

122ENI01	PROFESSIONAL ENGLISH-I (Embedded Course - Common to all branches)	L	T	P	C
		2	0	2	3

OBJECTIVES:

The Course prepares first semester Engineering and Technology students to:

- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialisation.
- Present information in an appropriate oral form.
- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write anything convincingly with grammatical accuracy.

THEORY

UNIT I – Listening

Listening to news and understanding its perspectives - Listening to motivational speech to comprehend the purpose - Listening to technical talks to understand its significance - Listening to classroom lecture to equip content knowledge - Listening comprehension

UNIT II - Speaking

Everyday activities for day to day communication - Extempore/Impromptu to develop spontaneous thoughts - Self introduction to face interviews - Public speaking for persuading the audience - Movie reviews to promote critical thinking.

UNIT III- Reading

Newspaper reading to upgrade world knowledge - Reading Comprehension to analyse the text – Novels to improve creativity - Biography/Autobiography to synthesise experience - Technical articles for upgrading technical knowledge.

UNIT IV- Writing

Definitions - Instructions - Checklists – Recommendations - Essays - Invitation and quotation letters - Email etiquettes - Reports - Minutes of a meeting

UNIT V- Language Development

Technical vocabulary - Parts of speech - Articles - Tenses - Voices - Numerical adjectives - Question tags - Misspelled words - Singular and plural nouns - Modals - Conditionals.

ENGLISH LABORATORY

Unit 1: Listening

Listening audios and answering MCQs - Watching video clips on famous speeches, motivational videos, documentaries and answering MCQs - TED talks.

Unit 2: Speaking

Prepared talk - Story knitting - Picture talk - Brainstorming - Debate - Group discussion - Elevator speech - Mock HR interviews - Story narration - Miming - Short skits.

Unit 3: Reading

Classification - Alphabet test - Logical sequence of words - Statement & conclusions - Statement & courses of action - Situation reaction test - Theme detection - Deriving conclusions from passages.

Unit 4: Writing

Resume writing - Letter writing (Covering letter - Follow up letter - Letter of thanks giving - appreciation - Gratitude) - Paragraph writing - Jumbled paragraph - Error spotting.

Unit 5: Career Skills

Vocabulary Test (GRE, TOEFL, TOEIC & CAT Exam words) - Confused Pair of words - Contronyms - Time management – Stress management - Decision making - Negotiation - Sentence correction.

TOTAL : 60 HOURS

Lab Requirements:

1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software

OUTCOMES:

At the end of the course, learners will be able to:

CO1: Listen and comprehend the various strategies of listening and its significance in their area of specialisation successfully.

CO2: Speak appropriately and effectively in varied formal and informal contexts.

CO3: Read and comprehend texts effortlessly and understand the prevailing practices of testing in the recruitment process by the corporates and the institutional selection processes.

CO4: Communicate the corporate and social requirements in an impressive written mode.

CO5: Understand the basic grammatical structures and its applications and enhance their verbal skills in the screening tests competently both for recruitment and pursuing higher studies as well.

TEXT BOOKS:

1. Board of editors. **Fluency in English: A Course book for Engineering and Technology**. Orient Blackswan, Hyderabad: 2016.
2. Sudharshana. N. P and Saveetha. C. **English for Technical Communication**. Cambridge University Press: New Delhi, 2016.
3. Uttham Kumar. N. **Professional English - I** (with work book). Sahana Publications, Coimbatore, 2016.
4. Agarwal R. S. A Modern Approach to Verbal and Non-verbal Reasoning. Chand & Co., New Delhi, 2012.
5. Ashraf Rizvi M. Effective Technical Communication. TATA McGraw Hill, New Delhi, 2007.

REFERENCES:

1. Raman, Meenakshi and Sharma, Sangeetha- Technical Communication Principles and Practice. Oxford University Press: New Delhi, 2014.
2. Kumar, Suresh. E. Engineering English. Orient Blackswan: Hyderabad, 2015.
3. Booth-L. Diana, Project Work, Oxford University Press, Oxford: 2014.
4. Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford: 2007
5. Means, L. Thomas and Elaine Langlois, English & Communication For Colleges. Cengage Learning, USA: 2007.
6. Lingua: Essays for TOEFL/IELTS, Dreamtech Press, New Delhi, 2016.
7. Lily Mangalam, Global English Comprehension, Allied Publishers Pvt. Ltd., New Delhi, 2014.
8. Sharon Weiner Green and Ira K. Wolf, Barron's GRE, Glagotia Publications Pvt. Ltd., 18th Edition, New Delhi, 2011.
9. Mohamed Elias, R. Gupta's IELTS/TOEFL Essays, Ramesh Publishing House, 6th Edition, New Delhi, 2016.

122MAT02	MATRICES AND CALCULUS (Common to all branches)	L	T	P	C
		3	1	0	4

Course Objectives

- To understand the eigenvalue problems.
- To learn the derivatives of multivariable functions and applications.
- To solve differential equations of certain types, including systems of differential equations that they might encounter in engineering subjects.
- To understand double and triple integration concepts.
- To study vector calculus comprising of surface and volume integrals along with the classical theorems involving them.

UNIT I MATRICES **9+3**
 Eigenvalues and eigenvectors of a real symmetric matrix – Properties – Cayley - Hamilton theorem (Statement and applications only) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II FUNCTIONS OF SEVERAL VARIABLES **9+3**
 Partial derivatives – Euler’s theorem for homogenous functions – Total derivatives – Jacobians – Taylor’s expansion– Maxima and Minima – Method of Lagrangian multipliers.

UNIT III ORDINARY DIFFERENTIAL EQUATIONS **9+3**
 Second order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients-Applications to Engineering problems- Electric Circuits, Simple Harmonic Motions and Bending of beams.

UNIT IV MULTIPLE INTEGRALS **9+3**
 Double integration – Cartesian and polar co-ordinates – Change of order of integration – Change of variables between Cartesian and polar coordinates –Triple integration in Cartesian co-ordinates – Area as double integral – Volume as triple integral.

UNIT-V VECTOR CALCULUS **9+3**
 Gradient, Divergence and Curl – Directional derivative – Irrotational and Solenoidal, vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (Statement and applications only) – Simple applications involving cubes and rectangular parallelepipeds.

TOTAL: 45+15= 60

Course Outcomes

After completing this course, the student will be able to

- CO 1:** Apply the matrix algebra concepts for solving practical problems.
CO 2: Compute extremities of a function using multivariable derivatives.
CO 3: Determine the solutions of ordinary differential equations by various methods which have an application in their core subjects.
CO 4: Determine the area and volume in 2-dimension and 3-dimension respectively using multiple integrals.
CO 5: Expertise the concept of vector calculus and apply in core subjects.

TEXT BOOKS

1. Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley India, 10th edition New Delhi 2016.
2. Grewal. B.S, “Higher Engineering Mathematics”, 44th Edition, Khanna Publications, Delhi, 2017.

REFERENCES

1. T. Veerarajan, “Engineering Mathematics” ,Tata McGraw-Hill Publishing company, New Delhi, 2014.
2. Kandasamy.P, Thilagavathy,K., &Gunavathi.K., “Engineering Mathematics for first year ”., S.Chand & Company Ltd., New Delhi,2014.
3. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11thReprint, 2010.
4. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 3rd Edition, 2007.
5. V. Prameelakaladharan and G.Balaji, “Engineering Mathematics - I”, 3rd Edition, Amrutha marketing, Chennai, 2017.

