ANNA UNIVERSITY : : CHENNAI – 600 025

UNIVERSITY DEPARTMENTS

R - 2008

B.E.ELECTRICAL AND ELECTONICS ENGINEERING
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I & II SEMESTERS CURRICULUM AND SYLLABI

SEMESTER - I

CODE NO.	COURSE TITLE	L	T	P	C
THEORY					
HS9111	Technical English - I	3	1	0	4
MA9111	Mathematics - I	3	1	0	4
PH9111	Engineering Physics	3	0	0	3
CY9111	Engineering Chemistry	3	0	0	3
GE9111	Engineering Graphics	2	0	3	4
GE9112	Fundamentals of Computing	3	0	0	3
PRACTICAL					
PH9112	Physics Laboratory	0	0	2	1
CY9112	Chemistry Laboratory	0	0	2	1
GE9113	Engineering Practices Laboratory	0	0	3	2
GE9114	Computer Practices Laboratory	0	0	3	2
	TOTAL	**17**	**2**	**13**	**27**

SEMESTER II

CODE NO	COURSE TITLE	L	T	P	C
THEORY					
HS9161	Technical English - II	2	0	2	3
MA9161	Mathematics – II	3	1	0	4
PH9167	Physics of Electrical and Electronics Materials	3	0	0	3
GE9151	Engineering Mechanics	3	1	0	4
EE9151	Electric Circuit Analysis	3	0	0	3
ME9153	Power Plant Engineering	3	0	0	3
EE9152	Object Oriented Programming	3	0	0	3
PRACTICAL					
EE9153	Electric Circuits Laboratory	0	0	3	2
EE9154	Computer Programming Laboratory	0	0	3	2
	TOTAL	**20**	**2**	**8**	**27**

HS 9111 TECHNICAL ENGLISH I L T P C
(Common to all branches of B.E. / B.Tech. Programmes) 3 1 0 4

AIM:

To help students specialising in the field of Engineering and Technology develop their proficiency in oral and written communication in Technical English.

OBJECTIVES:

- To enable students improve their vocabulary and employ the words appropriately in different academic and professional contexts.
- To make students comprehend classroom lectures and technically oriented passages.
- To enable students develop suitable reading strategies that could be adopted while reading science related texts.
- To enable students acquire the ability to speak effectively in English in real life situations and work-related situations.
- To train students in academic and professional writing.

UNIT I 9+3

Vocabulary - using words in context - use of suffixes to form nouns from verbs and adjectives – adjectives, adverbs - matching words with meanings - Active and passive voices – tenses - simple present, present continuous - comparative adjectives – adverbial forms - Reading text: skimming for general information - specific details - note making - cloze reading – Listening and transferring of information from text to graphic forms - bar charts, flow-charts - Paragraph writing - descriptions using descriptive words and phrases - organising information - Role play - conversational techniques – discussions - oral reporting.

UNIT II 9+3

Vocabulary items - words with prefixes (“multi-“, “under-“) - Asking and answering questions, error correction - spelling and punctuation - Reading Comprehension - scanning for information – inferring meaning from context - Listening and guided note-taking - paragraph writing - using notes – giving suitable headings / subheadings for paragraphs – Comparing and contrasting using expressions of comparison - Discussion using creative ideas

UNIT III 9+3

Compound nouns - negative prefixes – antonyms – Use of modal verbs – making sentences using phrases – tenses – simple past and present perfect - Reading and guessing meanings in context - Listening and note taking - Channel conversion from text to chart - Writing comparisons - making recommendations - coherence using discourse markers - Discussion - role-play (explaining and convincing)

UNIT IV 9+3

Expanding nominal compounds – words with multiple meanings – Error correction - prepositions - use of the prefix “trans-“ - compound adjectives - modal verbs to express probability - simple past and present prefect - Reading – prediction of content - understanding advertisements - scanning the text and comprehension check - Listening

for details - Writing definitions – expression of use and purpose - Role-play – discussion - speculating about the future

UNIT V **9+3**

Formation of nouns, verbs and adjectives from root words – some useful phrases and expressions - cloze exercises - 'If' conditional clauses – gerunds (verbal nouns) - Reading for comprehension - intensive reading - Accuracy in listening – listening to discussion on specific issues - Group discussion - role-play (stating, discussing problems and proposing solutions) - Planning a tour - Writing an itinerary - Writing formal letters - letter to the editor

LECTURE – 45 TUTORIAL – 15 TOTAL – 60 PERIODS

TEXTBOOKS

1. Department of Humanities and Social Sciences, Anna University, **English for** Engineers and Technologists, Vol. I and II (Combined Edition), Orient Longman, Pvt. Ltd., 2006.Themes 1 to 4.

REFERENCES

1. Day, R.A, Scientific English, Second Edition, Hyderabad: Universities Press, 2000.
2. Mitra, B.K, Effective Technical Communication: A Guide for Scientists & Engineers, New Delhi: Oxford University Press, 2006.
3. Website: www.uefap.co.uk

MA 9111	**MATHEMATICS – I**	**L**	**T**	**P**	**C**
	(Common to all branches of B.E. / B.Tech. Programmes)	**3**	**1**	**0**	**4**

AIM:

To make available the basic concepts of engineering mathematics, to prepare the student for new concepts to be introduced in the subsequent semesters and to provide the necessary mathematical skills that are needed in modeling physical processes by an engineer.

OBJECTIVES:

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling
- To familiarize the student with functions of several variables which is needed in many branches of engineering
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage

UNIT I MATRICES 9+3

Characteristic equation – Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Cayley-Hamilton Theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II INFINITE SERIES 9+3

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

Limit and Continuity – Partial derivatives – Homogeneous functions and Euler's theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT IV IMPROPER INTEGRALS 9+3

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions.

UNIT V MULTIPLE INTEGRALS 9+3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of Solids – Change of variables in double and triple integrals – Area of a curved surface.

