

# **B.E. / B. Tech. DEGREE PROGRAMMES**

## **FIRST YEAR SYLLABUS**

(For the students admitted during 2013-14 and onwards)



## **COIMBATORE INSTITUTE OF TECHNOLOGY**

(Government Aided Autonomous Institution affiliated to  
Anna University, Chennai)

**COIMBATORE - 641 014**



# COIMBATORE INSTITUTE OF TECHNOLOGY

(Government Aided Autonomous Institution affiliated to  
Anna University, Chennai)

## B.E. CIVIL ENGINEERING

### FIRST SEMESTER

| Subject Code | Name of the Subject               | L | T | P | Credit    |
|--------------|-----------------------------------|---|---|---|-----------|
| 13FY11       | Mathematics - I                   | 3 | 1 | 0 | 4         |
| 13FY12       | Technical English                 | 2 | 0 | 2 | 3         |
| 13FY13       | Engineering Physics               | 3 | 0 | 0 | 3         |
| 13FY14       | Engineering Chemistry             | 3 | 0 | 0 | 3         |
| 13FY15       | (S-5)Basic Electrical Engineering | 3 | 0 | 0 | 3         |
| 13FY16       | (S-14)Basic C Programming         | 2 | 0 | 3 | 4         |
| 13FY27       | Engineering Graphics              | 1 | 0 | 3 | -         |
| 13FY28       | Physics Laboratory                | 0 | 0 | 3 | -         |
| 13FY29       | Chemistry Laboratory              | 0 | 0 | 3 | -         |
| 13FY30       | Workshop                          | 0 | 0 | 3 | -         |
|              | <b>Total Credits</b>              |   |   |   | <b>20</b> |

### SECOND SEMESTER

| Subject Code | Name of the Subject                                    | L | T | P | Credit    |
|--------------|--------------------------------------------------------|---|---|---|-----------|
| 13FY21       | Mathematics-II                                         | 3 | 1 | 0 | 4         |
| 13FY22       | Professional English/German                            | 2 | 0 | 2 | 3         |
| 13FY23       | Materials Science                                      | 3 | 0 | 0 | 3         |
| 13FY24       | Principles of Environmental<br>Science and Engineering | 3 | 0 | 0 | 3         |
| 13FY25       | (S-2)Engineering Mechanics                             | 3 | 1 | 0 | 4         |
| 13FY26       | (S-3)Building Materials                                | 3 | 0 | 0 | 3         |
| 13FY27       | Engineering Graphics                                   | 1 | 0 | 3 | 4         |
| 13FY28       | Physics Laboratory                                     | 0 | 0 | 3 | 2         |
| 13FY29       | Chemistry Laboratory                                   | 0 | 0 | 3 | 2         |
| 13FY30       | Workshop                                               | 0 | 0 | 3 | 2         |
|              | <b>Total Credits</b>                                   |   |   |   | <b>30</b> |

**B.E. MECHANICAL ENGINEERING  
FIRST SEMESTER**

| Subject Code | Name of the Subject           | L | T | P | Credit    |
|--------------|-------------------------------|---|---|---|-----------|
| 13FY11       | Mathematics - I               | 3 | 1 | 0 | 4         |
| 13FY12       | Technical English             | 2 | 0 | 2 | 3         |
| 13FY13       | Engineering Physics           | 3 | 0 | 0 | 3         |
| 13FY14       | Engineering Chemistry         | 3 | 0 | 0 | 3         |
| 13FY15       | (S-4)Basics of Thermodynamics | 3 | 1 | 0 | 4         |
| 13FY16       | (S-14)Basic C Programming     | 2 | 0 | 3 | 4         |
| 13FY27       | Engineering Graphics          | 1 | 0 | 3 | -         |
| 13FY28       | Physics Laboratory            | 0 | 0 | 3 | -         |
| 13FY29       | Chemistry Laboratory          | 0 | 0 | 3 | -         |
| 13FY30       | Workshop                      | 0 | 0 | 3 | -         |
|              | <b>Total Credits</b>          |   |   |   | <b>21</b> |

**SECOND SEMESTER**

| Subject Code | Name of the Subject                                   | L | T | P | Credit    |
|--------------|-------------------------------------------------------|---|---|---|-----------|
| 13FY21       | Mathematics-II                                        | 3 | 1 | 0 | 4         |
| 13FY22       | Professional English/German                           | 2 | 0 | 2 | 3         |
| 13FY23       | Materials Science                                     | 3 | 0 | 0 | 3         |
| 13FY24       | Principles of Environmental Science and Engineering   | 3 | 0 | 0 | 3         |
| 13FY25       | (S-7)Electrical Engineering                           | 3 | 0 | 0 | 3         |
| 13FY26       | (S-10)Basic Electronics and Communication Engineering | 3 | 0 | 0 | 3         |
| 13FY27       | Engineering Graphics                                  | 1 | 0 | 3 | 4         |
| 13FY28       | Physics Laboratory                                    | 0 | 0 | 3 | 2         |
| 13FY29       | Chemistry Laboratory                                  | 0 | 0 | 3 | 2         |
| 13FY30       | Workshop                                              | 0 | 0 | 3 | 2         |
|              | <b>Total Credits</b>                                  |   |   |   | <b>29</b> |

**B.E. ELECTRICAL AND ELECTRONICS ENGINEERING  
FIRST SEMESTER**

| Subject Code | Name of the Subject                         | L | T | P | Credit    |
|--------------|---------------------------------------------|---|---|---|-----------|
| 13FY11       | Mathematics-I                               | 3 | 1 | 0 | 4         |
| 13FY12       | Technical English                           | 2 | 0 | 2 | 3         |
| 13FY13       | Engineering Physics                         | 3 | 0 | 0 | 3         |
| 13FY14       | Engineering Chemistry                       | 3 | 0 | 0 | 3         |
| 13FY15       | (S-1)Basic Civil and Mechanical Engineering | 4 | 0 | 0 | 4         |
| 13FY16       | (S-8)Electric Circuits                      | 3 | 1 | 0 | 4         |
| 13FY27       | Engineering Graphics                        | 1 | 0 | 3 | -         |
| 13FY28       | Physics Laboratory                          | 0 | 0 | 3 | -         |
| 13FY29       | Chemistry Laboratory                        | 0 | 0 | 3 | -         |
| 13FY30       | Workshop                                    | 0 | 0 | 3 | -         |
|              | <b>Total Credits</b>                        |   |   |   | <b>21</b> |

**SECOND SEMESTER**

| Subject Code | Name of the Subject                                 | L | T | P | Credit    |
|--------------|-----------------------------------------------------|---|---|---|-----------|
| 13FY21       | Mathematics-II                                      | 3 | 1 | 0 | 4         |
| 13FY22       | Professional English/German                         | 2 | 0 | 2 | 3         |
| 13FY23       | Materials Science                                   | 3 | 0 | 0 | 3         |
| 13FY24       | Principles of Environmental Science and Engineering | 3 | 0 | 0 | 3         |
| 13FY25       | (S-11)Electron Devices and Circuits                 | 3 | 0 | 0 | 3         |
| 13FY26       | (S-14)Basic C Programming                           | 2 | 0 | 3 | 4         |
| 13FY27       | Engineering Graphics                                | 1 | 0 | 3 | 4         |
| 13FY28       | Physics Laboratory                                  | 0 | 0 | 3 | 2         |
| 13FY29       | Chemistry Laboratory                                | 0 | 0 | 3 | 2         |
| 13FY30       | Workshop                                            | 0 | 0 | 3 | 2         |
|              | <b>Total Credits</b>                                |   |   |   | <b>30</b> |

**B.E. ELECTRONICS AND COMMUNICATION ENGINEERING  
FIRST SEMESTER**

| Subject Code | Name of the Subject                         | L | T | P | Credit    |
|--------------|---------------------------------------------|---|---|---|-----------|
| 13FY11       | Mathematics-I                               | 3 | 1 | 0 | 4         |
| 13FY12       | Technical English                           | 2 | 0 | 2 | 3         |
| 13FY13       | Engineering Physics                         | 3 | 0 | 0 | 3         |
| 13FY14       | Engineering Chemistry                       | 3 | 0 | 0 | 3         |
| 13FY15       | (S-1)Basic Civil and Mechanical Engineering | 4 | 0 | 0 | 4         |
| 13FY16       | (S-9)Circuit Theory                         | 3 | 1 | 0 | 4         |
| 13FY27       | Engineering Graphics                        | 1 | 0 | 3 | -         |
| 13FY28       | Physics Laboratory                          | 0 | 0 | 3 | -         |
| 13FY29       | Chemistry Laboratory                        | 0 | 0 | 3 | -         |
| 13FY30       | Workshop                                    | 0 | 0 | 3 | -         |
|              | <b>Total Credits</b>                        |   |   |   | <b>21</b> |

**SECOND SEMESTER**

| Subject Code | Name of the Subject                                 | L | T | P | Credit    |
|--------------|-----------------------------------------------------|---|---|---|-----------|
| 13FY21       | Mathematics-II                                      | 3 | 1 | 0 | 4         |
| 13FY22       | Professional English/German                         | 2 | 0 | 2 | 3         |
| 13FY23       | Materials Science                                   | 3 | 0 | 0 | 3         |
| 13FY24       | Principles of Environmental Science and Engineering | 3 | 0 | 0 | 3         |
| 13FY25       | (S-15) C Programming Theory and Practice            | 2 | 0 | 3 | 4         |
| 13FY26       | (S-13)Basic Computer Engineering                    | 3 | 0 | 0 | 3         |
| 13FY27       | Engineering Graphics                                | 1 | 0 | 3 | 4         |
| 13FY28       | Physics Laboratory                                  | 0 | 0 | 3 | 2         |
| 13FY29       | Chemistry Laboratory                                | 0 | 0 | 3 | 2         |
| 13FY30       | Workshop                                            | 0 | 0 | 3 | 2         |
|              | <b>Total Credits</b>                                |   |   |   | <b>30</b> |

**B.E. COMPUTER SCIENCE AND ENGINEERING  
FIRST SEMESTER**

| Subject Code | Name of the Subject                         | L | T | P | Credit    |
|--------------|---------------------------------------------|---|---|---|-----------|
| 13FY11       | Mathematics-I                               | 3 | 1 | 0 | 4         |
| 13FY12       | Technical English                           | 2 | 0 | 2 | 3         |
| 13FY13       | Engineering Physics                         | 3 | 0 | 0 | 3         |
| 13FY14       | Engineering Chemistry                       | 3 | 0 | 0 | 3         |
| 13FY15       | (S-1)Basic Civil and Mechanical Engineering | 4 | 0 | 0 | 4         |
| 13FY16       | (S-6)Fundamentals of Electrical Engineering | 3 | 0 | 0 | 3         |
| 13FY27       | Engineering Graphics                        | 1 | 0 | 3 | -         |
| 13FY28       | Physics Laboratory                          | 0 | 0 | 3 | -         |
| 13FY29       | Chemistry Laboratory                        | 0 | 0 | 3 | -         |
| 13FY30       | Workshop                                    | 0 | 0 | 3 | -         |
|              | <b>Total Credits</b>                        |   |   |   | <b>20</b> |

**SECOND SEMESTER**

| Subject Code | Name of the Subject                                 | L | T | P | Credit    |
|--------------|-----------------------------------------------------|---|---|---|-----------|
| 13FY21       | Mathematics-II                                      | 3 | 1 | 0 | 4         |
| 13FY22       | Professional English/German                         | 2 | 0 | 2 | 3         |
| 13FY23       | Materials Science                                   | 3 | 0 | 0 | 3         |
| 13FY24       | Principles of Environmental Science and Engineering | 3 | 0 | 0 | 3         |
| 13FY25       | (S-15)C Programming Theory and Practice             | 2 | 0 | 3 | 4         |
| 13FY26       | (S-12)Fundamentals of Digital Computers             | 2 | 0 | 3 | 4         |
| 13FY27       | Engineering Graphics                                | 1 | 0 | 3 | 4         |
| 13FY28       | Physics Laboratory                                  | 0 | 0 | 3 | 2         |
| 13FY29       | Chemistry Laboratory                                | 0 | 0 | 3 | 2         |
| 13FY30       | Workshop                                            | 0 | 0 | 3 | 2         |
|              | <b>Total Credits</b>                                |   |   |   | <b>31</b> |