Objectives:

The Course prepares first semester Engineering and Technology students to:

- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialization.
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122PHT03	ENGINEERING PHYSICS (Common to all branches)	L	T	P	C
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Objectives:

At the end of the course the students would be exposed to fundamental knowledge in

- Different engineering subjects and applications.
- Acoustics in building and Non-destructive techniques.
- Application of lasers in engineering and technology.
- Basics of Quantum theory.
- Identification of structure of engineering materials.
- Atomic and nuclear related theories.

UNIT-1: ACOUSTICS AND ULTRASONICS 9

Sound – classification – characteristics of musical sound – loudness – Decibel – Intensity of sound – Weber-Fechner law – Reverberation and Reverberation time – Sabine’s law – derivations – Absorption coefficient – Measurement of absorption coefficients – Factors affecting acoustics of buildings and their remedies.

Ultrasonics – production – Magnetostriction effect – Magnetostriction oscillator – Piezoelectric effect – Inverse piezoelectric effect – Piezoelectric oscillator-Detection of ultrasonic waves-properties-Cavitations-Applications-NDT-pulse echo system-Determination of depth of sea.

UNIT-2: OPTICAL PHYSICS 9

Lasers – Spontaneous and Stimulated Emissions-Types of lasers-Nd-YAG, Helium-Neon, CO₂ -Semiconductor lasers [Homojunction and Heterojunction (qualitative)]-Interference-Air wedge and its applications- Michelson interferometer: construction, working, determination of wavelength and thickness.

UNIT-3: QUANTUM PHYSICS 9

Blackbody Radiation-Laws of blackbody Radiation-Planck’s quantum theory of blackbody radiation(derivation)-Photo Electric Effect-Compton effect(derivation)-Matter Waves-De-Broglie’s Concept-Schrodinger wave Equation-Time independent and Time dependent equations(derivations)-Physical significance of wave function-particle in a box (one dimensional case).

UNIT-4: PROPERTIES OF MATTER AND THERMAL PHYSICS 9

Elasticity-Hook’s law-stress- strain diagram-factors affecting Elasticity-Poisson’s ratio-Bending Moment-Cantilever-Heavy Cantilever-Young’s Modulus-Uniform and Non-uniform bending (Theory and Experiment). Modes of heat Transfer-Thermal Conductivity-Newton’s Law of Cooling-Lee’s disc Method-Radial Heat Flow-Cylindrical Shell Method-Thermal conductivity of Rubber-Heat conduction through a compound media.

UNIT-5: NUCLEAR AND ATOMIC PHYSICS 9

Nuclear fission-chain Reaction-Nuclear reactor-condition for sustained chain reaction-Controlled chain reaction-Pressurized water reactor (PWR)-Boiling water reactor (BWR)-Nuclear power plant-Nuclear fusion- Differences between fission and fusion-Raman effect-applications-Raman spectroscopy.

TOTAL: 45 HOURS

COURSE OUTCOMES:

After successful completion of this course, the students should be able to:

- CO1: Apply the Acoustics and NDT techniques and modern engineering tools necessary for engineering practice.
- CO2: Categorize and illustrate the Lasers and its application to engineering
- CO3: Apply the quantum concepts in engineering field.
- CO4: Examine the elastic and thermal properties in various materials.
- CO5: Discuss the role of nuclear physics in energy production.

REFERENCES:

1. Dr. R.N. Jayaprakash, Engineering Physics, Dhanam Publications, 2018.
2. Rajendran V, Applied Physics, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
3. Palanisamy P.K., Engineering Physics I, Scitech Publications, Chennai, 2011.
4. Avadhanulu M.N. and Kshirsagar P.G., A Textbook of Engineering physics, S.Chand & Company Ltd, New Delhi, 2005.

122CYT04	ENGINEERING CHEMISTRY (Common to all branches)	L	T	P	C
		2	0	0	2

Course objectives:

At the end of the course the students would be exposed to fundamental knowledge in

- To understand the chemistry behind water technology
- To understand the chemistry of Corrosion
- To acquaint the student with concepts of important photo physical and photochemical processes and spectroscopy
- To acquaint the students with the basics of fuels, and chemistry behind combustion process.
- To understand the basic concepts of phase equilibrium

UNIT I WATER TECHNOLOGY

9

Physical, Chemical & Biological characteristics -Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen –determination and significances, Alkalinity – determination and significances - disadvantages of using hard water in boilers- Internal conditioning - phosphate, calgon and carbonate conditioning methods – External treatment: Zeolite, ion exchange methods - desalination – reverse osmosis and electro dialysis - domestic water treatment.

UNIT II CORROSION SCIENCE

9

Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion –Measurement of corrosion (wt. loss method only) - factors influencing corrosion. Corrosion control: Cathodic protection - sacrificial anodic method and impressed cathode current method. Electroplating (Copper plating) and Electroless plating (Nickel plating).

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY

9

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Quantum efficiency –Photophysical Process-Fluorescence, Phosphorescence, Chemiluminescence and Photo-sensitization. Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. UV-visible and IR spectroscopy – principles, instrumentation – applications.

UNIT IV FUELS AND COMBUSTION

9

Fuel: Introduction- classification of fuels- calorific value- higher and lower calorific values- coal- analysis of coal (proximate and ultimate)- carbonization- manufacture of metallurgical coke (Otto Hoffmann method) – petroleum – Fractional distillation - manufacture of synthetic petrol (Bergius process)- knocking- octane number - diesel oil- cetane number - natural gas- compressed natural gas(CNG)- liquefied petroleum gases(LPG). Combustion of fuels – (simple problems) flue gas analysis (ORSAT Method).

Gibbs phase rule-definition of terms involved- Thermal analysis-application of phase rule to one Component system-water system – Sulphur system. Reduced Phase rule-application of phase rule to two Component system- lead-silver system - KI-water system and Ferric Chloride water system

Course Outcomes:

At the end of the course, the student will be able to

- CO1: Developing the knowledge of chemistry behind water technology
- CO2: Understanding the chemistry of Corrosion
- CO3: Applying the basic concepts of photon on matter
- CO4: Understanding basics of fuels, and chemistry behind combustion process.
- CO5: Understanding the basic concepts of phase equilibrium

Text Books

1. P.C. Jain and Monika Jain, Engineering Chemistry, DhanpatRai and Sons, NewDelhi 2004.16th Edition.
2. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry,2nd Edition.PHI Learning PVT., LTD, New Delhi, 2008. 3rd Edition.
3. K. Sivakumar, Applied Chemistry, Sahana Publishers, Coimbatore 2022.4th Edition.

Reference Books

1. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand & Co., Ltd. NewDelhi. 2008. Reprint edition.
2. B. K. Sharma, Engineering Chemistry, 3rd edition Krishna Prakashan Media (P)Ltd., Meerut, 2001.
3. ArunBhal, B.S. Bhal, G. D. Tuli, Essentials of Physical Chemistry, S. Chand & Co., Ltd. New Delhi. 26th Edition.
4. P. W. Atkins & Julio de Paula, Atkins' Physical Chemistry, Oxford University Press York, 7thEdn, 2002.
5. ShashiChawla, A Text Book of Engineering Chemistry, 3rd Edition, DhanpatRai&New Delhi, 2007.
6. S. Vairam, P. Kalyani&Suba Ramesh, Engineering Chemistry, IstEdn, John Wiley &Sons, India, 2011.
7. Lee J.D., Concise Inorganic Chemistry, 7th Edn, Blackwel Science Publications Oxford, London, 2004.

122PPT05	PYTHON PROGRAMMING (Common to all Circuit Branches)	L	T	P	C
		3	0	0	3

OBJECTIVE(S):

- To know the basics of algorithmic problem solving
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures -- lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I ALGORITHMIC PROBLEM SOLVING 9

Fundamentals of Computing, Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA EXPRESSIONS, STATEMENTS 9

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL STATEMENTS AND FUNCTIONS 9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: Create-add- delete from a Dictionary- Operations associated with pairs of data, and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, histogram.

