

# PANIMALAR ENGINEERING COLLEGE

*An Autonomous Institution, Affiliated to Anna University, Chennai*

(JAISAKTHI EDUCATIONAL TRUST)

*Bangalore Trunk Road, Varadharajapuram,  
Poonamallee, Chennai – 600 123.*

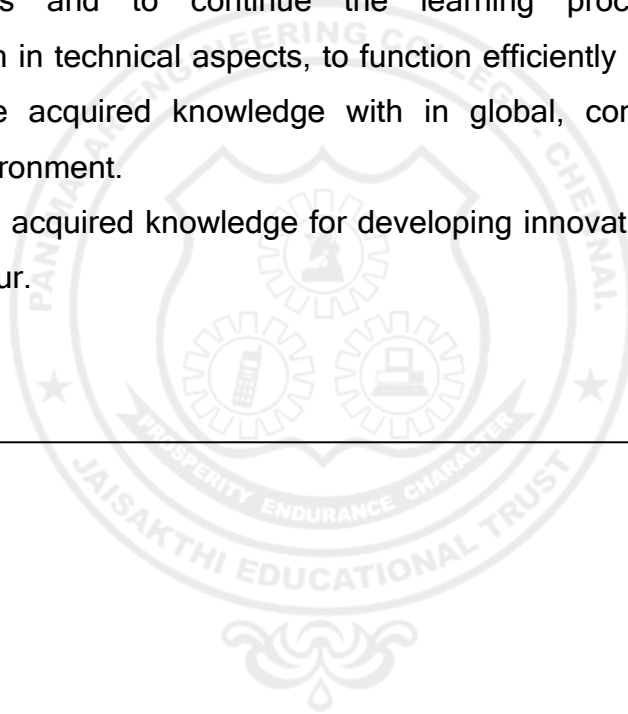


## DEPARTMENT OF INFORMATION TECHNOLOGY B.TECH- INFORMATION TECHNOLOGY

### CURRICULUM AND SYLLABUS REGULATION-2023

## PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

1. To provide Excellent Knowledge on Fundamental Computing Technology and Embedded System to inculcate interest and awareness in IT the stream.
2. To mould the student to synchronize the acquired theoretical knowledge with practical applications in real time situations.
3. To provide an insight for analyzing current trends, to explore the future issues in different perspectives of the computing environment.
4. To Stimulate the student to appear for the competitive examinations, to pursue higher studies and to continue the learning process with effective communication in technical aspects, to function efficiently as a team, individual and apply the acquired knowledge with in global, communal and to the stipulated environment.
5. To explore the acquired knowledge for developing innovative ideas, to become an Entrepreneur.

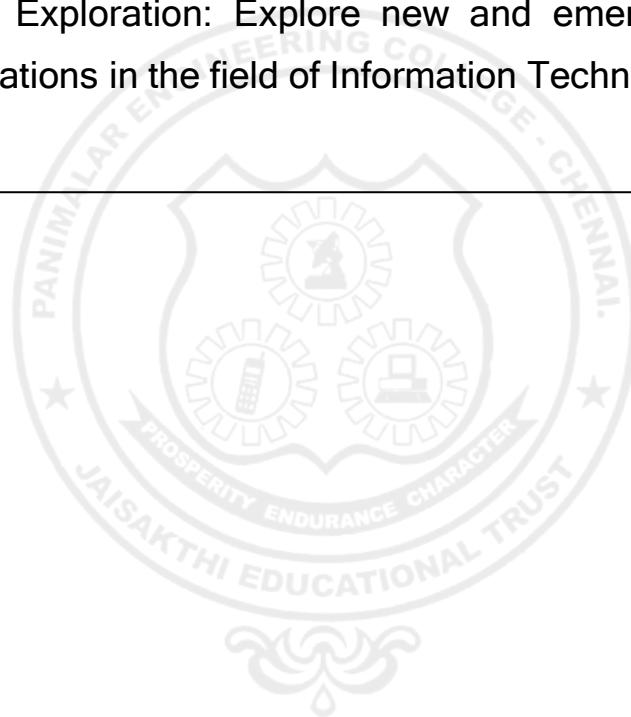


## PROGRAM OUTCOMES (PO)

- PO1 (Engineering knowledge):** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2 (Problem Analysis):** Identify, formulate, research literature, and analyze complex engineering problem reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3 (Design/development of solutions):** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4 (Conduct investigations of complex problems):** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5 (Modern tool usage):** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6 (The engineer and society):** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Professional engineering practice.
- PO7 (Environment and sustainability):** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8 (Ethics):** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- PO9 (Individual and team work):** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- PO10 (Communication):** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11 (Project management and finance):** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12 (Life-long learning):** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## PROGRAMME SPECIFIC OUTCOMES (PSO)

- **PSO1:** System Formulation: Apply Computing techniques to resolve issues with reasonable investigation for advancement.
- **PSO2:** System Design: Analyze systems for modeling and to provide domain specific solutions.
- **PSO3:** System Exploration: Explore new and emerging technologies leading to innovations in the field of Information Technology.



**B.Tech. – Information Technology**  
**CHOICE BASED CREDIT SYSTEM (CBCS)**  
**I - VIII SEMESTERS CURRICULUM AND SYLLABI (REGUALTION 2023)**

| Semester I                          |             |  |          |       |               |           |                     |
|-------------------------------------|-------------|--|----------|-------|---------------|-----------|---------------------|
| S. No                               | COURSE CODE | COURSE TITLE                                   | Category | L/T/P | Contact Hours | Credit    | Ext / Int Weightage |
| <b>Theory Courses</b>               |             |  |          |       |               |           |                     |
| 1.                                  | 23MA1101    | Matrices and Calculus                          | BS       | 3/1/0 | 4             | 4         | 60/40               |
| 2.                                  | 23ES1101    | Problem solving using C Programming            | ES       | 3/0/0 | 3             | 3         | 60/40               |
| 3.                                  | 23ES1103    | Engineering Graphics                           | ES       | 2/0/2 | 4             | 3         | 60/40               |
| <b>Theory Cum Practical Courses</b> |             |  |          |       |               |           |                     |
| 4.                                  | 23HS1101    | Communicative English and Language Skills      | HS       | 2/0/2 | 4             | 3         | 50/50               |
| 5.                                  | 23PH1101    | Engineering Physics                            | BS       | 2/0/2 | 4             | 3         | 50/50               |
| <b>Laboratory Courses</b>           |             |  |          |       |               |           |                     |
| 6.                                  | 23ES1111    | Problem solving using C Programming Laboratory | ES       | 0/0/4 | 4             | 2         | 40/60               |
| <b>Mandatory Course</b>             |             |  |          |       |               |           |                     |
| 7.                                  | 23TA1101    | தமிழர் மரபு /<br>Heritage of Tamils            | HS       | 1/0/0 | 1             | 1         | 60/40               |
| <b>TOTAL</b>                        |             |  |          |       | <b>24</b>     | <b>19</b> |                     |

| Semester II                         |             |   |          |       |               |           |                     |
|-------------------------------------|-------------|---|----------|-------|---------------|-----------|---------------------|
| S. No                               | COURSE CODE | COURSE TITLE                                    | Category | L/T/P | Contact Hours | Credit    | Ext / Int Weightage |
| <b>Theory Courses</b>               |             |   |          |       |               |           |                     |
| 1.                                  | 23MA1201    | Complex Variables and Laplace Transform         | BS       | 3/1/0 | 4             | 4         | 60/40               |
| 2.                                  | 23ES1201    | Python Programming                              | ES       | 3/0/0 | 3             | 3         | 60/40               |
| <b>Theory Cum Practical Courses</b> |             |   |          |       |               |           |                     |
| 3.                                  | 23HS1201    | Communicative and Aptitude Skills               | HS       | 2/0/2 | 4             | 3         | 50/50               |
| 4.                                  | 23IT1201    | Digital Logic and Computer Organization         | PC       | 3/0/2 | 5             | 4         | 50/50               |
| 5.                                  | 23ES1102    | Basic Electrical and Electronics Engineering    | ES       | 3/0/2 | 5             | 4         | 50/50               |
| <b>Laboratory Courses</b>           |             |   |          |       |               |           |                     |
| 6.                                  | 23ES1211    | Python Programming Laboratory                   | ES       | 0/0/4 | 4             | 2         | 40/60               |
| 7.                                  | 23ES1212    | Technical Skill Practices-I                     | EEC      | 0/0/2 | 2             | 1         | 40/60               |
| <b>Mandatory Course</b>             |             |   |          |       |               |           |                     |
| 8.                                  | 23TA1201    | தமிழரும் தொழில் நுட்பமும் Tamils and Technology | HS       | 1/0/0 | 1             | 1         | 60/40               |
| 9.                                  | 23MC1201    | Environmental Science                           | MC       | 2/0/0 | 2             | 0         | 0/100               |
| <b>TOTAL</b>                        |             |   |          |       | <b>30</b>     | <b>22</b> |                     |

## SEMESTER – I

|          |                       |   |   |   |   |
|----------|-----------------------|---|---|---|---|
| 23MA1101 | MATRICES AND CALCULUS | L | T | P | C |
|          |                       | 3 | 1 | 0 | 4 |

### COURSE OBJECTIVE

- Matrix algebra can be readily applied to the structural properties of graphs from an algebraic point of view.
- To introduce the concepts of limits, continuity, derivatives and maxima and Minima.
- To familiarize the functions of two variables and finding its extreme points.
- To provide understanding of various techniques of integration.
- To introduce integral ideas in solving areas, volumes and other practical problems.

### UNIT I MATRICES 9+3

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

### UNIT II DIFFERENTIAL CALCULUS 9+3

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (Sum, Product & Quotient rule, Chain rule, logarithmic and implicit differentiation) - Maxima and Minima of functions of one variable and its applications.

### UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial differentiation - Total derivative - Change of variables –Jacobian’s- Taylor’s series for functions of two variables - Maxima and minima of functions of two variables -Lagrange’s method of undetermined multipliers.

### UNIT IV INTEGRAL CALCULUS 9+3

Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts - Bernoulli’s formula- Integration of rational functions by partial fraction - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.

### UNIT V MULTIPLE INTEGRALS 9+3

Doubleintegrals in Cartesian and polar coordinates - Change of order of integration in Cartesian coordinates - Area enclosed by plane curves - Change of variables in double integrals -Triple integrals - Volume of Solids.

