**

**CH-101-E : CHEMISTRY (COMMON FOR ALL BRANCHES)**

L	T	P	Sessional	:	50 Marks
3	1	-	Exam.	:	100 Marks
			Total	:	150 Marks
			Duration of exam.	:	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, Claudius - Clapeyron equation, Related numerical problems with above topics.

**Unit-2 :**

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-3 :**

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).

**Unit-4 :**

Water and its treatment : Part II - Treatment of water for domestic use, coagulation, sedimentation, filtration and disinfection, water softening, Ion-exchange process, mixed bed demineralisation, Desalination (reverse osmosis) (electrodialysis).

**Unit-5 :**

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).

**Unit-6 :**

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-7 :**

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.

**Unit-8 :**

Analytical Methods - Thermal methods, Principle, method and application of Thermogravimetric analysis, Differential thermal analysis and Differential scanning calorimetry , (Experimental details are excluded), Spectroscopic methods, Spectrophotometry, interaction of E.M. radiations with a molecule and origin of spectrum, spectroscopic, techniques-vibrational and electronic spectroscopy (Experimental details are excluded), conductometric titration, elementary discussion on Flame-photometry.

NOTE : Eight questions are to be set with a fair weightage of all the units. The candidates will be required to attempt five questions in all.

**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. Atkins (ELBS, Oxford Press).
3. Physical Chemistry, W.J. Moore (Orient-Longman).

**CSE -101 E****Fundamentals of Computers & Programming in C**

L	T	P
3	1	-

Class Work:	50
Exam:	100
Total:	150
Duration of Exam:	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.

**Unit-2: Operating System Basics:** The user Interface, Running Programmes, Managing files, Introduction to PC operating Systems: Unix/Linux , DOS, Windows 2000.

**Unit-3: Internet basics:** : Introduction to the basic concepts of Networks and Data Communications, How Internet works, Major features of internet, Emails, FTP, Using the internet.

**Unit-4: Programming Languages:** Machine-, Assembly-, High Level- Language, Assembler, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flow charts and their symbols, introduction to compiler, interpreter, assembler, linker and loader and their inter relationship.

**Unit-5: 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; pointers & arrays.

**Unit-6:** Strings: strings literals, string variables, I/O of strings, arrays of strings; applications. Preprocessor: preprocessor directives, macro definition, conditional compilation; Structures, Unions and Enumerations: Structure variables and operations on structures; Structured types, nested array structures; unions; enumeration as integers, tags and types. Declaration: Declaration syntax, storage classes, types qualifiers, declarators, initializers. Program Design: modules, information hiding, abstract data types, difference between C & C++, Low level programming: Bitwise operators, Bit fields in structures, other low level techniques.

**Unit-7:** 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:**

- Using Information Technology, 5<sup>th</sup> Edi, Brian K Williams & Stacey C. Sawyer, 2003, TMH
- The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
- C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.

**Reference Books:**

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

**Note:** 8 questions will be set by the examiner (at least 2 questions from unit-1 to 4, 2 each from unit -5& 6, and one from unit-7). The students will be required to attempt 5 questions in all.

**EE-101-E****ELECTRICAL TECHNOLOGY**

L T P  
3 1 0

CLASS WORK	:	50
EXAM	:	100
TOTAL	:	150
DURATION OF EXAM	:	3 HRS

**UNIT1. D.C. CIRCUITS :**

Ohm's Law, Kirchoff's Laws, D.C. Circuits, Nodal and Loop methods of analysis.

**UNIT2.****a) 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.

**b) TRANSIENT RESPONSE :**

Transient response of RL, RC and RLC Circuits with step input.

**UNIT3. NETWORK THEOREMS :**

Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, Reciprocity theorem, Tellegen's theorem, Milman's theorem. Star to Delta & Delta to Star transformation.

**UNIT4. SERIES AND PARALLEL A.C. CIRCUITS :**

Series and parallel A.C. circuits, series and parallel resonance, Q factor, cut-off frequencies and bandwidth.

**UNIT5. 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.

**UNIT6. TRANSFORMERS :**

Principle, construction & working of transformer, Efficiency and regulation.

**UNIT7. ELECTRICAL MACHINES :**

Introduction to D.C. Machines, Induction motor, Synchronous machines.

**UNIT8. MEASURING INSTRUMENTS :**

Voltmeter, Ammeter, Watt meter, Energy meter.