UNIT V FILES, MODULES, PACKAGES 9

Files and exception: text files, reading and writing files, format operator; command line arguments, date and time, errors and exceptions, handling exceptions, debugging, modules, packages; Illustrative programs: word count, copy file. Case Study: Python Libraries (Numpy, Pandas, SciPy, PyGame).

TOTAL HOURS: 45

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- CO1: Develop algorithmic solutions to simple computational problems
- CO2: Read, write, execute by hand simple Python programs.
- CO3: Structure simple Python programs for solving problems and decompose into functions.
- CO4: Represent compound data using Python lists, tuples, and dictionaries.
- CO5: Read and write data from/to files in Python Programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016. (<http://greenteapress.com/wp/think-python/>)
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python" – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCE BOOKS:

1. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-Disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, "Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
5. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem"- Solving Focus, Wiley India Edition, 2013.
6. Paul Gries, Jennifer Campbell and Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC, 2013.

122CMT06	BASIC CIVIL AND MECHANICAL ENGINEERING (Common to ECE, BME & EEE)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To gain the knowledge in surveying and construction materials.
- To understand the building structures.
- The student should familiar with foundry, welding and forging processes.
- To know the working of IC engines and Boilers.
- To gain the knowledge about sources of energy and refrigeration.

PART-A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 09

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

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

UNIT II BUILDING COMPONENTS AND STRUCTURES 10

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

Superstructure: Brick masonry, stone masonry, beams, columns, lintels, roofing, flooring, plastering, Mechanics, Internal and external forces, Stress, Strain, Elasticity, Types of Bridges and Dams, Basics of Interior Design and Landscaping.

PART-B – MECHANICAL ENGINEERING

UNIT III FOUNDRY WELDING AND FORGING 10

Foundry: Introduction - Patterns –materials. Types of pattern and pattern allowances. Molding sand, types and properties, Molding procedure. Welding: Definition and Classification, Gas welding, Oxy Acetylene welding, Types of flames, advantages and disadvantages of gas welding. Resistance welding - Classification, Spot welding and Seam welding. Soldering, Definition and Classification. Brazing – Definition and Classification. Forging: Types of Forging, Differences between Hot working and Cold working processes.

UNIT IV IC ENGINES & BOILERS 08

Internal combustion engines, Working principle of Petrol and Diesel Engines, Four stroke and Two stroke cycles, Comparison of four stroke and two stroke engines, Boilers: Introduction of boilers, classification, Lancashire boiler, Babcock and Wilcox boiler, list of boiler mountings and accessories and applications (no sketches).

UNIT V SOURCE OF ENERGY & REFRIGERATION 08

Sources of energy: Introduction, conventional and non-conventional sources of energy, examples, solar energy, hydro power plant. Introduction to refrigeration and air-conditioning, COP, properties of refrigerants and types of refrigerants, working principle of vapour compression & vapour absorption refrigeration system, Layout of typical domestic refrigerator, Window and Split type room Air conditioner.

TOTAL HOURS:45

COURSE OUTCOMES:

The students will have an ability to

- CO1: Explain the usage of construction material and proper selection of construction materials.
- CO2: Design building structures.
- CO3: Gain knowledge on manufacturing processes like foundry, welding and forging.
- CO4: Demonstrate working principles of petrol and diesel engine and the components used in power plants.
- CO5: Explain the components of Refrigeration and Air conditioning cycle.

TEXT BOOKS:

1. Ranganath G and Channankaiah, "Basic Engineering Civil & Mechanical", S.S.Publishers, 2014.
2. Shanmugam G and Palanichamy M S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co., New Delhi, 3rd Edition, 2018.

REFERENCE BOOKS:

1. Shanmugasundaram. S and Mysamy. K, "Basics of Civil and Mechanical Engineering", Cenage Learning India Pvt. Ltd, New Delhi, 2012.
2. Ramamrutham. S, "Basic Civil Engineering", Dhanpat Rai Publishing Co. (P) Ltd, 3rd Edition reprint, 2013.
3. Gopalakrishna K R, "Elements of Mechanical Engineering", Subhas Publications, Bangalore, 2008.
4. Khanna O.P, Foundry Technology, Dhanpat Rai Publishing Co. (P) Ltd, 2011.
5. Venugopal.K and Prabhu Raja.V, "Basic Mechanical Engineering", Anuradha Publishers, Kumbakonam, 2015.
6. Shantha Kumar S R J, "Basic Mechanical Engineering", Hi-Tech Publications, Mayiladuthurai, 2001.

122HST07	HERITAGE OF TAMILS	L	T	P	C
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UNIT I LANGUAGE AND LITERATURE 3

Language Families in India - Dravidian Languages – Tamil as a Classical Language – Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature- Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS 3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL: 15 PERIODS

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. Social Life of the Tamils - The Classical Period (Dr. S. Singaravelu) (Published by:
3. International Institute of Tamil Studies.
4. Historical Heritage of the Tamils (Dr. S. V. Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).

5. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
6. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by:Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
7. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

122PHP07	ENGINEERING PHYSICS LABORATORY (Common to all Circuit Branches)	L	T	P	C
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Course Objectives:

- To understand the practical concepts of interference and diffraction.
- To understand the concept of velocities of sound in different liquids.
- To get better knowledge of modulus of elasticity.
- To understand the concepts of thermal conductivity.
- To understand the concept of viscosity of liquids.

LIST OF EXPERIMENTS

1. (a) Determination of laser Parameters-Wavelength.
(b) Particle size determination using diode laser.
1. Determination of Young's modulus of the material- uniform bending.
2. Determination of (i) the moment of inertia of the disc and (ii) the rigidity modulus of the material of a wire.
3. Determination of thickness of a thin Wire-Air wedge method.
4. Determination of velocity of sound and compressibility of liquid- Ultrasonic interferometer.
5. Determination of wavelength of mercury spectrum-spectrometer grating.
6. Determination of Young's modulus of the material-Non uniform bending.
7. Determination of viscosity of liquid-Poiseuille's method.
8. Determination of acceleration due to gravity 'g' – Compound pendulum.
9. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
10. Determination of wavelength of monochromatic light – Newton's ring method.

Course Outcomes:

At the end of the course students will be able to:

1. Understand the moduli of elasticity of various materials.
2. Understand the phenomenon of diffraction and interference of light using optical components.
3. Acquire knowledge of viscosity and compressibility of various liquids.
4. Understand the concept of heat transfer through conductors and bad conductors using Lee's disc.
5. Acquire knowledge about acceleration due to gravity.

122PPP08	PYTHON PROGRAMMING LABORATORY (Common to all Circuit Branches)	L	T	P	C
		0	0	2	1

OBJECTIVE(S):

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS:

1. To Implement python scripts using Variables and operators
2. To Demonstrate Operator precedence to evaluate an expression
3. Display grade of a student using elif statement
4. Implement Floyd triangle using for loop
5. Checks the given number is prime or not using while loop
6. Compute the GCD of Numbers and largest number in a list using functions
7. Finding factorial of a given number using recursive function.
8. Take a list of words and returns the length of longest one using strings
9. To perform linear and binary search using strings
10. To implement list as arrays (multiply 2 matrices)
11. To demonstrate use of list & related functions
12. To demonstrate use of tuple, set& related functions
13. To demonstrate use of Dictionary& related functions
14. Programs that take command line arguments (word count)
15. To import specific items from a library module.
16. Developing a game activity using Pygame like bouncing ball, car race etc.

