SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

for

BACHELOR OF TECHNOLOGY
(Environmental Engineering)

GURU GOBIND SINGH
INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI

w.e.f. session 2004-2005

BACHELOR OF TECHNOLOGY

(B.TECH.) DEGREE COURSE (Common to all branches)

FIRST SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETMA 101	Applied Mathematics – I	3	1	4
ETPH 103	Applied Physics – I	2	1	3
ETCH 105	Applied Chemistry – I	2	1	3
ETME 107	Manufacturing Process	2	0	2
ETCS 109	Introduction to Computers and Auto CAD	2	1	3
ETEL 111	Communication Skills – I	2	1	3
ETEL 113*	Impact of Science & Technology on Society	1	0	1
PRACTICAL/VIVA VOCE				
ETPH 151	Applied Physics Lab. – I	-	2	1
ETCH 153	Applied Chemistry Lab. – I	-	2	1
ETCS 155	Introduction to Auto CAD Office Automation and Web Design	-	3	2
ETME 157	Workshop Practice	-	3	2
ETME 159	Engineering Graphics Lab.	-	2	1
	TOTAL	**14**	**17**	**26**

ETEL-113* is NUES

BACHELOR OF TECHNOLOGY

(B.TECH.) DEGREE COURSE (Common to all branches)

SECOND SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETMA 102	Applied Mathematics – II	3	1	4
ETPH 104	Applied Physics – II	2	1	3
ETCH 106	Applied Chemistry – II	2	1	3
ETCS 108	Introduction to Programming	2	1	3
ETME 110	Engineering Mechanics	2	1	3
ETEC 112	Electrical Science	2	1	3
ETEL 114	Communication Skills – II	2	1	3
PRACTICAL/VIVA VOCE				
ETPH 152	Applied Physics Lab. – II	-	2	1
ETCH 154	Applied Chemistry Lab. – II	-	2	1
ETCS 156	C Programming Lab.	-	2	1
ETME 158	Engineering Mechanics Lab.	-	3	2
ETEC 160	Electrical Science Lab.	-	2	1
	TOTAL	**15**	**18**	**28**

BACHELOR OF TECHNOLOGY
(Environmental Engineering)

THIRD SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETEN 201	Applied Mathematics - lll	3	1	4
ETEN 203	Instrumental Analysis	3	1	4
ETEN 205	Environmental Science & Microbiology	3	1	4
ETEN 207	Mechanics of Solids	3	1	4
ETEN 209	Water Engineering	3	1	4
ETEN 211	Introduction to Electronics & Electrical Engineering	3	1	4
PRACTICAL/VIVA VOCE				
ETEN 251	Instrumental Analysis	-	2	1
ETEN 253	Mechanics of Solids	-	2	1
ETEN 255	Water Engineering	-	2	1
ETEN 257	Introduction to Electronics & Electrical Engineering	-	2	1
	TOTAL	**18**	**14**	**28**

BACHELOR OF TECHNOLOGY
(Environmental Engineering)

FOURTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETEN 202	Numerical Methods & Programming	3	1	4
ETEN 204	Instrumental Analysis & Pollution measurements	3	1	4
ETEN 206	Environmental Science & Biochemistry	3	1	4
ETEN 208	Solid Waste Management	3	1	4
ETEN 210	Computer Graphics & Multimedia	3	1	4
ETEN 212	Earth Science, GIS and Natural Pollution	3	1	4
PRACTICAL/VIVA VOCE				
ETEN 252	Numerical Methods & Programming	-	2	1
ETEN 254	Instrumental Analysis & Pollution measurements	-	2	1
ETEN 256	Solid Waste Management	-	2	1
ETEN 258	Computer Graphics & Multimedia	-	2	1
	TOTAL	**18**	**14**	**28**

Paper Code: ETMA-101	**L**	**T**	**C**
Paper: Applied Mathematics – I	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

COMPLEX NUMBERS AND INFINITE SERIES: De Moivre's theorem and roots of complex numbers. Euler's theorem, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses. Convergence and Divergence of Infinite series, Comparison test d'Alembert's ratio test. Higher ratio test, Cauchy's root test. Alternating series, Lebnitz test, Absolute and conditioinal convergence. **[No. of Hrs. 10]**

UNIT II

CALCULUS OF ONE VARIABLE: Successive differentiation. Leibnitz theorem (without proof) McLaurin's and Taylor's expansion of functions, errors and approximation.

Asymptotes of Cartesian curves. Curveture of curves in Cartesian, parametric and polar coordinates, Tracing of curves in Cartesian, parametric and polar coordinates (like conics, astroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardiode, Lemniscate of Bernoulli, equiangular spiral). Reduction Formulae for evaluating

Finding area under the curves, Length of the curves, volume and surface of solids of revolution.

[No. of Hrs. 15]

UNIT III

LINEAR ALGEBRA – MATERICES: Rank of matrix, Linear transformations, Hermitian and skeew – Hermitian forms, Inverse of matrix by elementary operations. Consistency of linear simultaneous equations, Diagonalisation of a matrix, Eigen values and eigen vectors. Caley – Hamilton theorem (without proof). **[No. of Hrs. 09]**

UNIT IV

ORDINARY DIFFERENTIAL EQUATIONS: First order differential equations – exact and reducible to exact form. Linear differential equations of higher order with constant coefficients. Solution of simultaneous differential equations. Variation of parameters, Solution of homogeneous differential equations – Canchy and Legendre forms. **(No. of Hrs. 10]**

TEXT BOOKS:

1. Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2. Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003 (2^{nd} Ed.).

REFERENCE BOOKS:

1. Mitin, V. V.; Polis, M. P. and Romanov, D. A., "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
2. Wylie, R., "Advanced Engineering Mathematics", McGraw-Hill, 1995.
3. "Advanced Engineering Mathematics", Dr. A. B. Mathur, V. P. Jaggi (Khanna publications)

Paper Code: ETPH – 103 **L T C**
Paper: APPLIED PHYSICS – I **2 1 3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Interference of Light: Interference due to division of wavefront and division of amplitude, Young's double slit expt., Interference, Principle of Superposition, Theory of Biprism, Interference from parallel thin films, wedge shaped films, Newton rings, Michelson interferometer.

Diffraction: Fresnel Diffraction, Diffraction at a straight edge, Fraunhoffer diffraction due to N slits, Diffraction grating, absent spectra, dispersive power of Grating, resolving power of prism and grating. **[No. of Hrs. 8]**

UNIT - II

Polarization: Introduction, production of plane polarized light by different methods, Brewster and Malus Laws. Double refraction, Quarter & half wave plate, Nicol prism, specific rotation, Laurent's half shade polarimeter.

Optical Instruments : Ramdson & Huygen Eye pieces, Electron microscope.

[No. of Hrs. 8]

UNIT - III

Laser: Introduction, temporal and spatial coherence, principle of Laser, stimulated and spontaneous emission, Einstein's Coefficients, He-Ne Laser, Ruby Laser, Application of Lasers.

Fibre Optics: Introduction, numerical aperture, step index and graded index fibres, attenuation & dispersion mechanism in optical fibers (Qualitative only), application of optical fibres, optical communication (block diagram only)

[No. of Hrs. 8]

UNIT - IV

Mechanics: Central and non-central forces, Inverse square force, SHM, Damped, undamped and forced Oscillations.

Special theory of Relativity: Frame of reference, Michelson-Morley experiment, basic postulates of special relativity, Lorentz transformations (space – time coordinates & velocity only), mass energy relation.

[No. of Hrs. 8]

TEXT BOOKS:

1. A. Ghatak, "Optics"
2. N. Subrahmanyam and Brij Lal, "Optics"

REFERENCE BOOKS:

1. Jenkins and White, "Fundamentals of Optics"
2. C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I.
3. A. Beiser, "Concepts of Modern Physics"

Paper Code: ETCH – 105 **L T C**
Paper: Applied Chemistry – I **2 1 3**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1.	Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2.	Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Water: Specifications for water, analysis of water – alkalinity, hardness and its determination (EDTA method only). Water for domestic use, Water softening processes – Lime – Soda process, Ion exchange method, boiler feed water, boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, removal of silica, removal of dissolved gases, carbonate and phosphate conditioning, colloidal conditioning, calgon treatment, Numerical problems on alkalinity, hardness, Lime-Soda process and Ion exchange method, EDTA method. **[No. of Hrs: 08]**

UNIT - II

Fuels: Classification, combustion and chemical principles involved in it, calorific value: gross and net calorific values and their determination by bomb calorimeter and Boy's gas calorimeter.

