

THIAGARAJAR COLLEGE OF ENGINEERING: MADURAI – 15.

(A Govt. Aided, ISO 9001: 2000 Certified, Autonomous Institution affiliated to Anna University)

CURRICULUM

(For the students admitted from the academic year 2005-2006 onwards)

Degree: **B.E /B.Tech. (Full Time)**

SEMESTER – I (Common to All Branches of Engineering and Technology)

Theory

Course Code	Course Title	Regulation			
		L	T	P	C
H11	English	3	1	0	4
H12	Mathematics	3	1	0	4
H13	Physics	3	1	0	4
H14	Chemistry	3	1	0	4
H15	Basic Civil & Mechanical Engineering	4	0	0	4
H16	Basic Electrical & Electronics Engineering	4	0	0	4

Practical

Course Code	Course Title	Regulation			
		L	T	P	C
H17	Engineering Drawing	0	0	5	2
H18	Physics Laboratory	0	0	3	2
H19	Chemistry Laboratory	0	0	3	2
Total		20	4	11	30

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SCHEME OF EXAMINATION

(For the students admitted from the academic year 2005-2006 onwards)

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SEMESTER – I (Common to All Branches of Engineering and Technology)

Sl. No	Sub. Code	Name of subject	Duration of Exam In hrs	Marks		Max Marks	Passing Minimum	
				Continuous Assessment	Terminal Examination		Terminal	Total
THEORY								
1.	H11	English	3	30	70	100	35	50
2.	H12	Mathematics	3	30	70	100	35	50
3.	H13	Physics	3	30	70	100	35	50
4.	H14	Chemistry	3	30	70	100	35	50
5.	H15	Basic Civil & Mechanical Engineering	4	30*	70	100	35	50
6.	H16	Basic Electrical & Electronics Engineering	4	30*	70	100	35	50
PRACTICAL								
7.	H17	Engineering Drawing	3	30	70	100	35	50
8.	H18	Physics Laboratory	3	30	70	100	35	50
9.	H19	Chemistry Laboratory	3	30	70	100	35	50

* The staff handling each section will award a maximum of 30 marks and the Controller of Examinations will reduce it to a maximum of 30 marks by taking average of each section.

QUESTION PAPER PATTERN FOR TERMINAL EXAMINATION

(Except H15, H16)

Maximum Marks: 100 marks for Terminal Examinations. Marks secured will be reduced to a maximum of 70 during processing.

Duration: 3 hours

Part – A : Ten short answer questions
Question No. 1 to 10 covering 2 questions from each unit
(10 x 2 = 20 Marks)

Part – B : Nine Analytical and Descriptive Type Questions
Question No. 11 to 19 covering all the units of syllabus.

- Question No. 11 is compulsory (without choice) and may be from any one unit of the syllabus. (20 X 1 = 20 Marks)
- Question No. 12 to 19 will be “either-or” type covering the remaining units of the syllabus (two questions from each unit) excluding the unit in which the Q.11 is set. (4 x 15 = 60 Marks)

QUESTION PAPER PATTERN FOR TERMINAL EXAMINATION

(For H15, H16)

Separate answer booklets are to be used for Section A and Section B.

For each Section maximum marks is 50. The total marks secured in Section A and Section B will be reduced to a maximum of 70 during processing.

Duration : 3 hours

Question paper pattern for each section should be

Part A : Question No. 1 to 6 covering two questions from each unit,
out of which five questions are to be answered.
each question carries 2 marks (5 x 2 = 10 Marks)

Part B : Three descriptive type questions.

Question No. 7 is compulsory (without Choice) and may be from any
unit of the syllabus. (1 x 14 = 14 Marks)

Question No. 8 to 11 will be “either – or” type covering the other two units of the syllabus (Two Questions from each Unit) excluding the unit in which the question No. 7 is set. (2 x 13 = 26 Marks)

H11 ENGLISH

3-1-0-4

Unit-I

Consolidation of Vocabulary, Structure and Notions

Abbreviations, acronyms, spelling, word formation, prefixes, suffixes, roots, compound nouns, synonyms, antonyms; changing one part of speech into another. Subject verb agreement; negative, interrogative, simple, compound and complex sentences; relative clauses, articles, prepositions, conjunctions, modals, nominal compounds, phrasal verbs, infinitives, gerunds; definitions, classifications, comparisons, cause and effect, purpose, method, instruction, measurement, condition. (10 periods)

Unit-II

Reading Comprehension and Summarising

General and Technical texts; Pre-reading, skipping, skimming, scanning, comprehension, application, evaluation, inference, information structure, study skills, note-making, summarising. (10 periods)