TOTAL HOURS: 45

COURSE OUTCOMES:

Upon completion of the course, students will be able to:

- CO1: Write, test, and debug simple Python programs.
- CO2: Implement Python programs with conditionals and loops.
- CO3: Develop Python programs step-wise by defining functions and calling them.
- CO4: Use Python lists, tuples, dictionaries for representing compound data.
- CO5: Read and write data from/to files in Python

LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 30 STUDENTS

Hardware:

LAN System with 30 Nodes (OR) Stand-alone PCs -30 No's.

Printer – 3 No's.

Software:

Operating System : Linux / Windows.

Open Source Software: Python.

Database : MySQL.

Open Source Platform: XAMPP, Eclipse IDE

222ENT01	PROFESSIONAL ENGLISH-II (Embedded Course - Common to all branches)	L	T	P	C
		3	0	0	2

COURSE OBJECTIVES:

The Course prepares second semester Engineering and Technology students to:

- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialisation.
- Present information in an appropriate oral form.
- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write anything convincingly with grammatical accuracy.
- Nurture the holistic perspective of industry readiness

UNIT I: Listening

Theory

Conversation - Telephonic conversation - Class memory quiz - Interviews of famous persons - A scene from a film - Podcast - Stories - Product description - Process description

English Laboratory

Scientific lectures - Educational videos - Gap filling exercises - Presentations - Formal job interviews - Introduction to classmates - Debates - Panel discussion - INK talks

UNIT II: Speaking

Theory

Exchanging personal information - Greeting - Leave taking - Introducing friends - Reporting - Role play - Describing a person/place/thing - Small talk - Celebrity interview

English Laboratory

Narrating personal experiences - Presentation - Information gap - Simulations - Find the difference - Giving and asking for directions - News brief - Alibi - Untranslatable

UNIT III: Reading

Theory

Short stories: The Gift of the Magi, A Service of Love and The Last Leaf by O. Henry - Magazines - Jigsaw - Newspaper reports - Newspaper articles - Journals - Travelogues

English Laboratory

Brochures - Social media messages - Excerpts from literature - Editorials - Case studies - Critical reviews - Excerpts of interview with professionals - Technical texts - One word splash

UNIT IV: Writing

Theory

Developing hints - Note-making - Note-taking - Agenda - Advertisement - Transfer of information (Pie chart, Bar chart and Flow chart) - Précis writing and summarizing - Free writing - Short stories

English Laboratory

Letter writing - Essay writing - What if? - Poetry - Cubing - Defining technical terms - Character description - One-minute paper - Feedback

UNIT V: Language Development

Theory

Consonants & vowels - Phonetic transcription - British and American English - Infinitive and gerund - Types of sentences - Information and emphasis - Cause and effect - Purpose and function - Phrasal verbs

English Laboratory - Career Skills

Abbreviations and acronyms - Homonyms and homophones - Word formation - One word substitution - Compound nouns - Concord - Life etiquettes - Emotional intelligence - Notable Indian start-ups - Work ethic

TOTAL: 60 HOURS

Lab Requirements:

1. Teacher console and systems for students.
2. English Language Lab Software
3. Career Lab Software

OUTCOMES:

At the end of the course, learners will be able to:

CO1: Listen and comprehend the various strategies of listening and its significance in their area of specialisation successfully.

CO2: Speak appropriately and effectively in varied formal and informal contexts.

CO3: Read and comprehend texts effortlessly and understand the prevailing practices of testing in the recruitment process by the corporates and the institutional selection processes.

CO4: Communicate the corporate and social requirements in an impressive written mode.

CO5: Understand the basic grammatical structures and its applications and enhance their verbal skills in the screening tests competently both for recruitment and pursuing higher studies as well.

TEXT BOOKS:

1. Board of editors. **Fluency in English: A Course book for Engineering and Technology**. Orient Blackswan, Hyderabad: 2016.
2. Sudharshana. N. P and Saveetha. C. **English for Technical Communication**. Cambridge University Press: New Delhi, 2016.
3. Uttham Kumar. N. **Professional English - II** (with work book). Sahana Publications, Coimbatore, 2023.
4. Agarwal R. S. A Modern Approach to Verbal and Non-verbal Reasoning. Chand & Co., New Delhi, 2012.
5. Ashraf Rizvi M. Effective Technical Communication. TATA McGraw Hill, New Delhi, 2007.

REFERENCES:

1. Raman, Meenakshi and Sharma, Sangeetha- Technical Communication Principles and Practice. Oxford University Press: New Delhi, 2014.
2. Kumar, Suresh. E. Engineering English. Orient Blackswan: Hyderabad, 2015.
3. Booth-L. Diana, Project Work, Oxford University Press, Oxford: 2014.
4. Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford: 2007
5. Means, L. Thomas and Elaine Langlois, English & Communication for Colleges. Cengage Learning, USA: 2007.
6. Lingua: Essays for TOEFL/IELTS, Dreamtech Press, New Delhi, 2016.
7. Lily Mangalam, Global English Comprehension, Allied Publishers Pvt. Ltd., New Delhi, 2014.
8. Sharon Weiner Green and Ira K. Wolf, Barron's GRE, Glagotia Publications Pvt. Ltd., 18th Edition, New Delhi, 2011.
9. Mohamed Elias, R. Gupta's IELTS/TOEFL Essays, Ramesh Publishing House, 6th Edition, New Delhi, 2016.

222EST03	ENVIRONMENTAL SCIENCE AND ENGINEERING (Common to all Branches)	L	T	P	C
		2	0	0	2

OBJECTIVES:

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and non renewable resources, causes of their degradation and measures to preserve them.
- To familiarize the concept of sustainable development goals and appreciate the interdependence of economic and social aspects of sustainability, recognize and analyse climate changes, concept of carbon credit and the challenges of environmental management.
- To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyze the role of sustainable urbanization.

UNIT I ENVIRONMENT AND BIODIVERSITY

6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

UNIT II ENVIRONMENTAL POLLUTION

6

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

UNIT III RENEWABLE SOURCES OF ENERGY

6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT IV SUSTAINABILITY AND MANAGEMENT

6

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

UNIT V SUSTAINABILITY PRACTICES

6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-

economical and technological change.

TOTAL: 30 PERIODS

OUTCOMES:

1. To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
2. To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
3. To identify and apply the understanding of renewable and non-renewable resources and
4. contribute to the sustainable measures to preserve them for future generations.
5. To recognize the different goals of sustainable development and apply them for suitable
6. technological advancement and societal development.
7. To demonstrate the knowledge of sustainability practices and identify green materials,
8. energy cycles and the role of sustainable urbanization.

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38. Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

222EGT04	ENGINEERING GRAPHICS (Common to all Circuit branches)	L	T	P	C
		2	0	4	4

OBJECTIVES:

- To gain knowledge on graphical skills for drawing the object.
- To comprehend the principle of orthographic projection of points, lines and plane surfaces.
- To study the principle of simple solids.
- To comprehend the principle of section and development of solids.
- To comprehend the principle of Isometric and Orthographic projections.

Concepts and conventions (Not for Examination)

03

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

UNIT I PLANE AND SPECIAL CURVES

09

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

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES

12

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

UNIT III PROJECTION OF SOLIDS

12

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

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

12

Sectioning of simple solids like prisms, pyramids, cylinders and cones in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS

12

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Representation of Three-Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

TOTAL HOURS :60

COURSE OUTCOMES

The student will be able to

- CO1: Recognize the conventions and apply dimensioning concepts while drafting simple objects.
- CO2: Draw the orthographic projection of points, line, and plane surfaces.
- CO3: Draw the orthographic projection of simple solids.
- CO4: Draw the section of solid drawings and development of surfaces of the given objects.
- CO5: Apply the concepts of Isometric and Orthographic projections in engineering practice.

