

# COIMBATORE INSTITUTE OF TECHNOLOGY

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

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

Course Code	Course Name	L	T	P	Credit	Cat
19FYM12	Calculus and Numerical Methods	3	1	0	4	BS
19FYE11	Technical English	2	0	1	2	HS
19FYP13	Engineering Physics	3	0	0	3	BS
19FYC11	Engineering Chemistry	3	0	0	3	BS
19CM11	Basic Civil and Mechanical Engineering	3	0	0	3	ES
19MEL11	Engineering Graphics	1	0	4	3	ES
19PL11	Physics Laboratory - I	0	0	2	0.5	BS
19CL11	Chemistry Laboratory - I	0	0	2	0.5	BS
19FYEL11	Employability Skills	0	0	2	1	EEC
	Total Credits				20	

## SECOND SEMESTER

Course Code	Course Name	L	T	P	Credit	Cat
19FYM22	Vector Calculus, Linear Algebra and Partial Differential Equations	3	1	0	4	BS
19FYE21	Language Elective	2	0	1	2	HS
19FYP23	Electron Devices	3	0	0	3	ES
19FYC21	Environmental Science and Engineering	3	0	0	1	HS
19EE22	Electric and Magnetic Circuits	3	0	0	3	ES
19CSL21	C programming and Data Bases	0	0	4	2	ES
19PL21	Physics Laboratory - II	0	0	2	0.5	BS
19CL21	Chemistry Laboratory - II	0	0	2	0.5	BS
19MEL12	Engineering Practices Laboratory	0	0	2	1	BS
19FYEL21	English for Employability	0	0	2	1	EEC
19CC01	Co - Curricular activities				1	
	Total Credits				19	

CAT – category; BS – Basic sciences, HS – Humanities and Social Sciences, ES –Engineering sciences, PC –Professional Core, PE- Professional Elective, EEC –Employability Enhancement Course

# 19 FYM12 CALCULUS AND NUMERICAL METHODS

(Only to EEE Programme)

L	T	P	C
3	1	0	4

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

*The main theme of this course is*

- *To incorporate the ideas of differential calculus that are imperative for the effective understanding of engineering subjects.*
- *To familiarize the student with function of several variables.*
- *To enrich the concepts of integral calculus those are vital for the study of engineering subjects*
- *To identify the type of a given differential equation and select the appropriate analytical techniques for solving ordinary differential equations.*
- *To incorporate the concepts of Numerical methods required for solving engineering problems.*

### COURSE OUTCOME

*Upon completion of this course the students will be able to*

CO1 : *Apply differential calculus ideas to solve engineering problems.*

CO2 : *Incorporate the ideas of integral calculus that are imperative for the effective understanding of electrical problems.*

CO3 : *Analyze ordinary differential equations concepts in modeling and solving physical problems.*

CO4 : *Solve problems related with the above mentioned areas and can identify the areas that could be directly applied.*

CO5 : *Demonstrate accurate and efficient use of numerical methods concepts to solve engineering problems.*

### DIFFERENTIAL CALCULUS

Limit of a function - Continuity -Rolle's theorem- Mean value theorem, Taylor's and Maclaurin theorems- Indeterminate forms and L'Hospital's rule-Maxima and Minima of functions of one variable.

(9)

### FUNCTIONS OF SEVERAL VARIABLES

Derivatives - Taylor's series for functions of two variables – Maxima and minima of functions of two variables-Lagrange's method of un-determined multipliers.

(9)

### INTEGRAL CALCULUS

Beta and gamma integrals –Simple problems- Double integrals-Change of order of integration–Double integrals in polar coordinates-Area enclosed by plane curves -Triple integrals –Evaluation -Volume of solids.

(9)

## ORDINARY DIFFERENTIAL EQUATIONS

Second and higher order linear differential equations with constant coefficients - Method of variation of parameters –Cauchy- Euler equation-Cauchy-Legendre equation – System of simultaneous equations with constant coefficients (9)

## NUMERICAL SOLUTIONS FOR LINEAR SYSTEMS AND ORDINARY DIFFERENTIAL EQUATIONS

Solution of algebraic and transcendental equations by Newton Raphson method, Solution of linear systems:Gauss elimination method-Gauss Seidel method. Numerical solution of first order ODE: Modified Euler's method-Runge-Kutta method of fourth order-Milne's predictor and corrector method. (9)

**TOTAL : 45+15=60**

## TEXT BOOKS

1. Joel R.Hass, Christopher E.Heil, Maurice D.Weir, "Thomos Calculus", 14<sup>th</sup> Edition (2018), Pearson.
2. B.V.Ramana," Higher Engineering Mathematics", 6<sup>th</sup> Edition (2014) Tata MC GrawHill Publishing Company Limited, New Delhi.

## REFERENCE BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", 43<sup>rd</sup> Edition (2014), Khanna Publishers.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 9<sup>th</sup> Edition (2010), JohnWiley& Sons.
3. Sivaramakrishnanadas.P, Rukmangadachari.E, "Engineering Mathematics", 2<sup>nd</sup> Edition (2013) Pearson, Chennai & Delhi.