Solid Fuels: Proximate and ultimate analysis of coal and their importance, High and low temperature carbonisation, Coke: Its manufacture by Otto Hoffman oven.

Liquid Fuels: Conversion of coal into liquid fuels (Bergius process and Fisher-Tropsch Process) and mechanism, Petroleum: its chemical composition and fractional distillation, cracking of heavy oil residues – thermal and catalytic cracking, knocking and chemical structure, octane number and cetane number and their significance, power alcohol, Analysis of flue gases by Orsat's apparatus, Numerical on calorific value, combustion, proximate and ultimate analysis of coal, flue gas analysis. **[No. of Hrs: 08]**

UNIT - III

Environmental Pollution and Control: Air Pollution: Types of pollutants, source effects, sink and control of primary pollutants – CO, No_x, HC, So_x and particulates, effects of pollutants on man and environment – photochemical smog and acid rain.

Water Pollution: Classification of pollutants, their sources, waste water treatment – domestic and industrial.

Soil Pollution: Composition of soil, classification and effects of soil pollutants and their control.

Solid Waste Pollution: Classification, waste treatment & Disposal methods (Composting, sanitary landfilling, thermal processes, recycling and reuse).

Hazardous Wastes: Classification – radioactive, biomedical and chemical, treatment and disposal – physical, chemical and biological processes. **[No. of Hrs: 08]**

UNIT - IV

Solutions: Ideal and non-ideal solutions, Raoult's Law, Distillation of binary solutions, Henry's Law, Nernst distribution law, Arrhenius theory and special behaviour of strong electrolytes.

Corrosion: Types of corrosion (dry, wet, atmospheric and soil corrosion), theories of corrosion, protective measures against corrosion. **[No. of Hrs: 08]**

TEXT BOOKS:

1. Chemistry in Engineering & Technology (Vol I & II) (Latest ed.), By J.C. Kuriacose & J. Rajaram
2. Environmental Chemistry & Pollution Control (Latest ed.), By S.S. Dara
3. Applied Chemistry (Latest ed.), By H.D. Gesser

Paper Code: ETME 107 **L T C**
Paper: Manufacturing Processes **2 0 2**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Casting Processes:

Principles of metal casting: Pattern materials, types and allowance; Study of moulding, sand moulding, tools, moulding materials, classification of moulds, core, elements of gating system, casting defects, description and operation of cupola: special casting processes e.g. die-casting, permanent mould casting, centrifugal casting, investment casting. **[No. of Hrs. 6]**

UNIT - II

Smithy and Forging:

Basic operation e.g. upsetting, fullering, flattening, drawing, swaging: tools and appliances: drop forging, press forging.

Bench Work and Fitting

Fitting, sawing, chipping, thread cutting (die), tapping; Study of hand tools, Marking and marking tools. **[No. of Hrs. 6]**

UNIT - III

Metal joining:

Welding principles, classification of welding techniques; Oxyacetylene Gas welding, equipment and field of application, Arc-welding, metal arc, Carbon arc, submerged arc and atomic hydrogen welding, Electric resistance welding: spot, seam, butt, and percussion welding; Flux: composition, properties and function; Electrodes, Types of joints and edge preparation, Brazing and soldering. **[No. of Hrs. 6]**

UNIT – IV

Sheet Metal Work:

Common processes, tools and equipments; metals used for sheets, standard specification for sheets, spinning, bending, embossing and coining. **[No. of Hrs. 5]**

TEXT BOOKS:

1. Manufacturing Process by Raghuvanshi.
1. Manufacturing Technology by P.N.Rao (TMH publications)

REFERENCE BOOK:

1. Workshop Technology by Hazra-Chowdhary
2. Production Engineering by R.K.Jain
3. Workshop Technology by Chapman

Paper Code: ETCS 109	***L***	***T***	***C***
Paper: Introduction to Computer Systems	**2**	**1**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Introduction to Computer:

Overview of Computer organization and historical perspective computer applications in various fields of science and management.

Data representation: Number systems, character representation codes, Binary, hex, octal codes and their inter conversions.

Binary arithmetic, Floating-point arithmetic, signed and unsigned numbers.

[No. of Hrs. 8]

UNIT - II

Introduction to OS and Office Automation

Concept of computing, Introduction to Operating Systems such as DOS, windows 2000/Xp, UNIX, Client Server Technology, etc. (only brief user level description).

Introduction to World Processing, Spread Sheet & Presentation software e.g. MS-Word, MS-Excel, MS-Power Point. **[No. of Hrs. 8]**

UNIT - III

Introduction to Auto CAD

Coordinate System, 2D drafting: lines, circles, arc, polygon, etc., Editing, 3D, Solid modeling, Rendering, Use of Auto CAD for engineering drawing practices.

[No. of Hrs. 8]

UNIT - IV

Web Technologies

Introduction to World Wide Web, Search engines, e-mail, news, gopher, Audio & Video Conferencing, Internet Protocols: FTP, telnet, TCP/IP, SMTP, HTTP, Languages used for WEB Technology: HTML, practical examples using DHTML and Static HTML

[No. of Hrs. 8]

TEXT BOOKS:

1. Rajaraman, "Fundamentals of Computers", Prentice Hall of India, 3rd Edition.
2. Mark Middlebrook, "Autocad 2004 for Dummies", Pustak Mahel Prakashan, 2000.
3. Vikas Gupta, "Comdex Computer Course Kit", Dreamtech Press, 2004.

REFERENCE BOOKS:

1. Alexis Leon & Mathews Leon, "Fundamentals of Computer Science & Communication Engineering", Leon Techworld, 1998.
2. Omura, "Mastering Autocad 2000 for Mechanical Eng ineers" BPB Publications, 2nd Edition, 1998.
3. A.S. Tanenbaum, " Computer Networks", Pearson Education India Ltd., 3rd Edition, 2002.

Paper Code: ETEL-111	**L**	**T**	**C**
Paper: Communication Skills – I	**2**	**1**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Remedial Grammar: Errors of Accidence and syntax with reference to Parts of Speech; Agreement of Subject and Verb; Tense and Concord; Conditional Clauses; Use of connectives in Complex and Compound sentences; Question tags and short responses.

[No. of Hrs: 06]

UNIT - II

Vocabulary and Usage: Word Formations (by adding suffixes and prefixes); Technical Word Formation; Synonyms, Antonyms, Homophones, and Homonyms; One Word Substitution; Misappropriations; Indianisms; Redundant Words; Phrasal Verb Idioms. **[No. of Hrs: 06]**

UNIT - III

Technical Writing:

(A) Scientific Attitude and Impersonal Style; Plain Statements, Definitions; Description and Explanations (of objects, instruments, Processes, Scientific Principles, etc.)

Summarizing and abstracting; Expressing ideas within a restricted word limit; Paragraph Writing (Paragraph division, introduction and the conclusion, Variety in sentences and paragraphs)

Interpretation and use of charts, graphs and tables in technical writing.

Punctuation

(B) Reading at various speeds (slow, fast, very fast); reading different kinds of texts for different purpose (e.g. for relaxation, for information, for discussion at a later stage, etc.); reading between the lines.

Comprehension of Unseen Passages **[No. of Hrs: 10]**

UNIT - IV

Text: The following prose pieces from ***Best Science Writing : Reading and Insights*** edited by Robert Gannon prescribed text (Hyderabad: University Press (India) Limited, 1991).