Unit-III

Interpretation of Graphics and Formal Letters

Unity, coherence, reference words, sentence linkers, punctuation; main facts, supporting facts; interpretation of graphic data; letters of application, bio-data; calling for quotations, placing orders, making complaints. (10 periods)

Unit-IV

Analytical Essay writing

Generating and organizing ideas; supporting ideas with examples or evidence; verifying contradictory view points, arriving at a consensus. (10 periods)

Unit-V

Listening, Speaking, Dialogue Writing

Sounds, stress, intonation, question tag, listening to lectures, audio/video cassettes, asking and answering questions, note-taking, dialogue-writing, three-minute speeches, description of objects; fluency, role-play, functions, group discussions. (10 periods)

Text Book

1. Humanities and Social Sciences Division, Anna University. English for Engineers and Technologists. Vol. 1. Chennai. Orient Longman, 2002.

Reference Book:

1. Curriculum Development Centre, TTTI. Communication in English for Technical Students. Calcutta. Orient Longman. 1984.

Unit-I**Matrices**

Rank of a matrix – Consistency of linear system of equations – Eigenvalue problem – Eigenvalues and eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley –Hamilton theorem (without proof) – Similarity transformation (concept only) – Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation. (10 periods)

Unit-II**Three Dimensional Analytical Geometry**

Direction cosines and ratios – Angle between two lines – Equations of a plane – Equations of a straight line – Coplanar lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere – Orthogonal spheres. (10 periods)

Unit - III**Geometrical Applications Of Differential Calculus**

Curvature – Cartesian and polar co-ordinates – Centre and radius of curvature – Circle of curvature – Involutives and evolutes – Envelopes – Properties of envelopes and evolutes – Evolute as envelope of normals. (10 periods)

Unit - IV**Functions Of Several Variables**

Functions of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and minima – Constrained maxima and minima – Lagrange's Multiplier method – Jacobians – Differentiation under integral sign. (10 periods)

Unit - V**Ordinary Differential Equations**

Simultaneous first order linear equations with constant coefficients – Linear equations of second order with constant and variable coefficients- Homogeneous equations of Euler type – Equations reducible to homogeneous form – Method of variation of parameters. (10 periods)

Text Book

1. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.

Reference Books

1. Veerarajan, T., "Engineering Mathematics (for First Year)," Second Edition , Tata McGraw–Hill Pub. Co. Ltd., New Delhi, 2002.
2. Venkataraman, M.K., "Engineering Mathematics, Volume I," Fourth Edition, The National Pub. Co., Chennai, 2003.
3. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics" Volume I, Fourth Revised Edition, S. Chand & Co., New Delhi, 2000.

2

Unit-I**Thermodynamics:**

Concept of entropy-Entropy and second law of thermodynamics -change in entropy in a reversible process (Carnot's cycle) and irreversible process-Temperature-Entropy diagram- Entropy of a perfect gas-problems.

Super Conductivity:

Superconductors – Properties – Meissner effect - Type I & Type II super conductors- BCS theory of super conductivity-Applications – Magnetic Levitation, SQUID devices.

(10

periods)

Unit-II

Acoustics of Buildings:

Reverberation time –Sabine's law – Derivation - conditions for good acoustics-methods of design – Measurement of absorption coefficient - Problems.

Ultrasonics:

Piezoelectric effect- Magnetostriction effect-production of ultrasonic waves-Magnetostriction method- Piezoelectric method –Detection of ultrasonic waves-Acoustic diffraction method-Applications –Flaws in metals (NDT method).-SONAR-Medical-field. (10 periods)

Unit-III

LASER:

Population inversion - He-Ne gas Laser- Nd:YAG Laser- CO₂ laser - Applications of Laser.

Fiber optics:

Acceptance angle-Numerical aperture-modes of optical propagation-types of fibers(single mode step index & multi mode step index)-fabrication of fibers-application of optical fibers - fiber optic sensors.

Photoelasticity:

Photo elastic bench-Stress analysis using photo elasticity-applications of photo elasticity.

(10

periods)

Unit-IV

Modern Physics:

Mosley's law in X-rays- -Compton effect-Derivation-Photo electric effect- Laws of Photo electric effect- Photo electric equation - Photo multipliers-Photo conductive cell, Photo emissive cell & Photovoltaic cell- Dual nature of matter-De Broglie wavelength derivation- Davisson Germer experiment- Heisenberg's uncertainty principle- Schrodinger's wave equation (Time-dependent & Time independent). (10 periods)

Unit-V

Crystallography:

Space lattice –unit cell - crystal systems - Bravais lattice-Types of crystal structures-SC,BCC,FCC & HCP-Calculation of parameters-Atomic radius-number of atoms per unit cell-Coordination number-Atomic packing factor-c/a ratio for HCP structure-Miller indices-Inter planar distance determination-Problems - Crystal defects and dislocations.