# 19FYE11 TECHNICAL ENGLISH

L	T	P	C
2	0	1	2

## ASSESSMENT : THEORY

### COURSE OUTCOME

*Upon completion of this course the students will be able to demonstrate ability to*

- CO1 : Given a social context, compose appropriate dialogues using functional words, Construct Descriptive Paragraphs and reviews using sequencing words and unity of thought.*
- CO2 : Given a communication context, categorize the barriers to communication and formulate solutions. For a given communication situation, like introducing oneself, asking questions, disagreeing, expressing preferences, asking for and giving directions, generate functional expressions and construct dialogues.*
- CO3 : Given short conversations and monologues for listening, specify appropriate responses and construct a summary.*
- CO4 : Interpret the given technical graphical representation and compose passages. Summarize and paraphrase technical texts in about 250 to 300 words.*
- CO5 : Apply the rules of the grammar viz, word formation, verbs, tenses, question tags, prepositions, articles, conjunctions, concord, Idiomatic expressions, one word substitutes, Homophones and homonyms, linking words, adjectives and Degrees of Comparison, use appropriate patterns in the given sentence.*

### FOCUS ON LANGUAGE: GRAMMAR & VOCABULARY

Tenses – Question Tags – Prepositions – Articles – Conjunctions – Subject Verb Agreement – Idiomatic Expressions - Word Formation: Prefixes & Suffixes - One Word Substitutes – Homophones and Homonyms – Contracted form of Verbs – Emphasis - Linking Words – Common Errors and Redundancies – Adjectives - Degrees of Comparison. (5)

### TECHNICAL COMMUNICATION

Importance of Technical Communication - Objective & Characteristics of Technical Communication – General and Technical Communication – Process of Communication - Levels of Communication – Flow of Communication – Visual Aids in Technical Communication - Barriers to Communication: Noise – Classification of Barriers – Non-verbal Communication: Kinesics – Proxemics- Chronemics - Social Media Etiquette. (5)

### READING

Reading Comprehension – Skimming and Scanning – Summarizing – Sequencing of Sentences - Intensive & Extensive Reading- Note Making – SQ3R Reading Technique. (4)

### WRITING

Email Etiquette – Gadget Review – Types of Paragraphs – Description – Describing Structures – Information Transfer - Describing Trends – Paragraph Construction - Paragraph Patterns – Kinds of Paragraph – Writing a First Draft, Revising & Finalizing – Steps to Effective Précis Writing - Dialogue Writing – Essay Writing. (6)

## LISTENING

Meaning and Art of Listening-Importance of Listening & Empathy in Communication – Reasons for Poor Listening – Traits of a good listener – Listening modes - Listening and Filling Information – Identifying parts from a discussion. (4)

## SPEAKING

Introducing Oneself- Asking Questions –Retelling an Incident – Small Talk – Disagreeing – Expressing Preferences – Asking for and Giving Directions -Achieving Confidence, Clarity & Fluency – Vocal Cues - Barriers to Speaking – Types of Speaking – Persuasive Speaking – Public Speaking - Effective Presentation Strategies – Planning - Outlining & Structuring – Nuances of Delivery – Controlling Nervousness & Stage Fright – Making an Oral Presentation -Visual Aids in Presentation –Applications of MS Power Point. (6)

**Practical Sessions based on Theory**

(15)

**TOTAL : 45**

## TEXT BOOKS

1. *Sudharshana N. P & Savitha C, "English for Technical Communication", CUP, 2016.*
2. *Meenakshi Raman, Sangeeta Sharma, "Technical Communication – Principles and Practice", Oxford University Press, New Delhi, 2015.*

## EXTENSIVE READING

*C.M.Sharma, "Twelve Short Stories" OUP, 2000. (Only Essay Questions)*

## REFERENCE BOOKS

1. *Jack C Richerds, "Interchange - 2", CUP, Fourth Edition, Chennai, 2015.*
2. *Sudharshana N. P & Savitha C, "English for Engineers", CUP, 2018.*
3. *Ronald Carter, Michael McCarthy. "Cambridge Grammar of English" Cambridge University Press, 2011.*
4. *Michael McCarthy and Felicity O'Dell, "English Vocabulary in Use", Cambridge University Press, 2012.*
5. *Mark Ibbotson. "Cambridge English for Engineering" Cambridge University Press, 2012.*

# 19FYP13 ENGINEERING PHYSICS

(Common to EEE, CSE and IT Programmes)

L	T	P	C
3	0	0	3

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

To impart knowledge about lasers, optical fibers, quantum mechanics, conductors and dielectric materials and nanomaterials.

### COURSE OUTCOME

1. The students will gain knowledge and understanding of lasers and optical fibers.
2. The students will have a conceptual understanding about quantum mechanics and acquire basic knowledge about nano materials.
3. The students will be able to demonstrate competency and understanding of the electrical properties of conductors and dielectrics.

### 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)

### CONDUCTING AND DIELECTRIC MATERIALS

Conductors - classical free electron theory of metals - Electrical and thermal conductivity-Wiedemann - Franz law - Lorentz number - Draw backs 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). (9)

## **NANO TECHNOLOGY 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 – Liquid crystal display – Twisted nematic display - metallic glasses – preparation, properties and applications.

(9)

**Total : 45**

### **TEXT BOOKS**

1. V.Rajendran., *Engineering Physics, Tata McGraw Hill, Publishing Company, New Delhi, 2017.*
2. Avadhanulu M. N, Kshirsagar P.G, Arun Murthy. T.V.S, *A Textbook of Engineering Physics, S.Chand& Company Ltd., New Delhi, 2018.*

### **REFERENCE BOOKS**

1. S. Jayakumar, *Engineering Physics, RK Publishers, Coimbatore, 2007.*

# 19FYC11 ENGINEERING CHEMISTRY

(Common to Civil, Mechanical, EEE, ECE, CSE and IT Programmes)

L	T	P	C
3	0	0	3

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches. The students will learn to calculate the calorific values for different fuels. They will understand the sources of energy conversion and storage devices. They will learn the preparation of nano materials of different size and shapes using different synthetic techniques.