1. Chapter 2: "After 63 years, Why Are They Still Testing Einstein?" by C.P. Gilmore
2. Chapter 5: "Star Wars : The Leaky Shield" By Carl Sagan
3. Chapter 10: "Chaos : The Ultimate Asymmetry" by Arthur Fisher
4. Chapter 11: "Bill Moss, Tentmaker" by Robert Gannon
5. Chapter 12: "Totality - A Report" by Michael Rogers

[No. of Hrs: 10]

TEXT BOOKS:

1. Maison, Margaret M. Examine Your English, Hyderabad: Orient Longman, 1980
2. Sharma, R.S. Technical Writing. Delhi: Radha Publication, 1999
3. Sudarsanam, R. Understanding Technical English. Delhi: Sterling Publishers Pvt. Ltd., 1992
4. Gannon, Robert, Edt. Best Science Writing: Readings and Insights. Hyderabad: University Press (India) Limited, 1991.

Paper Code: ETEL-113	**L**	**T**	**C**
Paper: Impact of Science & Technology on Society	**1**	**0**	**1**

***Non University Examination Scheme (NUES)**

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.

Paper Code: ETPH-151	**L**	**P**	**C**
Paper: APPLIED PHYSICS LAB – I	**0**	**2**	**1**

List of Experiments

(1) To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find

(a) The acceleration due to gravity
(b) The radius of gyration and the moment of inertia of the bar about an axis.

(2) To determine the moment of inertia of a flywheel about its own axis of rotation.

(3) To determine the value of acceleration due to gravity using koter's pendulum.

(4) To determine the frequency of A.C. mains using sonometer and an electromagnet.

(5) To determine the frequency of electrically maintained turning fork by Melde's method.

(6) To determine the dispersive power of prism using spectrometer and mercury source.

(7) To determine the wavelength of sodium light by Newton's Ring.

(8) To determine the wavelength of sodium light using diffraction grating.

(9) To determine the refractive index of a prism using spectrometer.

(10) To determine the specific rotation of cane sugar solution with the help of polarimeter.

(11) To find the wavelength of He-Ne Laser using transmission diffraction grating.

(12) To determine the numeral aperture (NA) of a Optical Fibre.

(13) Compute simulation (simple application of Monte Carlo) e.g. Brownian motion, charging & discharging of capacitor.

Note: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.

Paper Code: ETCH – 153	**L**	**P**	**C**
Paper: Applied Chemistry Lab – I	**0**	**2**	**1**

List of Experiments

1. To determine the percentage composition of a mixture of Sodium hydroxide and Sodium Chloride.

2. To determine the amount of Sodium Carbonate in the given mixture of Sodium Carbonate and Sodium Bicarbonate.

3. Determine the amount of Oxalic Acid and Sulphuric Acid/Hydrochloric Acid in one litre of solution given standard Sodium Hydroxide and Potassium Permanganate.

4. To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.

5. To determine the no. of water molecules of crystallization in Mohr's salt provided standard dichromate solution using internal indicator.

6. Determine the amount of Cu in the copper ore solution provided hypo solution.

7. Iodometric Titration of $K_2Cr_2O_7$ v/s $Na_2S_2O_3$ to determine the percentage purity of $K_2Cr_2O_7$ sample.

8. Argentometric titration one each of Vohlard's method and of Mohr's method.

9. Complexometric Titrations.

10. Detrmination of dissolved Oxygen in given sample if water.

TEXT BOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis (Latest ed.), Revised by G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney
2. Applied Chemistry: Theory and Practice (Latest ed.), By O.P. Vermani & A.K. Narula

Paper Code: ETCS 155	**L**	**P**	**C**
Paper: Introduction to AutoCAD, Office Automation and Web Design	**0**	**3**	**2**

List of Experiments

1. Use Microsoft-Word to perform the following:
   a) Send out invitation letter to several people using mail merge facility.
   b) Create tabular data in word and insert graph to represent data.
   c) Create a Macro and use it in an application.

2. Use Microsoft-Excel to perform the following:
   a) Create a Macro and use it in an application
   b) Enter the name and marks of 10 students and perform various mathematical functions on it.
   c) Enter first quarter performance of five companies and create a pie chart showing there shareholders in the market.

3. Use Microsoft Power-Point to perform the following
   a) Create a slide show on any subject of your choice using minimum five slides.
   b) Create slideshow in operating sound.
   c) Create an animation using group, ungroup, order, textbox image insert etc.

4. Use HTML to design a Home page for IGIT using all the features of HTML like buttons, frames, marquee check boxes etc..

5. Use AutoCAD to do the following:
   a) Use of Drawing & Editing Properties: Modify Object Properties and a know how of layers, colors and prototype drawing.
   b) Draw line (Poly line, multi line, linear line), polygon, ellipse, circle, arc, rectangle and use cross hatching, regions, boundary, spline, donut, fillet and extent commands.
   c) Dimensioning commands, styles, control scale factors, drawing set-up, grip editing objects snaps, utility commands.
   d) Projection of points, lines and solids,
   e) Section of Solids
   f) Development and Intersection of Surface
   g) Isomeric Projections

Create a WEB page containing hyperlinks to the pages having information about Science and Technology.

Paper Code: ETME-157	**L**	**P**	**C**
Paper: Workshop Practice	**0**	**3**	**2**

UNIT - I

Materials: Spectrography method for finding composition of materials.
Wood Working Shop: Making of various joints, Pattern making.

UNIT - II

Foundary Shop: Bench moulding with single piece pattern and two piece pattern.
Floor moulding – Making of bend pipe mould etc.
Machine moulding – Making of mould using Match-plate pattern.
Core making- Making and baking of dry sand cores for placing in horizontal, vertical and hanging positions in the mould cavity.

Fitting Shop: Learning use of fitting hand tools, marking tools, marking gauge.
Exercises: Jobs made out of MS Flats, making saw – cut filling V-cut taper at the corners, circular cut, fitting square in square, triangle in square.

UNIT - III

Welding Shop: Electric arc welding, Edge preparations, Exercises making of various joints. Bead formation in horizontal, vertical and overhead positions.
Gas Welding: Oxy-Acetylene welding and cutting of ferrous metals.
Soldering: Dip soldering.
Brazing: With Oxy-Acetylene gas.

UNIT - IV

Sheet Metal Shop: Learning use of sheet-metal tools, Exercises: Making jobs out of GI sheet metal. Cylindrical, Conical and Prismatic shapes.

Project Shop: Extrusion of soft metals, Plastic coating of copper wires, Plastic moulding.

Paper Code: ETME-159	**L**	**P**	**C**
Paper: Engineering Graphics Lab	**0**	**2**	**1**

UNIT - I

General: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications,

Projections of Point and Lines: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

UNIT - II

Planes other than the Reference Planes: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

Projections of Plane Figures: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

UNIT - III

Projection of Solids: Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.

CADD

UNIT - IV

Isometric Projection

Nomography : Basic Concepts and use.

TEXT BOOKS:

1. Engineering drawing by N.D.Bhatt (Charotar Publications).

REFERENCE BOOKS:

1. Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)
2. Engineering Drawing by Venugopalan.
3. Engineering Drawing by P.S.Gill

Paper Code: ETMA-102 **L T C**
Paper: Applied Mathematics - II **3 1 4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

CALCULUS OF SEVERAL VARIABLES:

Partial differentiation, ordinary derivatives of first and second order in terms of partial derivaties, Euler's theorem on homogeneous functions, change of variables, Taylor's theorem of two variables and its application to approximate errors. Maxima and Minima of two variables, Langranges method of undermined multipliers and Jacobians.

[No. of Hrs. 12]

UNIT - II

FUNCTIONS OF COMPLEX VARIABLES:

Derivatives of complex functions, Analytic functions, Cauchy-Riemann equations, Harmonic Conjugates, Conformal mapping, Standard mappings – linear, square, inverse and bilinear. Complex line integral, Cauchy's integral theorem, Cauchy's integral formula, Zeros and Singularities / Taylor series, Laurents series, Calculation of residues. Residue theorem, Evaluation and real integrals. **[No. of Hrs. 12]**

Unit - III

VECTOR CALCULUS:

Scalar and Vector point functions, Gradient, Divergence, Curl with geometrical physical interpretations, Directional: derivatives, Properties.

Line integrals and application to work done, Green's Lemma, Surface integrals and Volume integrals, Stoke's theorem and Gauss divergence theorem (both without proof).