**B.Tech. INFORMATION TECHNOLOGY  
FIRST SEMESTER**

| Subject Code | Name of the Subject                         | L | T | P | Credit    |
|--------------|---------------------------------------------|---|---|---|-----------|
| 13FY11       | Mathematics-I                               | 3 | 1 | 0 | 4         |
| 13FY12       | Technical English                           | 2 | 0 | 2 | 3         |
| 13FY13       | Engineering Physics                         | 3 | 0 | 0 | 3         |
| 13FY14       | Engineering Chemistry                       | 3 | 0 | 0 | 3         |
| 13FY15       | (S-1)Basic Civil and Mechanical Engineering | 4 | 0 | 0 | 4         |
| 13FY16       | (S-6)Fundamentals of Electrical Engineering | 3 | 0 | 0 | 3         |
| 13FY27       | Engineering Graphics                        | 1 | 0 | 3 | -         |
| 13FY28       | Physics Laboratory                          | 0 | 0 | 3 | -         |
| 13FY29       | Chemistry Laboratory                        | 0 | 0 | 3 | -         |
| 13FY30       | Workshop                                    | 0 | 0 | 3 | -         |
|              | <b>Total Credits</b>                        |   |   |   | <b>20</b> |

**SECOND SEMESTER**

| Subject Code | Name of the Subject                                 | L | T | P | Credit    |
|--------------|-----------------------------------------------------|---|---|---|-----------|
| 13FY21       | Mathematics-II                                      | 3 | 1 | 0 | 4         |
| 13FY22       | Professional English/German                         | 2 | 0 | 2 | 3         |
| 13FY23       | Materials Science                                   | 3 | 0 | 0 | 3         |
| 13FY24       | Principles of Environmental Science and Engineering | 3 | 0 | 0 | 3         |
| 13FY25       | (S-15)C Programming Theory and Practice             | 2 | 0 | 3 | 4         |
| 13FY26       | (S-12)Fundamentals of Digital Computers             | 2 | 0 | 3 | 4         |
| 13FY27       | Engineering Graphics                                | 1 | 0 | 3 | 4         |
| 13FY28       | Physics Laboratory                                  | 0 | 0 | 3 | 2         |
| 13FY29       | Chemistry Laboratory                                | 0 | 0 | 3 | 2         |
| 13FY30       | Workshop                                            | 0 | 0 | 3 | 2         |
|              | <b>Total Credits</b>                                |   |   |   | <b>31</b> |



## **LIST OF ELECTIVE SUBJECTS**

- (S-1) Basic Civil and Mechanical Engineering
- (S-2) Engineering Mechanics
- (S-3) Building Materials
- (S-4) Basics of Thermodynamics
- (S-5) Basic Electrical Engineering
- (S-6) Fundamentals of Electrical Engineering
- (S-7) Electrical Engineering
- (S-8) Electric Circuits
- (S-9) Circuit Theory
- (S-10) Basic Electronics and Communication Engineering
- (S-11) Electron Devices and Circuits
- (S-12) Fundamentals of Digital Computers
- (S-13) Basic Computer Engineering
- (S-14) Basic C Programming
- (S-15) C Programming - Theory and Practice
- (S-16) Chemistry for Chemical Engineers

## **LANGUAGE ELECTIVE**

- (L-1) Professional English
- (L-2) German

**PHYSICAL EDUCATION IS COMPULSORY**

# **SYLLABI**



## 13FY11 MATHEMATICS - I

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### ASSESSMENT : THEORY

#### OBJECTIVE

1. *To incorporate the ideas of calculus that are imperative for the efficient understanding of Engineering subjects.*
2. *To enrich the concepts of ordinary differential equations that are vital for the study of Engineering subjects.*
3. *To inculcate the concepts of Matrices and Hyperbolic functions which have a direct leverage over all branches of Engineering and its study.*
4. *To imbibe the concepts of solid geometry which are inevitable for the study of Engineering subjects.*
5. *The topics introduced and discussed will serve as basic tools for specialized studies in many Engineering fields.*

#### OUTCOME

1. *At the end of this course the students will be familiar in applying advanced calculus ideas to solve Engineering problems.*
2. *They will be capable of applying Ordinary differential equations in modeling and solving Engineering problems.*
3. *They will possess adequate knowledge in Matrices & Hyperbolic functions to analyze and study.*
4. *They will be able to solve problems related with the above mentioned areas and identify these in their disciplines wherein the ideas could be directly applied.*

### MATRIX AND HYPERBOLIC FUNCTIONS

Eigenvalues and eigenvectors-Cayley Hamilton theorem (without proof) - Application to find the inverse and higher powers of a matrix-Diagonalization-Quadratic forms-Orthogonal reduction to canonical form - Hyperbolic and inverse hyperbolic functions-properties. **(9)**

## **DIFFERENTIAL CALCULUS**

Curvature-Evolutes-Envelopes-Functions of two variables-Expansions and extreme values-Constrained extrema using Lagrange's multiplier method. **(9)**

## **INTEGRAL CALCULUS**

Beta - Gamma integrals-properties-Double and triple integrals-changing the order of integration-Jacobian of transformation-Application to areas and volumes. **(9)**

## **ORDINARY DIFFERENTIAL EQUATIONS**

Second and higher order linear differential equations with constant coefficients- variable coefficients-Euler Cauchy type-Linear Simultaneous equations-Method of variation of parameters.

Applications of Differential equations-Electrical circuits-Simple harmonic motion-Resisted vertical motion. **(9)**

## **SOLID GEOMETRY**

Equation of a sphere- Plane section of a sphere- Tangent plane-Orthogonal spheres- Equation of a cone- Right circular cone- Equation of a cylinder- Right circular cylinder. **(9)**

**Theory : 45**

**Tutorial : 15**

**Total : 60**

## **TEXT BOOKS**

1. Kandasamy, P. et al., "Engineering Mathematics for first year B.E/ B.Tech", (9<sup>th</sup> revised edition), S. Chand & Co - (2011).
2. Veerarajan T. "Engineering Mathematics" (For Semesters I & II) (Third Edition), Tata McGraw - Hill Education Private Ltd., - (2012).
3. Venkataraman, M.K, "Engineering Mathematics", (First year), The National Publishing Company - (2008).

## **REFERENCE BOOKS**

1. Erwin Kreyszig, "Advanced Engineering Mathematics", (10<sup>th</sup> Edition), Wiley India Pvt Ltd- (2011).
2. Grewal, B.S, "Higher Engineering Mathematics" (42<sup>nd</sup> Edition), Khanna Publishers - (2012).

## 13FY12 - TECHNICAL ENGLISH

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 2 | 3 |

### ASSESSMENT : THEORY AND PRACTICAL

#### OBJECTIVE

- 1 *To comprehend the rules of grammar and usage that underpins the patterns of language use.*
- 2 *To enhance the efficiency and effectiveness of communication skills in varied situations.*
- 3 *To familiarize students with the sounds of English and their symbols and introduce them to word stress, sentence stress and intonations.*
- 4 *To inculcate clear and effective Public Speaking Skills.*

#### OUTCOME

*At the end of the semester the students will*

- 1 *Use the structures and produce language fluently, easily and accurately.*
- 2 *Equip themselves with the fundamentals of communication and overcome the barriers of communication.*
- 3 *Perceive effectively the different speech sounds.*
- 4 *Learn the art of Public Speaking.*

#### FOCUS ON LANGUAGE: GRAMMAR & VOCABULARY

Changing Words from one form to another - Word Formation: Prefixes & Suffixes - Synonyms and Antonyms - Idioms - Phrasal Verbs - Nouns-Compound Nouns & Noun Phrases - Gerunds & Infinitives - Subject-verb Agreement- Tenses - Adjectives - Degrees of Comparison - Dictionary Skills. **(6)**

#### TECHNICAL COMMUNICATION

Importance of Communication - Basics of Communication - Communication Skills-LSRW - Effective Communication - Modes of Communication - Importance of Technical Communication - Barriers to Communication: Noise - Classification of Barriers - Filters -

Objective & Characteristics of Technical Communication - Process of Communication - Levels of Communication - Flow of Communication - Communication Networks - Visual Aids in Technical Communication. **(5)**

## **READING**

Purpose of Reading - Reading Rates - Reading & Interpreting Ideas - Interpreting Graphics in Technical Writing - Intensive & Extensive Reading- Reading Comprehension - Techniques for Good Comprehension - Skimming & Scanning - Sequencing of Sentences. **(4)**

## **WRITING**

Audience Recognition/ Analysis - Language - Elements of Style - Techniques for Good Writing - Referencing & Styling - Right Words and Phrases - Paragraph Construction - Paragraph Patterns - Kinds of Paragraph - Writing a First Draft, Revising & Finalizing - Steps to Effective Précis Writing - Process Description - Dialogue Writing. **(6)**

## **LISTENING**

Importance of Listening & Empathy in Communication - Reasons for Poor Listening - Traits of a good listener - Listening modes - Short Dialogues - Short Conversation. **(4)**

## **SPEAKING**

Achieving Confidence, Clarity & Fluency - Paralinguistic Features - Barriers to Speaking - Types of Speaking - Persuasive Speaking - Public Speaking - Conversations - Telephonic Conversations & Etiquette - Effective Presentation Strategies - Planning - Outlining & Structuring - Nuances of Delivery - Controlling Nervousness & Stage Fright - Visual Aids in Presentation - Applications of MS Power Point. **(5)**

**PRACTICAL SESSIONS BASED ON THE ABOVE SYLLABUS: 30**

**Total : 60**



## **TEXT BOOK**

1. Meenakshi Raman, Sangeeta Sharma, "Technical Communication - Principles and Practice", 2nd edition, Oxford University Press, New Delhi, 2012.

## **REFERENCE BOOKS**

1. Ronald Carter, Michael McCarthy. "Cambridge Grammar of English" Cambridge University Press, 2011.
2. Michael McCarthy and Felicity O'Dell, "English Vocabulary in Use", Cambridge University Press, 2012.
3. Mark Ibbotson. "Cambridge English for Engineering" Cambridge University Press, 2012.
4. Krishna Mohan, MeeraBanerji. "Developing Communication Skills" Macmillan Publishers, 2012.

## **ASSESSMENT PROCEDURE**

| <b>THEORY :</b>     |   | Weightage |
|---------------------|---|-----------|
| Final Examination   | = | 40%       |
| Internal Assessment | = | 10%       |

## **PRACTICAL :**

|                       |   |     |
|-----------------------|---|-----|
| Continuous Assessment | = | 50% |
|-----------------------|---|-----|

## 13FY13 ENGINEERING PHYSICS

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To know and understand about architectural acoustics, production of ultrasonics and their applications in NDT, basic concepts and theory of LASER and their applications, structure of optical fiber and propagation of light through optical fiber, wave function, Schrodinger's equations and different electron microscopes, crystallographic parameters, coordination number, packing factor for crystal structures and crystal imperfections.*

#### OUTCOME

- *Gain knowledge about architectural acoustics and ultrasonic waves.*
- *Understanding the concept, theory and different types of LASER and their applications.*
- *Gain knowledge about structure of optical fiber and propagation of light through optical fiber*
- *Understanding about wave function, Schrodinger's equations and different electron microscopes.*
- *Gain knowledge about crystal structures and crystal defects*

#### ACOUSTICS AND ULTRASONICS

Reverberation - Reverberation time - Sabine's formula - Absorption coefficient and its determination - Factors affecting the acoustics of the buildings and their remedies- Production of ultrasonic waves- Magnetostriction and Piezoelectric methods - Properties - Detection - Thermal and Piezoelectric methods, Determination of velocity of ultrasonic waves in liquids using acoustic grating - applications-SONAR, Non destructive testing. **(10)**

#### LASERS

Absorption and emission - Spontaneous emission - Stimulated emission - Population inversion - Sources of excitation - Active

medium - Resonant cavity - Einstein's theory of stimulated emission - Nd-YAG laser - CO<sub>2</sub> laser - Semiconductor laser - Applications - 3D profiling, laser drilling and laser welding. **(9)**

## **FIBER OPTICS**

Optical fiber - Advantages of optical fiber as wave guide and propagation of light in optical fibers - Numerical aperture and acceptance angle - Structure of optical fiber - Fiber optical materials - Types of optical fibers - Single and multimode fibers - Step index and graded index fibers - Applications - Fiber optic communication system, Fiber endoscope. **(9)**

## **QUANTUM PHYSICS**

Compton effect - Expression for Compton shift - Concept of matter waves - Physical significance of wave function - Schrödinger's wave equation - Time independent and time dependent equation - Eigen values and eigen function - Particle in a box (one dimension)- Scanning electron microscope (SEM)- Transmission electron microscope (TEM). **(9)**

## **CRYSTAL STRUCTURE**

Space lattice- Unit cell - Bravais Lattices- Miller indices- d-spacing in cubic lattice, coordination number, packing factor for SC, BCC, FCC and HCP structures, crystal imperfections- point and line defects. **(8)**

**Total : 45**

## **TEXT BOOKS**

1. V.Rajendran., Engineering Physics, Tata McGraw Hill, Publishing Company, New Delhi, 2011.
2. Gaur R K and Gupta S L, Engineering Physics, DhanpatRai Publications Pvt. Ltd, New Delhi, 2006.

## **REFERENCE BOOKS**

1. Avadhanulu M.N, Engineering Physics - Volume 1, S. Chand & Company Ltd., New Delhi, 2010.
2. S. Jayakumar, Engineering Physics, RK Publishers, Coimbatore, 2007.
3. S. Ganesan and N. Iyandurai, Engineering Physics - I, Gems Publishers, Coimbatore, 2009.

