



# **St. PETER'S UNIVERSITY**

**St. Peter's Institute of Higher Education and Research**  
(Declared Under Section 3 of the UGC Act, 1956)  
AVADI, CHENNAI – 600 054  
TAMIL NADU

Common to All **B.Tech.** Programmes  
(Circuit and Non-Circuit Branches)  
(Effective From **2009 – 2010**)

**Regulations and Syllabi**

**FIRST YEAR (I & II SEMESTERS)**  
(Distance Education)

**St. PETER'S INSTITUTE OF DISTANCE EDUCATION**  
Recognized by Distance Education Council and  
Joint Committee of UGC – AICTE - DEC, New Delhi  
(Ref. F. No. DEC/SPU/CHN/TN/Recog/09/14 dated 02.04.2009 and  
Ref.F.No.DEC/Recog/2009/3169 dated 09.09.2009)

# **ST. PETER'S UNIVERSITY**

**ST. PETER'S INSTITUTE OF DISTANCE EDUCATION**

Chennai – 600 054.

**Code No. – 501 to 516**  
**B.Tech. PROGRAMMES**  
(Distance Education)

## **Regulations and Syllabi for I & II Semesters** **Common to all B.Tech. Programmes** **(Circuit and Non – circuit Branches)** (Effective from 2009 – 2010)

- 1. Eligibility:** Candidates who passed the Three Year Diploma Examination in Technical Education conducted by the Government of Tamil Nadu or any other examination equivalent thereto are eligible for admission to Four Year B.Tech. Programme in the relevant Branch of study.
- 2. Duration:** Four Years comprising 8 Semesters.
- 3. Medium:** English is the medium of instruction and examination.
- 4. Methodology:** The methodology of distance education includes the supply of self-instructional study materials in print format and in CD, face-to-face instruction for theory and practicals for a limited period during week ends and holidays, provision of virtual class in phased manner, dissemination of information over e-mail, Student - Support Service at various Centres of the University, Continuous Assessment and End Assessment conducted by the University at various parts of India.
- 5. Weightage for Continuous and End Assessment:** There is no weightage for Continuous Assessment unless the ratio is specifically mentioned in the scheme of Examinations. The End Assessment (EA) has 100% weightage.

**6. Credit System:** Credit system be followed with 18 credits for each semester and each credit is equivalent to 25 hours of effective study provided in the Time Table of the formal system.

## 7. Scheme of Examinations (for I and II Semesters)

### I Semester

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
109BTT01	Technical English – I	1	100	100
109BTT02	Mathematics – I	3	100	100
109BTT03	Engineering Physics – I	3	100	100
109BTT04	Engineering Chemistry – I	3	100	100
109BTT05	Engineering Graphics – I	3	100	100
109BTT06	Fundamentals of Computing and programming	3	100	100
109BTP01	Computer Practices Laboratory – I Record	1	90 10	100
109BTP02	Engineering Practices Laboratory – I Record	1	90 10	100
109BTP03	*Physics & Chemistry Laboratory - I	-	-	-
	<b>Total</b>	<b>18</b>	<b>800</b>	<b>800</b>

\*The Practical Examination of First Semester will be held along with those of the second semester.

### II Semester

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
209BTT01	Technical English – II	2	100	100
209BTT02	Mathematics – II	3	100	100
209BTT03	Engineering Physics – II	2	100	100
209BTT04	Engineering Chemistry – II	2	100	100
209BTT05	Engineering Mechanics (For non-circuit branches)	3	100	100
209BTT06	Circuit Theory (For branches under Electrical Faculty)			
209BTT07	Electric Circuits and Electron Devices (For branches under I & C Faculty)			
209BTT08	Basic Electrical & Electronics Engineering (For non-circuit branches)	3	100	100
209BTT09	Basic Civil & Mechanical Engineering (For circuit branches)			
209BTP01	Computer Practices Laboratory – II Record	1	90 10	100
209BTP02	Physics & Chemistry Laboratory – II Record	1	90 10	100
209BTP03	Computer Aided Drafting and Modelling Laboratory(For non-circuit branches)	1	90	100
209BTP04	Electrical Circuits Laboratory (For branches under Electrical Faculty)			
209BTP05	Circuits and Devices Laboratory (For branches under I & C Faculty)			
	Record			
	<b>Total</b>	<b>18</b>	<b>900</b>	<b>900</b>

**8. Passing Requirements:** The minimum pass mark (raw score) be 50% in End Assessment (EA).

**9. Grading System:** Grading System on a 10 Point Scale be followed with 1 mark = 0.1 and the conversion of Grade point as given below:

$$\begin{aligned} \text{Overall Grade Point Average (OGPA)} &= \frac{\text{Sum of Weighted Grade Points}}{\text{Total Credits}} \\ &= \frac{\sum (EA)C}{\sum C} \end{aligned}$$

**The Overall Grade:** The Overall Grade and Classification of all successful candidates be arrived at from the Overall Grade Point Average as stipulated in the following conversion Table.

<b>Grade</b>	<b>Over all Grade Point Average(OGPA)</b>	<b>Over all weighted Average marks</b>	<b>Classification</b>
0	9.0 to 10.0	90 to 100	First Class
A	8.0 to 8.9	80 to 89	First Class
B	7.0 to 7.9	70 to 79	First Class
C	6.0 to 6.9	60 to 69	First Class
D	5.0 to 5.9	50 to 59	Second Class
<b>F</b>	4.0 to 4.9	40 to 49	<b>Reappearance</b>

The Grade Sheets of successful candidates provide particulars such as (1) overall weighted Average Marks, (2) Overall Grade Point Average, (3) Overall Grade and (4) Overall classification.

**10. Pattern of the Question Paper:** The question paper for End Assessment will be set for three hours and for the maximum of 100 marks with the following divisions and details.