### COURSE OUTCOME

- 1) The students will be able to calculate the calorific value of different types of fuels and apply the same for suitable application.
- 2) The student will be conversant with the principles and implication of corrosion and its application
- 3) The students will be able to familiarize with various types of material analysis.
- 4) The students will be able to synthesize the nano materials of different size and shapes using different synthesis technique and apply the same for the energy conversion and storage devices.

## 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)

## ENGINEERING MATERIALS

Refractories – classification – acidic, basic and neutral refractories – properties [refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling] – Manufacture of Alumina, magnesite and Zirconia bricks. Abrasives – natural and synthetic abrasives – quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide. Lubricants – Mechanism of lubrication, classification of lubricants: liquid lubricants – properties [viscosity index, flash and fire points, cloud and pour points, oiliness] – solid lubricants – graphite and molybdenum sulphide, semi – solid lubricants. (9)

## ENERGY SOURCES AND STORAGE DEVICES

Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant - breeder reactor - solar energy conversion - solar cells – Principle and applications of silicon solar cell-wind energy. Batteries, fuel cells and super capacitors: Types of batteries – primary battery (dry cell) secondary battery (lead acid battery, lithium-ion-battery) fuel cells–  $H_2$ - $O_2$  fuel cell. (9)

## NANO CHEMISTRY

Basics - distinction between molecules, nano particles and bulk materials; size dependent properties. Nano particles: nano cluster, nano rod, nano tube (CNT) and nano wire. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Nano materials - Properties and applications. (9)

Total : 45

## TEXT BOOKS

1. P.C. Jain and Monica Jain, "Engineering Chemistry", (2015) 16<sup>th</sup> Edition, Dhanpat Rai Publishing company.
2. Shashi Chawla, "A Text Book of Engineering Chemistry", (2017), Dhanpat Rai & Company.

## REFERENCE BOOKS

1. S.S Dara and S.S Umare, "A Text Book of Engineering Chemistry", (2004) 12<sup>th</sup> Edition, S Chand & Company.
- 2) T.Pradeep, "Nano:The Essentials: Understanding Nano science and Nano technology", (2008) Tata McGraw-Hill Publishing Company Limited, New Delhi.

# 19CM11 BASIC CIVIL AND MECHANICAL ENGINEERING

## PART - A BASIC CIVIL ENGINEERING

(Only to EEE & Chemical Engg. Programmes)

L	T	P	C
3	0	0	3

### ASSESSMENT : THEORY

### COURSE OBJECTIVE

To Impart Knowledge about the fundamentals of building Sciences.

### COURSE OUTCOME

At the end of the course, students will not be able to

C01 : Compute simple stress and strain, thermal stress

C02 : Demonstrate basic knowledge about building materials and construction

C03 : Understand the basic concept of vibration and Green building.

### CONCEPT OF STRESS, STRAIN AND VIBRATION

Stress and Strain – Simple stresses and strains at a point – Normal and Shear Stresses – Hook's law – Young's Modulus – Bars subjected to Axial Forces – Thermal Stresses. Poisson's Ratio – Modulus of Rigidity – Surface and Volume Strains – Bulk Modulus – Relationship between Elastic Constants – Simple Problems. Introduction to Vibrations – Simple Harmonic Motion, Mass-Spring System – Free and Forced Vibration – Damping (Concept only) (9)

### BUILDING MATERIALS AND BUILDING CONSTRUCTION

Building Materials – Classification of Stones, Bricks, Cement, Aggregates, Concrete and Steel. Building Components – Functions – Requirements. Green Building, Concept and Principles of Green Building – Energy Efficient Materials. (7)

### SUB STRUCTURES AND SUPER STRUCTURES

Objectives of Foundation – Types of Foundations – Requirements of Good Foundation.

Super Structure – Brick and Stone Masonry – Columns – Beams – Types of Flooring – Types of Roofing. Dams – Elements of Dam, Classification and Selection Criteria. (6)

**Total : 22**

## **TEXT BOOKS**

1. *Bansal R.K., "Strength of Materials", Laxmi Publications, New Delhi, 2010*
2. *Palanichamy M S., "Basic Civil Engineering", Tata McGraw Hill Publishing Co., New Delhi, 4<sup>th</sup> Edition, 2011.*

## **REFERENCE BOOKS**

1. *Duggal S K, "Building Materials", New Age International(P) Ltd., New Delhi, 2008.*
2. *Ganbir M, Neha Jamival, "Building Materials Products, properties and Systems" TaTa Mc Graw Hill Publishing Co., New Delhi, 2011.*
3. *Rajasekaran S and Sankarasubramanian G. " Engineering Mechanics Statics and Dynamics, Vikas Publishing House Pvt. Ltd., New Delhi, 2009.*
4. *Sadhu Singh, " Strength of Materials ", Khanna Publishers, New Delhi, 2012.*

# 19MEL11 ENGINEERING GRAPHICS

L	T	P	C
1	0	4	3

## ASSESSMENT : PRACTICAL

### COURSE OBJECTIVE

1. To introduce the students to the "universal language of Engineers" for effective communication through drafting exercises of different geometrical shapes.
2. To develop the ability to communicate with others through the language of technical drawing and sketching.
3. To enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient.

### COURSE OUTCOME

Upon successful completion of this course, the students will be able to

CO1 : Understand the importance of BIS and ISO Standards in Engineering Drafting.

CO2 : Imagine and visualize the geometric details of engineering objects.

CO3 : Communicate ideas through technical drawings.

CO4 : Use computer aided drafting in their respective engineering field.

CO5 : Interpret Orthographic and Isometric views of objects.

### INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their significance, usage of drawing instruments and Lettering, dimensioning and scales. (7)

### ORTHOGRAPHIC PROJECTIONS

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes. (15)

### PROJECTIONS OF REGULAR SOLIDS

Projections of solids Inclined to both the Planes - Draw simple annotation. (15)

### SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Sections - Prism, Cylinder, Pyramid, Cone; 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 simple Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa. (15)

## **OVERVIEW OF COMPUTER GRAPHICS**

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids].

**(8)**

## **TEXT BOOKS**

1. K. Venugopal and V. Prabhu Raja, *Engineering Graphics*, New Age International Publishers, 2017.

## **REFERENCE BOOKS**

1. Bhatt N.D., Panchal V.M. & Ingle P.R., *Engineering Drawing*, Charotar Publishing House, 2014.
2. Shah, M.B. & Rana B.C., *Engineering Drawing and Computer Graphics*, Pearson Education, 2008.
3. Agrawal B. & Agrawal C. M., *Engineering Graphics*, TMH Publication, 2012.
4. Narayana, K.L. & P Kannaiah, *Text book on Engineering Drawing*, Scitech Publishers, 2008.

# 19PL11 PHYSICS LABORATORY I

(Common to Civil, Mechanical, EEE, ECE, CSE and IT Programmes)

L	T	P	C
0	0	2	0.5

## ASSESSMENT : PRACTICAL

### COURSE OBJECTIVE

*To make students to understand basic concepts of properties of matter, light, electricity, magnetism and semiconductors and acquire experimental skills by carrying out experiments.*

### COURSE OUTCOME

*The student will be able to gain a fundamental understanding of the apparatus used in the experiments and recognize how observation, experiment and theory work together.*

### List of Experiments

1. Air Wedge-Thickness of thin wire.
2. Torsional Pendulum-Rigidity Modulus.
3. Determination of Band gap of a Semiconductor.
4. Magnetic field along the axis of a current carrying coil.
5. Calibration of Voltmeter and Ammeter.
6. Figure of Merit of Galvanometer.
7. Synthesis of nano materials by sol gel method (Demonstration Experiment).

**19CL11 CHEMISTRY LABORATORY I**  
(Common to Civil, Mechanical, EEE, ECE, CSE and IT Programmes)

L	T	P	C
0	0	2	0.5

**ASSESSMENT : PRACTICAL**

**COURSE OBJECTIVE**

- i. To help the students to understand the principles involved in complexometric titration.
- ii. To learn the principles such as conductometry and pH metry.
- iii. To understand and appreciate the working of conductormeter and pH meter.

**COURSE OUTCOME**

- i. By the estimation of dissolved oxygen present in water, the student will be able to appreciate how oxygen in water causes corrosion of boiler materials. Students are able to handle analytical tools such as of conductormeter and pH meter.
- ii. Students will gain an understanding of different types of volumetric titration.

**List of experiments**

1. Estimation of Nickel Using Murexide Indicator, by Direct Method.
2. Determination of strength of given HCl using NaOH by pH measurement.
3. Assay Determination of Sodium Carbonate.
4. Determination of Alkalinity of water by Warden's Method.
5. Determination of equivalent conductance of a strong electrolyte.
6. Estimation of Dissolved Oxygen in water sample by Winkler's Method.

# 19FYEL11 EMPLOYABILITY SKILLS

L	T	P	C
0	0	2	1

## ASSESSMENT : PRACTICAL

### COURSE OUTCOME :

- Given strictly timed objective questions on logical reasoning and verbal ability solve within the given time.
- For a given specific speaking task on topics like describing a picture, movie reviews, and story telling, generate ideas and speak confidently.
- For a given social situation viz., greeting, thanking, congratulating, apologizing and giving directions, demonstrate command over conversations using appropriate functional expressions.
- For a given 2 to 5 minutes speaking activity like Extempore and Debate, produce language structures accurately and fluently. For a given technical topic, prepare a power point presentation for 15 minutes.
- Given short conversations and monologues for listening, specify appropriate responses and construct a summary. Construct dialogues for a given social scenario and interpret the given graphic information and write creative paragraphs.

### UNIT - 1

Self Introduction - Barriers to Speaking and Listening - Introduction to Spoken English, Greetings, Thanking - Apologizing, Congratulating - Giving Directions, Shopping – Role Play. (6)

### UNIT - 2

Activity based on newspaper articles - Word Building - A picture and a few words activity - Current Events. (4)

### UNIT - 3

Alphabet test – Alphabet Order, Alphabet Series - Letter Word Problem, Word Formation and Scramble - Series Completion – Para Jumbles- Synonyms and Antonyms- Types and Exercises- Sentence Completion – Types and Exercises. (8)

### UNIT - 4

Reading Comprehension- Skimming and Scanning - Reading Prose – Bacon's Essays (Speaking Activity based on the essays) - Story Building- Extempore - Movie Reviews. (4)

### UNIT - 5

Speech Sounds - Word Vocabulary - Reading Comprehension - Listening Practice- I - Dialogue Writing - Conversational Exercise – I - Focus on Language - Creative Writing - Conversational Exercise – II - Listening Practice – II. (8)

**Total - 30**

# 19FYM22 Vector Calculus, Linear Algebra and Partial Differential Equations

(only to EEE programme)

L	T	P	C
3	1	0	4

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

The main objective of this course is

- To inculcate the concepts of vector calculus which have got a direct leverage over various disciplines of engineering and its applications.
- To gain knowledge on basic tools useful for specialized studies in electrical engineering.
- To gain knowledge of basic concepts of partial differential equations those are vital for the study of engineering subjects.