## 13FY14 ENGINEERING CHEMISTRY

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

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

#### OUTCOME

- *The student will be conversant with the principles, water characterization and treatment of potable and industrial purpose, engineering applications of polymers, implication of corrosion and application of analytical techniques.*

### WATER TREATMENT

Hardness of water-units of hardness, Estimation of hardness-EDTA method. Boiler troubles-sludge and scale formations, boiler corrosion, caustic embrittlement, priming and foaming. Softening methods-Zeolite process, Ion exchange process. Drinking water treatment-removal of impurities, disinfection, Break-point chlorination.Desalination by electrodialysis and reverse osmosis methods. **(9)**

### FUELS AND COMBUSTION

Classification of fuels-calorific value, units of heat, Gross and Net calorific values. Determination of calorific value by Bomb calorimeter-Dulong's formula- theoretical calculation of calorific value. Coal-types of coal-Analysis of coal-Proximate analysis and ultimate analysis-Metallurgical coke- carbonization, Manufacture-Otto Hoffmann's by-product oven method .Petroleum-Refining of crude oil, Knocking-Octane number and Cetane number. LPG - composition - characteristics and advantages. CNG - composition characteristics applications - advantages over LPG. **(9)**

## **CORROSION AND ITS CONTROL**

Introduction - mechanism of corrosion - chemical corrosion, electrochemical corrosion - Differential aeration corrosion - Pilling Bedworth rule - factors influencing corrosion. Corrosion control- cathodic protection - sacrificial anodic protection method - Impressed current cathodic protection - use of inhibitors. Protective coatings - Metallic coatings - anodic and cathodic coatings - Methods of application of metal coatings. Organic coatings - paints, varnishes, emulsion paints - Special paints : Luminescent paint, Heat - resistant paint, Fire - retardant paint, Water repellent paint, Antifouling paint.

**(9)**

## **POLYMER CHEMISTRY**

Polymerisation - Introduction - Degree of polymerization, functionality - Effect of polymer structure on properties. Mechanical properties of polymers - plastics - thermoplastics and thermosets - Silicone polymers - types and uses - polyurethanes - vulcanization of rubber - synthetic rubbers - styrene rubber, nitrile rubber and reclaimed rubber - reinforced plastics - polymers in medicine and surgery. Polymer composites - types - polymer composite matrixes - examples - applications of FRP.

**(9)**

## **ANALYTICAL CHEMISTRY**

Lambert's law, Beer-Lambert's law, Theory of colorimetry and spectrophotometry - Determination of Nickel by colorimetry - Determination of ferric ion by spectrophotometry, Theory of flame photometry - Estimation of sodium by flame photometry, Theory of conductometric titrations - Determination of mixture of acids by conductometric titration, Theory of potentiometric titration - Estimation of ferrous ion by potentiometry, pH measurements - Estimation of hydrochloric acid by pH measurements.

**(9)**

**Total : 45**

## **TEXT BOOKS**

1. Jain, P. C. and Monikka Jain, "Engineering Chemistry" - Dhanpat Rai & Co. (2011).
2. Dara, S. S., "A Text book of Engineering Chemistry"- S Chand & Company Ltd (2011).

## **REFERENCE BOOKS**

1. Chawla. S., "A Text book of Engineering Chemistry"- Dhanpat Rai & Co. (2010).
2. Sharma, B. K. "Engineering Chemistry" - Krishna Prakashan Media (P) Ltd (2011).

## 13FY21 MATHEMATICS-II

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### ASSESSMENT : THEORY

#### OBJECTIVE

1. *To incorporate the Laplace Transforms ideas that are imperative for the efficient understanding of engineering subjects.*
2. *To impart the concepts of Fourier series that are vital for the study of various disciplines of Engineering.*
3. *To inculcate the concepts of Vector Calculus which have a direct leverage over various disciplines of Engineering and its applications.*
4. *To fertilize the concepts of Theory of equations and Difference Calculus which are inevitable for the study of Engineering subjects.*
5. *The topics introduced and discussed will serve as basic tools for specialized studies in many Engineering fields.*

#### OUTCOME

1. *At the end of this course the students will be familiar in applying vector calculus ideas to solve various problems in their disciplines.*
2. *They will be capable of applying Laplace transforms ideas in modeling and solving the problems in their fields.*
3. *They will possess adequate knowledge in Fourier series & Theory of equations to analyze and solve problems.*
4. *They will be able to solve problems related with the above mentioned areas and identify these in their disciplines wherein the ideas could be directly applied.*

#### THEORY OF EQUATIONS

Relation between the roots and the coefficients-Symmetric functions of the roots -Transformation of equations-Reciprocal equations-Solution of algebraic and transcendental equations by Newton-Raphson method-polynomial equations by Graeffe's root squaring method and Horner's method. **(9)**



## **DIFFERENCE CALCULUS**

Finite differences-operators and their interrelations- Interpolations-Newton's and Lagrange's method, Numerical differentiation based on Newton's formula, Numerical integration-Trapezoidal and Simpson's  $1/3^{\text{rd}}$  rule-Solutions of finite difference equations with constant coefficients. **(9)**

## **VECTOR CALCULUS**

Vector differentiation - gradient - divergence - curl - physical interpretation and identities.Vector integration-line-surface and volume integrals. Gauss, Stoke's and Green's theorems (without proof)-applications. **(9)**

## **LAPLACE TRANSFORMS**

Transform of standard functions-Transform of unit step, dirac delta, error and periodic functions-Initial and final value theorems-Inverse transforms and their properties-Convolution theorem-Applications to ordinary differential equations and integral equations. **(9)**

## **FOURIER SERIES**

Dirichlet's conditions-Full range series-Half range series-Complex form of series-Parseval's identity -Harmonic analysis. **(9)**

**Theory : 45**

**Tutorial : 15**

**Total : 60**

## **TEXT BOOKS**

1. Kandasamy, P. et al., "Engineering Mathematics for first year B.E/ B.Tech", (9<sup>th</sup> revised edition), S Chand & Co - (2011).
2. Veerarajan, T, "Engineering Mathematics" (For Semesters I & II) (Third Edition), Tata McGraw - Hill Education Private Ltd., - (2012).
3. Venkataraman, M.K, "Engineering Mathematics", (First year), The National Publishing Company - (2008).

## **REFERENCE BOOKS**

1. Erwin Kreyszig, "Advanced Engineering Mathematics", (10<sup>th</sup> Edition), Wiley India Pvt Ltd- (2011).
2. Grewal, B.S, "Higher Engineering Mathematics" (42<sup>nd</sup> Edition), Khanna Publishers - (2012).

## 13FY22 - PROFESSIONAL ENGLISH

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 2 | 0 | 2 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To enhance vocabulary and gain knowledge in technical grammatical patterns.*
- *To acquire the skills in the key areas of communication viz., socializing, telephoning and negotiations.*
- *To enable the students to acquire proficiency in speaking and writing skills for various professional purposes.*
- *To develop team playing, problem-solving, decision-making, planning, organizing, self-learning, and self-management skills, providing a practical approach to communication at workplace.*

#### OUTCOME

*At the end of the semester the students will*

- *Produce appropriate and accurate language for transactions of various kinds.*
- *Integrate what they have learned into everyday communication activity at workplace.*
- *Utilize the critical ability to have a better comprehension of communication.*
- *Perceive work ethics and work culture.*

#### FOCUS ON LANGUAGE: ENGLISH GRAMMAR & VOCABULARY

One Word Substitutes - Homophones - Homonyms - Eponyms - Direct Indirect Speech - Active Passive Voice - Conditional Sentences - Adverbs - Conjunctions - Prepositions - Articles - Relative Clause - Pronouns - Cause and Effect Expressions - Purpose and Function.

**(5)**

## **BUSINESS ENGLISH**

Cultural Diversity and Socializing: Building a relationship - Culture and Entertainment - Telephoning Skills: Preparing to make a Telephone Call - Receiving Calls - Taking and Leaving Messages - Asking for and Giving Repetition - The Secretarial Barrier - Cross-Cultural Communication on the Telephone - Setting up Appointments - Changing Arrangements - Ending a Call - Cross-cultural Communication on the Telephone - Problem-solving on the Telephone - Complaints - Negotiations: Types of Negotiation - Preparation for a Negotiation - Making an Opening Statement - Bargaining and Making Concessions - Accepting and Confirming - Summarizing and Looking Ahead - Types of Negotiator - Dealing with Conflict - Rejecting - Ending the Negotiation. **(5)**

## **READING**

Summarizing - SQ3R Reading Technique - Note Making: Outline/Linear Method- Sentence Method - Schematic/Mapping Method - Understanding Discourse Coherence - Non-Verbal Signals - Cloze Comprehension - Critical Reading: Creative and Critical Thinking. **(4)**

## **WRITING**

Essays - Letter Writing - Business Letters - Cover Letters - Resumes - Memos - Emails - Reports - Technical Proposals - Instructions & Recommendation - Technical Description - Checklist. **(6)**

## **LISTENING**

Types of Listening - Barriers of Effective Listening - Listening & Note Taking - Intensive Listening. **(4)**

## **SPEAKING**

Group Communication: Forms of Group Communication - Using Body Language in Group - Discussions - Group Discussions - Organizational GD - GD as a Part of Selection Process - Meetings - Conferences - Symposia & Seminars - Negotiation - Interviews:

Objectives of Interviews - Types of Interviews - Job Interviews -Media Interviews - Press Conference. **(6)**

**PRACTICAL SESSIONS BASED ON THE ABOVE SYLLABUS : 30**

**Total : 60**

### **TEXT BOOK**

- Meenakshi Raman, Sangeeta Sharma, "Technical Communication - Principles and Practice", 2<sup>nd</sup> edition, Oxford University Press, New Delhi, 2012.

### **REFERENCE BOOKS**

- Simon Sweeney, "English for Business Communication", Cambridge University Press, 2010.
- NagarajGeetha, "A Course in Grammar and Composition", Cambridge University Press, 2012.
- Samson T, "Innovate with English", Cambridge University Press, 2012.
- Mark Ibbotson. "Cambridge English for Engineering" Cambridge University Press, 2012.
- B. Sai Lakshmi. "Poly Skills- A Course in Communication and Life Skills" Cambridge University Press, 2012.

# GERMAN

## DEUTSCH-EIN GRUNDKURS GERMAN- A BASIC COURSE

### 1. EINFÜHRUNG

Begrüßung - Name - Vorname - Familienname - Anrede

### 2. THEMA

Hallo! Wie geht's?

Begegnungen

Guten Tag, ich suche...,

Im Supermarkt

Arbeit und Freizeit

Familie und Haushalt

### 3. GRAMMATIK

Position des Verbs : Aussage, W- Frage und

Ja/ Nein - Frage; Artikel die der das.

W- Frage; Konjugation in Präsens;

Nominativ : bestimmter, unbestimmter und negativer Artikel

Akkusativ : unbestimmter und negativer Artikel

Adjektive : Akkusativ-Ergänzung

Artikel als Pronomen

Dative - Ergänzung : Personalpronomen und Ortsangaben;  
Imperativ

Modalverben; Ortsangaben; Richtungsangaben;

Zeitangaben; Ordinalzahlen

Possessiv- Artikel; trennbare und nicht trennbare Verben;

Wechselpräpositionen

Unterricht 50 + Teste 10 = 60 Stunden

## **Lehrbuch**

- \* Studio d A1: Kurs - und Übungsbuch  
(Deutsch als Fremdsprache)  
Cornelsen Verlag.
- \* Tangarm aktuell 1 : Kursbuch + Arbeitsbuch  
(Deutsch als Fremdsprache)  
Max Hueber Verlag

## **GERMAN A BASIC COURSE**

Basic course in German will enable the students to apply the new language actively and creatively. This text book aims for a communicative competence and provides the basic skills required to learn this language. In view of the limited number of hours and restricted lessons, the testing of learners is based on grammar topics covered in this syllabus.

