

H.P. University, Shimla

**Syllabus for Ist Year
(Group-A & Group-B)**

(Common to all Branches)

Applied Maths-I (AS-1001)

Course Code	AS-1001	Credits-4	L-3, T-1, P-0
Name of the Course	Applied Maths-I		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	50%	Max Marks: 50	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Function of several variables, limits and continuity, partial derivatives, higher order partial derivatives, Euler's theorem, Jacobians, maxima of functions of two variables. Lagrange's method of multipliers, double and triple integrals, change of variables, applications of double and triple integrals, beta and gamma functions.

Section B

Reduction formulae, definite integral as limit of a sum, area under a curve, length of an arc of a curve. Linear differential equations of second order with constant coefficients: complementary functions, particular integrals, Euler homogeneous form, and variation of parameters. Convergence of series, Taylor's theorem with remainder, power series expansion of functions, Taylor's and Maclaurin's series.

Section C

Matrices: review of properties of determinants. Elementary operations on matrices. Homogeneous and nonhomogeneous system of linear equations and their properties, bilinear, quadratic, hermitian and skew-hermitian forms. Eigenvalues of hermitian, skew-hermitian and unitary matrices.

Section D

Complex analytic functions: brief review of complex numbers, complex variable, concept of limit, continuity and derivatives of analytical function, Cauchy-Riemann equations, harmonic function, complex series, some elementary functions, logarithm.

Books:

1. Kryszig, Thomas-Finny, Advanced Engineering Mathematics.
2. S.S. Shastri, "Engineering Mathematics (2nd edition) Vol-I and Vol-II.
3. B.S. Grewal, Higher Engineering Mathematics.
4. Piskunov, Differential and Integral Calculus.
5. R.K.Jain and S.R. K. Iyengar, Advanced Engineering, Mathematics.
6. Michael D. Greenberg, Advanced Engg. Mathematics.

Applied Physics-I (AS-1002)

Course Code	AS-1002	Credits-4	L-3, T-1, P-0
Name of the Course	Applied Physics-I		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	50%,		Max Marks: 50

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Physical Optics: Interference-division of wavefront-fresnel's biprism, division of multitude, interference by Newton's rings, Michelson's interferometer and its applications.

Diffraction- Difference between fraunhofer and fresnel diffraction through slit, plane transmission grating, its dispersal and resolving powers Polarization- polarized and unpolarised light, double refraction, nicol prism, quarter and half wave plates, polarimetry, biquartz and laurents half shade polarimeters, simple concepts of photoelasticity.

Special theory of Relativity: Michelson-Moreley experiments, Relativistic transformations, Variation of mass with velocity, mass energy equivalence.

Section B

Wave and oscillations: Simple harmonic oscillations, simple concept of harmonic oscillator, resonance, quality factor, E.M wave theory, Review of basic ideas, Maxwell's equations and their experimental basis. Simple plane wave equations, simple concepts of wave-guides and co-axial cables, Poynting vector.

Dielectrics: Molecular Theory, polarization, displacement susceptibility, dielectric coefficient, permittivity and various relations between these Gauss's law in the presence of dielectric, energy stored in an electric field. Behavior of dielectric in field –simple concepts, dielectric losses.

Section C

Quantum Physics: Difficulties with classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant. De Broglie Waves, Phase and Group Velocities, Particle diffraction, Uncertainty Principle, the wave equation, Postulates of quantum mechanics, Time dependent and independent Schrodinger equation, Expectation Values, Eigen Values and Eigen functions, Particle in a box, Finite Potential Well, Tunnel Effect, Harmonic oscillator. Statistical distributions, Maxwell Boltzmann Statistics, Quantum statistics.

Section D

Nuclear Physics: Neutron cross-section, nuclear fission, moderators, nuclear reactors, reactor criticality, interaction of radiation with matter-basic concepts, Radiation Detectors-ionization chamber, G.M counter, scintillations & solid state detectors, cloud Chamber & bubble chamber.

Books:

- Arthur Beiser, Concepts of Modern Physics, 5th International edition Tata McGraw Hill
- Wehr, Richards & Adair, Physics of the Atom.
- A.S.Vasudeva, Modern Engg. Physics.

Engg. Graphics Drawing (ME-1001)

Course Code	ME-1001	Credits-6	L-0, T-0, P-6
Name of the Course	Engg. Graphics Drawing		
Lectures to be Delivered	78 Hrs. of Lab. Work (6 hrs. per week)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max Marks: 50	Min. Pass Marks: 25	

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.
- This course will be conducted in drawing hall fitted with drawing tables and drafters.

Section A

Drawing Techniques: Various types of lines, principles of dimensioning, size and location as per IS code of practice (SP-46) for general engg. Drawing. Practice of drawing, various types of lines and dimensioning exercises. Drawing exercises pertaining to symbols. Conventions and Exercise of lettering techniques. Free hand printing of letters and numerals in 3, 5, 8 and 12 mm sizes, vertical and inclined at 75 degree. Instrumental lettering in single stroke. Linear Scale, Diagonal scale & vernier scale.

Projection of Points, Lines and Planes: Concept of horizontal and vertical planes. First and third angle projections: projections of point and lines, true length of lines and their horizontal and vertical traces, projection of planes and their traces. Auxiliary planes.

Section B

Projections of Solids: Right regular solids of revolution and polyhedrons etc. and their auxiliary views.

Section C

Sectioning of Solids: Principles of sectioning, types of sectioning and their practice on projection of solids, sectioning by auxiliary planes.

Isometric Projection: Concept of isometric views: isometric scale and exercise on isometric views.

Section D

Practice In: Orthographic projections

Development of Surfaces: Development of surfaces of cylinders, cones, pyramid, prism etc. exercises involving development of unique surfaces like Y-piece, hopper, tray, truncated pieces etc.

Intersection of Surfaces: Intersection of cylinders, cones and prisms with their axes being vertical, horizontal or inclined. Exercise on intersection of solids-cylinder and cylinder, cylinder and cone, prism and prism.

Note: Some exercise in each Section should be done using Auto CAD.

Books:

1. N.D. Bhatt, Elementary Engineering Drawing.
2. P.S.Gill, Engineering Drawing & Engg. Graphics.
3. L.V. Lakshminarayan & R.S. Vaish Engineering Graphics.
4. N.D. Bhatt and V.M. Panchal, Engineering Drawing Plane and Solid Geometry, 44th Edition 2002, Charotar Publishing House.
5. James D. Bethune, Engineering Graphics with AutoCAD 2002, Publisher-Pearson Education.
6. P.S.Gill, engineering Graphics and Drawing, S.K.Kataria and Sons Millennium Edition.
7. T. Jeyapoovan, Engineering Graphics using AUTOCAD 2000, 1st Edition 2002, Vikas Publishing House.
8. K. Venugopal: Engineering Drawing and Graphics + AutoCAD 4th Edition, New Age International Publishers Ltd. New Delhi.

Communication & Professional Skills in English (HU-1003)

Course Code	HU-1003	Credits-4	L-3, T-1, P-0
Name of the Course	Communication & Professional Skills in English		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	50%	Max Marks: 50	

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E.

Section A

Reading Skills: The skill of effective reading – eye movements, fixations, regression and visual wandering, the right approach to reading; Factors affecting the style of reading – reader related material related and environmental; Memory, retention, association of read material.

Kinds of Reading: Introduction to phonetics – familiarization with speech sound and their symbols – articulation of speech sounds – stress and intonation.

Grammar: Word building use of punctuation marks, articles, tenses, abbreviations, prepositions, idioms & phrases transformation of sentences, incorrect to correct English, single word for a group of words.

Section B

Writing Skills: Business letters: principles, structure and style of writing business i.e., sales letters, claim and adjustment letters, inviting quotations/tenders, writing a memo, job application letters, preparing a personal resume; Effective Meetings: Qualities i.e. planning, processing the discussion, conducting a meeting use of different type of questions, summaries, handling problem situations and problem people, writing notices, agenda and minutes of meetings; Report writing: Characteristics, types of reports, structure of technical/research reports, preparatory steps to report writing; Elements of style: Definition of style, characteristics of a good technical style – practical hints to improve the style of writing ; précis writing; Comprehension of passages (May be picked up from the books recommended for reading).

Section C

Listening Skills: Barriers to listening, effective listening and feedback skills, Telephone techniques. Considerations of listening and voice, developing telephone skills – preparing for the call, controlling the call follow up action. Handling difficult calls and difficult callers.

Section D

Speaking And Discussion Skills: Effective speaking: Preparation i.e., deciding the objective, preparing the environments, organizing the material selection of words, voice modulation, speed, expression, body language, dealing with questions, dealing with nervousness, presentation of audio-visual aids; Group Discussions: The art of participating in group discussion i.e., initiative, cooperation with group members, analysis of the issue, putting one's views effectively, establishing leadership.