L: 45, T: 15, TOTAL : 60 PERIODS

TEXT BOOKS

1. Grewal B.S., Higher Engineering Mathematics (40th Edition), Khanna Publishers, Delhi (2007).
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill Co. Ltd., New Delhi (2007).

REFERENCES

1. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics (3rd Edition), Narosa Publications, Delhi (2007).
2. Bali N., Goyal M. and Watkins C., Advanced Engineering Mathematics (7th Edition), Firewall Media, New Delhi (2007).
3. Greenberg M.D., Advanced Engineering Mathematics (2nd Edition), Pearson Education, New Delhi (1998).

PH 9111	ENGINEERING PHYSICS	L	T	P	C
	(Common to ALL Branches of B.E. / B.Tech. Programmes)	3	0	0	3

OBJECTIVE:

To introduce the basic physics concepts relevant to different branches of Engineering and Technology

UNIT I PROPERTIES OF MATTER 9

Elasticity – Poisson's ratio and relationship between moduli (qualitative) – Stress-strain diagram – factors affecting elasticity – bending of beams – cantilever – bending moment – theory and experiment of Young's modulus determination – Uniform and non-uniform bending – I shaped girders – twisting couple – hollow cylinder – shaft – torsion pendulum – determination of rigidity modulus – moment of inertia of a body (regular and irregular).

UNIT II ACOUSTICS AND ULTRASONICS 9

Classification of sound – loudness and intensity – Weber-Fechner Law – standard Intensity and Intensity level – decibel – reverberation – reverberation time — rate of growth and decay of sound intensity - derivation of Sabine's formula – absorption coefficient and its determination – factors affecting acoustics of buildings : focussing, interference, echo, Echelon effect, resonance – noise and their remedies. Ultrasonics – production – magnetostriction and piezoelectric methods – detection of ultrasound – acoustic grating – Industrial applications – NDT - Ultrasonic method: scan modes and practice.

UNIT III THERMAL PHYSICS 9

Thermal expansion - thermal stress – expansion joints – bimetallic strips - thermal conductivity – conductions in solids – Forbe's and Lees' disc methods – thermal insulation of buildings – Laws of thermodynamics – Otto and diesel engines and their efficiency – entropy – entropy of Carnot's cycle – reverse Carnot's cycle – refrigerator.

UNIT IV APPLIED OPTICS 9

Interference - Michelson interferometer: construction, working, determination of wave length and thickness – anti-reflection coating – air wedge and its application – Lasers – Einstein's coefficients – CO_2, Nd:YAG and semiconductor lasers - construction and working – applications – Optical fibres – classification (index & mode based) – principle and propagation of light in optical fibres – acceptance angle and numerical aperture – fibre optic communication system - active and passive sensors.

UNIT V SOLID STATE PHYSICS 9

Nature of bonding – growth of single crystals (qualitative) - crystal systems - crystal planes and directions – expressions for interplanar distance – coordination number and packing factor for simple structures: SC, BCC, FCC and HCP – structure and significance of NaCl, ZnS, diamond and graphite – crystal imperfections: point defects, dislocations and stacking faults.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Palanisamy, P.K., Engineering Physics, Scitech Publications (P) Lt, 2006.
2. Arumugam, M., Engineering Physics, Anuradha Publ., 2000.

REFERENCES:

1. Gaur R.K., and Gupta, S.L Engineering Physics, Dhanpat Raj Publ., 2003.
2. Sankar B.N., Pillai.S.O., Engineering Physics, New age International (P) Ltd, 2007

CY9111 ENGINEERING CHEMISTRY L T P C
(Common to all branches of Engineering and Technology) 3 0 0 3

AIM:

To gain a sound knowledge of thermodynamics, phase rule, surface chemistry and catalysis, basic organic reaction mechanisms and principles and applications of spectroscopy and nanochemistry.

OBJECTIVES:

To make the student conversant with the

- Applications of second law of thermodynamics.
- Phase rule and various types of alloys
- Surface chemistry and its importance in adsorption and catalysis.
- Basic principles in organic reaction mechanisms and principles and applications of spectroscopy
- Nanochemistry and its applications

UNIT I THERMODYNAMICS 9

Statement of second law of thermodynamics – Clausius and Kelvin – definition of entropy – entropy change for a reversible process – entropy change for flow of heat in an irreversible process – entropy change for an isothermal expansion of an ideal gas – problems – entropy of phase transitions- problems – definition of free energy and work function – Gibbs Helmholtz equation – applications – problems – derivation of Maxwell relations – van't Hoff isotherm and isochore – applications – problems – chemical potential – variation of chemical potential with temperature and pressure - significance.

UNIT II PHASE RULE 9

Phase rule – statements and explanation of the terms involved – condensed phase rule – construction of phase diagram – water system – sulphur system – phase rule for two component alloy systems- thermal analysis – eutectic system - Lead-Silver system – simple eutectic formation – Zinc-Magnesium alloy system – Iron-Carbon alloy system-solved examples.

UNIT III SURFACE CHEMISTRY AND CATALYSIS 9

Adsorption – types of adsorption – adsorption of gases on solids – adsorption isotherm – Freundlich and Langmuir isotherms – adsorption of solutes from solutions – applications

– role of adsorption in catalytic reactions – ion exchange adsorption – basic principles in adsorption chromatography – Catalysis – classification – characteristics of catalysis - auto catalysis – enzyme catalysis – Michaelis – Mention equation – solid acid catalysis.

UNIT IV ORGANIC REACTIONS AND SPECTROSCOPY 9

Electrophilic and nucleophilic, substitution and elimination reactions mechanisms – SN^1, SN^2, E^1, E^2 reactions – Electromagnetic spectrum – absorption of radiation – electronic transition – vibrational transition – rotational transition – intensities of spectral lines – beer-lamberts law –type of instrument used for absorption measurements –UV & visible spectroscopy, IR spectroscopy – principles of instrumentation and applications.