**Part A:** 10 questions (with equal distribution to all units in the syllabus). Each question carries 2 marks.

**Part B:** 5 questions with either or type (with equal distribution to all the units in the syllabus). Each question carries 16 marks.

The total marks scored by the candidates will be calculated to the maximum prescribed in the Regulations.

## **11. Syllabus**

**AIM:**

To encourage students to actively involve in participative learning of English and to help them acquire Communication Skills.

**OBJECTIVES:**

1. To develop the listening skills for academic and professional purposes.
2. To acquire the ability to speak effectively in English in real-life situations.
3. To inculcate the reading habit and to develop effective reading skills.
4. To help students improve their active and passive vocabulary.
5. To familiarize students with the different rhetorical functions of scientific English.
6. To enable the students write letters and reports effectively in formal and business situations.

**UNIT I**

General Vocabulary - changing words from one form to another - Adjectives, comparative adjectives – Adverbs - Active and passive voice – Tenses - simple present, present continuous - Adverb forms – Nouns – compound nouns - Skimming and scanning - Listening and transfer of information – bar chart, flowchart - Paragraph writing, description – Discussing as a group and making an oral report on the points discussed, conversation techniques - convincing others.

**Suggested activities:**

1. Matching words & meanings - Using words in context – Making sentences.
  2. Changing sentences from active to passive voice & vice versa.
  3. Skimming, exercises transferring information from text to graphic form – bar charts, flow charts.
  4. Writing descriptions using descriptive words & phrases, and technical vocabulary.
  5. Role play, conversation exercises, discussions, oral reporting exercises
- Any other related relevant classroom activity

**UNIT II**

Vocabulary – prefixes & suffixes – simple past tense - Spelling and punctuation – ‘wh’ Question forms - Scanning, inference - Listening & note-taking - Paragraph writing - comparison and contrast - Creative thinking and speaking.

**Suggested Activities:**

1. a. Vocabulary activities using prefixes and suffixes.
    - b. Exercises using questions – asking & answering questions.
  2. Scanning the text for specific information
  3. Listening guided note-taking - Writing paragraphs using notes, giving suitable headings and subheadings for paragraphs. Using expressions of comparison and contrast.
  4. Discussion activities and exploring creative ideas.
- Any other related relevant classroom activity

**UNIT III**

Tenses - simple past, simple future and past perfect - Reading in Context -Listening & Note-taking – Single line – Definitions – Sequencing of sentences – Instruction - Persuasive speaking.

**Suggested activities:**

1. a. Providing appropriate context for the use of tenses
2. Listening and note-taking
3. (a) Writing sentence definitions, instructions  
(b) Identifying the discourse links and sequencing jumbled sentences /writing instructions.
4. Speaking exercises, discussions, role play exercises using explaining, convincing and persuasive strategies  
Any other related relevant classroom activity

**UNIT IV**

Model verbs and Probability – Concord - subject verb agreement – Correction of errors - Cause and effect expressions – Extended Definition - Speaking about the future plans.

**Suggested activities:**

1. a. Making sentences using modal verbs to express probability  
b. Gap filling using relevant grammatical form of words.
2. Writing extended definitions
3. Speaking - role play, discussions, extempore and speaking exercises speculating the future.
4. Any other related relevant classroom activity

**UNIT V**

‘If’ conditionals – Gerunds - Intensive reading - Speaking – Presentation of problems & solutions - Itinerary – planning for an industrial visit - Formal Letter writing – Letter to the Editor, Invitation letter, Accepting and Declining an invitation and Permission letter.

**Suggested activities:**

1. a) Sentence completion exercises using ‘If’ conditionals.  
b) Gap filling exercises using gerunds and present participle forms
2. Reading comprehension exercises.
3. Role play, discussion, debating and speaking activities for stating, discussing problems and suggesting solutions.
4. Planning a tour, Writing a travel itinerary. Writing letters to officials and to the editor in formal/official contexts.  
Any other related relevant classroom activity

**TEXT BOOK:**

1. Department of Humanities & Social Sciences, Anna University, ‘English for Engineers and Technologists’ Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006. Themes 1 – 4 (Resources, Energy, Computer, Transport)

**REFERENCES:**

1. Meenakshi Raman and Sangeeta Sharma, ‘Technical Communication English skills for Engineers’, Oxford University Press, 2008.
2. Andrea, J. Rutherford, ‘Basic Communication Skills for Technology’, Second Edition, Pearson Education, 2007.

**Extensive Reading:**

A.P.J. Abdul Kalam with Arun Tiwari, 'Wings of Fire' An Autobiography, University Press (India) Pvt. Ltd.,1999, 30<sup>th</sup> Impression 2007.

**NOTE:**

The book given under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

# 109BTT02 MATHEMATICS – I

## UNIT I MATRICES

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

## UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY

Equation of a sphere – Plane section of a sphere – Tangent Plane – Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

## UNIT III DIFFERENTIAL CALCULUS

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals.

## UNIT IV FUNCTIONS OF SEVERAL VARIABLES

Partial derivatives – Euler's theorem for homogenous functions – Total derivatives – Differentiation of implicit functions – Jacobians – Taylor's expansion – Maxima and Minima – Method of Lagrangian multipliers.

## UNIT V MULTIPLE INTEGRALS

Double integration – Cartesian and polar coordinates – Change of order of integration – Change of variables between Cartesian and polar coordinates – Triple integration in Cartesian co-ordinates – Area as double integral – Volume as triple integral

## TEXT BOOK:

1. Bali N. P and Manish Goyal, "Text book of Engineering Mathematics", Third edition, Laxmi Publications (p) Ltd., (2008).
2. Grewal. B.S, "Higher Engineering Mathematics", 40<sup>th</sup> Edition, Khanna Publications, Delhi, (2007).