[No. of Hrs. 10]

UNIT - IV

LAPLACE TRANSFORMATION:

Existence condition, Laplace transform of standard functions, Properties, Inverse Laplace transform of functions using partial fractions, Convolution and coinvolution theorem. Solving linear differential equations using Laplace transform. Unit step function, Impulse function and Periodic function and their transforms. **[No. of Hrs. 10]**

TEXT BOOKS:

1. E. Kresyzig, "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa, 2003 (2^{nd} Ed.).
3. Dr. A. B. Mathur, V. P. Jaggi, "Advanced Engineering Mathematics", Khanna Publishers.

REFERENCE BOOKS:

1. V. V. Mitin, M. P. Polis and D. A. Romanov, "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
2. R. Wylie, "Advanced Engineering Mathematics", McGraw-Hill, 1995.

Paper Code: ETPH-104 **L T C**
Paper: APPLIED PHYSICS – II **2 1 3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Electromagnetic Theory (EMT)

Motion of Charged Particles in crossed electric & magnetic fields, Velocity Selector & Magnetic focussing, Gauss law, continuity equation, inconsistency in Ampere's Law, Maxwell's equations (differential and integral forms), poynting vector, Poynting Theorem (Statement only), propagation of plane electromagnetic waves in conducting and non-conducting medium.

[No. of Hrs. 8]

UNIT - II

Quantum Mechanics & Statistical Physics:

De-Broglie Hypothesis, Davisson Germer experiment, wave function and its properties, expectation value, Wave Packet, Uncertainity principle. Schrodinger Equation for free Particle, Time Dependent Schrodinger Equation, Particle in a box (1-D), Single step Barrier, Tunneling effect.

Qualitative Features of Maxwell Bollzman, Bose-Einstein and Fermi-Dirac statistics distribution, functions & their comparison (no derivation) **[No. of Hrs. 8]**

UNIT - III

Solid State Physics

Formation of energy bands in metals, semiconductors and insulators; intrinsic and extrinsic semiconductors, Fermi energy levels for doped, undoped semiconductors and pn junction; Tunnel diode, Zener diode.

Superconductivity: Meissner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), London's equation, properties of superconductors & applications.

[No. of Hrs. 8]

UNIT - IV

X-Rays: production and properties, Crystalline and Anorphous solids (Brief) Bragg's Law, Applications.

Ultrasonics: Introduction, Production of Ultrasonics (Magentostriction and piezoelectric methods), engineering applications. **[No. of Hrs. 8]**

TEXT BOOKS:

1. A. BEISER, "Concept of Modern Physics"
2. Rajam, "Atomic Physics"
3. Greiner, "Quantum Physics"
4. Griffth, "Introduction to Electrodynamics"

REFERENCE BOOKS:

1. Jordan & Balmain, "Electromagnetic waves and Radiating Systems"
2. Kittel, "Solid State Physics"
3. R.L. Singhal, "Solid State Physics"
4. Schiff, "Quantum Mechanics"

Paper Code: ETCH – 106 **L T C**
Paper: Applied Chemistry – II **2 1 3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Chemical Bonding:

Potential Energy curve for H_2 molecule, co-ordinate bond, Werner's theory, effective atomic numbers, isomerism in co-ordinate compounds. Hydrogen bonding, Vander Waal's forces, hybridization including d-orbitals, Valence shell Electron Repulsion Theory (VSEPR). Discussion of structures of IF_3, $SnCl_2$, CO_3^{2-}, Molecular Orbital theory, Linear combination of atomic orbitals (LCAO) method. Structures of simple heteronuclear diatomic molecules such as CO, NO, HF, HCl. **[No. of Hrs: 08]**

UNIT - II

Gaseous State: Gas laws and Kinetic theory of gases, Distribution of molecular velocities, Mean free path, Real gases – non ideal behaviour, causes of deviation from ideal behaviour, Vander Waal's equation. Liquefaction of gases. Numericals based on above topics.

Thermochemistry: Hess's Law, Heat of a reaction, Effect of temperature on heat of reaction at constant pressure (Kirchoff's eq.), heat of dilution, heat of hydration, heat of neutralization and heat of combustion, Flame temperature. **[No. of Hrs: 08]**

UNIT - III

Catalysis: Criteria for catalysis : Homogeneous catalysis – acid-base, Enzymatic catalysis, Catalysis by metal salts, Heterogeneous catalysis, concepts of promoters, inhibitors and poisoning, physiosorption, chemisorption, surface area.

The Phase Rule: Definitions of various terms, Gibb's Phase rule, Application of phase rule to one component system – the water system and Sulphur system. Two component system : Lead – Silver, $FeCl_3$ – water, Na_2SO_4 – water. **[No. of Hrs: 08]**

UNIT - IV

Polymers and Composites: Functionality, Degree of polymerization, concept of molecular weight (number average, weight average & numerical based on them), Linear, branched and cross-linked polymers, Tacticity of polymers, Homo and Copolymers (Classification based on repeat unit), Structure – property relationship of polymers. Industrial applications of important thermoplastic, thermosetting polymers, Elastomers, Natural Polymers.

Conducting Polymers : Properties and applications.

Composites : Classification, Fibre and particle reinforced composites. **[No. of Hrs: 08]**

TEXT BOOKS:

1. J.D. Lee, "Inorganic Chemistry", Latest ed.
2. J.C. Kuriacose & J. Rajaram, "Chemistry in Engineering & Technology, Vol I & II, Latest ed.
3. Puri, Sharma & Pathania, "Principles of Physical Chemistry", Latest ed.
4. V.R. Gowarikar, N.V. Viswanathan & Jayadev Sreedha, "Polymer Science", Latest ed.

Paper Code: ETCS 108 | ***L*** | ***T*** | ***C***
Paper: Introduction to Programming | **2** | **1** | **3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Introduction to Programming: Concept of algorithms, Flow Charts, Data Flow diagrams etc., Introduction to the Editing tools such as vi or MS-VC editors, Concepts of the finite storage, bits bytes, kilo, mega and gigabytes. Concepts of character representation, Number Systems & Binary Arithmetic. **[No. of Hrs. 8]**

UNIT - II

Programming using C: The emphasis should be more on programming techniques rather than the language itself. The C Programming language is being chosen mainly because of the availability of the compilers, books and other reference materials.

Example of some simple C program. Concept of variables, program statements and function calls from the library (Printf for example)

C data types, int, char, float etc., C expressions, arithmetic operation, relational and logic operations, C assignment statements, extension of assignment of the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions, C Statements, conditional executing using if, else. Optionally switch and break statements may be mentioned.

[No. of Hrs. 8]

UNIT - III

Iterations and Subprograms: Concept of loops, example of loops in C using for, while and do-while. Optionally continue may be mentioned.

One dimensional arrays and example of iterative programs using arrays, 2-d arrays Use in matrix computations.

Concept of Sub-programming, functions Example of functions. Argument passing mainly for the simple variables. **[No. of Hrs. 8]**

UNIT - IV

Pointers and Strings: Pointers, relationship between arrays and pointers Argument passing using pointers Array of pointers. Passing arrays as arguments.

Strings and C string library.

Structure and Unions. Defining C structures, passing strings as arguments Programming examples. **[No. of Hrs. 8]**

TEXT BOOKS:

1. Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
2. Herbert Schildt, "C:The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.

REFERENCE BOOKS:

1. Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.
2. Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.

Paper Code: ETME 110	**L**	**T**	**C**
Paper: Engineering Mechanics	**2**	**1**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Force system: Free body diagram, Eqilibrium equations and applications.

Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, friction of flat pivot and collared thrust bearings, Belt drive- derivation of equation.

$T_1/T_2 = e^{\mu\theta}$ and its application

[No. of Hrs. 8]

UNIT - II

Structure: Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Distributed Force: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia. **[No. of Hrs. 8]**

UNIT - III

Kinematics of Particles: Rectilinear motion, plane curvilinear motion-rectangular coordinates, normal and tangential component.

Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

[No. of Hrs. 8]

UNIT - IV

Kinematics of Rigid Bodies: Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, relative acceleration (Corioli's component excluded) and instantaneous center of velocity, Velocity and acceleration polygons for four bar mechanism and single slider mechanism.

Kinetics of Rigid Bodies: Equation of motion, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

Shear force and bending Moment Diagram. **[No. of Hrs. 8]**

TEXT BOOKS:

1. A.K.Tayal, "Engg Mechanics", Umesh Publications
2. Sadhu Singh, "Engg Mechanics", Khanna Publishers

REFERENCE BOOKS:

1. Irving H. Shames, "Engg Mechanics", PHI publications
2. U.C.Jindal, "Engg Mechanics", Galgotia Publications
3. Beer & Johnston, "Engg Mechanics", TMH
4. Subramanyam, "Engg Mechanics"

Paper Code: ETEC-112	**L**	**T**	**C**
Paper: ELECTRICAL SCIENCE	**2**	**1**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT - I

Circuit Analysis

Ohm's Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta Transformation. Application of theorem to the Analysis of dc circuits. **[No. of Hrs. 8]**

UNIT - II

A.C.Circuits

R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor representation, Response of R-L, R-C and R-L-C circuit to soinusoidal input Resonance-series and parallel R-L-C Circuits, Q-factor, Bandwidth. **[No. of Hrs. 7]**

UNIT - III

Measuring Instruments

Principles, Construction and application of moving coil, moving iron, dynamometer type, induction type instruments, extension of range of ammeter, voltmeter (shunt and multiplier), Two-wattmeter method, for the measurement of power, Cathol-ray Oscilloscope and Applications. **[No. of Hrs. 7]**

UNIT - IV

Transformers

Construction and Working principles and phaser diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, Regulation and efficiency, and Auto transformer.

Rotating Machines

Construction and working principles of dc motor and generator and its characteristics Applications of DC machines

Construction and working principles of 3-φ-Induction motor, Torque-speed characteristics, and Industrial applications. **[No. of Hrs. 10]**

TEXT BOOKS:

1. P.C. Sen "Principles of Electric Machines and Power Electronics", Wiley Eastern 2003.
2. Vincent DEL TORO "Electrical Engineering Fundamental's Prentice Hall India", Ed 2002.

Paper Code: ETEL-114	**L**	**T**	**C**
Paper: Communication Skills – II	**2**	**1**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT – I

Basic Concepts in Communication: Communication as sharing; context of communication; the speaker/writer and the listener/reader; medium of communication; barriers to communication; accuracy, brevity, clarity and appropriateness in communication.

[No. of Hrs: 05]

UNIT - II

Writing Skills: Types of writings (Expository, Descriptive, Analytic, Argumentative, Narrative etc) and their main features. Resumes and CV's and Cover letters. Memos and Notices. Basics of Formal Reports. **[No. of Hrs: 08]**

UNIT - III

Verbal, Non-Verbal and Listening Skills: Elementary Phonetics (Speech Mechanism, The Description of Speech Sounds, The Phoneme, the syllable; Prosodic Features, Word Accent, Features of Connected Speech); Paralanguage and Body language; and Classroom Presentations, Hearing and Listening; Essentials of Good Listening: Achieving ability to comprehend material delivered at relatively fast speed. **[No. of Hrs: 08]**

UNIT - IV

Group Discussion: Use of persuasive strategies including some rhetorical devices for emphasizing (for instance; being polite and firm; handling questions and taking in criticism of self; turn-taking strategies and effective intervention; use of body language).

[No. of Hrs: 09]

TEXT BOOKS:

1. R. K. Bansal, and J. B. Harrison, "Spoken English For India: A Manual of Speech and Phonetics", Hyderabad: Orient Longman, 1983.
2. Lewis, Hedwig. "Body Language: A Guide For Professionals. New Delhi: Response Books", A division of Sage Publication, 2000
3. Sides, H. Charles, "How to Write & Present Technical Information", Cambridge: CUP, 1999.
4. Forsyth, Sandy & Lesley Hutchison, "Practical Composition", Edinburgh Oliver & Boyd, 1981

Paper Code: ETPH-152	**L**	**P**	**C**
Paper: Applied Physics Lab – II	**0**	**2**	**1**

List of Experiments

1. To determine the value of e/m of electron by J.J. Thomson method.
2. To determine unknown resistance of a wire by Carey Foster's Bridge.
3. To determine the internal resistance of Leclanche cell using potentiometer.
4. To study the charging and discharging of a capacitor and to find out the time constant.
5. To find the thermal conductivity of a poor conductor by Lee's disk method.
6. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.
7. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil)
8. To measure the frequency of a sine-wave voltage obtain from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave voltage from two signal generator.
9. To determine the temp. coefficient of resistance of platinum by Callender & Griffith's Bridge.
10. To study Hall effect.
11. To determine plank's constant.

Note:
Atleast 8 experiments must be carried out.
Proper error – analysis must be carried out with all the experiments.

Paper Code: ETCH – 154	**L**	**P**	**C**
Paper: Applied Chemistry Lab – II	**0**	**2**	**1**

List of Experiments

1. Determine the heat of hydration of $CuSO_4.5H_2O/FeSO_4.7H_2O$.
2. Determine the heat of neutralization of strong Acid (say H_2SO_4/HCl) with strong base (NaOH).
3. Determine the heat of neutralization of Weak Acid with strong base.
4. Determine the molecular weight of a substance by Rast Method.
5. Determine the reaction rate constant for 1^{st} order reaction.
6. Determine the surface tension of a liquid using drop weight method.
7. To determine the viscosity of the given liquid (density to be determined).
8. Preparation of a Polymer.
9. To determine the cell constant of a conductivity cell.
10. Titration of strong acid/strong base conduct metrically.

TEXT BOOKS:

1. B.D. Khosla, A. Gulati & V.C. Garg, "Practical Physical Chemistry", Latest ed
2. S.K. Bhasin and Sudha Rani, "Laboratory Manual on Engineering Chemistry", Latest ed.

Paper Code: ETCS 156	**L**	**P**	**C**
Paper: C Programming Lab.	**0**	**2**	**1**

List of Experiments

1. Write a program to produce ASCII equivalent of given number
2. Write a program to find divisor or factorial of a given number.
3. Write a program to evaluate the following algebraic expressions after reading necessary values from the user
   - ? (ax+b)/(ax-b)
   - ? 2.5 log x-cos 30+|x^2-y^2|+sqrt (2xy)
   - ? (x^5+10x^4+8x^3+4x+2
4. Write a program to find sum of a geometric series
5. Write a program to cipher a string
6. Write a program to check whether a given string follows English capitalization rules
7. Write a program to find sum of the following series
   1+ ½ + 1/3 +_____+1/20
8. Write a program to search whether a given substring exist in an input string or not and then delete this string from input string.
9. Write a recursive program for tower of Hanoi problem
10. The fibonacci sequence of numbers is 1,1,2,3,5,8……. Based on the recurrence relation
    F(n)=F(n-1)+F(n-2)for n>2
    Write a recursive program to print the first m Fibonacci number
11. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices
    a) Addition of two matrices
    b) Subtraction of two matrices
    c) Finding upper and lower triangular matrices
    d) Trace of a matrix
    e) Transpose of a matrix
    f) Check of matrix symmetry
    g) Product of two matrices.
12. Write a program that takes two operands and one operator from the user perform the operation and then print the answer
13. Write a program to print the following outputs:

```
1                                   1
2   2                           2   2
3   3   3                   3   3   3
4   4   4   4               4   4   4   4
5   5   5   5   5           5   5   5   5   5
```

14. Write functions to add, subtract, multiply and divide two complex numbers (x+iy) and (a+ib) Also write the main program.
15. Write a menu driven program for searching an sorting with following options:-
    a) Searching (1) Linear searching (2) Binary searching
    b) Sorting (1) Insersection sort (2) Selection sorting
16. Write a program to copy one file to other, use command line arguments.
17. Write a program to mask some bit of a number (using bit operations)
18. An array of record contains information of managers and workers of a company. Print all the data of managers and workers in separate files.

Paper Code: ETME 158	**L**	**P**	**C**
Paper: Engineering Mechanics Lab	**0**	**3**	**2**

List of Experiments

1. To verify the law of Force Polygon
2. To verify the law of Moments using Parallel Force apparatus. (simply supported type)
3. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
4. To find the forces in the members of Jib Crane.
5. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
6. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle
7. To determine the MA, VR, η of Worm Wheel (2-start)
8. Verification of force transmitted by members of given truss.
9. To verify the law of moments using Bell crank lever
10. To find CG and moment of Inertia of an irregular body using Computation method.

Paper Code: ETEC 160	**L**	**P**	**C**
Paper: Electrical Science Lab	**0**	**2**	**1**

List of Experiments

1. Verification of Thevenin's theorem
2. Verification of Superposition theorem
3. Phasor Diagram and Power factor of LCR circuit.
4. Measurement of Power and Power factor in single phase Load using three ammeters/voltmeters.
5. Calibration of Energy Meter/Wattmeter/Voltmeter/Ammeter
6. Two wattmeter method of measuring power in three phase circuit (resistive load only)
7. Load test on Single Phase Transformer, Regulation and Efficiency of Transformer
8. Short Circuit/Open Circuit tests on Single Phase transformer
9. Measure the armature and field resistance of a D.C. Machine
10. Connection and starting of a Three Phase Induction Motor using direct on line or Star Delta Starter.
11. Starting and Speed Control of a D.C. shunt motor
12. Resonance

Paper Code: ETEN - 201	**L**	**T**	**C**
Paper: Applied Mathematics – III	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

Laplace Transformation: Laplace Transformation, Inverse Laplace transformation Convolution Theorem, application to linear differential equations with constant coefficients, Unit step function, impulse functions/periodic functions.

[No. of Hrs: 11]

UNIT II

Special Functions: Beta and Gamma functions, Bessels functions of first kind, Recurrence relations, modified Bessel functions of first kind, Ber and Bei functions, Legendre Polynomial, Rodrigue's formula, orthogonal expansion of function

[No. of Hrs: 11]

UNIT III

Fourier Series: Fourier Series, Euler's formulae, even and odd functions, having arbitrary periods, half range expansion, Harmonic analysis.

Fourier Transforms: Fourier transform, Sine and Cosine transforms, Application to differential equations

[No. of Hrs: 11]

UNIT IV

Partial Differential Equation: formation of first and second order linear equations, Laplace, Wave and heat conduction equation, initial and boundary value problems.

[No. of Hrs: 11]

TEXT BOOKS:

1. Kresyzig E, "Advanced Engg. Mathematics", John Wiley and Sons
2. R. K. Jain and S. R. K. Iyengar, "Advanced Engg. Maths", Narosa

REFERENCE BOOKS:

3. Dr. A. B. Mathur, V.P. Jaggi, "Advanced Engg. Maths", Khanna Publication
4. V. V. Mitin, M. P. Palis and D. A. Romano, "Modern Advanced Maths for Engineering", John Wiley and Sons
5. R. Wylil, "Advanced Engineering Maths", Mc Graw Hill

Paper Code: ETEN – 202 **L T C**
Paper : Numerical Methods and Programming **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.	
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.	

UNIT I

(a) Numeric Computation:

Computer Arithmetic: Floating point numbers – operations, Normalizations and their consequences.

Iterative Methods: Zeros of a single transcendental equations and zeros of polynomials using by section false position, Newton-Raphson etc. convergence of solution.

Simultaneous Linear Equations: Solutions of simultaneous linear equations – Gauss elimination method and pivoting.

[No. of Hrs: 11]

UNIT II

III-conditioned equations and refinement of solution; Gauss – Seidal iterative method. Numerical differentiation and Integration; Solutions of Differential equations ; Ruge Kutta methods, Predictor – corrector methods, Automatic error monitoring, stability of solutions.

Interpolations and Approximation.

[No. of Hrs : 11]

UNIT III

Polynomial interpolation – Newton Method, Langrages Method etc. Difference tables: Approximation of function by Taylor series and Chebshev Polynomials.

[No. of Hrs: 11]

UNIT IV

(a) **Statistical Computation: Frequency charts:** Different frequency charts.

(b) **Regressional Analysis:** Least square fit, Polynomial and curve fittings, Linear regression and non linear regression.

[No. of Hrs: 11]

TEXT BOOKS:

1. Stoer Bullrich, "Computer Oriented Numerical Methods", Veroap 1980
2. S. K. Sen, E. V. Krishnamurthy, "Computer Based Numerical Algorithms", East End Press

REFERENCE BOOKS:

1. C. F. Gerald, "Applied Numerical Analysis"
2. V. Rajaraman's, "Computer Oriented Numerical Methods", PHI, 1980
3. E. Balagursamy, "Numerical Methods"
4. R. S. Salaria, "Computer Based Numerical and Statistical Techniques"

Paper Code: ETEN - 203	**L**	**T**	**C**
Paper : Instrumental Analysis	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

3. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
4. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

Introduction, classification of Analytical methods.

(a) Types of instrument method, selecting an analytical method, chemical analysis and its applications.

(b) I. R. spectroscopy:- Theory of I. R spectroscopy, Molecular Vibrations, Vibration spectra of polyatomic molecules, Instrumentation and applications of I.R. spectroscopy.

[No. of Hrs: 11]

UNIT II

Uv-visible spectroscopy:

Absorption laws (Lambert – Beer Law), Asbsorption spectroscopy, Formation of absorption bands, Types of electronic transitions, Wood-ward Feazer rules for calculating absorption maxima of dienes and carbonyl compounds.

[No. of Hrs: 11]

UNIT III

Applications of Uv-spectroscopy to structure elucidation of simple molecules.

(a) **Colorimetry**, Variation of Colour with concentration, Colorimetric methods of analysis, Instrumentation and applications.

(b) **Raman Spectroscopy**, Principle and application and theoretical principle of turbidmetry and its applications.

[No. of Hrs: 11]

UNIT IV

Chromatography: Introduction to chromatographic separations. Types of chromatic graphic techniques, Partition chromatography, Adsorption chromatography, Technique and applications of Gas chromatography, H. P. L.C and T. L.C.

[No. of Hrs: 11]

TEXT BOOKS:

1. Skoog, Holler, “Instrumental Analysis”, Saunder Publications.
2. Khandpur, “Hand Book of Analytical Instruments”, TMH

REFERENCE BOOKS:

3. Khopkar, “Environmental Pollution Analysis” Latest Ed
4. Jagmohan, “Organic Spectroscopy Principles & Application”, Narosa
5. W. Kemp, “Molecular Spectroscopy”, Palgrave
6. G. Aruldhas, “Molecular Structure and Spectroscopy”, PHI
7. Vogel’s, “Text Book of Quantitative Analysis”

Paper Code: ETEN – 204	**L**	**T**	**C**
Paper: Instrumental Analysis and Environmental Pollution	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

(a) Thermal Methods of Analysis

Thermo gravimetric Methods (TG). Principle, instrumentation data handling and applications.

Differential Thermal Analysis, Principle, Instrumentation and Applications of TDA.

Differential scanning calorimetry (DSC), Principle instrumentation and applications of DSC.

[No. of Hrs: 11]

UNIT II

Flourimetry and Phosphorimetery, Principle of fluorescence applications, Measurement of fluorescence, spectrofluremeters and applications, Measurement of phosphorescence.

Flame photometry, Principle, Construction details of flame photometers, clinical flame photometers, applications of flame photometry.

[No. of Hrs: 11]

UNIT III

N.M.R. Spectroscopy: Principle and theory, instrumentation (brief) chemical shift, Environmental effects on NMR spectra, Applications of Proton NMR. C-^{13} NMR (Brief idea)

[No. of Hrs: 11]

UNIT IV

Environmental Pollution Monitoring Instruments, Air Pollution monitoring Instruments CO, SO_2 Hydrocarbons and Ozone, Water pollution monitoring instruments, Automated Wet chemical Analyzer.

[No. of Hrs: 11]

TEXT BOOKS:

1. Willard Merrit Dean, "Instrumental Methods of Analysis", CBS
2. Mendham, Denny Barner Thomas, "Vogels Text-Book of Quantitative Chemical Analysis", Pearson

REFERNECE BOOKS:

1. S. M. Khopkar, "Environmental Pollution Analysis", New Age
2. S. Koog, Holler, "Instrumental Analysis", Saunder Publication
3. Khandpur and Khandpur, "Instrumental Analysis", TMH
4. Vogel's, "Text Book of Quantitative Analysis"

Paper Code: ETEN – 205	**L**	**T**	**C**
Paper : Environmental Science and Microbiology	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.	
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.	

UNIT I

Environmental segments: Lithosphere, Hydrosphere, Biosphere, Composition of Atmosphere, Troposphere, Stratosphere, Mesosphere. Thermosphere, Chemical species and particulars in atmosphere, ions radicals particles Reactions in atmosphere.

[No. of Hrs: 11]

UNIT II

Principle of Ecology, Definition of Ecology and environment, kind of ecology, environmental and eco-factors, climate factor, medium factor, biotic factor, Ecosystem and its components, Nutrient cycle in ecosystem, carbon nitrogen, sulphur and phosphorous cycle (brief details)

[No. of Hrs:11]

UNIT III

Water chemistry:

Hydraulic cycle, specification of water, physical and chemical properties of water, chemistry of pollution due to detergents, pesticides, polymers trace organic metals, petroleum and radioactive components.

[No. of Hrs: 11]

UNIT IV

Environmental Microbiology. Basic principle of microbial transformation of organic matter. Biodegradation acclimatization of waster and microbial inhibition. **Species of algae and their significance in water engineering. Eutrophication. Water borne diseases and their control.**
Role of microorganism in water and waste water engineering, Role of microorganism in air pollution control (Bio filters and bio scrubbers)

[No. of Hrs: 11]

TEXT BOOKS:

1. A. K. Datta, "Introduction to Environmental Science & Engineering", Oxford & IBH, New Delhi
2. Subramaniam, "Text book of Environmental Science", Narosa

REFERENCE BOOKS:

3. Purohit & Purohit, "Text book of Microbiology", Agro Publication
4. Subramaniam & Sambamurty, "Ecology", Narosa
5. Davis & Cornwell, "Introduction to Environmental Science & Environmental Engineering", Mcgraw Hill Inst.
6. Botkin Keller, "Environmental Science", Wiley & Son, New York

Paper Code: ETEN – 206	**L**	**T**	**C**
Paper: Environmental Chemistry & Biochemistry	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.	
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.	

UNIT I

Biochemistry:

Structure of Cell, Structure and function of biologically important compounds such as carbohydrates protein, Lipids enzymes and Amino acids, Nucleic acids.

[No. of Hrs: 11]

UNIT II

Noise Pollution: Introduction, The describe scale, effects of noise – physiological and psychological effects, Measurement of noise levels, Noise control in industrial establishments.

[No. of Hrs: 11]

UNIT III

Environmental Toxicology: Classification of toxic materials, toxicity testing, toxic effects of hydrocarbons, alcohols, aldehydes, ketones, amines.

[No. of Hrs: 11]

UNIT IV

Environmental Toxicology and control, toxic effects and control of metal pollutants like Hg, Col, Pb, V, Cr, Co, etc. Disease measurement and control of occupational diseases.

[No. of Hrs: 11]

TEXT BOOKS:

1. S. M. Khopkar, “Environmental Pollution Monitoring & Control”, New Age
2. T. G. Spiro, W. M. Stigliani, “Chemistry of Environment”, PHI

REFERNECE BOOKS:

1. A. K. Das, “Textbook on Medical Aspects of Bioinorganic Chemistry”, CBS
2. Nelson Cox and Lehninger, “Biochemistry”
3. M. Ather & S. B. Vohra, “Heavy Metal & Environment”, New Age
4. S. S. Dara, “Environmental Chemistry » latest édition

Paper Code : ETEN – 207	**L**	**T**	**C**
Paper: Mechanics of Solids	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

Simple stresses and strains: Principal stresses, Mohr circle, stresses in Compound bars carrying axial loads, thermal stresses.

Strain Energy: Strain Energy under tension compression of bars of uniform and varying sections, stresses due to sudden and impact loads.

[No. of Hrs: 11]

UNIT II

Simple Bending: S.F. and B.M. diagrams of Cantilevers and beams under concentrated and uniformly distributed loads, varying loads, beams with & without overhangs. Stresses in beams and Cantilevers under bending, flitched beams; beams of uniform strength. Slope and deflection of Cantilevers, beams under concentrated and uniformly distributed loads.

[No. of Hrs: 11]

UNIT III

Columns: combined direct and bending stresses in columns.

Torsion: Stresses and strains in pure torsion of solid and circular shafts; power transmitted by shafts, combined bending and torsion.

[No. of Hrs: 11]

UNIT IV

Cylinders: Thin and thick cylinders, Lame's Theorems, Compound Cylinders, Spherical vessels.

Different Theories of Failure.

[No. of Hrs: 11]

TEXT BOOKS:

1. Abdul Mubeen, "Mechanics of Solids", First 2002 – Pearson Education Asia
2. D. K. Singh, "Mechanics of Solid" Theory & Problems, First 2002 – Pearson Education Asia

REFERENCE BOOKS:

1. Egor P. Popov, "Mechanics of Solid", Theory & Problems, Second 2003 – Pearson Education Asia
2. M. Chakraborti, "Strength of Material"
3. Dr. R. K. Bansal, "Strength of Material"
4. D. R. Malhotra, "Strength of Material"
5. R. S. Lehri, "Strength of Material", Mechanics of Material
6. R. K. Rajput, "Strength of Materia1", MOS,
7. Timoshenko Youngh, "Element of St of Material",
8. Dr. B. C. Punmia, Ashok Kr.Jain, Arum Kr. Jain, "Mechanics of Material"
9. R. S. Khurmi, "Applied Mechanics & S.M."
10. D.R. Malhotra, H. C. Gupta, "The St. of Material (S.I.Unit)", R-2002 – Satya Prakashan, New Delhi.
11. Gere & Timoshenko, "Mechanics of Material"

Paper Code: ETEN - 208	**L**	**T**	**C**
Paper: Solid Waste Management	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.	
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.	

UNIT I

Origin of domestic solid wastes, refuse analysis composition & quantity of refuse & transportation of refuse, economics of refuse collection.

Solid waste in industries, agricultural waste – its effect on environment.

[No. of Hrs: 11]

UNIT II

Solid waste handling methods, treatment & disposal of solid wastes.

Sanitary land fill, lechates and latest methods.

[No. of Hrs: 11]

UNIT III

Composting – Theory of composting, design of composting plant, recovery of bio-energy from organic waste.
Incineration.
Pyrolysis & its by-products.

[No. of Hrs: 11]

UNIT IV

Cost economics studies in solid waste management.
Introduction to linear programming & transportation problem, route & cost optimization.
Cost economics studies in solid waste management.

[No. of Hrs: 11]

TEXT BOOKS:

1. D.H.Liu. and Liptak B. G, "Hazardous Waste and Solid Waste",. Lewis Publishers, Washington 2000
2. H. s. Peavy & Rowe, "Environmental Engineering", Mc.Grow Hill Inst.

REFERENCE BOOKS:

1. C. S. Roa, "Environmental Pollution Control", New Age
2. Sawyer Mc Carty G. F. Parkin, "Chemistry for Environment Engineering & Science", TMH
3 S. S. Dara, "Environmental Chemistry", Latest Edition

Paper Code : ETEN - 209	**L**	**T**	**C**
Paper : Water Engineering	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1.	Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2.	Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

Characteristics of water, physical, chemical and biological standards. Water quality standards.

Theory operation and design of aeration system, sedimentation, coagulation, clari-flocculation, filteration, slow and rapid gravity filter, multimedia filters etc. Tube settlers.

[No. of Hrs: 11]

UNIT II

Disinfection, Theory and application of chlorine, Ozone and ultra violate rays Miscellaneous methods of water treatment-removal of iron and manganese, hardness, fluorides, colour taste and odour, dissolved metals, dissolved gases CO_2, O_2, Cl_2, etc. Disposal and treatment of water treatment plant, sludges and back wash waters. Disinfection by products.

[No. of Hrs: 11]

UNIT III

Adsorption, ion exchange, membrane processes.
O & M of water treatment, plants, industrial water treatment, Desalination of water.