## 13FY23 - MATERIALS SCIENCE

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To understand the basic properties of conducting and dielectric materials, the basic behavior and theory of semiconductor materials, superconducting materials and magnetic materials, to gain basic knowledge about nanomaterials, shape memory alloys and liquid crystal displays.*

#### OUTCOME

- *Gain knowledge about conducting and dielectric materials.*
- *Understand the basic properties and behavior of semiconducting materials.*
- *Understand the basic properties, and applications of superconducting materials.*
- *Gain knowledge about magnetic materials and their applications.*
- *Have an understanding about nanomaterials, shape memory alloys and liquid crystal displays.*

### CONDUCTING AND DIELECTRIC MATERIALS

Conductors - classical free electron theory of metals - Electrical and thermal conductivity-Wiedemann - Franz law - Lorentz number - Drawbacks of classical free electron theory. Electrical susceptibility - dielectric constant - electronic, ionic, orientational and space charge polarization - frequency and temperature dependence of polarization - internal field - Clausius- Mosotti relation (derivation). **(10)**

### SEMICONDUCTING MATERIALS

Intrinsic and extrinsic semiconductors - Direct band gap and indirect band gap semiconductors - Fermi level - Variation of Fermi level with temperature in intrinsic semiconductor, variation of Fermi



level with temperature and impurity concentration in extrinsic semiconductors (no derivation) - Expression for conductivity - Variation of electrical conductivity with temperature - Determination of band gap energy of intrinsic semiconductors. **(9)**

## **SUPERCONDUCTORS AND ITS APPLICATIONS**

Superconductors - Properties of superconductors, electrical resistance, and diamagnetic property - Effect of magnetic field, heavy current and pressure - Josephson's effect - Isotope effect - BCS theory - Type I and type II superconductors - High temperature superconductors - Applications - SQUID, cryotron and magnetic levitation. **(8)**

## **MAGNETIC 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 - principle of magnetic recording and readout - magnetic hard disc. **(8)**

## **NANOTECHNOLOGY AND NEW ENGINEERING MATERIALS**

Nanomaterials - Preparation of nano materials - Physical vapour deposition - sol gel method - properties of nano particles - applications - Shape memory alloys - characteristics and applications of shape memory alloy - Liquid crystal display - Twisted nematic display - metallic glasses - preparation, properties and applications. **(10)**

**TOTAL : 45**

## **TEXT BOOKS**

1. V.Rajendran, Engineering Physics, Tata McGraw Hill publishing Company, New Delhi, 2011.
2. Avadhanulu. M.N, Engineering Physics Vol II, S. Chand & Company Ltd., New Delhi 2011.

## **REFERENCE BOOKS**

1. Ali Omar. M, Elementary Solid State Physics, Pearson Education Inc., and Dorling Kindersley Publishing Inc., 2009.
2. Pillai. S.O, Solid State Physics, New Age International Pvt. Ltd, 2009.

## 13FY24 PRINCIPLES OF ENVIRONMENTAL SCIENCE AND ENGINEERING

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *This course is intended to provide a basic knowledge of the environment, threat to environment, social issues related to it, the necessity for Environmental Legislation, Sustainable Development and the option of Biotechnology and Green Chemistry.*

#### OUTCOME

- *After successful completion of the course, the student will understand the concept of environment, the causes for deterioration, the measure taken for its preservation and the need for Sustainable Development.*

### ENVIRONMENTAL CHEMISTRY

Chemistry and Environment - Environmental segments - Composition and Characteristics of Atmosphere, Hydrosphere, Lithosphere, and Biosphere: Chemical species and particulates present in the environment - reactions in the atmosphere. Photochemical smog. Impact of man on environment. Impact of Environment upon humans. **(9)**

### ECOSYSTEMS AND BIODIVERSITY

Concepts of an ecosystem: types, structure and functions of the ecosystem. Food chains, food webs and ecological pyramids. Biodiversity: Definition - Genetic, species, ecosystems and landscape diversities - India as a mega diversity nation - Hot spots of biodiversity. Importance of biodiversity - loss of biodiversity - causes of reduction in biodiversity. Conservation of biodiversity - restoration of biodiversity. **(9)**

## **ENVIRONMENTAL POLLUTION**

Sources, causes, effects and management of Air, Water, Soil, Marine, Noise and Radioactive pollution. Sources of Solid, Hazardous, Biomedical and Chemical wastes. Solid Waste Disposal and treatment methods. **(9)**

## **ENERGY AND ENVIRONMENT**

Energy resources - Growing energy needs - renewable and nonrenewable energy sources - use of alternate energy sources - Solar, Wind, Tidal, Geothermal and OTEC (Principles only) merits and limitations. **(3)**

## **SOCIAL ISSUES AND ENVIRONMENT**

Sustainable development - Urban Population - problems related to energy - Water Conservation. Rainwater harvesting - Environment Ethics - Green house effect, Global warming, Climate change, Nuclear hazards and accidents. Issues involved in enforcement of environment legislation - Precautionary principle - Polluter pays principle - Beneficiary pays principle - role of an individual in Environment protection - Environment (Protection) Act - Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act and Forest (Conservation) Act. **(6)**

## **HUMAN POPULATION AND ENVIRONMENT**

Population growth - Variation among nations - Population explosion - Effects of population explosion - Indian Scenario. **(3)**

## **BIOTECHNOLOGY AND GREEN CHEMISTRY**

Biotechnology and its applications in environmental protection - Bioinformatics - Bioremediation. Biological purification of contaminated air. Green chemistry for clean technology: Significance of green chemistry - Basic components of Green chemistry. Industrial applications of green chemistry. Green fuels - e - green propellants and Biocatalysts. **(6)**

**Total : 45**

## **TEXT BOOKS**

1. Dara, S.S., Mishra, D.D. "A text Book of Environmental Chemistry and pollution control", Ninth Revised Edition, S.Chand & Company Ltd., 2011.
2. Benny Joseph, "Environmental Studies", Tata McGraw Hill Publishing Company Ltd., 2010.
3. Surinder Deswal and Anupama Deswal, "A Basic Course in Environmental Studies", Dhanpat Rai & Co. (P) Ltd., 2010.

## **REFERENCE BOOKS**

1. Kaushik, A. and Kaushik, C.P., "Environmental Science and Engineering", 3<sup>rd</sup> Edition, New Age International (P) Limited Publishers, 2009.
2. Linda D. Williams "Environmental Science demystified", Tata McGraw Hill Publishing Company Ltd., 2008.

## 13FY27 - ENGINEERING GRAPHICS

| L | T | P | C |
|---|---|---|---|
| 1 | 0 | 3 | 4 |

### ASSESSMENT : PRACTICAL

#### OBJECTIVE

*This is a fundamental course on graphics, which is the language of engineers, aimed at preparing the first year students with an appropriate breadth and depth of technical knowledge necessary to work effectively in the society.*

#### OUTCOME

- *Student's ability in hand-lettering and basic sketching techniques will improve*
- *Student's ability to use architectural and engineering scales will improve*
- *Student's ability to convert sketches to engineered drawings will increase*
- *Students will become familiar with office practice and standards*
- *An ability to apply knowledge of mathematics, science and engineering*
- *An ability to function on multidisciplinary teams*

Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, conic sections including the rectangular hyperbola (general method only); Cycloid, epicycloid, hypocycloid and involute; Scales - plain, diagonal and vernier Scales. **(23)**

Orthographic Projections: Principles of Orthographic Projections - Conventions - Projection of points and lines, inclined to both planes; Projection of planes - inclined Planes - auxiliary planes. **(15)**

Projection of Regular Solids: Inclined to both the Planes - Auxiliary Views. **(15)**

Sections and Sectional Views of Right Angular Solids - Prism, cylinder, pyramid, cone - Auxiliary Views; Development of surfaces of right regular solids - Prism, pyramid, cylinder and cone. **(15)**

Isometric Projections - Principles of isometric projection - Isometric scale, isometric views, conventions; Isometric views of lines, planes, simple and compound solids; Conversion of isometric views to orthographic views and vice-versa, conventions. **(15)**

Perspective Projections - applications of perspective projections - visual ray method and vanishing point method. **(10)**

Plan, elevation and section of single storied residential / office building with flat RCC roof and brick masonry walls having not more than two rooms (Planning/ Designing is not expected in this course). **(15)**

Introduction to computer aided graphics - AutoCAD - formatting commands, basic drawing entities - exercise on simple 2D drafting. **(12)**

**TOTAL : 120**

## **REFERENCE BOOKS**

1. Bhatt N.D., Panchal V.M., Engineering Drawing, Charotar Publishing House, 2010.
2. Shah M.B., Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3. Dhawan R.K., A Text Book of Engineering Drawing, S. Chand Publications, 2012.
4. Narayana K.L., Kannaiah P., Venkat Reddy K., Text book on Engineering Drawing, Scitech Publishers, 2012.
5. Venugopal K., Engineering Drawing and Graphics + AutoCAD, New Age International, 2007.

## 13FY28 PHYSICS LABORATORY

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 2 |

### ASSESSMENT : PRACTICAL

#### OBJECTIVE

- *To make students to understand basic concepts of properties of matter, light, electricity, magnetism and semiconductor physics by carrying out experiments.*

#### OUTCOME

- *The practical classes provide hands-on working with the equipment to make physics real to the student. The experiments will make the students to understand how the basic concepts of physics are used in applications.*

#### LIST OF EXPERIMENTS

1. Torsional pendulum - Rigidity modulus
2. Air wedge -Thickness of thin wire
3. Spectrometer - Dispersive power
4. Potentiometer - Ammeter and Voltmeter calibration
5. Figure of merit of galvanometer
6. Post office box - Temperature coefficient of resistance
7. Magnetic field along the axis of a current carrying coil
8. Implementation of basic logic gates using universal gates
9. Determination of band gap of a semiconductor
10. Determination of particle size using laser
11. Numerical aperture of optical fiber - Fiber optics kit (Demonstration)
12. Characteristics of LED - Fiber optics kit (Demonstration)
13. Determination of resistivity - Carey Foster Bridge
14. Determination of band gap of thermistor
15. Solar cell characteristics



## 13FY29 CHEMISTRY LABORATORY

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 0 | 0 | 3 | 2 |

### ASSESSMENT : PRACTICAL

#### OBJECTIVE

- i) *To help the students to understand the principles involved in complexometric titration.*
- ii) *To learn the principles of analytical instruments such as flame photometry, spectrophotometry, conductometry, pH metry and potentiometry.*
- iii) *To understand and appreciate the working of conductormeter, pH meter spectrophotometer, flame photometer and potentiometer.*

#### OUTCOME

- i) *By performing EDTA titrations, the students could understand how hardness producing salts create boiler troubles and how to quantify hardness producing ions present in raw water.*
- ii) *By the estimation of dissolved oxygen present in water, the student will be able to appreciate how oxygen in water causing corrosion of boiler materials. Students are able to handle analytical tools such as of conductormeter, pH meter, spectrophotometer, flame photometer and potentiometer.*

#### LIST OF EXPERIMENTS

1. Determination of total, permanent and temporary hardness of water by EDTA method.
2. Determination of Alkalinity of water.
3. Estimation of Dissolved Oxygen in water sample
4. Determination of corrosion rate of steel in acid media by weight loss method
5. Estimation of mixture of acids by conductometry.

6. Determination of strength of given HCl using NaOH by pH measurement
7. Determination of equivalent conductance of a strong electrolyte
8. Estimation of ferrous ion by potentiometric titration
9. Determination of sodium by flame photometry
10. Estimation of iron by spectrophotometry

## 13FY30 - WORKSHOP

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 0 | 0 | 3 | 2 |

### ASSESSMENT : PRACTICAL

#### OBJECTIVE

*Workshop practice course is designed to train the students in metal joining process like carpentry, fitting, plumbing, etc. It will impart skill in fabricating simple components using sheet metal with sufficient emphasis on cultivating safety first aspects in handling of tools and equipment. On completion of this course, the students will be able to perform simple sheet metal parts operations. They will also be acquainted to latest tool kits.*

#### OUTCOME

- *Students will be able to use their skills during their project work.*
- *Students will be able to understand the practical difficulties encountered in industries during any assembly work.*
- *Students will be able to do simple electronic and electrical work throughout their carrier.*
- *Students will be able to rectify simple problem connected with pipe fittings.*

#### CARPENTRY

Study of carpentry tools, Exercise on planning, marking, chiselling, half lap joint, dovetail joint, square tongue joint, bridle joint, halving dovetail joint. Demonstration on usage of precompressed wood - awareness to plywood, chip board, laminated boards and sheets. **(18)**

#### FITTING

Study of fitting tools, Exercise on marking, punching and filing, square joint, dovetail joint, V-joint, one side dovetail joint, diagonal square joint and diagonal dovetail joint. **(18)**

## **SHEET METAL**

Study of sheet metal tools, Exercise on development of surfaces - cylinder, rectangular box, tray, dust pan, funnel. **(18)**

## **PLUMBING**

Study of plumbing tools, study of valves and taps, cutting and threading of GI pipes, preparation of saddle connection, T, elbow and union joints. Pumps and foot valve connections. **(18)**

## **ELECTRICAL WIRING AND HOME APPLIANCES**

Study of single and three phase connections - Ammeter, voltmeter, frequency meter, energy meter. Single and three phase lighting and power connection, domestic wiring and soldering. Selection of fuse wire - MCB and earthing as per ISS/IE rules, UPS connections. Installation and maintenance of home appliances - fan and regulator, iron box, mixie, refrigerator, water heater, single phase and three phase motors - safety measures. **(18)**

**TOTAL : 90**

## **REFERENCE BOOKS**

1. Fitter first trade theory - Central Instructional Media Institute, Chennai, Directorate of General Employment and Training, Ministry of Labour, Govt. of India, University Press (India) Ltd, Hyderabad, 2005.
2. Santhakumar S.R.J., "Workshop Practice Manual", Anuradha Agencies Publishers, Kumbakonam, 2004.
3. Swaran Singh S.K., "Workshop Practice", Kataria & Sons, New Delhi, 2004.
4. Basic Machine Shop-Vol-1 by TESWANI, Tata McGraw Hill, 2005.
5. Kannaiah P., Narayana K.L., Workshop Manual, Scitech Publishers, 2009.
6. Venkat Reddy K., Workshop Practice Manual, B.S. Publications, 2008.

## S-1 BASIC CIVIL AND MECHANICAL ENGINEERING

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 0 | 4 |

**ASSESSMENT : PRACTICAL**

### **PART-A CIVIL ENGINEERING**

#### **OBJECTIVE**

- *To impart knowledge about the fundamentals of building sciences and Civil Engineering.*

#### **OUTCOME**

- *The students acquire knowledge about basics of Civil Engineering*

### **BUILDING CONSTRUCTION AND BUILDING MATERIALS**

Building Components -Functions - Requirements - Orientation of Buildings - Principles of Planning.

Building Materials - Stones - Bricks - Cement - Concrete - Steel.

**(8)**

### **SUB STRUCTURES AND SUPER STRUCTURES**

Bearing capacity - Types of foundations - Illustration of wall footing, Isolated footing, Combined footing, Piles and Caissons.

Super structure - Brick and Stone Masonry - Types of flooring - Types of roofing.

**(7)**

### **ROADS AND BRIDGES**

Classification of Roads - Types of Road construction - Flexible and Rigid Pavements - Traffic signs and signals

Classification of bridges - Illustration of Deck slab, T-Beam, Bow String and Trussed bridges.

**(8)**

### **DAMS AND ENVIRONMENTAL ENGINEERING**

Dams - Introduction - Purpose of dams - Components of a reservoir - Selection of site - Classification of dams.

Environmental Engineering - Introduction - Elements of protected water supply - Sewage treatment. (7)

**Total : 30**

### **TEXT BOOKS**

1. Punmia B.C., " Building Construction", Laxmi Publication, New Delhi, 10th edition, 2009
2. Gambir M, NehaJamwal, "Building Materials Products, Properties and Systems" Tata McGraw Hill Publishing Co., New Delhi, 2011.
3. Palanichamy M S, "Basic Civil Engineering", Tata McGraw Hill Publishing Co., New Delhi, 4th edition, 2011.

### **REFERENCE BOOKS**

1. Arora, S.P. and Bindra, S.P., "Building Construction", DhanpatRai& Sons, New Delhi,2005.
2. Duggal SK., "Building Materials", New Age International (P) Ltd., New Delhi, 2008.
3. Khanna.S.K and Justo.C.E.G., "Highway Engineering" , Khanna Publishers, Roorkee, 2001.
4. Krishna Raju.N, "Design of Bridges", Oxford and IBH Publishing companyPvt Ltd, New delhi, 2010.
5. Garg S.K. "Environmental Engineering (Vol-I & II) ", Khanna Publishers, New Delhi, 2010
6. Punmia B.C., "Irrigation and Water Power Engineering", Laxmi Publication, New Delhi, 2009.
7. National building code of India, Parts III, IV, VII & IX, 1983.

## **PART - B - MECHANICAL ENGINEERING**

### **OBJECTIVE**

*This course provides an understanding on fundamentals of mechanical sciences and engineering and its applications by exposing the students to concepts of energy and its conversion, behaviour of fluids and solids under action of forces, basics of design and manufacturing science.*

### **OUTCOME**

- *An ability to apply knowledge of mathematics, science and engineering in real life applications in a global / societal context.*
- *An ability to function on multidisciplinary teams.*
- *An ability to identify, formulate and solve problems using appropriate techniques.*
- *An understanding of professional and ethical responsibility.*
- *A recognition of the need for and an ability to engage in life long learning.*
- *A knowledge of contemporary issues.*
- *An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.*

### **Basic concepts of thermodynamics & fluids**

Zeroth law - relationship between pressure, volume, temperature, heat and work done in a process - PV diagram of various processes. First law of thermodynamics - enthalpy - internal energy - application to open and closed systems. Second law of thermodynamics - efficiency of heat engine, COP of refrigerator. Thermodynamic cycles - vapour cycles - Rankine, air standard cycles - Otto & Diesel cycle - vapour compression cycle - description and simple problems. **(8)**

## **Basics of fluid mechanics & machinery**

Fluid Properties - Density, viscosity, compressibility. Fluid Pressure - Pascal's law - Hydrostatic - manometers - Simple and differential pressure gauges. Buoyancy and stability of floating bodies.

Fluid kinematics - Stream line, classification of flows - steady and unsteady, uniform and non-uniform, laminar and turbulent, rotational and irrotational flows.

Fluid machinery - impulse and reaction turbines - principles and examples. Pumps - positive displacement and centrifugal pumps, reciprocating compressors - working principles. **(7)**

## **Basics of engineering design**

Mechanics - types of loading patterns on a structure. Force system - simple stress - strain curve for ductile and brittle materials - Poisson's ratio - simple problems. Friction - description of power transmission systems - belts, gears, clutches and bearings. Introduction to computers in design and drafting - principles of wire frame, surface and solid models, design simulation and analysis.

**(8)**

## **Basics of manufacturing**

Types of manufacturing process - Foundry, forming, machining and joining. Merits and demerits of these processes. Use of computers in manufacturing - Components of CAM, CAPP, Robotics and allied technologies. **(7)**

**TOTAL : 30**

## **REFERENCE BOOKS**

1. Sawhney G.S., Fundamentals of Mechanical Engineering - Thermodynamics, Mechanics and Strength of Materials, Prentice-Hall of India Pvt. Limited, 2006.



2. Nag P.K., Engineering Thermodynamics, Tata McGraw Hill, 4<sup>th</sup> Edition, 2008.
3. Kumar K.L., Engineering Fluid mechanics, 6<sup>th</sup> Edition, S. Chand Ltd., 2008.
4. Bhandari V.B., Design of Machine Elements, 3<sup>rd</sup> Edition, Tata McGraw Hill Education Pvt. Ltd, 2010.
5. Groover M.P., Automation, Production Systems and Computer-Integrated Manufacturing, 3<sup>rd</sup> Edition, Prentice Hall, 2008.

## S-2 ENGINEERING MECHANICS

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### ASSESSMENT : THEORY

#### 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 and the concept of friction. Further he should be able to understand centre of gravity, moment of inertia, kinematics and kinetics of particles, impulse and basics of vibration. All these should be achieved conceptually with worked out examples.*

#### OUTCOME

- *The students will understand the statics and dynamics.*

### STATICS OF PARTICLES

Forces in plane and space - Vector addition of concurrent forces in plane and space-Problems involving the equilibrium of a particle - Free body diagram - Equilibrium of particle in space.

### STATICS OF RIGID BODIES IN TWO DIMENSIONS

Rigid bodies - Two dimensional structure - Moment of force about a point and about an axis - Moment of a couple - Equivalent systems of coplanar forces - Rigid body in equilibrium - Problems involving equilibrium of rigid body. **(9)**

### FRICTION

Laws of friction - Coefficient of friction - Problems involving dry friction - Wedge & ladder friction - Screw jack.

### APPLICATION OF STATICS

Types of supports - Reactions of beams and trusses - Plane roof trusses - Method of joints and sections. **(9)**

## **CENTROID, CENTRE OF GRAVITY AND MOMENT OF INERTIA**

Centroids of areas, composite areas - Determination of moment of inertia of plane figures, polar moment of inertia - Radius of gyration.

**(9)**

## **KINEMATICS OF PARTICLES**

Introduction - Plane, Rectilinear motion - Time dependent motion- Rectangular coordinates - Projectile motion.

## **KINETICS OF PARTICLES**

Equation of motion - Rectilinear motion - Work energy method - Potential energy - Kinetic energy - Conservation of energy. **(9)**

## **IMPULSE & MOMENTUM**

Impulse - momentum principle - Concept of conservation of momentum - Impact -Direct central impact - Oblique central impact

## **INTRODUCTION TO VIBRATION**

Simple Harmonic Motion - Mass spring system-Free vibration (elementary treatment only) **(9)**

**Theory : 45**

**Tutorial : 15**

**Total : 60**

## **TEXT BOOKS**

1. Beer F P and Johnson E R, "Vector Mechanics for Engineers, Statics & Dynamics", Tata Mc-Graw Hill Publishing Co., Ltd., New Delhi, 2007
2. Rajasekaran S and Sankarasubramanian G, "Engineering Mechanics- Statics and Dynamics", Vikas Publishing House Pvt. Ltd., New Delhi, 2005

## REFERENCE BOOKS

1. Natesan S.C., "Engineering Mechanics-Statics and Dynamics", Umesh Publications, New Delhi, 2002.
2. Irving H Shames, "Engineering Mechanics-Statics and Dynamics", IV Edition, Pearson Education Asia Pvt Ltd, 2003
3. Hibbeler R C, "Engineering Mechanics, Voll, Statics and Vol II Dynamics", Pearson Education Asia Pvt Ltd, 2001
4. Bhavikatti S S & Rajasekarappa KG, "Engineering Mechanics", New Age International (P) Ltd., New Delhi, 2008
5. Bansal R K, "Engineering Mechanics", Laxmi Publications (P)., New Delhi, 2007

## S-3 BUILDING MATERIALS

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *At the end of this course the student will be able to understand the properties of stones, bricks, building blocks, timber, steel, paint, bitumen and other special materials. Further the student will be able to understand the importance of cement, mortar and concrete. The student also will be able to understand the uses of all the materials at various stages of construction activities. All these will be achieved by demonstrating the materials visually as well as explaining them in class lectures.*

#### OUTCOME

- *On completion of the course the students will acquire basic knowledge about the building materials*

#### STONES

Classification - Selection - Application of stone in buildings - Requirement and testing of stones - Deterioration and preservation of stone work - common building stones. **(9)**

#### BRICKS AND BUILDING BLOCKS

Manufacture of bricks - Classification - Qualities - Test on bricks - Tiles - Manufacture - Tests - Light weight concrete blocks. **(9)**

#### MORTAR - CEMENT - CONCRETE

Classification of mortar - Preparation - Selection for mortar - Tests for mortars - Manufacture of cement - Types of cement - Characteristics - Aggregates - Basic characteristics - Types of aggregates - Admixtures - Types of concrete. **(9)**

#### TIMBER, STEEL ETC

Timber - Market forms - Industrial timber - Plywood - Veneer - Seasoning, preservation and defects.

Steel - Composition uses - Market forms - Mechanical treatment.  
Paints - Varnishes - Distempers - Emulsions - Plaster of Paris  
Asphalt, Bitumen and Tar - Terminology, Specifications and Uses.  
**(9)**

### **SPECIAL MATERIALS**

Glass - Ceramics - Sheets for pitched roof coverings - False ceiling - Thermocole panels - Refractories - Types - Geo textiles - Mats and pads for earth reinforcement - Aluminum - wall panels.**(9)**  
**Total : 45**

### **TEXT BOOKS**

1. Varghese PC, "Building Materials", Prentice Hall India Pvt. Ltd, New Delhi, 2008.
2. Duggal SK., "Building Materials", New Age International (P) Ltd., New Delhi, 2008

### **REFERENCE BOOKS**

1. Neil Jackson and Dhir,R.K., "Civil Engineering Materials", McMillan Publishers Ltd, New Delhi,1996
2. Surendra Singh, "Building Materials", Vikas Publishing Company, New Delhi, 1996.
3. Rangwala, SC., "Engineering Materials", Charotar Publishing House, Anand, 1997.