UNIT V NANOCHEMISTRY 9

Introduction to nanochemistry – preparations and properties of nanomaterials - nanorods – nanowires – nanotubes – carbon nanotubes and their applications – nanocomposites – sensors and electronic devices – nanochemistry in biology and medicines – nanocatalysis.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Puri B.R., Sharma L.R. and Madhan S. Pathania, Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co. Jalandar –2000.
2. Jain P.C. and Renuka Jain, Physical Chemistry for Engineers, Dhanpet Rai &Sons, New Delhi, 2001.

REFERENCES

1. Bahl B.S., Tuli G.D., and Arun Bahl, Essentials of Physical Chemistry, S. Chand & Company Ltd., New Delhi, 2004.
2. Morrison R.T., & Boyd R.N., Organic chemistry, Prentice-Hall of India Private Limited, New Delhi, 1992.
3. Sanyal S.N., Reactions, Rearrangements and Reagents Bharati Bhawan Publishers & Distributors New Delhi, 2006.
4. G. B. Sergeev, Nanochemistry, Elsevier Science, New York, 2006

GE 9111 ENGINEERING GRAPHICS L T P C

(Common to All branches of B.E. / B.Tech. Programmes) 2 0 3 4

OBJECTIVES:

To develop in students the graphic skills that would enable them to communicate the concepts, ideas and design of engineering products

To provide an exposure to the national/international standards related to technical drawings

INTRODUCTION 2

Importance of graphics in engineering applications – use of drafting instruments – BIS specifications and conventions – size, layout and folding of drawing sheets – lettering and dimensioning

UNIT I FREE HAND SKETCHING OF ENGG OBJECTS AND CONSTRUCTION OF PLANE CURVE 3+9=12

Pictorial representation of engineering objects – representation of three dimensional objects in two dimensional media – need for multiple views – developing visualization skills through free hand sketching of three dimensional objects.

Polygons & curves used in engineering practice– methods of construction– construction of ellipse, parabola and hyperbola by eccentricity method – Cycloidal and involute curves- construction - drawing of tangents to the above curves.

UNIT II ORTHOGRAPHIC PROJECTION: PROJECTION OF POINTS, LINES AND PLANE SURFACES 6+9=15

General principles of orthographic projection – first angle projection – layout of views – projections of points, straight lines located in the first quadrant – determination of true lengths of lines and their inclinations to the planes of projection – traces – projection of polygonal surfaces and circular lamina inclined to both the planes of projection

UNIT-III ORTHOGRAPHIC PROJECTION: PROJECTION OF SOLIDS AND SECTIONS OF SOLIDS 6+9=15

Projection of simple solids like prism, pyramid, cylinder and cone when the axis is inclined to one plane of projection –change of position & auxiliary projection methods-sectioning of above solids in simple vertical positions by cutting plane inclined to one reference plane and perpendicular to the other and above solids in inclined position with cutting planes parallel to one reference plane – true shapes of sections

UNIT IV DEVELOPMENT OF SURFACES AND INTERSECTION OF SOLIDS 6+9=15

Need for development of surfaces – development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones – development of lateral surfaces of the above solids with square and circular cutouts perpendicular to their axes. Intersection of solids and curves of intersection –prism with cylinder, cylinder & cylinder, cone & cylinder with normal intersection of axes and with no offset.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 4+9=13

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones – principles of perspective projections – projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY) 3

Introduction to computer aided drafting software packages and demonstration of their use.

L=30 P=45 TOTAL: 75 PERIODS

TEXT BOOKS

1. Bhatt,N.D, “Engineering Drawing”, Charotar Publishing House, 46th Edition-2003
2. Natarajan,K.V, “ A Textbook of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2006 .

REFERENCES

1. Shah,M.B and Rana,B.C.,"Engineering Drawing", Pearson Education,2005,
2. Gopalakrishnan.K.R,. "Engineering Drawing I & II", Subhas Publications 1998.
3. Dhananjay,A.J., "Engineering Drawing with Introduction to AutoCAD", Tata McGraw-Hill Publishing Company Ltd., 2008.
4. Venugopal,K. and Prabhu Raja, V., "Engineering Graphics", New Age International(P) Ltd.,2008.

Codes from Bureau of Indian Standards

1. IS 10711-2001: Technical Products Documentation – Size and Layout of Drawing Sheets
2. IS 9609 (Parts 0 & 1)-2001: Technical Products Documentation – Lettering
3. IS 10714(Part 20)-2001 & SP 46 -2003: Lines for Technical Drawings
4. IS 11669-1986 & SP 46-2003: Dimensioning of Technical Drawings
   IS 15021(Parts 1 to 4)-2001: Technical Drawings-Projection Methods

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions one from each unit covering all units of the syllabus
2. All questions will carry equal marks of 20 each making a total of 100
3. Answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solutions within A3 size
4. The examination will be conducted in appropriate sessions on the same day

GE 9112 FUNDAMENTALS OF COMPUTING L T P C
(Common to all branches of B.E. / B.Tech. Programmes) 3 0 0 3

AIM:

To introduce the basics of computing and the fundamentals of C programming.

OBJECTIVES:

- To introduce the fundamentals of computing systems.
- To introduce the concepts of internet and WWW.
- To teach programming in C.

UNIT I 9

Computer systems – Exploring computers – Inside the system – Processing data – CPUs – Types of storage devices - Operating systems basics – Networking basics.

UNIT II 9

The internet and the WWW – Internet services – connecting to the internet - Working with applications software – productivity software – graphics and multimedia – Data base Management systems – Creating computer program.

UNIT III **9**

C programming fundamentals – compilation process – variables – Data types – Expressions – looping – decisions.

UNIT IV **9**

Arrays - Working with functions – structures – character strings – pre processor.