**TOTAL :60 PERIODS**

### COURSE OUTCOME

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

- CO1** Find Eigen values and Eigen vectors, diagonalization of a matrix, symmetric matrices, positive definite matrices.
- CO2** Apply limit definition and rules of differentiation to differentiate functions.

- CO3** Understand familiarity in the knowledge of Maxima and Minima, Jacobian, Taylor series and apply the problems involving Science and Engineering.
- CO4** Understand the knowledge of Integration by parts, Integration of rational functions by partial fraction.
- CO5** Understand the knowledge of Area enclosed by plane curves, Change of variables in double integrals, Triple integrals, Volume of Solids.

**TEXT BOOKS**

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, NewDelhi, 44<sup>rd</sup> Edition, 2018.
2. James Stewart, "Calculus: Early Transcendental", Cengage Learning, 9<sup>th</sup> Edition, NewDelhi, 2015.
3. Bali N., Goyal M. and Walkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt. Ltd.), New Delhi, 7<sup>th</sup> Edition, 2015.

**REFERENCE BOOKS**

1. Narayanan, S. and Manicavachagom Pillai, T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt.Ltd.Chennai, 2007.
2. Srimantha Paland Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.
3. B.V. Ramana "Higher Engineering Mathematics", McGraw Hill Education, India.
4. Erwin Kreyzig, Advanced Engineering Mathematics, John Wiley sons, 10th Edition, 2015.
5. Sivaramakrishna Dass, C. Vijayakumari, "Engineering Mathematics", Pearson Education India, 4th Edition 2019.
6. Sundar Raj. M and Nagarajan. G , "Engineering Mathematics-I", 3rd Edition, Sree Kamalamani Publications, Chennai, 2020.

**ONLINE COURSES / RESOURCES**

1. [https://onlinecourses.nptel.ac.in/noc21\\_ma60/preview](https://onlinecourses.nptel.ac.in/noc21_ma60/preview)
2. [https://onlinecourses.nptel.ac.in/noc21\\_ma58/preview](https://onlinecourses.nptel.ac.in/noc21_ma58/preview)

**CO-PO MAPPING**

|            | PO1      | PO2      | PO3      | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12     |
|------------|----------|----------|----------|-----|-----|-----|-----|-----|-----|------|------|----------|
| <b>CO1</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO2</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO3</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO4</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO5</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |



|          |                                     |   |   |   |   |
|----------|-------------------------------------|---|---|---|---|
| 23ES1101 | PROBLEM SOLVING USING C PROGRAMMING | L | T | P | C |
|          |                                     | 3 | 0 | 0 | 3 |

### COURSE OBJECTIVE

- To learn the syntax for C programming
- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions, pointers
- To develop applications using structures and union

### UNIT-I **BASICS OF C PROGRAMMING** **9**

Introduction to programming paradigms – Algorithms – Flowchart - Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Type Conversion Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Format specifiers, Assignment statements – Decision making statements - Switch statement – Break – Continue - Goto statement - Looping statements – Pre-processor directives - Compilation process.

### UNIT-II **ARRAYS AND STRINGS** **9**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Example Program: Computing Mean, Median and Mode - Two dimensional arrays – Example Program: Matrix Operations (Addition, Multiplication, Determinant and Transpose) - String operations: length, compare, concatenate, copy, Reverse and Palindrome – Selection sort, Insertion sort - linear and binary search

### UNIT-III **FUNCTIONS AND POINTERS** **9**

Introduction to functions: Function prototype, function definition, function call, Built-in functions(string functions, math functions) – Recursion – Example Program: Computation of Sine series, Scientific calculator using built-in functions, Binary Search using recursive functions – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Example Program: Sorting of names – Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

### UNIT-IV **STRUCTURES AND UNION** **9**

Structure - Nested structures– Pointer and Structures– Array of structures – Example Program using structures and pointers – Self-referentials structures – Dynamic memory allocation – Singly linked list– typedef and Union.

### UNIT-V **FILE PROCESSING** **9**

Files – Types of file processing: Sequential access, Random access – Sequential access file - Example Program: Finding average of numbers stored in sequential access file - Random access file - Example Program: Transaction processing using random access files – Command line arguments

**COURSE OUTCOME**

**Upon successful completion of the course student will be able to:**

- CO1** Learn the syntax for C programming
- CO2** Develop simple applications in C using basic constructs
- CO3** Design and implement applications using arrays and strings
- CO4** Develop and implement applications in C using functions and pointers.
- CO5** Develop applications in C using structures and union.
- CO6** Design applications using sequential and random access file processing.

**TEXTBOOKS**

1. Reema Thareja, —Programming in C, Oxford University Press, Second Edition, 2016.
2. Kernighan, B.W and Ritchie,D.M, —The C Programming language, Second Edition, Pearson Education, 2006

**REFERENCE BOOKS**

1. Paul Deitel and Harvey Deitel, — C How to Program, Seventh edition, Pearson Publication, 2015
2. Juneja, B. L and Anita Seth, —Programming in C, CENGAGE Learning India Pvt. Ltd.,2011
3. Pradip Dey, Manas Ghosh, —Fundamentals of Computing and Programming in C, FirstEdition, Oxford University Press, 2009.
4. Anita Goel and Ajay Mittal, —Computer Fundamentals and Programming in C, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. Byron S. Gottfried, "Schism"s Outline of Theory and Problems of Programming with C",McGraw-Hill Education, 1996.

**WEB REFERENCES**

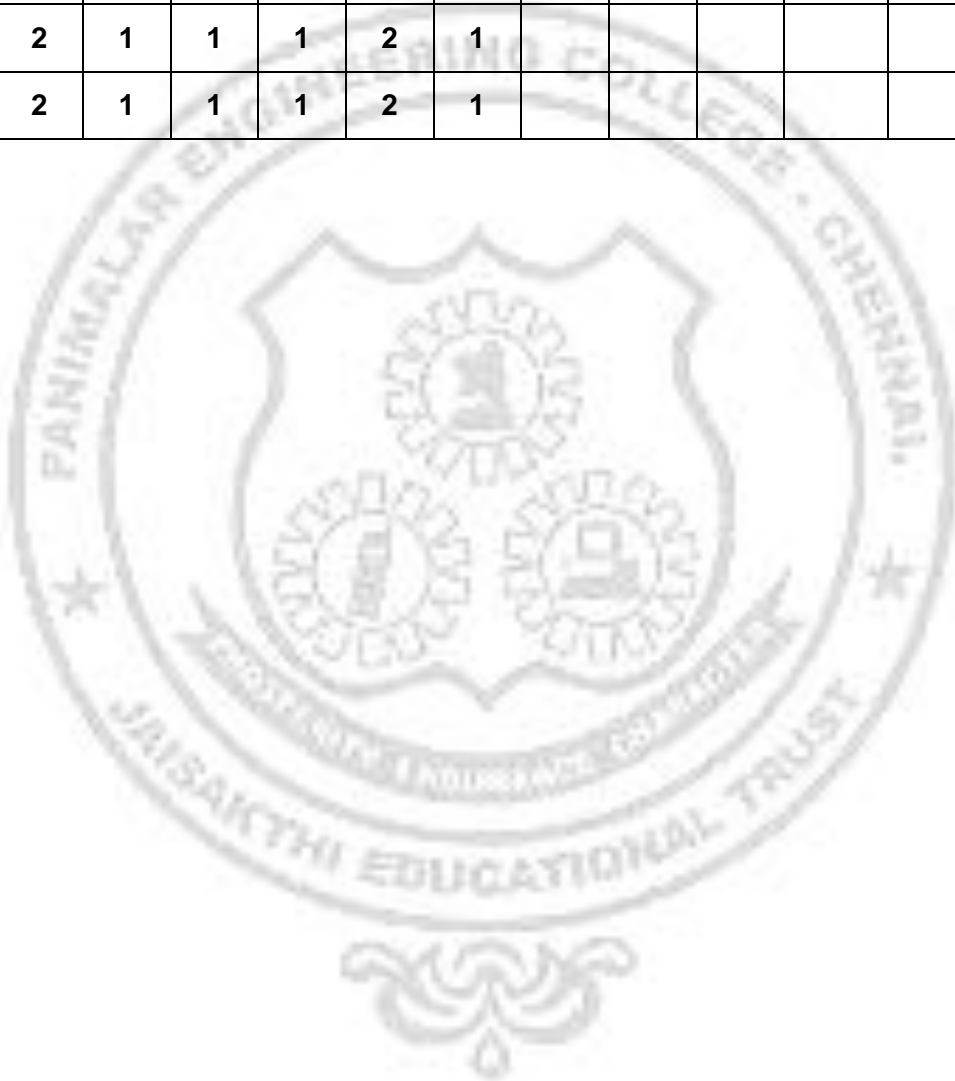
1. <https://github.com/tscheffl/ThinkC/blob/master/PDF/Think-C.pdf>
2. <https://freecomputerbooks.com/langCBooks.html>

**ONLINE COURSES/RESOURCES**

1. <https://www.programiz.com/c-programming>
2. <https://www.tutorialspoint.com/cprogramming/index.htm>
3. <https://www.javatpoint.com/c-programming-language-tutorial>
4. <https://www.geeksforgeeks.org/c-programming-language/>
5. [https://en.wikibooks.org/wiki/C\\_Programming](https://en.wikibooks.org/wiki/C_Programming)
6. <https://www.cprogramming.com/tutorial/c-tutorial.html?inl=hp>

### CO – PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2   | 1   | 1   | 1   |     | 1   |     |     |     |      |      |      |
| CO2 | 2   | 1   | 1   | 1   | 2   | 1   |     |     |     |      |      |      |
| CO3 | 3   | 2   | 2   | 1   | 3   | 1   |     |     |     |      |      |      |
| CO4 | 3   | 2   | 2   | 1   | 3   | 1   |     |     |     |      |      |      |
| CO5 | 2   | 1   | 1   | 1   | 2   | 1   |     |     |     |      |      |      |
| CO6 | 2   | 1   | 1   | 1   | 2   | 1   |     |     |     |      |      |      |



|          |                      |   |   |   |   |
|----------|----------------------|---|---|---|---|
| 23ES1103 | ENGINEERING GRAPHICS | L | T | P | C |
|          |                      | 2 | 0 | 2 | 3 |

## COURSE OBJECTIVE

- Drawing Engineering curves
- Drawing orthographic projections of lines and planes
- Drawing orthographic projections of solids
- Drawing section and development of the surfaces of objects
- Drawing isometric views and intersection curves of simple solids
- Drawing free hand sketches of basic geometrical shapes, multiple views of objects and Applications of Engineering Graphics

### UNIT 0 CONCEPTS AND CONVENTIONS (Not for Examination) 2

Importance of drawing in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size, layout and folding of drawing sheets - Lettering and dimensioning - Introduction to Scales - Geometric construction - to draw perpendiculars, parallel lines, divide a line and circle, to draw equilateral triangle, square, regular polygons. Introduction to drafting packages like CAD and demonstration of their use in engineering fields.