Assignments / Seminars / discussions may be given for following skill development.

- a) Word processing a document
- b) Report writing
- c) Preparing agenda for meeting
- d) Preparing minutes of the meeting / seminars.
- e) Press Releases
- f) Preparing a Brochure
- g) Advertisements
- h) Preparing a power point slide show on a PC / OHP
- i) Any other exercise decided by the course Professor.

Recommended Books:

1. Sheila HA Smith, M and Thomas, L., Methuen, Reading to Learn; London, 1982.
2. McGraw, SJ; Basic Managerial Skills for all, Prentice Hall of India, New Delhi 1991
3. Technical Reporting Writing British Association for commercial and Industrial Education, BACIE, 1992
4. Chrissie Wright (Ed.); Handbook of Practical Communication Skills; JAICO Books
5. K.K.Sinha, Business Communication, Galgotia Publishing Company, New Delhi, 1999.
6. English Grammar
7. David Cameron, Mastering Modern English.
8. Robert L. Shuster, Written Communication in Business.
9. Ron Ludlow & Ferous panton. The Essence of Effective Communication.
10. Ragmond & Petit, business Communication.
11. Common Errors in English, by Sudha Publication (P) Ltd., B-5, Prabhat Kiran Building, Rajendra Place, New Delhi – 110008.
12. Abul Hashem, Common Errors in English, Ramesh Publishing House, Daryaganj New Delhi.
13. Objective English by Tata McGraw Hill Publishing Co. Ltd., New Delhi.
14. R.K.Bansal & J.B. Harrison, spoken English for India, Orient Longman.
15. Veena Kumar, The Sounds of English, Makaav Educational Software, New Delhi.
16. R.C.Sharma & Krishna Mohan, Business Correspondence and Report writing, Tat McGraw Hill Publishing Co. Ltd., New Delhi
17. Group Discussion by Sudha Publications and Ramesh Publishing House, New Delhi.

Recommended Readings

1. Business @ The Speed of thought, Bill Gates.
2. My Experiments with Truth, M.K.Ghandhi
3. Wings of Fire, A.P.J. Kalam
4. An Autobiography, Jwahar Lal Nehru.

Basic Electronics (EC – 1001)

Course Code	EC -1001	Credits-4	L-3, T-1, P-0
Name of the Course	Basic Electronics		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	50%	Max Marks: 50	

Instructions

- 1. For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- 2. For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section -A

Brief review of Band Theory, transport phenomenon in semiconductors, Electrons and holes in Intrinsic semiconductor, Donor and acceptor Impurities, charge densities in semiconductor. PN Junction, Reverse and Forward bias conditions, Diode Characteristic and parameter, Ideal vs. Practical diode.equivalent circuits and frequency response. rectification-half and full wave, Zener and Avalanche diode, its role as regulator, photodiode.

Section B

Bipolar junction transistor (BJT) and their characteristics as circuit and gain elements. Two port network analysis, h-parameters and trans-conductance. Equivalent circuits for JFET and MOSFET, enhancement mode and depletion mode MOSFETS. Unijunction transistor (UJT), UJT characteristics, parameters and circuit operation.

Section C

Bias for transistor amplifier: fixed bias, emitter feed back bias. Feedback principles. Types of feedback, Stabilization of gain, reduction of non-linear distortion, change of inputs and output resistance by negative feedback in amplifier. Amplifiers coupling, types of coupling, Amplifier pass band, Eq circuits for BJT at high frequency response of CE, RC-Coupled amplifiers at mid, low and high frequencies.

Section D

Semi conductor processing, active and passive elements, Integrated circuits, bias for integrated circuits. Basic operational amplifier, applications of operational amplifier – adder, subtractor, Integrator, differentiator and comparator, Photo transistor: its characteristics and applications.

Reference Books:-

1. A.P.Malvino.Electronic Principles.
2. J.D. Ryder Electronic Fundamentals and Applications.
3. J.Millman and C.C.Halkias Electronic Circuits & Devices.
4. J.Millman & C.C.Halkias Integrated Circuits & Devices.
5. N.N.Bhargava & Kulshrestha, Electronic Devices.

Introduction to Computer & Programming in C (CS-1001)

Course Code	CS-1001	Credits-4	L-3, T-1, P-0
Name of the Course	Introduction to Computer & Programming in C		
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	50%	Max Marks: 50	

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

Section A

Fundamental Computer Concept: Operating system fundamentals, disk basics, VDU Basics, Keyboard basics, introduction to compiler, interpreter, assembler, linker and loader and their inter relationship, Introduction to basics of Information Technology.

Section B

Problem solving with Computers: Algorithms, pseudo codes and Flowcharts, Debugging, testing and documentation, structure-programming concepts, top down and bottom-up design approaches. Data types, Constants, variables, arithmetic and logical expressions, data inputs and output, assignments statements, conditional statements.

Section C

Iteration, arrays processing, use-defined data types, functions, recursion, parameter passing by reference and by value.

Section D

Structure, Multiple structures, Arrays of structure, Unions,
Files: reading, writing text and binary files, pointers, character pointers, pointers to arrays, arrays of pointer to structures.
(The programming language C is to be taught along with the course in detail.)

Books:

1. Kanitkar, "Let us C", BPB Publications
2. Richie and Kerningham, "C Programming"
3. V Rajaraman "Fundamentals of computers"
4. D.Dromey, "How to solve it by computers" (Prentice Hall)
5. E. Balaguruswamy, "Programming in C", Tata McGraw Hill.

Applied Physics Lab (AS-1003)

Course Code	AS-1003	Credits-2	L-0, T-0, P-2	
Name of the Course	Applied Physics Lab			
Lectures to be Delivered	26 hours of Lab. work (2 hrs. per week)			
Semester	End	Max Marks: 50	Min Pass Marks: 20	Maximum Time: 3 hrs
Examination				
Continuous Assessment	Lab work	30%	Max Marks: 50	Min Pass Marks: 25
	Lab Record	25%		
	Viva/ Hands on	25%		
	Attendance	20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments

Note: (Two experiments to be done from each section, total number of experiments required to be performed 10 to be decided by the teacher concerned and availability of equipment.)

Section A

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 sodium light by using the phenomenon of diffraction of light at a straight edge.
4. To find the wavelength of various colors of white light with the help of a plane transmission diffraction grating.
5. To find the wavelength of sodium light by Michelson interferometer.

Section B

1. To find the refractive index and Cauchy's constant of a prism by using spectrometer.
2. To find the resolving power of a telescope.
3. To study the beam parameters of a helium-neon laser.
4. To find the specific rotation of sugar solution by using a polarimeter.
5. To find the velocity of Ultrasonic Waves in a given liquid.
6. To find the specific rotation of sugar using polarimeter

Electricity and Magnetism

Section C

1. To compare the capacitances of two capacitors by De'sauty Bridge.
2. To find the flashing & quenching potentials of argon & also to find the capacitance of unknown capacitor.
3. To find the temperature coefficient of resistance by using platinum resistance thermometer and Callender & Griffith bridge.

Section D

1. To find the frequency of AC mains by using sonometer.
2. To find the low resistance by carrey – Foster's bridge.
3. To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box.
4. To find the value of high resistance by Substitution method.
5. To find the value of high resistance by Leakage method.
6. To convert a galvanometer into an ammeter of a given range.
7. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
8. To find the reduction factor of two turn coil of tangent galvanometer by using a copper voltammeter.

Modern Physics:**Section E**

1. To find the value of e/m for electrons by Helical method.
2. To determine the charge of an electron by Millikan's oil drop method.
3. To find the ionization potential of Argon. Mercury using a thyratron tube.
4. To find the value of Planck's constant by using a photoelectric cell.

Section F

1. To study the various crystal structures using Beed Model.
2. To calculate the hysteresis loss by tracing a B-H curve for a given sample.
3. To determine the band gap of an intrinsic semiconductor by four probe method.
4. To determine the resistivity of a semi-conductor by four probe method at different temperatures.
5. To determine the Hall co-efficient.
6. To study the photovoltaic cell & hence to verify the inverse square law.

Books:

1. Practical Physics-S.L.Gupta & V.Kumar.
2. Advanced Practical Physics Vol. I & II – S.P. Singh
3. Practical Physics for B.Sc I, II and III - C.L.Arora.

Basic Electronics Lab (EC-1002)

Course Code	EC-1002	Credits-2	L-0, T-0, P-2
Name of the Course	Basic Electronics Lab		
Lectures to be Delivered	26 hours of Lab. work (2 hrs. per week)		
Semester End Examination	Max Marks: 50	Min Pass Marks: 20	Maximum Time: 3 hrs
Laboratory	Lab work 30%	Max Marks: 50	Min Pass Marks: 25
Continuous Assessment	Lab Record 25%		
	Viva/ Hands on 25%		
	Attendance 20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practical performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments:

1. (a) To study the use and scope of using an oscilloscope as a measuring device in an electronic laboratory.
- (b) To study the use and scope of using a millimeter (digital and analog) as a measuring device in an electronics laboratory.
- (c) To study the use and scope of function generator as a signal source in an electronics laboratory.