**TEXT BOOKS:**

1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarith, 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 : Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

## ME- 101 E ELEMENTS OF MECHANICAL ENGINEERING

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 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.

### Unit II **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 III **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.

### Unit IV **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 V **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.

### Unit VI **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 VII **Stresses and Strains:**

Introduction, Concept & types of Stresses and strains, Poisson'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.

**Unit VIII 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: In the semester examination, the examiner will set eight questions, at least one question from each unit. The students will be required to attend only 5 questions.

## ME-105 E ENGINEERING GRAPHICS AND DRAWING

L	T	P	Sessional	: 50 Marks
1	-	4	Practical	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

**Unit I** Various types of projections, First and Third angle systems of orthographic projections. Projection 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 planes, inclined to both the planes, true length of a line and its inclination with reference planes, traces of a line.

**Unit III** Projections of Planes – parallel to one reference plane, inclined to one plane but perpendicular to the other, inclined to both reference planes.

**Unit IV** 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, Projections of sections of Prisms, Pyramids, Cylinders and Cones. True shape of section. Development of surfaces of various solids.

**Unit V** Isometric projections - introduction, isometric scale, Isometric views of plane figures, prisms, pyramids and cylinders.

**Unit VI** Orthographic drawings of Bolts and Nuts, Bolted Joints, Screw threads, Screwed Joints.

**Unit VII** Free Hand Sketching - Orthographic Views from Isometric, Views of Simple Machine Components such as Brackets, Bearing Blocks, Guiding Blocks and Simple Couplings.

**Note :** Some simple exercises may be attempted with AUTOCAD.

### Text Book

1. 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. Engineering Graphics using AUTOCAD 2000 : T. Jeyapoovan, First Edition 2002, Vikas Publishing House.

**PHY-103-E : PHYSICS LAB.-I**

**(COMMON FOR ALL BRANCHES)**

L	T	P	Class Work	:	25 Marks
-	-	2	Practical	:	25 Marks
			Total	:	50 Marks
			Duration of exam.	:	3 Hours

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

**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).

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

L T P  
- - 4

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

**List of Experiments / Jobs**

1. To study different types of measuring tools used in metrology and determine least counts of Vernier callipers, 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 of 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 meld and core assembly, to put metal in the meld 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.

- 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.

**B.E. I/II Semester**

**CH-103-E : CHEMISTRY LAB. (COMMON FOR ALL BRANCHES)**

L	T	P	Class Work	:	25 Marks
-	-	2	Practical	:	25 Marks
			Total	:	50 Marks
			Duration of exam.	:	3 Hours

**LIST OF EXPERIMENTS**

1. Determination of  $\text{Ca}^{++}$  and  $\text{Mg}^{++}$  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. Determination of concentration of  $\text{KMnO}_4$  solution spectrophotometrically.
11. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
12. To determine amount of sodium and potassium in a, given water sample by flame photometer.
13. Estimation of total iron in an iron alloy.

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

**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)

L T P  
0 0 2

CLASS WORK	:	25
EXAM	:	25
TOTAL	:	50
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 maximum power transfer theorem in D.C. Circuit & A.C circuit.
4. To verify reciprocity & Superposition theorems.
5. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q- factor for various Values of R,L,C.
6. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R,L,C.
7. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
- 8.To perform direct load test of a D.C. shunt generator and plot load voltage Vs load current curve.
- 9.To plot V-curve of a synchronous motor.
- 10.To perform O.C. and S.C. tests of a three phase induction motor.
- 11.To study various type of meters.
- 12.Measurement of power by 3 voltmeter / 3 ammeter method.
- 13.Measurement of power in a 3 phase system by two watt meter method.

NOTE: 1. At least 10 experiments are to be performed by students in the semester.

2. At least 7 experiments should be performed from the above list, remaining three experiments may either be performed from the above list or designed and set by the concerned institution as per the scope of the syllabus of EE-101-E.

**CSE -103 E**

L	T	P
-	-	2

**C Programming Lab.**

Class Work:	25
Exam:	25
Total:	50
Duration of Exam:	3 Hrs.

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 male 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 Quicksort 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.

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

## ME- 109 E ELEMENTS OF MECHANICAL ENGINEERING LAB.

L	T	P	Sessional	: 50Marks
-	-	2	Practical	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

### 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 study 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.

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.