## S-4 BASICS OF THERMODYNAMICS

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### ASSESSMENT : THEORY

#### OBJECTIVE

*This course in thermodynamics is aimed to provide students with basic theory and practice. Strong emphasis is placed on problem solving and professional judgement through an understanding of energy, energy transformations and its interactions with the surrounding, and to master the thermodynamic concepts of energy by recognizing path - dependent and independent functions.*

#### OUTCOME

- An ability to apply knowledge of mathematics, science and engineering to energy and its interaction in real life applications in a global / societal context.*
- An ability to analyze a thermodynamic system, component, or process to meet desired needs.*
- An ability to function on multidisciplinary teams.*
- An ability to identify, formulate and solve thermodynamic problems in engineering application.*
- A recognition of the need for and an ability to engage in lifelong learning.*

Introduction - Basic concepts: System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle - Reversibility - Quasi - static Process, Irreversible Process, Causes of Irreversibility - Energy in State and in Transition, Types, Displacement & Other forms of Work and Heat, Point and Path functions, Zeroth Law of Thermodynamics - Concept of quality of Temperature - Principles of Thermometry - Reference Points -

Constant Volume gas Thermometer - Scales of Temperature, Ideal Gas Scale. **(12)**

PMM I - Joule's Experiments - First law of Thermodynamics - Corollaries - First law applied to a Process - applied to a flow system - Steady Flow Energy Equation. Limitations of the First Law - Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence/Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase - Availability and Irreversibility - Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations - Elementary Treatment of the Third Law of Thermodynamics. **(12)**

Pure Substances, p-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations - Triple point at critical state, properties during change of phase, Dryness Fraction - Clausius Clapeyron Equation, Property tables. Mollier charts - Various Thermodynamic processes and energy Transfer - Steam Calorimetry. Perfect Gas Laws - Equation of State, specific and Universal Gas constants - various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy - Throttling and Free Expansion Processes - Flow processes. **(12)**

Deviations from perfect Gas Model - Vander Waals Equation of State - Compressibility charts - variable specific Heats - Gas Tables. Mixtures of perfect Gases - Mole Fraction, Mass Fraction, Gravimetric and Volumetric Analysis - Dalton's Law of partial pressures, Avogadro's Laws of additive volumes - Mole fraction, Volume fraction and partial pressure, Equivalent Gas constant and Molecular Internal Energy, Enthalpy, Specific Heats and Entropy of Mixture of Perfect Gases and Vapour. **(12)**



Atmospheric air - Psychrometric Properties - Dry Bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Thermodynamic Wet Bulb Temperature, Specific Humidity, Relative Humidity, Saturated Air, Vapour pressure, Degree of saturation - Adiabatic Saturation, Carrier's Equation - Psychrometric chart. **(12)**

**TOTAL : 60**

### **TEXT BOOKS**

1. Nag P.K., Engineering Thermodynamics, Tata McGraw Hill, 4<sup>th</sup> Edition, 2008.
2. Yadav R., Fundamentals of Engineering Thermodynamics, Central Publishing, Allahabad, 2009.

### **REFERENCE BOOKS**

1. Van Wylen G.J., Sonntag R.E., and Borgnakke C., Fundamentals of Thermodynamics, 4<sup>th</sup> Edition, John Wiley, 2010.
2. Yunus A Cengel and Michael A Boles, Thermodynamics - An Engineering Approach, 5<sup>th</sup> Edition, Tata McGraw Hill, New Delhi, 2008.
3. Jones J.B., and Dugan R.E., Engineering Thermodynamics, Prentice Hall India, 1995.
4. Rao Y.V.C., An Introduction to Thermodynamics, University Press (India) Private Limited, Revised Edition, 2004.
5. William Z. Black, James G. Hartley, Thermodynamics, Prentice Hall, 3<sup>rd</sup> Edition, 1997.

## S-5 BASIC ELECTRICAL ENGINEERING

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To understand the fundamentals and working of measuring instruments and induction machines. To inculcate a basic knowledge about wiring, communication and remote monitoring.*

#### OUTCOME

- *The students will have knowledge of suitable application of single and three phase induction motors and measuring instruments.*
- *The students will be exposed to major applications of electrical wiring and installation.*
- *The students will have knowledge of wired and wireless communication networks with the application of remote sensing.*

### MEASURING INSTRUMENTS

Cathode ray oscilloscope - digital storage oscilloscope - signal generator - function generator - digital voltmeter - digital multimeter - LED, LCD and dot matrix displays. **(9)**

### INDUCTION MACHINES

Principle of operation of three phase induction motors - rotating magnetic field - construction - squirrel cage and slip ring motors - phasor diagram - slip - torque-slip curves. Principle of operation of single phase induction motor - double revolving field theory - capacitor start motor - capacitor start and run motor. **(9)**

### ELECTRICAL INSTALLATION

Types of wiring system - wiring accessories- earthing - fluorescent tubes-CFL-Sodium (Na) vapour lamp. Simple domestic wiring layouts - staircase wiring - IE rules - testing of electrical installation. **(9)**

## **COMMUNICATION NETWORKS**

Wired and wireless networks - system design - multiple access - switching - the OSI model - concepts of the telephone network - internet - ATM networks - Introduction to LAN, WAN, MAN, Bluetooth and Cellular Networks. **(9)**

## **REMOTE MONITORING**

Introduction to PLC networking - networking standards - protocols - field bus - process bus and ethernet - communication between several PLCs - Introduction to SCADA. **(9)**

**Total : 45**

## **TEXT BOOKS**

1. A.K.Sawhney, "A Course in Electrical and Electronic Measurements", Dhanpat Rai and Sons, New Delhi, 2004.
2. V.N. Mittle, "Basic Electrical Engineering", Tata Mcgraw Hill, New Delhi, 2005.

## **REFERENCE BOOKS**

1. Metha V.K., "Principles of Electrical Engineering", S.Chand & Company Ltd, New Delhi, 2001.
2. A.S. Tanenbaum, "Computer Networks", II Edition, Prentice Hall of India, New Delhi, 2003.
3. Gary Dunning, "Introduction to Programmable Logic Controllers", Delmar Cengage Learning, USA, 2013.

## S-6 FUNDAMENTALS OF ELECTRICAL ENGINEERING

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To acquaint the students pursuing engineering disciplines other than electrical engineering, the fundamental concepts of electrical engineering. To have an understanding of the basic laws of electromagnetism and study the basics of AC, DC circuits and various types of measuring instruments. To acquaint the students the techniques of wiring and various wiring materials.*

#### OUTCOME

- *With the basic concepts of electromagnetic the students can solve the practical AC and DC circuits.*
- *The students acquire knowledge about the working of measuring instruments.*
- *The students understand about electrical installation techniques and various methods of conserving electrical energy.*

### CIRCUIT ELEMENTS, LAWS AND ANALYSIS

Circuit elements and definitions - active and passive elements - voltage-current relationships - Ohm's law - Kirchhoff's laws - series and parallel circuits - star-delta transformation - mesh and nodal analysis for DC circuits. **(9)**

### ELECTROMAGNETICS

Magnetic field - Biot-savart's law - force on current carrying conductor in magnetic field - hysteresis - magneto motive force - magnetic field strength - reluctance - laws of magnetic circuits - Faraday's laws of electromagnetic induction - Lenz's law - Fleming's rules - statically and dynamically induced emf - energy stored in magnetic field. **(9)**

## **AC CIRCUITS UNDER STEADY STATE**

Sinusoidal inputs and their representations - production of alternating voltage - phase and phase difference - instantaneous, average and rms values - steady state responses of R, L and C to sinusoidal input- impedance and series RLC circuits - admittance and parallel RLC circuits -three phase circuits - power in AC circuits - two wattmeter method of power measurements. **(9)**

## **MEASURING INSTRUMENTS**

Classification of measuring Instruments - essential requirements of indicating instruments - deflecting torque, controlling torque and damping torque in indicating instruments - construction and operating principles of moving coil and moving iron instruments - voltmeters and ammeters- dynamometer type wattmeter -induction type energy meter - megger. **(9)**

## **ELECTRICAL INSTALLATION**

Types of wiring systems - wiring accessories - earthing - fluorescent tubes - CFL - sodium vapour lamp - simple domestic wiring layouts - staircase wiring - IE rules - testing of electrical installation- electrical energy conservation. **(9)**

**Total : 45**

## **TEXT BOOKS**

1. Mittle V.N., "Basic Electrical Engineering", Tata McGraw Hill, New Delhi, 2005.
2. Mehta V.K., "Principles of Electrical Engineering", S.Chand& Company Ltd, New Delhi, 2003.

## **REFERENCE BOOKS**

1. Gupta B.R, "Fundamentals of Electric Circuits", S.Chand& Co. (Pvt) Ltd, New Delhi, 2002.
2. Rajput, R.K. "Basic Electrical Engineering", Dhanpat Rai and Sons, New Delhi, 2007.

## S-7 ELECTRICAL ENGINEERING

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To understand the fundamentals of electric and magnetic fields. To gain knowledge in understanding the concepts of DC circuits, AC Circuits, DC machines, transformers and measuring instruments.*

#### OUTCOME

- *The students will have knowledge of suitable application electrical machines and measuring instruments.*
- *The students will be exposed to major applications of electrical circuits.*

### INTRODUCTION TO ELECTRICAL ENGINEERING

Ohm's law - Kirchhoff's laws - series and parallel circuits - star-delta transformation - mesh and nodal analysis for DC circuits - analogy between electric and magnetic circuits, Magnetic field due to electric current flow, force on a current carrying conductor placed in a magnetic field, Faradays laws of electromagnetic induction. Self inductance and mutual inductance, energy in linear magnetic systems. (11)

### ALTERNATING QUANTITIES

Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of single phase series and parallel circuits, power in ac circuits. (9)

## **DIRECT CURRENT MACHINES**

Construction of DC machine- DC generator - principle, working, EMF equation, types of excitation and characteristics. DC Motor - principle, working, torque equation, and characteristics - applications.

**(9)**

## **TRANSFORMERS**

Principles of operation - constructional details - ideal transformer and practical transformer - losses - transformer test- efficiency and regulation calculations (All the above topics are only elementary treatment and simple problems).

**(9)**

## **MEASURING INSTRUMENTS**

Introduction - classification of instruments - operating principles - essential features of measuring instruments. PMMC instruments - moving iron ammeters and voltmeters (elementary treatment only).

**(7)**

**Total : 45**

## **TEXT BOOKS**

1. Mittle V.N., "Basic Electrical Engineering", Tata McGraw Hill, New Delhi, 2005.
2. T.K.Nagasarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press, USA, 2005.

## **REFERENCE BOOKS**

1. D.P. Kothari & I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", Prentice Hall of India, 2009.
2. V.K Mehta, "Principles of Electrical Engineering", S.Chand& Co. (Pvt) Ltd, New Delhi, 2006.

## S-8 ELECTRIC CIRCUITS

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To introduce the students about fundamental concepts and analysis of AC and DC circuits that involves the application of different laws and network theorems.*

#### OUTCOME

- *The students can realize the electric circuits in real time applications.*
- *With the knowledge about the theorems, the analysis and modeling of electric and electronic circuits could be done.*

### BASIC CIRCUIT CONCEPTS AND DC CIRCUITS

Concept of linearity and bilateral property-passive and active elements - independent and dependent sources - Ohm's law - Kirchhoff's laws-analysis of dc series and parallel circuits -network reduction - source transformation - star/delta transformation - mesh current and node voltage method of analysis of simple dc circuits.

**(9)**

### SINUSOIDAL STEADY STATE ANALYSIS

Sinusoidal voltage and current - peak, average, and rms values - peak(crest) and form factors for sinusoidal and non-sinusoidal periodic waveforms - R, L and C elements and their voltage-current relationships - phasor diagrams - concept of phasor and complex impedance and admittance - analysis of simple, single phase ac series and parallel circuits - apparent power, active power, reactive power, and power factor - concept of complex power - impedance and power triangle. Resonance in series and parallel circuits - Q factor-half power frequencies and bandwidth.

**(10)**



## **NETWORK THEOREMS**

Superposition theorem - Thevenin's theorem - Norton's theorem - Maximum power transfer theorem - Reciprocity theorem - Millman's theorem - Substitution theorem - Compensation theorem - Tellegen's theorem. **(9)**

## **COUPLED CIRCUITS**

Self and mutual inductance - coefficient of coupling - analysis of simple coupled circuits - ideal transformer - conductively coupled circuits - analysis of single tuned circuits involving mutual inductance. **(9)**

## **THREE PHASE CIRCUITS**

Three phase star and delta connections - phase sequence - line and phase quantities - analysis of three phase circuits with star and delta connected balanced loads - phasor diagram representation - two wattmeter method of power measurement-reactive power measurement. **(8)**

**Theory : 45**

**Tutorial : 15**

**Total : 60**

## **TEXT BOOKS**

1. Joseph A. Edminister and Mahmood Nahvi, "Electric Circuits", Schaum's Series, Tata McGraw Hill, New Delhi, 2011.
2. Sudhakar A. and Shyammmohan S.P., "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill, New Delhi, 2010.

## **REFERENCE BOOKS**

1. William H. HaytJr, Jack E. Kemmerly, and Steven M.Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, New Delhi, 2002.

2. Paranjothi S.R., "Electric Circuit analysis", New Age International (P) Ltd, New Delhi 2000.
3. Gupta B.R, "Fundamentals of Electric Circuits", S.Chand& Co. (Pvt) Ltd, New Delhi, 2002.
4. Chakrabarti A., "Circuit Theory (Analysis and Synthesis)", Dhanpat Rai & Co. (Pvt) Ltd, VI Edition, New Delhi, 2010.

## S-9 CIRCUIT THEORY

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To acquire basic knowledge about Kirchhoff's laws, network theorems, mesh analysis, nodal analysis and duality in networks.*
- *To understand the principles of operation of resonant circuits, tuned circuits, mutual conductivity and mutual inductance.*
- *To formulate and solve problems in DC and AC transient response of RL, RC and RLC circuits using Laplace Transform and differential equations*
- *To know about Hurwitz polynomials, positive real functions and network synthesis by Foster &Cauer realization methods.*

#### OUTCOME

*On completion of this course the students will have*

- *an ability to apply knowledge of theorems to analyze and design electric circuits.*
- *an in-depth understanding of resonant circuits, tuned circuits, mutual conductivity and mutual inductance.*
- *an in-depth understanding of transient response of RL, RC and RLC networks using Laplace and classical method of analysis*
- *an in-depth understanding of Hurwitz polynomials, positive real functions and network synthesis by Foster &Cauer realization methods.*
- *an ability to solve problems in the topics listed above.*

#### BASIC CIRCUIT ANALYSIS

Network Elements and Sources - Kirchoff's voltage law - voltage division - power in a series circuit - Kirchoff's current law - parallel resistance - current division - power in a parallel circuit.

Mesh analysis - mesh equations by inspection method - super mesh analysis - Nodal analysis: nodal equations by inspection method - super node analysis (for AC and DC circuits with dependent and independent sources). **(9)**

## **THEOREMS IN CIRCUIT ANALYSIS**

Star-delta transformation - Superposition theorem - Thevenin's theorem - Norton's theorem - Reciprocity theorem - Compensation (Substitution) theorem - maximum power transfer theorem - duals and duality - Tellegen's theorem - Millman's theorem - Maxwell's Theorem (for AC and DC circuits with dependent and independent sources). **(9)**

## **RESONANCE AND COUPLED CIRCUITS**

Series resonance - impedance and phase angle of a series resonant circuit - Voltages and currents in a series resonant circuit - Bandwidth of an RLC circuit - Quality factor and its effect on bandwidth - magnification in resonance - Parallel resonance - Resonant frequency for a tank circuit - Variation of impedance with frequency - Q-factor of parallel resonance - magnification - Reactance curves in Parallel resonance.

Conductively coupled circuit and mutual inductance - Mutual inductance - Dot convention - Coefficient of coupling - Analysis of multi-winding coupled circuit - Series and parallel connection of coupled coils - Tuned circuits. **(9)**

## **TRANSIENTS**

Steady state and transient response- Classical and Laplace Transform methods of analysis for determining the DC and Sinusoidal response of RL, RC and RLC circuits. **(9)**

## **ELEMENTS OF REALIZABILITY AND SYNTHESIS OF ONE-PORT NETWORKS**

Hurwitz polynomials - positive real functions - frequency response of reactive one port - Synthesis of reactive one port - R-L network and R-C network by Foster and Cauer method. **(9)**

**Theory : 45**

**Tutorial : 15**

**Total : 60**

### **TEXT BOOKS**

1. Sudhakar A. and Shyam Mohan S.P., "Circuits and Networks- Analysis and Synthesis", 4<sup>th</sup> Edition, Tata McGraw Hill, New Delhi, 2010
2. Chakrabarti A., "Circuit Theory", 4<sup>th</sup> Edition, DhanpatRai& Co., New Delhi, 2008

### **REFERENCE BOOKS**

1. Van Valkenberg, "Network Analysis", 3<sup>rd</sup> Edition, Prentice Hall, 2006
2. Stanley, "Networks Analysis with applications", 4<sup>th</sup> Edition, Pearson Education, 2009
3. MahmoodNahvi, Joseph A. Edminister, "Electric Circuits", 5<sup>th</sup> Edition, Schaum's outline series, Tata McGraw Hill, New Delhi, 2011
4. Suresh Kumar K.S., "Electric circuits and networks", 1<sup>st</sup> edition, Pearson Education, Delhi, 2009.

## S-10 BASIC ELECTRONICS AND COMMUNICATION ENGINEERING

(QUALITATIVE TREATMENT ONLY)

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To acquire knowledge on the fundamental concepts of diodes and transistors.*
- *To gain knowledge on the operating principles of various Linear Integrated Circuits.*
- *To study, identify and solve problems in logic gates and flip flops.*
- *To acquire knowledge of various modulation Schemes.*
- *To know about the applications of communication systems and networks.*

#### OUTCOME

*On completion of this course the students will have*

- *an in-depth understanding of the fundamental concepts of diodes and transistors, Linear Integrated Circuits.*
- *an in-depth understanding of logic gates and flip flops.*
- *an knowledge of various modulation Schemes..*
- *an understanding of the applications of communication systems and networks.*

#### ELECTRONIC DEVICES

Principles and characteristics of junction diode- zener diode- photo diode - Bipolar junction transistors - Field effect transistor, photo transistor and thyristor - various configurations of bipolar junction transistors - Biasing - thermal stability. **(9)**

## **LINEAR INTEGRATED CIRCUITS**

741 Operational amplifier- Ideal op-amp characteristics-Inverting and Non-inverting amplifier-op-amp applications-Adder- Subtractor - integrator - Differentiator - comparator - 555 timer - Applications : Multivibrators. **(9)**

## **DIGITAL ELECTRONICS**

Number systems- binary, octal, hexadecimal, logic gates- AND, OR, NOT, NAND, NOR, XOR, XNOR, Half adder - Full adder, - Subtractor, -Flip flops RS, JK, JK Master slave, D and T type - Counters and Shift registers Introduction to Microprocessors. **(9)**

## **AMPLITUDE MODULATION, DEMODULATION, PULSE AND DIGITAL MODULATION**

Elements of communication system - Types of communication systems - Electromagnetic spectrum - Bandwidth - Need for Modulation- AM Modulation Principles - FM Modulation Principles - Phase Modulation - Sampling theorem- Pulse Modulation Techniques - PAM, PWM, PPM, PCM and DM - Line codes - Time Division Multiplexing - Digital Modulation Techniques - ASK, FSK and PSK. **(9)**

## **COMMUNICATION SYSTEMS AND NETWORKS**

Satellite Communication system - Optical Fiber Communication system - Microwave Transmitter and Receiver- Colour Television Transmitter and Receiver- RADAR Systems (block diagrams) - WAN - MAN - LAN - Switching concepts - Circuit, Message and Packet Switching - PSTN - ISDN - Block diagram of Cellular Transmitter and Receiver. **(9)**

**TOTAL : 45**

## **TEXT BOOKS**

1. Allan Mottershead, "Electron Devices and Circuits", Prentice Hall of India Pvt. Ltd., 2000.
2. Louis Frenzel, "Communication Electronics Principles and Applications", Third Edition, Tata McGRAW Hill, 2008.

## **REFERENCE BOOKS**

1. Roy Blake, "Electronic Communication Systems", 2<sup>nd</sup> Edition, Thomson Delmar, 2005.
2. Malvino, A.P, "Electronics Principles", Tata McGraw Hill company Ltd, 2000.
3. Mathur, A, "Introduction to Microprocessor", Tata McGraw Hill company Ltd, 2000.
4. Ramesh S Gaonkar, "Microprocessor Architecture, Programming and Application with 8085", Penram International Publishing (India) Pvt., 5<sup>th</sup> Edition, February 2002.
5. Wayne Tomasi, "Electronic Communication Systems - Fundamental Through Advanced", 5<sup>th</sup> Edition, Pearson education, 2004.



## S-11 ELECTRON DEVICES AND CIRCUITS

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To introduce the students the basic concepts of semiconductor devices and gain knowledge about the working principles as well as applications of electron devices such as BJT and FET.*

#### OUTCOME

- *The students will gain knowledge about the working details, major applications of BJT, FET, power supplies and related analysis.*
- *The students learn the theory and realize them in simple practical circuits.*

#### BJT AND FET

Transistor operation - current components - CC, CE, CB configuration - transistor characteristics - DC, AC load lines and operating point - need for bias stabilization - types of biasing - stability factor - JFET - Construction and operation - VI Characteristics - MOSFET - Construction and operation - VI Characteristics. **(9)**

#### BJT AND FET AMPLIFIERS

BJT Amplifier - small signal low frequency parameters and equivalent circuit - small signal analysis of CE amplifiers using hybrid  $\pi$  model -- multistage amplifiers: RC Coupled - transformer coupled amplifiers -frequency response. JFET Amplifiers - small signal model and frequency response of common source amplifier. Power Amplifier - Classification - Class A power amplifier - power dissipation - efficiency - Class B push-pull amplifier - power dissipation - efficiency - complementary symmetry operation. **(10)**

#### DC POWER SUPPLIES

Single phase rectifiers: Half-Wave, full-wave and bridge rectifiers -ripple factor - rectification efficiency - TUF - PIV - regulation -Filters:

inductor, capacitor, L-section and  $\pi$ -section filters - ripple factor - Regulators: series and shunt type - protection circuits **(8)**

### **FEEDBACK AMPLIFIERS AND OSCILLATORS**

Feedback concepts - ideal feedback topologies - Advantages and disadvantages of negative feedback - analysis of voltage and current:-Series and Shunt feedback amplifier circuits - Oscillators: Barkhausen criterion - RC phase shift oscillator - Hartley Oscillator - Colpitts Oscillator-Frequency Stability - Crystal Oscillator. **(9)**

### **MULTIVIBRATORS AND TIME-BASE GENERATORS**

Astable and monostableMultivibrators - collector coupled configuration - fixed biased bistablemultivibrator - Schmitt trigger - general features of a time base signal - methods of generating a time base signal - exponential sweep circuit- transistor constant current sweep -Miller and Bootstrap voltage time-base generators - current time-base generator - triggered transistor blocking oscillator (base timing). **(9)**

**Total : 45**

### **TEXT BOOKS**

1. Jacob Millman, Christos C Halkias, Satyabrata Jit, "Electronic Devices and Circuits", Tata McGraw-Hill, Second Edition, 2008.
2. Thomas L.Floyd, "Electronic Devices", 9<sup>th</sup> Edition, Pearson Education Asia, 2011.

### **REFERENCE BOOKS**

1. Jacob Millman and Herbert Taub, "Pulse, Digital and switching Waveforms", 2<sup>nd</sup> Edition, Tata McGraw-Hill, New Delhi, 2008.
2. Robert L. Boylestead and Louis Nashelsky, "Electronic Devices and Circuit Theory", 9<sup>th</sup> Edition, Prentice-Hall of India, New Delhi, 2005.
3. Allen Mottershed, "Electronic Devices and Circuits- An Introduction", PHI Learning, 2011.
4. Salivahanan, "Electron Devices and Electronic Circuits", Tata McGraw-Hill, New Delhi, 2004.

## S-12 FUNDAMENTALS OF DIGITAL COMPUTERS

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 3 | 4 |

### ASSESSMENT : THEORY & PRACTICAL

#### OBJECTIVE

- *To learn the basics of data representation, arithmetic operations, Boolean algebra, digital circuit design and different types of memory.*

#### OUTCOME

- *Understand the basics of number systems and arithmetic, data representation schemes, logic gates and Boolean algebra.*
- *Ability to analyze the given problem and formulate simplified Boolean expressions in terms of input-output to design combinational and sequential logical circuits.*
- *Basic knowledge in programmable devices such as PALs and PLAs and ability to utilize the knowledge in the implementation of digital systems.*
- *Basic knowledge in memory organization, its types and operations.*

#### DATA REPRESENTATION

Digital Computers and digital systems. Number system: Binary, Octal, Hexadecimal, Base Conversion, Complements. Binary Codes: BCD, Excess-3, Gray, ASCII, Error Detecting Code, Reflected code. Number representation: Signed and Unsigned Number Representation, Fixed point Binary Data, Decimal data, Floating point Data. Binary Arithmetic: Arithmetic addition and subtraction-Overflow. **(6)**

#### BOOLEAN ALGEBRA LOGIC GATES

Boolean Algebra : Basic Definitions, Theorem Properties - Canonical Standard Forms - Min term, Max term, SOP, POS. Digital Logic gates - NAND and NOR Implementations- Simplification of

Boolean Functions - Karnaugh map- Don't Care Conditions - Quine-Mccluskey Method. **(7)**

### **COMBINATIONAL LOGIC**

Adders - Half Adder, Full Adder, Binary Parallel Adder, BCD Adder - Subtractor - Half Subtractor , Full Subtractor - Code Conversion - Magnitude Comparator- Decoders -Demultiplexer -Encoder - Multiplexer - Introduction to PLAS and PALS. **(7)**

### **SEQUENTIAL LOGIC**

Introduction - Flip Flops - Types - Analysis of Clocked Sequential Circuits: State Table , State Diagram , State Equation, State Reduction, Assignment - Flip Flop Excitation Table - Design Procedure - Design of Counters- Ripple Counters - Synchronous counters: Binary-BCD Counters. **(6)**

### **REGISTERS AND MEMORY**

Registers - Shift Register - Structure of Memory Cell - Memory Organization - Random Access Memories - SRAM - DRAM -SDRAM- ROM - Types of ROM - Flash Memory. **(4)**

**Theory : 30**

**Practical : 45**

**Total : 75**

### **TEXT BOOK**

1. M. Morris Mano, "Digital Logic and Computer Design", Prentice Hall, 4<sup>th</sup> edition, 2007.

### **REFERENCE BOOKS**

1. Tocci R.J., Neal S. Widemer, Gregory L. Moss "Digital Systems: Principles and Applications", Prentice Hall of India (New Delhi), 11<sup>th</sup> edition, 2010.

2. Floyd T.L., Charles E., "Digital Fundamentals", Pearson Education, 10<sup>th</sup> edition, 2007.
3. Charles H. Roth Jr., Larry L. Kinney "Fundamentals of Logic Design", Cengage Learning, 7<sup>th</sup> edition, 2010.
4. V.Rajaraman, T.Radhakrishnan, "Digital Logic and Computer Organization", PHI Learning Pvt. Ltd, New Delhi, 2009.( For PAL and PLA Introduction).

## **ASSESSMENT PROCEDURE**

| <b>THEORY :</b>     |   | Weightage |
|---------------------|---|-----------|
| Final Examination   | = | 40%       |
| Internal Assessment | = | 10%       |

## **PRACTICAL :**

|                       |   |     |
|-----------------------|---|-----|
| Continuous Assessment | = | 50% |
|-----------------------|---|-----|

## S-13 BASIC COMPUTER ENGINEERING

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To acquire basic knowledge about number representation and math operations used in digital computers.*
- *To understand the principles of operation of digital computers, memories and interconnection of computer units.*
- *To understand the basics of operating systems, networking concepts, data and voice communication.*
- *To learn about fundamentals of display devices and computer graphic systems.*

#### OUTCOME

*On completion of this course the students will have*

- *an in-depth understanding of number representation and math operations used in digital computers.*
- *an understanding of principles of digital computers, memories and interconnection of computer units.*
- *an understanding of the basics of operating systems, networking concepts and data and voice communication.*
- *an understanding of fundamentals of display devices and computer graphic systems.*

#### DATA REPRESENTATION

Binary, Octal and hexadecimal number system- Base conversions-Representation of integers, fractions and characters - Signed and unsigned number representations - Fixed and floating point number representation-Complements- BCD, Excess-3, Gray, and ASCII codes - Error detecting codes. Binary arithmetic: addition, subtraction, multiplication and division. **(9)**

## **COMPUTER HARDWARE**

Basic structure of a digital computer- CPU- Processor - Instruction- Machine language- Input/output units - Memory cell- Memory organization - Types: ROMs, RAM - Magnetic hard disk- CDROM - Interconnection of computer units- Processor to memory communication- I/O to processor communication - Bus Architecture - Virtual memory - Computer generation- Classification. **(9)**

## **OPERATING SYSTEM AND NETWORKS**

Basics of Operating System - Batch Operating System- Multiprogramming Operating System- Time sharing Operating System - Personal computer Operating System- WINDOWS OS - UNIX OS- LINUX OS - Microkernel based Operating System- On-line and Real-time systems.

Networking Concepts: Need for computer communication Networks - Internet and the World Wide Web- Communication Protocols- Local Area Networks- Token Ring Local Area Network- Interconnecting Networks. **(9)**

## **VOICE AND DATA COMMUNICATIONS**

Types of communications with & among Computers - Characteristics of Communication Channels- Allocation of Channel- Physical Communication Media- Public switched telephone Networks- Multiplexing Techniques in Wireless Communication- Cellular Communication system- Communication paths- ATM networks. **(9)**

## **COMPUTER GRAPHICS**

Computer Graphics Applications- Display Devices- Overview of Display method- Raster Scan Display Processing unit- Input Devices for Interactive Graphics- Programmers Model of Interactive Graphics systems- Image Acquisition and storage- Storage Formats for pictures- Image Acquisition with a Digital Camera. **(9)**

**Total : 45**

## **TEXT BOOK**

1. Rajaraman.V "Fundamentals of Computers", 5<sup>th</sup> Edition, PHI Learning Private Ltd., 2010.

## **REFERENCE BOOKS**

1. E.Balagurusamy, "Basic Computer Engineering", 1<sup>st</sup> Edition, Tata McGraw Hill Education, 2010.
2. Anita Goel, AnandMotwani, "Basic Computer Engineering", 1<sup>st</sup> Edition, Pearson education, 2012.
3. ITL Education Solutions Ltd, "Introduction to Information Technology", Pearson education, 2006.
4. Morris Mano M., "Digital Logic and Computer Design", Prentice Hall, 2007.
5. Thomas C.Bartee, "Digital Computer Fundamentals", McGraw Hill, New Delhi, 6<sup>th</sup> edition,1997.



## S-14 BASIC C PROGRAMMING

|   |   |   |   |
|---|---|---|---|
| L | T | P | C |
| 2 | 0 | 3 | 4 |

### ASSESSMENT : THEORY & PRACTICAL

#### OBJECTIVE

- *To develop the ability to formulate logic for solving problems and write simple C programs.*

#### OUTCOME

- *Knowledge in the basic concepts of C programming and the ability to design C programs for simple applications.*
- *Ability to design, analyze problems and interpret data.*
- *Knowledge to experiment the engineering problems using C concepts like functions, structures and files.*

### INTRODUCTION TO PROGRAMMING

Fundamentals of programming- Flowcharts. Programming strategies (Introduction): top-down, structured programming, object oriented. **(3)**

### INTRODUCTION TO C

C data types - C compilation and execution. Operators: hierarchy of operators- associativity of operators - expressions. Single dimensional arrays - console I/O functions: formatted I/O: scanf(), printf()- getchar(), putchar(). **(3)**

### CONTROL STATEMENTS

If statements, if-else statement, nested if statements- ternary operators-while loop, do-while loop, for loop- break statement-continue statement- switch case statement- Goto statement and statement labels. **(6)**

### POINTERS AND ARRAYS

Array of pointers - multidimensional arrays - pointers and strings -standard string library functions: strlen(), strcpy(), strcat(),strchr() and strcmp()- dynamic memory allocation and deallocation. **(6)**

## **FUNCTION**

Function declaration and prototypes- parameter passing- recursion-command line arguments- function pointers- passing pointers to functions- passing arrays to functions- passing function to other functions. Storage classes- C preprocessor. **(6)**

## **STRUCTURES AND FILES**

Definition of structure - array of structures - pointer to structures - self referential structures- union - Bit fields - typedef - enum data type - high level file I/O - text and binary file processing- low level file IO and processing. **(6)**

**Theory : 30**

**Practical : 45**

**Total : 75**

## **TEXT BOOK**

1. Byron S. Gottfried, "Programming with C", 2<sup>nd</sup> Edition, Schaum's series, Tata McGraw Hill, New Delhi, Reprint 2008.

## **REFERENCE BOOK**

1. Brian W. Kernigham and Dennis M.Ritchie, "The C Programming Language", 2<sup>nd</sup> Edition, Prentice hall of India, New Delhi, 2008.

## **ASSESSMENT PROCEDURE**

### **THEORY :**

|                     | Weightage |
|---------------------|-----------|
| Final Examination   | = 40%     |
| Internal Assessment | = 10%     |

### **PRACTICAL :**

|                       |       |
|-----------------------|-------|
| Continuous Assessment | = 50% |
|-----------------------|-------|

## S-15 C PROGRAMMING - THEORY AND PRACTICE

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 3 | 4 |

### ASSESSMENT : THEORY & PRACTICAL

#### OBJECTIVE

- *To develop the ability to formulate logic for solving problems and write simple C programs.*

#### OUTCOME

- *Knowledge in the basic concepts of C programming and the ability to design C programs for simple applications.*
- *Ability to design, analyze problems and interpret data.*
- *Knowledge to experiment the engineering problems using C concepts like functions, structures and files.*

### INTRODUCTION TO PROGRAMMING

Fundamentals of programming- Flowcharts. Programming strategies (Introduction): top-down, structured programming, object oriented. **(3)**

### INTRODUCTION TO C

C data types - C compilation and execution. Operators: hierarchy of operators- associativity of operators - expressions. Single dimensional arrays - console I/O functions: formatted I/O: scanf(), printf()- getchar(), putchar(). **(3)**

### CONTROL STATEMENTS

If statements, if-else statement, nested if statements- ternary operators-while loop, do-while loop, for loop- break statement-continue statement- switch case statement- Goto statement and statement labels. **(6)**

### POINTERS AND ARRAYS

Array of pointers - multidimensional arrays - pointers and strings -standard string library functions: strlen(), strcpy(), strcat(), strstr() and strcmp()- dynamic memory allocation and deallocation. **(6)**

## **FUNCTION**

Function declaration and prototypes- parameter passing- recursion-command line arguments- function pointers- passing pointers to functions- passing arrays to functions- passing function to other functions. Storage classes- C preprocessor. **(6)**

## **STRUCTURES AND FILES**

Definition of structure - array of structures - pointer to structures - self referential structures- union - Bit fields - typedef - enum data type - high level file I/O - text and binary file processing- low level file IO and processing. **(6)**

**Theory : 30**

**Practical : 45**

**Total : 75**

## **TEXT BOOK**

1. Byron S.Gottfried, "Programming with C", 2<sup>nd</sup> Edition, Schaum's series, Tata McGraw Hill, New Delhi, Reprint 2008.

## **REFERENCE BOOK**

1. Brian W.Kernigham and Dennis M.Ritchie, "The C Programming Language", 2<sup>nd</sup> Edition, Prentice hall of India, New Delhi, 2008.

## **ASSESSMENT PROCEDURE**

### **THEORY :** WEIGHTAGE

|                     |   |     |
|---------------------|---|-----|
| Final Examination   | = | 40% |
| Internal Assessment | = | 10% |

### **PRACTICAL :**

|                       |   |     |
|-----------------------|---|-----|
| Continuous Assessment | = | 50% |
|-----------------------|---|-----|

## S-16 CHEMISTRY FOR CHEMICAL ENGINEERS

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

### ASSESSMENT : THEORY

#### OBJECTIVE

- *To make the students knowledgeable in the fundamental and applied aspects of Inorganic chemistry, Analytical chemistry and Bio-technology.*

#### OUTCOME

- *Knowledge in the fundamental aspects of Coordination Chemistry.*
- *Acquire knowledge in the applied aspects of Chemistry.*
- *Familiar with an introductory aspect of Biotechnology.*
- *Able to gain knowledge in theory and practical aspects of volumetric titrations.*

### CO-ORDINATION COMPOUNDS

Co-ordination compounds - Terminology - IUPAC Nomenclature- Werner's Theory - EAN concept - Factors affecting stability of a complex ion - Shortcomings of VB theory - Crystal Field Theory - CFSE- Crystal field splitting - Factors influencing crystal field splitting - Octahedral, tetrahedral and Square planar complexes. Magnetic properties - MOT (Basic concepts only). **(10)**

### INORGANIC POLYMERS

Inorganic polymers - properties - Glass transition temperature - Important inorganic polymers - Structures, Properties and industrial applications of Phosphorus-based, Boron-based polymers, Sulphur-based polymers, silicon based and coordination polymers. **(7)**

## **LUBRICANTS**

Functions - Mechanism of lubrication - Classification - properties of lubricating oils - Semi-solid lubricants - Solid lubricants - Synthetic lubricants. **(5)**

## **NANOCHEMISTRY**

Carbon nanotubes - Structure and properties - Fabrication of carbon nanotubes - Applications of carbon nanotubes. **(3)**

## **POWDER METALLURGY**

Principles of powder metallurgy - Characteristics of metal powders- Methods of producing metal powders - stages involved - Applications of powder metallurgy. **(3)**

## **THEORETICAL BASIS FOR ANALYSIS**

Volumetric titrations - Terminology - Basic requirement for a titration reaction - Standard solutions - Primary standards - Expressing concentrations of standard solutions - Acid-base titrations - Mathematical treatment of acid-base titrations - redox titrations - Complexometric titrations - EDTA titrations - Masking agents - Indicators for EDTA titrations - Cautions in volumetric titrimetry - Correction for unavoidable errors - Analytical applications of DMG and oxine. **(9)**

## **BIOTECHNOLOGY**

Introduction - Biotechnology processes - chemical synthesis through biotechnology - production of Ethanol from Molasses, production of acetic acid, production of lactic acid - Industrial Enzymes used in food and beverages.

Biofuels - Biofertilizers - Biosurfactants - Biomembranes - starch processing for textiles - Biochips (A brief account only) **(8)**

**Total : 45**

### **TEXT BOOKS**

1. Jain P.C. and Monikka Jain, "Engineering Chemistry" - DhanpatRai and Co. 2011.
2. Puri B.R. Sharma L.R "Principles of Inorganic Chemistry" S. Chand and Company Ltd. 2011.
3. Manjula Devi M, Revathi P, and Jalaja D - "Engineering Chemistry Volume I" R.K Publishers, 2010.

### **REFERENCE BOOKS**

1. Chawla S. "A Text book of Engineering Chemistry" - DhanpatRai and Company, 2010.
2. Dara, S.S. "A Text Book of Engineering Chemistry" S. Chand and Company Ltd, 2012.