GOVERNMENT COLLEGE OF ENGINEERING –BARGUR
KRISHNAGIRI-635 104, TAMILNADU
(An Autonomous Institution Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E. – CSE – CURRICULUM AND SYLLABI

Students admitted during 2025-2026

REGULATIONS - 2025

9/4

HOD / Dept. of CSE
Government College of Engg.
Bargur-635104.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

CURRICULUM 2025

B.E. – Computer Science and Engineering

Academic Year: 2025-2026 | Regulation: [R2025]

Program Overview

Program Duration: 4 Years (8 Semesters)

Total Credits Required: 168 Credits

Affiliated University: Anna University, Chennai

NBA Accreditation Status: Not Accredited

Program Outcomes:

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and computer science to solve complex engineering problems.
2. **Problem Analysis**: Identify, formulate, research literature, and analyze complex computing problems using principles of mathematics, natural sciences, and engineering sciences.
3. **Design/Development of Solutions**: Design and develop solutions for complex engineering problems and design system components or processes that meet specified needs, considering public health and safety, cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
5. **Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern computing tools with an understanding of limitations to complex engineering activities.
6. **The Engineer and Society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability**: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
10. **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.

11. **Project Management and Finance**: Demonstrate knowledge and understanding of 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.

Program Specific Outcome

1. **Computing Solutions Development**

Design, develop, and optimize software solutions using programming languages, data structures, algorithms, databases, and operating systems to solve complex computing problems across diverse domains.

2. **Intelligent Systems and Data Analytics**

Apply principles of artificial intelligence, machine learning, and data science to extract insights, automate processes, and build intelligent systems for real-world applications.

3. **System Integration and Emerging Technologies**

Integrate knowledge of networking, cloud computing, cybersecurity, IoT, and other emerging technologies to develop secure, scalable, and efficient computing systems and services.

Credit Distribution Comparison

Component	Anna University	AICTE Norms	GCE Bargur
Mathematics & Basic Sciences (BS)	24	23	29
Humanities & Social Sciences (HS)	12	16	15.5
Engineering Sciences (ES)	26	29	21.5
Professional Core (PC)	57	59	63
Professional Electives (PE)	22	12	18
Open Electives (OE)	9	9	9
Project Work (PR)	13	15	12
Mandatory courses (MC)	0	0	0
Total Credits	163	163	168

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Department of Computer Science and Engineering

Category Abbreviations

BS - Basic Sciences | **ES** - Engineering Sciences | **PC** - Professional Core

PE - Professional Electives | **OE** - Open Electives | **HS** - Humanities & Social Sciences

| **MC** Mandatory courses | **PR** - Project

Notes

- Legend: L - Lecture Hours per Week | T - Tutorial Hours per Week | P - Practical Hours per Week | C - Credits
- Credits are calculated as: L + T + P/2 for theory courses with lab, and based on contact hours for other courses.
- Professional Electives are domain-specific advanced subjects.
- Open Electives can be chosen from any other department to promote interdisciplinary learning.

Changes from previous curriculum R2022:

1. Problem Solving and Python Programming, Problem Solving and Python Programming Laboratory have been moved from Semester 1 to Semester 2.
2. Engineering Graphics, Engineering Practices Laboratory has been moved from Semester 2 to Semester 1.
3. Physics for Information Science has been introduced in place of Physics of Semiconductor Devices.
4. The following Professional Core courses are included in the curriculum 2025:
    - Communication Systems
    - Web Technology
    - Web Technology Laboratory
    - Foundations of Data Science
    - Data Science Laboratory
5. The following Professional Elective courses are included in the curriculum 2025:
    - High Performance Computing Architecture
    - Embedded Systems and IOT
    - Edge Computing
    - Full Stack Development
    - Generative AI
6. The following department specific requirements are included in the curriculum 2025:
    - Idea / Proof of Concept / Design thinking
    - Internship (Minimum 4 weeks)
    - Technical Seminar / Publications / Participation in Conferences
    - Industry Lecture
    - Technical Club activity / Participation in Sports / Cultural Club activity / NSS

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

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Department of Computer Science and Engineering

SEMESTER-WISE CURRICULUM STRUCTURE

SEMESTER I

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25ZHS101**	English for Engineers - I	3	0	0	3	**HS**
2	**25ZBS102**	Matrices and Calculus	3	1	0	4	**BS**
3	**25ZBS103**	Engineering Physics	3	0	2	4	**BS**
4	**25ZBS104**	Engineering Chemistry	3	0	2	4	**BS**
5	**25ZES105**	Programming in C	3	0	0	3	**ES**
6	**25ZES106**	Engineering Graphics	1	0	4	3	**ES**
7	**25ZMC107**	தமிழர் மரபு / Heritage of Tamils	1	0	0	0	**MC**
8	**25ZES108**	Programming in C Laboratory	0	0	3	1.5	**ES**
9	**25ZES110**	Engineering Practices Laboratory	0	0	4	2	**ES**
Total			17	1	15	**24.5**	

SEMESTER II

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25ZHS201**	English for Engineers – II	3	0	0	3	**HS**
2	**25ZBS202**	Random Processes and Linear Algebra	3	1	0	4	**BS**
3	**25ZBS203**	Physics for Information Science	3	0	0	3	**BS**
4	**25SES204**	Digital Principles and Design	3	0	0	3	**ES**
5	**25ZES205**	Python Programming	3	0	0	3	**ES**
6	**25ZMC207**	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	1	0	0	0	**MC**

S.No	Course Code	Course Title	L	T	P	C	Category
7	**25SES208**	Digital Principles and Design Laboratory	0	0	3	1.5	**ES**
8	**25ZES209**	Python Programming Laboratory	0	0	3	1.5	**ES**
9	**25ZHS210**	Communication English Laboratory	0	0	2	1	**HS**
Total			16	1	8	**20**	

SEMESTER III

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25ZBS301**	Discrete Mathematics	3	1	0	4	**BS**
2	**25SPC302**	Database Management Systems	3	0	0	3	**PC**
3	**25SPC303**	Object Oriented Programming	3	0	0	3	**PC**
4	**25SPC304**	Data Structures and its Applications	3	0	0	3	**PC**
5	**25SPC305**	Design and Analysis of Algorithms	3	0	0	3	**PC**
6	**25ZMC306**	Constitution of India	1	0	0	0	**MC**
7	**25ZHS307**	Technical Club activity / Participation in Sports / Cultural Club Activity / NSS	0	0	0	1	**HS**
8	**25SPC308**	Database Management Systems Laboratory	0	0	3	1.5	**PC**
9	**25SPC309**	Object Oriented Programming Laboratory	0	0	3	2	**PC**
10	**25SPC310**	Data Structures and Algorithms Laboratory	0	0	4	2	**PC**
Total			16	1	10	**22.5**	

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Department of Computer Science and Engineering

SEMESTER IV

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25SBS401**	Applied Statistics and Numerical Methods	3	1	0	4	**BS**
2	**25SPC402**	Computer Organization and Architecture	3	0	0	3	**PC**
3	**25SPC403**	Computer Networks	3	1	0	4	**PC**
4	**25SPC404**	Operating Systems	3	0	0	3	**PC**
5	**25SPC405**	Software Engineering	3	0	0	3	**PC**
6	**25ZBS406**	Environmental Sciences and Sustainability	2	0	0	2	**BS**
7	**25SPC407**	Idea / Prof of Concepts / Design Thinking	0	0	0	1	**PC**
8	**25SPC408**	Computer Networks Laboratory	0	0	3	1.5	**PC**
9	**25SPC409**	Operating Systems Laboratory	0	0	3	1.5	**PC**
Total			17	2	6	**23**	

SEMESTER V

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25SES501**	Communication Systems	3	0	0	3	**ES**
2	**25SPC502**	Engineering Economics and Financial Accounting	3	0	0	3	**PC**
3	**25SPC503**	Formal Languages and Automata Theory	3	1	0	4	**PC**

S.No	Course Code	Course Title	L	T	P	C	Category
4		Professional Elective – I	2	0	2	3	PE
5		Professional Elective – II	2	0	2	3	PE
6		Open Elective – I	3	0	0	3	OE
7		Internship (Minimum 4 Weeks)	0	0	0	1	PC
8		Industry Lecture	0	0	0	1	PC
9	**25ZHS508**	Soft Skills and Personality Development Laboratory	0	0	3	1.5	HS
Total			16	1	7	**22.5**	

SEMESTER VI

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25SPC601**	Artificial Intelligence and Machine Learning	3	1	0	4	PC
2	**25SPC602**	Web Technology	3	0	0	3	PC
3	**25SPC603**	Principles of Compiler Design	3	1	0	4	PC
4		Professional Elective – III	2	0	2	3	PE
5		Professional Elective – IV	2	0	2	3	PE
6		Open Elective – II	3	0	0	3	OE
7	**25SPC607**	Technical Seminar / Publications / Participation in Conference	0	0	0	1	PC
8	**25SPC608**	Artificial Intelligence and Machine Learning Laboratory	0	0	3	1.5	PC
9	**25SPC609**	Web Technology Laboratory	0	0	3	1.5	PC

S.No	Course Code	Course Title	L	T	P	C	Category
Total			16	2	10	**24**	

SEMESTER VII

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25SHS701**	Management and Entrepreneurship	3	0	0	3	**HS**
2	**25ZHS702**	Human Values and Professional Ethics	3	0	0	3	**HS**
3	**25SPC703**	Foundations of Data Science	3	0	0	3	**PC**
4		Professional Elective – V	2	0	2	3	**PE**
5		Professional Elective – VI	2	0	2	3	**PE**
6		Open Elective – III	3	0	0	3	**OE**
7	**25SPC707**	Data Science Laboratory	0	0	3	1.5	**PC**
8	**25SPR708**	Project – I	0	0	8	4	**PR**
Total			16	0	15	**23.5**	

SEMESTER VIII

S.No	Course Code	Course Title	L	T	P	C	Category
1	**25SPR801**	Project – II	0	0	16	8	**PR**
Total			0	0	16	**8**	

Professional Electives (PE)

Students must choose 6 Professional Electives

VERTICAL 1: DATA SCIENCE

Based on the industrial needs and latest developments in the engineering subjects may be proposed.						
1	25SPE101	Exploratory Data Analysis	2	0	2	3
2	25SPE102	Recommender Systems	2	0	2	3
3	25SPE103	Neural Networks and Deep Learning	2	0	2	3
4	25SPE104	Text and Speech Analysis	2	0	2	3
5	25SPE105	Business Analytics	2	0	2	3
6	25SPE106	Image and Video Analytics	2	0	2	3
7	25SPE107	Computer Vision	2	0	2	3
8	25SPE108	Big Data Analytics	2	0	2	3

VERTICAL 2: CLOUD COMPUTING AND DATA CENTER TECHNOLOGIES

Based on the industrial needs and latest developments in the engineering subjects may be proposed.						
1	25SPE201	Cloud Computing	2	0	2	3
2	25SPE202	Virtualization	2	0	2	3
3	25SPE203	Cloud Services Management	2	0	2	3
4	25SPE204	Data Warehousing	2	0	2	3
5	25SPE205	Storage Technologies	2	0	2	3
6	25SPE206	Software Defined Networks	2	0	2	3
7	25SPE207	Stream Processing	2	0	2	3
8	25SPE208	Full Stack Development	2	0	2	3

VERTICAL 3: CYBER SECURITY AND DATA PRIVACY

Based on the industrial needs and latest developments in the engineering subjects may be proposed.						
1	25SPE301	Ethical Hacking	2	0	2	3
2	25SPE302	Digital and Mobile Forensics	2	0	2	3
3	25SPE303	Social Network Security	2	0	2	3
4	25SPE304	Modern Cryptography	2	0	2	3
5	25SPE305	Engineering Secure Software Systems	2	0	2	3
6	25SPE306	Cryptocurrency and BlockchainTechnologies	2	0	2	3
7	25SPE307	Cryptography and Network Security	2	0	2	3
8	25SPE308	Security and Privacy in Cloud	2	0	2	3

VERTICAL 4: EMERGING TECHNOLOGIES

Based on the industrial needs and latest developments in the engineering subjects may be proposed.						
1	25SPE401	Augmented Reality / Virtual Reality	2	0	2	3
2	25SPE402	Robotic Process Automation	2	0	2	3
3	25SPE403	Embedded Systems and IOT	2	0	2	3
4	25SPE404	Cyber security	2	0	2	3
5	25SPE405	Quantum Computing	2	0	2	3
6	25SPE406	High Performance Computing Architecture	2	0	2	3
7	25SPE407	Game Development	2	0	2	3
8	25SPE408	3D Printing and Design	2	0	2	3

VERTICAL 5: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Based on the industrial needs and latest developments in the engineering subjects may be proposed.						
1	25SPE501	Knowledge Engineering	2	0	2	3
2	25SPE502	Soft Computing	2	0	2	3
3	25SPE503	Edge Computing	2	0	2	3

4	25SPE504	Generative AI	2	0	2	3
5	25SPE505	Optimization Techniques	2	0	2	3
6	25SPE506	Game Theory	2	0	2	3
7	25SPE507	Cognitive Science	2	0	2	3
8	25SPE508	Ethics and AI	2	0	2	3

Open Electives (OE)

Students must choose 4 Open Electives from other departments (3 credits each = 12 credits)

To provide interdisciplinary engineering knowledge, subjects may be proposed.						
1	25SOE001	Structured Programming	3	0	0	3
2	25SOE002	Programming in Java	3	0	0	3
3	25SOE003	Database Concepts	3	0	0	3
4	25SOE004	Web Designing	3	0	0	3
5	25SOE005	Mobile Application Development	3	0	0	3
6	25SOE006	Computer Organization	3	0	0	3
7	25SOE007	Introduction to Computer Networks	3	0	0	3
8	25SOE008	Operating System Concepts and Design	3	0	0	3
9	25SOE009	Software Engineering	3	0	0	3
10	25SOE010	Introduction to Artificial Intelligence	3	0	0	3
11	25SOE011	Principles of Machine Learning	3	0	0	3
12	25SOE012	Introduction to Data Analytics	3	0	0	3
13	25SOE013	Introduction to Cyber Security	3	0	0	3
14	25SOE014	Software Testing and Automation	3	0	0	3

VERTICALS

Vertical – I Data Science	Vertical – II Cloud Computing and Data Center Technologies	Vertical – III Cyber Security and Data Privacy	Vertical – IV Emerging Technologies	Vertical – V Artificial Intelligence and Machine Learning
Exploratory Data Analysis	Cloud Computing	Ethical Hacking	Augmented Reality / Virtual Reality	Knowledge Engineering
Recommender Systems	Virtualization	Digital and Mobile Forensics	Robotic Process Automation	Soft Computing
Neural Networks and Deep Learning	Cloud Services Management	Social Network Security	Embedded Systems and IOT	Edge Computing
Text and Speech Analysis	Data Warehousing	Modern Cryptography	Cyber Security	Generative AI
Business Analytics	Storage Technologies	Engineering Secure Software Systems	Quantum Computing	Optimization Techniques
Image and Video Analytics	Software Defined Networks	Cryptocurrency and Blockchain Technologies	High Performance Computing Architecture	Game Theory
Computer Vision	Stream Processing	Cryptography and Network Security	Game Development	Cognitive Science
Big Data Analytics	Full Stack Development	Security and Privacy in Cloud	3D Printing and Design	Ethics and AI

Department Specific Requirement

Sl. No	Course Code	Course Title	CAT	Credit
1		Idea / Proof of Concept / Design thinking (Students shall identify real-world problems and propose innovative solutions or prototypes through design thinking.)	PC	1
2		Internship (Minimum 4 weeks) (Students must undergo a minimum of four weeks of industrial/research internship and submit a certified report for evaluation.)	PC	1
3		Technical Seminar / Publications / Participation in Conferences (Each student must present a seminar or publish/participate in a conference to develop	PC	1

		communication and research skills.)		
4		Industry Lecture (Students must attend at least two expert lectures either organized by Institute or third party and submit a summary report to gain industrial exposure.)	PC	1
5		Technical Club activity / participation in Sports / Cultural Club activity / NSS (Active participation in technical, cultural, sports, or NSS activities are mandatory to promote holistic and team-based learning.)	HS	1

Institute Requirement

Sl. No	Course Code	Course Title	CAT	Credit
1		Induction Program (All first-year students must attend the induction program to understand institute culture, ethics, and learning practices.)	HS	0
2		Participation in Hackathon (Students must participate in at least one hackathon to encourage innovation, teamwork, and problem-solving aptitude.)	HS	0

Note:

- Department-Specific Requirement (DSR) courses shall be completed between the 3rd and 6th semesters.
- All listed activities are mandatory components of the curriculum and must be completed before graduation.
- Students must maintain records such as attendance, reports, or participation certificates for verification.
- Department coordinators will verify and forward activity completion reports to the Head of the Department.
- Credits for each activity will be awarded only after successful completion and submission of required documents.
- Non-completion of any activity within the scheduled semester must be compensated in the subsequent semester.
- Evidence of participation and performance will be maintained in the department portfolio and subject to audit.
- The consolidated list of students completing these requirements will be forwarded to the Controller of Examinations for grade entry.

9/1/26

Signature of HOD

SEMESTER - I

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

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Department of English

Subject Code	25ZHS101	**Subject Title**	English for Engineers-I
Category	HSMC	**L-T-P-C**	3-0-0-3
Regulation	2025	**Semester**	I
Prerequisites	Common vocabulary and ability to frame simple sentences in English		

Course Objectives:

1. To comprehend and interpret complex information from diverse academic audio and video sources by focusing on accent variations and core message extraction.
2. To equip learners with a good command of technical vocabulary and grammatical structures to ensure accuracy in professional discourse.
3. To train students in applying skimming and scanning techniques to analyze technical articles, user manuals, and gadget reviews for detailed comprehension and information retrieval.
4. To enable students to produce well-structured technical documents, including reports, minutes of meetings, instructions, and the interpretation of data from charts and graphs.
5. To foster confidence in delivering short presentations (JAM) seeking clarifications and providing process descriptions.