Set up an experiment to:

2. Draw forward bias and reverse bias characteristics of a p-n junction diode and use it as a half wave and full wave rectifier.
3. Draw the characteristics of a zener diode and use it as a voltage regulator.
4. Draw characteristics of common base configuration of p-n-p transistor.
5. Draw characteristics of common emitter configuration of an npn transistor.
6. Draw characteristics of common drain configuration of a MOSFET.
7. Find the voltage and current gain of single stage common emitter amplifier.
8. Draw the characteristics curve of UJT.
9. Find the voltage gain of single stage voltage series feedback amplifier.
10. Use operational amplifier as
 - I) Inverting amplifier
 - II) Non-inverting amplifier
 - III) Comparator
11. Use operational amplifier as
 - I) Integrator
 - II) Differentiator
12. Use operational amplifier as
 - I) Adder
 - II) Precision amplifier
13. Find the overall voltage gain and current gain of a two stage RC coupled amplifier.

Basic electronics should stress on interfacing with real life devices and general-purpose linear units. Emphasis is on system design and not on discrete components, some of the components around which exercises can be built are

 1. SCR as triacs and power control.
 2. Power supplies starting with zener.
 3. Op to compliers and isolations where photo diode, transistors, leds are used.
 4. Laser diode (laser pointer)
 5. Op amps
 6. Op amps for instrument amplifiers.

Note: - Record to be maintained in the laboratory record book for evaluation. Usage of breadboard approach to be encouraged.

Workshop Practice-I (ME-1002)

Course Code	ME-1002	Credits-3	L-0, T-0, P-3
Name of the Course	Workshop Practice-I		
Lectures to be Delivered	39hrs. (Lab Session=13(3 hrs. each))		
Semester End Examination	Max Marks: 50	Min Pass Marks: 20	Maximum Time: 3 hrs
Laboratory	Lab work 30%	Max Marks: 50	Min Pass Marks: 25
Continuous Assessment	Lab Record 25%		
	Viva/ Hands on 25%		
	Attendance 20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments: -

Fitting Shop: -

Introduction to the tools used in Fitting Shop and various processes in Fitting shop.

1. To make a square piece of mild steel.
2. To make V-matching joint of mild steel.
3. To make a V-notch.

Machine Shop: -

Introduction to various machine tools and machine parts, such as Lathes, drilling machine, grinders etc. Cutting tools and operations.

1. Facing and turning on mild steel rod on Lathe Machine.
2. To make a groove on lathe machine.
3. Taper turning operation on Lathe Machine.

Carpentry and Pattern making Shop: -

Carpentry and Pattern Making Various types of timber and practice boards, defects in timber, seasoning of wood, tools, operations and joints. Introduction to the tools used in carpentry shop.

1. To make the 'T' lap joint.
2. To make 'T' Dove-tail joint.
3. To make Mortise & Tennon joint.

Welding Shop: -

Introduction to different welding methods, welding equipment, electrodes, welding joints, awareness of welding defects.

1. To make a lap joint.
2. To make a T joint.
3. To make a V-butt joint.

Smithy and Forging: -

Introduction to forging tools, equipments and operations, Forgability of metals.

1. To make a ring of mild steel by cold forging process.
2. To make S-hook by hot forging process.
3. To make chisel by hot forging process.

Foundry Shop: -

Introduction to moulding materials, moulds, use of cores, melting furnaces, tools and equipment used in Foundry.

1. Make a single piece pattern mould.
2. To make split pattern mould.
3. To make mould and core and assemble it.

Electrical and Electronics Shop: -

1. Introduction to electric wiring.
2. Exercises preparation of PCBs, involving soldering of electrical & electronic application.

Books: -

1. Workshop Technology by Chapman.
2. Manufacturing Processes by Begman.
3. Manufacturing Materials and processes by JS Campbell.

Note: - Industrial visits can be undertaken to various industries available in the vicinity of the concerned Engineering College. One project at the end of semester has to be submitted by a group of six students.

Information Technology Trainer Workshop-I (IT-1001)

Course Code	IT-1001	Credits-3	L-0, T-0, P-3
Name of the Course	Information Technology Trainer Workshop-I		
Lectures to be Delivered	39 Hrs. (Lab Session = 13(3 hrs. each))		
Semester End Examination	Max Marks: 50	Min Pass Marks: 20	Maximum Time: 3 hrs
Laboratory	Lab work	30%	Max Marks: 50
Continuous Assessment	Lab Record	25%	Min Pass Marks: 25
	Viva/ Hands on	25%	
	Attendance	20%	

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

The workshop will provide training of hardware and software theory of a computer based on Pentium-IV CPU with windows 98 as an operating system with DMP/ DeskJet Printer/ Laser Printer.

(i) Study of Computer Mother Board: -

- a) CPU, DMA, Wait state, RAM / ROM, NMI, Logic Address, reset, I / O Ports, Device Drivers, Power Management, Block Diagram.

(ii) Study of bus, Slots and Ports: -

- a) ISA, EISA, VESA, PCI, MCA, AGP, USB, AMR
- b) Parallel, Serial – RS 232C, USB

(iii) Study of Memories on a PC: -

- a) Memory – Types, Selection, Installation
- b) ROM BIAS – Types, Setup, Installation
- c) Floppy Drive – Types, R/W head, Control Card, Spindle Motor, Stepper Motor, Termination Resistor, Block Diagram, Write protect, Testing.
- d) Hard Disk – Jumper Setting, Configuration, HDC, Installation Software, Testing, Block Diagram.

(iv) Study of Input/Output Device: -

- a) Monitor – Types, Working principle, Configuration, modes, scanning, Block diagram Adapter
- b) Card – Types, Dot pitch, Resolution.
- c) Keyboard – Types, Construction, Working Principle.
- d) Mouse – Types, Construction, Working Principle.

(v) Study of Hardware, Accessories (Mechanical / Electrical): -

- a) Cabinet – Types, Selections
- b) SMPS – Rating, Green PC, EPA Compliance
- c) Cables – HD Cable, FDD Cable, Printer Cable.
- d) Connectors – 9 pin M/F, 25 Pin M/F

(vi) Study of Printers: -

- a) Printers – Types, construction, working Principle, Fonts, DeskJet, Dot Matrix, Laser Jet, Line Printer, Plotters, Block Diagram

(vii) Study of Multimedia Hardware Modules

- a) CDROM drive – Jumper setting, Installation, Cables, Block Diagram, Configuration.
- b) DVD drive – Types, Working Principle, Installation, Configuration
- c) Speakers/Mike – Different Types
- d) Tuner Cards – Different Types
- e) Digital Cameras – Different Types
- f) Video Conferencing Kit.

(viii) Study of Clean Power Supply Equipments: -

- a) CVT's
- b) UPS

Note: - Industrial visits can be undertaken to various industries available in the vicinity of the concerned Engineering College. One project at the end of semester has to be submitted by a group of six students.

Computer Programming Lab. (CS -1002)

Course Code	CS -1002	Credits-2	L-0, T-0, P-2
Name of the Course	Computer Programming Lab.		
Lectures to be Delivered	26 Hrs. of Lab. Work (2 hrs. per week)		
Semester End Examination	Max Marks: 50	Min Pass Marks: 20	Maximum Time: 3 hrs
Laboratory	Lab work 30%	Max Marks: 50	Min Pass Marks: 25
Continuous Assessment	Lab Record 25%		
	Viva/ Hands on 25%		
	Attendance 20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

- A. Dos 6.2 (through MS-DOS prompt, usage of basic commands, idea of .bat, .sys, .com, .exe etc.and usage of an editor to be done in consultation with the faculty incharge for the course).
- B. Windows (usage of GUI for working effectively in laboratory to be done in consultation with the faculty incharge for the course).
- C. Microsoft office (projects based on word, excel, power point, access, to prepare reports, presentations and databases to be done in consultation with the faculty incharge for the course).
- D. Programming of fundamental algorithms in C in the form of projects in groups of two (based on how to solve it, Dromey and let us C by Kanitkar and in consultation with the faculty incharge for the course).List of Lab. exercises to be displayed in advance covering whole of the course. Tentative list is given below to be developed in the form of projects. 10 more exercises to be added by the faculty incharge.
 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 statement.
 5. Write a program using arrays to find the largest and second largest no.
 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 Quick sort Algorithm.
 10. Represent a deck of playing cards using arrays.

Note: -Record to be maintained both electronically and hard copy for evaluation.