TEXT BOOKS:

1. Ranganath G, "Engineering Graphics", Second Edition, Sahana Publishers, Reprint, 2021.
2. Bhatt. N.D., "Engineering Drawing" Charotar Publishing House, 53th Edition, 2014.

REFERENCE BOOKS:

1. Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited, 2017.
2. Gopalakrishnana. K. R, "Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.
3. Basant Agarwal and C.M.Agarwal, "Engineering Drawing", Tata McGraw Hill, 2013.
4. Natrajan K. V, "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2012.
5. M.B.Shaw and B.C.Rana, "Engineering Drawing", Pearson Education India, 2011.

222PET05	PHYSICS FOR ELECTRONICS ENGINEERING (Common to ECE & EEE)	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

1. To make the students to understand the basics of crystallography and its importance in studying materials properties.
2. To understand the conducting properties of materials including Classical and Quantum theories.
3. To instill knowledge on physics of semiconductors.
4. To inculcate an idea of significance of modern engineering material like nano materials with its applications.
5. To insist the basic knowledge about Capacitors and Transistors.

UNIT I: PHYSICS OF CRYSTALS

6

Definitions: Crystal Structure – parameters - Bravais lattices – Calculations of no. of atoms per unit cell –atomic radius – Coordination number – packing factor of SC, BCC, FCC and HCP Structures – Miller indices - d-spacing in Cubic structure.

UNIT II: ELECTRICAL PROPERTIES OF MATERIALS

6

Conducting Materials: Classical free electron theory - Expression for electrical and thermal conductivity – Wiedmann - Franz law– drawbacks - Quantum free electron theory - Fermi-Dirac statistics - Density of energy states.

UNIT III: SEMICONDUCTING MATERIALS

6

Semiconductors – Properties - Energy band diagram – Types of semiconductors - direct and indirect band gap, Elemental and Compound semiconductors - carrier concentration in intrinsic semiconductors – Hall Effect and Devices.

UNIT IV: MODERN ENGINEERING MATERIAL

6

Nano materials: Introduction – different forms – Synthesis - ball milling - Plasma arcing method – Electro deposition- Chemical vapour deposition – application of nano phase materials.

UNIT V: ELECTROSTATICS AND TRANSISTORS

6

Capacitor – Sharing of energy between two capacitors – Capacity of a spherical and Cylindrical capacitors – Capacitors in series and parallel. Transistors – Working – Transistor current and parameters – input and output Characteristics of NPN transistor – Transistor as voltage amplifier and switch.

TOTAL HOURS: 30

COURSE OUTCOMES:

At the end of the course, the students should be able to

1. Know basics of crystal physics and its importance for various material properties.
2. Gain knowledge on the conducting properties of materials and their applications.
3. Understand about physics of semiconducting materials.
4. Gain knowledge about nano materials and its applications.
5. Get the basic knowledge about Capacitors and Transistors.

TEXT BOOKS:

1. R. N. Jayaprakash, Physics for information science, Sahana publication, 2022
2. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw Hill Education (Indian Edition), 2020.
3. Jasprit Singh, “Semiconductor Devices: Basic Principles”, Wiley (Indian Edition), 2007.
4. S.O. Kasap. Principles of Electronic Materials and Devices, McGraw-Hill Education (Indian Edition), 2020.
5. Parag K. Lala, Quantum Computing: A Beginner& Introduction, McGraw-Hill Education (Indian Edition), 2020.

REFERENCES:

1. Charles Kittel, Introduction to Solid State Physics, Wiley India Edition, 2019.
2. Y. B. Band and Y. Avishai, Quantum Mechanics with Applications to Nanotechnology and Information Science, Academic Press, 2013.
3. V.V.Mitin, V.A. Kochelap and M.A.Stroscio, Introduction to Nanoelectronics, Cambridge Univ.Press, 2008.
4. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson Education (Indian Edition) 2009.
5. B. Rogers, J.Adams and S.Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2014.

TEXT BOOKS:

1. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits" – Shaum series, TMH, 2001.
2. S. Salivahanan, N. Suresh kumar and A. Vallavaraj, "Electronic Devices and Circuits", 2nd Edition, 2008.

REFERENCES:

1. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5th Edition, 2008.
2. Robert T. Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, 7th Edition, 2006.
3. William H. Hayt, J.V. Jack, E. Kemmebly and Steven M. Durbin, "Engineering Circuit Analysis", TMH, 6th Edition, 2002.
4. J. Millman & Halkins, Satyabranta Jit, "Electronic Devices & Circuits", TMH, 2nd Edition, 2008.

CIRCUITS AND DEVICES LABORATORY**COURSE OBJECTIVES:**

- Verify different Laws for Network circuits
- Verify various Theorems for Network circuits
- Understand the frequency response of resonance circuits
- Study the characteristics of various semiconductor devices

LIST OF EXPERIMENTS:

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

COURSE OUTCOMES:

Upon Completion of this course, students will be able to:

CO1: Demonstrate the different Laws for Network circuits

CO2: Analyze various Theorems for Network circuits

CO3: Determine the frequency response of resonance circuits

CO4: Compute the characteristics of various semiconductor devices

222CYP08	ENGINEERING CHEMISTRY LABORATORY (Common to all Circuit Branches)	L	T	P	C
		0	0	2	1

Objectives:

Students will be conversant with the estimation of various compounds using volumetric and instrumental analysis.

LIST OF EXPERIMENTS

1. Estimation of Total hardness by EDTA
2. Determination of percentage of calcium in Lime Stone by EDTA
3. Estimation of chloride in water sample
4. Estimation of alkalinity of Water sample
5. Determination of DO in Water (Winkler's Method)
6. Determination of Rate of Corrosion of the given steel specimen by weight loss method (Without inhibitor)
7. Determination of Rate of Corrosion of the given steel specimen by weight loss method (With inhibitor)
8. Conduct metric titration (Simple acid base)
9. Conduct metric titration (Mixture of weak and strong acids)
10. Conduct metric titration using BaCl_2 vs Na_2SO_4
11. Potentiometric Titration (Fe^{2+} / KMnO_4 or $\text{K}_2\text{Cr}_2\text{O}_7$)
12. PH titration (acid & base)
13. Determination of water of crystallization of a crystalline salt -Copper sulphate
14. Preparation of Bio-Diesel by Trans etherification method.

A minimum of TEN experiments shall be offered.

Course Outcomes:

- CO1: Carry out the volumetric experiments and improve the analytical skills.
- CO2: Understand the maintenance and usage of analytical instruments and thereby develop their skills in the field of engineering.
- CO3: Understand the principle and handling of electrochemical instruments and Spectrophotometer.
- CO4: Apply their knowledge for protection of different metals from corrosion by using different inhibitors

Reference(s):

1. Arthur I. Vogel's, "Quantitative Inorganic Analysis including Elementary Instrumental Analysis", ELBS, Group, 7th Edition, 2000.
2. Dr. K .Sivakumar, "Engineering Chemistry lab manual", S.S publishers, 2022.

222EPP09	ENGINEERING PRACTICE LABORATORY (Common to all Non-Circuit Branches)	L	T	P	C
		0	0	2	1

OBJECTIVES:

- To get the knowledge on welding techniques and sheet metal operation.
- To know the principle involved in plumbing work and in carpentry work.
- To know about wiring various electrical joints in common household electrical and wire work.
- To know about the working procedure of electrical appliances.
- To get the knowledge about basics of electronics and to know the characteristics of switching devices.

PART –A (MECHANICAL)

LIST OF EXPERIMENTS

WELDING:

Study of Electric Arc welding equipment's.

Preparation of welding joints:

i) Butt joint ii) Lap joint iii) T - joint.

SHEET METAL WORK:

Study of sheet metal tools and operations

Preparation of sheet metal models: i) Rectangular Tray ii) Funnel

PLUMBING WORKS:

Study of pipeline joints and house hold fittings.

Preparation of plumbing models: Basic pipe connections with PVC and GI pipe fittings.

CARPENTRY:

Study of wooden joints and tools used in roofs, doors, windows, furniture.

Preparation of carpentry models:

i) Lap joint ii) Dovetail joint iii) T-Joint

PART B (ELECTRICAL AND ELECTRONICS)

LIST OF EXPERIMENTS

1. Introduction to House Wiring.
2. Staircase Wiring.
3. Fluorescent lamp Wiring.
4. Measurement of single phase energy meter.
5. Measurement of Power, Power factor by using two- wattmeter Method.
6. Study of Electrical iron box and fan with regulator.
7. Characteristics of SCR and Diode
8. Introduction to color coding of resistor.

COURSE OUTCOMES:

The students will be able to

CO1: Weld various joints in steel plates using arc welding work; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.

CO2: Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work

CO3: Wire various electrical joints in common household electrical wire work.

CO4: Basic knowledge about electrical appliances.

CO5: Basic knowledge about electronics devices.

COURSE OBJECTIVES:

- Demonstrate an understanding of the fundamental properties and representation of discrete and continuous time signals.
- Do Spectral analysis of CT periodic and aperiodic signals using CT Fourier and Laplace methods.
- Analyse and Characterization of total response, impulse response and frequency response of LTI CT systems.
- Use Discrete Time Fourier Transforms and Z transform to analyze discrete time signals.
- Analyse and Characterization of total response, impulse response and frequency response of LTI DT systems.

UNIT I	CLASSIFICATION OF SIGNALS AND SYSTEMS	9
Continuous Time signals (CT signals), Discrete Time signals (DT signals) - Step, Ramp, Impulse, Exponential, Classification of CT and DT signals - periodic and aperiodic, Energy and power, even and odd, Deterministic and Random signals, Transformation on Independent variables -CT systems and DT systems, Properties of Systems – Linearity, Causality, Time Invariance, Stability, Invertibility and LTI Systems.		
UNIT II	ANALYSIS OF CT SIGNALS	9
Fourier Series for periodic signals-Fourier transform-properties-Laplace transforms and properties		
UNIT III	LTI-CT SYSTEMS	9
Differential equations-Total Response- Fourier Transform & Laplace Transform, Impulse response, Convolution Integral, Frequency response.		
UNIT IV	ANALYSIS OF DT SIGNALS	9
Spectrum of DT Signals, Discrete Time Fourier Transform (DTFT), Z-Transform in signal analysis, Z-transform-Properties-ROC and Inverse Z Transform-Partial Fraction-Long Division.		
UNIT V	LTI-DT SYSTEMS	9
Difference equations, Total Response-Z- Transform, Impulse response, Convolution sum, Frequency response-DT systems connected in series and parallel		

TOTAL:45 PERIODS**COURSE OUTCOMES:**

Upon Completion of this course, students will be able to :

- CO1: Categorize the properties and representation of discrete and continuous time signals.
 CO2: Analyze the continuous time signal using Fourier and Laplace transform.
 CO3: Determine total response, impulse response and frequency response of LTI-CT systems
 CO4: Analyze the discrete time signals using Discrete Time Fourier Transforms and Z transform
 CO5: Determine total response, impulse response and frequency response of LTI-DT systems

TEXT BOOKS:

1. Alan V. Oppenheim, Alan S. Willsky with S. Hamid Nawab, Signals & Systems, 2nd edn., Pearson Education, 2015
2. M. J. Roberts, Signals and Systems Analysis using Transform method and MATLAB, TMH 2003.

REFERENCE BOOKS:

1. Lathi.B.P, Signals Systems and Communication, B S Publications, Hyderabad, 2001.
2. Simon Haykin and Barry Van Veen, Signals and Systems, John Wiley, 1999
3. K.Lindner, "Signals and Systems", McGraw Hill International, 1999
4. Michael J Roberts, "Fundamentals of Signals and systems" Tata McGraw Hill, 2007

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	1	2	1				1	2	2	3	3	1
2	3	2	3	1		1		2		1	2	2	3	3	1
3	3	3	1		2	1	2	2		1	2	3	2	3	1
4	3	3	2	2		1		2		1	2	2	3	3	
5	3	3	2	1	2	1	2	2		1	2	2	3	3	1
CO	3	2.8	2.2	1.25	2	1	2	2		1	2	2.2	2.8	3	1

1 - low, 2 - medium, 3 - high

322ECT03

C PROGRAMMING AND DATA STRUCTURES

L T P C

3 0 0 3

COURSE OBJECTIVES

- Familiarize the basic programming concepts in C.
- Solve real time problems using functions, structure and union.
- Impart the basic concepts of linear data structures.
- Solve problem using nonlinear data structures.
- Identity the various Sorting, Searching and hashing algorithms.

UNIT I C PROGRAMMING BASICS

9

Structure of a C program - compilation and linking processes - Constants, Variables – DataTypes - Expressions using operators in C - Managing Input and Output operations - Decision Making and Branching - Looping statements. Arrays - Initialization - Declaration - One dimensional and Two-dimensional arrays. Strings - String operations - String Arrays.

UNIT II FUNCTIONS, POINTERS, STRUCTURES AND UNIONS

9

Functions - Pass by value - Pass by reference - Recursion - Pointers - Initialization - Pointers arithmetic. Structures and unions - Structure within a structure - Union - Files- Operations on Files- Memory Management

UNIT III LINEAR DATA STRUCTURES

9

Abstract Data Types - Linked list Implementation of List- polynomial addition- Linked List Implementation of Stack- Balancing Symbols - Postfix Expressions - Infix to Postfix Conversion - Linked list Implementation of Queues- Circular Queue

UNIT IV NON LINEAR DATA STRUCTURES

9

Preliminaries -Binary Trees -Tree Traversals - Binary Search Tree -Operations on Binary Search Tree - Heaps - Binary Heaps - Operations of Heaps - Graph and its representations -Graph Traversals - Shortest Path Algorithm: Dijkstra's Algorithm- Minimum Spanning Tree: Prim's Algorithm – Kruskal's Algorithm.

UNIT V SEARCHING, SORTING AND HASHING**9**

Linear Search - Binary Search -Bubble Sort - Insertion Sort - Quick Sort - Merge Sort - Hash Functions - Separate Chaining -Open Addressing

TOTAL: 45 PERIODS**COURSE OUTCOMES:****At the end of the course the students will be able to****CO1:** Summarize the basic concepts of C**CO2:** Develop programs for real-time application using functions, structures, union**CO3:** Gain knowledge on operations of linear data structures**CO4:** Develop applications using nonlinear data structures**CO5:** Apply appropriate sorting, searching technique for given problem.**TEXT BOOKS:**

- 1.ReemaThareja, “Programming in C”, Second Edition, Oxford University Press, 2016.
- 2.Ashok.N. Kamthane, - “Computer Programming”, Pearson Education, Second edition(India), 2012
- 3.Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition, Pearson Education,1997.