UNIT V **9**

Pointers – Dynamic memory allocation – linked list - Applications

TOTAL: 45 PERIODS

TEXT BOOKS

1. Peter Norton, "Introduction to Computers", Sixth Edition, Tata McGraw Hill, 2007.
2. Stephen G. Kochan, "Programming in C", Third Edition, Pearson Education, 2007.

REFERENCES

1. Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006
2. Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.
3. Kenneth A. Reek, "Pointers on C", Pearson Education, 2007.
4. Dromey,R.G, "How to solve it by Computer", Pearson Education, 2007.

PH 9112 PHYSICS LABORATORY L T P C

(Common to ALL Branches of B.E. / B.Tech. Programmes) 0 0 2 1

1. Torsional Pendulum- Determination of rigidity modulus of wire and moment of Inertia of disc.
2. Non-uniform bending - Determination of Young's modulus.
3. Lees' disc- Determination of thermal conductivity of a bad conductor.
4. Potentiometer - Determination of thermo e.m.f of thermocouple
5. Air wedge- Determination of thickness of a thin sheet of paper.
6. i. Optical fibre - Determination of Numerical Aperture and acceptance angle
   ii. Compact disc - Determination of width of the groove using laser.
7. Acoustic grating - Determination of velocity of ultrasonic waves in liquids.
8. Post office box - Determination of Band gap
9. Spectrometer - Determination of wavelength using grating
10. Viscosity of liquid- Determination of co-efficient of viscosity of a liquid by Poiseuille's flow.

TOTAL: 30 PERIODS

CY9112 CHEMISTRY LABORATORY L T P C
(Common to all branches of Engineering and Technology) 0 0 2 1

I. WEIGHING AND PREPARATION OF STANDARD SOLUTIONS

i) Preparation of molar and normal solutions of the following substances oxalic acid, sodium carbonate, sodium hydroxide, and hydrochloric acid.
ii) Preparation of buffer solutions: borate buffer, phosphate buffer using Henderson equation.

2. WATER ANALYSIS

i) Determination of total hardness, temporary & permanent hardness of water by EDTA method.
i) Determination of DO content by Winkler's method.
ii) Determination of alkalinity in a water sample.
iii) Determination of chloride content of water sample by argentometric method.

3. PH-METRY

To find out the strength of given hydrochloric acid by sodium hydroxide.

4. CONDUCTOMETRY

i) Conductometric titration of mixture of acids
ii) Conductometric precipitation titration using $BaCl_2$- Na_2SO_4

5. POTENTIOMETRY

i) Redox titration – Iron Vs. dichromate

6. SPECTROPHOTOMETRY

i) To determine λmax of a colored solution such as potassium permanganate.
ii) To determine the iron content of an unknown solution (1,10- phenanthroline/ thiocyanate method)

7. FLAME PHOTOMETRY

i) To determine sodium and potassium in water.

8. VISCOMETRY

i) Determination of molecular weight of a polymer

9. WATER POLLUTION

i) COD analysis of a waste water by dichromate method.

10. KINETICS

i) Determination of reaction rate constant of acid catalyzed hydrolysis of ester.

11. ADSORPTION

i) Adsorption of acetic acid on activated charcoal.

TOTAL: 30 PERIODS

REFERENCE BOOKS

1. A text of quantitative Inorganic Analysis, A. L. Vogel , ELBS London. 1995.
2. Experiments in physical chemistry, D.P. Shoemarker and C.W. Gardad, McGraw Hill, London, 2001.

GE 9113 ENGINEERING PRACTIES LABORATORY L T P C
(Common to all Branches of B.E. / B.Tech. Programmes) 0 0 3 2

OBJECTIVE

To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE 12

Plumbing

Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.

Laying pipe connection to the suction side of a pump – inlet.

Laying pipe connection to the delivery side of a pump – out let.

Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

Wood Work

Sawing, planning and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

Study

Study of joints in door panels, wooden furniture

Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICE 9

Basic household wiring using switches, fuse, indicator – lamp etc.,

Preparation of wiring diagrams

Stair case light wiring

Tube – light wiring

Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS) 15

3. MECHANICAL ENGINEERING PRACTICE

Welding

Arc welding of butt joints, lap joints, tee joints

Gas welding Practice.

Basic Machining

Simple turning, drilling and tapping operations.

Machine assembly Practice.

Study and assembling the following:

Centrifugal pump, mixies and air conditioners.

Demonstration on

(a) Smithy operations like the production of hexagonal bolt.

(b) Foundry operation like mould preparation for grooved pulley.

4. ELECTRONIC ENGINEERING PRACTICE 9

Soldering simple electronic circuits and checking continuity.

Assembling electronic components on a small PCB and testing.

Study of Telephone, FM radio, low-voltage power supplies.

TOTAL: 45 PERIODS

GE 9114	COMPUTER PRACTICE LABORATORY	L	T	P	C
	(Common to all branches of B.E. / B.Tech. Programmes)	0	0	3	2

AIM:

The aim is to teach the use of computer applications related to office automation and to teach implementation of C programs.

OBJECTIVES:

- To introduce office automation software packages.
- To teach the fundamentals in C programming.

1. Simple OS commands and simple editors for file operations.
2. Word processors for more complex operations, like formatting documents, creating tables and so on.
3. Simple data base packages for creating and manipulating databases.
4. Spread sheet packages for data preparation and analysis.
5. Preparation of reports involving mathematical functions (Income Tax Statement, Mark sheets, Payroll etc.,)
6. C Programs using one dimensional arrays.
7. C Programs using multi-dimensional arrays and pointer data types.
8. Programs using structures, nested structures and union.
9. Programs using functions- recursive, non-recursive and Library functions.
10. Programs for passing aggregate data types as parameters between functions.
11. Programs for dynamic memory allocation / deallocation.
12. Programs for self-referential structure – Implementing linked list.