HUM-102-E

COMMUNICATION SKILLS IN ENGLISH  
B.E. Semester-II  
(COMMON FOR ALL BRANCHES)

L T P  
3 1 -

Class Work : 50 Marks  
Exam : 100 Marks  
Total : 150 Marks  
Duration of Exam: 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.

**COURSE CONTENT:**

**Unit-I**

**Communicative Grammar:** Spotting the errors pertaining to nouns, pronouns, adjective and adverbs; Concord - grammatical concord, notional concord and the principle of proximity between subject and verb.

**Unit-II**

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

**Unit-III**

**Oral Communication:**

Part-A: Introduction to principal components of spoken English - Word-stress patterns, 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.

**Unit-IV**

**Written Communication:**

Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises

Reading verbal and non-verbal texts-like cartoons, Graphs and tabulated data etc.

**Unit-V (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

## Unit-VI

### 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.

### 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 two parts of 10 marks each from part A and B of the unit. Part A will have content words, form words and sentences for stress marking, transcription and intonation marking respectively. Part B will test students' speaking skills through various oral tasks and activities - debate, group discussion and speech - in written form only.

**Note:** Speaking and listening skills 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, graph 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.

**BTT-102-E**

**BASICS OF BIOTECHNOLOGY  
(COMMON FOR ALL BRANCHES)**

L T P/D  
3 1 -

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

**Unit-I**

1. **Cell Structure and Function** : Prokaryotes and Eukaryotes: Cell Wall, Membrances, Nucleus, Mitochondria, Chloroplast, Ribosome, Vacuoles, Bacteria and viruses : a brief descriptions.
2. **Biomolecules** : A brief account of sturcture of Carbohydrates, Lipids, Proteins.
3. **Cell Division** : Mitosis and Meiosis.
4. **Genes** : Classical- brief idea about Mendel's laws and chromosomes, Nature of Genetic material, DNA and RNA, DNA replication.

**Unit-II**

5. **Gene Expression** : Central dogma, genetic code, molecular mechanism on mutations, regulation of gene expression, housekeeping genes, differentiation and development mutations and their molecular basis.
6. **Genetic Engineering** : an introduction to genetic engineering : Cloning (vectors, enzymes); cDNA and genomic libraries, Transgenics, DNA fingerprinting, Genomics.

**Unit-III**

7. **Development of Biotechnology** : Nature and Scope of Biotechnology.
8. **Applications of Biotechnology** : Bioprocess and fermentation technology, Cell Culture, Enzyme technology, Biological fuel generation, Single cell protein, Sewage Treatment, Environmental Biotechnology, Biotechnology and medicine, Biotechnology in agriculture & forestry industry, Food and Beverage Technology Production of Biological inventions, Safety in Biotechnology.

**Text/Reference Books :**

1. Biotechnology, Smith, Cambridge Press.
2. Modern Concepts of Biotechnology, H.D.Kumar, Vikas Publishing House (P) Ltd.
3. Elements of Biotechnology, P.K.Gupta, Rastogi Publications.

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**(COMMON FOR ALL BRANCHES)**

L	T	P	Class Work	:	50 Marks
3	2	-	Exam.	:	100 Marks
			Total	:	150 Marks
			Duration of exam.	:	3 Hours

**Part-A**

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 vectors, 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.

**Part-B**

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 Legendre's linear equations, simultaneous linear equations with constant coefficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

**Part-C**

Laplace Transforms and its Applications : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, 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.

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: Examiner will set eight questions, taking two from Part-A, three from Part-B and three from Part-C. Students will be required to attempt five question taking atleast one from each part.

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

L	T	P	Sessional	:	50 Marks
3	1	-	Exam.	:	100 Marks
			Total	:	150 Marks
			Duration of exam.	:	3 Hrs.

**PART-A**

**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.

**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.

**PART-B**

**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.

**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. Solid 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 four from each part. The students will be required to attempt five questions in all selecting at least two from each part. All questions will carry equal marks.

**PHY-104-E : PHYSICS LAB.-II**

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**(COMMON FOR ALL BRANCHES)**

L	T	P	Class Work	:	25 Marks
-	-	2	Practical	:	25 Marks
			Total	:	50 Marks
			Duration of exam.	:	3 Hours

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

**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).

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

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