### UNIT I ENGINEERING CURVES AND PROJECTION OF POINTS AND LINES 6+6

Basic construction of cycloid, epicycloid and hypocycloid - Drawing of tangents and normal to the above curves. Construction of involutes of square, pentagon and circle - Drawing of tangents and normal to the above involutes.

Orthographic projection – Introduction to Principal Planes of projections - First angle projection - Projection of points. Projections of straight lines (only in First angle projections) inclined to both the principal planes - Determination of true lengths, true inclinations and traces by rotating line method

### UNIT II PROJECTIONS OF PLANES AND PROJECTIONS OF SOLIDS 6+6

Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method and auxillary plane method.

Projection of simple solids like prisms, pyramids, cylinder, and cone when the axis is inclined to one principle planes by rotating object method.

### UNIT III SECTIONS of SOLIDS AND DEVELOPMENT OF SURFACES 6+6

Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section.

Development of lateral surfaces of simple solids and frustum and truncated solids – Prisms, pyramids cylinders and cones.

### UNIT IV INTERSECTION OF SOLIDS AND ISOMETRIC PROJECTIONS 6+6

Line of intersection - Determining the line of intersection between surfaces of two interpenetrating two square prisms and Intersection of two cylinders with axes of the solids intersecting each other perpendicularly, using line method.

Principles of isometric projection – isometric scale –Isometric projections and isometric views of simple solids and frustum and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions.

**UNIT V****FREE-HAND SKETCHING****5+5**

Steps in free hand sketching - Orthographic views (front, top and side views) of simple blocks from their Isometric view, Isometric view of simple blocks from their Orthographic views (front, top and side views)

**TOTAL : 60 PERIODS****COURSE OUTCOME**

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

- CO1** Draw the engineering curves and draw orthographic projections of lines and planes
- CO2** Draw orthographic projections of planes and solids
- CO3** Draw the sections and development of the surfaces of objects
- CO4** Draw isometric projections and intersection of curves of simple solids.
- CO5** Draw free hand sketching of basic geometrical shapes, multiple views of objects

**TEXT BOOKS**

1. Natarajan, K. V., "A text book of Engineering Graphics", 28thEd.,Dhanalakshmi Publishers, Chennai, 2015.
2. Venugopal, K. and Prabhu Raja, V., "Engineering Graphics", New Age Publications,2008.

**REFERENCE BOOKS**

1. Bhatt, N.D.,Panchal V M and Pramod R. Ingle, "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2014.
2. Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015
3. Agrawal, B. and Agrawal C.M., "Engineering Drawing", Tata McGraw, N.Delhi, 2008.

**WEB REFERENCES:**

1. <https://nptel.ac.in/courses/105/104/105104148/>
2. <https://www.youtube.com/channel/UCkCk0nvNyWhEOLge9JtDLDg>

**ONLINE COURSES / RESOURCES:**

1. <https://nptel.ac.in/courses/112/103/112103019/>

**CO – PO MAPPING**

|            | PO1      | PO2      | PO3      | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11     | PO12     |
|------------|----------|----------|----------|-----|-----|-----|-----|-----|-----|------|----------|----------|
| <b>CO1</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      | <b>3</b> | <b>3</b> |
| <b>CO2</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      | <b>3</b> | <b>3</b> |
| <b>CO3</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      | <b>3</b> | <b>3</b> |
| <b>CO4</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      | <b>3</b> | <b>3</b> |
| <b>CO5</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      | <b>3</b> | <b>3</b> |

|          |  |   |   |   |   |
|----------|--|---|---|---|---|
| 23HS1101 | COMMUNICATIVE ENGLISH AND LANGUAGE<br>SKILLS | L | T | P | C |
|          |  | 2 | 0 | 2 | 3 |

## COURSE OBJECTIVE

- To induce the basic reading and writing skills among the first year engineering and technology students.
- To assist the learners to develop their listening skills, which will enable them listening to lectures and comprehend them by asking questions and seeking clarifications
- To succor the learners to develop their speaking skills and speak fluently in real contexts.
- To motivate the learners to develop vocabulary of a general kind by developing their reading skills for meeting the competitive exams like GATE, TOFEL, GRE, IELTS, and other exams conducted by Central and State governments
- To learn to use basic grammatical structures in suitable contexts

### UNIT I 6 INFORMAL COMMUNICATION

**Listening:** Listening and filling details, Listening to Speeches by Specialists and Completing Activities such as Answering Questions, Identifying the Main Ideas, Style, etc. **Speaking:** Introducing One-self – Introducing a Friend/ Family. **Reading:** Descriptive Passages (From Newspapers / Magazines). **Writing:** Autobiographical Writing, Developing Hints. **Grammar:** Noun, Pronoun & Adjective. **Vocabulary Development:** One Word Substitution

### UNIT II 6 CONVERSATIONAL PRACTICE

**Listening:** Listening to Conversations (Asking for and Giving Directions). **Speaking:** Making Conversation Using (Asking for Directions, Making an Enquiry), Role Plays, and Dialogues. **Reading:** Reading a Print Interview and Answering Comprehension Questions. **Writing:** Writing a Checklist, Dialogue Writing **Grammar:** Tenses and Voices, Regular and Irregular Verbs. **Vocabulary Development:** Prefix & Suffix, Word formation.

### UNIT III 6 OFFICIAL COMMUNICATIONS

**Listening:** Listening for specific information. **Speaking:** Giving Short Talks on a given Topic. **Reading:** Reading Motivational Essays on Famous Engineers and Technologists (Answering Open-Ended and Closed Questions). **Writing:** Writing Permission Letters/Editor, Complaint, and Invitation. Emails and Review Writing-Books, Films. **Grammar:** Adverb, Prepositions & Conjunctions. **Vocabulary Development:** Collocations – Fixed Expressions.

### UNIT IV 6 COMMUNICATION AT WORK PLACE

**Listening:** Listening to Short Talks (5 Minutes Duration and Fill a Table, Gap-Filling Exercise) Note Taking/Note Making. **Speaking:** Small Group Discussion, Giving Recommendations. **Reading:** Reading Problem – Solution Articles/Essays Drawn From Various Sources. **Writing:** Making Recommendations. **Grammar:** Subject-Verb Agreement, Framing Questions. **Vocabulary Development:** Infinitives and Gerunds, Reference Words, Technical Vocabulary.

**Listening:** Listening to a Product Description (Labelling and Gap Filling) Exercises. **Speaking:** Describing a Product and Comparing and Contrasting it with Other Products. **Reading:** Reading Graphical Material for Comparison (Advertisements). **Writing:** Essay Writing. Compare and Contrast Paragraphs, Essay writing. **Grammar:** Phrasal Verbs – Cause and Effect Sentences –Compound Nouns and Definitions. **Vocabulary Development:** Use of Discourse Markers

**THEORY : 30 PERIODS**

### TEXT BOOKS

1. N P Sudharshana & C Savitha. English for Technical Communication Delhi: CUP, 2019.
2. Board of Editors. English for Engineers and Technologists Volume 1 Orient Black Swan Limited, 2020

### REFERENCE BOOKS

1. Board of Editors. Using English-A course book for Undergraduate engineers and Technologists Orient Black Swan Limited, 2017
2. Bailey, Stephen. Academic Writing: A Practical Guide for Students. New York: Rutledge, 2011.
3. Comfort, Jeremy, et al. Speaking Effectively: Developing Speaking Skills for Business English. Cambridge University Press, Cambridge: Reprint 2011 3. Means, L. Thomas and Elaine Langlois. English & Communication For Colleges. Cengage Learning ,USA:2007
4. Redston, Chris & Gillies Cunningham Face2Face (Pre-intermediate Student's Book & Workbook) Cambridge University Press, New Delhi: 2005.

### WEB REFERENCES

1. <https://learnenglishteens.britishcouncil.org/exams/grammar-and-vocabulary-exams/> word formation
2. <https://cdn.s3waas.gov.in/s347d1e990583c9c67424d369f3414728e/uploads/2018/02/2018031621.pdf>
3. <http://xn--englishclub-ql3f.com/grammar/parts-of-speech.htm>
4. <https://www.edudose.com/english/grammar-degree-of-comparison-rules/>

### ONLINE COURSES / RESOURCES

1. <https://basicenglishspeaking.com/wh-questions/>
2. <https://agendaweb.org/verbs/modals-exercises.html>
3. <https://cdn.s3waas.gov.in/s347d1e990583c9c67424d369f3414728e/uploads/2018/02/2018031621.pdf>
4. <https://www.ego4u.com/en/cram-up/grammar/prepositions>

## LIST OF EXPERIMENTS

1. Listen to lectures- articulate a complete idea as opposed to producing fragmented utterances- Tedtalks, Science Fiction- My Fair Lady
2. Listening – following, responding to explanations, giving directions and instructions in academic and business contexts- IELTS,TOEFL.
3. Listening to transcripts and answer to the questions.
4. Listening for specific information: accuracy and fluency – BEC.
5. Reading: Different Text Type.
6. Reading: Predicting Content using pictures and titles.
7. Reading: Use of Graphic Organizers to review.
8. Reading: Aid Comprehension.
9. Reading: Speed Reading Techniques.
10. Reading and Comprehending the passages in the competitive exams like GATE, TOEFL, GRE, IELTS, and other exams conducted by Central and state governments.

**PRACTICAL : 30 PERIODS**  
**TOTAL : 60 PERIODS**

### REFERENCE BOOKS

1. Suresh Kumar.E and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Blackswan: Hyderabad,2012
2. Davis, Jason and Rhonda Liss. Effective Academic Writing (level 3) Oxford University Press: Oxford,2006
3. Withrow, Jeans and et al. Inspired to write. Reading and Tasks to develop writing skills. Cambridge University Press: Cambridge,2004

### COURSE OUTCOME

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

- CO1** The students will be able to comprehend conversation and short talks delivered in English.  
**CO2** Participate effectively in informal conversation; introduce themselves and their friends and express opinions English.  
**CO3** Read articles of a general kind in magazines and newspaper  
**CO4** Write short essays of a general kind and personal letters and emails in English.  
**CO5** To gain understanding of basic grammatical structures and use them in right context.  
**CO6** To use appropriate words in a professional context.

### CO-PO MAPPING

|            | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9      | PO10     | PO11 | PO12     |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|----------|----------|------|----------|
| <b>CO1</b> |     |     |     |     |     |     |     |     | <b>3</b> | <b>3</b> |      | <b>2</b> |
| <b>CO2</b> |     |     |     |     |     |     |     |     | <b>3</b> | <b>3</b> |      | <b>2</b> |
| <b>CO3</b> |     |     |     |     |     |     |     |     | <b>2</b> | <b>3</b> |      | <b>2</b> |
| <b>CO4</b> |     |     |     |     |     |     |     |     | <b>2</b> | <b>3</b> |      | <b>2</b> |
| <b>CO5</b> |     |     |     |     |     |     |     |     | <b>2</b> | <b>3</b> |      | <b>2</b> |
| <b>CO6</b> |     |     |     |     |     |     |     |     | <b>3</b> | <b>3</b> |      | <b>2</b> |



|          |                     |   |   |   |   |
|----------|---------------------|---|---|---|---|
| 23PH1101 | ENGINEERING PHYSICS | L | T | P | C |
|          |                     | 2 | 0 | 2 | 3 |

## COURSE OBJECTIVE

- To impart knowledge in basic concepts of physics relevant to engineering applications
- To introduce advances in technology for engineering applications

### UNIT-I PROPERTIES OF MATTERS 6

**Elasticity:** Stress, strain, Hooke's law and elastic moduli – stress-strain diagram – twisting couple per unit twist for solid cylinder – torsional pendulum (theory) – bending moment of beam – non-uniform and uniform bending (theory)– I-shape girder.

**Thermal Physics:** Mode of heat transfer: conduction, convection and radiation – thermal expansion of solids – bimetallic strips – thermal conductivity – Forbe's method and Lee's disc method; theory and experiment – thermal insulation – applications

### UNIT-II SEMICONDUCTING AND MAGNETIC MATERIALS 6

**Semiconducting Materials:** Intrinsic Semiconductors – energy band diagram – carrier concentration in intrinsic semiconductors – extrinsic semiconductors (N-type & P-type) – variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – Zener and avalanche breakdown in p-n junctions – Ohmic contacts – Schottky diode – tunnel diode.

**Magnetic Materials:** Magnetism in materials – Basic definitions – Classifications of Magnetic Materials- Ferromagnetic Domain theory – M versus H behavior- Hard and Soft Magnetic materials- Magnetic principle in Computer data storage – Magnetic Hard Disc and Embedded systems.

### UNIT-III MODERN OPTICS 6

**Laser:** Population of energy levels, Einstein's A and B coefficients derivation – optical amplification (qualitative) – Semiconductor lasers: homojunction and heterojunction– **Fiber Optics:** components and principle of fiber optics – numerical aperture and acceptance angle derivation – types of optical fibers (material, refractive index, mode) – losses associated with optical fibers– fiber as pressure and displacement sensors.

### UNIT-IV QUANTUM PHYSICS AND NANOSCIENCE 6

**Quantum Physics:** Blackbody radiation – Planck's hypothesis and derivation – wave particle duality of light: concepts of photon – de Broglie hypotheses – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations.

**Nanoscience:** Introduction – Classification of nanomaterials – preparation (bottom up and top down approaches), mechanical, optical and electrical properties – applications: NEMS and MEMS– carbon nanotubes: types.

Divergence – curl – integral calculus – Gauss divergence theorem – Stoke's theorem – equation of continuity – displacement current – Maxwell's equations – Gauss's laws – Faraday's law – Ampere-Maxwell law – mechanism of electromagnetic wave propagation – Hertz observation – production and detection of electromagnetic wave – properties of electromagnetic waves.

**THEORY: 30 PERIODS**

#### LIST OF EXPERIEMENTS

1. Determination of Moment of Inertia of the disc and Rigidity Modulus of the material of the wire – Torsional Pendulum
2. Determination of Young's Modulus – Non - Uniform Bending
3. Determination of Thermal Conductivity of the Bad Conductor – Lee's Disc Method
4. Determination of thickness of a thin wire – Air wedge method
5. (i) Determination of wavelength of Laser using Grating and Particle size determination  
(ii) Determination of Numerical Aperture and Acceptance angle of an Optical Fibre
6. Determination of Velocity of ultrasonic waves in a liquid and compressibility of the liquid – Ultrasonic Interferometer.
7. Determination of wavelength of Hg source using Grating by normal incidence method using spectrometer
8. Determine the band gap energy of a semiconductor.

**PRACTICAL : 30 PERIODS**

**TOTAL : 60 PERIODS**

#### TEXT BOOKS

1. Ajoy Ghatak, Optics, 5th Ed., Tata McGraw Hill, 2012
2. Arthur Beiser, Shobhit Mahajan and S RaiChoudhury, Concepts of Modern Physics, 6th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2014
3. B. K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt Ltd., New Delhi, 2017
4. Basics of laser physics: for students of science and engineering  
<http://www.springer.com/978-3-319-50650-0>

#### REFERENCE BOOKS

1. Halliday, D., Resnick, R. & Walker, J.—Principles of Physics, Wiley, 2015.
2. Tipler, P.A. & Mosca, G. — Physics for Scientists and Engineers with Modern Physics'. W.H.Freeman, 2007.
3. Ruby Das, C.S. Robinson, Rajesh Kumar, Prashant Kumar Sahu, A Textbook of Engineering Physics Practical, University Science Press, Delhi, II Edition (2016), ISBN 978-93-80386-86-7

## COURSE OUTCOME

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

- CO1** Upon completion of this course, the students will understand the basics properties of materials, especially elastic and thermal properties of materials.
- CO2** Upon completion of this course, the students will have adequate knowledge on the concepts of semiconducting and magnetic materials and their applications in memory storage.
- CO3** Upon completion of this course, the students will acquire the knowledge on the concepts of lasers, fiber optics and their technological applications.
- CO4** Upon completion of this course, the students will get knowledge on fundamental concepts of quantum theory, nanoscience its applications
- CO5** Upon completion of this course, the students will gain knowledge on the basics of electromagnetic waves and its properties.
- CO6** Upon completion of this course, the students will understand the basics properties of materials, especially elastic and thermal properties of materials.

### CO-PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | 3   | 2   | 1   | 1   | 1   |     |     |     |      |      |      |
| CO2 | 3   | 3   | 2   | 1   | 2   | 1   |     |     |     |      |      |      |
| CO3 | 3   | 3   | 2   | 2   | 2   | 1   |     |     |     |      |      | 1    |
| CO4 | 3   | 3   | 1   | 1   | 2   | 1   |     |     |     |      |      |      |
| CO5 | 3   | 3   | 1   | 1   | 2   | 1   |     |     |     |      |      |      |

|          |   |   |   |   |   |
|----------|---|---|---|---|---|
| 23ES1111 | PROBLEM SOLVING USING C PROGRAMMING<br>LABORATORY | L | T | P | C |
|          |   | 0 | 0 | 4 | 2 |

### COURSE OBJECTIVE

- To write, test, and debug simple C programs.
- To implement C programs with conditional and looping statement
- To develop applications in C using strings, pointers, functions.
- To implement C programs with structures and union.
- To develop applications in C using file processing
- To develop an application in real time situation

### LIST OF EXPERIMENTS

1. Programs using I/O statements and expressions.
2. Programs using decision-making constructs.
3. Write a program to find whether the given year is leap year or Not? (Hint: not every centurion year is a leap. For example 1700, 1800 and 1900 is not a leap year)
4. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of a number.
5. Check whether a given number is Armstrong number or not?
6. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions
  - a) if it is a perfect cube
  - b) if it is a multiple of 4 and divisible by 6
  - c) if it is a prime number
  - d) Sort the numbers based on the weight in the increasing order as shown below  
<10,its weight>,<36,its weight><89,its weight>
7. Populate an array with height of persons and find how many persons are above the average height.
8. Given a string —a\$bcd./fgll find its reverse without changing the position of special characters. (Example input:a@gh%;j and output:j@hg%;a)
9. Convert the given decimal number into binary, octal and hexadecimal numbers using userdefined functions.
10. From a given paragraph perform the following using built-in functions:
  - a) Find the total number of words.
  - b) Capitalize the first word of each sentence.
  - c) Replace a given word with another word.
11.
  - a) Sort the list of numbers using Selection sort and insertion sort
  - b) Sort the list of numbers using pass by reference.
12. Search an element from an unsorted array using linear search  
Search an element in an array using Binary search recursion call.
13. Generate salary slip of employees using structures and pointers.

14.
  - a) Programs using Pointers
  - b) Pointer demonstration the use of & and \*
  - c) Access Elements of an Array Using Pointer
  - d) Perform the string operations like Length of the String , Concatenation of string and compare the string using Pointer
  - e) Count number of words, digits, vowels using pointers
  - f) Add two matrices using Multidimensional Arrays with pointers
  - g) Multiply two matrices using pointers
  - h) Multiply two numbers using Function Pointers
15. Compute internal marks of students for five different subjects using structures and functions.
16. Program to demonstrate the difference between unions and structures
17. Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.
18. Count the number of account holders whose balance is less than the minimum balance using sequential access file.
19. **MINI PROJECT**  
Create a —Railway reservation systemll with the following modules
  - a) Booking
  - b) Availability checking
  - c) Cancellation
  - d) Prepare chart

**TOTAL : 60 PERIODS**

### **COURSE OUTCOME**

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

- CO1** Write, test, and debug simple C programs.
- CO2** Implement C programs with conditionals and loops.
- CO3** Develop C programs for simple applications making use arrays and strings.
- CO4** Develop C programs involving functions, recursion, pointers, and structures and union.
- CO5** Design applications using sequential and random access file processing.
- CO6** Perform task as an individual and / or team member to manage the task in time

### **WEB REFERENCES**

1. <https://www.programiz.com/c-programming/examples>
2. <https://beginnersbook.com/2015/02/simple-c-programs/>
3. <https://www.programmingsimplified.com/c-program-examples>
4. <https://www.tutorialgateway.org/c-programming-examples/>
5. <https://www.javatpoint.com/c-programs>
6. [https://www.tutorialspoint.com/learn\\_c\\_by\\_examples/simple\\_programs\\_in\\_c.htm](https://www.tutorialspoint.com/learn_c_by_examples/simple_programs_in_c.htm)

### CO-PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | 3   | 3   | 2   |     |     |     |     |     |      |      |      |
| CO2 | 3   | 2   | 2   | 1   | 3   |     |     |     |     |      |      |      |
| CO3 | 3   | 3   | 3   | 2   | 3   |     |     |     |     |      |      |      |
| CO4 | 3   | 2   | 2   | 1   | 3   |     |     |     |     |      |      |      |
| CO5 | 3   | 3   | 3   | 2   | 3   |     |     |     |     |      |      |      |
| CO6 | 3   | 2   | 2   | 1   | 3   |     |     |     |     |      |      |      |



|          |                    |   |   |   |   |
|----------|--------------------|---|---|---|---|
| 23TA1101 | HERITAGE OF TAMILS | L | T | P | C |
|          |                    | 1 | 0 | 0 | 1 |

**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 – 3**  
**SCULPTURE**

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 3**  
**MOVEMENT AND INDIAN CULTURE**

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**

**TEXT-CUM REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)

4. பொருறை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை)
5. Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: InternationalInstitute of Tamil Studies
7. Historical by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book



|          |             |   |   |   |   |
|----------|-------------|---|---|---|---|
| 23TA1101 | தமிழர் மரபு | L | T | P | C |
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**UNIT – I**

**மொழி மற்றும் இலக்கியம்**

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

**UNIT – II**

**மரபு - பாறை ஓவியங்கள் முதல் நவீன**

3

**ஓவியங்கள் வரை - சிற்பக் கலை**

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

**UNIT – III**

**நாட்டுப்புறக் கலைகள் மற்றும் வீர**

3

**விளையாட்டுகள்**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

**UNIT –IV**

**தமிழர்களின் திணைக் கோட்பாடுகள்**

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்கப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

**TOTAL : 15 PERIODS**

**TEXT-CUM REFERENCE BOOKS:**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணிணித் தமிழ் - முனைவர். இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை)
5. Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7. Historical by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

## SEMESTER – II

|          |   |   |   |   |   |
|----------|---|---|---|---|---|
| 23MA1201 | COMPLEX VARIABLES AND LAPLACE TRANSFORM | L | T | P | C |
|          |   | 3 | 1 | 0 | 4 |

### COURSE OBJECTIVE

- To solve the linear differential equations with constant coefficients.
- To understand the concepts of vectors as it gives the insight into how to trace along the different types of curves.
- To understand the standard technique of a complex variable theory in particular of analytics functions and its mapping property
- Complex variable techniques have been used in a wide area of engineering
- To apply the basic ideas of Laplace Transform to solve the problems in engineering and technology

### UNIT I ORDINARY DIFFERENTIAL EQUATIONS 9+3

Higher order linear differential equations with constant coefficients -Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous first order linear differential equations with constant coefficients.

### UNIT II 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 and Stokes' theorem (excluding proofs) – Simple applications involving cubes, rectangular parallelepiped, sphere and cylinder.

### UNIT III ANALYTIC FUNCTIONS 9+3

Functions of a complex variable–Analytic functions -Cauchy-Riemann equations – Necessaryandsufficientconditions–Harmonicandorthogonalpropertiesofanalytic function – Harmonic conjugate – Construction of analytic functions by Milne Thomson method– Conformal mapping:  $w = z+c, cz, 1/z$  and bilinear transformation.

### UNIT IV COMPLEX INTEGRATION 9+3

Line integrals- Cauchy's integral theorem-Cauchy's integral formula - Singularities – Residues– Cauchy's residue theorem - Taylor's and Laurent's series expansions – Application of residue theorem for evaluation of real definite integrals – Use of circular contour and semi- circular contour (excluding poles on the real axis).

### UNIT V LAPLACE TRANSFORM 9+3

Laplace transform: Sufficient conditions for existence – Transform of elementary functions –Basic properties–Transforms of derivatives and integrals of functions-Derivatives and integrals of transforms - Transforms of unit function, unit step function and unit impulse functions – Transforms of periodic functions– Initial and final value theorems. Inverse Laplace transforms: Convolution theorem–Solution of linear ODE of second order with constant coefficients using the techniques of Laplace transformation.

**TOTAL : 60 PERIODS**

## COURSE OUTCOME

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

- CO1** Apply various techniques in solving differential equations.
- CO2** Identify the gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
- CO3** Understand the concepts of analytic functions, harmonic functions and conformal mapping.
- CO4** Determine the types of singularities, residues and contour integration.
- CO5** Able to solve differential equations using Laplace transform.

## TEXT BOOKS

1. Grewal B.S.,- "Higher Engineering Mathematics", Khanna Publishers, NewDelhi, 44<sup>th</sup> Edition,2018.
2. B.V. Ramana, "Higher Engineering Mathematics", McGraw Hill Education, India.
3. Bali N., Goyal M. and Walkins C., "Advanced Engineering Mathematics", Firewall.

## REFERENCE BOOKS

1. Kreyszig Erwin, "Advanced Engineering Mathematics", John wiley and Sons, 10<sup>th</sup> Edition, New Delhi.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3<sup>rd</sup> Edition, 2007.
3. O'Neil, P.V. "Advanced Engineering Mathematics", Cengage Learning India Pvt. Ltd, New Delhi, 2007.
4. 4.Sastry, S.S, "Engineering Mathematics", Vol.I& II, PHI LearnigPvt. Ltd, 4<sup>th</sup> Edition, New Delhi, 2014.
5. Wyile, R.C. and Barrett, L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt Ltd, 6<sup>th</sup>Edition, New Delhi, 2012.

## ONLINE COURSES / RESOURCES

1. [https://onlinecourses.nptel.ac.in/noc21\\_ma69](https://onlinecourses.nptel.ac.in/noc21_ma69)
2. [https://onlinecourses.nptel.ac.in/noc21\\_ma57](https://onlinecourses.nptel.ac.in/noc21_ma57)

## CO-PO MAPPING

|            | PO1      | PO2      | PO3      | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12     |
|------------|----------|----------|----------|-----|-----|-----|-----|-----|-----|------|------|----------|
| <b>CO1</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO2</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO3</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO4</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |
| <b>CO5</b> | <b>3</b> | <b>3</b> | <b>3</b> |     |     |     |     |     |     |      |      | <b>1</b> |

|          |                    |   |   |   |   |
|----------|--------------------|---|---|---|---|
| 23ES1201 | PYTHON PROGRAMMING | L | T | P | C |
|          |                    | 3 | 0 | 0 | 3 |

## COURSE OBJECTIVE

- To know the basic programming constructs and control structures in python
- To use python data structures – Lists, Tuples and Dictionary
- To define Python functions and use Strings
- To learn about input/output with files in Python.
- To understand python packages and GUI concepts

### UNIT - I INTRODUCTION TO PYTHON PROGRAMMING AND CONTROL STRUCTURES 9

Introduction to Python, Demo of Interactive and script mode, Tokens in Python – Variables, Keywords, Comments, Literals, Data types, Indentation, Operators and its precedence, Expressions, Input and Print functions, Type Casting. Illustrative problems: find minimum in a list, guess an integer number in a range, Towers of Hanoi.

Control Structures: Selective statements – if, if-else, nested if, if – elif ladder statements ; Iterative statements - while, for, range functions, nested loops, else in loops, break, continue and pass statements. Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

### UNIT - II FUNCTIONS AND STRINGS 9

Functions: Types, parameters, arguments: positional arguments, keyword arguments, parameters with default values, functions with arbitrary arguments, Scope of variables: Local and global scope, Recursion and Lambda functions. Illustrative programs: power of a number, sorting, Fibonacci series using lambda.

Strings: Formatting, Comparison, Slicing, Splitting, Stripping, Negative indices, String functions, Regular expression: Matching the patterns, Search and replace. Illustrative programs: check whether the string is symmetrical, reverse a string, length of a string.

### UNIT - III COLLECTIONS 9

List: Create, Access, Slicing, Negative Indices, List Methods, and comprehensions Tuples: Create, Indexing and Slicing, Operations on tuples. Dictionary: Create, add, and replace values, operations on dictionaries. Sets: Create and operations on set.

Illustrative programs: Interchange first and last element in a list, maximum and minimum N elements in a tuple, sort dictionary by key or value, size of a set.

### UNIT - IV FILES AND EXCEPTION HANDLING 9

Files: Open, Read, Write, Append and Close. Tell and seek methods. Illustrative programs: word count, copy file.

Command line arguments, Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, Exception Chaining, User-defined Exceptions, Defining Clean-Up actions.

Illustrative programs: prompt the user to input an integer and raises a Value Error exception if the input is not a valid integer, open a file and handles a FileNotFoundError exception if the file does not exist, prompt the user to input two numbers and raises a Type Error exception if the inputs are not numerical, executes an operation on a list and handles an Index Error exception if the index is out of range.

## UNIT -V

## PACKAGES & GUI

9

**Python packages:** Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. Illustrative programs: create a pandas series using numpy, make a pandas dataframe with 2D list.

**GUI Programming:** Tkinter introduction, Tkinter and Python Programming, Tk Widgets, Tkinter examples. Python programming with IDE. Illustrative programs: create a GUI marksheet, calendar, file explorer using Tkinter,

**TOTAL: 45 PERIODS**

### COURSE OUTCOME

On successful completion of the course student will be able to:

- CO1** Develop and execute simple Python programs using conditionals and loops for solving problems.
- CO2** Express proficiency in the handling of strings and functions
- CO3** Represent compound data using Python lists, tuples, dictionaries, set etc
- CO4** Read and write data from/to files and handle exceptions in Python programs
- CO5** Implement python packages in data analysis and design GUI
- CO6** Examine various problem solving concepts in python to develop real time applications.