TOTAL: 45 PERIODS

HS 9161	TECHNICAL ENGLISH II	L	T	P	C
	(For all branches of B.E. / B.Tech. Programmes)	2	0	2	3

AIM:

To help students specialising in the field of Engineering and Technology develop their proficiency in oral and written communication in Technical English.

OBJECTIVES:

- To enable students develop their critical thinking skills.
- To enable students develop higher order reading skills such as interpreting, evaluating and analysing.
- To enable students develop their active listening skills.
- To enable students participate successfully in Group Discussions.

UNIT I **6**

Word formation using prefixes 'self' – modified cloze – contextual meanings - Sequencing words - future simple passive form - Predicting content – Intensive reading – interpreting advertisements – Listening and completing table – Writing extended definition – describing a process using sequence words – developing ideas into paragraphs – writing about the future.

UNIT II **6**

Identifying objects and their use – word puzzles using words with suffixes – Prepositions – adverbs – structures that express purpose - adjectives – group discussion – Reading - skimming for content and analysis of style – modes of non verbal communication – Listening and categorising data in tables – Writing formal letter – writing paragraphs on various issues.

UNIT III **6**

Stress and intonation - Cause and effect expressions - Tense forms - simple past and past continuous - Different grammatical forms of the same word - Critical reading - guided note-making and evaluating content - Listening – guided note-taking – completing a table – Role-play – group discussion techniques - discussing an issue – offering suggestions – Sequencing jumbled sentences using coherence markers– Writing a report – Writing recommendations – Writing a letter of complaint.

UNIT IV **6**

Numerical adjectives - Prepositions – use of intensifying prefixes – phrasal verbs - different grammatical forms of the same words – cloze exercise - Reading a text and evaluating the content - advertisements – analysing style and language - Listening and entering classified information – Intensive listening and completing the steps of a process - Role-play - Group discussion expressing opinions and convincing (agreeing and disagreeing) - Giving oral instructions – Descriptive writing - writing based on hints – writing argumentative paragraphs – formal letter writing – letter of application with biodata / CV Writing safety instructions - warnings and notices – preparing checklist – email communication.

UNIT V **6**

Identifying problems, their causes and finding solutions using case studies – creative and critical thinking – levels of thinking – thinking strategies – brainstorming - analytical reasoning skills – evaluative essay – decision making – conflict resolution

English Language Lab **(30 Periods)**

1. Listening: **(10)**

Recognising English sounds – accents - listening & answering questions - gap filling - listening & note making - listening to telephonic conversations - listening to speeches.

2. Speaking: **(10)**

Pronouncing words & sentences correctly - word stress - conversation practice.

3. Reading: **(5)**

Cloze test - Reading and answering questions - sequencing of sentences.

4. Writing: **(5)**

Correction of errors - Blogging.

TOTAL : 60 PERIODS

TEXTBOOK

1. Department of Humanities & Social Sciences, Anna University. English for Engineers and Technologists, Combined edition Vols. I & II. Chennai: Orient Longman, Pvt. Ltd. 2006, Themes 5 to 8 (for Units 1 – 4)
2. Sunita Mishra & C. Muralikrishna, Communication Skills for Engineers, Pearson Education, Second Impression, 2007. (for Unit 5)

REFERENCES

1. Ashraf, R.M, Effective Technical Communication, New Delhi: Tata McGraw Hill, 2007.
2. Thorpe, E & Thorpe, S, Objective English, New Delhi : Pearson Education, 2007.
3. Joan Van, Emden, A Handbook of writing for Engineers, Cambridge University Press, 1997
4. Website: www.englishclub.com

LAB REQUIREMENTS

1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders

MA 9161	MATHEMATICS - II	L T P C
	(Common to all branches of B.E. / B.Tech Programmes)	3 1 0 4

AIM:

To introduce the effective mathematical tools needed for solving engineering problems and to emphasize the underlying mathematical principles in specific situations confronting practicing engineers.

OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated

UNIT I DIFFERENTIAL EQUATIONS 9+3

Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler's and Legendre's type – System of Simultaneous linear differential equations with constant coefficients.

UNIT II VECTOR CALCULUS 9+3

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface Integral and Volume Integral - Green's, Gauss divergence and Stoke's theorems – Verification and Application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION 9+3

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal Mapping – Mapping by functions $w = z + c$, az, $\frac{1}{z}$, z^2 - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 9+3

Line Integral - Cauchy's theorem and integral formula – Taylor's and Laurent's Series – Singularities – Residues – Residue theorem – Application of Residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS 9+3

Existence conditions – Transforms of elementary functions – Basic properties – Transforms of derivatives and integrals – Initial and Final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear ordinary differential equations with constant coefficients.

L: 45, T: 15, TOTAL : 60 PERIODS

TEXT BOOKS

1. Grewal, B.S. “Higher Engineering Mathematics”, Khanna Publications (2007)
2. Ramana, B.V. “Higher Engineering Mathematics” Tata McGraw Hill (2007).

REFERENCES

1. Glyn James, “Advanced Modern Engineering Mathematics, Pearson Education (2007)
2. Jain R.K. and Iyengar S.R.K., Advanced Engineering Mathematics (3rd Edition) Narosa Publications, Delhi (2007).

PH9167 PHYSICS OF ELECTRICAL AND ELECTRONIC MATERIALS LT P C
(Common to EEE and E & I) 3 0 0 3

OBJECTIVE:

To introduce the essential principles of physics for electrical and related engineering applications.

UNIT I ELECTRICAL PROPERTIES OF METALS 9

Classical theory: Drude model - thermal conductivity, thermal resistance - electrical conductivity of nonmetals: semiconductors, ionic crystals and glasses - thin metal films: conductivity and resistivity - Schroedinger wave equation – particle in a box – degenerate states – Fermi-Dirac statistics – density of states: electron concentration and Fermi Level - band theory of solids: energy band formation – electron effective mass.