(10

periods)

Text Book:

1. A.S.Vasudeva-Modern Engineering Physics-S.Chand & Co, New Delhi-1998-Second edition 2003.

Reference books:

1. Gaur.R.K & Gupta S.L-Engineering Physics-Dhanpat Rai Publications Pvt Ltd-VII Edition,1992.
2. Brij Lal & Subramaniam –Heat & Thermodynamics-S.Chand & Co-IV Edition-1996.
3. Satyaprakash-Engineering Physics-Pragati Prakashan,Meerut-I Edition 2003.
4. Dr.M.Arumugam-Engineering Physics-Anuradha Agencies,Kumbakonam-III Revised Edition 2002.

H14 CHEMISTRY**3-1-0-4****Unit – I****Technology Of Water**

Water – Impurities – Hardness – Expression – Estimation by EDTA method – Boiler feed water Boiler troubles – Treatment methods – External Treatment methods – lime soda, zeolites processes – demineralization – Internal treatment methods – Treatment for Potable water –Treatment for Brackish water – Electro dialysis – Reverse osmosis. (10 periods)

Unit – II**Fuels**

Fuels – types, Calorific values – Gross and Net – Analysis of Coal – Proximate and Ultimate analysis – significance – Coke – Properties – Manufacture – Otto Hoffmann method – Liquid Fuels – Fractional Distillation of Crude Petroleum – Various Fractions – Composition – Boiling Ranges and Uses – Knocking in Petrol & Diesel Engines – Octane and Cetane numbers – Other Liquid Fuels – Benzol and Power Alcohol – Gaseous Fuels – Water Gas, Producer gas, Natural gas, Gobar gas and LPG.

Combustion

Principles of Combustion – Spontaneous and Ignition Temperature – Explosive Range – Flue gas analysis – Combustion Calculations. (10 periods)

Unit – III**High Polymers**

Polymerization – Types and Mechanism of Polymerization – Effect of Polymer Structure on Properties – Fabrication Methods – Injection and Compression Moulding – Industrially Important Polymer - Manufacture and Properties and uses of Polyethylene, Polyvinyl chloride, Polyester, Nylons, Polystyrene, Polycarbonate – Thermocole, Epoxy resins, Bakelite – Introduction to Conducting polymers and their Applications –Polyacetylene, Polyaniline only. (10 periods)

Unit – IV

Silicate Industries

Lime & Cement – Manufacture, Composition – Setting and Hardening.

Refractories – Classifications and Characteristics

Insulating Materials – Classifications, Properties and uses.

Abrasives – Classifications, Properties and uses.

Glass – Types and uses.

Lubricants

Mechanism of Lubrication, Classification – Definition and Significance of the following Properties.

Viscosity, Viscosity index, Flash point, Fire point, Cloud point, Pour point, Aniline point.

(10 periods)

Unit – V

Electrochemistry

Electrodes – Standard Electrodes – Single Electrode potential – Nernst equation – Cell Potential – Electrochemical series – Cell types – Composition and Concentration Cells – Polarization.

Corrosion

Types, Factors affecting Corrosion – Corrosion Control Measures.

Pollution

Land, Water and Air Pollution – Sources, their effects and Prevention (Basic Principles only)

periods)

(10

Text Books

1. P.C. Jain, Monika Jain, ENGINEERING CHEMISTRY, Dhanpat Rai & sons, New Delhi, Ed.2003.
2. V. Subramanian, K. Ganesan, S. Ganesh, CHEMISTRY FOR ENGINEERS, Scitech Publications, 1999 Edn. (Unit I, II & V).

Reference Books

1. S.S. Dara, ENGINEERING CHEMISTRY, S. Chand & Co. Ltd., New Delhi, Ed.2003.
2. J.C. Kuriacose, J. Rajaram, CHEMISTRY IN ENGINEERING & TECHNOLOGY, Vol.I & II, Tata McGraw Hill Publishing Co. Ltd., Ed.2000.