### COURSE OUTCOME

Upon completion of this course the students will be able to

- CO1 : Apply vector calculus concepts to understand and solve electrical problems
- CO2 : Explain the fundamental concepts of linear algebra and their role in modern Mathematics and applied contexts.
- CO3 : Analyze partial differential equations concepts in modeling and solving physical problems.

### VECTOR CALCULUS

Vector differentiation – Gradient and directional derivative – Divergence and curl - Solenoidal and irrotational vector fields – Vector integration- Line, surface integral and volume integrals – Green's, Gauss divergence and Stoke's theorems (without proof) – Simple applications involving cube and rectangular parallelepiped. (9)

### MATRIX ALGEBRA I

Systems of Linear Equations-Row Reduction and Echelon Forms-Vector Equations.

The Matrix Equation  $Ax=b$ -Solution Sets of Linear Systems -Applications of Linear Systems-Linear Independence- Introduction to Linear Transformations-The Matrix of a Linear Transformation- Matrix factorization-LU decomposition. (9)

### MATRIX ALGEBRA II

Eigenvalues and Eigenvectors – properties (without proof) -Diagonalization- Eigenvectors and linear transformation-Graphical description of solution (linear lines only). (9)

### VECTOR SPACES

Vector Spaces and Sub spaces -Null spaces, column spaces and linear transformations-Linearly Independent Sets, Basis-The Dimension of a Vector space-Rank- Change of Basis - Inner product,

Length and Orthogonality-Orthogonal sets- Orthogonal projections- The Gram-Schmidt process- Least square problems-Application to linear models- Least square lines only. (9)

### **PARTIAL DIFFERENTIAL EQUATIONS**

Formation of partial differential equation– Solutions of first order non-linear partial differential equations (standard types only)-Lagrange's linear equations – Second and higher order linear homogeneous partial differential equation with constant coefficients. (9)

**TOTAL : 45+15=60**

### **TEXT BOOKS**

1. David C.Lay, "Linear algebra and its applications", third edition, (2010) Pearson Education.
2. B.V.Ramana, "Higher Engineering Mathematics", 6<sup>th</sup> Edition (2014), Tata Mc Graw-Hill Publishing Company Limited, New Delhi.

### **REFERENCE BOOKS**

1. Grewal B.S, "HigherEngineeringMathematics", 42<sup>nd</sup> Edition (2012), Khanna Publishers.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 9<sup>th</sup> Edition (2010), JohnWiley& Sons.
3. Gilbert Strang, "Introduction to Linear Algebra", 5<sup>th</sup> Edition (2016), Wellesley Cambridge Press and SIAM.

# 19FYE21 PROFESSIONAL ENGLISH

L	T	P	C
2	0	1	2

## ASSESSMENT : THEORY

### COURSE OUTCOME

- CO1 : Apply the rules of grammar namely Active and Passive voice, Direct and Indirect speech, Cause and effect, Purpose and Function, Prepositions, Conditional sentence, Modal verbs and use suitable patterns in a given sentence or passage.
- CO2 : Construct appropriate responses to greet, transfer, place the caller on hold enquires, callbacks, unintentional disconnects, interruptions, using suitable language and telephoning etiquettes. Given a business communication scenario, construct a suitable strategy and action plan using specific negotiation tactics consistent with the objectives of the negotiator.
- CO3 : Given a communication context, specify the type and barrier to listening, provide solutions and justify. For a given passage, categorize information and complete the passage using appropriate vocabulary and grammatical form.
- CO4 : Given a business communication scenario, compose Business Letters, Memo, Emails, Reports, Minutes of the Meeting, Technical Proposals, Instructions and Recommendation and Checklists using appropriate language and format. For a given job requirement, prepare a job application letter with resume.
- CO5 : For a given communication content viz., Giving Advice and Suggestions, Apologizing, Asking for Giving Permission, construct dialogues with appropriate functional expressions.

### FOCUS ON LANGUAGE: ENGLISH GRAMMAR & VOCABULARY

Reported Speech – Active Passive Voice – If Clause – Modal Verbs – Verb Preposition Combinations – Confusing Words – Abbreviations and Acronyms – Business and Job Related Vocabulary – One Relative Clause – Pronouns – Cause and Effect Expressions – Purpose and Function. (5)

### BUSINESS ENGLISH

Telephoning Skills: Understanding Telephone communication – Telephonic Conversations and Etiquettes - Handling Calls – Leaving a Message – Making Requests –Asking for and Giving Information – Giving Instructions - Negotiations: Types of Negotiation –Six Basic Steps of Negotiations – Informal and formal Negotiations. (5)

### READING

Reading a Procedure – Researching for supporting Evidence – Categorizing Information - Cloze Comprehension – Critical Reading: Creative and Critical Thinking -- Reading Proverbs. (4)

### WRITING

Business Letters – Job Application Letters – Describing a Product and Process – Minutes of the Meeting - Report Writing – Proposal Writing –Memos – Emails - Instructions & Recommendations – Checklist. (6)

## LISTENING

Listening to a lecture and sorting information – Listening and filling a mind map – Listening to an interview to create a bio-sketch – Types of Listening – Barriers of Effective Listening – Intensive Listening. (4)

## SPEAKING

Group Communication: Forms of Group Communication – Using Body Language – Group Discussions - Organizational GD – GD as a Part of Selection Process - Interviews: Objectives of Interviews – Types of Interviews – Job Interviews – Apologizing – Discussing an Advertisement – Giving Advice and Suggestions – Asking for and Giving Permission – Meetings. (6)

**Practical Sessions based on Theory** (15)

**Total : 45**

## TEXT BOOKS

1. Sudharshana N. P & Savitha C, "English for Technical Communication", CUP, 2016.
2. Meenakshi Raman, Sangeeta Sharma, "Technical Communication – Principles and Practice", Oxford University Press, New Delhi, 2015.