UNIT II SEMICONDUCTORS 9

Intrinsic semiconductors: energy band-diagram - direct and indirect band gap semiconductors - carrier concentrations and conductivity - extrinsic semiconductors: n, p-type doping, compensation doping - temperature dependence of conductivity - degenerate and nondegenerate semiconductors - recombination and minority carrier injection: direct and indirect recombination - minority carrier lifetime - diffusion and conduction equations and random motion - continuity equation: time-dependent continuity equation, steady-state continuity equation - optical absorption - Hall effect and devices - Ohmic contacts - Schottky diode and solar cell.

UNIT III DIELECTRIC MATERIALS AND INSULATION 9

Matter polarization and relative permittivity: definition - dipole moment and polarization vector P - polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence - local field and Clausius-Mossotti equation - dielectric constant and dielectric loss - Gauss’s law and boundary conditions - dielectric strength and insulation breakdown in gases, liquids and solids - capacitor materials - typical capacitor constructions - piezoelectricity, ferroelectricity and pyroelectricity - quartz oscillators and filters - piezo and pyroelectric crystals.

UNIT IV MAGNETIC PROPERTIES AND SUPERCONDUCTIVITY 9

Magnetic dipole moment – origin: atomic magnetic moments - magnetic materials: diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, ferrimagnetism, ferromagnetism origin and the exchange interaction - saturation magnetization and Curie temperature - ferromagnetic materials: magnetic domains, magnetocrystalline anisotropy, domain walls and motion - *M* versus *H* behaviour, demagnetization - soft and hard magnetic materials - examples and uses – Giant Magneto Resistance and materials - superconductivity: properties and classifications - High Tc superconductors - applications.

UNIT V OPTICAL PROPERTIES OF MATERIALS 9

Light waves in a homogeneous medium - refractive index - dispersion: refractive index-wavelength behavior - group velocity and group index - Fresnel's equations: amplitude, reflection and transmission coefficients, intensity, reflectance and transmittance - complex refractive index and light absorption - lattice absorption - luminescence, phosphors and white LEDs – polarization - optical anisotropy: uniaxial crystals, Fresnel's optical indicatrix, birefringence, dichroism - birefringent retarding plates - electro-optic effect and amplitude modulators – phase modulators – electro-optic effect in waveguide devices.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Palanisamy, P.K. Materials Science, Scitech, 2003
2. Arumugam, M., Materials Science, Anirutha Publ., 2002.

REFERENCES:

1. Kasap, S.O. Principles of Electronic Materials and Devices, Tata McGraw-Hill, 2007.
2. Ali Omar, M., Elementary Solid State Physics, Addition Wiley, 1974
3. Kittel, C., Introduction to Solid State Physics, John Wiley, 1996

GE 9151 ENGINEERING MECHANICS L T P C

(Common to Civil, Geoinformatics and Agriculture & Irrigation Engineering) **3 1 0 4**

OBJECTIVE:

At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, the student should understand the principle of work and energy. The student should be able to comprehend the effect of friction on equilibrium. The student should be able to understand the laws of motion, the kinematics of motion and the interrelationship. The student should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

UNIT I BASICS & STATICS 12

Introduction - Units and Dimensions - Laws of Mechanics – Lame's theorem, Parallelogram and triangular Law of forces – Vectors – Vectorial representation of forces and moments – Vector operations on forces, dot product and cross product - Coplanar Forces – Resolution and Composition of forces – Equilibrium of a forces – Forces in space - Equilibrium in space - Equivalent systems of forces – Principle of transmissibility – Single equivalent force

UNIT II EQUILIBRIUM OF RIGID BODIES 12

Free body diagram – Types of supports and their reactions – requirements of stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem - Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions – Examples

UNIT III PROPERTIES OF SURFACES AND SOLIDS 12

Determination of Areas and Volumes – First moment of area and the Centroid of standard sections – T section, I section, Angle section, Hollow section – second and product moments of plane area – Rectangle, triangle, circle - T section, I section, Angle section, Hollow section – Parallel axis theorem and perpendicular axis theorem – Polar moment of inertia – Principal moments of inertia of plane areas – Principal axes of inertia - Mass moment of inertia – Derivation of mass moment of inertia for rectangular solids, prism, rods, sphere from first principle – Relation to area moments of inertia.

UNIT IV DYNAMICS OF PARTICLES 12

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum

UNIT V CONTACT FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS12

Frictional force – Laws of Coloumb friction – simple contact friction – Rolling friction – Belt friction Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion – Impact of elastic bodies

L: 45+T=15 TOTAL : 60 PERIODS

TEXT BOOK

1. Beer,F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers", Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, 2007.

REFERENCES

1. Irving H. Shames, Engineering Mechanics - Statics and Dynamics, IV Edition – PHI / Pearson Education Asia Pvt. Ltd., 2003
2. Hibbeller, R.C., Engineering Mechanics, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2000.
3. Ashok Gupta, Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM), Pearson Education Asia Pvt., Ltd., 2002
4. J.L. Meriam & L.G. Kraige, Engineering Mechanics Vol. I & Vol. II, V edition, John Wiley & Sons, 2006.

5. P. Boresi & J. Schmidt, Engineering Mechanics Statics & Dynamics, Micro Print Pvt. Ltec., Chennai, 2004.

EE 9151 ELECTRIC CIRCUIT ANALYSIS L T P C
3 0 0 3

AIM

To introduce the concepts and investigate the behavior of electric circuits by analytical techniques

OBJECTIVES

- To introduce the basic concepts of single phase, three phase and DC Electrical circuits
- To study the transient and steady state response of the circuits subjected to step and sinusoidal excitations.
- To introduce the methods of circuit analysis using Network theorems

UNIT I BASIC CIRCUIT CONCEPTS 9

Lumped circuits – circuit elements, ideal sources (independent and dependent), linear passive parameter R, L and C, V-I relationship of circuit elements – Sinusoidal voltage and current : RMS value, form factor – Kirchhoff's laws – analysis of series and parallel circuits – network reduction : voltage and current division, source transformation, star / delta transformation.