APPLIED MATHS – II(AS – 1006)

Course Code	AS – 1006	Credits : 4	L-3, T-1, P-0
Name of the Course	APPLIED MATHS – II		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max. Marks: 50		

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Vector Calculus: Curves, arc length, tangent, curvature and torsion, Directional derivative, Gradient of a scalar field, divergence and curl of a vector field. Line, surface and volume integrals, theorem of Gauss, Stoke's and Green's (proofs not needed), consequences and applications.

SECTION – B

Integral Transforms: Fourier series, Euler's formula, even and odd functions, half range expansions. Fourier integral. Fourier and Laplace transform, Inverse transform of derivatives and integrals, shifting theorem, application to periodic functions, unit step function, impulse function.

SECTION – C

Second order Differential Equations: Solution by: Power series method and its basis, Solution of Bessel and Legendre differential equations, properties of Bessel and Legendre functions.

SECTION – D

Partial Differential Equations (PDE): Formulation and classification. Solution of wave equation heat equation in one dimension and Laplace equation in two dimension by the method of separation of variables.

Books:

- E. Kreyszig, Advanced Engineering Mathematics (Wiley Eastern Pvt. Ltd.).
- S.S. Sastri, Engineering Mathematics (2nd edition) Vol-I and Vol-II.
- B.S. Grewal, Higher Engineering Mathematics.
- Piskunov, Differential and Integral Calculus.
- R.K. Jain and S.R.K. Iyengar, Advanced Engineering, Mathematics.
- Michael d. Greenberg, Advanced Engg. Mathematics.

APPLIED PHYSICS– II(AS – 1007)

Course Code	AS – 1007	Credits : 4	L-3, T-1, P-0
Name of the Course	APPLIED PHYSICS – II		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max. Marks: 50		

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Crystal Structure: Space lattice, unit cell and translation vector, miller indices, Simple crystal structure, bonding in solids, Experimental x-ray diffraction method, laue method, powder method.

Free electron theory: Elements of classical free electron theory and its limitations. Quantum theory of free electrons, Fermi level, density of states, fermi dirac distribution function, Thermionic emission, Richardson's equation.

SECTION – 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 into metals, semiconductors and insulators, fermi energy and its variation with temperature.

SECTION – C

Photoconductivity & Photovoltaic: Photoconductivity in insulating crystals, variation with illumination, Effect of traps, application of photoconductivity, Photovoltaic cell and their characteristics.

Properties of Solids: Atomic Magnetic Moments, Orbital Diamagnetism, Classical Theory of Para magnetism, Ferromagnetism Molecular Field theory and domains, Magnetic circuit. Its comparison with Electric circuit and its applications, Super Conductor (Introduction, Types and Applications) Hall Effect.

SECTION – D

Laser: Spontaneous and stimulated emission, Laser action, Characteristics of Laser Beam – Concept of coherence, Types of lasers based on pumping techniques, He-Ne Laser, Semiconductor Laser (simple Ideas) with applications.

Fiber Optics: Optical communication: Communication through open space, optical wave guides with special reference to Propagation of light in Fibres, Numerical Aperture, single mode and multi mode Fibers, applications.

Books:

1. Charles Kittel: Introduction to Solid State Physics.
2. B.S.Saxena, R.C.Gupta & P.N.Saena: Solid state Physics.
3. M.B.Avadhanulu & P.G.Kshirsagar, A text book of Engineering Physics.
4. Arthur Beiser, concepts of Modern Physics, 5th International edition Tata McGraw Hill.
5. A.J.Dekkar, Introduction to solid state Physics.

CHEMISTRY (AS – 1004)

Course Code	AS – 1004	Credits : 4	L-3, T-1, P-0
Name of the Course	CHEMISTRY		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max. Marks: 50		

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Thermodynamics: Second law concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change Gibb's Helmholtz equation, Clausius – Clapeyron equation, Related numerical problems with above topics.

Phase Rule: Introduction, One Component System, Two components System (Water, Sulphur and Alloy System), thermal Analysis, auxiliary.

SECTION – B

Water Treatment: Introduction, Sources of water, Impurities, Hardness Analysis, Oxidations, (BOD & COD), Boiler Corrosion Sewage & Treatment.

Pollution and Control: Introductions, causes/reasons, types of pollutions, air, water, soil and radioactive pollution and controls.

Corrosion and its Controls: Introduction, Types of corrosions, Electrochemical Theory, Pitting, Water Line, Differential Aeration corrosions, Stress Corrosions, Factors affecting Corrosions, Preventive measures.

SECTION – C

Lubricants: Introductions, Frictions and Wear, Lubricants, Mechanism of Lubrications, Base oil, Additives, Greases and Emulsions.

Fuel and Combustion: Introduction, class of fuels (Solid, Liquid and Gases) Coal and its origin, Analysis of Coals, Petroleum fuels, Crude Petroleum and its refining, Cracking, Hydrofinishings and Diesel, Kerosene, Gasoline as fuel. Gaseous fuel, Water Gas, Bio-Gas, nuclear Fuel, Breeder Reactor.

SECTION – D

Solid State Chemistry: Introduction, Lattices and Periodicity, Elements of Band Theory, Conductors, Insulators and Semi-Conductors, Structure Determination by I.R.NMR, X-Ray UV, Mass Spectroscopy.

Catalysis: Introduction, criteria of Catalysts, Types of Catalyst, Enzyme Catalysis, Mechanism of Catalysis (Homogeneous & Heterogeneous Catalysis).

BOOKS:

1. Engineering Chemistry: By P.C.Jain & Monika Jain, Dhanpat Rai and Sons.
2. A Text Book of Engineering Chemistry: By Shastri Chawla, Dhanpat Rai & Sons.
3. Physical Chemistry: By R.P.Verma, Pardeep Publishers Jalandhar.
4. Principles of Physical Chemistry: By Puri, Sharma, Pathania, Shobhan Lal Nagin Chand & Co.
5. Chemistry in Engineering & Technology, Vol.I & Vol.II, Rajaram, Kuriacose (TMH).
6. Physical Chemistry, P.W.Atkin (ELBS, Oxford Press)
7. Physical Chemistry, W.J.Moore (Orient Longman)

FOUNDATION OF INFORMATION TECHNOLOGY(IT – 1002)

Course Code	IT – 1002	Credits : 4	L-3, T-1, P-0
Name of the Course	FOUNDATION OF INFORMATION TECHNOLOGY		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	Max. Marks: 50		

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Information concept and Processing: Definition of Information, Need for Information, Quality of Information, Value of Information, Categories and Levels of information in Business Organization, Data concepts and Data Processing, data representation – Number system.

Computer Appreciation: Definition of an Electronic Digital Computer, history, Generations, Characteristics and applications of Computers, classification of Computers.

Elements of Computers Processing System: Hardware CPU, Peripherals, Storage Media, Software Definition, Role and Categories, Firmware and Human ware.

SECTION – B

Communication: Need for communication, Data Transmission, Baud, Bandwidth, Data transmission rate, Channel Capacity, transmission impairments, Signal noise ratio.

Transmission media (twisted cables, Micro wave and radio wave, Optical fiber and satellite) and communication through these media.

A/D and D/A, Modulation, Multiplexing-FDM, TDM.

Communication techniques: circuit switching, message switching and packet switching and their advantages and disadvantages.

SECTION – C

Networking Essentials: Networking of Computer – Introduction of LAN and WAN, Types of LAN, Basic ISO-OSI model of LAN, client – Sever Architecture's.

Programming Language Classification: Computer Languages, Generation of Languages, Translators – Interpreters, Compilers, Assembles, Introduction to 4GLS.

SECTION – D

Information Technology Applications: Multimedia introduction, tools graphics, sound, video and animations. Artificial intelligence (AI) – Basic concepts of AI and Expert systems.

Latest IT enabled business applications: Basic concepts with definitions and short introduction of Enterprise Resource Planning (ERP), Customer relationship Management (CRM) Supply Chain Management (SCM), E-Commerce. Awareness of Ongoing IT Projects in India such as NICNET, ERNET, INFLIBNET etc.

Books:

1. Rajaram,V.: Introduction to Computer.
2. Morris: Computer Organisation.
3. Hamacher: Computer Organisation.
4. Kanter: Managing Information System.
5. Vital N: Information Technology India Tomorrow.
6. Murthy C.S.V: Fundamentals & Information Technology.

SCIENCE, TECHNOLOGY AND SOCIETY (HU – 1002)

Course Code	HU – 1002	Credits : 4	L-3, T-1, P-0
Name of the Course	SCIENCE, TECHNOLOGY AND SOCIETY		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

Instructions

For Paper Setters: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

For candidates: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

1. Science, Technology and Engineering, as knowledge and as social and professional activities.
2. Inter-relationship of technology growth and social, economic and cultural growth: historical perspective.
3. Ancient, medieval and modern technology/Industrial revolution and its impact. The Indian Science and Technology.