Course Content:

[VOCABULARY] (9 Hours)

Technical Vocabulary – Formal and Informal Vocabulary – Avoidance of Jargon -Verbal Analogies One Word Substitution – Tenses- Linking Words – Fixed and Semi-Fixed Expressions.

[LANGUAGE] (9 Hours)

Numerical Adjectives - Embedded Sentences - Subject-Verb Agreement - If Conditionals - Active Voice and Passive Voice – Phrasal Verbs – Misplaced Modifiers – Discourse Markers – Question Tag

[LISTENING AND SPEAKING] (9 Hours)

Listening to TED/ POD Talks – Self introduction- Formal and Informal Conversation - Greeting People - Asking for and Giving directions - Asking for and Offering Help – Seeking Clarification – Speaking about a Process- JAM (short presentation)

[READING] (9 Hours)

Skimming and Scanning – Accent Variations - Pronunciation - Reading for Detailed Comprehension - Reading and Understanding Technical Articles - Reading Advertisements.- Gadgets reviews; user manuals.

[WRITING] (9 Hours)

Writing Instructions, Recommendations and Warnings - Interpreting Charts and Graphs - Describing a Process - Extended Definitions - Report Writing - Minutes of Meeting – Jumbled Sentences.

Total Hours: 45

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Department of English

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

CO	COURSE OUTCOMES	Bloom's Level
CO1	Recall and identify technical vocabulary, phrasal verbs, and grammar rules to form accurate sentences.	L1
CO2	Summarize and interpret key information from complex academic audio such as TED Talks and podcasts to demonstrate active listening comprehension.	L2
CO3	Demonstrate fluent communication in formal and informal contexts, including giving directions, seeking clarifications, and delivering short presentations (JAM).	L3
CO4	Analyze technical articles and user manuals to distinguish between denotative and connotative meanings and extract detailed specifications.	L4
CO5	Evaluate and interpret data from charts and graphs, technical documents, including reports, minutes of meetings, and extended definitions, using a logical structure with a professional command of the language.	L5

TEXT BOOKS:

1. D Praveen Sam KN Shoba, "A Course in Technical English", Cambridge University Press. 2020.

REFERENCES BOOKS:

1. *Markel, Mike. "Technical Communication" New York: Bedford.2007.*
2. *"Communication Skills in English" Edited by The department Of English, Osmania University, Hyderabad, Oxford University Press.1998.*
3. *Laplante, A. Phlip. "Technical Writing: A Practical guide for Engineers, Scientists and Nano Technical Professionals" CRC Press.2019.*
4. *Gerson, Sharon & Steven Gerson. "Technical Communication: Process and Product". Pearson. 2019.*

E-resources:

1. innovate.ieee.org/ieee-english-for-technical-professionals/
2. onlinecourses.nptel.ac.in/noc20hs56/preview
3. swayam.gov.in
4. cambridge english for engineering

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Department of English

Course Articulation Matrix:

CO	Program Outcomes (PO)										
	1	2	3	4	5	6	7	8	9	10	11
CO1	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	3	-	2
CO3	-	-	-	-	-	-	-	-	3	2	-
CO4	-	-	-	2	-	-	-	-	3	-	3
CO5	-	-	-	3	-	-	-	-	3	-	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

12/3/2026

Course Designed By

Dr. A. Jesu Steephan Samy. AP/Eng.

BOS Approval

Date: 12.03.2026

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

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Department of Mathematics

Subject Code	25ZBS102	Subject Title	MATRICES AND CALCULUS
Category	BASIC SCIENCE	L-P-T-C	3-0-1-4
Regulation	2025	Semester	I
Prerequisites	Basic knowledge of algebra, trigonometry, and elementary calculus.		

Course Objectives:

1. Provide essential matrix algebra tools used in engineering.
2. Strengthen understanding of single-variable differential calculus.
3. Introduce functions of several variables, important for advanced engineering problems.
4. Train students in integration techniques for various applications.
5. Familiarize students with multiple integrals and their applications in physical sciences and engineering.

Course Content:

[MATRICES] (9+3)

Eigen values and Eigen vectors of a real matrix–Characteristic equation–Properties of Eigen values and Eigen vectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation –Reduction of a quadratic form to canonical form by orthogonal transformation– Nature of quadratic forms–Applications: Stretching of an elastic membrane.

[DIFFERENTIALCALCULUS] (9+3)

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.

[FUNCTIONS OF SEVERAL VARIABLES] (9+3)

Partial differentiation – Homogeneous functions and Euler's theorem –Total derivative– Change of variables –Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

[INTEGRAL CALCULUS] (9+3)

Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions-Improper integrals-Applications: Hydrostatic force and pressure, moments and centres of mass.

[MULTIPLE INTEGRALS] (9+3)

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals–Applications: Moments and centres of mass, moment of inertia.

Total Hours: 60

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

CO	Course Outcome	Bloom's Level
CO1	Define and recall fundamental concepts, definitions, standard formulas and theorems related to matrices, differential calculus, functions of several variables, integral calculus and multiple integrals.	L1

CO2	Explain the concepts and interpret the relationships among eigenvalues, derivatives, partial derivatives, integrals and multiple integrals, including their properties, rules and geometric or physical meaning.	L2
CO3	Apply eigenvalue methods, Cayley–Hamilton theorem, differentiation and integration techniques, Jacobians, and multiple integrals to solve standard mathematical problems.	L3
CO4	Analyze and differentiate appropriate methods for solving problems involving eigenvalues, quadratic forms, derivatives, Jacobians, and multiple integrals by examining given conditions and constraints.	L4
CO5	Apply suitable mathematical techniques from matrices, differential calculus, functions of several variables, integral calculus and multiple integrals to solve structured and real-world problems.	L5

Text Books:

1. Kreyszig.E, "Advanced Engineering Mathematics" John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, NewDelhi,44th Edition,2018.
3. James Stewart, " Calculus: Early Transcendental", Cengage Learning, 8th Edition, NewDelhi,2015.[For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only),2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem),5.5,7.1 - 7.4 and 7.8].

Reference Books:

1. Anton.H ,Bivens.I and Davis.S, "Calculus",Wiley,10th Edition,2016.
2. Bali.N.,Goyal.M. and Watkins.C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi,7th Edition, 2009.
3. Jain. R.K. and Iyengar. S.R.K. ,"Advanced Engineering Mathematics" , Narosa Publications, New Delhi,5th Edition, 2016.
4. Narayanan.S. and Manicavachagom Pillai. T. K., "Calculus" Volume I and II, S.Viswanathan Publishers Pvt. Ltd., Chennai,2009
5. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi,

.Course Articulation matrix:

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

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

S. 2/3/26

CS. Gowtham Prakash AP(T)/MAT

BOS Approval

Date: 4/3/2026

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Physics

Subject Code	25ZBS103	Subject Title	Engineering Physics
Category	Basic Science	L-P-T-C	3-2-0-4
Regulation	2025	Semester	I (CSE, CSE-CS, ECE, Mech)
Prerequisites	Fundamental knowledge of mechanics, optics, and thermal physics at higher secondary level. Familiarity with mathematical concepts such as algebra, differentiation, and integration. Basic understanding of electricity and magnetism. Ability to perform simple physics experiments and data analysis.		

Course Objectives:

1. Provide fundamental knowledge of properties of matter, thermal physics, quantum mechanics, lasers and fibre optics, and physics of materials, enabling students to understand the basic physical principles governing mechanical, thermal, optical, and material properties.
2. Enable students to apply the concepts of elasticity, heat transfer, quantum phenomena, laser principles, and optical fibre propagation to interpret the working of practical devices and systems used in engineering and scientific applications.
3. Develop the ability to analyze the behavior of physical systems and materials, including stress–strain relationships, heat conduction mechanisms, quantum mechanical phenomena, laser operation, and the magnetic, dielectric, and superconducting properties of materials.
4. Equip students with the conceptual ability to design or conceptualize engineering and scientific applications such as optical fibre sensors, laser-based systems, superconducting devices, and materials with specific magnetic or dielectric properties.
5. Encourage students to enhance their learning through assignments, presentations, seminars, and team-based activities, promoting analytical thinking, communication skills, and collaborative learning related to modern developments in physics and materials science.

COURSE CONTENT

PROPERTIES OF MATTER 9

Elasticity: stress- strain – Hooke's law – modulus of elasticity – Poisson's ratio, stress-strain diagram - factors affecting modulus of elasticity, beam: expression for bending moment – depression of cantilever (Theory and Experiment), Young's modulus: uniform bending (Theory and Experiment) – non-uniform bending (qualitative).

THERMAL PHYSICS 9

Review of thermal properties: specific heat capacity- thermal capacity, modes of heat transfer, thermal conductivity- Lee's Disc method (theory and experiment), conduction through compound media (series and parallel), thermal expansion of solids – bimetallic strip, application: thermostat.

QUANTUM MECHANICS 9

Blackbody radiation – Planck's theory of radiation (derivation) – Wien's law – Rayleigh-Jean's law, photo-electric effect: determination of Planck's constant, matter waves – de-Broglie's hypothesis – wavefunction and its physical significance, Schrödinger wave equation – time-dependent and time-independent, applications: Transmission Electron Microscope (TEM).

LASERS AND FIBRE OPTICS 9

LASER: characteristics of LASER – Einstein's A and B coefficient (derivation) – population inversion – pumping actions, types: Nd-YAG LASER- industrial and medical applications of LASER.

Fibre Optics: propagation of light in optical fibers - total internal reflection – critical angle - numerical aperture and acceptance angle, types of optical fibers (material, refractive index and mode), application: fiber optic displacement sensor.

PHYSICS OF MATERIALS 9

Magnetic materials: magnetic dipole moment – Bohr magneton – magnetic permeability and susceptibility – classification of magnetic materials (dia, para, ferro), Ferromagnnetic materials –

Domain theory - hysteresis behavior of ferromagnetic materials – soft and hard magnets.
Dielectric materials: dipole moment – permittivity –polarization - types–Langevin- Debye equation - total polarization– dielectric capacitors.
Superconductors: Properties: Meissner's effect, critical temperature, fields and heavy current, types, BCS theory (qualitative) - applications: Magnetic levitation.

Total: 45 Periods

30 Periods

Experiments:
1. Determination of Young's modulus of a beam by uniform bending method.
2. Determination of thermal conductivity of poor conductor by Lee's disc method.
3. Determination of Planck's constant by Photoelectric effect.
4. Determination of wavelength of laser using grating.
5. Determination of acceptance angle and numerical aperture of an optical fiber.
6. Determination of retentivity and coercivity of ferromagnetic material.

THEROY: 45 PERIODS, PRACTICALS: 30 PERIODS, TOTAL: 75 PERIODS

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

CO	Course Outcome	Bloom's Level	POs
CO1	Explain and describe the fundamental principles, laws, and concepts related to: elasticity, bending of beams, heat transfer, thermal conductivity, expansion, Planck's theory, photoelectric effect, Schrödinger equation, Lasers and Fibre Optics, magnetic, dielectric, superconducting materials	L1, L2	-
CO2	Apply physical laws and mathematical formulations of elasticity, heat transfer, quantum theory, laser principles, fibre optics, and material properties to solve engineering-oriented numerical problems and theoretical applications.	L3	PO1
CO3	Analyze physical phenomena and engineering systems by interpreting stress–strain behavior, heat conduction models, quantum radiation laws, wave equations, laser mechanisms, fibre optic propagation, and magnetic/dielectric material responses.	L4	PO2
CO4	Design conceptual models and propose engineering solutions based on principles of elasticity, thermal management, quantum mechanics applications-TEM, laser systems, fibre optic sensors, and advanced functional materials for technological applications.	L5,L6	PO3
CO5	Perform experiments, record data, interpret results, and communicate findings effectively while adhering to ethical and safety standards in laboratory practice.	L4. L5, L6	PO2, PO5,PO4, PO6,PO7, PO8, PO9, PO11

Text Books:

1. M. N. Avadhanulu, P. G. Kshirsagar, and T. V. S. Arun Murthy, A Textbook of Engineering Physics, 11th Edition, S. Chand & Company Pvt. Ltd., New Delhi, 2018.

2. Arthur Beiser, Shobhit Mahajan, and S. Rai Choudhury, Concepts of Modern Physics, 6th Edition, McGraw-Hill Education (India) Pvt. Ltd., New Delhi, 2003.
3. B. B. Laud, Introduction to Electrodynamics and Optics, Wiley Eastern Limited, New Delhi.
4. R. S. Gambhir, Physics of Materials, Tata McGraw-Hill Publishing Company Limited, New Delhi.
5. S. O. Pillai, Solid State Physics, 7th Edition, New Age International Publishers, New Delhi, 2015.

Reference Books:

1. Robert Eisberg and Robert Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles, 2nd Edition, Wiley, New York, 1985.
2. B. B. Laud, Lasers and Nonlinear Optics, 3rd Edition, New Age International (P) Limited Publishers, New Delhi, 2011.
3. J. A. Stratton, Introduction to Electromagnetic Theory, McGraw-Hill Book Company, New York, 1941.
4. C. K. Sharma, Fiber Optics and Optoelectronics, Dhanpat Rai & Co. (P) Ltd., New Delhi.
5. N. Subrahmanyam, Brijlal, and P. S. Hemne, Heat, Thermodynamics and Statistical Physics, 1st Edition, S. Chand & Company Pvt. Ltd., New Delhi, 2008.
6. John M. Senior, Optical Fiber Communications: Principles and Practice, 3rd Edition, Pearson Education, London, 2010

e-resources:

1. https://nptel.ac.in/courses/122106093
2. https://nptel.ac.in/courses/115106060
3. https://ocw.mit.edu/courses/8-05-quantum-physics-ii-fall-2013/

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO5	-	1	-	1	3	1	3	1	2	-	1	-	-	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By:
Name & Designation:
1. Dr. R. Bakkiyaraj, Associate Professor & Head / Physics,
2. Mr. A. Anandakumar, Assistant Professor /Physics
3. Dr. S. Santhosh, Assistant Professor /Physics

Approved by BoS
Date: 12/03/2026

HoD/Physics 12/3/2026
Dr.R.BAKKIYARAJ, M.Sc.,M.Phil.,B.Ed.,Ph.D.,
Associate Professor & Head,
Department of Physics,
Government College of Engineering,
Bargur-635104, Krishnagiri Dt, Tamilnadu.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Chemistry

Course code	25ZBS104	**Course Title**	ENGINEERING CHEMISTRY
Category	Basic Science	**L-P-T-C**	3-2-0-4
Regulation	R-2025	**Semester**	01
Prerequisites	Nil		

Course Objectives:

1. To recognize the basics of water treatment, polymers, electrochemistry, corrosion, energy sources and analytical techniques.
2. To understand the principles of water treatment methods, electrochemical reactions, mechanism of corrosion, polymers properties, cell reactions, instrumentation of various analytical instruments.
3. To equip students to apply the acquired basic knowledge of science in solving engineering problems.
4. To enable the students to analyze boiler efficiency, corrosion environment, differentiate between properties of polymers, compare efficiency of energy storage devices.
5. To learn evaluation of water parameters, EMF and analytical instruments and interpret experimental data for real time applications.

Course Content:

WATER TECHNOLOGY **Theory: 9 hours; Practicals: 6 hours**

Global and Indian water scenario – engineering applications of water – Characteristics – alkalinity and its significance – hardness (problems) - estimation by EDTA method – potable water treatment – boiler feed water - requirements – disadvantages of using hard water in boilers (Scales & Sludge, Boiler corrosion, Priming & Foaming, Caustic embrittlement) – water treatment – Internal treatment – external treatment – Ion exchange process – desalination – reverse osmosis method.

Practicals:

- Analysis of basic parameters of water (Colour, odour, pH, Conductance, TDS)
- Determination of alkalinity in the given water sample by titrimetric method.
- Determination of total hardness of given water sample by EDTA method.
- Demonstration of treatment of hard water by Ion exchange process.
- To study the effects of hard water on boilers by preparing small boiler provided with heating element and to observe the scale/sludge formation.

ELECTROCHEMISTRY AND CORROSION **Theory: 9 hours; Practicals: 6 hours**

Electrochemistry: Reversible and irreversible cells – EMF – single electrode potential – Nernst equation (Problems) – reference electrode – standard hydrogen electrode and calomel electrode – glass electrode and measurement of pH – electrochemical series and its applications.

Corrosion: Corrosion - dry corrosion and its mechanism - Pilling Bedworth rule - electrochemical corrosion and its mechanism – types (galvanic, pitting) – factors influencing corrosion – corrosion control methods – sacrificial anode method – impressed current method –protective coatings: paints – definition - constituents and its functions.

Practicals:

- To Determine the EMF of the cell by Poggendroff compensation method.
- Conductometric titration: Strong acid (HCl) vs Strong base (NaOH).
- Measurement of pH using glass electrode (pH titration).
- Observe the type and rate of corrosion by comparing the effects of different solutions (tap water, salt water and acid) on different metal samples (Iron, Copper and Zinc).

POLYMERS AND COMPOSITES	Theory: 9 hours; Practicals: 6 hours

Polymers: Classification – functionality – degree of polymerization – types (addition, condensation, co-polymerization) – free radical mechanism – thermoplastics and thermosetting plastics – preparation, properties and uses of individual polymers (PVC, TEFLON, epoxy resin) – Conducting polymers - Properties and its applications (Polyacetylene) – Insulators – types – engineering applications.

Composites: definition – types polymer matrix composites – Fibre Reinforced Polymers – applications.

Practicals:

- Determination of molecular weight of polymer using Ostwald viscometer.
- Identification of Thermoplastics and Thermosetting plastics. Impacts of plastic waste on land and life below ocean.
- To study the difference between conductor and insulator with various materials. To observe
  (i) how materials with different electrical properties affect the flow of current and
  (ii) how insulation affects rate of heat transfer.
- Fabricate a simple composite panel using layers of fabric (like fiberglass) and resin. Measure the tensile strength of composite. Compare the properties of composites made with different types of resins.