UNIT II TRANSIENT ANALYSIS OF FIRST AND SECOND ORDER CIRCUITS 9

Source free response of RL, RC and RLC circuits – forced (step and sinusoidal) response of RL, RC and RLC circuits – Time constant and natural frequency of oscillation – Laplace Transform application to the solution of RL, RC and RLC circuits - initial and final value theorems and their applications – concept of complex frequency – driving point and transfer impedance – poles and zeros of network function.

UNIT III SINUSOIDAL STEADY STATE ANALYSIS 9

Concept of phasor and complex Impedance / Admittance – Analysis of simple series and parallel circuits – active power, reactive power, apparent power (volt ampere), power factor and energy calculations - concept of complex power – phasor diagram, impedance triangle and power triangle –series and parallel resonance circuits – Q factor, half-power frequencies and bandwidth of resonant circuits.

UNIT IV MULTIDIMENSIONAL CIRCUIT ANALYSIS & NETWORK THEOREMS 9

Node-voltage analysis of multi node circuit with current sources – rules for constructing nodal admittance matrix [Y] V = I – Mesh-current analysis of multi node circuits with voltage sources – rules for constructing mesh impedance matrix [Z] for solving matrix equation [Z] I = V – Superposition theorem – Thevenin's theorem – Norton's theorem – Reciprocity theorem – Compensation theorem – Tellegen's Theorem – Millman's

theorem – maximum power transfer theorem for variable resistance load, variable impedance load and variable resistance and fixed reactance load.

UNIT V COUPLED CIRCUITS AND THREE PHASE CIRCUITS 9

Coupled circuits : mutual inductance – coefficient of coupling – dot convention – analysis of simple coupled circuits . Three phase circuits : three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads(balanced and unbalanced) – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Van Valkenburg," Network Analysis", Prentice –Hall of India Private limited, New Delhi, 3rd Edition, 1991.
2. Joseph A.Edminister , Mahmood Nahvi, " Electric Circuits:, Schaum's Series, Tata McGraw-Hill, New Delhi 2001.

REFERENCES

1. R.C.Dorf, "Introduction to Electric Circuits " John Wiley & Sons Inc, New York, Second Edition, 1993
2. Charles K. Alexender, Mathew N.O.Sadiku, " Fundamentals of Electric circuit ", McGraw-Hill, N.Y, 2003.
3. Wiliam H.Hayt Jr, Jack E.Kemmerly and Steven M. Durbin, " Engineering Circuit Analysis", Tata McGraw-Hill Publishing Co Ltd, New Delhi, 2002.

ME 9153 POWER PLANT ENGINEERING L T P C
3 0 0 3

AIM

To learn the basics of various power plants so that they will have the comprehensive idea of power system operation.

OBJECTIVES

To become familiar with operation of various power plants.

UNIT I THERMAL POWER PLANTS 10

Basic thermodynamic cycles, various components of steam power plant-layout-pulverized coal burners- Fluidized bed combustion-coal handling systems-ash handling systems-Forced draft and induced draft fans- Boilers-feed pumps-super heater-regenerator-condenser-dearearators-cooling tower

UNIT II HYDRO ELECTRIC POWER PLANTS 9

Layout-dams-selection of water turbines-types-pumped storage hydel plants

UNIT III NUCLEAR POWER PLANTS 8

Principles of nuclear energy- Fission reactions-nuclear reactor-nuclear power plants

UNIT IV GAS AND DIESEL POWER PLANTS 9

Types, open and closed cycle gas turbine, work output & thermal efficiency, methods to improve performance-reheating, intercoolings, regeneration-advantage and disadvantages- Diesel engine power plant-component and layout

UNIT V NON-CONVENTIONAL POWER GENERATION 9

Solar energy collectors, OTEC, wind power plants, tidal power plants and geothermal resources, fuel cell, MHD power generation-principle, thermoelectric power generation, thermionic power generation.

TOTAL : 45 PERIODS

TEXT BOOKS

1. A Course in Power Plant Engineering by Arora and Domkundwar, Dhanpat Rai and Co.Pvt.Ltd. New Delhi.
2. Power station Engineering and Economy by Bernhardt G.A.Skrotzki and William A. Vopat-Tata McGraw Hill Publishing Company Ltd., New Delhi, 20th reprint 2002.
3. Power Plant Engineering by P.K. Nag, Tata McGraw Hill Second Edition 2001.

REFERENCES

1. An introduction to power plant technology by G.D. Rai-Khanna Publishers, Delhi-110 005.
2. Power Plant Engineering, M.M. El-Wakil McGraw Hill 1985.

EE 9152 OBJECT ORIENTED PROGRAMMING L T P C
3 0 0 3

AIM

To Introduce the concept of Object Oriented Programming and C++.

OBJECTIVES

At the end of the course the students will be

- Familiar with the concepts of Object Oriented Programming.
- Able to appreciate the features of C++ programming Language.
- Having a thorough understanding about Classes and Objects.
- Able to develop programs in C++

UNIT I INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING AND C++ 10

Procedure-Oriented Programming System – Object-Oriented Programming System – Comparison of C++ with C – Object-Oriented Terms and Concepts – Object-Oriented Languages – Differences between Procedural and Object-Oriented Programming – Merits and Demerits of Object-Oriented Methodology. Structure of a C++ Program – Data Types – Operators in C++ - Control Structures – Functions in C++.

UNIT II CLASSES AND OBJECTS 8

Introduction to Classes and objects – Member Functions and Member Data – Objects and Functions – Objects and Arrays – Name Spaces – Nested Classes – Dynamic Memory Allocation and Deallocation – Constructors and Destructors.