## REFERENCES:

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).
2. Glyn James, "Advanced Engineering Mathematics", 7<sup>th</sup> Edition, Pearson Education, (2007).
3. Jain R.K and Iyengar S.R.K," Advanced Engineering Mathematics", 3<sup>rd</sup> Edition, Narosa Publishing House Pvt. Ltd., (2007).

**UNIT I      ULTRASONICS**

Introduction – Production – magnetostriction effect - magnetostriction generator- piezoelectric effect - piezoelectric generator- Detection of ultrasonic waves properties – Cavitations - Velocity measurement – acoustic grating - Industrial applications – drilling, welding, soldering and cleaning – SONAR - Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C –scan displays, Medical applications - Sonograms

**UNIT II      LASERS**

Introduction – Principle of Spontaneous emission and stimulated emission. Population inversion, pumping. Einsteins A and B coefficients - derivation. Types of lasers – He-Ne, CO<sub>2</sub>, Nd-YAG, Semiconductor lasers (homojunction & heterojunction) Qualitative Industrial Applications - Lasers in welding, heat treatment, cutting – Medical applications - Holography (construction & reconstruction).

**UNIT III      FIBRE OPTICS & APPLICATIONS**

Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – Double crucible technique of fibre drawing - Splicing, Loss in optical fibre – attenuation, dispersion, bending - Fibre optical communication system (Block diagram) - Light sources - Detectors - Fibre optic sensors – temperature & displacement - Endoscope.

**UNIT IV      QUANTUM PHYSICS**

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh – Jeans' Law from Planck's theory – Compton effect. Theory and experimental verification – Matter waves – Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box - Electron microscope - Scanning electron microscope - Transmission electron microscope.

**UNIT V      CRYSTAL PHYSICS**

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – NaCl, ZnS, diamond and graphite structures – Polymorphism and allotropy - Crystal defects – point, line and surface defects- Burger vector.

**TEXT BOOKS:**

1. R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New Delhi(2003)
2. M.N. Avadhanulu and PG Kshirsagar, 'A Text book of Engineering Physics', S.Chand and company, Ltd., New Delhi, 2005.

**REFERENCES:**

1. Serway and Jewett, 'Physics for Scientists and Engineers with Modern Physics', 6<sup>th</sup> Edition, Thomson Brooks/Cole, Indian reprint (2007).
2. Rajendran, V and Marikani A, 'Engineering Physics' Tata McGraw Hill Publications Ltd, III Edition, New Delhi, (2004).
3. Palanisamy, P.K., 'Engineering Physics' Scitech publications, Chennai, (2007).
4. Jayakumar. S, 'Engineering Physics', R.K. Publishers, Coimbatore, (2003).
5. Chitra Shadrach and Sivakumar Vadivelu, 'Engineering Physics', Pearson Education, New Delhi, (2007).

**AIM**

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

**OBJECTIVES**

- The student should be conversant with the principles of water characterization and treatment of potable and industrial purposes.
- Principles of polymer chemistry and engineering applications of polymers
- Industrial applications of surface chemistry
- Conventional and non-conventional energy sources and energy storage devices and Chemistry of engineering materials

**UNIT I WATER TECHNOLOGY**

Characteristics – alkalinity – types of alkalinity and determination – hardness – types and estimation by EDTA method (problems); Domestic water treatment – disinfection methods (Chlorination, ozonation. UV treatment) – Boiler feed water – requirements – disadvantages of using hard water in boilers – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning – demineralization process – desalination and reverse osmosis.

**UNIT II POLYMERS AND COMPOSITES**

Polymers-definition – polymerization – types – addition and condensation polymerization – free radical polymerization mechanism – Plastics, classification – preparation, properties and uses of PVC, Teflon, polycarbonate, polyurethane, nylon-6,6, PET- Rubber -vulcanization of rubber, synthetic rubbers – butyl rubber, SBR, Composites – definition, types polymer matrix composites – FRP only.

**UNIT III SURFACE CHEMISTRY**

Adsorption – types – adsorption of gases on solids – adsorption isotherms – Freundlich and Langmuir isotherms – adsorption of solutes from solution – role of adsorbents in catalysis, ion-exchange adsorption and pollution abatement.

**UNIT IV NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES**

Nuclear energy – fission and fusion reactions and light water nuclear reactor for power generation (block diagram only) – breeder reactor – solar energy conversion – solar cells – wind energy – fuel cells – hydrogen – oxygen fuel cell – batteries – alkaline batteries – lead-acid, nickel-cadmium and lithium batteries.

**UNIT V ENGINEERING MATERIALS**

Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) – manufacture of alumina, magnesite and zirconia bricks, Abrasives – natural and synthetic abrasives – quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide. Lubricants – mechanism of lubrication, liquid lubricants, - properties – viscosity index, flash and fire points, cloud and pour points, oiliness) – solid lubricants – graphite and molybdenum sulphide. Nanomaterials – introduction to nanochemistry – carbon nanotubes and their applications

**TEXT BOOKS:**

1. P.C. Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S. Dara "A text book of engineering chemistry" S. Chand & Co. Ltd., New Delhi (2006).

**REFERENCES:**

1. B.K. Sharma "Engineering chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub. Co. Ltd, New Delhi (2008).

**AIM**

To develop graphic skills in students.

**OBJECTIVES**

To develop students in graphic skill for the communication of concepts, ideas and design of engineering products and expose them to the existing national standards related to technical drawings.

**Concepts and conventions (Not for Examination)**

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

**UNIT I PLANE CURVES AND FREE HAND SKETCHING****Curves used in engineering practices:**

Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

**Free hand sketching:**

Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

**UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES**

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to both reference planes.

**UNIT III PROJECTION OF SOLIDS**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

**UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES**

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

**UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS**

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms, pyramids and cylinders by visual ray method.

## **TEXT BOOKS:**

1. N.D. Bhatt, “Engineering Drawing” Charotar Publishing House, 46<sup>th</sup> Edition, (2003).

## **REFERENCES:**

1. K. V. Natrajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai (2006).
2. M.S. Kumar, “Engineering Graphics”, D.D. Publications, (2007).
3. K. Venugopal & V. Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited (2008).
4. M.B. Shah and B.C. Rana, “Engineering Drawing”, Pearson Education (2005).
5. K. R. Gopalakrishnana, “Engineering Drawing” (Vol.I&II), Subhas Publications (1998).
6. Dhananjay A. Jolhe, “Engineering Drawing with an introduction to AutoCAD” Tata McGraw Hill Publishing Company Limited (2008).
7. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, (2008).

## **Publication of Bureau of Indian Standards:**

1. IS 10711 – 2001: Technical products Documentation – Size and lay out 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.
5. 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, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. Whenever the total number of candidates in a college exceeds 150, the University Examination in that college will be conducted in two sessions (FN and AN on the same day) for 50 percent of student (approx) at a time.

# 109BTT06 FUNDAMENTALS OF COMPUTING AND PROGRAMMING

## AIM:

To provide an awareness to Computing and Programming

## OBJECTIVES:

- To enable the student to learn the major components of a computer system
- To know the correct and efficient ways of solving problems
- To learn to use office automation tools
- To learn to program in C

## UNIT I INTRODUCTION TO COMPUTERS

Introduction – Characteristics of Computers – Evolution of Computers - Computer Generations – Classification of Computers – Basic Computer organization – Number Systems

## UNIT II COMPUTER SOFTWARE

Computer Software –Types of Software – Software Development Steps – Internet Evolution - Basic Internet Terminology – Getting connected to Internet Applications.

## UNIT III PROBLEM SOLVING AND OFFICE APPLICATION SOFTWARE

Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudocode - Application Software Packages- Introduction to Office Packages (not detailed commands for examination).

## UNIT IV INTRODUCTION TO C

Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making - Branching and Looping.

## UNIT V FUNCTIONS AND POINTERS

Handling of Character Strings – User-defined Functions – Definitions – Declarations - Call by reference – Call by value – Structures and Unions – Pointers – Arrays – The Preprocessor – Developing a C Program : Some Guidelines

## TEXT BOOKS:

1. Ashok. N. Kamthane, “ Computer Programming”, Pearson Education (India) (2008).
2. Behrouz A. Forouzan and Richard.F. Gilberg, “A Structured Programming Approach Using C”, II Edition, Brooks-Cole Thomson Learning Publications, (2007).

## REFERENCES:

1. Pradip Dey, Manas Ghoush, “Programming in C”, Oxford University Press. (2007).
2. Byron Gottfried, “Programming with C”, 2<sup>nd</sup> Edition, (Indian Adapted Edition), TMH publications, (2006).
3. Stephen G. Kochan, “Programming in C”, Third Edition, Pearson Education India, (2005).
4. Brian W. Kernighan and Dennis M. Ritchie, “The C Programming Language”, Pearson Education Inc., (2005).
5. E. Balagurusamy, “Computing fundamentals and C Programming”, Tata McGraw-Hill Publishing Company Limited, (2008).
6. S. Thamarai Selvi and R. Murugan, “C for All”, Anuradha Publishers, (2008).

**LIST OF EXERCISES**

**a) Word Processing**

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart

**b) Spread Sheet**

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
8. Sorting and Import / Export features.

**Simple C Programming \***

9. Data types, Expression Evaluation, Condition Statements.
10. Arrays
11. Structures and Unions
12. Functions

\* For programming exercises Flow chart and pseudocode are essential

**HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS**

**Hardware**

LAN System with 33 nodes (OR) Standalone PCs – 33 Nos.  
Printers – 3 Nos.

**Software**

OS – Windows / UNIX Clone  
Application Package – Office suite  
Compiler – C

# 109BTP02 ENGINEERING PRACTICES LABORATORY - I

## OBJECTIVES

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 & MECHANICAL)

### I CIVIL ENGINEERING PRACTICE

#### Buildings:

- (a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

#### Plumbing Works:

- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- (b) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise:

Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

- (e) Demonstration of plumbing requirements of high-rise buildings.

#### Carpentry using Power Tools only:

- (a) Study of the joints in roofs, doors, windows and furniture.
- (b) Hands-on-exercise:

Wood work, joints by sawing, planning and cutting.

### II MECHANICAL ENGINEERING PRACTICE

#### Welding:

- (a) Preparation of arc welding of butt joints, lap joints and tee joints.
- (b) Gas welding practice

#### Basic Machining:

- (a) Simple Turning and Taper turning
- (b) Drilling Practice

#### Sheet Metal Work:

- (a) Forming & Bending:
- (b) Model making – Trays, funnels, etc.
- (c) Different type of joints.

## **Machine assembly practice:**

- (a) Study of centrifugal pump
- (b) Study of air conditioner

## **Demonstration on:**

- (a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
- (b) Foundry operations like mould preparation for gear and step cone pulley.
- (c) Fitting – Exercises – Preparation of square fitting and vee – fitting models.

## **GROUP B (ELECTRICAL & ELECTRONICS)**

### **III ELECTRICAL ENGINEERING PRACTICE**

- 1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
- 2. Fluorescent lamp wiring.
- 3. Stair case wiring
- 4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
- 5. Measurement of energy using single phase energy meter.
- 6. Measurement of resistance to earth of an electrical equipment.

### **IV ELECTRONICS ENGINEERING PRACTICE**

- 1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.
- 2. Study of logic gates AND, OR, EOR and NOT.
- 3. Generation of Clock Signal.
- 4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
- 5. Measurement of ripple factor of HWR and FWR.

## **REFERENCES:**

- 1. K. Jeyachandran, S. Natarajan & S. Balasubramanian, “A Primer on Engineering Practices Laboratory”, Anuradha Publications, (2007).
- 2. T.Jeyapoovan, M.Saravanapandian & S.Pranitha, “Engineering Practices Lab Manual”, Vikas Publishing House Pvt. Ltd., (2006)
- 3. H.S. Bawa, “Workshop Practice”, Tata McGraw – Hill Publishing Company Limited, (2007).
- 4. A. Rajendra Prasad & P.M.M.S. Sarma, “Workshop Practice”, Sree Sai Publication, (2002).
- 5. P.Kannaiah & K.L.Narayana, “Manual on Workshop Practice”, Scitech Publications, (1999).

## SEMESTER EXAMINATION PATTERN

The Laboratory examination is to be conducted for Group A & Group B, allotting 90 minutes for each group, with a break of 15 minutes. Both the examinations are to be taken together in sequence, either in the FN session or in the AN session. The maximum marks for Group A and Group B lab examinations will be 50 each, totaling 100 for the Lab course. The candidates shall answer either I or II under Group A and either III or IV under Group B, based on lots.

### Engineering Practices Laboratory

#### List of equipments and components

(For a Batch of 30 Students)

#### CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets.
2. Carpentry vice (fitted to work bench) 15 Nos.
3. Standard woodworking tools 15 Sets.
4. Models of industrial trusses, door joints, furniture joints 5 each
5. Power Tools:
  - (a) Rotary Hammer 2 Nos
  - (b) Demolition Hammer 2 Nos
  - (c) Circular Saw 2 Nos
  - (d) Planer 2 Nos
  - (e) Hand Drilling Machine 2 Nos
  - (f) Jigsaw 2 Nos

#### MECHANICAL

1. Arc welding transformer with cables and holders 5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.
5. Centre lathe 2 Nos.
6. Hearth furnace, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 Sets.
8. Power Tool: Angle Grinder 2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner One each.

## **ELECTRICAL**

- |   |         |
|---|---------|
| 1. Assorted electrical components for house wiring                  | 15 Sets |
| 2. Electrical measuring instruments                                 | 10 Sets |
| 3. Study purpose items: Iron box, fan and regulator, emergency lamp | 1 each  |
| 4. Megger (250V/500V)   | 1 No.   |
| 5. Power Tools: (a) Range Finder                                    | 2 Nos   |
| (b) Digital Live-wire detector                                      | 2 Nos   |

## **ELECTRONICS**

- |   |         |
|---|---------|
| 1. Soldering guns   | 10 Nos. |
| 2. Assorted electronic components for making circuits                 | 50 Nos. |
| 3. Small PCBs   | 10 Nos. |
| 4. Multimeters  | 10 Nos. |
| 5. Study purpose items: Telephone, FM radio, low-voltage power supply |         |

## 109BTP03 - PHYSICS LABORATORY – I

### LIST OF EXPERIMENTS

1. (a) Particle size determination using Diode Laser  
(b) Determination of Laser parameters – Wavelength, and angle of divergence.  
(c) Determination of acceptance angle in an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method
3. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
4. Determination of wavelength of mercury spectrum – spectrometer grating.
5. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
6. Determination of Hysteresis loss in a ferromagnetic material

- A minimum of FIVE experiments shall be offered.
- Laboratory classes on alternate weeks for Physics and Chemistry.
- The lab examinations will be held only in the second semester.

## CHEMISTRY LABORATORY – I

### LIST OF EXPERIMENTS

1. Estimation of hardness of Water by EDTA
2. Estimation of Copper in brass by EDTA
3. Determination of DO in water ( Winkler's method)
4. Estimation of Chloride in Water sample (Argentometric)
5. Estimation of alkalinity of Water sample
6. Determination of molecular weight and degree of polymerization using viscometry.

- A minimum of FIVE experiments shall be offered.
- Laboratory classes on alternate weeks for Physics and Chemistry.
- The lab examinations will be held only in the second semester.

**AIM:**

To encourage students to actively involve in participative learning of English and to help them acquire Communication Skills.

**OBJECTIVES:**

1. To develop the listening skills for academic and professional purposes.
2. To acquire the ability to speak effectively in English in real-life situations.
3. To inculcate the reading habit and to develop effective reading skills.
4. To help students improve their active and passive vocabulary.
5. To familiarize students with different rhetorical functions of scientific English.
6. To enable the students write letters and reports effectively in formal and business situations.

**UNIT I**

Technical Vocabulary - meanings in context, sequencing words, Articles- Prepositions, intensive reading& predicting content, Reading and interpretation, extended definitions, Process description

**Suggested activities:**

1. Exercises on word formation using the prefix 'self' - Gap filling with preposition.
2. Exercises - Using sequence words.
3. Reading comprehension exercise with questions based on inference – Reading headings and predicting the content – Reading advertisements and interpretation.
4. Writing extended definitions – Writing descriptions of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future.

**UNIT II**

Phrases / Structures indicating use / purpose – Adverbs-Skimming – Non-verbal communication - Listening – correlating verbal and non-verbal communication -Speaking in group discussions – Formal Letter writing – Writing analytical paragraphs.

**Suggested activities:**

1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) - Reading comprehension exercises with texts including graphic communication - Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categorise data in tables.
3. Writing formal letters, quotations, clarification, complaint – Letter seeking permission for Industrial visits– Writing analytical paragraphs on different debatable issues.

**UNIT III**

Cause and effect expressions – Different grammatical forms of the same word - Speaking – stress and intonation, Group Discussions - Reading – Critical reading - Listening, - Writing – using connectives, report writing – types, structure, data collection, content, form, recommendations .

### **Suggested activities:**

1. Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different grammatical forms of the same word. ( e.g. object –verb / object – noun )
2. Speaking exercises involving the use of stress and intonation – Group discussions– analysis of problems and offering solutions.
3. Reading comprehension exercises with critical questions, Multiple choice question.
4. Sequencing of jumbled sentences using connectives – Writing different types of reports like industrial accident report and survey report – Writing recommendations.

### **UNIT IV**

Numerical adjectives – Oral instructions – Descriptive writing – Argumentative paragraphs – Letter of application - content, format (CV / Bio-data) - Instructions, imperative forms - Checklists, Yes/No question form – E-mail communication.

### **Suggested Activities:**

1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking - Role play – group discussions – Activities giving oral instructions.
5. Writing descriptions, expanding hints – Writing argumentative paragraphs – Writing formal letters – Writing letter of application with CV/Bio-data – Writing general and safety instructions – Preparing checklists – Writing e-mail messages.

### **UNIT V**

Speaking - Discussion of Problems and solutions - Creative and critical thinking – Writing an essay, Writing a proposal.

### **Suggested Activities:**

1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements.

### **TEXT BOOK:**

1. Chapters 5 – 8. Department of Humanities & Social Sciences, Anna University, ‘English for Engineers and Technologists’ Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006. Themes 5 – 8 (Technology, Communication, Environment, Industry)

**REFERENCES:**

1. P. K. Dutt, G. Rajeevan and C.L.N Prakash, 'A Course in Communication Skills', Cambridge University Press, India 2007.
2. Krishna Mohan and Meera Banerjee, 'Developing Communication Skills', Macmillan India Ltd., (Reprinted 1994 – 2007).
3. Edgar Thorpe, Showick Thorpe, 'Objective English', Second Edition, Pearson Education, 2007.

**Extensive Reading:**

1. Robin Sharma, 'The Monk Who Sold His Ferrari', Jaico Publishing House, 2007.

**Note:**

The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

**UNIT I ORDINARY DIFFERENTIAL EQUATIONS**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

**UNIT II VECTOR CALCULUS**

Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Simple applications involving cubes and rectangular parallel pipeds.

**UNIT III ANALYTIC FUNCTIONS**

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping :  $w = z+c$ ,  $cz$ ,  $1/z$ , and bilinear transformation.

**UNIT IV COMPLEX INTEGRATION**

Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

**UNIT V LAPLACE TRANSFORM**

Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse functions – Transform of periodic functions.

Definition of Inverse Laplace transform as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

**TEXT BOOK:**

1. Bali N. P and Manish Goyal, “Text book of Engineering Mathematics”, 3<sup>rd</sup> Edition, Laxmi Publications (p) Ltd., (2008).
2. Grewal. B.S, “Higher Engineering Mathematics”, 40<sup>th</sup> Edition, Khanna Publications, Delhi, (2007).

**REFERENCES:**

1. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi, (2007).
2. Glyn James, “Advanced Engineering Mathematics”, 3<sup>rd</sup> Edition, Pearson Education, (2007).
3. Erwin Kreyszig, “Advanced Engineering Mathematics”, 7<sup>th</sup> Edition, Wiley India, (2007).
4. Jain R.K and Iyengar S.R.K, “Advanced Engineering Mathematics”, 3<sup>rd</sup> Edition, Narosa Publishing House Pvt. Ltd., (2007).

**UNIT I CONDUCTING MATERIALS**

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

**UNIT II SEMICONDUCTING MATERIALS**

Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration – compound semiconductors – Hall effect – Determination of Hall coefficient – Applications.

**UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS**

Origin of magnetic moment – Bohr magneton – Dia and para magnetism – Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – anti – ferromagnetic materials – Ferrites – applications – magnetic recording and readout – storage of magnetic data – tapes, floppy and magnetic disc drives.

Superconductivity: properties - Types of super conductors – BCS theory of superconductivity(Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

**UNIT IV DIELECTRIC MATERIALS**

Electrical susceptibility – dielectric constant – electronic, ionic, orientational and space charge polarization – frequency and temperature dependence of polarisation – internal field – Claussius – Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer) – ferro electricity and applications.

**UNIT V MODERN ENGINEERING MATERIALS**

Metallic glasses: preparation, properties and applications.

Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA

Nanomaterials: synthesis – plasma arcing – chemical vapour deposition – sol-gels – electrodeposition – ball milling - properties of nanoparticles and applications.

Carbon nanotubes: fabrication – arc method – pulsed laser deposition – chemical vapour deposition - structure – properties and applications.

**TEXT BOOKS:**

1. Charles Kittel ‘ Introduction to Solid State Physics’, John Wiley & sons, 7<sup>th</sup> edition, Singapore (2007).
2. Charles P. Poole and Frank J. Owen, ‘Introduction to Nanotechnology’, Wiley India(2007) (for Unit V).

**REFERENCES:**

1. Rajendran, V, and Marikani A, ‘Materials science’ Tata McGraw Hill publications, (2004) New Delhi.
2. Jayakumar, S. ‘Materials science’, R.K. Publishers, Coimbatore, (2008).
3. Palanisamy P.K, ‘Materials science’, Scitech publications(India) Pvt. Ltd., Chennai, second Edition(2007).
4. M. Arumugam, ‘Materials Science’ Anuradha publications, Kumbakonam, (2006).

## 209BTT04 ENGINEERING CHEMISTRY – II

### AIM

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

### OBJECTIVES

- The student should be conversant with the principles of electrochemistry, electrochemical cells, emf and applications of emf measurements.
- Principles of corrosion control
- Chemistry of Fuels and combustion
- Industrial importance of Phase rule and alloys
- Analytical techniques and their importance.

### UNIT I ELECTROCHEMISTRY

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox -  $\text{Fe}^{2+}$  vs dichromate and precipitation –  $\text{Ag}^+$  vs  $\text{Cl}^-$  titrations) and conduct metric titrations (acid-base – HCl Vs, NaOH) titrations,

### UNIT II CORROSION AND CORROSION CONTROL

Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating.

### UNIT III FUELS AND COMBUSTION

Calorific value – classification – Coal – proximate and ultimate analysis metallurgical coke – manufacture by Otto-Hoffmann method – Petroleum processing and fractions – cracking – catalytic cracking and methods-knocking – octane number and cetane number – synthetic petrol – Fischer Tropsch and Bergius processes – Gaseous fuels- water gas, producer gas, CNG and LPG, Flue gas analysis – Orsat apparatus – theoretical air for combustion.

### UNIT IV PHASE RULE AND ALLOYS

Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

### UNIT V ANALYTICAL TECHNIQUES

Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (problem) (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

**TEXT BOOKS:**

1. P.C. Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S. Dara "A text book of Engineering Chemistry" S. Chand & Co. Ltd., New Delhi (2006).

**REFERENCES:**

1. B. Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub. Co. Ltd., New Delhi (2008).
2. B.K. Sharma "Engineering Chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2001).

**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, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He 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 OF PARTICLES**

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: additions, subtraction, dot product, cross product – Coplanar Forces – Resolution and Composition of forces – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility – Single equivalent force.

**UNIT II EQUILIBRIUM OF RIGID BODIES**

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**

Determination of Areas and Volumes – First moment of area and the Centroid of sections – Rectangle, circle, triangle from integration – T section, I section, - Angle section, Hollow section by using standard formula – second and product moments of plane area – Rectangle, triangle, circle from integration – T section, I section, Angle section, Hollow section by using standard formula – 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 section, prism, sphere from first principle – Relation to area moments of inertia.

**UNIT IV DYNAMICS OF PARTICLES**

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton’s law – Work Energy Equation of particles – Impulse and Momentum – Impact of elastic bodies.

**UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS**

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

**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, (1997).

**REFERENCES:**

1. Rajasekaran, S, Sankarasubramanian, G., “Fundamentals of Engineering Mechanics”, Vikas Publishing House Pvt. Ltd., (2000).
2. Hibbeller, R.C., “Engineering Mechanics”, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., (2000).
3. Palanichamy, M.S., Nagam, S., “Engineering Mechanics – Statics & Dynamics”, Tata McGraw-Hill, (2001).
4. Irving H. Shames, “Engineering Mechanics – Statics and Dynamics”, IV Edition – Pearson Education Asia Pvt. Ltd., (2003).
5. Ashok Gupta, “Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM)”, Pearson Education Asia Pvt., Ltd., (2002).

## **209BTT06            CIRCUIT THEORY**

(Common to EEE, EIE and ICE Branches)

### **UNIT I            BASIC CIRCUITS ANALYSIS**

Ohm's Law – Kirchoffs laws – DC and AC Circuits – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis for D.C and A.C. circuits.

### **UNIT II            NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS:**

Network reduction: voltage and current division, source transformation – star delta conversion. Thevenins and Novton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

### **UNIT III            RESONANCE AND COUPLED CIRCUITS**

Series and paralled resonance – their frequency response – Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

### **UNIT IV            TRANSIENT RESPONSE FOR DC CIRCUITS**

Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input.

### **UNIT V            ANALYSING 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 & un balanced – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

### **TEXT BOOKS:**

1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", Tata McGraw Hill publishers, 6<sup>th</sup> edition, New Delhi, (2002).
2. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, (2007).

### **REFERENCES:**

1. Paranjothi SR, "Electric Circuits Analysis," New Age International Ltd., New Delhi, (1996).
2. Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series, Tata McGraw-Hill, New Delhi (2001).
3. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, (1999).
4. Charles K. Alexander, Mathew N.O. Sadik, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, (2003).

# 209BTT07 ELECTRIC CIRCUITS AND ELECTRON DEVICES

(For ECE, CSE, IT and Biomedical Engg. Branches)

## UNIT I CIRCUIT ANALYSIS TECHNIQUES

Kirchoff's current and voltage laws – series and parallel connection of independent sources – R, L and C – Network Theorems – Thevenin, Superposition, Norton, Maximum power transfer and duality – Star-delta conversion.

## UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS

Basic RL, RC and RLC circuits and their responses to pulse and sinusoidal inputs – frequency response – Parallel and series resonances – Q factor – single tuned and double tuned circuits.

## UNIT III SEMICONDUCTOR DIODES

Review of intrinsic & extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitances – effect of temperature and breakdown mechanism – Zener diode and its characteristics.

## UNIT IV TRANSISTORS

Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

## UNIT V SPECIAL SEMICONDUCTOR DEVICES

(Qualitative Treatment only)

Tunnel diodes – PIN diode, varactor diode – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Laser, CCD, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

### TEXT BOOKS:

1. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits" – Shaum series, Tata McGraw Hill, (2001).
2. S. Salivahanan, N. Suresh kumar and A. Vallavanraj, "Electronic Devices and Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition, (2008).
3. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5<sup>th</sup> Edition, (2008).

### REFERENCES:

1. Robert T. Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, 7<sup>th</sup> Edition, (2006).
2. William H. Hayt, J.V. Jack, E. Kemmely and Steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 6<sup>th</sup> Edition, 2002.
3. J. Millman & Halkins, Satyabranta Jit, "Electronic Devices & Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition, 2008.

# **209BTT08 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

(Common to branches under Civil, Mechanical and Technology faculty)

## **UNIT I ELECTRICAL CIRCUITS & MEASUREMENTS**

Ohm's Law – Kirchoff's Laws – Steady State Solution of DC Circuits – Introduction to AC Circuits – Waveforms and RMS Value – Power and Power factor – Single Phase and Three Phase Balanced Circuits.

Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters.

## **UNIT II ELECTRICAL MECHANICS**

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single Phase Transformer, single phase induction Motor.

## **UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS**

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation.

Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier.

## **UNIT IV DIGITAL ELECTRONICS**

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion (single concepts)

## **UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING**

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations.

Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

### **TEXT BOOKS:**

1. V.N. Mittle "Basic Electrical Engineering", Tata McGraw Hill Edition, New Delhi, 1990.
2. R.S. Sedha, "Applied Electronics" S. Chand & Co., 2006.

### **REFERENCES:**

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering", Tata McGraw Hill, Second Edition, (2006).
2. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press (2005).
3. Mehta V K, "Principles of Electronics", S.Chand & Company Ltd, (1994).
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, (2002).
5. Premkumar N, "Basic Electrical Engineering" Anuradha Publishers, (2003).

# **209BTT09 BASIC CIVIL & MECHANICAL ENGINEERING**

(Common to branches under Electrical and I & C Faculty)

## **A – CIVIL ENGINEERING**

### **UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS**

**Surveying:** Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

**Civil Engineering Materials:** Bricks – stones – sand – cement – concrete – steel sections.

### **UNIT II BUILDING COMPONENTS AND STRUCTURES**

**Foundations:** Types, Bearing capacity – Requirement of good foundations.

**Superstructure:** Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.

## **B – MECHANICAL ENGINEERING**

### **UNIT III POWER PLANT ENGINEERING**

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

### **UNIT IV I C ENGINES**

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

### **UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM**

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

### **REFERENCES:**

1. Shanmugam G and Palanichamy M S, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Co., New Delhi, (1996).
2. Ramamrutham. S, “Basic Civil Engineering”, Dhanpat Rai Publishing Co. (P) Ltd. (1999).
3. Seetharaman S. “Basic Civil Engineering” Anuradha Agencies, (2005).
4. Venugopal K and Prahua Raja V, “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, (2000).
5. Shantha Kumar S R J., “Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, (2000).

# **209CLP01 COMPUTER PRACTICE LABORATORY – II**

## **LIST OF EXPERIMENTS**

### **1. UNIX COMMANDS**

Study of Unix OS - Basic Shell Commands - Unix Editor

### **2. SHELL PROGRAMMING**

Simple Shell program - Conditional Statements - Testing and Loops

### **3. C PROGRAMMING ON UNIX**

Dynamic Storage Allocation-Pointers-Functions-File Handling

## **HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS**

### *Hardware*

1 UNIX Clone Server  
33 Nodes (thin client or PCs)  
Printer – 3 Nos.

### **Software**

OS – UNIX Clone (33 user license or License free Linux)  
Compiler - C

**LIST OF EXPERIMENTS**

1. Determination of Young's modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
4. Determination of viscosity of liquid – Poiseuille's method.
5. Spectrometer dispersive power of a prism.
6. Determination of Young's modulus of the material – uniform bending.
7. Torsional pendulum – Determination of rigidity modulus.

- **A minimum of FIVE experiments shall be offered.**
- **Laboratory classes on alternate weeks for Physics and Chemistry.**
- **The lab examinations will be held only in the second semester.**

## CHEMISTRY LABORATORY – II

### LIST OF EXPERIMENTS

1. Conduct metric titration (Simple acid base)
2. Conduct metric titration (Mixture of weak and strong acids)
3. Conduct metric titration using  $\text{BaCl}_2$  Vs  $\text{Na}_2\text{SO}_4$
4. Potentiometric Titration ( $\text{Fe}^{2+}$  /  $\text{KMnO}_4$  or  $\text{K}_2\text{Cr}_2\text{O}_7$ )
5. PH titration (acid & base)
6. Determination of water of crystallization of a crystalline salt (Copper sulphate)
7. Estimation of Ferric iron by spectrophotometry.

- **A minimum of FIVE experiments shall be offered.**
- **Laboratory classes on alternate weeks for Physics and Chemistry.**
- **The lab examinations will be held only in the second semester.**

## **209BTP03 COMPUTER AIDED DRAFTING AND MODELING LABORATORY**

### **List of Exercises using software capable of Drafting and Modeling**

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building ( Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
9. Drawing isometric projection of simple objects.
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

**Note: Plotting of drawings must be made for each exercise and attached to the records written by students.**

### **List of Equipments for a batch of 30 students:**

1. Pentium IV computer or better hardware, with suitable graphics facility -30 No.
2. Licensed software for Drafting and Modeling. – 30 Licenses
3. Laser Printer or Plotter to print / plot drawings – 2 Nos.

## **209BTP04 ELECTRICAL CIRCUIT LABORATORY**

(Common to EEE, EIE and ICE)

### **LIST OF EXPERIMENTS**

1. Verification of Ohm's laws and Kirchoff's laws.
2. Verification of Thevenin's and Norton's Theorem
3. Verification of superposition Theorem
4. Verification of maximum power transfer theorem.
5. Verification of Reciprocity theorem
6. Measurement of self inductance of a coil
7. Verification of mesh and nodal analysis.
8. Transient response of RL and RC circuits for DC input.
9. Frequency response of series and parallel resonance circuits.
10. Frequency response of single tuned coupled circuits.

## **209BTP05 CIRCUITS AND DEVICES LABORATORY**

1. Verification of KVL and KCL
2. Verification of Thevenin and Norton Theorems.
3. Verification of superposition Theorem.
4. Verification of Maximum power transfer and reciprocity theorems.
5. Frequency response of series and parallel resonance circuits.
6. Characteristics of PN and Zener diode
7. Characteristics of CE configuration
8. Characteristics of CB configuration
9. Characteristics of UJT and SCR
10. Characteristics of JFET and MOSFET
11. Characteristics of Diac and Triac.
12. Characteristics of Photodiode and Phototransistor.