ENERGY SOURCES AND STORAGE DEVICES	Theory: 9 hours; Prac.:6 hours

Introduction – classification of energy sources - global and Indian energy scenario - Solar energy and wind energy – working principle and applications – light water nuclear reactor for power generation. Batteries: primary and secondary batteries – Lead–acid battery, Li-ion and Li-Iron phosphate batteries – Fuel cell: Alkaline ($H_2 - O_2$) fuel cell, polymer electrolyte fuel cell– principles and applications – advantages and disadvantages – Supercapacitor – Definition – Difference between Supercapacitor and Battery – merits and demerits of supercapacitor.

Practicals:

- Build a simple battery with household items. Explore how different materials and conditions affect battery performance.
- To Study the safety storage and disposal of batteries.
- Measurement of voltage in a photovoltaic cell.
- Identification of components in dry/alkaline cell and Lead-acid battery.
- To learn the real-life examples of supercapacitor.

ANALYTICAL TECHNIQUES	Theory: 9 hours; Prac.: 6 hours

Spectroscopy: Electromagnetic spectrum - Fundamentals of spectroscopy – Beer Lambert's law (problems) – Instrumentation, working principle and applications of UV-Visible spectrophotometer, Atomic Absorbance Spectrophotometer (AAS), Flame photometer.

Chromatography: Introduction – Instrumentation, working principle and applications of Paper chromatography, Gas liquid Chromatography and HPLC.

Practicals:

- Estimation of iron content of the given sample using UV-Visible Spectro photometer.
- Estimation of sodium present in water sample using flame photometer.
- To study the components, present in given sample using GCMS.

Theory: 45 Periods; Practicals: 30 Periods	TOTAL : 75 PERIODS

Upon successful completion of this course, student will be able to,		
CO	Course Outcome	Bloom's Level
CO1	Recall the basic science of water parameters, electrochemistry, corrosion, polymers, energy sources and analytical techniques.	L1
CO2	Explain the boiler problems, electrochemical reactions, mechanism of corrosion, types of polymers, working principles of batteries and various analytical techniques.	L2
CO3	apply theoretical knowledge in laboratory experiments related to water parameters analysis, EMF, corrosion studies and instrumental methods to solve engineering problems.	L3
CO4	Analyze boiler efficiency, corrosion behaviour, properties of polymers, efficiency of energy systems and instrumental data interpretation for industrial applications. Directly contributes to **Sustainable Development Goal 6: Clean Water and Sanitation.**	L4
CO5	Evaluate water quality, corrosion control techniques, suitable polymers and energy storage systems for engineering applications Assess the environmental impact of chemical processes. **SDG 12: Responsible Consumption and Production & SDG 14: Life below water.**	L5

Text Books:

1. P. C. Jain and Monica Jain, "Engineering Chemistry" 17th edition, Dhanpat Rai Publishing Co., 2023.
2. Sivasankar B., "Engineering Chemistry", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2015.

Reference Books:

1. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", 2ndEdition, Cambridge University Press, Delhi, 2019.
2. Douglas A Skoog, Donald M, West "Fundamentals of Analytical Chemistry", 10th edition, Cengage, 2022.
3. O.V. Roussak and H.D. Gesser, Applied Chemistry - A Text Book for Engineers and Technologists, 2nd Edition, Springer Science Business Media, New York, 2013.
4. O.G. Palanna, "Engineering Chemistry" 2nd Edition, McGraw Hill Education (India) Private Limited, 2017.

COURSE ARTICULATION MATRIX											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2				2	3	2			
CO2	3	2	1				3	2			
CO3	3	2				2	3	2			
CO4	3	2				2	3	2			
CO5	3	2									

Correlation Levels: 3 – Strong, 2 – Medium, 1 – Low and (-) No correlation

Course Designed by

(1) Dr.G.SARASWATHY,
ASP & Head/Chemistry.

(2) Dr.S.ELUMALAI, AP/Chemistry.

BoS Approval
Date: 29.05.2025.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25ZES105	Subject Title	PROGRAMMING IN C
Category	Engineering Sciences	L-T-P-C	3-0-0-3
Regulation	2025	Semester	II
Prerequisites	Awareness of elementary mathematical concepts such as arithmetic operations and logical reasoning.		

Course Objectives:

1. To impart fundamental knowledge about C programming, enabling students to solve engineering and real-world problems algorithmically.
2. To develop modular programming abilities in students using control structures, arrays, functions, pointers, and file operations.
3. To nurture analytical, debugging, and problem-solving skills relevant to contemporary engineering and technology applications.

Course Content:

Problem Solving and Fundamentals of C Programming **(9 Hours)**

Introduction to Problem Solving - Problem-solving concepts, Programming logic, Program Design Representation – Algorithm, Pseudocode, Flowchart.

History of C - Programming paradigms - C program structure - Data types - Variables - Operators - Expressions - Input/Output - Control statements - Preprocessor directives - Compilation process.

Arrays and Strings **(9 Hours)**

Declaration and initialization - 1D/2D arrays - Array operations - String operations (length, compare, concatenate, copy) - Sorting (bubble, selection) - Searching (linear, binary)

Functions and Pointers **(9 Hours)**

Modular programming - User-defined and built-in functions - Recursion, Pointers and pointer arithmetic - Parameter passing - Arrays and pointers - Array of pointers.

Structures, Unions and Dynamic Memory **(9 Hours)**

Structures & nested structures - Unions - Array of structures - Self-referential structures - Pointers with structures - Dynamic memory allocation (malloc, calloc, realloc, free) - Storage classes - Visibility - Typedef.

File Processing and Advanced Topics **(9 Hours)**

File operations (open, read, write, close) - Types of file processing (sequential/random access) - Standard I/O - Command line arguments - Error handling in C (using errno, perror(), strerror(), error codes)

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Explain problem-solving strategies, C program structure, data representation, and the role of arrays, functions, structures, dynamic memory, and files in solving computational problems.	L2	-
CO2	Implement modular C programs using arrays, strings, functions, pointers, dynamic memory allocation, and file operations to solve real-world problems.	L3	PO1, PO2, PO3

CO3	Analyze C programs involving sorting/searching techniques, pointer manipulation, structured data, memory usage, and file processing to identify errors, optimize performance, and improve reliability.	L4	PO1, PO2, PO3, PO4, PO5
CO4	Evaluate alternative program designs and data handling techniques—such as recursion vs iteration, static vs dynamic memory, arrays vs structures, and sequential vs random file access—to select appropriate solutions.	L5	PO1, PO2, PO3, PO4, PO5
CO5	Prepare and deliver a technical seminar on C programming applications by integrating problem-solving techniques, arrays, functions, pointers, structures, dynamic memory management, file processing, and error-handling concepts.	L6	PO3, PO5, PO8, PO9, PO10, PO11

Text Books:

1. E. Balagurusamy, "Programming in ANSI C", McGraw Hill, 9th Edition, 2024.
2. Yashavant Kanetkar, "Let Us C", BPB Publications, 20th Edition, 2024.

Reference Books:

1. Reema Thareja, "Data Structures Using C", Oxford University Press, 3rd Edition, 2025.
2. B.W. Kernighan and D.M. Ritchie, "The C Programming Language", Prentice Hall, 2nd Edition, 1988.
3. Greg Perry & Dean Miller, "C Programming Absolute Beginner's Guide", Que Publishing, 3rd Edition, 2013.
4. Stephen G. Kochan, "Programming in C", Addison-Wesley, 3rd Edition, 2004.

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	2	3	-	-	-	-	-	-	-	-	3	2	-
CO3	3	3	3	2	3	-	-	-	-	-	-	2	2	-
CO4	2	3	3	2	3	-	-	-	-	-	-	3	1	-
CO5	-	-	2	-	2	-	-	2	2	3	1	2	1	1

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr.J.Nafeesa Begum,
Professor/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Mechanical Engineering

Subject Code	25ZES106 / 25YES204	Subject Title	ENGINEERING GRAPHICS
Category	Engineering Science	L-T-P-C	1-0-4-3
Regulation	2025	Semester	I
Prerequisites	NIL		

Course Objectives:

1. To impart knowledge on engineering drawing fundamentals, BIS/ISO conventions, and geometric constructions, enabling students to understand and represent technical information graphically.
2. To develop the ability to visualize and draw orthographic projections of points, lines, planes, solids, sectioned solids, and their surface developments accurately using conventional and CAD tools.
3. To train students in freehand sketching and the application of isometric and perspective projections for effective communication of engineering designs.

Course Content:

PLANE CURVES (3+12 Hours)

Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method — Construction of cycloid — construction of involutes of square and circle — Drawing of tangents and normal to the above curves - *BIS/ISO conventions (Not applicable for SEE & Only for CIE).*

PROJECTION OF POINTS, LINES AND PLANE SURFACE (3+12 Hours)

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

PROJECTION OF SOLIDS AND FREEHAND SKETCHING (3+12 Hours)

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three Dimensional objects — Layout of views- Freehand sketching of multiple views from pictorial views of objects.

Practicing three dimensional modeling of simple objects by CAD Software (Not applicable for SEE & Only for CIE)

PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES (3+12 Hours)

Sectioning of above 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 and sectioned solids — Prisms, pyramids cylinders and cones.

Practicing three dimensional modeling of simple objects by CAD Software (Not

applicable for SEE & Only for CIE)

ISOMETRIC AND PERSPECTIVE PROJECTIONS (3+12 Hours)

Principles of isometric projection — isometric scale - Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids- Prisms, pyramids and cylinders by visual ray method.

Practicing three dimensional modeling of isometric projection of simple objects by CAD Software (Not applicable for SEE & Only for CIE)

Total Hours: 90

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Recall and explain the fundamentals of engineering drawing, including BIS/ISO conventions, plane curves, orthographic projection principles, and standard practices for points, lines, planes, and solids.	L1, L2	–
CO2	Apply principles of orthographic projection to construct accurate projections of points, straight lines, plane surfaces, and simple solids using first angle projection and rotating line/object methods.	L3	PO1
CO3	Analyze projections of solids, sectioned solids, and plane surfaces to determine true lengths, true shapes of sections, and correct development of lateral surfaces.	L4	PO2
CO4	Design and draw isometric and perspective projections of simple and combined solids, including truncated forms, adhering to standard drawing conventions and visualization principles.	L5	PO3
CO5	Use CAD tools and freehand sketching techniques collaboratively to model, visualize, and communicate three-dimensional objects effectively for engineering applications. *(Only for CIE)*	L3–L6	PO4–PO11

Text Books:

1. Natrajan K. V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2016.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2016.
3. Shah, M.B and Rana B. C. "Engineering Drawing and Computer Graphics", Pearson Education, 2010.

Reference Books:

1. N S Parthasarathy and Vela Murali, "Engineering Graphics", Oxford University Press, New Delhi, 2015.

2. Gopalakrishna K.R, "Engineering Drawing" (Vol. I & II combined), Subhas publications, Bangalore, 2014.
3. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2013.
4. Luzzader, Warren J. and Duff John M., "Fundamentls of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Productiion", Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005
5. Bhatt N. D. and Panchal V. M., "Engineering Drawing", Charotar Publishing House, 53rd Edition , 2014.

Course Articulation matrix:

CO \ PO	1	2	3	4	5	6	7	8	9	10	11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CO2	3	2	2	–	–	1	–	–	1	–	1	2	1	1
CO3	3	3	2	–	–	1	–	–	1	–	1	2	2	1
CO4	3	3	3	–	–	1	–	–	2	–	1	3	2	1
CO5	1	1	1	2	3	1	–	1	2	2	2	3	3	1

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.P.Thirumal / Professor

BOS Approval

Date: 27/05/2025

UNIT V FILES, MODULES, PACKAGES 9

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).

TOTAL : 45 PERIODS

COURSE OUTCOMES:

Upon completion of the course, students will be able to

CO1: Develop algorithmic solutions to simple computational problems.
CO2: Develop and execute simple Python programs.
CO3: Write simple Python programs using conditionals and looping for solving problems.
CO4: Decompose a Python program into functions.
CO5: Represent compound data using Python lists, tuples, dictionaries etc.
CO6: Read and write data from/to files in Python programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and programming", 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press 2021
4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
5. https://www.python.org/
6. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.

~~GE3152~~ 25ZMC107 தமிழர் மரபு L T P C
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அலகு I மொழி மற்றும் இலக்கியம்: 3

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

அலகு II மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை: 3

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

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: 3

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

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்: 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: 3

இந்திய விடுதலைப்போரில் 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. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. 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 Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published 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 ofArchaeology & 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)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25ZES108	Subject Title	Programming In C Laboratory
Category	Engineering Sciences	L-T-P-C	0-0-3-1.5
Regulation	2025	Semester	I
Prerequisites	The ability to understand basic program flow, such as sequence, selection (decision-making), and iteration (loops).		

Course Objectives:

1. Develop practical programming skills in C language through hands-on coding exercises.
2. Enhance problem-solving ability by implementing algorithms and data manipulation using C.
3. Foster debugging, testing, and optimization techniques in real-world C programming scenarios.

Course Content:

1. Calculate simple and compound interest.
2. Find the largest of three numbers using if-else statements.
3. Check whether a number is prime or not.
4. Calculate the factorial of a number using recursion.
5. Perform basic arithmetic operations (addition, subtraction, multiplication, division) using switch-case.
6. Find the sum and average of elements in an array.
7. Perform linear and binary search on an array.
8. Sort an array using selection sort.
9. Reverse a string without using library functions.
10. Program using functions to find the GCD (Greatest Common Divisor) of two numbers.
11. demonstrate pointer usage including pointer arithmetic.
12. Create, initialize, and display elements of a structure.
13. Ddynamically allocate memory to an array and perform operations.
14. Read from and write to a file (file handling).
15. Count Characters, Words, and Lines in a File.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Explain the working of conditional statements, loops, arrays, strings, functions, and recursion used in solving simple computational problems.	L2	-
CO2	Develop and implement C programs using decision-making statements, loops, arrays, functions, searching, sorting, and recursion to solve real-world problems.	L3	PO1, PO2, PO3, PO5

CO3	Analyze and debug C programs involving pointers, structures, dynamic memory allocation, and file handling to identify errors and improve program efficiency.	L4	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Evaluate and compare different programming approaches such as recursion vs iteration, static vs dynamic memory, and linear vs binary search to select appropriate solutions.	L5	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Prepare and deliver a technical seminar on C programming applications by integrating core programming concepts and effective technical communication skills.	L6	PO8, PO9, PO10, PO11

Course Articulation matrix:

CO	Program Outcomes (PO)											PEO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	1	-
CO2	3	3	2	-	2	-	-	-	-	-	-	2	-	-
CO3	3	3	3	2	2	3	-	-	-	-	-	2	2	-
CO4	2	3	3	2	2	2	-	-	-	-	-	3	2	1
CO5	-	-	-	-	-	-	-	2	2	3	1	2	1	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr.J.Nafeesa Begum,
Professor/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Mechanical Engineering

Subject Code	25ZES110 / 25ZES208	Subject Title	ENGINEERING PRACTICES LABORATORY
Category	Engineering Science	L-T-P-C	0-0-4-2
Regulation	2025	Semester	I
Prerequisites	NIL		

Course Objectives:

1. To introduce basic manufacturing and fabrication processes such as welding, machining, foundry, and additive manufacturing, and enable students to gain hands-on skills.
2. To expose students to civil engineering practices such as plumbing, woodwork, and construction-related fittings used in domestic and small-scale structures.
3. To familiarize students with fundamental computer operations including hardware assembly, operating system installation, and essential software applications for documentation and data processing

Course Content:

LIST OF EXPERIMENTS

PART I: MECHANICAL ENGINEERING PRACTICES

Welding Work:

1. Welding of Butt Joints, Lap Joints, and Tee Joints using SMAW welding. &
2. Practicing GMAW welding.
3. Practicing GTAW welding.

Basic Machining Work:

1. Simple Turning,
2. Simple Drilling
3. Simple Tapping.

Assembly Work:

1. Assembling a centrifugal pump
2. Assembling a household mixer
3. Assembling an air-conditioner.

Sheet Metal Work:

1. Making of a square tray or Dust Pan or Fabrication of Corner Tray

Additive Manufacturing:

1. Modeling and printing of solid Cone or any shape using 3D printing

Foundry Work:

1. Demonstrating basic foundry operations.

PART II: CIVIL ENGINEERING PRACTICES

PLUMBING WORK:

1. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
2. Preparing plumbing line sketches.
3. Laying pipe connection to the suction side of a pump
4. Laying pipe connection to the delivery side of a pump.
5. Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

1. Sawing, Planing
2. Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

1. Studying joints in door panels and wooden furniture
2. Studying common industrial trusses using models.

PART III: COMPUTERS

1. Demonstration of Computer or Laptop Peripherals and Preparation of CPU Block Diagram.
2. Installation of Linux and Windows Operating Systems and Dual Boot Configuration.
3. Document Creation and Formatting using MS Word.
4. Spreadsheet Operations using MS Excel.
5. Presentation Creation using MS PowerPoint.
6. Document Structure and Table Creation using LaTeX.
7. Insertion of Figures, Equations, and References using LaTeX.
8. Newsletter Design using MS Word.

GPA Calculation of Students using MS Excel.