REFERENCES:

1. Paul J. Deitel, Harvey Deitel, “C How to Program”, Seventh Edition, Pearson Education, 2013.
- 2.PradipDey and Manas Ghosh, —Programming in C, Second Edition, Oxford University Press, 2011.
- 3.E. Balagurusamy, - “Computing fundamentals and C Programming”, Tata McGraw-Hill Publishing Company Limited, 2008.
- 4.Ellis Horowitz, SartajSahni, Susan Anderson-Freed, —Fundamentals of Data Structures in C, Second Edition, University Press, 2008

CO’s-PO’s & PSO’s MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	3	3	3	3	2	3	1	1	2	1	1	3	3	3	1
2	3	3	3	3	2	3	1	1	2	1	1	3	3	3	1
3	3	3	3	3	2	3	1	1	2	1	1	3	3	3	1
4	3	3	3	3	2	3	1	1	2	1	1	3	3	3	1
5	3	3	3	3	2	3	1	1	2	1	1	3	3	3	1
CO	3	3	3	3	2	3	1	1	2	1	1	3	3	3	1

1 - low, 2 - medium, 3 - high**322ECT04****ANALOG ELECTRONICS-I****L T P C****3 0 0 3****COURSE OBJECTIVES**

- Understand DC loadline and various biasing technique and compensation technique for transistors
- Analyze small signal and large signal model for BJT
- Analyze small signal model for JFET
- Analyze high and low frequency model of BJT and MOSFET

CO's-PO's & PSO's MAPPING

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
1	3	2	2	3	3	1	2	2			2	3	3	3	
2	3	2	2	3	3	1	2	2			2	3	3	3	
3	3	2	2	3	3	1	2	2			2	3	3	3	1
4	3	2	2	3	3	1	2	2			2	3	3	3	1
5	3	2	2	3	3	1	2	2			2	3	3	3	1
CO	3	2	2	3	3	1	2	2			2	3	3	3	1

1 - low, 2 - medium, 3 - high

322ECI05

DIGITAL SYSTEM DESIGN

L T P C

3 0 2 4

COURSE OBJECTIVES:

- Minimize the Boolean expression and identify the various operations of Logic gates
- Design and analyze of various combinational circuits
- Design various sequential circuits like counters, registers, etc
- Understand the concept of memories and programmable logic devices.
- Design and analyze synchronous and asynchronous sequential circuits

UNIT I MINIMIZATION TECHNIQUES AND LOGIC GATES 9

Minimization Techniques: Boolean postulates and laws – De-Morgan's Theorem -Principle of Duality - Boolean expression - Minimization of Boolean expressions — Minterm – Maxterm - Sum of Products (SOP) – Product of Sums (POS) – Karnaugh map Minimization – Don't care conditions - Quine-McCluskey method of minimization.

Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR- Implementations of Logic Functions using gates, NAND–NOR implementations – Multi level gate implementations- Multi output gate implementations

UNIT II COMBINATIONAL CIRCUITS 9

Design procedure – Half adder – Full Adder – Half subtractor – Full subtractor - Parallel binary adder, parallel binary Subtractor - Serial Adder/Subtractor - Binary Multiplier – Binary Divider - Multiplexer/ Demultiplexer – decoder - encoder – parity checker – parity generators - code converters - Magnitude Comparator

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS 9

Latches, Flip-flops - SR, JK, D, T, and Master-Slave –Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, lock - out condition circuit implementation - Counters, Ripple Counters, Ring Counters, Registers – shift registers - Universal shift registers– Shift register counters – Ring counter – Shift counters - Sequence generators.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS 9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Fundamental and Pulse mode sequential circuits, Design of Hazard free circuits.

UNIT V MEMORY DEVICES 9

Classification of memories – ROM - ROM organization - PROM – EPROM – EEPROM – EAPROM, RAM – RAM organization – Memory cycle - Timing wave forms – Memory decoding – memory expansion – Static RAM Cell-Bipolar RAM cell – MOSFET RAM cell – Dynamic RAM cell – Implementation of logic Circuits using PLD, PLA, PAL, Implementation of combinational logic circuits using ROM.

TOTAL :45 PERIODS

PRACTICAL EXERCISES:

1. Verification of basic Logic gates
2. Realization of given Boolean Function using Universal gates and minimizing the Same
- 3. Design of adders and subtractors**
- 4. Design of code converters.**
- 5. Design of Multiplexers & Demultiplexers.**
- 6. Design of Encoders and Decoders.**
- 7. Design of Magnitude Comparators**
- 8. Design and implementation of counters using flip-flops**
- 9. Design and implementation of shift registers.**

TOTAL :30 PERIODS

TOTAL :75 PERIODS

COURSE OUTCOMES

Upon Completion of this course, students will be able to :

CO1:Solve and implement various Boolean expression with minimized logic gates

CO2:Implement the various combinational circuits for real time applications

CO3:Design and analyze various sequential circuits like counters, registers, etc

CO4: Implement synchronous and asynchronous sequential circuits

CO5: Demonstrate the concept of memories and programmable logic devices.

TEXT BOOKS

1. M. Morris Mano and Michael D. Ciletti, 'Digital Design', Pearson, 5th Edition, 2013.(Unit - I - V)
2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3rd Edition., Vikas Publishing House Pvt. Ltd, New Delhi, 2006

REFERENCE BOOKS

1. Charles H. Roth, Jr, 'Fundamentals of Logic Design', Jaico Books, 4th Edition, 2002.
2. William I. Fletcher, "An Engineering Approach to Digital Design", Prentice- Hall of India, 1980.
3. Floyd T.L., "Digital Fundamentals", Charles E. Merrill publishing company,1982.
4. John. F. Wakerly, "Digital Design Principles and Practices", Pearson Education, 4 th Edition,2007

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	2	2	1	1		2	3	3	3	3
2	3	3	3	3	3	2	2	1	1		2	3	3	3	2
3	3	3	3	3	3	2	2	1	1		2	3	3	3	2
4	3	3	3	3	3	2	2	1	1		2	3	3	3	1

5	3	3	3	3	3	2	2	1	1		2	3	3	3	2
CO	3	3	3	3	3	2	2	1	1		2	3	3	3	2

1 - low, 2 - medium, 3 - high

322ECT06

ELECTROMAGNETIC FIELDS

L T P C

3 0 0 3

COURSE OBJECTIVES:

- To impart knowledge on the basics of electromagnetics.
- To impart knowledge on the basics of static electric and magnetic field and the associated laws
- To study the significance of Time varying fields.
- To give insight into coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations
- To gain the behaviour of the propagation of EM waves

UNIT I INTRODUCTION

9

Electromagnetic model, Units and constants, Review of vector algebra, Rectangular, cylindrical and spherical coordinate systems, Line, surface and volume integrals, Gradient of a scalar field, Divergence of a vector field, Divergence theorem, Curl of a vector field, Stoke's theorem, Null identities, Helmholtz's theorem, Verify theorems for different path, surface and volume.

UNIT II ELECTROSTATICS

9

Electric field, Coulomb's law, Gauss's law and applications, Electric potential, Conductors in static electric field, Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Electrostatics boundary value problems, Capacitance, Parallel, cylindrical and spherical capacitors, Electrostatic energy, Poisson's and Laplace's equations, Uniqueness of electrostatic solutions, Current density and Ohm's law, Electromotive force and Kirchhoff's voltage law, Equation of continuity and Kirchhoff's current law.

UNIT III MAGNETOSTATICS

9

Lorentz force equation, Ampere's law, Vector magnetic potential, Biot-Savart law and applications, Magnetic field intensity and idea of relative permeability, Calculation of magnetic field intensity for various current distributions Magnetic circuits, Behaviour of magnetic materials, Boundary conditions, Inductance and inductors, Magnetic energy, Magnetic forces and torques.

UNIT IV TIME-VARYING FIELDS AND MAXWELL'S EQUATIONS

9

Faraday's law, Displacement current and Maxwell-Ampere law, Maxwell's equations, Potential functions, Electromagnetic boundary conditions, Wave equations and solutions, Time-harmonic fields, Observing the Phenomenon of wave propagation with the aid of Maxwell's equations.