H15 BASIC CIVIL AND MECHANICAL ENGINEERING 4-0-0-4

SECTION A CIVIL ENGINEERING

Unit – I

Introduction:

Role of Civil Engineers – Branches of Civil Engineering – Types of Structures: Buildings, Bridges and Dams

Building Materials:

Characteristics and uses of Bricks, Stones, Timber, Cement, Plastics, Steel, Plain Cement Concrete and Reinforced Cement Concrete. (8 Periods)

Unit – II

Building Components:

Functions of Foundation, Basement, Damp Proof Course, Wall, Column, Lintel, Beam, Slab, Roof, Weathering course, Plastering, Flooring, Doors and Windows. (8 Periods)

Unit – III

Foundation Engineering:

Types of soils – Basic properties of soils – Safe bearing capacity – Types of foundations: Wall footing, Column footing, Combined footing, Raft foundation and Pile foundation. (8

Periods)

Text Book:

1. Shanmugan.G and Palanichamy.M.S., “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishers Company Ltd, 2002

Reference Books:

1. Rangwala,S.C, “Engineering Materials”, Charotar Publishing House, New Delhi,1998
2. Ramamrutham.S, (1999), “Basic Civil Engineering”, Dhantpat Rai Publishing Company, New Delhi,1999

SECTION B MECHANICAL ENGINEERING

Unit – I

Introduction to Mechanical Engineering.

Principle and Operation of

Boilers: Fire Tube (Cochran Boiler), Water Tube (Babcock & Wilcox Boiler)

Power Plants: thermal, Hydel, diesel & Nuclear Power Plants.

IC Engines: Spark Ignition & Compression Ignition, 2 Strokes & 4 Strokes.

Refrigeration: Vapour Compression & Vapour absorption refrigeration system. (8 periods)

Unit – II

The Working Principle and Operations of.

Metal joining processes- soldering, brazing, welding (Gas, Arc Welding).

Metal Removal processes: Engine Lathe, Upright Drilling Machine, Shaping & Vertical Milling Machine.

Metal Casting process: Two Box Sand molding .

Metal Forming processes – Power forging – Rolling. (8 periods)

Unit – III

Stress & Strain

Introduction – Types of stress – Tensile, Compressive, Shear, Bending and thermal. Stress – strain diagram – Hooke’s Law – Introduction to centroid and Moment of Inertia. (8

periods)

Text Book:

1. Lecture Notes Prepared by faculty of Mechanical Engineering Department.

Reference Books:

1. K. Venugopal, V. Prabhu Raja, “ Basic Mechanical Engineering ”, Anuradha Publishers, 4th edition 2000. – (UNIT I & II)
2. Bansal.R.K.,A Text Book of “Strength of Materials” Lakshmi Publications Pvt. Ltd., 2003 (UNIT-III)
3. Shanmugam, G and Palanichamy, M.S., “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishers Company Ltd, 2002.
4. Khurmi.,R.S., “A text book of Mechanical Technology”. S Chand & Company, 2002.

**H16 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
SECTION A ELECTRICAL ENGINEERING****4-0-0-4****Unit – I**

Definition of Voltage, Current, Power & Energy, Ohm’s law, Kirchoff’s law & its applications – Simple Problems, Division of current in Series & parallel circuits, Generation of Alternating EMF, Definition of RMS value, Average value, Peak factor, Form factor.

(8 periods)

Unit - II

Definition of MMF, Flux, Reluctance, Properties of Flux lines, Self & Mutual Inductance, Ampere Turns, Series & parallel magnetic circuits, Comparison between Electric & Magnetic circuits, Law of Electromagnetic induction, Fleming’s Right & Left hand rule.

periods)

(8

Unit – III

(Qualitative Treatment only)

Construction, Type, Principle of Operation & Working Principle of DC Generator, DC Motor, Transformer, Induction Motor, Induction type single phase energy meter, Domestic wiring practice, Tube light circuit, Earthing & earthing methods.

(8 periods)

Text Book :

1. Malika Jain and priyanka Jain, ABC of Electrical Engineering, Dhanpat Rai Publishing Company (P) Limited, New Delhi (1995).

Reference Book :

1. Edward Hughes, Electrical Technology, 8th edition Longman / Pearson Publications (2001).
2. Sahdev SK & Rama D.S, Elements of Electrical Science. S. Chand & Co Publications, New Delhi.

SECTION B ELECTRONICS ENGINEERING

UNIT I

BASIC ELECTRONIC DEVICES AND CIRCUITS

PN Junction diode & Zener Diode -Characteristics- Half wave and full wave rectifier-Bipolar junction transistors – CB,CE,CC Configurations and characteristics- Basic concepts of amplifiers and oscillators- Logic gates- Inverting, Non inverting amplifiers and Operational amplifiers.