### TEXT BOOKS

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. ReemaThareja,"Problem Solving and Programming with Python", 2<sup>nd</sup> edition, Oxford University Press, New Delhi, 2019.
3. Alan D. Moore, Python GUI Programming with Tkinter, Design and Build Functional and User-friendly GUI Applications, Packt Publishing, 2021.

### REFERENCE BOOKS

1. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018
2. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
3. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.

### ONLINE COURSES / RESOURCES

1. <https://docs.python.org/3/tutorial/>

2. <https://www.w3schools.com/python/>
3. <https://www.tutorialspoint.com/python/index.htm>
4. <https://www.javatpoint.com/python-tutorial>
5. <https://nptel.ac.in/courses/>

### CO-PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2   | 3   | 3   | 1   | 2   |     |     |     |     |      |      | 1    |
| CO2 | 2   | 3   | 3   | 1   | 2   |     |     |     |     |      |      | 1    |
| CO3 | 2   | 3   | 3   | 1   | 2   |     |     |     |     |      |      | 1    |
| CO4 | 2   | 3   | 3   | 1   | 2   |     |     |     |     |      |      | 1    |
| CO5 | 2   | 3   | 3   | 1   | 2   |     |     |     |     |      |      | 1    |
| CO6 | 2   | 3   | 3   | 1   | 2   |     |     |     |     |      |      | 1    |



|          |                                   |   |   |   |   |
|----------|-----------------------------------|---|---|---|---|
| 23HS1201 | COMMUNICATIVE AND APTITUDE SKILLS | L | T | P | C |
|          |                                   | 2 | 0 | 2 | 3 |

**COURSE OBJECTIVE:**

- To develop linguistic and strategic competence in workplace context and to enhance language proficiency and thereby the employability of budding engineers and technologists.
- To improve the relevant language skills necessary for professional communication.
- To help learners to develop their listening skills, which will, enable them to listen to lectures and comprehend them by asking questions; seeking clarification and developing their speaking skills and to speak fluently in real contexts.
- To improve the verbal ability skill and communicative skill of the students.
- To enhance the analytical and problem solving skills of the students.
- To prepare them for various public and private sector exams & placement drives.

**UNIT I INTERPERSONAL COMMUNICATION 6**

**Listening:** Listening to Telephone Etiquettes and Conversations. **Speaking:** Role Play Exercises Based on Workplace Contexts, Introducing Oneself - PEP Talks. **Reading:** Reading the Interview of an Achiever and Completing Exercises (Skimming, Scanning and Predicting). **Writing:** Writing a Short Biography of an Achiever Based on Given Hints, **Grammar:** Comparative Adjective, Numerical Expressions and Sentence pattern. **Vocabulary Development:** Idioms and Phrases

**UNIT II TECHNICAL COMMUNICATION 6**

**Listening:** Listening to Talks/Lectures Both General and Technical and Summarizing the Main Points. **Speaking:** Participating in Debates, TED Talks. **Reading:** Reading Technical Essays/Articles and Answering Comprehension Questions. **Writing:** Summary Writing, Minutes of the meeting. **Grammar:** Prepositional Phrases and Relative Clauses. **Vocabulary Development:** Abbreviations and Acronyms.

**UNIT III PROCESS DESCRIPTION 6**

**Listening:** Listening to a Process Description and Drawing a Flowchart. **Speaking:** Participating in Group Discussions, Giving Instructions, Presentation. **Reading:** Reading Instruction Manuals **Writing:** Process Descriptions – Writing Instructions **Grammar:** Use of Imperatives, Tenses, Impersonal Passive Voice and Phrasal verbs **Vocabulary Development:** Misspelt words. Homophones and Homonyms.

**UNIT IV REPORT WRITING 6**

**Listening:** Listening to a Presentation and Completing Gap-Filling Exercises. **Speaking:** Making Formal Presentations, **Reading:** Reading and Interpreting Charts/Tables and diagrams. **Writing:** Interpreting Charts/Tables and Diagrams, Writing a Report. **Grammar:** Reported Speech; Interrogatives- Question Tags and Articles – omission of articles **Vocabulary Development:** Technical Jargon.



**Listening:** Listening to a Job Interview and Completing Gap-Filling Exercises **Speaking:** Mock Interview, Telephone Interviews & Etiquette, and Group Discussion **Reading:** Reading a Job Interview, SOP, Company Profile and Completing Comprehension Exercises **Writing:** Job Applications and Resume. **Grammar:** Conditional Clauses, Modal verbs **Vocabulary Development:** Technical Vocabulary, Purpose Statement. **Aptitude Skills: Ratio and Proportion** – Ratio, Proportion, Simple equations, Problems on Ages. **Percentages** - Percentages increase/decrease, Simple and Compound interest. **Number system** - Factors, Multiples - HCF and LCM. **Permutation** - Combination and Probability

**THEORY : 30 PERIODS**

### TEXT BOOKS

1. Board of Editors. English for Engineers and Technologists Volume 2 Orient Black Swan Limited, 2020
2. Richards, C. Jack. Interchange, New Delhi: CUP, 2017
3. Aggarwal R.S. (2017). Quantitative Aptitude for Competitive Examinations 3<sup>rd</sup> (Ed.) New Delhi: S.Chand Publishing.

### REFERENCE BOOKS

1. Kumar, Suresh. E. Engineering English. Orient Blackswan: Hyderabad, 2015
2. Raman, Meenakshi and Sharma, Sangeetha- Technical Communication Principles and Practice. Oxford University Press: New Delhi, 2014.
3. Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford: 2007.
4. Means, L. Thomas and Elaine Langlois, English & Communication For Colleges. Cengage Learning, USA: 2007.
5. Sharma Arun.(2016). Quantitative Aptitude, 7<sup>th</sup> (Ed.). Noida: McGraw Hill Education Pvt. Ltd.

### WEB REFERENCES

1. <https://learnenglishteens.britishcouncil.org/exams/grammar-and-vocabularyexams/word-formation>.
2. <https://cdn.s3waas.gov.in/s347d1e990583c9c67424d369f3414728e/uploads/2018>.
3. <http://xn--englishclub-ql3f.com/grammar/parts-of-speech.htm> .
4. <https://www.edudose.com/english/grammar-degree-of-comparison-rules/>
5. <https://www.math-only-math.com/practice-test-on-ratio-and-proportion.html>
6. <https://www.hitbullseye.com/Simple-Interest-and-Compound-Interest.php>

### ONLINE COURSES / RESOURCES

1. <https://basicenglishspeaking.com/wh-questions/>
2. <https://agendaweb.org/verbs/modals-exercises.html>
3. <https://cdn.s3waas.gov.in/s347d1e990583c9c67424d369f3414728e/uploads/2018/02/2018031621.pdf>
4. <https://www.ego4u.com/en/cram-up/grammar/prepositions>
5. <https://www.classcentral.com/course/quantitative-methods-4340>
6. <https://www.classcentral.com/subject/qualitative-research>

### **LIST OF EXPERIMENTS**

1. Speaking- sharing personal information- self introduction
2. Speaking- Group Discussion, Small talk or Peb Talk
3. Speaking- Presentation- Formal and Informal
4. Speaking- Mock Interview
5. Speaking- FAQ's on Job Interview
6. Speaking – JAM
7. Speaking- Debate and Story Narration
8. Writing: Error Detection- Spotting and reasoning the errors from the passages in competitive exams.
9. Writing: Letter of recommendation
10. Writing: Elements of a good essay
11. Writing: Types of essays. Descriptive – Narrative-Issue based.

**PRACTICAL : 30 PERIODS**  
**TOTAL : 60 PERIODS**

### **REFERENCE BOOKS**

1. Kumar, Suresh. E. Engineering English. Orient Blackswan: Hyderabad, 2015
2. Raman, Meenakshi and Sharma, Sangeetha- Technical Communication Principles and Practice. Oxford University Press: New Delhi, 2014.
3. Grussendorf, Marion, English for Presentations, Oxford University Press, Oxford: 2007.
4. Means, L. Thomas and Elaine Langlois, English & Communication For Colleges. Cengage Learning, USA: 2007.
5. Sharma Arun.(2016). Quantitative Aptitude, 7<sup>th</sup> (Ed.). Noida: McGraw Hill Education Pvt. Ltd.

### **COURSE OUTCOME**

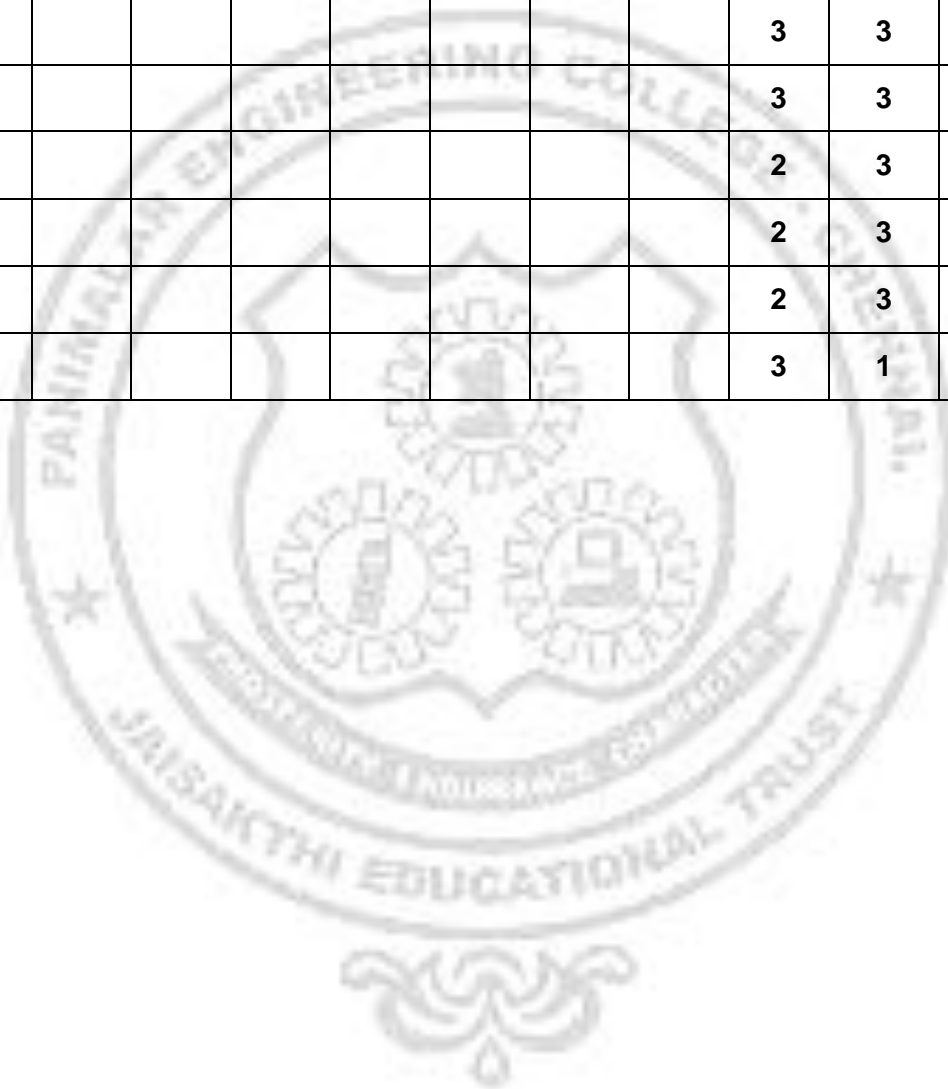
**Upon successful completion of the course, students will be able to:**