SECTION – B

1. Social and Human critiques of technology: Mumford and Ellul.
2. Rapid technological growth and depletion of resources. Reports of the club of Rome.
3. Energy crisis; renewable energy resources.

Environmental degradation and pollution. Eco-friendly technologies. Environmental regulations. Environmental ethics.

SECTION – C

1. Technology and the arms race. The nuclear threat.
2. Appropriate technology movement Schumacher; later developments.
3. Technology and the developing nations. Problems of technology transfer. Technology assessment/impact analysis.
4. Human operator in Engineering projects and industries Problems of man machine interaction. Impact of assembly line and automation. Human centered technology.

SECTION – D

1. Industrial hazards and safety. Safety regulations. Safety Engineering.
2. Politics and technology. Authoritarian versus democratic control of technology. Social and ethical audit of industrial organizations.
3. Engineering profession. Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and Ethical responsibilities of the engineer. Codes of professional ethics. Whistle blowing and beyond. Case studies.

BOOKS:

1. Appleyard, R.ed. 1989. the impact of international migration on developing countries paris: OECD.
2. Barger, Bernard 1952 science and the social order New York: Free Press.
3. Gaillard, J 1991. Scientists in the third world Lexington: Kentucky University Press.
4. Gaillard, J., V.V.Krishna and R.Waast, eds. 1997. Scientific communities in the developing world New Delhi: Sage.
5. Kamala Cahubey ed. 1974. Science policy and national development New Delhi: Macmillan.
6. Krishna, V.V.1993. S.S.Bhatnagar on science, technology and development 1938-54 New Delhi: Wiley Eastern.
7. Kornhauser, William, 1962 Scientists in industry, Berkley; University of California Press, price, Derek J.dSolla, 1963 little science, big science New York Columbia University Press.
8. Rahman, A.1972 Trimurti: Science, Technology and society – A collection of essays New Delhi: Peoples Publishing House.
9. Storer, Norman W.1966. The social system of science New York: Holt Rinehart and Winston.
10. UNCTAD/CSIR Case study in reverse transfer of technology: A survey of problems and policy in India Doc. TD/B/C.6AC.4/6 and Corr.1, Geneva.
11. Crane, Diana. 1965. "scientists at major and minor universities: A study of productivity and recognition" American sociological review, 30 (5) , Pp. 699-714.
12. Coler, Myron A.ed 1963 Essays on the creativity in the sciences New York: New York University Press.
13. Debroy, Bibek. 1996. Beyond the Uruguay round: The Indian perspective on GATT New Delhi: Sage.
14. Gilpin, Robert, and Christopher Wright eds. 1964. Scientists and national policy making New York: Columbia University Press.
15. Kumar, Nagesh and N.S.Siddharthan. 1997. Technology, market structures and internationalization: Issues and policies for developing countries London: Routledge and the united National University.
16. MacLeod, Roy and Deepak Kumar, 1995. Technology and the raj: Western technology and technical transfers to India, 1700-1947 New Delhi: Saga.
17. Merton, Robert K.1938. "Science, technology and society in seventeenth – century England" Osiris (Bruges, Belgium), 14 Pp.360-632.

BASIC ELECTRICAL ENGINEERING (EE – 1001)

Course Code	EE – 1001	Credits: 4	L-3, T-1, P-0
Name of the Course	BASIC ELECTRICAL ENGINEERING		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester	End	Max. Time: 3 hrs.	Max. Marks: 100
Examination			Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A:

D.C. circuits: Ohm's law, Kirchoff's Laws, Thevenin's, Norton's, superposition theorem, Maximum power transfer theorem, Reciprocity, Compensation, Millman and Tellegan's Theorem . D.C. circuits, Nodal and Mesh analysis.

A.C. circuits: Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar and rectangular, exponential and trigonometric representations RL and C components, behavior of these components in A.C. circuits, concept of complex power, power factor.

Transient Response: transient response RL, RC and RLC circuits with step input.

Section B:

Series and Parallel A.C. circuits: Series and Parallel A.C. circuit, Series and Parallel resonance. Q factor, cut off frequency and bandwidth.

Three phase circuits: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by 2-wattmeter method, importance of earthing.

Section C:

Transformers: Principle, construction and working of transformer, Efficiency and regulation.

Electrical Machines: Introduction to D.C. Machines, induction motor, Synchronous machines.

Section D:

Measuring Instruments: Voltmeter, Ammeter, Wattmeter, Energy meter.

Batteries: Storage batteries:- Types, construction, charging and discharging, capacity and efficiency.

Books:

- Kothari & Nagarith: Basic Electrical Engg. (2nd Edition), TMH.
- B.L. Theraja & A.K. Theraja, S.Chand: Electrical Technology(Vol-1).
- Deltoro: Electrical Engg Fundamentals, PHI.

BASIC MECHANICAL ENGINEERING (ME – 1003)

Course Code	ME - 1003	Credits: 5	L-4, T-1, P-0
Name of the Course	Basic Mechanical Engineering		
Lectures to be delivered	65 (1 Hr Each) (L =52, T = 13 for each semester)		
Semester	End	Maximum Time: 3 hrs.	Max. Marks: 100
Examination			Min. Pass Marks: 40
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A**First Law of Thermodynamics**

Essence and corollaries of the first law, analytical expressions applicable to a process and cycle, internal energy, enthalpy and specific heats, first law analysis of steady flow, applications of steady flow energy equation to engineering devices.

Applications of first law of Thermodynamics

Closed and open systems, analysis of non-flow and flow processes for an ideal gas under constant volume (Isochoric), constant pressure (Isobaric), constant temperature (Isothermal), adiabatic and polytropic conditions. Analysis of free expansion and throttling processes. Representation of these processes on P-V charts and analysis of property changes and energy exchange (work and heat) during these processes.

SECTION – B**Second Law of Thermodynamics**

Limitations of first law, various statements of second law and their equivalence, application of statements of second law to heat engine, heat pump and refrigerator. Philosophy of Carnot cycle and its consequences. Carnot theorem for heat engines and heat pump. Clausius inequality, concept and philosophy of entropy and entropy changes during various processes. Temperature – entropy chart and representation of various processes on it. Third law of thermodynamics.

SECTION – C**Simple Stresses & Strains**

Concept & types of Stresses and strains, Poisson's ratio, stresses and strain in simple and compound bars under axial loading, stress strain diagrams, Hooks law, Elastic constants and their relationships. Temperature stress and strain in simple and compound bars under axial loading, Numerical problems.

Shear Force and Bending Moments

Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without over-hang and calculation of maximum BM and SF and the point of contraflexure under (i) concentrated loads, (ii) uniformly distributed loads over whole span or a part of it, (iii) combination of concentrated loads and uniformly distributed loads. Relation between the rate of loading, the shear force and the bending moments, Numerical Problems.

SECTION – D

Bending Stresses in Beams

Bending Stresses in Beams with derivation of Bending equation and its application to beams of circular, rectangular I & T Section, Composite beams, stress in beam with derivation, Combined Bending , Torsion & Arial loading of beams , Numerically .

Torsion of Circular Members

Design of thin Circular Tubes, Torsion of Solid and hollow circular shafts, Combined bending and torsion, Equivalent torque, Numerical Problems.

Text Books

1. Nag, P.K., "Engineering Thermodynamics", Tata McGraw – Hill, New Delhi.
2. Yadav, R., Thermal Science and Engineering, Central Publishing House, Allahabad.
3. Strength of Materials – G.H.Ryder – Third Edition in S I units 1969 Macmillan India.
4. Mechanics of Materials – Dr. Kirpal Singh, Standard Publishers Distributors, New Delhi.

Reference Books

1. Strength of Materials – Popoy, PHI, New Delhi.
2. Strength of Materials – Sadhu Singh, Khanna Publications.
3. Strength of Materials – A Rudimentary Approach – M.A.Jayaram, Revised Ed. 2001, Sapna Book House, Bangalore.
4. Strength of Materials – U.C.Jindal
5. Moran, M.J. and Shapiro, H.N., Fundamentals of Engineering Thermodynamics, John Wiley, New York.
6. Van Wylen, G.J., Fundamental of Classic Thermodynamics, John Wiley, New York.
7. Spalding, D.B. and Cole, E.H., Engineering Thermodynamics, ELBS, New Delhi.
8. Hibbeler, R.C. Engineering Mechanics – Statics, Addison Wesley Longman, New Delhi.