(8 periods)

UNIT-II

COMMUNICATION SYSTEMS

Introduction to communication systems- Block Diagram- Modulation- Types- Block diagram of Tuned RF and Super heterodyne receivers – FM receiver block diagram - Block diagram of Optical and Satellite communication systems. (8 periods)

UNIT III

COMPUTER ARCHITECTURE & PROGRAMMING

Characteristics of Computers- Computer Generations-Categories of computers- Basic computer organization- CPU- Types of computer memory – Communication pathways- Input devices-Output devices-Hierarchy and classifications of programming languages-Planning the computer program-Flow chart. (8 periods)

TEXT BOOKS

1. Albert Paul Malvino, "Principles of Electronics" TMH Publishers,2000 (Unit I)
2. George Kennedy, Electronic Communication Systems, Tata McGraw Hill, Third Edition, 1991 (For Unit – II)
3. D.P.Nagpal, Computer Fundamentals Concepts, Systems & Applications, Wheeler Publishing, 1999 (For Unit – III)

H17 ENGINEERING DRAWING

0-0-5-2

Unit-I

Introduction :

Drawing Instruments – IS specification on lines – Drawing sheets – Size of Folding, Printing Letters and Dimensioning-Scales (Not included for examination)

Orthographic Projection of Points and Straight Lines – Traces.

Orthographic Projection of Planes inclined to any one reference plane. (10 periods)

Unit-II

Orthographic Projection of simple regular solids - Cubes, Prisms, Pyramids, Cylinder and Cone inclined to any one reference plane.

Drawing sectional view and true shape of section for above solids kept in simple position.

(10 periods)

Unit-III

Drawing Orthographic views (Top, Front and End views) of simple objects given in the pictorial view. Development of lateral surfaces of Solids - Cubes, Prisms, Pyramids, Cylinder and Cone.

(10 periods)

Unit-IV

Drawing Isometric views and projections of Solids - Cubes, Prisms, Pyramids, Cylinder and Cone kept in simple position only. Drawing of perspective projection of simple solids kept in simple positions only.

(10 periods)

Unit-V

Drawing using AutoCAD – Drawing of 2D objects – Drawing of Prisms , Cylinders and Pyramids. (Not included for examinations, However bonafide record of AutoCad practice is a pre-requisite for the terminal examination)

(10 periods)

Text Book

1. Venugopal, K “ Engineering Graphics ”, New Age International Publishers ,2004.

Reference Books

1. Natarajan, K.V, “A Text book of Engineering Drawing” , Chennai, 1997.
2. James D. Bethune “ Engineering Graphics with AutoCAD 2002”
– Pearson Education – 2003.

Note: AutoCAD drawings are to be submitted as a separate bonafide record which is a prerequisite for taking terminal examination, however Auto CAD drawings are not included for the terminal examination.

H18 PHYSICS LABORATORY

0-0-3-2

1. Determination of current & voltage sensitivity of the galvanometer .
2. Compound pendulum- Determination of acceleration due to gravity.
3. Poiseuille’s flow method- Determination of viscosity of liquids.
4. Sonometer-Verification of II law & Determination of mass of the given body.
5. Potentiometer-Calibration of the given ammeter.
6. Potentiometer-Calibration of the given voltmeter.
7. Microscope – Air wedge – Determination of thickness of a thin wire..
8. Microscope – Newton’s Ring – Determination of the Radius of Curvature.
9. Microscope - Determination of refractive index of solid.
10. Spectrometer - Determination of refractive index of liquid.
11. Spectrometer - Diffraction grating - Determination of wavelength.
12. Laser – Particle size determination.

Note : Any Ten Experiments are to be conducted.

H19 CHEMISTRY LABORATORY

0-0-3-2

I. WATER ANALYSIS : (QUANTITATIVE ANALYSIS)

1. Estimation of Total Hardness of water by EDTA method.
2. Estimation of Alkalinity of water.
3. Estimation of Chloride ions in water.
4. Estimation of Sulphate ions in water.
5. Estimation of Dissolved Oxygen in water.
6. Determination of COD.
7. Determination of BOD (Demonstration only).

II. MATERIALS ANALYSIS (QUALITATIVE ANALYSIS).

1. Analysis of Boiler Scales.
2. Analysis of Ores / Minerals (Lime stone , Dolomite).
3. Analysis of Alloys (Bronze, Cupronickel, Gun metal).

III. ELECTROCHEMICAL ANALYSIS.

1. Determination of Specific and Equivalent conductivities of solutions.
2. Acid – Base Titrations by Conductometry.
3. Estimation of Ferrous ion in a solution by Potentiometric titration method.

References:

1. A.I. Vogel, Quantitative Chemical Analysis, Longman Scientific & Technical Publications, Edition 1989.
2. A.I. Vogel, Qualitative Chemical Analysis, Longman Scientific & Technical Publications, Edition 1989.

Note: Any Ten of the above – listed experiments may be conducted.