UNIT V PLANE ELECTROMAGNETIC WAVES

9

Plane waves in lossless media, Plane waves in lossy media (low-loss dielectrics and good conductors), Group velocity, Electromagnetic power flow and Poynting vector, Normal incidence at a plane conducting boundary, Normal incidence at a plane dielectric boundary.

COURSE OUTCOMES

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

CO1: Relate the fundamentals of vector, coordinate system to electromagnetic concepts.

CO2: Analyze the characteristics of Electrostatic field.

CO3: Interpret the concepts of Magnetic field in material space and solve the boundary conditions.

CO4: Determine the significance of time varying fields.

CO5: Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.

TOTAL:45 PERIODS

TEXT BOOKS

1. D.K. Cheng, Field and wave electromagnetics, 2nd ed., Pearson (India), 2002

2. M.N.O.Sadiku and S.V. Kulkarni, Principles of electromagnetics, 6th ed., Oxford(Asian Edition), 2015

REFERENCES

1. Edward C. Jordan & Keith G. Balmain, Electromagnetic waves and Radiating Systems, Second Edition, Prentice-Hall Electrical Engineering Series, 2012.

2. W.H. Hayt and J.A. Buck, Engineering electromagnetics, 7th ed., McGraw-Hill (India), 2006

3. B.M. Notaros, Electromagnetics, Pearson: New Jersey, 2011

4. Engineering Electromagnetics – Nathan Ida, 2nd Ed., 2005, Springer (India) Pvt. Ltd., New Delhi.

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	2	3	2	3	1	2	1	1	3	3	2	1
2	3	3	3	3	3	2	3	1	2	1	1	3	3	2	3
3	3	3	3	3	3	2	3	1	2	1	1	3	3	2	3
4	3	3	3	3	3	2	3	1	2	1	1	3	3	2	3
5	3	3	3	3	3	2	3	1	2	2	1	3	3	2	2
CO	3	3	3	2.8	3	2	3	1	2	1.2	1	3	3	2	2.4

1 - low, 2 - medium, 3 - high

322ECP07

C PROGRAMMING AND DATA STRUCTURES LAB

L T P C

0 0 2 1

COURSE OBJECTIVES:

- Understand and implement basic data structures using C
- Apply linear and non-linear data structures in problem solving
- Learn to implement functions and recursive functions by means of data structures
- Implement searching and sorting algorithms.

LIST OF EXERCISES:

1. Basic C Programs – Looping, Decision- Making
2. Programming using Arrays and String functions
3. Programming using Functions and Recursion
4. Programs using Structures and Union
5. Program using Pointers
6. Program using Memory Management Functions
7. Linked list implementation of List, Stacks and Queues
8. Implementation of Tree Traversals
9. Implementation of Binary Search trees
10. Implementation of Graph Traversals
11. Implementation of Shortest Path Algorithm
12. Implementation of Linear search and binary search
13. Implementation of Insertion sort, Quick sort and Merge Sort

COURSE OUTCOMES:

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

CO1: Implement basic and advanced programs in C

CO2: Implement functions and recursive functions in C

CO3: Apply the different Linear Data Structures for Implementing Solutions to Practical Problems.

CO4: Apply and implement Graph Data Structures for Real Time Applications.

CO5: Implement various Searching, Sorting and hashing Algorithms.

LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 30 STUDENTS

Hardware:

LAN System with 30 Nodes (OR) Stand-alone PCs -30 No's.

Printer – 3 No's.

Software: OS: Windows , Turbo C

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	2			2	2	2	3	2	1	1
2	3	3	3	3	3	2			2	2	2	2	2	2	1
3	3	3	3	3	3	2			2	2	2	2	2	1	1
4	3	3	3	3	3	2			2	2	2	2	2	3	1
5	3	3	3	3	3	2			2	2	2	3	2	2	1
CO	3	3	1	3	3	2			2	2	2	2.4	2	1.8	1

1 - low, 2 - medium, 3 - high

COURSE OBJECTIVES

- Analyze the different parameters of power supply circuits.
- Design amplifier circuit for various biasing technique
- Design Darlington amplifiers
- Design differential amplifiers
- Design of Power amplifiers

LIST OF EXPERIMENTS

1. Power Supply circuit - Full wave rectifier with and without filter.
2. Design of voltage regulator using BJT.
3. Fixed Bias amplifier circuit using BJT.
4. Frequency response of BJT- CB amplifier.
5. Frequency response of BJT- CC amplifier.
6. Design and Construct Darlington Amplifier using BJT.
7. Differential amplifier using BJT.
8. Design and construct FET CS Amplifier.
9. Design and construct FET CD Amplifier.
10. Design of Class B and Class AB Power Amplifier.

TOTAL: 30 PERIODS**COURSE OUTCOMES**

Upon Completion of this course, students will be able to :

CO1: Design power supply circuits for various application

CO2: Calculate the gain of the amplifier

CO3: Measure the Bandwidth of Darlington amplifiers

CO4: Measure the CMRR value for differential amplifiers

CO5: Calculate the gain of the power amplifier

CO's-PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	3	2	1	1	3	2	1	2	3	3	1
2	3	3	3	3	3	2	1	1	3	2	1	2	3	3	1
3	3	3	3	3	3	2	1	1	3	2	1	2	3	3	1
4	3	3	3	3	3	2	1	1	3	2	1	2	3	3	1
5	3	3	3	3	3	2	1	1	3	2	1	2	3	3	1
CO	3	3	3	3	3	2	1	1	3	2	1	2	3	3	1

1 - low, 2 - medium, 3 - high

COURSE OBJECTIVES:

- To be proficient in important Microsoft Office tools: MS WORD, EXCEL, POWERPOINT.
- To be proficient in using MS WORD to create quality technical documents, by using standard templates, widely acceptable styles and formats, variety of features to enhance the presentability and overall utility value of content.
- To be proficient in using MS EXCEL for all data manipulation tasks including the common statistical, logical, mathematical etc., operations, conversion, analytics, search and explore, visualize, interlink, and utilizing many more critical features offered
- To be able to create and share quality presentations by using the features of MS PowerPoint, including: organization of content, presentability, aesthetics, using media elements and enhance the overall quality of presentations.

MS WORD:**10**

Create and format a document

Working with tables

Working with Bullets and Lists

Working with styles, shapes, smart art, charts

Inserting objects, charts and importing objects from other office tools

Creating and Using document templates Inserting equations, symbols and special characters

Working with Table of contents and References, citations

Insert and review comments

Create bookmarks, hyperlinks, endnotes footnote

Viewing document in different modes

Working with document protection and security

Inspect document for accessibility

MS EXCEL:**10**

Create worksheets, insert and format data

Work with different types of data: text, currency, date, numeric etc.

Split, validate, consolidate, Convert data Sort and filter data

Perform calculations and use functions: (Statistical, Logical, Mathematical, date, Time etc.,)

XLOOKUP and Dynamic Arrays

Create and Work with different types of charts

Create & format pivot tables to summarize and analyse data**Unpivoting data**

Perform data analysis using own formulae and functions

Combine data from multiple worksheets using own formulae and built-in functions to generate results

Export data and sheets to other file formats

Working with macros

Protecting data and Securing the workbook

MS POWERPOINT:**10**

Select slide templates, layout and themes

Formatting slide content and using bullets and numbering

Insert and format images, smart art, tables, charts

Using Slide master, notes and handout master

Working with animation and transitions Organize and Group slides

Import or create and use media objects: audio, video, animation

Perform slideshow recording and Record narration and create presentable videos

TOTAL: 30 PERIODS

COURSE OUTCOMES:

On successful completion the students will be able to

CO1:Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements

CO2:Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding

CO3:Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.