[No. of Hrs: 11]

UNIT IV

Water Supply Engineering: water demand, design period, population forecasting, sources of water, hydrological, conveyance of water, pipe materials, corrosion, laying of pipes, distribution system planning of water supply projects.

[No. of Hrs: 11]

TEXT BOOKS:

1. B. C. Pumnia, Ashok Jain, Arun Jain, "Water Supply Engg.", LP
2. Raju, "Water Supply and Waste Water Engineering.", TMH

REFERENCE BOOKS:

1. Kaul & Gautam, "Water and Waste Water Analysis", Daya
2. B. C. Puri, Ashok Jain, "Waste Water Engineering", LP
3. Patrich, "Hydrology and Water Resource Engineering", Narosa
4. C. S. Rao, "Environmental Pollution Control" New age

Paper Code: ETEN - 210	**L**	**T**	**C**
Paper: Computer Graphics and Multimedia	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

Basic raster graphics, algorithms for drawing 2 D Primitives lines, circles, ellipses, arcs, clipping, clipping circles, ellipses & polygon.

Polygon Meshes in 3 D, curves, cubic & surfaces, Solid modeling.

Geometric Transformation: 2 D, 3 D transformations, window to viewport transformations, achromatic and color models.

[No. of Hrs: 11]

UNIT II

Shading Techniques: Transparency, Shadows, Object reflection, Gouraud & Phong shading techniques. Visible surface determination techniques for visible line determination, Z-buffer algorithm, scanline algorithm, algorithm for oct-tres, algorithm for curve surfaces, visible surfaces ray-tracing, recursive ray tracing, radio-city methods.

[No. of Hrs: 11]

UNIT III

Image manipulation & storage: File formats for BMP, GIF, TIFF, IPEG, MPEG-II, & Introduction to animation techniques.

Graphics Hardware: Hardcopy & display techniques, Input devices, image scanners

[No. of Hrs: 11]

UNIT IV

Elementary filtering techniques, elementary Image Processing techniques, Geometric & multi-pass transformation mechanisms for image storage & retrieval.

Procedural models, fractals, grammar-based models, multi-particle system, volume rendering.

[No. of Hrs: 11]

TEXT BOOKS:

1. Herrington, "Computer Graphics A Programming Approach" Mc Graw Hill, Int-Edn.
2. Foly Van Dam Feina Huges, "Computer Graphics Principles and Practice", Pearson

REFERENCE BOOKS:

1. Donald Hearn, M-Paulin Baker, "Computer Graphics C-Version", Pearson
2. David F. Rogers, "Procedural Elements for Computer Graphics", TMH
3. Schaum's "Outlinersof Computer Graphics", TMH

Paper Code: ETEN -211 **L T C**
Paper: Introduction to Electrical and Electronics Engineering **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:	**MAXIMUM MARKS: 75**
1.	Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2.	Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

(a) Philosophy of Measurements, Measurement, significance of measurement, Methods of measurement. Accuracy and precision, errors in measurement, types of instruments with brief details.

(b) Analog Measurement of Electrical Quantities. Review of various instruments for measurement of voltage and current, Moving coil electrodynamometer type, Hot wire, Electrostatic, Induction type instrument.

[No. of Hrs: 11]

UNIT II

Display Devices and Signal Analyses:

Digital Instrument: Advantage of Digital Instruments, Digital versus Analog Instruments, Digital frequency meter. Period measurement, Time interval measurement, Digital Voltmeter

[No. of Hrs: 11]

UNIT III

Electronics:

Semiconductors current carriers in semiconductors, p-n-junction diode, Bipolar Transistors, zener diode operation and characteristics, Amplifier circuits-frequency response hybrid parameters, equivalent circuit for common emitter configuration, current and voltage gain, input and output impedance.

[No. of Hrs: 11]

UNIT IV

Field effect transistors: Characteristics & application in typical amplifier circuits. CMOS – characteristics & application.

Integrated circuits: OPAMP & time with typical applications. Introduction to logic circuits, digital-ICs & their applications. Oscillators & RF signal generators.

[No. of Hrs: 11]

TEXT BOOKS:

1. David A. Bell, "Electronic Devices & Circuits", EEE
2. S. Chaum's Outliners, "Electronic Devices & Circuits", TMH
3. Donald L. Schilling Charles Belove, "Electronic Devices & Circuits", TMH

REFERENCE BOOKS:

1. Ramakant A. Gayakwad, "Op-Amp and Linear Integrated Circuits", Pearson Education
2. D.Roy Choudhary, Shail B. Jain, "Linear Integrated Circuits", New Age International Publisher
3. A. K. Sawhney, Dhanpet Rai & Sons, "Electrical Measurement & Measuring Instruments",
4. Goldding & Widdies, "Electrical Measurement & Measuring Instruments"
5. Kalsi, "Electronic Instrumentation", TMH
6. Umesh sinha, "Electrical & Electronic Measurement & Instruments", Satya Prakashan
7. Cooper, "Electrical Measurement & Measuring Instruments"

Code No. : ETEN 251	**L**	**P**	**C**
Paper: Instrumental Analysis Lab.	**0**	**2**	**1**

Practical will be based on Instrumental Analysis.

Code No. : ETEN 253	**L**	**P**	**C**
Paper: Mechanics of Solids Lab.	**0**	**2**	**1**

Practical will be based on Mechanics of Solids.

Code No. : ETEN 255	**L**	**P**	**C**
Paper: Water Engineering Lab.	**0**	**2**	**1**

Practical will be based on Water Engineering

Code No. : ETEN 257	**L**	**P**	**C**
Paper: Introduction to Electronics & Electrical Engg. Lab.	**0**	**2**	**1**

Practical will be based on Introduction to Electronics & Electrical Engineering.

Paper Code: ETEN - 212 **L T C**
Paper: Earth Science, GIS and Natural Pollution **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:	MAXIMUM MARKS: 75
1.	Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2.	Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I

Introduction: Definition and scope of geology, branches of geology, origin age & interior of Earth, Earth movements importance in engineering.

Minerals – Physical & optical properties of rock & ore forming minerals.

[No. of Hrs: 11]

UNIT II

Geological agencies:

Weathering, erosion by running waters, glaciers wind and oceans and their engineering importance.

Structural Geology:

Dip, strike, folds, faults & joints and their engineering aspects.

[No. of Hrs: 11]

UNIT III

Geochemistry:

Effects of rocks on the quality of ground water/surface waters, the causes of salinity in the soils.

GIS:

Introduction to GIS, Components of GIS, Database structure vector and raster method. GIS software packages.

[No. of Hrs: 11]

UNIT IV

Remote sensing: Fundamentals of remote sensing, physics of remote sensing, Atmospheric interaction, Scattering, Reflection absorption and Transmission platforms and sensors, remote sensing data for mapping.

[No. of Hrs: 11]

TEXT BOOKS:

1. E. Podum, "Fundamental of Ecology", Natraj Publication
2. Alisdur Rogers & H. A. Villvs, "Geography", Black Well Publishing
3. M. Demers, "Fundamental of Geographical Information system", Wiley Wew Yock

REFERENCE BOOKS:

1. Heywood Cornetues & Carver, "Introduction to Geographical Information System", Prentice Hall, London
2. Cunnigham & Cunnigham, "Principles of Environmental Science"
3. Borrough & Mc Donnel, "Principles of Geographical Information System", Oxford University –Press

Code No. : ETEN 252	**L**	**P**	**C**
Paper: Numerical Methods & Programming Lab.	**0**	**2**	**1**

Practical will be based on Numerical Methods & Programming.

Code No. : ETEN 254	**L**	**P**	**C**
Paper: Instrumental Analysis & Pollution Measurements Lab.	**0**	**2**	**1**

Practical will be based on Instrumental Analysis & Pollution Measurements.

Code No. : ETEN 256	**L**	**P**	**C**
Paper: Solid Waste Management Lab.	**0**	**2**	**1**

Practical will be based on Solid Waste Management

Code No. : ETEN 258	**L**	**P**	**C**
Paper: Computer Graphics & Multimedia	**0**	**2**	**1**

Practical will be based on Computer Graphics & Multimedia.