UNIT III INHERITANCE AND POLYMORPHISM 9

Introduction – Base Class and Derived Class Pointers – Function Overriding – Base Class Initialization – Protected Access Specifier – Deriving by Different Accessing specifiers – Different Kinds of Inheritance – Order of Invocation of Constructors and Destructors – Virtual Functions – Mechanism of Virtual Functions – Pure Virtual Functions – Virtual Destructors and Constructors.

UNIT IV OPERATOR OVERLOADING, TEMPLATES 9

Operator Overloading – Overloading various Operators – Type Conversion – New Style Casts and the typed Operator – Function Templates – Class Templates – The Standard Template Library (STL).

UNIT V EXCEPTION HANDLING AND CASE STUDIES 9

Introduction – C-Style Handling of Error-generating Code – C++-Style Solution-the try/throw/catch Construct – Limitations of Exception Handling. Case Studies: String Manipulations – Building classes for matrix operations.

TOTAL : 45 PERIODS

TEXT BOOKS

1. Sourav Sahay, “Object Oriented Programming with C++”, Oxford University Press, 2006.
2. Balagurusamy E., “Object Oriented Programming with C++”, 3rd Edition, Tata McGraw Hill, 2007.

REFERENCES

1. Bhushan Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.
2. Ira Pohl, “Object Oriented Programming using C++”, Pearson Education, 2nd Edition, 2003.
3. Deittel and Deittel, “C++ - How to Program”, 2nd Edition, Prentice Hall of India.

EE 9153 ELECTRIC CIRCUITS LABORATORY L T P C
0 0 3 2

AIM

To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics and simulation of time response.

OBJECTIVES

- Simulation and real time Verification of theorems.
- Study of CRO and measurement of Sinusoidal Voltage, frequency and Power factor.
- Simulation and real time Frequency response of RLC circuits.

- Study of resonance and filter circuits.
- Simulation and real time Power measurement.
- Study of circuit transients by Digital Simulation.

LIST OF EXPERIMENTS

1. Simulation and real time Verification of Kirchhoff's Voltage and current laws

2. Simulation and real time Verification of Network Theorems (Thevenin, Norton, Superposition and Milman's Theorems).

3. Study of CRO and measurement of Sinusoidal Voltage, frequency and Power factor.

4. Simulation and real time measurement of time constant of Series R-C electric circuits.

5. Simulation and real time Frequency response of RC and RL circuits.

6. Simulation and real time Frequency measurement of resonant Frequency and Frequency response of Series RLC Circuit.

7. Study of the effect of Q on frequency response and bandwidth of series resonant circuits.

8. Study of the characteristics of parallel resonant circuits.

9. Study of Low Pass and High Pass filters.

10. Simulation and real time Power measurement by 3 ammeters and 3 voltmeters.

11. Simulation and real time Power measurement by two-watt meters.

12. Study of first and second order circuit transients by Digital Simulation.

TOTAL : 45 PERIODS

LIST OF LABORATORY EQUIPMENTS

S.No.	Description	Quantity
1.	Regulation Power Supply : 0 – 15 V D.C	6 Nos.
2.	SPST Switch	6 Nos.
3.	SPDT Switch	6 Nos.
4.	Oscilloscope	8 Nos.
5.	Function Generator	8 Nos.
6.	(0-10) m.A – Moving Coil Ammeter	4 Nos.
7.	(0-100) m.A – Moving Coil Ammeter	6 Nos.
8.	(0-100) m.A – Moving Iron Ammeter	6 Nos.
9.	(0-500) m.A - Moving Coil Ammeter	6 Nos.
10.	(0-500) m.A – Moving Iron Ammeter	6 Nos.
11.	(0-5) A – Moving Coil Ammeter	4 Nos.
12.	Voltmeter (0-30) V- Moving Coil Voltmeter	10 Nos.
13.	Voltmeter (0-30) V - Moving Iron Voltmeter	6 Nos.

14.	Wattmeter 500 V, 15 A UPF	6 Nos.
15.	Ohm Meter	1 Nos.
16.	Digital Multimeter	3 Nos.
17.	3 phase loading rheostat	1 Nos.
18.	3 phase introduction motor load	1 Nos.
19.	Resister: 68E, 100E, 330E, 390E, 470E, 560E, 680E, 820E, 1KE, 1.2KE	Each 6 Nos.
20.	Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box	Each 6 Nos.
21.	Circuit Connection Boards	10 Nos.
22.	Simulation of Electrical Circuits Using Circuits Simulation Tools (MATLAB / SIMULINK or Pspice	2 Nos.

EE 9154 COMPUTER PROGRAMMING LABORATORY L T P C
0 0 3 2

AIM

To learn the concepts like Unix Shell programming and Object Oriented Programming

LIST OF EXPERIMENTS

1. Shell Commands, Wild Cards, Escaping and Redirection.
2. Pipes, Tees and Command Substitution.
3. Shell Variables, Simple program using Shell Scripting.
4. Shell Programs using Loops.
5. Simple Shell Programs using File I/O.
6. Advanced Shell Programs using File I/O.
7. Directories and inodes.
8. Programs for application of Stack.
9. Heap Sort
10. Recursive Quick Sort
11. Simple programs using classes for understanding objects, member function, constructions and destructors.
12. Programs using operator overloading including unary operators, new and delete
13. Programs using inheritance concepts
14. Programs using virtual functions and dynamic polymorphism
15. Programs using templates.

TOTAL : 45 PERIODS

S.No.	Hardware / Software Requirements	Quantity
1.	UNIX Clone Server	1
2.	Nodes (thin client or PCs)	70
3.	Printer	1
4.	UNIX Clone Os (70 user license or Licenses free Linux)	70
5.	Compiler – C and C++	1 each