Total Hours: 60

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

CO	Course Outcome	Bloom's Level	POs Addressed
CO1	Identify tools, materials, safety practices, and standard procedures used in plumbing, woodwork, and computer laboratory environments, demonstrating awareness of professional responsibility and safety norms.	L1, L2	**PO6, PO7, PO8**
CO2	Prepare plumbing line sketches and perform pipe connections	L3	**PO1, PO3,**

CO	Course Outcome	Bloom's Level	POs Addressed
	for pump suction and delivery systems, including joining pipes of different materials, by applying engineering knowledge and teamwork skills.		**PO9**
CO3	Execute basic wood working operations such as sawing, planing, and fabrication of standard joints, and analyze joints and trusses used in doors, furniture, and industrial structures using appropriate engineering practices.	L3, L4	**PO2, PO3, PO4**
CO4	Apply modern computer tools to install operating systems and create technical documents, spreadsheets, presentations, and LaTeX-based reports for engineering and academic applications.	L3	**PO5, PO10**
CO5	Work collaboratively to complete workshop and computer-based tasks by planning activities, documenting results, communicating effectively, and adhering to ethical and professional standards. *(Only for CIE)*	L3–L6	**PO8, PO9, PO10, PO11**

Reference Books:

1. R.K. Rajput, Workshop Practice, Laxmi Publications (P) Limited, 2009.
2. Shashi Kant Yadav, Workshop Practice, Discovery Publishing House, New Delhi, 2006

Course Articulation matrix:

CO \ PO	1	2	3	4	5	6	7	8	9	10	11	PSO1	PSO2	PSO3
CO1	1	–	–	–	–	2	1	–	–	–	–	–	–	–
CO2	2	1	3	–	–	1	–	–	2	1	–	2	1	1
CO3	2	2	3	1	–	1	–	–	2	1	–	2	2	1
CO4	1	1	2	–	3	1	–	–	2	2	1	2	2	1
CO5	–	–	2	3	3	1	1	1	3	3	3	3	3	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Mr.S.Sathishkumar / Assistant Professor

BOS Approval

Date: 27/05/2025

SEMESTER - II

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of English

Subject Code	25ZHS201	Subject Title	English for Engineers-II
Category	HSMC	L-T-P-C	3-0-0-3
Regulation	2025	Semester	II
Prerequisites	Specific technical vocabulary and familiarity with document structures like reports, manuals, proposals and reviews.		

Course Objectives:

1. To equip students with the ability to draft clear and accurate product descriptions, formal responses to complaints using effective error analysis techniques.
2. To foster proficiency in high-stakes speaking scenarios with a focus on correct intonation and public speaking styles.
3. To master advanced grammatical structures and distinguish between British and American English and Engineering Terminology.
4. To enable students to synthesize information for technical proposals, event reports, film or book reviews and also engaging in modern digital formats like technical blogs.
5. To train learners in the preparation of professional resumes, job and internship applications, and the construction of both formal and informal letters for diverse professional contexts.

Course Content:

[BASICS OF LANGUAGE] (9 Hours)

Infinitives - Plain Infinitive – Participles – Gerund – Difference in British and American English – Engineering Terminology – Impersonal Passive Voice – Prepositional Phrases – Idioms and Phrases

[WIRTING DESCRIPTIONS] (9 Hours)

Errors Analysis - Airline/Train Announcement – Weather Forecast Report – Product Description – Advertisement Preparation – Writing Responses to Complaints – Enquiring about a course over phone.

[ORAL COMMUNICATION] (9 Hours)

Intonation – Oral Presentation – Extempore speech- Difference between Lecture and Public Speech - Role Play (Interview/ Telephone Interview)

[TECHNICAL WRITING] (9 Hours)

Technical Essay writing –Case study-- Letter Writing (Formal and Informal) – Job / Internship Application – Resume preparation- Compare and Contrast essay.

[NARRATION AND SUMMATION] (9 Hours)

Writing Vision and Mission Statement - Short Report on an Event (Field Trip, Internship Report etc.) – Writing Articles in Technical Blogs – Letter to Editor –Writing Proposals – Film/Book Reviews.

Total Hours: 45

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

CO	COURSE OUTCOMES	Bloom's Level
CO1	Recall and identify engineering terminology, idioms, and grammatical structures such as the impersonal passive voice and prepositional phrases.	L1
CO2	Explain industrial processes and interpret technical data to write accurate product descriptions and weather forecast reports.	L2
CO3	Demonstrate professional oral communication through extempore speech, presentations, and role-playing in interview scenarios.	L3
CO4	Analyze case studies and distinguish between formal and informal letter structures to draft appropriate internship applications and resumes.	L4
CO5	Appraise and critique technical traits and events to justify solutions in film/book reviews, structured technical proposals and project reports in a planned and logical manner and technical blog articles.	L5

TEXT BOOK:

1. Aruna Koneru, "English Language Skills for Engineers", McGraw Hill Education (India) Private Ltd 2020.

REFERENCES BOOKS:

1. *Bailey, Stephen. Academic Writing: "A Practical guide for students "New York: Rutledge, 2018. Pearson. 2019.*
2. *Sudarshana, N.P. and Savitha, C, "English for Engineers" Cambridge University Press, 2018.*
3. *Zinsser, William "On Writing Well" Harper Resource Book, 2001.*
4. *Hamp-Lyons, L "Study writing" Cambridge University Press, 2006.*

E-resources:

1. innovate.ieee.org/ieee-english-for-technical-professionals/
2. onlinecourses.nptel.ac.in/noc20hs56/preview
3. swayam.gov.in
4. cambridge english for engineering

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

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Department of English

Course Articulation Matrix:

CO	Program Outcomes										
	1	2	3	4	5	6	7	8	9	10	11
CO1	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	3	2	-
CO4	-	-	-	-	-	-	-	-	3	-	2
CO5	-	-	-	-	-	-	-	-	3	-	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

12/3/2026

Course Designed By

Dr. A. Jesu Steephan Samy. AP/Eng.

BOS Approval

Date: 12.03.2026

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Mathematics

Subject Code	25ZBS202	Subject Title	RANDOM PROCESSES AND LINEAR ALGEBRA
Category	Basic science	L-P-T-C	3-0-1-4
Regulation	2025	Semester	II
Prerequisites	Basic knowledge of calculus, matrices, and fundamental probability concepts.		

Course Objectives:

1. To introduce the basic notions of vector spaces which will then be used to solve related problems.
2. To understand the concepts of vector space, linear transformations, inner product spaces and orthogonalization.
3. To provide necessary basic concepts in probability and random processes for applications such as random signals, linear systems in communication engineering.
4. To provide necessary basics in probability that are relevant in applications such as random signals, linear systems in communication engineering.
5. To understand the basic concepts of probability, one and two-dimensional random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon.

Course Content:

[PROBABILITY AND RANDOM VARIABLES] (9+3)

Axioms of probability – Conditional probability – Baye's theorem – Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions – Functions of a random variable.

[TWO – DIMENSIONAL RANDOM VARIABLES] (9+3)

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

[RANDOM PROCESSES] (9+3)

Classification – Stationary process – Markov process – Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations (Statement only) – Limiting distributions

[VECTOR SPACES] (9+3)

Vector spaces – Subspaces – Linear combinations and linear system of equations – Linear independence and linear dependence – Bases and dimensions.

[LINEAR TRANSFORMATION AND INNER PRODUCT SPACES] (9+3)

Linear transformation – Null spaces and ranges – Dimension theorem – Matrix representation of a linear transformations – Inner product – Norms – Gram Schmidt orthogonalization process – Adjoint of linear operations – Least square approximation.

Total Hours: 60

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

CO	Course Outcome	Bloom's Level
CO1	Recall axioms of probability, standard distributions, definitions of random processes, vector spaces, linear transformations, and inner product concepts.	L1
CO2	Explain probabilistic models, joint and marginal distributions, Markov processes, and limiting behavior of random systems. Interpret the structure of vector spaces, linear mappings, orthogonality, and least squares approximation.	L2

CO3	Compute probabilities, moments, regression coefficients, and apply standard distributions to solve problems. Determine bases, dimensions, matrix representations, orthogonal sets using Gram–Schmidt, and least square solutions.	L3
CO4	Examine dependence between random variables using covariance and correlation, and analyze Markov chain behavior. Test linear independence, compare subspaces, evaluate null space and range, and verify the Dimension theorem.	L4
CO5	Justify appropriate probability models, distributions, or stochastic processes for real-life situations. Assess the effectiveness of linear transformations, orthogonalization methods, and least squares approximations in problem solving.	L5

Text Books:

1. Gross, D., Shortle, J.F, Thompson, J.M and Harris. C.M., "Fundamentals of Queueing Theory", Wiley Student 4th Edition, 2014.
2. Ibe, O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier,1st Indian Reprint, 2007.
3. Friedberg. A.H., Insel. A.J. and Spence. L., "Linear Algebra", Prentice Hall of India, New Delhi, 4th Edition, 2004.

Reference Books:

1. Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.
2. Trivedi, K.S., "Probability and Statistics with Reliability, Queueing and Computer Science Applications", 2nd Edition, John Wiley and Sons, 2002.
3. Yates, R.D. and Goodman. D. J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012.
4. Kolman. B. Hill. D.R., "Introductory Linear Algebra", Pearson Education, New Delhi, First Reprint, 2009.
5. Kumaresan. S., "Linear Algebra – A Geometric Approach", Prentice – Hall of India, New Delhi, Reprint, 2010

Course Articulation matrix:

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

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

S. 21/1/26

Cs. Gowtham Prakash/AP(T)/MAT)

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Science and Humanities

Subject Code	25ZBS203	Subject Title	Physics For Information Science
Category	Basic Science	L-P-T-C	3-0-0-3
Regulation	2025	Semester	II (CSE & CSE-CS)
Prerequisites	Fundamental understanding of basic physics principles and laws, Knowledge of elementary quantum theory and electrical concepts, Basic mathematical skills in algebra, calculus, and differential equations.		

Course Objectives:

1. Provide fundamental knowledge of conducting materials, semiconducting materials, memory and non-destructive testing devices, applied quantum mechanics, and quantum computing, enabling students to understand the basic principles governing electronic materials and modern computational technologies.
2. Enable students to apply the concepts of electrical conduction, semiconductor carrier transport, memory devices, NDT techniques, and quantum mechanical principles to solve basic problems and understand their applications in electronic and nanotechnology systems.
3. Develop the ability to analyze the behavior and performance of conducting and semiconducting materials, memory technologies, and quantum devices, including the effect of temperature, doping, and quantum confinement in modern electronic and computing systems.
4. Equip students with the conceptual ability to design or conceptualize basic electronic and nanoscale devices, such as semiconductor memory devices, tunnel diodes, single electron transistors, and simple quantum circuits.
5. Encourage students to enhance learning through assignments, presentations, seminars, and team-based activities, promoting collaborative learning, communication skills, and the ability to explore emerging topics such as quantum computing, nanotechnology, and advanced electronic devices.

COURSE CONTENT

CONDUCTING MATERIALS 9

Classification of conducting materials, Classical free electron theory: electrical conduction in metals - expression for electrical conductivity - thermal conductivity - Wiedemann – Franz law - Lorenz number- success and failures, quantum free electron theory: Fermi-Dirac statistics- Fermi energy – effect of temperature, density of energy states (derivation), energy bands in solids (qualitative).

SEMICONDUCTING MATERIALS 9

Types of semiconductors – properties, energy band diagram: direct and indirect band gap, Intrinsic semiconductor: carrier concentration – Fermi level, extrinsic semiconductor – carrier concentration of n type and p type semiconductor – Fermi level: temperature and doping concentration.

MEMORY and NDT DEVICES 9

Memory devices: Overview of memory hierarchy, volatile vs non-volatile memory, concepts of semiconductor memories: static RAM - dynamic RAM - ferroelectric RAM, magneto-resistive RAM, applications in embedded systems and consumer electronics.

Non-Destructive Techniques (NDT): introduction, classifications– X-ray testing-ultrasonic testing (UT) -radiographic testing (RT), applications and advantages of NDT: manufacturing industries.

APPLIED QUANTUM MECHANICS 9

Quantum confinement – quantum structures: well, wire, dots, applications in quantum computing, quantum tunneling – tunnel diode, single electron phenomena: Coulomb blockade - single electron transistor, applications in nano-scale logic gates and quantum sensing.

QUANTUM COMPUTING **9**

Introduction: quantum mechanics for computation - quantum states – classical bits – quantum bits or qubits- Bloch sphere - superposition – entanglement – single and multiple qubits gates – simple quantum circuits – challenges and advantages of quantum computing.

Total: 45 PERIODS

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

CO	Course Outcome	Bloom's Level	POs
CO1	Explain the fundamental concepts of conducting materials, semiconducting physics, memory and NDT devices, applied quantum mechanics, and quantum computing including principles, theories, characteristics, and applications.	L1,L2	-
CO2	Apply classical and quantum electron theories, semiconductor carrier statistics, memory device principles, quantum mechanical concepts, and quantum logic to solve theoretical and numerical engineering problems.	L3	PO1
CO3	Analyze electrical conduction mechanisms, semiconductor behavior, performance of memory and NDT techniques, quantum confinement effects, and quantum computational models to interpret engineering performance and technological relevance.	L4	PO2
CO4	Design theoretical models and propose innovative solutions using conducting materials, semiconductor devices, memory technologies, quantum devices, and quantum circuits addressing engineering requirements and sustainability aspects.	L5, L6	PO3, PO4
CO5	Analyze emerging trends and create technical reports, seminar presentations, and collaborative discussions on advanced semiconductor technologies, NDT applications, nano-quantum devices, and quantum computing systems.	L4,L5, L6	PO2, PO4, PO5, PO7, PO8, PO9, PO11

Text Books:

1. S.O. Pillai, Solid State Physics, New Age International (P) Ltd.,
2. M.S. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Eastern Ltd.,
3. Robert Eisberg, Robert Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, Wiley, 2nd Edition, 1985
4. K. Goser, P. Lugli, D. Ferry, Nanoelectronics and Nanosystems: From Transistors to Molecular and Quantum Devices, Springer, 2004
5. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 2nd Edition, 2010.

Reference Books:

1. Neil W. Ashcroft, N. David Mermin, Solid State Physics, Harcourt Brace Jovanovich, 3rd Edition, 1976.
2. Charles Kittel, Introduction to Solid State Physics, Wiley Publication, 9th Edition, 2018.
3. Donald A. Neamen, Semiconductor Physics and Devices, McGraw-Hill, 4th Edition, 2012.
4. David J. Griffiths, Introduction to Quantum Mechanics, Cambridge University Press, 3rd Edition, 2018.
5. Michael A. Nielsen, Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 10th Anniversary Edition, 2010.
6. Donald A. Neamen, Dhrubes Biswas, Semiconductor Physics and Devices, McGraw-Hill Education India,4th edition.

e-resources:

1. https://nptel.ac.in/courses/115106127
2. https://ocw.mit.edu/courses/8-231-physics-of-solids-i-fall-2006/
3. https://ocw.mit.edu/courses/8-370-quantum-computation-fall-2001/

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO5	-	2	-	1	1	-	2	2	3	-	1	-	-	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By:
Name & Designation:
1. Dr. R. Bakkiyaraj, Associate Professor & Head,
2. Mr. A. Anandakumar, Assitatant Professor/Physics,
3. Dr. S. Santhosh, Assitatant Professor/Physics,

BOS Approval
Date: 12/03/2026

Dr.R.BAKKIYARAJ, M.Sc.,M.Phil.,B.Ed.,Ph.D., 12/3/2026
Associate Professor & Head,
Department of Physics,
Government College of Engineering,
Bargur-635104, Krishnagiri Dt, Tamilnadu.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SES204	Subject Title	Digital Principles and Design
Category	Engineering Sciences	L-T-P-C	3-0-0-3
Regulation	2025	Semester	II
Prerequisites	Basic knowledge of electronics and electrical circuits		

Course Objectives:

1. To introduce the fundamentals of digital systems, number systems and binary codes used in digital electronics.
2. To provide a strong foundation in Boolean algebra, logic gates and logic minimization techniques for digital circuit analysis.
3. To enable students to analyze and design combinational and sequential logic circuits using standard digital components.

Course Content:

Introduction & Number Systems **(9 Hours)**

Digital and analog systems- Representation of digital signals-Binary number system-Number system conversions (decimal, binary, octal, hexadecimal)-Complements of numbers -Signed binary numbers-Binary codes: BCD, Excess-3 and Gray code- Error Detection and Correction.

Boolean Algebra & Logic Gates **(9 Hours)**

Boolean algebra: postulates and theorems-Boolean functions and expressions-Canonical and Standard Forms: Minterms and Maxterms- Digital Logic Gates: Truth tables and logic symbol representation-Integrated Circuits.

Gate- Level Minimization **(9 Hours)**

Karnaugh-Maps(Four-variable, Five-variable and Don't-care conditions)-Product-of-Sums Simplification-Implementation using NAND and NOR gates-Exclusive OR Function-Variable Entered Mapping (VAM)-Quine-McCluskey Technique.

Combinational Logic Circuits **(9 Hours)**

Design procedure for combinational circuits -Design of half adder and full adder-Introduction to subtractor circuits- Multiplexers and demultiplexers-Encoders and decoders-Code Converters.

Sequential Logic Circuits **(9 Hours)**

Introduction to sequential logic circuits-Storage Elements: Latches and Flip-Flops- State reduction and assignment- Design procedure for sequential circuits-Registers and Counters.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Understand the fundamental principles of number systems, boolean algebra, logic minimization techniques, combinational circuits and sequential logic circuits.	L2	-
CO2	Employ principles of number systems, boolean algebra, logic gates and digital circuits to analyze simple digital systems.	L3	PO1, PO2, PO5

CO3	Analyze combinational and sequential logic circuits to determine functionality and performance.	L4	PO1, PO2, PO4, PO5
CO4	Design basic combinational and sequential digital circuits using logic gates, flip-flops, registers and counters.	L5	PO1, PO2, PO3, PO5, PO9
CO5	Create technical seminar presentations on digital logic concepts and applications.	L6	PO1, PO5, PO9, PO10, PO11

Text Books:

1. M. Morris Mano, Michael D. Ciletti, "Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog", Sixth Edition, Pearson Education, 2018.

Reference Books:

1. S. Salivahanan & S. Arivazhagan, "Digital Circuits and Design". 5th Edition, Oxford University Press,2022.
2. Charles H. Roth Jr., Larry L. Kinney & Eugene B. John, "Fundamentals of Logic Design (Enhanced)", 7th Edition, Cengage India release,2024
3. John. F. Wakerly, "Digital Design Principles and Practices", Pearson Education, Fifth Edition, 2018.
4. T.L. Floyd, "Digital Fundamentals", 11th Edition, Pearson education, 2017.

