SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

for

BACHELOR OF TECHNOLOGY
(B.TECH) DEGREE

GURU GOBIND SINGH
INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI-110 403
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Effective from academic session 2007-08

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	Engineering Chemistry	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	Engineering Chemistry Lab.	-	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	Environmental Studies	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	Environmental Studies Lab.	-	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**

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. 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 (2nd Ed.).
3. "Advanced Engineering Mathematics", Dr. A. B. Mathur, V. P. Jaggi (Khanna publications)

References 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.

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. 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. 7)

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"

3. Jenkins and White, “Fundamentals of Optics”
4. C. Kittle, “Mechanics”, Berkeley Physics Course, Vol.- I.
5. A. Beiser, “Concepts of Modern Physics”

Paper Code: ETCH – 105	**L**	**T**	**C**
Paper: Engineering Chemistry	**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. 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 TECHNOLOGY (8 lectures)

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion : causes & prevention, Removal of silica & dissolved gases; carbonate & phosphate conditioning, Water softening processes : Lime – soda process, Ion exchange method, colloidal conditioning & calgon treatment , Water for domestic use.

UNIT II: FUELS (8 lectures)

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Boy's Gas calorimeter, Solid fuels - Proximate and ultimate analysis, High & Low temperature carbonisation, manufacture of coke (Otto-Hoffmann oven), Liquid Fuels – Petroleum-Chemical composition, fractional distillation, Cracking - Thermal & catalytic cracking, Octane & Cetance No. and its significance, Power Alcohol, Analysis of flue gases (Orsat's apparatus).

UNIT III: GASEOUS STATE (5 lectures)

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.

UNIT IV: THERMOCHEMISTRY (2 lectures)

Hess's Law, Heat of Reaction, Heat of dilution, Heat of Hydration, Heat of neutralization and Heat of Combustion, Effect of temperature on heat of reaction at constant pressure (Kirchoff's equation), Flame Temperature

UNIT V: THE PHASE RULE (3 lectures)

Definition 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.

UNIT VI: CATALYSIS (4 lectures)

Characteristics, types and theories of catalysis, concept of promoters, inhibitors and poisons, Homogenous catalysis (mechanisms of acid-base and Enzyme), catalysis by metal salts, Heterogenous catalysis (mechanism of surface reactions).

REFERENCE BOOKS:

1. Chemistry in Engineering & Technology (Vol I & II) (Latest ed.), By J.C. Kuriacose & J. Rajaram
2. Principles of Physical Chemistry, (Latest ed.), Puri B.R., Sharma L.R. and Pathania, M.S.
3. Text book of Engg. Chemistry, S. Chand & Co., (Latest ed.), S.S. Dara.

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

Reference Books:

1. 1. Workshop Technology by Hazra-Chowdhary
2. 2. Production Engineering by R.K.Jain
3. 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. 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. Alexis Leon & Mathews Leon, "Fundamentals of Computer Science & Communication Engineering", Leon Techworld, 1998.

Reference Books:

1. Omura, "Mastering Autocad 2000 for Mechanical Eng ineers" BPB Publications, 2nd Edition, 1998.
2. 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. 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	**P**	**C**
Paper: APPLIED PHYSICS LAB – I	**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	**P**	**C**
Paper: Engineering Chemistry Lab	**2**	**1**

List of Experiments

1. Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and sodium chloride.

2. Determine the amount of Oxalic acid and Sulphuric acid in one litre of solution, given standard sodium hydroxide and Potassium Permanganate.

3. Determine the amount of copper in the copper ore solution, provided hypo solution.

4. Argentometric titration one each by Vohlard's method and by Mohr's method.

5. Complexometric titrations.

6. Determine the heat of neutralization of strong acid with strong base.

7. Determine the surface tension of a liquid using drop weight method.

8. Determine viscosity of a given liquid (density to be determined).

9. Determine the reaction rate constant for the Ist order reaction.

10. Determine the cell constant of a conductivity cell and titration of strong acid/strong base conductometrically.

REFERENCE BOOKS:

1. Vogel's Textbook of Quatitative Chemical Analysis, Revised by G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney.

2. Applied Chemistry: Theory and Practice by O.P. Vermani and A.K. Narula.

3. Laboratory Manual on Engg. Chemistry by S.K. Bhasin and Sudha Rani.

Paper Code: ETCS 155 **P** **C**
Paper: Introduction to AutoCAD, Office Automation and Web Design **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	**P**	**C**
Paper: Workshop Practice	**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 4

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	**P**	**C**
Paper: Engineering Graphics Lab	**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. 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. 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.).
3. "Advanced Engineering Mathematics", Dr. A. B. Mathur, V. P. Jaggi (Khanna Publishers)

References:

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.