- CO1** Recognise the need for life skills; apply them to different situations, the basic communication practices in different types of communication.
- CO2** Gain confidence to communicate effectively in various situations to acquire employability skills.

- CO3** Develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others.
- CO4** Communicate effectively & appropriately in real life situation and enhance student's problem solving skill.
- CO5** Prepare for various public and private sector exams & placement drives.
- CO6** Enhance students' problem solving skills.

#### CO-PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 |     |     |     |     |     |     |     |     | 3   | 3    |      | 2    |
| CO2 |     |     |     |     |     |     |     |     | 3   | 3    |      | 2    |
| CO3 |     |     |     |     |     |     |     |     | 2   | 3    |      | 2    |
| CO4 |     |     |     |     |     |     |     |     | 2   | 3    |      | 2    |
| CO5 |     |     |     |     |     |     |     |     | 2   | 3    |      | 2    |
| CO6 |     |     |     |     |     |     |     |     | 3   | 1    |      | 3    |





## LIST OF EXPERIMENTS

1. Verification of Boolean Theorems using basic gates.
2. Implement the combinational circuits using basic gates for arbitrary functions, code converters
3. Design and Implement Half/Full Adder and Subtractor
4. Design and Implement combinational circuits using MSI devices:
  - 4 – bit binary adder / Subtractor
  - Parity generator / checker
  - Magnitude Comparator
  - Application using multiplexers
5. Simulate the shift-registers.
6. Design and Implement synchronous counters.
7. Simulate the asynchronous counters.

**PRACTICAL: 30 PERIODS**  
**TOTAL: 75 PERIODS**

### TEXTBOOKS

1. M. Morris Mano, Michael D. Ciletti, "Digital Design", Fifth Edition, Pearson Education, 2013.
2. M. Morris R. Mano, Michael D. Ciletti, —Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog, 6th Edition, Pearson Education, 2018.
3. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier, 2014.

### REFERENCES

1. G. K. Kharate, Digital Electronics, Oxford University Press, 2010
2. John F. Wakerly, Digital Design Principles and Practices, Fifth Edition, Pearson Education, 2018.
3. Charles H. Roth Jr, Larry L. Kinney, Fundamentals of Logic Design, Sixth Edition, CENGAGE Learning, 2013
4. Donald D. Givone, Digital Principles and Design, Tata Mc Graw Hill, 2003.
5. William Stallings, "Computer Organization and Architecture – Designing for Performance", Tenth Edition, Pearson Education, 2016.
6. John L. Hennessey, David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fourth Edition, 2007.
7. Douglas E. Comer, "Essentials of Computer Architecture", Sixth Edition, Pearson Education, 2012.
8. Govindarajalu, "Computer Architecture and Organization, Design Principles and Applications", Second edition, McGraw-Hill Education India Pvt Ltd, 2014.

### COURSE OUTCOME

**Upon successful completion of the course student will be able to:**

- CO1** Simplify complex Boolean functions.
- CO2** Design digital circuits with combinational and sequential components.
- CO3** Understand the characteristics of various Flip-Flops.

- CO4** Understand the basic structure of computers, operations and instructions.
- CO5** Implement a control unit as per the functional specification.
- CO6** Understand the memory hierarchies, cache memories and parallel processing.

**CO-PO MAPPING**

|            | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| <b>CO1</b> | 2   | 1   | 3   |     |     |     |     |     |     |      |      | 1    |
| <b>CO2</b> | 3   | 2   | 3   | 2   |     |     |     |     |     |      |      | 2    |
| <b>CO3</b> | 1   | 2   | 2   | 1   |     |     |     |     |     |      |      |      |
| <b>CO4</b> | 2   | 2   | 2   | 2   |     |     |     |     |     |      |      |      |
| <b>CO5</b> | 2   | 3   | 2   | 2   |     |     |     |     |     |      |      | 2    |
| <b>CO6</b> | 1   | 2   | 2   | 2   |     |     |     |     |     |      |      | 2    |



|          |   |   |   |   |   |
|----------|---|---|---|---|---|
| 23ES1102 | BASIC ELECTRICAL AND ELECTRONICS<br>ENGINEERING | L | T | P | C |
|          |   | 3 | 0 | 2 | 4 |

### COURSE OBJECTIVE

- To learn the concepts related with Electrical circuits and Wiring.
- To study the concept of electrical machines.
- To understand basics of Semiconductor Devices.
- To understand the basics of Sensors and Actuators
- To develop IOT infrastructure for Real time applications

### UNIT I BASIC ELECTRICAL CIRCUITS AND HOUSE WIRING 9

Electrical Quantities – Ohms Law – Kirchhoff's Law – Series and Parallel Connections – Earthing and its Types- basic house wiring - tools and components, different types of wiring, safety measures at home and industry. **Case Study** -staircase Wiring and ceiling fan Wiring.

### UNIT II ELECTRICAL MACHINES 9

Construction, Working Principle of Dc motors, Brushless dc motor, Permanent magnet DC Motor, stepper motor, Servo Motor(No Problems). -Application of motor in Industrial automation.

### UNIT III SEMICONDUCTOR DEVICES AND CIRCUITS 9

PN junction diode -Zener diode – Half wave and Full wave rectifier, - BJT, MOSFET,IGBT- Characteristics- **Case Study**: SMPS in computer and UPS in Residential Application.

### UNIT IV SENSORS AND ACTUATORS 9

Sensors: Temperature Sensor- Pressure Sensor-Proximity Sensor, Ultrasonic sensors. Actuators: Actuation using thermal forces, Actuation using shape memory Alloys, Actuation using piezoelectric crystals. **Case Study**: Integrated sensor and actuator systems in automation.

### UNIT V EMERGING TECHNOLOGIES 9

Solar PV system- solar and battery powered Electric Vehicle - IOT Concept and its Functional blocks- Introduction to Arduino Uno. **Case Study**: Smart and Connected Cities: Smart Lighting-Smart Parking Architecture - Smart Traffic Control.

**THEORY : 45 PERIODS**

## **TEXT BOOKS**

1. Hughes revised by Mckenzie Smith with John Hilcy and Keith Brown, Electrical and Electronics Technology, 8th Edition, Pearson, 2012.
2. R.J. Smith, R.C. Dorf, Circuits Devices and Systems, 5th Edition, John Wiley and sons, 2001
3. P. S. Dhogal, Basic Electrical Engineering – Vol. I & II, 42nd Reprint, McGraw Hill, 2012.
4. Clarence W. de Silva, “Sensors and Actuators: Engineering System Instrumentation”, 2nd Edition, CRC Press, 2015
5. David Hanes, Gonzalo Salgueiro, Patrick Grossetete. Rob Barton and Jerome Henry, "IOT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017.

## **REFERENCE BOOKS**

1. Del Toro, "Electrical Engineering Fundamentals" Pearson Education, New Delhi, 2007
2. 2.SmarjitGhosh, "Fundamentals of Electrical and Electronics Engineering", 2<sup>nd</sup> Edition 2007
3. 3.Olivier Hersent, David Boswarthick, Omar Elloumi, —The Internet of Things – Key applications and ProtocolsII, Wiley, 2012

## **WEB REFERENCES**

1. <https://electrical-engineering-portal.com/download-center/books-and-guides/electrical-engineering/basic-course>
2. <https://www.infoq.com/articles/internet-of-things-reference-architecture/>

## **ONLINE COURSES / RESOURCES**

1. <https://archive.nptel.ac.in/courses/117/106/117106108/>
2. <https://archive.nptel.ac.in/courses/108/105/108105155/>
3. [https://onlinecourses.nptel.ac.in/noc22\\_cs53/preview](https://onlinecourses.nptel.ac.in/noc22_cs53/preview)



## LIST OF EXPERIMENTS

1. (i) Study of Electronic components and equipment's – Resistor, colour coding  
(ii) Soldering practice – Components Devices and Circuits–Using general purpose PCB
2. Electrical House Wiring:
  - (i) Residential house wiring using switches, fuse, indicator, lamp and energy meter.
  - (ii) Fluorescent lamp wiring
  - (iii) Stair case wiring
  - (iv) Study of Home Appliances- wiring and assembly
3. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
4. Design of Half wave Rectifier & Full wave Rectifier
5. Simulation of following circuits using suitable software
  - (i) Seven segment LED display
  - (ii) Stepper Motor control
  - (iii) Traffic Light Control
6. 2D & 3D Electrical wiring Model using suitable Software.