## REFERENCE BOOKS

1. Jack C Richerds, "Interchange - 2", CUP, Fourth Edition, Chennai, 2015.
2. Sudharshana N. P & Savitha C, "English for Engineers", CUP, 2018
3. Ronald Carter, Michael Mc Carthy. "Cambridge Grammar of English" Cambridge University Press, 2011.
4. Michael McCarthy and Felicity O'Dell, "English Vocabulary in Use", Cambridge University Press, 2012.
5. Mark Ibbotson. "Cambridge English for Engineering" Cambridge University Press, 2012.

# 19FYP23 ELECTRON DEVICES

(Common to EEE & ECE programmes)

L	T	P	C
3	0	0	3

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

To acquaint the students with theory and operation of the basic electron devices.

### COURSE OUTCOME

CO1 : To understand operation and switching characteristics of semiconductor diode.

CO2 : To gain knowledge about the working details, major applications of BJT, FET, power devices and display devices.

CO3 : To realize simple practical circuits

### PN JUNCTION DIODE :

PN junction diode- Current equations-Diffusion and drift currents\* - forward and reverse bias characteristics-Switching Characteristics- Diode Resistance – Transition or space charge Capacitance – Diffusion or storage capacitance-Avalanche and Zener breakdown-Zener diode-Zener voltage regulator. (9)

### BIPOLAR JUNCTION TRANSISTOR :

NPN and PNP transistors-Current equations – Input and Output characteristics of CE, CB CC-Early effect- Multi Emitter Transistor –Methods of transistor biasing –Transistor as switch– bias stability – bias compensation-Thermal runaway. (9)

### FIELD EFFECT TRANSISTORS :

JFET - Types – construction - Drain and Transfer characteristics -Current equations-Pinch off voltage and its significance - JFET as Voltage Variable Resistor -Applications of JFET.

MOSFET- Enhancement MOSFET - Depletion MOSFET – Comparison of MOSFET with JFET – Biasing the JFET - Biasing the MOSFET - Comparison of JFET and BJT. (9)

### SPECIAL SEMICONDUCTOR DEVICES\* :

Metal-Semiconductor Junction- MESFET-Schottky barrier diode-Varactor diode –Tunnel diode-Gallium Arsenide device-LASER diode, LDR. (9)

### POWER DEVICES AND DISPLAY DEVICES\* :

UJT, SCR, DIAC, TRIAC, Power BJT- Power MOSFET- DMOS-VMOS. LED- LCD- Photo transistor - Opto Coupler- Solar cell. (9)

\*Qualitative Treatment only

Total : 45

### **TEXT BOOKS**

1. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", 11th Edition, Prentice-Hall of India, New Delhi, 2015.
2. Jacob Millman, Christos C Halkias, SatyabrataJit, "Electronic Devices and Circuits", Tata McGraw-Hill, Fourth Edition, 2015.
3. Thomas L. Floyd, "Electronic Devices", 9th Edition, Pearson Education Asia, 2017.

### **REFERENCE BOOKS**

1. Donald A Neaman, "Semiconductor Physics and Devices", Fourth Edition, Tata McGrawHill Inc. 2017.
2. Allen Mottershed, "Electronic Devices and Circuits an Introduction", PHI Learning, 2015.
3. Salivahanan, "Electron Devices and Circuits", Second edition, Tata McGraw-Hill, New Delhi, 2017.
4. David A. Bell, "Electronic Devices and Circuits", Fifth Edition, Oxford Higher education, 2016.

# 19FYC21 ENVIRONMENTAL SCIENCE AND ENGINEERING

(Common to Civil, Mechanical, EEE, ECE, CSE and IT Programmes)

L	T	P	C
3	0	0	1

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

- ♦ To study the nature and facts about environment.
- ♦ To find and implement scientific, technological, economic and political solutions to environmental problems.
- ♦ To study the interrelationship between living organism and environment.
- ♦ To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- ♦ To study the dynamic processes and understand the features of the earth's interior and surface.
- ♦ To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

### COURSE OUTCOME

The students completing the course will have

- ♦ An insight into the chemical reactions in water, air and soil environment.
- ♦ The ability to apply chemistry principles in analysing pollution of water, air and soil environment.
- ♦ An understanding on the fate of chemicals on the environment and suggest relevant interventions.
- ♦ An insight into the environmental protection act and the associated rules knowledge on the institutional setup for environmental management and pollution control.

### NATURAL RESOURCES

(9)

Forest resources: Use and over-exploitation, deforestation, Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

### RENEWABLE ENERGY RESOURCE AND ENVIRONMENTAL POLLUTION

(9)

Energy resources-growing energy needs, renewable and non-renewable energy sources uses of alternative energy sources-merits and limitation of solar energy-wind and tidal energy- OTEC- Geothermal energy- Hydel energy.

Source, causes, effects and management of air pollution, water pollution, soil pollution, noise pollution, marine pollution and radioactive pollution. Solid waste Management.

## **ECOSYSTEM AND BIODIVERSITY**

(9)

Concept of an ecosystem- structure and functions- ecological succession, food chain, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem (Ponds, lakes, ocean and rivers).

Biodiversity-types, Importance and values of biodiversity, India as a mega diversity nation, Hot spots of biodiversity, Threats to biodiversity and Conservation of biodiversity.