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

Reference Books

1. Electromagnetic waves and Radiating Systems :Jordan & Balmain

2. Solid State Physics : Kittel
3. Solid State Physics : R.L. Singhal
4. Quantum Mechanics : Schiff

Paper Code: ETCH – 106	**L**	**T**	**C**
Paper: Environmental Studies	**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 questSions. It should be of 25 marks.
2. 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

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance, need for public awareness, introduction to concept of green technology**.** **(2 lectures)**

UNIT-II: ENVIRONMENTAL CONSERVATION AND MANAGEMENT

(7 lectures)

Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forest and tribal people.

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

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources-green fuel.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Resource Management-Sustainable development.

UNIT-III: ENVIRONMENTAL POLLUTION & CONTROL (7 lectures)

Air Pollution - Types of pollutants, source, effects, sink & control of primary pollutants– CO, NO_X, HC, SOx and particulates, effect of pollutants on man & environment: photochemical smog, acid rain and global warming, CO_2 Sequestration.

Water Pollution - Classification of Pollutants, their sources, waste water treatment (domestic and industrial).

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

Solid Waste Pollution – Classification, waste treatment and disposal methods; compositing, sanitary land filling, thermal processes, recycling and reuse methods.

Hazardous wastes - Classification, radioactive, biomedical & chemical, treatment and disposal- Physical, chemical and biological processes.

Marine Pollution – Causes, effects and control of marine pollution, coastal zone management.

UNIT-IV: CHEMICAL TOXICOLOGY (4 lectures)

Toxic chemicals in the environment, Impact of toxic chemicals on enzymes, biochemical effects of arsenic, cadmium, lead, chromium, mercury, biochemical effects of pesticides.

UNIT-V: ECO-FRIENDLY POLYMERS (3 lectures)

Polymer synthesis, Environmental degradation of polymers, photodegradable polymers, hydrolysis and hydro-biodegradable polymers, biopolymers and bioplastics, thermal degradation of plastics during recycling.

UNIT-VI: ENVIRONMENTAL BIOTECHNOLOGY (2 lectures)

Bioaccumulation, biodegradation, bioremediation, bioleaching, Biomethanation,

UNIT-VII: GREEN TECHNOLOGY (3 lectures)

Introduction, Basic principles of green technology, concept of Atom economy, Tools of Green technology, zero waste technology.

UNIT-VIII: ENVIRONMENTAL MANAGEMENT SYSTEMS (3 lectures)

Objectives, Components, Environmental Impact Assessment, Some important Environmental laws, Green bench, Carbon Credits, Environmental Management System standards-ISO 14000 series.

REFERENCE BOOKS:

1. Roger Perman et. al., Natural Resources & Environmental Economics, 2nd Ed., Longman, USA, 2000
2. Stern, A.C. (1980), Air Pollution, Vol. 1-VIII, Academic Press.
3. James M., Lynch & Alan Wiseman, Environmental Bio-monitoring : The Biotechnology Ecotoxicology Interface, Cambridge University Press, 1998.
4. John Glasson, Riki Therivel and Andrew Chadwick, Introduction to Environmental Impact Assessment, 2nd Ed., UCL Press, Philadelphia, USA, 1994.
5. Richard K. Morgan, Environmental Impact Assessment: A methodological perspective, Kluwar Academic Publications, Boston, 1998.
6. Gabriel Bitton, Wastewater Microbiology, 2nd Ed., Wiley-Liss, New York, 1999.
7. Environmental Chemistry & Pollution Control, S. Chand & Co. (Latest ed.), By S.S. Dara
8. Environmental Chemistry, I.K. Publishers, 2007, Balaram Pani
9. Environmental Chemistry, New Age Int. Publ. (Latest ed.), A.K. De.
10. Environmental Studies, S.K. Kataria Publ. . (Latest ed.), S.K. Dhamija.
11. A text book in Environmental Science, Narosa Publ. 2007, V. Subramanian.

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. 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 4

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 Book:

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. 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. Engg Mechanics by A.K.Tayal (Umesh Publications).
2. Engg Mechanics by Sadhu Singh (Khanna Publishers).

Reference Books:

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

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. 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. 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. Bansal, R.K. 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, Charles H. *How to Write & Present Technical Information*. Cambridge: CUP, 1999.
4. Forsyth, Sandy & Lesley Hutchison. *Practical Composition*. Edinburgh : Oliver & Boyd, 1981

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

Paper Code: ETCS 156 **P C**
Paper: C Programming Lab. **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	**P**	**C**
Paper: Engineering Mechanics Lab	**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	**P**	**C**
Paper: Electrical Science Lab	**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