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	2	-
CO2	3	3	-	-	1	-	-	-	-	-	-	3	-	2
CO3	2	3	-	2	1	-	-	-	-	-	-	3	-	2
CO4	2	2	3	-	2	-	-	-	1	-	-	3	-	3
CO5	1	-	-	-	1	-	-	-	2	3	1	-	2	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

B.Purushothaman, AP(Temp)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25ZES205	Subject Title	Python Programming
Category	Engineering Science	L-P-T-C	3-0-0-3
Regulation	2025	Semester	II
Prerequisites	Basic knowledge of programming concepts such as variables, operators, conditional statements, and loops (in any programming language). Basic logical and mathematical problem-solving skills.		

Course Objectives:

1. To understand the fundamental concepts and principles of Python programming, including syntax, data types, and control structures.
2. To develop python programs using variables, control structures, functions, modules, and file handling.
3. To develop python programs using object-oriented programming concepts.

Course Content:

Introduction to Python **(9 Hours)**

Python interpreter and modes – Variables and Data types – Operators – Precedence of operators – Control Flow – Expressions – Iteration – Statements – Tuple assignment – Comments. Illustrative problems: Find minimum and maximum in a list, Insert a card in a list of sorted cards, Towers of Hanoi, Exchange the values of two variables, Circulate the values of n variables, Distance between two points.

Functions, Modules and Packages **(9 Hours)**

Functions – Function Definition and use – Function Calls – Flow of execution – local and global scope – Function composition – Recursion – Parameters and arguments – Fruitful Functions and Void Functions – Command line arguments. Modules – User-defined Modules – Packages. Illustrative programs: Factorial, Fibonacci Series, GCD, Exponentiation.

Data Structures in Python **(9 Hours)**

Lists: List operations and methods – List Comprehension – Tuples: Tuple Operations and methods – Dictionaries: Dictionary operations and methods – Sets: Set operations and methods – Strings: String operations and methods. Illustrative programs: Selection sort, Insertion sort, Merge sort, Linear Search, Binary Search.

OOP Concepts in Python **(9 Hours)**

Classes and Objects – Attributes – Instances – Methods – Inheritance – Polymorphism – Interface. Illustrative programs demonstrating inheritance and polymorphism in Python.

Files and Exception Handling **(9 Hours)**

Files: Text files – Opening and Closing Files – Reading and Writing files – Errors and Exceptions – Handling exceptions. Illustrative programs: Word count, Copy file, Merging Files.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Remember the concepts of Python programming fundamentals, functions, data structures, object-oriented concepts, and file and exception handling mechanisms and understand their role in developing Python programs.	L1, L2	-
CO2	Apply Python syntax, control flow constructs, functions, data structures, object-oriented features, and file handling techniques to implement solutions for standard programming problems.	L3	PO1, PO2, PO3, PO5
CO3	Use Python modules, packages, recursion, searching and sorting techniques, and file operations to solve computational problems.	L3	PO1, PO2, PO5
CO4	Analyze Python programs involving algorithms, data structures, object-oriented designs, and file/exception handling to examine program structure and execution behavior.	L4	PO2, PO4
CO5	Design and develop Python applications by integrating functions, data structures, object-oriented programming concepts, and file/exception handling.	L6	PO1, PO3, PO5, PO9

Text Books:

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

Reference Books:

1. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press , 2013.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python : An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	2	-	-	-	-	-	-	3	2	-
CO3	3	3	-	-	3	-	-	-	-	-	-	3	2	-
CO4	-	3	-	2	-	-	-	-	-	-	-	3	2	3
CO5	3	-	2	-	2	-	-	-	2	-	-	3	3	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.R.Subathra, AP/CSE

R. Subj.

BOS Approval

Date:

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

25ZMC207.

~~GE8252~~ **தமிழரும் தொழில்நுட்பமும்** **L T P C**
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அலகு I <u>நெசவு மற்றும் பானைத் தொழில்நுட்பம்</u>: **3**

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

அலகு II <u>வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்</u>: **3**

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான 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 – செட்டிநாட்டு வீடுகள் – பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு III <u>உற்பத்தித் தொழில் நுட்பம்</u>: **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 – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV <u>வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்</u>: **3**

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

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்: 3

அறிவியல் தமிழின் வளர்ச்சி –கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – 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. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. 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 Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published 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 ofArchaeology & 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.

GE3252	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.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SES208	Subject Title	Digital Principles and Design Laboratory
Category	Engineering Sciences	L-T-P-C	0-0-3-1.5
Regulation	2025	Semester	II
Prerequisites	Basic knowledge of electronics and safe handling of digital ICs		

Course Objectives:

1. To understand and verify the operation of basic logic gates, Boolean theorems and combinational logic circuits through practical experimentation.
2. To design, implement, and test combinational and sequential digital circuits such as adders, subtractors, encoders, decoders, multiplexers, flip-flops, shift registers and counters.
3. To develop practical skills in analyzing digital logic behavior, interpreting truth tables and timing diagrams, and validating theoretical concepts using hardware or simulation tools.

List of Experiments

1. Verification of basic logic gates
2. Verification of Boolean theorems using logic gates
3. Design and verification of half adder and full adder
4. Design and verification of half subtractor and full subtractor
5. Implementation of functions using multiplexers and demultiplexers
6. Design and implementation of encoder and decoder circuits
7. Implementation of code converters
8. Verification of flip-flops
9. Design and implementation of shift registers
10. Implementation and verification of a simple synchronous counter

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Describe the operation of Boolean theorems, adders, subtractors, encoders, decoders, flip-flops, shift registers, and counters using logic diagrams and truth tables.	L2	-
CO2	Implement basic logic gates, Boolean functions, adders, subtractors, multiplexers, demultiplexers, code converters, and flip-flops using standard digital ICs.	L3	PO1, PO2, PO3, PO5, PO9

CO3	*Analyze* the behavior and functional correctness of combinational and sequential circuits such as encoders/decoders, shift registers, and synchronous counters by interpreting timing diagrams and output responses.	L4	PO1, PO2, PO4, PO5
CO4	Verify and test the performance of implemented digital circuits, identify faults or mismatches between theoretical and practical results, and validate results against expected outputs.	L5	PO1, PO2, PO4, PO5, PO9
CO5	Present techniques for constructing digital systems with combinational and sequential logic elements to achieve specific control and arithmetic functions in a technical seminar.	L6	PO1, PO2, PO3, PO4, PO5, PO9, PO10

Course Articulation matrix:

CO	Program Outcomes (PO)											PEO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	2	-
CO2	3	2	2	-	2	-	-	-	1	-	-	3	1	2
CO3	3	3	-	2	1	-	-	-	-	-	-	3	-	2
CO4	2	3	-	3	2	-	-	-	1	-	-	3	-	3
CO5	3	3	3	2	2	-	-	-	1	1	-	1	2	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

B.Purushothaman

Course Designed By

B.Purushothaman, AP(Temp)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25ZES209	Subject Title	Python Programming Laboratory
Category	Engineering Science	L-P-T-C	0-0-3-1.5
Regulation	2025	Semester	II
Prerequisites	Basic knowledge of programming concepts such as variables, operators, conditional statements, and loops (in any programming language). Basic logical and mathematical problem-solving skills.		

Course Objectives:

1. To write, test and debug simple python programs.
2. To use functions for structuring Python programs.
3. To represent compound data using Python lists, tuples and dictionaries.
4. To implement python programs with conditionals and loops.
5. To read and write data from/to files in Python.

Course Content:

1. Find the maximum and minimum in a list of numbers.
2. Factorial of a number (Iterative and recursive).
3. Generating Fibonacci Series (Iterative and recursive).
4. Compute the GCD of two numbers (Iterative and recursive).
5. Exponentiation (power of a number).
6. Linear search and Binary search.
7. Selection sort and Insertion sort.
8. Merge sort.
9. First n prime numbers.
10. Matrix multiplication.
11. Inheritance.
12. Polymorphism.
13. Programs that take command line arguments.
14. Find the most frequent words in a text read from a file.
15. Merging Files.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand fundamental programming constructs, algorithmic approaches, recursion, data structures, object-oriented concepts, and file handling techniques used in Python laboratory programs.	L2	-
CO2	Apply iterative and recursive techniques to solve numerical and	L3	PO1, PO2,

	algorithmic problems.		PO3, PO5, PO9
CO3	Use searching, sorting, and matrix processing techniques to implement Python programs for data organization and computation.	L3	PO1, PO2, PO5, PO9
CO4	Analyze Python programs involving command line arguments, file operations, and text processing to examine program structure and correctness of results.	L4	PO2, PO4, PO9
CO5	Design and develop Python programs using object-oriented programming concepts, algorithms, data structures, and file handling.	L6	PO1, PO3, PO5, PO9

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	2	-	2	-	-	-	3	-	-	3	2	-
CO3	3	2	-	-	2	-	-	-	3	-	-	3	2	-
CO4	-	2	-	2	-	-	-	-	3	-	-	3	2	3
CO5	3	-	2	-	2	-	-	-	3	-	-	3	3	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr.R.Subathra, AP/CSE

R. Dubj.

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of English

Subject Code	25ZHS210	Subject Title	Communication English Laboratory
Category	HSMC	L-T-P-C	0-0-2-1
Regulation	2025	Semester	II
Prerequisites	Basic English conversation and varieties in English language.		

Course Objectives:

1. To cultivate confidence in formal and informal speaking scenarios through practical engagement in Just A Minute (JAM) sessions, role plays, and professional telephone etiquette.
2. To refine students' auditory perception and pronunciation by identifying speech sounds, accents through audio-visual tools.
3. To empower students to deliver effective presentations by combining verbal communication with appropriate body language and non-verbal cues to improve overall communicative competency.
4. To train students to extract gist and specific information from academic audio and the speeches of eminent personalities to facilitate effective note-taking and summarization.
5. To equip learners with the ability to perform reading comprehension and produce concise writing using correct punctuation for professional clarity.

Course Content:

[Introduction to Phonetics] (6 Hours)

The Sounds of English (Speech sound -vowels and consonants) - Stress and Intonation - Accent and Rhythm.

[Listening Skills] (6 Hours)

Listening for gist and specific information- listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

[Speaking Skills] (6 Hours)

Self-introduction -Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

[Reading and Writing Skills] (6 Hours)

Reading Comprehension-Précis Writing - E-Mail writing – Punctuation.

[Presentation Skills] (6 Hours)

Verbal and non-verbal communication -Body Language - Making a Presentation.

Total Hours: 30

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of English

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

CO	COURSE OUTCOMES	Bloom's Level
CO1	Recall and identify the basic sounds of English, including vowels, consonants, stress, and intonation patterns to improve pronunciation.	L1
CO2	Summarize main ideas and interpret specific details from academic audio and speeches by eminent personalities to demonstrate active listening.	L2
CO3	Demonstrate communicative competency by applying telephone etiquette and participating in role plays and JAM sessions.	L4
CO4	Distinguish between various non-verbal communication cues and analyze reading comprehension passages for professional context.	L3
CO5	Appraise and critique oral presentations based on body language and verbal clarity to justify effective communication strategies.	L5

Text Books:

1. "Communication Skills for Engineers and Scientists", PHI Learning PVT.LTD, Delhi, 2014.
2. Dorling Kindersley, "Communication Skills and Soft Skills an Integrated Approach", (INDIA) PVT.LTD, New Delhi, 2012.
3. "Soft Skills", MJP Publishers, Chennai, 2010.

References Books:

1. Ashraf Rizvi," Effective Technical Communication", Tata McGraw Hill Education Private Limited, New Delhi.
2. "Speak Well" Orient Blackswan Publishers, Hyderabad.
3. Allan Pease, "Body Language" Manjul Publishing House, New Delhi.

E-resources:

1. https://ve-iitg.vlabs.ac.in/

Course Articulation Matrix:

CO	Program Outcomes (PO)										
	1	2	3	4	5	6	7	8	9	10	11
CO1	-	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	3	2	-
CO4	-	-	-	-	-	-	-	-	3	-	2
CO5	-	-	-	-	-	-	-	-	3	-	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

12/3/26

Course Designed By

Dr. A. Jesu Steephan Samy. AP/Eng.

BOS Approval

Date: 12.03.2026

SEMESTER - III

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR-635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Mathematics

Subject Code	25ZBS301	Subject Title	DISCRETE MATHEMATICS
Category	Basic science	L-P-T-C	3-0-1-4
Regulation	2025	Semester	III
Prerequisites	Basic knowledge of set theory, algebraic operations, elementary logic, and mathematical reasoning.		

Course Objectives

1. To understand logical reasoning, propositions, predicates, and proof techniques used in the design and verification of computer programs and algorithms.
2. To apply combinatorial techniques such as counting principles, permutations, combinations, recurrence relations, and the Pigeonhole Principle to solve computational and algorithmic problems.
3. To develop problem-solving skills in number theory concepts such as the Division Algorithm, Chinese Remainder Theorem, and Fermat's Little Theorem, which are useful in cryptography and computer algorithms.
4. To introduce algebraic structures such as semi groups, monoids, groups, rings, and lattices and understand their applications in computer science areas like coding theory, automata, and cryptography.
5. To analyze graph structures and graph models, including connectivity, Euler and Hamiltonian paths, matching, and colouring, which are widely, used in computer networks and data structures.

Course Content:

[LOGIC AND PROOFS] (9+3)

Sets – Relations – Functions – Propositional logic – Propositional equivalences – Predicates and quantifiers – Nested quantifiers – Rules of inference – Introduction to proofs.

[COMBINATORICS] (9+3)

Mathematical induction – Strong induction and well ordering – The basic Counting Principles – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions – Inclusion and exclusion principle and its applications.

[NUMBER THEORY] (9+3)

Division algorithm – Euclid's lemma – Euclidean algorithm – Basic properties of congruences – Chinese remainder theorem – Euler–Fermat theorem – Primitive roots.

[ALGEBRAIC STRUCTURES] (9+3)

Algebraic systems – Semi groups and monoids - Groups – Subgroups – Homomorphisms – Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields – Partial ordering – Posets – Lattices as posets.

[GRAPHS] (9+3)

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamiltonian paths – Matching – Colouring.

Total Hours: 60

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

CO	Course Outcome	Bloom's Level
CO1	Recall definitions, formulas, and basic concepts of logical propositions, predicates, counting techniques, number theory concepts, algebraic structures, and graph terminology.	L1
CO2	Explain properties of logical reasoning, congruences, counting techniques, recurrence relations, graph models, and algebraic structures such as groups and monoids with examples.	L2

CO3	Apply techniques such as rules of inference, the Pigeonhole Principle, Principle of Mathematical Induction, and the Inclusion–Exclusion Principle to solve problems in combinatorics, number theory, algebraic structures, and graph theory.	L3
CO4	Analyze relationships among logical statements, recurrence relations, number theoretic concepts, algebraic structures, and graph structures to determine connectivity, isomorphism, cosets, and lattice relations.	L4
CO5	Evaluate the validity of mathematical arguments and proofs using rules of inference, and justify conclusions in algebraic structures and graph theory through proper mathematical reasoning.	L5

TEXT BOOKS :

1. Rosen, K.H., "Discrete Mathematics and Its Applications", 7th Edition, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, Special Indian Edition, 2011.
2. Tremblay, J.P., and Manohar, R., "Discrete Mathematical Structures with Applications to Computer Science", McGraw-Hill Education, New Delhi, Indian Edition, 2017.
3. Burton, D.M., "Elementary Number Theory", 7th Edition, Tata McGraw-Hill Education, 2011.

REFERENCES :

1. Grimaldi, R.P., "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, New Delhi, 2007.
2. Koshy, T., "Discrete Mathematics with Applications", Elsevier Publications, 2006.
3. Lipschutz, S., Lipson, M., and Patil, V.H., "Discrete Mathematics", Schaum's Outline Series, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, Revised 3rd Edition, 2017.
4. Rosen, K.H., "Elementary Number Theory and Its Applications", 6th Edition, Pearson Education, 2011.

E-resources:

1. https://nptel.ac.in/courses/106103205

Course Articulation matrix:

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

Correlation Levels: 3- Strong, 2- Medium, 1 -Low, - (dash)-No correlation

Course Designed By

1. S. M 12/3/26 C. Gowtham Prakash AP(CT)/MAT

2. S. 12/3/26 (S. VADIVEL) AP(CT)/Maths

12-03-26. (Dr. D. BABU)

BOS Approval
Date: 12/3/2026

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC302	**Subject Title**	Database Management Systems
Category	Professional Core	**L-P-T-C**	3-0-0-3
Regulation	2025	**Semester**	III
Prerequisites	Fundamentals of computers and basic programming concepts. Basic understanding of data organization and logical problem solving.		

Course Objectives:

1. To learn the fundamentals of data models and represent database systems using ER diagrams.
2. To study SQL and relational database design and understand internal storage structures using different file and indexing techniques for physical database design.
3. To understand the fundamental concepts of transaction processing, concurrency control techniques, and recovery procedures.