## **ENVIRONMENTAL BIOTECHNOLOGY AND GREEN CHEMISTRY**

(9)

Biotechnology and its applications in environment protection, Bioinformatics- Bioremediation, Bio deodorization, Green chemistry for clean technology. Significance of green chemistry-basic components of green chemistry. Industrial application of green chemistry-green fuels-e-green propellants and bio catalysts.

## **GLOBAL ENVIRONMENTAL ISSUES AND MANAGEMENT**

(9)

Water conservation, Rain water harvesting, Environmental Ethics, Climate change, Ozone depletion, Acid rain and Greenhouse effect and global warming, Environment (protection) Act, Air( prevention and control of pollution) Act, Water ( prevention and control of pollution) Act, Wildlife protection Act and Forest (conservation) Act. Disaster management- Earthquakes, Floods, Landsides and cyclones.

**TOTAL : 45**

## **TEXT BOOKS**

1. SurinderDeswal and Dr.Aunpama Deswal, "A Basic Course in Environmental Studies", (2017) DhanpatRai & Co.
2. AnubhaKaushik and CP Kaushik, "Perspectives in Environmental Studies", 6<sup>th</sup> Edition (2015), New Age International (P) Ltd.

## **REFERENCE BOOKS**

1. Benny Joseph, "Environmental Studies", (2017) 3<sup>rd</sup> Edition, McGraw Hill India.
2. Dr.S.S.Dara and Dr.D.D.Mishra, "A Text Book of Environmental Chemistry and Pollution Control", (2010), S Chand & Company.

# 19EE22 ELECTRIC AND MAGNETIC CIRCUITS

(Only to EEE programme)

L	T	P	C
3	0	0	3

## ASSESSMENT : THEORY

### COURSE OBJECTIVE

*To introduce the fundamentals of electric circuits, magnetic circuits and electrical installation to the students*

### COURSE OUTCOME

CO1 : *To gain knowledge of basic circuit elements and able to analyze DC circuits.*

CO2 : *To understand the concepts of magnetic circuits and electromagnetic induction.*

CO3 : *To realize the electrical wiring system and safety measures.*

### CIRCUIT ELEMENTS

Electric circuit – System of units – Charge and Current – Voltage – Power and Energy – Concept of Linearity and bilateral property – Circuit Elements – Active and Passive Elements – Independent and dependent current and voltage sources – Resistors, Inductors, and Capacitors – Stored Energy – Voltage, Current and Power Relationships of circuit elements – Series and Parallel combination of circuit elements. (9)

### DC CIRCUIT ANALYSIS

Ohm's Law – Kirchhoff's Laws – DC Analysis of Series, Parallel and Series-Parallel circuits – Voltage and Current division rules – Nodes, Branches and Loops – Network Reduction Techniques – Branch current, Mesh current and node voltage methods of analysis of DC circuits – Source transformation – Star -Delta transformation. (9)

### MAGNETIC CIRCUITS

Magnetic Field – Magnetic Flux – Magnetic Field Strength – Flux Density – MMF – Reluctance and permeability - Laws of magnetic circuits; Biot-Savart's Law- Ampere's Circuital Law – Force on current carrying conductor in Magnetic field – Fleming's Left hand rule – Hysteresis – Calculation of Ampere-turns for series and series-parallel magnetic circuits – Comparison of Electric and Magnetic circuits. (9)

### ELECTRO MAGNETIC INDUCTION

Faraday's laws of electromagnetic induction – Lenz's Law- Direction of induced EMF – Fleming's Right Hand Rule – Statically induced EMF – Dynamically induced EMF – Self-inductance – Mutual inductance – Coefficient of coupling – Dot convention – equivalent inductance of coupled coils connected in series and parallel. (9)

## **FUNDAMENTALS OF ELECTRICAL INSTALLATION**

Types of installation: AC and DC – Types of wiring systems – Accessories of electrical installation – Domestic wiring installation – Staircase wiring – Fluorescent tubes – Earthing of installation – Testing of electrical installation – Fuses – MCBs - ELCBs – Basic safety measures.

(9)

**Total : 45**

### **TEXT BOOKS**

1. V. N. Mittle, "Basic Electrical Engineering", Tata McGraw Hill publishing company Limited, New Delhi, 2011.

### **REFERENCE BOOKS**

1. Charles K. Alexander, Mathew N. O. Sadiku, "Fundamentals of Electric Circuits", V Edition, McGraw Hill Education (India) Private Limited, New Delhi 2013.
2. Sergio Franco, "Electric Circuits Fundamental", Oxford University press, USA 2010.
3. Thomas L Floyd, "Principles of electric circuits", Pearson, 9<sup>th</sup> edition 2016
4. Van Velkenburgh, Nooger&Niville Inc., "Basic electrical engineering", Cengage Learning India private Limited, 2009.

# 19CSL21 C PROGRAMMING AND DATA BASES

(Only to EEE programme)

L	T	P	C
0	0	4	2

## ASSESSMENT : PRACTICAL

### COURSE OUTCOME

- CO1 : Ability to write, compile and debug C programs.
- CO2 : Develop simple programs using decision making statements, looping constructs, arrays and structures.
- CO3 : Practice various DDL, DML, TCL commands so as to perform various database operations and solve queries for given application.