APPLIED CHEMISTRY LAB (AS – 1005)

Course Code	AS – 1005	Credits : 2	L-0, T-0, P-2
Name of the Course	APPLIED CHEMISTRY LAB		
Lectures to be delivered	26 hours of Lab sessions		
Semester End Examination	Max. Time : 3 hrs	Max. Marks : 50	Min. Pass Marks : 20
Laboratory	Continuous Assessment (based on Lab work 30%, Lab record 30%, Viva 30%, Attendance 10%)	Max. Marks: 50	Min. Pass Marks: 25

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

- i) Performing a practical examination assigned by the examiner (25 marks).
- ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

NOTE: At least 8 experiments to be performed.**List of Experiments**

1. To determine the surface tension of the given liquid by drop number method by using Stalgmometer and identify the given liquid.
2. To determine the insoluble, soluble and total solids in given sample of sewage.
3. To determine the solid carbon, volatile matter, ash content and percentage of moisture in given sample of coal by proximate analysis method and classify the coal.
4. To determine the total alkalinity in a given sample of water using a standard acid. Ask for what you want
5. To determine the percentage of Chlorine in a given sample of CaOCl_2 which has been dissolved in one litre of solution..
6. To determine the surface tension of the two given unknown liquids by using Stalgmometer and identify the given liquid.
7. To determine the fineness of a given sample of cement by solving through standard 75:90 micro sieve.
8. To determine the coefficient of viscosity of the given unknown liquids by using Ostwald's Viscometer and identify the given liquid.
9. To determine the coefficient of viscosity of the given lubricating oil using Red Wood Viscometer
10. To determine the coefficient of viscosity of the given lubricating oil using Seybolt Viscometer.
11. To determine the flash point and fire point of given sample of oil using Pens key Marten's apparatus.
12. To determine the amount of Chlorine in given sample of water approximate N/20 sodium Thiosulphate solution. Ask for your requirement.
13. Estimation of calcium as CaO volumetrically in cement
14. To determine the maximum wavelength of solution of cobalt chloride
15. To determine the Beer's Law and apply it to find the concentration of given unknown solution by spectra-photometer.
16. To determine the chemical oxygen demand of waste water.
17. To determine the half-life period of given radioactive sample using GM counter.

MAT LAB (IT– 1003)

Course Code	IT– 1003	Credits : 2	L-0, T-0, P-2
Name of the Course	MAT LAB		
Lectures to be delivered	26 hours of Lab sessions		
Semester End Examination	Max. Time : 3 hrs	Max. Marks : 50	Min. Pass Marks : 20
Laboratory	Continuous Assessment (based on Lab work 30%, Lab record 30%, Viva 30%, Attendance 10%)	Max. Marks: 50	Min. Pass Marks: 25

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

- i) Performing a practical examination assigned by the examiner (25 marks).
- ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

The aim of this laboratory is to help students get an idea about a programming environment very widely used by engineer to solve the problem in their respective disciplines.

Exercises on computer

- i. Roots of a quadratic equation.
- ii. Guessing a number
- iii. Units conversion
- iv. Factorial program
- v. Simulation of RC circuit
- vi. V-I characteristics of a MOSFET.
- vii. Finding average with dynamic array.
- viii. Writing a binary file
- ix. Reading a binary file
- x. Plotting one dimensional and two dimensional graph using MAT LAB 2-D plot types.
- xi. Using functions in MAT LAB Environment

To teacher concerned will give at least 10 exercises to solve non trivial problems using MAT LAB environment.

BOOKS:

1. Programming in MAT LAB, Marc E.Herniter, Thomson ASIA Ptd. Ltd Singapore(2001)
2. MAT LAB, the languages of computing; The maths work inc.

BASIC ELECTRICAL ENGINEERING LAB (EE– 1002)

Course Code	EE – 1002	Credits : 2	L-0, T-0, P-2
Name of the Course	BASIC ELECTRICAL ENGINEERING LAB		
Lectures to be delivered	26 hours of Lab sessions		
Semester End Examination	Max. Time : 3 hrs	Max. Marks : 50	Min. Pass Marks : 20
Laboratory	Continuous Assessment (based on Lab work 30%, Lab record 30%, Viva 30%, Attendance 10%)	Max. Marks: 50	Min. Pass Marks: 25

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

- i) Performing a practical examination assigned by the examiner (25 marks).
- ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

List of Experiments

1. To verify KCL and KVL.
2. TO study frequency response of series RLC circuit and determine resonance frequency and Q factor for various values of R,L,C
3. TO study frequency response of parallel RLC circuit and determine resonance frequency and Q factor for various values of R,L,C
4. To perform direct load test of transformer and plot efficiency v/s load characteristics.
5. To perform direct load test of the DC shunt generator and plot load v/s current curve.
6. To study and verify Thevenins, Norton's, superposition, Milliman's, maximum power, reciprocity theorems .
7. To perform O.C and S.C test of transformer.
8. to study various types of meters
9. Measurement of power by 3 voltmeter/ 3 ammeter method.
10. Measurement of power in 3-phase system by 2-wattmeter method.

WORKSHOP PRACTICE – II (ME– 1004)

Course Code	ME– 1004	Credits : 4	L-1, T-0, P-3
Name of the Course	WORKSHOP PRACTICE –II		
Lectures to be delivered	52 hours		
Semester End Examination	Max. Time : 3 hrs	Max. Marks : 50	Min. Pass Marks : 20
Laboratory	Continuous Assessment (based on Lab work 30%, Lab record 30%, Viva 30%, Attendance 10%)	Max. Marks: 50	Min. Pass Marks: 25

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

- i) Performing a practical examination assigned by the examiner (25 marks).
- ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

List of Experiments

Fitting shop:-

1. Drilling and Tapping in M.S. piece
2. To make a male-female joint (taper type) of mild steel.

Machine Shop :-

1. To perform boring operation on lathe machine.
2. To perform knurling and threading operation on lathe machine.
3. step turning operation on a lathe machine

Carpentry and Pattern making shop:-

1. To make a single piece pattern of connecting rod.
2. To make a self cod pattern.
3. To make a split pattern.

Welding shop:-

1. To make V butt joint in horizontal position.
2. To make a V butt joint in vertical position.
3. To perform Gas welding operation.

Smithy and Forging:-

1. To make a cube from a circular bar.
2. To make a tong using hot forging operations
3. To perform drawing down operation.

Foundry Shop:-

1. To make a mould and perform casting operation.
2. Study of casting defects and remedies.

Books:

1. Workshop Technologies By Chapman
2. Manufacturing Processes by Begam
3. Manufacturing Materials And Processes By JS Campbell
4. Introduction To Electrical Wiring
5. Exercises And Prepration Of PCBs Involving soldering of electrical and electronic applications.

INFORMATION TECHNOLOGY TRAINER WORKSHOP II (IT – 1004)

Course Code	IT – 1004	Credits : 4	L-1, T-0, P-3
Name of the Course	INFORMATION TECHNOLOGY TRAINER WORKSHOP II		
Lectures to be delivered	52 hours		
Semester End Examination	Max. Time : 3 hrs	Max. Marks : 50	Min. Pass Marks : 20
Laboratory	Continuous Assessment (based on Lab work 30%, Lab record 30%, Viva 30%, Attendance 10%)	Max. Marks: 50	Min. Pass Marks: 25

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

- i) Performing a practical examination assigned by the examiner (25 marks).
- ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester

List of Experiments

This workshop will provide training of different types of operating systems (Windows98,LINUX) with hands on experiments on the following:

1. Installation of operating system.
2. Configuration of Hard Disk.
3. Configuration of Display Cards.
4. Configuration of sound cards.
5. Configuration of CDROM.
6. Configuration of Mouse.
7. Configuration of Printer.
8. Configuration of Display Cards.
9. Configuration of Network Cards.
10. Configuration of Modems.
11. Understanding Boot up process.
12. Creating and using emergency Disk.
13. Troubleshooting exercises related to various components of computer like Monitor drives, memory, printers etc.
14. Assembling a PC.

BASIC MECHANICAL ENGG. LAB (ME – 1005)

Course Code	ME – 1005	Credits : 2	L-0, T-0, P-2
Name of the Course	BASIC MECHANICAL ENGG. LAB		
Lectures to be delivered	26 hours of Lab sessions		
Semester End Examination	Max. Time : 3 hrs	Max. Marks : 50	Min. Pass Marks : 20
Laboratory	Continuous Assessment (based on Lab work 30%, Lab record 30%, Viva 30%, Attendance 10%)	Max. Marks: 50	Min. Pass Marks: 25

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

- i) Performing a practical examination assigned by the examiner (25 marks).
- ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS

1. To study low-pressure boilers.
2. To study High-pressure boilers.
3. Calibration of thermometers.
4. Calibration of pressure gauges.
5. Study of discharge measuring devices.
6. To determine co-efficient of discharge of orifice meter.
7. To verify the Bernoulli's Theorem.
8. To find Young's Modulus of Elasticity using Searl's apparatus.
9. To find Young's Modulus of Elasticity of a beam with deflection beam apparatus.
10. To find Modulus of rigidity with the help of torsion apparatus.