Course Content:

Relational Databases **(9 Hours)**

Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Advanced SQL features – Embedded SQL– Dynamic SQL

Database Design **(9 Hours)**

Entity-Relationship model – E-R Diagrams – Enhanced-ER Model – ER-to-Relational Mapping – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

Transaction Processing, Concurrency Control and Recovery **(9 Hours)**

Transaction Concepts – ACID Properties – Schedules – Serializability – Transaction support in SQL – Need for Concurrency – Concurrency control –Two Phase Locking- Timestamp – Multiversion – Validation and Snapshot isolation– Multiple Granularity locking – Deadlock Handling – Recovery Concepts – Recovery based on deferred and immediate update – Shadow paging

Implementation Techniques **(9 Hours)**

RAID – File Organization – Organization of Records in Files – Data dictionary Storage – Column Oriented Storage– Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Algorithms for Selection, Sorting and join operations – Query optimization using Heuristics

Advanced Databases **(9 Hours)**

Distributed Databases: Architecture, Data Storage, Transaction Processing, Query processing and optimization – NOSQL Databases: Introduction – CAP Theorem – Document Based systems – Key value Stores – Column Based Systems – Graph Databases. Database Security: Security issues – Access control based on privileges – Role Based access control – SQL Injection

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand the fundamental concepts of relational databases, relational algebra, and SQL queries.	L2	-
CO2	Design relational database schemas using ER and Enhanced ER models and apply normalization techniques to eliminate redundancy.	L3	PO1, PO2, PO3
CO3	Apply transaction processing concepts, concurrency control mechanisms, and recovery techniques to ensure database consistency.	L3	PO1, PO2, PO5
CO4	Analyze different file organization, indexing, and hashing strategies and apply appropriate techniques to improve database performance.	L4	PO1, PO2, PO4, PO5
CO5	Evaluate advanced database technologies such as distributed databases and NoSQL systems and select suitable database solutions for given applications.	L5	PO1, PO2, PO3, PO5

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Seventh Edition, McGraw Hill, 2020.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education, 2017

Reference Books:

1. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006
2. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, Tata Mc GrawHill, 2015.
3. G.K.Gupta" Database Management Systemsll, Tata McGraw-Hill, 2011.
4. Carlos Coronel, Steven Morris, Peter Rob, "Database Systems: Design, Implementation and Management", Ninth Edition, Cengage Learning, 2011.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104
(Autonomous institute affiliated to Anna University, Chennai)
Department of Computer Science and Engineering

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	2	-
CO2	3	3	3	2	2	-	-	-	-	-	-	3	2	2
CO3	3	3	2	2	3	-	-	-	-	-	-	3	2	-
CO4	2	3	2	2	3	-	-	-	-	-	-	3	2	3
CO5	3	2	2	-	2	-	-	-	-	-	-	3	3	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

G.Dhivya, AP(T)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous Institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC303	Subject Title	Object Oriented Programming
Category	Engineering Science	L-P-T-C	3-0-0-3
Regulation	2025	Semester	III
Prerequisites	Basic knowledge of programming concepts such as variables, operators, conditional statements, and loops (in any programming language). Basic logical and mathematical problem-solving skills.		

Course Objectives:

1. To understand Object oriented programming concepts, basics of programming in C++ using classes and objects.
2. Be familiar with the C++ concepts of overloading, Inheritance, Polymorphism, Constructors etc.
3. Be exposed to the Object oriented programming concepts using Java and features of Java Programming Language

Course Content:

OBJECT ORIENTED PROGRAMMING **(9 Hours)**

Procedural languages- Object oriented approach- Characteristics of object oriented languages - objects- classes- inheritance- reusability- creating new data types- polymorphism and overloading- Introducing C++ classes - Structures and Classes - Unions and Classes -Constructors and Destructors.

OBJECTS AND CLASSES IN C++ **(9 Hours)**

Friend functions - Friend classes - Inline functions - Parameterized constructors - Static class members - Scope resolution operator - Nested classes - Passing objects to functions- Returning objects. Arrays of objects - Pointers to objects - this pointer - Pointers to derived types -Pointers to class members - References - Dynamic allocation operators - new and delete.

FEATURES OF C++ **(9 Hours)**

Function overloading- Copy constructors- Default arguments- Operator overloading- Inheritance-Virtual functions and polymorphism- Templates

JAVA PROGRAMMING LANGUAGE **(9 Hours)**

Data types- variables and Arrays- Operators, Control Statements- Introducing classes - constructors - this keyword - overloading methods - Arrays - Command line arguments- Inheritance basics – using super - dynamic method dispatch - abstract classes.

FEATURES OF JAVA **(9 Hours)**

Exception handling - Multithreaded Programming – I/O Basics - Streams - Applets- Collections framework-java.util, Event handling-A WT - Swing.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand the basic concepts of OOPS like classes, polymorphism, Structures and unions using C++.	L1, L2	-
CO2	Apply the concepts of objects and classes in C++ to develop programs using friend functions, returning, arrays of objects, pointers to objects, references, and dynamic memory allocation using *new* and *delete.*	L3	PO1, PO2, PO3,PO5
CO3	Apply the advanced features of C++ such as function overloading, copy constructors, default arguments, operator overloading, inheritance, virtual functions, polymorphism, and templates to develop efficient object-oriented programs.	L3	PO1, PO2, PO3,PO5
CO4	Understand the basic concepts of java.	L1,L2	PO1, PO2, PO3,PO5
CO5	Design and develop interactive web applications using advance features of Java	L6	PO1, PO2, PO3,PO5

Text Books:

1. Robert Lafore, "Object oriented Programming in C++", Fourth edition, SAMS Publishing, 2002.
2. Herbert Schildt, "Java: The Complete Reference", Ninth Edition, McGraw-Hill Education, 2014.

Reference Books:

1. E Balagurusamy, "Object oriented Programming with C++", Sixth edition, 2013.
2. Herber Schildt, "C++. The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2011.
3. Venugopal K. R., RajkumarBuyya and Ravishankar T, "Mastering C++ ", TalCl McGrawHil, Publishing company, New Delhi,2009
4. DT Editorial services, "Core and Advanced Java, Black Book", Dreamtech Press, 2015.
5. Bruce Eckel, "Thinking in Java", Fourth edition, Pearson education. 2006.

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	2	1
CO2	3	2	3	-	2	-	-	-	-	-	-	2	3	3
CO3	3	2	3	-	2	-	-	-	-	-	-	2	3	2
CO4	3	2	3	-	2	-	-	-	-	-	-	2	3	3
CO5	3	2	3	-	3	-	-	-	-	-	-	2	3	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
K.Savitha, AP(Temp)/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC304	Subject Title	Data Structures and its Applications
Category	Program Core	L-P-T-C	3-0-0-3
Regulation	2025	Semester	III
Prerequisites	Basic programming skills in a high-level language (C/Python/Java). Basic knowledge of algorithmic problem solving and discrete mathematical concepts.		

Course Objectives:

1. To understand the concepts of abstract data types and implement linear data structures such as lists, stacks, and queues using appropriate techniques.
2. To analyze and apply non-linear data structures such as trees and graphs to represent and solve complex computational problems efficiently.
3. To design and evaluate efficient algorithms using advanced data structures such as balanced trees, heaps, hashing, and graph algorithms.

Course Content:

Linear Data Structures – List **(9 Hours)**

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial Manipulation – Sparse Matrix operations.

Linear Data Structures – Stack, Queue **(9 Hours)**

Stack ADT – Operations – Applications – Evaluating arithmetic expressions – Conversion of Infix to postfix expression – Evaluating postfix expressions. Queue ADT – Operations – Circular Queue – Priority Queue – deQueue.

Non-Linear Data Structures – Trees **(9 Hours)**

Tree ADT – Tree traversals - Binary Tree ADT – Expression trees – Binary search tree ADT – Priority Queue (Heaps) – Binary Heap – d-Heaps.

Non-Linear Data Structures – Balanced Trees and Hashing **(9 Hours)**

Balanced Trees – AVL Trees – B-Tree – B+ Tree – Red Black Trees. Hashing – Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

Non-Linear Data Structures – Graphs **(9 Hours)**

Definition – Representation of Graph – Types of graphs – Breadth-first traversal – Depth-first traversal – Bi-connectivity – Euler circuits – Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand the concepts of abstract data types and the working principles of linear and non-linear data structures such as lists, stacks, queues, trees, hashing, and graphs.	L2	–
CO2	Apply linear and non-linear data structures including linked lists, stacks, queues, trees, heaps, hashing techniques, and graph representations to solve computational problems.	L3	PO1, PO2, PO3, PO5
CO3	Analyze the behavior and performance of different data structures and associated algorithms such as tree traversals, hashing methods, and graph traversal algorithms.	L4	PO1, PO2, PO3, PO4, PO5
CO4	Evaluate and compare various data structures and algorithms to determine suitable solutions for different problem scenarios based on efficiency and complexity.	L5	PO1, PO2, PO3, PO4, PO5
CO5	Design and develop efficient programs using appropriate data structures and algorithms to solve real-world problems involving lists, trees, hashing, and graphs.	L6	PO1, PO2, PO3, PO4, PO5, PO9

Text Books:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2002.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, University Press, 2008

Reference Books:

1. Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2011.
2. Clifford A. Shaffer, "Data Structures & Algorithm Analysis in C++", Third Edition, Dover Publications, 2011
3. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education,1983.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, University Press, 2008
5. Thomas H. Cormen, Charles E. Leiseron, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Third Edition, PHI learning Pvt. Ltd., 2011.

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	2	-	-	-	-	-	-	3	1	1
CO3	3	3	2	1	1	-	-	-	-	-	-	3	2	1
CO4	2	3	2	2	1	-	-	-	-	-	-	2	2	2
CO5	2	3	3	2	2	-	-	-	1	-	-	3	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr.R.Subathra, AP/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC305	Subject Title	Design and Analysis of Algorithms
Category	Program Core	L-P-T-C	3-0-0-3
Regulation	2025	Semester	III
Prerequisites	Basic programming knowledge including loops, functions, arrays, and recursion. Understanding of fundamental data structures such as arrays, linked lists, stacks, queues, trees, and graphs. Basic discrete mathematics and mathematical foundations, including sets, functions, logarithms, and basic combinatorics.		

Course Objectives:

1. To understand fundamental concepts of algorithms and their efficiency analysis, including time and space complexity and asymptotic notations.
2. To study and apply various algorithm design strategies such as brute force, divide and conquer, dynamic programming, greedy techniques, and backtracking to solve computational problems.
3. To analyze and evaluate algorithms for different problem domains and understand computational complexity including NP and NP-complete problems.

Course Content:

Introduction **(9 Hours)**

Algorithm – The Role of Algorithms in Computing – Algorithm analysis: Time and space complexity – Asymptotic Notations and basic efficiency classes – Best-case, Worst-case and average-case Efficiencies – Solving Recurrence relations: Substitution method – Recursion-tree method – Master theorem – Mathematical analysis of non-recursive and recursive algorithms.

Brute Force, Exhaustive Search, Decrease And Conquer **(9 Hours)**

Brute force – Selection sort and Bubble sort, Sequential search and brute force string matching. Exhaustive search – Traveling salesman problem, knapsack problem, Assignment Problem, Depth First Search and Breadth First Search. Decrease and conquer – Insertion sort, Topological sort, Generating Permutations, Generating Subsets, Binary Search.

Divide and Conquer, Transform and Conquer **(9 Hours)**

Divide and Conquer - Merge sort, Quicksort, Binary tree traversals. Transform and Conquer – Balanced search trees – AVL Trees, 2-3 Trees, Heaps and Heapsort. Iterative improvement – Maximum flow problem.

Dynamic Programming, Greedy Technique **(9 Hours)**

Dynamic programming - Basic examples, Knapsack problem and memory functions, Optimal binary search trees, Warshall's and Floyd algorithms. Greedy technique – Prim's algorithm, Kruskal's algorithm, Dijkstra's algorithm, Huffman trees and codes.

State Space Search Algorithms **(9 Hours)**

Backtracking – n-Queens Problem, Hamiltonian Circuit Problem And Subset-Sum Problem. Branch and Bound – Assignment Problem, Knapsack Problem And Traveling Salesman Problem. Decision trees – P, NP and NP-Complete problems.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Remember and understand the principles of algorithm design and analysis, including complexity measures, asymptotic notations, and different algorithm design paradigms.	L1, L2	–
CO2	Apply appropriate algorithm design techniques such as brute force, divide and conquer, dynamic programming, greedy methods, and backtracking to solve computational problems.	L3	PO1, PO2, PO3, PO5
CO3	Analyze the time and space complexity of algorithms and compare the efficiency of different algorithmic approaches for solving the same problem.	L4	PO1, PO2, PO3, PO4, PO5
CO4	Evaluate algorithmic solutions and select suitable strategies for solving complex computational problems considering performance and constraints.	L5	PO1, PO2, PO3, PO4, PO5
CO5	Design and develop efficient algorithms using appropriate design paradigms to solve real-world optimization and decision problems.	L6	PO1, PO2, PO3, PO4, PO5, PO9

Text Books:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2019.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.

Reference Books:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms", Galgotia Publications, New Delhi, 2010.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Harsh Bhasin, "Algorithms Design and Analysis", Oxford university press, 2016.
4. S. Sridhar, "Design and Analysis of Algorithms", Oxford university press, 2014.
5. http://nptel.ac.in/

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104
(Autonomous institute affiliated to Anna University, Chennai)
Department of Computer Science and Engineering

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	1	-
CO2	3	3	2	-	2	-	-	-	-	-	-	3	2	1
CO3	3	3	2	2	1	-	-	-	-	-	-	3	2	-
CO4	2	3	2	2	2	-	-	-	-	-	-	3	2	1
CO5	2	3	3	2	2	-	-	-	1	-	-	3	2	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
Dr.R.Subathra, AP/CSE

R. Subathra.

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR-635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25ZMC306	SubjectTitle	CONSTITUTION OF INDIA
Category	Mandatory Course	L-P-T-C	1-0-0-0
Regulation	2025	Semester	III
Prerequisites			

[INTRODUCTION] (5)

Constitution Definition and Classification - Constitutional Organs - Indian Constitution: Sources and constitutional history, Salient features of Indian Constitution – Citizenship,Preamble,Fundamental Rights and Duties, Directive Principles of State Policy Rule of Law - Separation of Powers Constitution - Doctrine of Basic Structure.

[UNION GOVERNMENT & STATE GOVERNMENT AND THEIR ADMINISTRATION] (5)

Distribution of Powers between Center and States Structure of the Indian Union: Federalism, Centre-State -relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha. Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

[LOCAL ADMINISTRATION AND ELECTION COMMISSION] (5)

District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI:Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy Emergency Provisions - Amendment of Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission:Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC and women.

TEXT BOOKS:

1. V.N. Shukla, "Constitution of India", EBC, 13th Edition, 2017.
2. M.P. Jain, "Indian Constitutional Law", LexisNexis, 8th Edition, 2018.
3. H.M.Seervai, "Constitution of India", LexisNexis, Second edition, 2014.

REFERENCES:

1. DD Basu's, "Shorter Constitution of India", Lexisnexis, 14 th Edition, 2016.
2. https://www.india.gov.in/my-government/constitution-india/constitution-india-full-text.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC308	**Subject Title**	Database Management Systems Laboratory
Category	Professional Core	**L-P-T-C**	0-0-3-1.5
Regulation	2025	**Semester**	III
Prerequisites	Basic knowledge of Database Concepts, Tables, and File Management. Familiarity with Programming Logic. Understanding of Mathematics and Algorithms for basic operations		

Course Objectives:

1. To learn and apply SQL DDL/DML commands for creating, modifying, querying, and maintaining relational databases.
2. To understand and implement database constraints, views, sequences, and indexing strategies, and develop PL/SQL programs including procedures, functions, and triggers.
3. To develop database applications with front-end connectivity, perform transaction handling, and apply exception handling in database programming.

Course Content:

1. **To create a DDL to perform creation of table, alter, modify and drop column.**

i. Create Table Command: - It defines each column of the table uniquely. Each column has minimum of three attributes, a name, data type and size.

ii. Modifying the structure of tables- Add new columns

iii. Dropping a column from a table.

iv. Modifying existing columns.

v. Renaming the tables

vi. Truncating the tables.

vii. Destroying tables.

2. **To study the various DML commands and implement them on the database. Create the following tables namely "DEPARTMENT" and "EMPLOYEE" their schemas as follows: Department (dept_no, dept_name,dept_location); Employee (emp_no, employee_name, job,hire_date, salary, dept_no);**

i. Insert a single record into Department table.

ii. Insert more than a record into Employee table using a single insert command.

iii. Update the Employee table to set the salary of all employees to Rs.15000/- who are working as Assistant Professor.

iv. Select employee name, job from the Employee table.

v. Delete only those who are working as lecturer.

vi. List the records in the Employee table orderby salary in ascending order.

vii. List the records in the Employee table orderby salary in descending order.

viii. Display only those employees whose deptno is 30. Compute the GCD of two numbers (Iterative and recursive).

3. **Database Constraints:**

Create table "STUDENT" with the following fields: Student (ID, Name, Age, Address);

i. Write a query to create a table Student where the field ID is specified as UNIQUE.

ii. Write a query to create a table Student with the fields ID and NAME as NOT NULL.

iii. Write a query to create a table Student and specifies the field ID as primary key.

iv. Create a two tables Orders and customers and Create a foreign key constraint for the table (Orders).

v. Write a query to create a table Student and specifies the condition for the field AGE as (AGE >= 18) and the default value for the field AGE as 18.

4. **Consider the following tables namely "DEPARTMENTS" and "EMPLOYEES" their schemas are as follows : Departments (dept _no , dept_ name , dept_location);Employees (emp_id , emp_name , emp_salary);**

i. Develop a query to grant all privileges of employees table into departments table.

ii. Develop a query to grant some privileges of employees table into departments table.

iii. Develop a query to revoke all privileges of employees table from departments table.

iv. Develop a query to revoke some privileges of employees table from departments table.

v. Write a query to implement the save point.

vi. Write a query to implement the rollback.

vii. Write a query to implement the commit.

5. **A. Database Querying:**

i. Write a simple Query to create a table Student and Subject.

ii. Write a Sub Query using WHERE, SELECT, FROM, HAVING Clause.

iii. (Nested Sub Query)-Write a Sub Query in a WHERE and HAVING clause of another Sub Query.

B. Create the following "CUSTOMER" and "ORDERS" tables: Customer(Cust_id, Cust_name ,Country ,Receipt_no ,Order_id); Orders(Order_id, Item_ordered, Order_date);

i. To join a table using an USING, ON Clause.

ii. Write a query to implement Equi Join, Inner Join, Outer Join, Full Join, Left Join, Right Join for the above table.

6. **A. Consider the "CUSTOMERS" table having the following records:**

ID	NAME	AGE	ADDRESS	SALARY
1	Ramesh	32	Ahmedabad	2000
2	Khilan	25	Delhi	1500
3	Karthick	23	Calcutta	2000
4	Chandru	25	Mumbai	6500
5	Surendhar	27	Chennai	8500

6	Arun	22	Mysore	4500
7	Mohammed	24	Indore	10000

i. Create view customers_view as select name, age from CUSTOMERS.

ii. Updating a Views.

iii. Inserting Rows into a Views.

iv. Deleting Rows into a Views.

v. Inserting Rows into a Views. Deleting Rows into a Views. Dropping Views.