### EXPERIMENTS USING THE FOLLOWING CONCEPTS :

#### C Programming

- ◆ Operators
- ◆ Decision Statements
- ◆ Control Statements
- ◆ Arrays
- ◆ Pointers
- ◆ Structures

#### Database Programming

- ◆ Database Creation, Insertion and Deletion
- ◆ Queries based on DML commands
- ◆ Aggregate Functions
- ◆ Sub - Queries and Joins
- ◆ Group by clause and DATE functions

## 19PL21 PHYSICS LABORATORY II

(Common to Civil, Mechanical, EEE, ECE, CSE and IT Programmes)

L	T	P	C
0	0	2	0.5

### ASSESSMENT : PRACTICAL

### COURSE OBJECTIVE

*To make students to understand basic concepts of properties of matter, light, electricity, and semiconductors and acquire experimental skills by carrying out experiments.*

### COURSE OUTCOME

*The student will be able to gain a fundamental understanding of the apparatus used in the experiments and recognize how observation, experiment and theory work together.*

### List of Experiments

1. Implementation of Basic Logic Gates using Universal Gates.
2. Study of I-V characteristics of Solar Cell and Determination of its efficiency.
3. LASER - Determination of wavelength.
4. Young's Modulus- cantilever
5. Study of charging and discharging of a capacitor.
6. Determination of Specific Resistance.
7. Determination of Numerical aperture of an Optical fibre (Demonstration Experiment).

# 19CL21 CHEMISTRY LABORATORY II

(Common to Civil, Mechanical, EEE, ECE, CSE and IT Programmes)

L	T	P	C
0	0	2	0.5

## ASSESSMENT : PRACTICAL

### COURSE OBJECTIVE

- To help the students to understand the principles involved in complexometric titration.
- To learn the principles such as flame photometry, spectrophotometry and potentiometry.
- To understand and appreciate the working of spectrophotometer, flame photometer and potentiometer.

### COURSE OUTCOME

- 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.
- By the determination of weight loss method, the student will be able calculate rate of corrosion
- Students are able to handle analytical tools such as spectrophotometer, flame photometer, conductometer and potentiometer.

### List of Experiments

- Determination of sodium in water sample by flame photometry.
- Estimation of iron in water sample by spectrophotometry.
- Estimation of Calcium using Eriochrome Black -T indicator Substitution method
- Determination of corrosion rate of steel in acid media by weight loss method
- Estimation of acid in a mixture by conductometry.
- Estimation of ferrous ion by potentiometric titration

# 19FYEL21 ENGLISH FOR EMPLOYABILITY

L	T	P	C
0	0	2	1

## ASSESSMENT : PRACTICAL

### COURSE OUTCOME

- CO1 : Given strictly timed objective questions on logical sequence of words, sequential order of things, comparison, and sentence correction, solve within the given time.
- CO2 : For a given specific speaking task on topics like JAM, Describing an object, Book Review and Extempore, Generate ideas and speak confidently.
- CO3 : For a given social situation viz., Travel and Transport, Complaining, Giving Instructions, Advising and Sympathizing, Requesting and Warning people, Communicate effectively to peer using appropriate functional language.
- CO4 : For a given HR topic, generate valid points for and against the topic and present them with appropriate group behavior. For any job requirement, plan and prepare a 20 min HR mock interview.

### UNIT – 1

Ice Breakers - Just a Minute - Book Reviews - Describing an object – Extempore – Paraphrasing. (6)

### UNIT – II

Spoken English - Travel and Transport, Complaining - Giving Instructions, Advising and Sympathizing – Requesting and warning people. (5)

### UNIT – III

Logical Sequence of Words- Exercises - Sequential Order of Things - Comparison Type Questions - Introduction and Exercises - Idioms and Phrases - Types and Exercises - Vocabulary through Mythology - One word Substitutes - Word Power Exercises - Common Errors in English - Sentence Correction. (7)

### UNIT – IV

Activity based on newspaper articles - Vocabulary – Homophones and Homonyms - Reading Prose – Reading Comprehension Activity. (4)

### UNIT – V

Professional Communication - Mock Group Discussion – Mock Interview – Telephoning Skills – Personality Development Activities. (8)

**Total - 30**

# 19MEL12 ENGINEERING PRACTICES LABORATORY

L	T	P	C
0	0	2	1

## ASSESSMENT : PRACTICAL

## COURSE OBJECTIVE

To provide exposure to the students with hands on experience on various basic engineering practices.

## COURSE OUTCOME

At the end of this course, the students will be able to

- CO1 : Understand various engineering practices like carpentry, fitting, sheet metal, plumbing and electrical wiring and relevant tools.
- CO2 : Identify and rectify minor electrical problems at home and office.
- CO3 : Implement the skills acquired during their project work.
- CO4 : Develop their hand-eye coordination capabilities.

## CARPENTRY

1. Planing and marking practice
2. Chiseling practice
3. Making a half- lap joint
4. Making a dove-tail joint

## FITTING

1. Making a square joint
2. Making a dove-tail joint
3. Making a V-joint
4. Making a L and single dove-tail joint

## SHEET METAL

1. Making of single seam panned-down joint
2. Making of double seam knocked-up joint
3. Making of dove-tail seam double-grooved joint
4. Fabrication of dust pan
5. Fabrication of rectangular box with base

## PLUMBING

1. Practice of external threading on PVC pipe
2. Practice of saddle connection to a house service line
3. Study of valve and tap repairs
4. Laying of pipe connections for wash basin/sink

## **ELECTRICAL WIRING**

1. BIS symbols used in electrical circuits and precautions to be observed.
2. Preparation of a wiring circuit for a single lamp controlled by a single switch.
3. Dim and bright connection method.
4. Preparation of wiring circuit to control one lamp by two switches at different places (Staircase wiring)
5. Measurement of power and energy.

## **REFERENCE BOOK**

1. *Engineering Practices Laboratory Manual, Department of Mechanical Engineering, CIT, 2019.*