THIRD SEMESTER

PRINCIPLES OF ENGINEERING ECONOMICS**AS-3001**

Course Code	AS-3001	L-3, T-0, P-0		
Name of the Course	Principles of Engineering Economics			
Lectures to be Delivered	39 (1 Hr Each) (L=39 for each semester)			
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs	
Continuous Assessment (based on sessional test (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max Marks: 50		

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SYLLABUS**SECTION-A**

Economics: Definition, nature and scope of economics, the economic problems, Economic systems- Meaning of capitalism, socialism and mixed economy; circular flow of money.

SECTION-B

Demand: Meaning, Determinants of demand, Demand Curve, Exception to the law of demand, Increase & Decrease in demand, Contraction & extension of demand, Elasticity of demand, Methods of measuring Elasticity of demand.

Supply: Law of supply, Extension & contraction of supply, Increase & Decrease in supply, Elasticity of supply.

SECTION-C

Cost of Production : Concept, types, Relation between average & marginal cost.

Theory of Production : Laws of returns- Law of variable proportions and law of returns to scale, Economics of Scale of Production.

SECTION-D

Price Determination under perfect competition, Equilibrium of firm and industry, Monopoly, Monopolistic competition.

Theories of Distribution, Rent, Wages, Interest and Profits

Books:

- Modern Micro Economics : Koutsoyannisa : MC Millan
- Elementary Economic Theory : K.K. Dewett & J.D. Verma : S. Chand
- Business Economics : K.P.M. Sundharam & E.N. Sundharam : Sultan Chand & Sons

SOLID MECHANICS**CE-3001**

Course Code	CE-3001	L-4, T-1, P-0		
Name of the Course	Solid Mechanics			
Lectures to be Delivered	65 (1 Hr Each) (L=52, T=13 for each semester)			
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs	
Continuous Assessment	(based on sessional test (2) 50%,			Max Marks: 50
Tutorials/Assignments	30%, Quiz/Seminar 10%, Attendance 10%)			

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SYLLABUS**SECTION-A**

Analysis of stresses and strains-Analysis of simple states of stresses and strains, elastic constraints, bending stresses, theory of simple bending, flexure formula, combined stresses in beams, shear stresses, Mohr's circle, Principle stresses and strains, torsion in shafts and closed thin walled sections, stresses and strains in cylindrical shells and spheres under internal pressure.

SECTION-B

Theory of Columns- Slenderness ratio, end connections, short columns, Euler's critical buckling loads, eccentrically loaded short columns, **slender** columns subjected to axial and eccentric loading.

Bending moment and shear force in determinate beams and frames- Definitions and sign conventions, axial force, shear force and bending moment diagrams.

SECTION-C

Three hinged arch- Horizontal thrust, shear force and bending moment diagrams.

Deflections in beams- Introduction, slope and deflections in beams by differential equations, moment area method and conjugate beam method, unit load method, principle of virtual work, Maxwell's Law of Reciprocal Deflections, Williot Mohr's diagram

SECTION-D

Analysis of statically determinate trusses- Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

Books:

- Strength of Materials Part-I : S. Timoshenko : Affiliated East-West Press,

- | | | |
|---|------------------------|--------------------------------------|
| 2. Strength of Materials and Theory of Structures-I | : B.C. Punmia | New Delhi
: Laxmi Pub., New Delhi |
| 2. Mechanics of Materials | : Popov, Nagarjan & Lu | : Prentice Hall of India |
| 3. Mechanics of Solids | : Prasad, V.S | : Galgotia Pub. New Delhi |

BUILDING CONSTRUCTION AND DRAWING

CE-3002

Course Code	CE-3002	L-2, T-0, P-3	
Name of the Course	Building Construction and Drawing		
Lectures to be Delivered	65 (1 Hr Each) (L=26, P=39 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max Marks: 50

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SYLLABUS

SECTION-A

Masonry Construction:

Introduction, various terms used, Stone masonry- dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry- bonds in brick work- English, Flemish etc., laying brick work, structural brick work- cavity and hollow walls, reinforced brick work, defects in brick masonry, composite stone and brick masonry, glass block masonry.

Cavity and Partition Walls:

Advantages, position of cavity, types of non-bearing partitions, constructional details and precautions, construction of masonry cavity wall.

SECTION-B

Foundation:

Functions, types of shallow foundations, sub-surface investigations, geophysical methods, general feature of shallow foundation, foundations in water-logged areas, design of masonry wall foundation, introduction to deep foundations i.e. pile and pier foundations.

Damp-Proofing and Water-Proofing:

Defects and causes of dampness, prevention of dampness, materials used, damp-proofing treatment in buildings, water proofing treatment of roofs including pitched roofs.

SECTION-C

Roofs and Floors:

Types of roofs, various terms used, roof trusses- king post truss, queen post truss etc.
Floor structures- ground, basement and upper floors, various types of floorings

Doors and Windows: Locations, sizes, types of doors and windows, **fixtures** and **fasteners** for doors and windows.

Acoustics, Sound Insulations and Fire Protection:

Classification, measurement and transmission of sound, sound absorber, classification of absorbers, sound insulation of buildings, wall construction and acoustical design of auditorium, fire-resisting properties of materials, fire resistant construction and fire protection requirements for buildings.

SECTION-D

DRWAINGS:

Typical sketches of:

- a) Cavity Wall
- b) Bonds in brick work
- c) Grillage foundation

Preparation of building drawing mentioning its salient features including the following details:

- a) Ground floor plan
- b) Two Sectional Elevations
- c) Front and Side Elevations
- d) Plan and Sectional Elevation of stair case, doors/ windows/ ventilators
- e) Roof-trusses.

Books:

- | | | |
|---|---|----------------------------------|
| 1. Building Construction | : Sushil Kumar | : Standard Pub., N. Delhi |
| 2. Building Construction | : B C Punmia, Jain and Jain | : Laxmi Publishers |
| 3. Construction Engineering | : Y.S. Sane | : Y.S. Sane Const.
Associates |
| 4. Building Construction | : Gurcharan Singh | : Standard Pub., N.
Delhi. |
| 5. Building Construction:
Principles, Materials and
Systems | : Madan Mehta, Armpriest
and Scarborough | : Prentice Hall |

FLUID MECHANICS**ME-3005**

Course Code	ME-3005	L-4, T-1, P-0		
Name of the Course	Fluid Mechanics			
Lectures to be Delivered	65 (1 Hr Each) (L=52, T=13 for each semester)			
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs	
Continuous Assessment (based on sessional test (2) 50%, Max Marks: 50)				
Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%				

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SYLLABUS
SECTION – A

Introduction

Fluid and flow- definition and types, properties of ideal and real fluids, continuum concept, Lagrangian & Eulerian approach.

Fluid Statics

General differential equation, manometry, Force on plane and curved surfaces, stability of floating and submerged bodies, Relative equilibrium.

SECTION – B***Kinematics of fluid***

Steady flow, uniform flow, stream, streak and path lines, continuity equation, stream function, irrotational flow, velocity potential, flow nets, circulation, simple flows, flow around circular cylinder with and without rotation, lift and drag.

Dynamics of fluids

Concept of system and control volume, Reynold's transportation theorem, Euler's equation, Bernoulli's equation, Navier Stoke's equation and their application to nozzle, venturimeter, orifices and mouth pieces, time taken in emptying a vessel, Pitot - Prandtl tube.

SECTION-C**Flow in pipes**

Laminar flow through pipes, total and hydraulic gradient lines, series and parallel connection of pipes, transmission of power through pipes.

Laminar flow of viscous fluids

Boundary layer concept, boundary layer thickness, displacement, momentum and energy thickness, integral method, drag on flat plate, flow around an airfoil, boundary layer separation.

SECTION-D**Turbulent flow**

Fluid friction and Reynolds number, Prandtl mixing length hypothesis, velocity distribution in pipes, Colebrook formula.

Dimensional analysis

Buckingham's Pi theorem, Non – dimensional numbers and their application, similitude.

Books:

- | | | |
|--|-------------------------|--|
| 1. Fluid Mechanics and Machinery | : Aggarwal | : Tata McGraw Hill Publishing Company Ltd., New Delhi |
| 2. Introduction To Fluid Mechanics and Fluid Machines | : Som, S.K. & Biswas, G | : Tata McGraw Hill Publishing Company Ltd., New Delhi. |
| 3. A Text Book of Fluid Mechanics and Hydraulic Machines | : Bansal, Dr. R.K. | : Luxmi Publications (P) Ltd., New Delhi |
| 4. Fluid Mechanics & Hydraulics | : P.N. Modi and | Standard Publishers, New |

SURVEYING- I**CE-3003**

Course Code	CE-3003	L-3, T-1, P-0		
Name of the Course	Surveying-I			
Lectures to be Delivered	52 (1 Hr Each) (L=39, T=13 for each semester)			
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs	
Continuous Assessment (based on sessional test (2) 50%, Max Marks: 50 Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)				

Instructions

- 1. For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- 2. For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SYLLABUS**SECTION – A**

Fundamental Principles of Surveying: Definition, objects, classification, fundamental principles, methods of fixing stations.

Measurement of distances: Direct measurement, instruments for measuring distances, instruments for marking stations, chaining of line, errors in chaining, tape corrections examples.

SECTION – B

Compass and Chain Traversing: Methods of traversing, instruments for measurement of angles-prismatic and surveyor's compass, bearing of lines, local attraction, examples.

Levelling: Definition of terms used in levelling, types of levels and staff, temporary adjustment of levels, principles of levelling, reduction of levels, booking of staff readings, examples,

Contouring: Definition, characteristics of contour lines, locating contours, interpolation of contours.

SECTION – C

Theodolite and Theodolite Traversing: Theodolite, temporary adjustment of theodolite, measurement of angles, repetition and reiteration method, traverse surveying with theodolite, checks in traversing, adjustment of closed traverse, examples.

Plane Table Surveying: Plane table, methods of plane table surveying, radiation, intersection, traversing and resection, two point and three point problems.

SECTION – D

Tacheometry: Uses of tacheometry, principle of tacheometric surveying, instruments used in tacheometry, systems of tacheometric surveying- stadia system, fixed hair method, determination of tacheometric constants, tangential systems, examples.

Curves: Classification of curves, elements of simple circular curve, location of tangent points- chain and tape methods, instrumental methods, examples of simple curves. Transition Curves- Length and types of transition curves, length of combined curve, examples. Vertical Curves: Necessity and types of vertical curves.

Books:

1. Surveying Vol.I

: B.C.Punmia

: Laxmi Publication

2. Surveying and Levelling : N N Basak : Tata McGraw Hill
 3. Plane Surveying : A M Chandra : New Age International

CIVIL ENGINEERING MATERIALS

CE-3004

Course Code	CE-3004	L-4, T-1, P-0	
Name of the Course	Civil Engineering Materials		
Lectures to be Delivered	65 (1 Hr Each) (L=52, T=13 for each semester)		
Semester End Examination	Max Marks: 100	Min Pass Marks: 40	Maximum Time: 3 hrs
Continuous Assessment (based on sessional test (2) Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)	50%,	Max Marks: 50	

Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five question in all selecting one question from each of the section A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

SYLLABUS

SECTION-A

Stones

Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

Brick and Tiles

Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Tiles: Terra-cotta, manufacturing of tiles and terra-cotta, types of terra-cotta, uses of terra-cotta.

SECTION-B

Lime, cement and mortars:

Classification of lime, manufacturing, artificial hydraulic lime, pozzolana, testing of lime, storage of lime, cement's composition, types of cement, manufacturing of ordinary portland cement (OPC), testing of cement, special types of cement, storage of cement.

Mortars: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.

SECTION-C

Timber: Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fibre boards, masonite and its manufacturing, important Indian timbers.

Ferrous and Non-Ferrous Metals: Definitions, manufacturing of cast iron, manufacturing of steel from pig iron, types of steel, marketable form of steel, manufacturing of aluminium and zinc.

SECTION-D

Paints and Varnishes: Basic constituents of paints, types of paints, painting of wood, constituents of varnishes, characteristics and types of varnishes.

Plastic- Definition, classification of plastics, composition and raw materials, manufacturing, characteristics and uses, polymerisation, classification, special varieties.

Books:

1. Civil Engineering Materials Kulkarni, P.; Subramanian, R.; : Tata McGraw Hill, New
Gahlot, P.; Juneja, A.; Puri, V.; Delhi
Likhi, S.; Duggal, A.
2. Building Materials : S K Duggal : New Age International
3. Construction Materials for : H. John Parsaie : Writers Club Press
Civil and Structural
Engineering
4. Materials in Construction : G.D. Taylor : Pearson Education
5. Building Construction: : Madan Mehta, Armpriest and : Prentice Hall
Principles, Materials and
Systems Scarborough

STRUCTURAL MECHANICS LAB

CE-3005

Course Code	CE-3005	L-0, T-0, P-2		
Name of the Course	Structural Mechanics Lab			
Lectures to be Delivered	26 hours of Lab. work (2 hrs. per week)			
Semester End Examination	Max Marks: 50		Min Pass Marks: 20	
Continuous Assessment	Lab work	30%	Max Marks: 50	Min Pass Marks: 25
	Lab Record	25%		
	Viva/ Hands on	25%		
	Attendance	20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (iii) Performing a practical exercise assigned by the examiner (25 marks).
- (iv) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments

Note: (Total number of experiments required to be performed are to be decided by the teacher concerned and availability of equipment.)

Syllabus

1. Verification of reciprocal theorem of deflection using a simply supported beam.
2. Verification of moment area theorem for slopes and deflections of the beam.
3. Deflections of a truss- horizontal deflections & vertical deflections of various joints of a pin-jointed truss.
4. Elastic displacements (vertical & horizontal) of curved members.
5. Experimental and analytical study of 3 hinged arch and influence line for horizontal thrust.
6. Experimental and analytical study of behaviour of struts with various end conditions.
7. To determine elastic properties of a beam.
8. Uniaxial tension test for steel (plain & deformed bars)
9. Uniaxial compression test on concrete & bricks specimens.

Books:

Experimental Methods in Structural Mechanics: C.B. Kukreja and V.V. Shastry, Standard Publishers Distributors, Nai Sarak, Delhi.

FLUID MECHANICS LAB**ME-3006**

Course Code	ME-3006	L-0, T-0, P-2	
Name of the Course	Fluid Mechanics Lab		
Lectures to be Delivered	26 hours of Lab. work (2 hrs. per week)		
Semester	End	Max Marks: 50	Min Pass Marks: 20
Examination			
Continuous Assessment	Lab work	30%	Max Marks: 50 Min Pass Marks: 25
	Lab Record	25%	
	Viva/ Hands on	25%	
	Attendance	20%	

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments

Note: Total number of experiments required to be performed are to be decided by the teacher concerned and availability of equipment.

SYLLABUS

1. To determine the coefficient of impact for vanes.
2. To determine the coefficient of discharge of Notch (V and Rectangular types)
3. To determine the friction factor for the pipes.
4. To determine the coefficient of discharge of venturimeter.
5. To determine the coefficient of discharge, contraction & velocity of an orifice.
6. To find critical Reynolds number for a pipe flow.
7. To determine the meta-centric height of a floating body.
8. To determine the minor losses due to sudden enlargement, sudden contraction and bends.
9. To show the velocity and pressure variation with radius in a forced vortex flow.

SURVEYING- I LAB**CE-3007**

Course Code	CE-3007	L-0, T-0, P-3		
Name of the Course	Surveying-I Lab			
Lectures to be Delivered	39 hours of Lab. work (3 hrs. per week)			
Semester End Examination	Max Marks: 50	Min Pass Marks: 20		
Continuous Assessment	Lab work	30%	Max Marks: 50	Min Pass Marks: 25
	Lab Record	25%		
	Viva/ Hands on	25%		
	Attendance	20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments

Note: (Total number of experiments required to be performed are to be decided by the teacher concerned and availability of equipment.)

1. Chain surveying: Chaining and chain traversing.
2. Compass traversing.
3. Plane tabling: methods of plane table surveying, two point & three point problems.
4. Leveling: Profile leveling and plotting of longitudinal section and cross sections.
5. Y-leveling.
6. Permanent adjustment of level.
7. Reciprocal leveling.
8. Contouring and preparation contour map.
9. Use of tangent clinometer.

**VOCATIONAL TRAINING OF 4-WEEK DURATION
AFTER SECOND SEMESTER**

ME-3001

Course Code	ME-3001	L-0, T-0, P-0		
Name of the Course	Workshop Training of 4 weeks duration after second semester			
Lectures to be Delivered				
Semester End Examination	Max Marks: 50	Min Pass Marks: 20		
Continuous Assessment	Lab work	30%	Max Marks: 50	Min Pass Marks: 25
	Lab Record	25%		
	Viva/ Hands on	25%		
	Attendance	20%		

Instructions for paper setter / candidates

Laboratory examination will consist of two parts:

- (i) Performing a practical exercises assigned by the examiner (25 marks).
- (ii) Viva-voce examination (25 marks)

Viva-voce examination will be related to the practicals performed / project executed by the candidate related to the paper during the course of the semester.

List of Experiments

The number of experiments required to be performed are to be decided by the teacher concerned and availability of equipment.

SYLLABUS

The students will be required to do the job work in the college workshops.