B. Write a query to creating a sequence in ascending order and descending order.

C. Write a query to create and drop Synonyms.

7. **Database Programming with PL/SQL**: To illustrate the concepts of Implicit and Explicit cursors.
8. **A.** Write PL/SQL queries to create and delete **Procedures.**

   B. Write a PL/SQL program to demonstrate **Functions** that computes and returns the maximum of two values and factorial of a given number.
9. Write a database **Trigger** for displaying the salary difference between the old salary and new salary for table CUSTOMER.
10. Write a PL/SQL Program to construct database and apply **Exception Handling**.
11. **Database Connectivity with Front End Tools:** Design and implement a calculator using visual Basic.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Create and manage database structures using SQL Data Definition Language (DDL) commands such as CREATE, ALTER, DROP, TRUNCATE, and RENAME with appropriate constraints.	L3	PO1, PO5
CO2	Perform data manipulation and retrieval operations using SQL Data Manipulation Language (DML) commands including INSERT, UPDATE, DELETE, and SELECT with sorting and filtering.	L3	PO1, PO2, PO5
CO3	Construct advanced SQL queries using joins, nested queries, and subqueries to retrieve meaningful information from relational databases.	L4	PO1, PO2, PO4, PO5
CO4	Develop database programs using PL/SQL concepts such as cursors, procedures, functions, triggers, and exception handling.	L3	PO1, PO3, PO5
CO5	Design database applications by creating views, sequences,	L4	PO1, PO3, PO5

	synonyms, and integrating databases with front-end tools to build practical database solutions.		

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	-	-	3	-	-	-	-	-	-	3	2	-
CO3	3	3	2	2	3	-	-	-	-	-	-	3	2	-
CO4	3	2	3	-	3	-	-	-	-	-	-	3	2	2
CO5	3	2	3	-	3	-	-	-	-	-	-	3	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

G.Dhivya, AP(T)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous Institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC309	Subject Title	Object Oriented Programming Laboratory
Category	Engineering Science	L-P-T-C	0-3-0-1.5
Regulation	2025	Semester	III
Prerequisites	Basic knowledge of programming concepts such as variables, operators, conditional statements, and loops (in any programming language). Basic logical and mathematical problem-solving skills.		

Course Objectives:

- To write, test and debug simple C++programs.
- To build software development skills using Java programming for real-world applications using generic programming and event handling.
- To understand and apply the concepts of classes, packages, interfaces array, list exception handling and file processing.
- To develop a java application with threads and generics classes and design and build simple Graphical User Interfaces.

Course Content:

C++ PROGRAMS

1. Inheritance.
2. Call by value and Call by Reference.
3. Constructor and Destructor
4. Friend function and Friend class
5. Static Data and Member Function.
6. Objects as Arguments.
7. Function Overloading.
8. Operator Overloading

10. Virtual functions.

JAVA PROGRAMS

11. Classes and Inheritance
12. Overloading methods
13. Exception Handling
14. Multithreaded programming
15. Applet Development using Swing

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand OOPS concepts in simple C++ programs.	L1	-
CO2	Build a C++ programs using call by value and call by reference	L6	PO1,PO2,PO3, PO4,PO5,PO8, PO9,PO11
CO3	Construct a C++ programs using virtual functions and templates	L6	PO1,PO2,PO3, PO4,PO5,PO8, PO9,PO11
CO4	Use of classes and inheritance Overloading for Java simple applications.	L3	PO1,PO2,PO3, PO4,PO5,PO8, PO9,PO11
CO5	Build a Java Programs with exception handling and Multithreading, I/0 streams applets	L6	PO1,PO2,PO3, PO4,PO5,PO8, PO9,PO11

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	3	3
CO2	3	3	2	2	2	-	-	1	1	-	3	2	3	3
CO3	3	1	2	2	2	-	-	1	1	-	3	2	3	3
CO4	3	2	1	2	2	-	-	1	1	-	3	2	3	3
CO5	3	3	1	2	2	-	-	1	1	-	3	2	3	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
K.Savitha, AP(Temp)/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC310	**Subject Title**	Data Structures and Algorithms Laboratory
Category	Program Core	**L-P-T-C**	0-4-0-2
Regulation	2025	**Semester**	III
Prerequisites	Basic programming knowledge in a language such as C/C++/Java/Python including control structures, arrays, and functions. Basic understanding of fundamental data structures such as arrays, linked lists, stacks, queues, trees, and graphs.		

Course Objectives:

1. To implement linear data structures such as linked lists, stacks, and queues using arrays and linked representations.
2. To develop programs for solving computational problems using data structure applications such as expression evaluation, polynomial manipulation, and sparse matrix operations.
3. To implement and analyze non-linear data structures including trees, binary search trees, AVL trees, and heaps.
4. To implement hashing techniques and graph traversal algorithms for efficient data organization and processing.
5. To apply appropriate data structures and algorithms to solve practical problems using programming tools.

Course Content:

1. Implementation of Singly Linked List, Doubly Linked List and Circularly Linked List.
2. Array implementation of Stack, Queue and Circular Queue ADTs.
3. Linked List implementation of Stack and Queue ADTs.
4. Implementation of Polynomial Manipulation using Linked list.
5. Implementation of Sparse matrix operations using Linked list.
6. Evaluating postfix expressions.
7. Converting infix to postfix expressions.
8. Binary Tree traversals – Recursive and non-recursive functions.
9. Implementation of Binary Search Trees.
10. Implementation of Heaps using Priority Queues.
11. Implementation of AVL Trees.
12. Implementation of Open Addressing (Linear Probing and Quadratic Probing).
13. Implementation of Breadth-first and Depth-first Graph Traversals.
14. Implementation of Prim's algorithm.
15. Implementation of Dijkstra's Algorithm.

Total Hours: 60

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand the concepts and working principles of linear and non-linear data structures and their applications in solving computational problems.	L2	-
CO2	Implement programs using appropriate data structures such as linked lists, stacks, queues, trees, hashing techniques, and graph algorithms.	L3	PO1, PO2, PO3, PO5, PO9
CO3	Apply suitable data structures and algorithms for solving specific programming problems efficiently.	L3	PO1, PO2, PO3, PO4, PO5, PO9
CO4	Analyze the performance and behavior of different data structure implementations and algorithms used in laboratory exercises.	L4	PO1, PO2, PO3, PO4, PO5, PO9
CO5	Design and develop efficient programs using appropriate data structures and algorithms to solve real-world computational problems.	L6	PO1, PO2, PO3, PO4, PO5, PO9

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	-	3	-	-	-	3	-	-	3	1	1
CO3	3	3	2	2	2	-	-	-	3	-	-	3	1	-
CO4	2	3	2	2	2	-	-	-	3	-	-	2	1	1
CO5	2	3	3	2	3	-	-	-	3	-	-	3	2	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

Dr.R. Subathra, AP/CSE

R. Subathra

BOS Approval

Date:

SEMESTER - IV

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR-635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Mathematics

Subject Code	**25SBS401**	**Subject Title**	**APPLIED STATISTICS AND NUMERICAL METHODS**
Category	Basic science	**L-P-T-C**	3-0-1-4
Regulation	2025	**Semester**	IV
Prerequisites	Basic knowledge of calculus, matrices, probability, and differential equations concepts.		

Course Objectives

1. To introduce the fundamental concepts of statistical hypothesis testing and design of experiments for analyzing and interpreting data.
2. To develop the ability to solve algebraic, transcendental, and system of linear equations using various numerical methods.
3. To understand and apply interpolation techniques and numerical methods for differentiation and integration.
4. To provide knowledge of numerical techniques for computing eigen values and solving ordinary differential equations.
5. To enable students to apply statistical and numerical methods for computational problem solving in engineering and computer science applications

Course Content:

[TESTING OF HYPOTHESIS] (9+3)

Sampling distributions – Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

[DESIGN OF EXPERIMENTS] (9+3)

One way and two way classifications – Completely randomized design – Randomized block design – Latin square design – 2^2 factorial design.

[SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS] (9+3)

Solution of algebraic and transcendental equations – Fixed point iteration method – Newton Raphson method – Solution of linear system of equations – Gauss elimination method – Pivoting – Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices.

[INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION] (9+3)

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivates using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3rules.

[NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS] (9+3)

Single step methods: Taylor's series method – Euler's method – Modified Euler's method – Fourth order Runge - Kutta method for solving first order differential equations – Multi step methods: Milne's and Adams -Bash forth predictor corrector methods for solving first order differential equations.

Total Hours : 60

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

CO	Course Outcome	Bloom's Level
CO1	Recall the basic definitions, formulas, and concepts related to hypothesis testing, experimental design, numerical methods, interpolation, integration, and differential equations.	L1
CO2	Explain the principles and procedures of statistical tests, experimental designs, and numerical techniques used for solving equations, interpolation, and differential equations.	L2

CO3	Apply appropriate statistical and numerical methods such as the Newton–Raphson method, Gauss elimination method, interpolation techniques, numerical integration methods, and Runge–Kutta methods to solve practical problems.	L3
CO4	Analyze the results obtained from statistical tests and numerical methods to evaluate the effectiveness of different techniques used in solving equations and differential equations.	L4
CO5	Evaluate and justify the selection of suitable statistical and numerical methods for solving mathematical and engineering problems based on the results obtained.	L5

Text Books:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", 10th Edition, Khanna Publishers, New Delhi, 2015.
2. Johnson, R.A., Miller, I., and Freund, J., "Miller and Freund's Probability and Statistics for Engineers", 8th Edition, Pearson Education Asia, 2015.

Reference Books:

1. Burden, R.L., and Faires, J.D., "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore, J.L., "Probability and Statistics for Engineering and the Sciences", 8th Edition, Cengage Learning, New Delhi, 2014.
3. Gerald, C.F., and Wheatley, P.O., "Applied Numerical Analysis", 7th Edition, Pearson Education Asia, New Delhi, 2007.
4. Gupta, S.C., and Kapoor, V.K., "Fundamentals of Mathematical Statistics", 12th Edition, Sultan Chand & Sons, New Delhi, 2020.
5. Spiegel, M.R., Schiller, J., and Srinivasan, R.A., "Schaum's Outline of Probability and Statistics", 4th Edition, Tata McGraw-Hill, 2012.

E-resources:

1. https://nptel.ac.in/courses/111105041
2. https://nptel.ac.in/courses/111107105

Course Articulation matrix:

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

Correlation Levels:3- Strong, 2- Medium,1 -Low, - (dash)- No correlation

Course Designed By

1. S. Gowtham Prakash, AP(T)/Maths, 12/3/26

2. S. VADIVEL, AP(T)/Maths, 12/3/26

BOS Approval 12/3/2026

Date: 12/3/2026

12-03-26.

D. D. BABU
ASP/Mathematics, TPGIT, Vellore

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR-635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC402	Subject Title	Computer Organization and Architecture
Category	Professional Core	L-P-T-C	3-0-0-3
Regulation	2025	Semester	IV
Prerequisites	Basic knowledge of Digital Electronics , Programming Fundamentals, Data Structures and Basic Mathematics		

Course Objectives:

1. To understand the fundamental concepts of computer organization including register transfer language, micro-operations, instruction codes, instruction cycle, and CPU organization with instruction formats and addressing modes.
2. To study the architecture and performance aspects of processors, including pipelining, parallel processing, RISC architecture, and various computer arithmetic operations such as addition, subtraction, multiplication, division, and floating-point arithmetic.
3. To understand the organization and functioning of input–output systems and memory hierarchy, including I/O interfaces, data transfer modes, interrupts, Direct Memory Access (DMA), cache memory, associative memory, and virtual memory.

Course Content:

Basic Computer Design **(9 Hours)**

Register Transfer Language – Register Transfer – Bus and Memory Transfers – Arithmetic Micro operations– Logic Micro operations– Shift Micro operations-Arithmetic Logic Shift Unit- Instruction Codes – Computer Registers – Computer Instructions-Timing and Control-Instruction Life Cycle –Memory Reference Instructions-IO and Interrupt.

Central Processing Unit and Pipelining **(9 Hours)**

Introduction – General Register Organization – Stack Organization-Instruction Formats-Addressing Modes – Data Transfer and Manipulation-Program Control-RISC-Parallel Processing-Pipelining-Arithmetic Pipeline- Instruction Pipeline-RISC Pipeline-Vector Processing-Array Processors.

Computer Arithmetic **(9 Hours)**

Introduction – Addition and Subtraction – Multiplication Algorithms – Division Algorithms- Floating-Point Arithmetic Operations – Decimal Arithmetic Unit-Decimal Arithmetic Operations.

Input-Output Organization **(9 Hours)**

Peripheral Devices – Input-Output Interface – Asynchronous Data Transfer – Modes of Transfer- Priority Interrupt-DMA-IOP-Serial Communication.

Memory Organization **(9 Hours)**

Memory Hierarchy– Main Memory – Auxiliary Memory– Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	To understand the basic concepts of computer design including register transfer language, micro-operations, instruction codes, registers, and instruction cycle.	L2	–

CO2	To explain CPU organization including instruction formats, addressing modes, program control, stack organization, and pipelining concepts.	L2	PO1, PO2, PO3, PO5
CO3	To analyze arithmetic operations including addition, subtraction, multiplication, division algorithms, and floating-point operations.	L4	PO1, PO2, PO3, PO4, PO5
CO4	To understand input–output organization including peripheral devices, data transfer modes, interrupts, DMA, and communication interfaces.	L2	PO1, PO2, PO3, PO4, PO5
CO5	To analyze memory organization including cache memory, virtual memory, associative memory, and memory hierarchy.	L4	PO1, PO2, PO5

Text Books:

1. M. Morris Mano "Computer System Architecture", Third Edition, Pearson Education, 2017.
2. David A. Patterson and John L. Hennessey, "Computer organization and design', Morgan Kauffman / Elsevier, Fifth edition, 2014.
3. V. Carl Hamacher , Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation",VIth edition, Mc Graw-Hill Inc, 2012.

Reference Books:

1. William Stallings "Computer Organization and Architecture" , Seventh Edition , Pearson Education, 2006.
2. Govinda rajalu, "Computer Architecture and Organization, Design Principles and Applications", first edition, Tata McGraw Hill, New Delhi, 2005.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata Mc Graw Hill, 1998.

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	–	–	–	–	–	–	–	–	–	–	–	3	2	1
CO2	3	2	2	–	2	–	–	–	–	–	–	3	2	2
CO3	3	3	2	2	2	–	–	–	–	–	–	3	2	2
CO4	2	2	2	2	3	–	–	–	–	–	–	3	2	2
CO5	3	3	–	–	2	–	–	–	–	–	–	3	3	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
R.Nithya,AP(T)/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC403	Subject Title	Computer Networks
Category	Professional Core	L-T-P-C	3-1-0-4
Regulation	2025	Semester	IV
Prerequisites	• Fundamentals of Computer Systems • Basic Programming and Data Communication Concepts • Basic Knowledge of Algorithms and Operating Systems.		

Course Objectives:

1. To understand the fundamental concepts of computer networking and layered network architecture.
2. To analyze data link layer protocols, error control, and flow control mechanisms
3. To Apply concepts of logical addressing, IP addressing (IPv4/IPv6), subnetting, and routing algorithms to determine efficient data transmission paths in network layer.
4. To Evaluate Transport Layer protocols such as TCP and UDP, including connection management, flow and congestion control mechanisms, and reliable data transfer techniques.
5. To explore application layer protocols and modern networking technologies including network security.

Course Content:

UNIT I Network Fundamentals and Physical Layer **(12 Hours)**

Introduction to Computer Networks – Applications of Computer Networks – Network Types (LAN, MAN, WAN) – Network Topologies – Protocols and Standards – Layered Architecture – OSI Reference Model – TCP/IP Model – Transmission Media (Guided and Unguided Media) – Data Communication Components – Signal Encoding Techniques – Digital Transmission – Switching Techniques (Circuit Switching, Packet Switching, Message Switching) – Multiplexing (FDM, TDM, WDM) – Performance Metrics: Bandwidth, Throughput, Delay.

UNIT II Data Link Layer and Medium Access Control **(12 Hours)**

Data Link Layer Services – Framing – Error Detection and Correction (Parity, CRC, Checksum, Hamming Code) – Flow Control Protocols – Stop-and-Wait ARQ – Go-Back-N ARQ – Selective Repeat ARQ – Multiple Access Protocols – ALOHA – Slotted ALOHA – CSMA/CD – CSMA/CA – Ethernet – IEEE 802.3 Standards – Wireless LAN – IEEE 802.11 Architecture – Bluetooth – Switching and Bridging Concepts.

UNIT III Network Layer **(12 Hours)**

Logical Addressing – IPv4 Addressing – Subnetting – Supernetting – IPv6 Addressing – Internet Control Protocols (ICMP, ARP, RARP) – Routing Algorithms – Distance Vector Routing – Link State Routing – Hierarchical Routing – Congestion Control – Quality of Service (QoS) – Virtual Circuits vs Datagram Networks – Routing Protocols (RIP, OSPF, BGP).

UNIT IV Transport Layer **(12 Hours)**

Transport Layer Services – Process-to-Process Communication – Port Addressing – Multiplexing and Demultiplexing – Connection-Oriented and Connectionless Services – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – TCP Segment Structure – TCP Connection Management – Flow Control and Congestion Control (Sliding Window Protocol & Reliable Data Transfer)– Performance Issues.

UNIT V Application Layer and Network Security **(12 Hours)**

Domain Name System (DNS) – Hypertext Transfer Protocol (HTTP, HTTPS) – File Transfer Protocol (FTP) – Email Protocols (SMTP, POP3, IMAP) – Dynamic Host Configuration Protocol (DHCP) – Network Security Concepts – Cryptography Basics – Firewalls – Network Security Mechanisms (IDS, VPN) – Introduction to Cloud Networking and IoT.