**SOFTWARE REQUIRED: Keil/Proteus/Fusion 360**

**PRACTICAL: 30 PERIODS  
TOTAL: 75 PERIODS**

## COURSE OUTCOME

**On successful completion of the course student will be able to:**

- CO1** Acquire basic knowledge on Basic Electrical circuits and House Wiring.
- CO2** Understand the construction, working principle and applications of DC and AC Machines
- CO3** Acquire basic knowledge on semiconductor devices and their applications
- CO4** Illustrate the concepts of Sensors and Actuators
- CO5** Identify and analyse Various Emerging Technologies.
- CO6** Analyse the applications of IOT in real time scenario.

### CO-PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | 2   | 2   | 2   | 1   |     | 1   |     |     |      |      | 1    |
| CO2 | 3   | 2   | 2   | 2   | 1   |     | 1   |     |     |      |      | 1    |
| CO3 | 3   | 2   | 2   | 2   | 1   |     | 1   |     |     |      |      | 1    |
| CO4 | 3   | 2   | 2   | 2   | 1   |     | 1   |     |     |      |      | 1    |
| CO5 | 3   | 2   | 2   | 2   | 1   |     | 1   |     |     |      |      | 1    |
| CO6 | 3   | 2   | 3   | 3   | 3   |     | 1   |     |     |      |      | 1    |



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| 23ES1211 | PYTHON PROGRAMMING LABORATORY | L | T | P | C |
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## COURSE OBJECTIVE

- To write, test, and debug simple Python programs
- To implement Python programs with conditions and loops
- To use functions for structuring Python programs.
- To represent compound data using Python lists, tuples, dictionaries.
- To learn to implement string functions and file operations
- To understand python packages and GUI development.

## LIST OF EXPERIMENTS

1. Basic Python Programs
2. Write programs to demonstrate different number data types in python
3. Develop python programs to demonstrate various conditional statements
4. Implement user defined functions using python
5. Develop python scripts to demonstrate built-in functions
6. Develop python programs to perform various string operations like slicing, indexing & formatting
7. Develop python programs to perform operations on List & Tuple
8. Demonstrate the concept of Dictionary with python programs
9. Develop python programs to perform operations on Sets.
10. Develop python codes to perform matrix addition, subtraction and transpose of the given matrix
11. Develop python codes to demonstrate the concept of function composition and anonymous functions.
12. Demonstrate python codes to print try, except and finally block statements
13. Implement python programs to perform file operations
14. Write a python code to raise and handle various built in exceptions.
15. Implement python programs using packages numpy and pandas
16. UI development using tkinter

**Mini Project :Suggested Topics(but not limited to)**

1. Dice roll simulator
2. Guess the number game
3. Random password generator

**TOTAL: 60 PERIODS**

### **COURSE OUTCOMES**

**Upon successful completion of the course student will be able to:**

- CO1** Develop and execute simple Python programs
- CO2** Implement programs in Python using conditionals and loops for solving problems.
- CO3** Deploy functions to decompose a Python program.
- CO4** Develop programs using string operations.
- CO5** Utilize Python packages in data analysis
- CO6** Create GUI for python applications

### **WEB REFERENCES**

1. <https://www.programiz.com/python-programming/examples>
2. <https://www.geeksforgeeks.org/python-programming-examples/>
3. <https://beginnersbook.com/2018/02/python-programs/>
4. <https://www.javatpoint.com/python-programs>
5. [https://www.w3schools.com/python/python\\_examples.asp](https://www.w3schools.com/python/python_examples.asp)

### **CO- PO MAPPING**

|            | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> | <b>PO6</b> | <b>PO7</b> | <b>PO8</b> | <b>PO9</b> | <b>PO10</b> | <b>PO11</b> | <b>PO12</b> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| <b>CO1</b> | 2          | 3          | 3          | 1          | 2          |            |            |            |            |             |             | 1           |
| <b>CO2</b> | 2          | 3          | 3          | 1          | 2          |            |            |            |            |             |             | 1           |
| <b>CO3</b> | 2          | 3          | 3          | 1          | 2          |            |            |            |            |             |             | 1           |
| <b>CO4</b> | 2          | 3          | 3          | 1          | 2          |            |            |            |            |             |             | 1           |
| <b>CO5</b> | 2          | 3          | 3          | 1          | 2          |            |            |            |            |             |             | 1           |
| <b>CO6</b> | 2          | 3          | 3          | 1          | 2          |            |            |            |            |             |             | 1           |

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| 23ES1212 | TECHNICAL SKILL PRACTICES - I | L | T | P | C |
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## COURSE OBJECTIVE

- To impart essential problem solving skills through general problem solving concepts.
- To provide basic knowledge on programming essentials using C as implementation tool.
- To introduce various programming methods using C.

## LIST OF EXPERIMENTS

1. Data Types, Variables, Operators
2. Expressions, Precedence , Operators
3. Conditional Statements , Switch Statements
4. Looping, Nested Loops
5. Problems on Bit Manipulation
6. Patterns
7. Number Problems
8. Array Basics , Static vs Dynamic Array, Two Dimensional Matrix
9. Structure , Union ,Storage Classes
10. Function , Parameters passing
11. Recursion
12. Strings
13. Pointers
14. Command Line Arguments, Pre-processors
15. File Handling & Exception Handling.

**TOTAL: 30 PERIODS**

## COURSE OUTCOME

**Upon successful completion of the course student will be able to:**

- CO1** Propose solutions for a given problem.
- CO2** Infer the fundamental programming elements in C language and learn to apply basic control structures in C.
- CO3** Demonstrate the applications of structures and unions.
- CO4** Visualize the capabilities of modular programming approach in C.
- CO5** Understand the basic principles of pointers and their association during implementations.
- CO6** Apply various input, output and error handling functions in C.

## TEXT BOOKS

1. ReemaThareja, ``Programming in C'', 2nd edition, OXFORD University Press, New Delhi, 2019.
2. Paul Deitel and Harvey Deitel, "C How to Program", Seventh edition, Pearson Publication,2016.

## REFERENCES BOOKS

1. Stephen G. Kochan, "Programming in C", 3rd edition, Pearson Education, 2014.
2. Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill, 2000.

#### ONLINE COURSES / RESOURCES

1. <https://www.javatpoint.com/c-programming-language-tutorial>
2. <https://www.tutorialspoint.com/cprogramming/>
3. <https://nptel.ac.in/Courses/>

#### CO – PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| CO2 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| CO3 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| CO4 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| CO5 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |
| CO6 | 3   | 3   | 3   | 3   | 3   |     |     |     |     |      |      | 3    |

|          |                       |   |   |   |   |
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| 23TA1201 | TAMILS AND TECHNOLOGY | L | T | P | C |
|          |                       | 1 | 0 | 0 | 1 |

**UNIT – I WEAVING AND CERAMIC TECHNOLOGY 3**

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

**UNIT – II DESIGN AND CONSTRUCTION TECHNOLOGY 3**

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age — Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

**UNIT – III MANUFACTURING TECHNOLOGY 3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold-Coins as source of history - Minting of Coins — Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

**UNIT – IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3**

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoempu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries — Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

**UNIT – V SCIENTIFIC TAMIL & TAMIL COMPUTING 3**

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

**TOTAL : 15 PERIODS**

**TEXT-CUM REFERENCE BOOKS:**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருதை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை)

5. Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: InternationalInstitute of Tamil Studies
7. Historical by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book





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|----------|--------------------------|---|---|---|---|
| 23TA1201 | தமிழரும் தொழில்நுட்பமும் | L | T | P | C |
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**UNIT – I நெசவு மற்றும் பானைத் தொழில்நுட்பம் 3**

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

**UNIT – II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் 3**

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாடு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசோனிக் கட்டிடக் கலை.

**UNIT – III உற்பத்தி தொழில்நுட்பம் 3**

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

**UNIT –IV வேளாண்மை மற்றும் நீர்பாசனத் தொழில்நுட்பம் 3**

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக் கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

**TOTAL : 15 PERIODS**

**TEXT-CUM REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருறை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை)
5. Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies)
7. Historical by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bookand Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book

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| 23MC1201 | ENVIRONMENTAL SCIENCE | L | T | P | C |
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## COURSE OBJECTIVE

- 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 familiarize the influence of societal use of resources on the environment and introduce the legal provisions, National and International laws and conventions for environmental protection

### UNIT-I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 6

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers– energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids Introduction to biodiversity definition: genetic, species and ecosystem diversity – bio geographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – 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 conservation of biodiversity.

### UNIT-II ENVIRONMENTAL POLLUTION 6

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes, biomedical wastes and e-wastes – role of an individual in prevention of pollution – pollution case studies

### UNIT-III NATURALRE SOURCES 6

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – 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, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Land resources:

### UNIT-IV SOCIAL ISSUES AND THE ENVIRONMENT 6

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acidrain, ozone layer depletion. environment protection act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness

#### **UNIT-V**

#### **HUMAN POPULATION AND THE ENVIRONMENT**

**6**

Population growth, variation among nations – population explosion – family welfare Programme – environment and human health – human rights – value education – HIV / AIDS women and child welfare – role of information technology in environment and human health case studies.

**TOTAL: 30 PERIODS**

#### **COURSE OUTCOME**

**Upon successful completion of the course student will be able to:**

- CO1** To recognize and understand the functions of environment, ecosystems
- CO2** To identify the causes, effects and environmental pollution and natural disasters and contribute to the preventive measures in the immediate society.
- CO3** To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
- CO4** To recognize different forms of energy and apply them for suitable applications in for technological advancement and societal development
- CO5** To demonstrate the knowledge of societal activities on the long and short term environmental issues and abide by the legal provisions, National and International laws and conventions in professional and personal activities and to identify and analyse effect of population dynamics on human value education, consumerism and role of technology in environmental issues.

#### **TEXT BOOKS**

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6<sup>th</sup> 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).

#### **REFERENCE BOOKS**

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorbani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.

3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. (2013).

#### CO-PO MAPPING

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2   | 1   |     |     |     | 2   | 3   |     |     |      |      | 2    |
| CO2 | 3   | 2   |     |     |     | 3   | 3   |     |     |      |      | 2    |
| CO3 | 3   |     | 1   |     |     | 2   | 3   |     |     |      |      | 2    |
| CO4 | 3   | 2   | 1   | 1   |     | 2   | 2   |     |     |      |      | 2    |
| CO5 | 3   | 2   | 1   |     |     | 2   | 2   |     |     |      |      | 1    |