Total Hours: 60

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

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand the fundamentals of computer networks and layered architecture	L2	-
CO2	Analyze data link layer protocols and medium access techniques	L4	PO1, PO2, PO3
CO3	Apply IP addressing and routing algorithms in network design	L3	PO1, PO2, PO3
CO4	Evaluate transport layer protocols for reliable data communication	L4	PO1, PO2, PO3
CO5	Assess application layer protocols and network security mechanisms	L5	PO1, PO2, PO3, PO5

Text Books:

1. Tanenbaum & Wetherall, Computer Networks, 6th Edition, Pearson, 2021/2022.
2. Kurose & Ross, Computer Networking: A Top-Down Approach, 8th Edition, Pearson, 2021 / 2024 Global Edition.

Reference Books:

1. William Stallings, Data and Computer Communications, 11th Edition, Pearson, 2020
2. Behrouz A. Forouzan, Data Communications and Networking, 5th Edition, McGraw-Hill.
3. Peterson & Davie, Computer Networks: A Systems Approach, 6th Edition, Morgan Kaufmann, 2021.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104
(Autonomous institute affiliated to Anna University, Chennai)
Department of Computer Science and Engineering

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	–	–	–	–	–	–	–	–	–	–	–	2	1	1
CO2	3	3	2	1	2	–	–	–	–	–	–	2	2	1
CO3	3	3	2	2	2	–	–	–	–	–	–	3	2	1
CO4	3	3	2	2	2	–	–	–	–	–	–	3	2	1
CO5	3	2	2	1	2	1	1	1	1	–	2	2	3	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By
K.Savitha, AP(Temp)/CSE

BOS Approval
Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC404	Subject Title	Operating Systems
Category	Professional Core	L-T-P-C	3-0-0-3
Regulation	2025	Semester	IV
Prerequisites	• Basic knowledge on computer programming and data structures • Basic knowledge on computer organization and architecture		

Course Objectives:

1. To learn the functions, structures, and design of operating systems, including system calls and OS services.
2. To gain skills in process scheduling, synchronization, deadlock handling, memory allocation, and file/I/O management.
3. To understand access control, security threats, and defense mechanisms, with practical insights from Linux and Windows 10.

Course Content:

Introduction **(9 Hours)**

Computer System - Elements and organization; Operating System Overview - Objectives and Functions - Evolution of Operating System; Operating System Structures – Operating System Services - User Operating System Interface - System Calls – System Programs - Design and Implementation – Operating System Debugging-Operating System Generation-System Boot.

Process Management **(9 Hours)**

Processes - Process Concept - Process Scheduling - Operations on Processes - Inter-process Communication; CPU Scheduling - Scheduling criteria - Scheduling algorithms: Threads - Multithread Models – Threading issues; Process Synchronization - The Critical-Section problem - Synchronization hardware – Semaphores – Mutex - Classical problems of synchronization - Monitors; Deadlock - Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

Memory Management **(9 Hours)**

Main Memory - Swapping - Contiguous Memory Allocation – Paging - Structure of the Page Table - Segmentation, Segmentation with paging; Virtual Memory - Demand Paging – Copy on Write - Page Replacement - Allocation of Frames –Thrashing.

Storage Management **(9 Hours)**

Mass Storage system: Disk Structure - Disk Scheduling and Management; File Systems: File-System Interface - File concept - Access methods - Directory Structure - Directory organization - File system mounting - File Sharing and Protection; File System Implementation - File System Structure - Directory implementation - Allocation Methods - Free Space Management; I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O subsystem.

Protection and Security, Case Studies **(9 Hours)**

Protection: Goals of Protection-Principles of Protection- Domain of Protection– Access matrix –Access Control -Security: Security Problems-Program threats – System and Network threats – User Authentication-Implementing security defenses– Firewalling to Protect Systems and Networks-Case Studies: Linux system – Windows 10.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Explain the objectives, functions, and evolution of operating systems, along with process management, memory and storage management, and protection mechanisms.	L2	-
CO2	Apply process scheduling, synchronization, memory allocation, file system operations, and security techniques to practical operating system scenarios.	L3	PO1, PO3, PO5 PO9
CO3	Analyze processes, CPU and disk scheduling algorithms, memory management strategies, file system structures, and security mechanisms to identify bottlenecks or vulnerabilities.	L4	PO2, PO4, PO5, PO10
CO4	Evaluate different operating system strategies, including synchronization, deadlock handling, memory management, file systems, and security policies, for efficiency and reliability.	L5	PO2, PO3, PO7, PO8
CO5	Demonstrate the ability to research, analyze, and present advanced operating system concepts, case studies, and current technologies effectively in a seminar format.	L6	PO2, PO4, PO5, PO9, PO10

Text Books:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", 10th Edition, John Wiley and Sons Inc., 2018.
2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, 5th Edition, 2022 New Delhi.

Reference Books:

1. William Stallings, "Operating Systems: Internals and Design Principles", 7th Edition, Prentice Hall, 2018.
2. Achyut S.Godbole, Atul Kahate, "Operating Systems", McGraw Hill Education, 2016
3. D M Dhamdhere, "Operating Systems: A Concept-based Approach", 2nd Edition, Tata McGraw-Hill Education, 2009.
4. Ramaz Elmasri, A. Gil Carrick, David Levine, "Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010.
5. Harvey M. Deitel, —Operating Systemsll, Third Edition, Pearson Education, 2004.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	2
CO2	3	-	3	-	3	-	-	-	2	-	-	3	-	3
CO3	-	3	-	3	3	-	-	-	-	2	-	3	2	3
CO4	-	3	3	-	-	-	2	2	-	-	-	3	2	3
CO5	-	3	-	3	3	-	-	-	2	3	-	2	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

B.Purushothy

Course Designed By

B.Purushothaman, AP(Temp)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC405	Subject Title	Software Engineering
Category	Professional Core	L-T-P-C	3-0-0-3
Regulation	2025	Semester	IV
Prerequisites	Basic knowledge of computer fundamentals and problem-solving skills.		

Course Objectives:

1. To learn different software process models and how to apply them in projects.
2. To Develop skills to gather requirements, analyze, and design software using modern modeling techniques.
3. To Understand software quality, testing, and project management to build reliable and well-managed software.

Course Content:

Software Process Models **(9 Hours)**

Introduction– A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models- Product and Process – Process Models – The Waterfall Model –Incremental Process Models - Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process – Agile Development- Extreme Programming(XP)- Agile Process Models.

Requirement Engineering **(9 Hours)**

Software Engineering Practice – Communication Practice – Planning Practice - Modeling Practice– Construction Practice – Deployment - Requirements Engineering - Requirements Engineering Tasks –Initiating the Requirements Engineering Process -Eliciting Requirements– Developing Use Cases – Building the Analysis Models – Elements of the Analysis Model – Analysis Pattern – Negotiating Requirements – Validating Requirements.

Analysis Modeling **(9 Hours)**

Requirements Analysis – Analysis Modeling Approaches – Data Modeling Concepts –Scenario Based Modeling –UML Models that Supplement the Use Case- Flow Oriented Modeling – Class Based Modeling– Creating a Behavioral Model.

Design and Testing **(9 Hours)**

Design Concepts – Design Model -Architectural Design – Component Level Design-User Interface Design – Testing Strategies - Testing Tactics - Strategies Issues for Conventional and Object-Oriented Software - Validation Testing – System Testing – Art of Debugging – Testing conventional applications-White Box Testing-Control Structure Testing- Black Box Testing.

Quality and Managing Software Projects **(9 Hours)**

Quality Concepts- Software Quality Assurance (SQA)-Software Reliability-Software Configuration Management (SCM)- SCM Process- Process and Product Metrics- Estimation for Software Projects-Project Scheduling. Case Studies: E-Commerce Website- ATM Banking System- Student Management System.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Explain software process models, requirement engineering tasks, analysis models, design principles and testing strategies.	L2	-
CO2	Apply suitable process models, requirement techniques, UML models, design and testing methods in software development.	L3	PO1, PO2, PO3, PO5, PO9
CO3	Analyze requirements and system models using data, scenario, class and behavioral modeling techniques.	L4	PO1, PO2, PO3, PO4, PO5
CO4	Evaluate software quality, reliability, testing results and project management practices such as metrics, estimation and scheduling.	L5	PO1, PO2, PO3, PO4, PO5, PO9, PO11
CO5	Present a technical seminar on software engineering concepts including requirements, design, testing strategies, and project management practices.	L6	PO5, PO9, PO10, PO11

Text Books:

1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", McGraw Hill International edition, Eighth edition, 2019.
2. Ian Sommerville, "Software Engineering", Tenth Edition, Pearson Education, 2017.

Reference Books:

1. Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning Private Limited ,2009.
2. Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
3. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited,2007.

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Course Articulation matrix:

CO	Program Outcomes (PO)											PEO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	2	2	3	-	3	-	-	-	1	-	-	3	1	1
CO3	2	3	2	2	2	-	-	-	-	-	-	3	1	1
CO4	1	2	2	3	2	-	-	-	1	-	3	2	-	1
CO5	-	-	-	-	1	-	-	-	2	3	1	1	-	-

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

B.Purushothaman

Course Designed By

B.Purushothaman, AP(Temp)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Chemistry

Course code	25ZBS406	**Course Title**	Environmental Sciences and Sustainability
Category	Basic Science	**L-P-T-C**	2-0-0-2
Regulation	R-2025	**Semester**	04
Prerequisites	Nil		

Course Objectives:

1. To define key terms, concepts, and principles of environmental science, ecology, biodiversity, pollution, environmental laws and sustainability.
2. To understand the inter relationship between environment and living organisms. Environmental literacy: 1) Where do the things I consume come from?
   2) What do I know about the place where I live?
   3) What is my responsibility as a human being?
3. To equip students to apply environmental principles and scientific methods to solve real-world environmental problems.
4. To enable the students to analyse complex environmental issues, their root causes and connections between environmental, social, and economic systems.
5. To evaluate the waste management strategies, energy efficiency, carbon footprints and standards regarding environmental policies and sustainable practices.

ENVIRONMENT AND BIODIVERSITY 6 hours

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

ENVIRONMENTAL POLLUTION 6 hours

Pollution: Definition - Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Hazardous waste: definition – types - Solid waste - Solid waste management - waste disposal methods – E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

RENEWABLE SOURCES OF ENERGY 6 hours

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

SUSTAINABILITY AND MANAGEMENT 6 hours

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

SUSTAINABILITY PRACTICES 6 hours

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

TOTAL: 30 PERIODS

Upon successful completion of this course, student will be able to,		
CO	**Course Outcome**	**Bloom's Level**
CO1	Environmental problems cannot be solved by mere laws. Public awareness is an important aspect which defines the importance of environment conservation and its benefits.	L1
CO2	The key goals of environmental literacy will help the students, to make a leap from 1) YES 'I KNOW' about MY Environment. 2) 'I will CARE' for MY Environment. 3) 'I'll RESPECT and CONSERVE MY Environment.	L2
CO3	Apply environmental laws and regulations to specific case studies. Implement new technologies in solving environmental problems can move towards health, longevity, peace and prosperity.	L3
CO4	Analysing the values and attitudes towards understanding complex environmental-economic-social challenges, and participating actively in solving current environmental problems by adopting sustainability as a practice in life, society and industry.	L4
CO5	Evaluate and design an eco-friendly product or a green technology solution for improving environmental quality and develop a better understanding of human relationships, perceptions and policies towards the environment.	L5

Text Books:

1. G. Tyler Miller & Scott Spoolman, "Environmental Science" 16th edition, Cengage Learning India Pvt. Ltd., 2023.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.

Reference Books:

1. R K Trivedy, "Handbook of Environmental Laws, Acts, Guidelines, Compliances & Standards" Vol.I, B.S. Publications, 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopaedia", 2ndEdition, Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice Hall of India Pvt. Ltd., New Delhi,2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press 2005.
5. Bharucha Erach, "The Biodiversity of India", Mapin Publishing Pvt. Ltd., Ahmedabad India.

COURSE ARTICULATION MATRIX											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	1	1	2	1	1	2		1	1		1
CO2	1	1	1	1	1	2		1	1		2
CO3	1		1	1	1	2		1			2
CO4	1	1	3	1	2	2		1	1		2
CO5	1	1	1	1	2	2		1	1		2

Correlation Levels: 3 – Strong, 2 – Medium, 1 – Low and (-) No correlation

Course Designed by

1. **Dr.G.SARASWATHY, ASP & Head/Chemistry.**
2. **Dr.S.ELUMALAI, AP/Chemistry.**

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC408	Subject Title	Computer Networks Laboratory
Category	Professional Core	L-T-P-C	0-0-3-1.5
Regulation	2025	Semester	IV
Prerequisites	Basic knowledge of Computer Networks and Programming.		

Course Objectives:

1. To understand the working of various networking protocols through simulation tools.
2. To implement error detection, flow control, and routing algorithms.
3. To analyze network performance using simulation software.
4. To gain hands-on experience with network configuration and packet analysis.

List of Experiments:

1. Study of network devices and network configuration commands.
2. Simulation of different network topologies using Cisco Packet Tracer / NS2 / NS3.
3. Implementation of CRC error detection technique.
4. Implementation of Hamming Code for error correction.
5. Simulation of Stop-and-Wait ARQ protocol.
6. Simulation of Go-Back-N ARQ protocol.
7. Simulation of Selective Repeat ARQ protocol.
8. Implementation of Distance Vector Routing algorithm.
9. Implementation of Link State Routing algorithm.
10. Study of Ethernet LAN and MAC addressing.
11. Configuration of IP addressing and subnetting.
12. Port scanning & Packet analysis using Wireshark tool.
13. Configuration of DNS and DHCP services.
14. Simulation of TCP and UDP protocols.
15. Study of network security mechanisms (Firewall / Packet filtering).

Total Hours: 45

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Upon successful completion of this laboratory, students will be able to:

CO	Course Outcome	Bloom's Level	POs mapped
CO1	Understand basic networking concepts and configure simple network topologies using simulation tools	L3	--
CO2	Implement error detection, error correction and flow control mechanisms in data communication	L3	PO1-PO5
CO3	Apply IP addressing, subnetting and routing algorithms to design and analyze computer networks	L3	PO1-PO5
CO4	Analyze the functioning of transport layer protocols such as TCP and UDP using network simulation and packet analysis tools	L4	PO1-PO5
CO5	Demonstrate network monitoring, configuration and basic network security mechanisms using modern networking tools	L3	PO1-PO9, PO11

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	–	–	–	–		–	–	–	–	–	–	2	1	1
CO2	3	3	2	1	2	–	–	–	–	–	–	2	2	1
CO3	3	3	2	2	2	–	–	–	–	–	–	3	2	1
CO4	3	3	2	2	2	–	–	–	–	–	–	3	2	1
CO5	3	2	2	1	2	1	1	1	1	–	2	2	3	2

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

Course Designed By

K.Savitha, AP(Temp)/CSE

BOS Approval

Date:

GOVERNMENT COLLEGE OF ENGINEERING, BARGUR- 635104

(Autonomous institute affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Subject Code	25SPC409	Subject Title	Operating Systems Laboratory
Category	Professional Core	L-T-P-C	0-0-3-1.5
Regulation	2025	Semester	IV
Prerequisites	• Basic knowledge of C programming • Fundamental understanding of Operating System concepts		

Course Objectives:

1. To develop practical skills in installing and configuring operating systems, and using UNIX commands and shell scripting to manage and control system processes.
2. To develop C programs to simulate CPU scheduling, memory management, deadlock handling, and file allocation strategies, fostering hands-on understanding of OS algorithms.
3. To design and implement solutions for synchronization and resource management problems, including concurrency control, deadlock handling, and efficient disk and memory operations.

List of Experiments

1. Installation of windows operating system.
2. Illustrate UNIX commands and Shell Programming.
3. Process Management using System Calls: Fork, Exit, Getpid, Wait, Close.
4. Write C programs to implement the various CPU Scheduling Algorithms.
5. Simulation of Producer consumer problem and dining philosopher's problem.
6. Write C program to avoid Deadlock using Banker's Algorithm.
7. Write a C program to Implement Deadlock Detection Algorithm.
8. Implement the paging Technique using C program.
9. Write C programs to implement the following Memory Allocation Methods. a. First Fit b. Worst Fit c. Best Fit
10. Write C programs to implement the various Page Replacement Algorithms.
11. Implement the following File Allocation Strategies using C programs a. Sequential b. Indexed c. Linked
12. Write C programs for the implementation of various disk scheduling algorithms.

Total Hours: 45

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

CO	Course Outcome	Bloom's Level	POs Mapped
CO1	Explain the principles behind system processes, CPU scheduling, memory and disk management, synchronization, deadlocks, and file allocation techniques	L2	-
CO2	Apply operating system concepts to write C programs and shell scripts for process management, scheduling, memory allocation,	L3	PO1, PO2, PO3, PO5

	deadlock handling, file allocation, and disk scheduling.		
CO3	Analyze process execution, CPU scheduling, memory allocation, synchronization, deadlock scenarios, file management, and disk I/O to determine system behavior and performance.	L4	PO2, PO4
CO4	Evaluate different CPU scheduling, memory allocation, page replacement, deadlock management, file allocation, and disk scheduling strategies to select the most efficient approach.	L5	PO2, PO4
CO5	Design and implement a mini-project in the laboratory to develop OS solutions covering scheduling, memory management, deadlock handling, file allocation, and disk management.	L6	PO2, PO3, PO5, PO9, PO10, PO11

Course Articulation matrix:

CO	Program Outcomes (PO)											PSO		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	-	-	-	-	-	-	-	-	-	2	-	2
CO2	2	2	3	-	3	-	-	-	-	-	-	3	-	3
CO3	-	3	-	2	-	-	-	-	-	-	-	3	2	3
CO4	-	3	-	2	-	-	-	-	-	-	-	3	2	3
CO5	-	2	3	-	3	-	-	-	2	2	2	2	2	3

Correlation Levels: 3 - Strong, 2 - Medium, 1 - Low, - (dash) - No correlation

B. Purushotty
Course Designed By
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BOS Approval
Date: