



TAKSHASHILA UNIVERSITY

(Tamil Nadu State Private University)

ONGUR, TINDIVANAM TK, VILLUPURAM DT

FACULTY OF ENGINEERING AND TECHNOLOGY

SCHOOL OF COMPUTATIONAL ENGINEERING

Department of Computer Science and Engineering

REGULATION 2025NEP

CURRICULUM & SYLLABI

B.Tech. - CSE

Semester – II



VISION AND MISSION OF UNIVERSITY

VISION:

To create change makers and world leaders similar to the ancient Takshashila University

MISSION:

The brightest minds and the best resources are used to nurture and develop the leaders of tomorrow, where they are encouraged to be eternally curious and ethically sound.

DEPARTMENT VISION AND MISSION

VISION:

To be a center of excellence in Computer Science and Engineering through quality education, innovation, and research, producing ethical professionals to meet global and societal needs

MISSION:

M1: Quality Education	Deliver quality education through outcome-based learning and modern teaching practices.
M2: Innovation and Research	Foster innovation, research, and industry collaboration to solve real-world problems.
M3: Career Development	Enhance employability and entrepreneurship through skill development and experiential learning.
M4: Ethics and Social Responsibility	Promote professionalism, ethical values, leadership, and lifelong learning.

PROGRAMME OUTCOMES (POs)

PO1: Engineering knowledge

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis

Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

PO8: Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Career Excellence

Build successful careers in industry, academia, research, or entrepreneurship.

PEO2: Innovation

Develop innovative and sustainable computing solutions.

PEO3: Professionalism

Demonstrate ethics, leadership, teamwork, and effective communication.

PEO4: Lifelong Learning

Adapt to emerging technologies through continuous learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Software Development

Design and develop efficient software solutions using modern computing techniques.

PSO2: Emerging Technologies

Apply emerging computing technologies and modern tools to develop intelligent and scalable solutions for real-world problems.

PSO3: Professional Practice

Demonstrate innovation, technical competence, ethical responsibility, and effective communication.



Faculty of Engineering and Technology
B.Tech. in Computer Science and Engineering
(REGULATION 2025NEP)
SEMESTER – II

Sl. No.	Course Code	Course Title	Cate gory	Periods			Cre dits	Hrs.	Max. Marks								
				L	T	P			CAT (Best of two)	ASS	MCQ	ATT	SEM	PRAC	CAM	ESM	Total
1	U25EN08T	Technical English	HS	3	0	0	3	45	20	5	5	5	5	-	40	60	100
2	U25MA08T	Multiple Integrals and Transforms	BS	3	1	0	4	60	20	5	5	5	5	-	40	60	100
3	U25GE03T	Biology for Engineers	BS	3	0	0	3	45	20	5	5	5	5	-	40	60	100
4	U25EC02B	Basic Electrical and Electronics Engineering	ES	2	0	2	3	60	20	5	5	5	5	10	50	50	100
5	U25CE02B	Programming for Problem Solving Using C	PC	3	0	2	4	75	20	5	5	5	5	10	50	50	100
6	U25CE03T	Computer Architecture	PC	3	0	0	3	45	20	5	5	5	5	-	40	60	100
Total:							20	330							260	340	600
7	U25VA04T	Introduction to Indian Knowledge System	VAC	0	0	2	1	30	-	-	-	-	-	-	100	-	100
8	U25SE01P	Skill Enhancement Course I	SEC	0	0	2	1	30	-	-	-	-	-	-	100	-	100
Total:							2	60							200		200
Semester Total:							22	390							460	340	800

Note:

L – Lecture

T – Tutorial

P – Practical

CAT – Continuous Assessment Test

ESM – End Semester Exam Marks

ASS – Assignment

ATT – Attendance

CAM – Continuous Assessment Marks

SEM – Seminar

BoS Chairman

U25EN08T	Technical English	L	T	P	C	Hrs.
		3	0	0	3	45

COURSE OBJECTIVES:

To develop effective language skills for academic communication
To strengthen technical vocabulary, grammar, and workplace writing skills for preparing professional documents
To enhance interpersonal, presentation, interview, and group discussion skills for workplace practice
To utilize modern digital communication and language-learning tools to improve communication
To apply ethical communication practices and professional etiquette for societal context

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Demonstrate effective language skills in academic and professional engineering contexts.
CO2 :	Prepare clear and professional technical documents, including emails, reports, resumes, and project documentation.
CO3 :	Communicate confidently through presentations, group discussions, interviews, and workplace interactions.
CO4 :	Apply modern digital tools for technical writing, documentation, and professional communication.
CO5 :	Demonstrate ethical, collaborative, and lifelong learning skills in professional communication.

UNIT I: Essential Grammar	9 Hrs.
Parts of Speech (Noun, Verb, Adjective, Adverb), Subject-predicate - Basic Question Formation: Yes/No questions, Wh-questions - Practical application in describing routines, ongoing actions, past events, and future plans - Common errors in writing and speaking.	

UNIT II: Technical Writing Skills	9 Hrs.
Learning Vocabulary /Acquiring Vocabulary: Active and Passive Vocabulary, Reading and Speaking Vocabulary - Word Building (Affixation and Compounding) - Content Words and	

Function Words- Types of Vocabulary: Jargons, Technical Vocabulary, Academic Vocabulary (AWC) - Vocabulary for Daily Life.

UNIT III: Technical Aspects of Speaking skills

9 Hrs.

Greetings, Self-introduction, Making requests, Asking for permission - Expressing opinions, Agreeing/disagreeing politely - Group Discussions (GD): Purpose and importance - Strategies for effective participation (initiating, expressing, interrupting, agreeing, disagreeing, concluding) - Short Presentations/Show and Tell: Describing an object, a place or a simple process using visual aids.

UNIT IV: Functional Writing for Practical Purposes

9 Hrs.

Personal Notes and Messages: Writing short notes, leaving phone messages, informal emails/texts - Vocabulary Building for Writing: Synonyms, antonyms, common collocations - Formal Reports and Proposals: Comprehensive reports (analytical, research, feasibility), executive summaries, abstract writing - Professional Correspondence Mastery: Emails (persuasive, informational, request-based), formal letters, memos, notices and press releases.

UNIT V: Advanced Business Writing & Documentation

9 Hrs.

Technical Writing Principles: Clarity, conciseness, precision, use of visuals, avoiding jargon, writing for specific technical audiences - Minutes of Meetings and Agendas: Recording discussions, decisions and action items - Preparing effective meeting agendas - Manuals and Instructions: Designing instructions (MoU), standard operating procedures (SOPs) and user manuals - Building an Online Professional Brand: Crafting compelling LinkedIn profiles, professional use of social media, online networking - Virtual Communication: Video conferences, virtual presentations, and online collaboration tools, advantages and disadvantages.

Total Hours: 45

TEXT BOOKS :

- | | |
|----|--|
| 1. | Syal, Pushpinder and D.V Jindal. An Introduction to Linguistics: Language, Grammar and Semantics. 2nd Ed. Delhi: PHI learning private Limited, 2016. |
| 2. | Lightbown, Patsy and Nina Spada. How Languages are Learned. 4th Ed. Oxford: Oxford University Press, 2000. |
| 3. | Robinson, Sarah. "A Context Driven Approach To Teaching Accademic Vocabulary." North Dakota: University of North Dakota, 2012. 1-46. |
| 4. | Carnegie, Dale. The Art of Public Speaking. Random House, 2010. |

REFERENCE BOOKS :

1.	Koneru, Aruna. "English Language Skills for Engineers", McGraw Hill Education (India) Private Limited, 2020.
2.	Narayanan, Lakshmi K.R. "English for Technical Communication" Vol 1 & 2 Combined Edition, Scitech Publications (India) Pvt Ltd., 2009.
3.	Mohan, Krishna & Banerji, Meena. "Developing Communication Skills" 2 nd Edition, Laxmi Publications, 2009.

WEB REFERENCES :

1.	https://www.scribd.com/document/522901749/English-Notes-Form-1-to-4
2.	Vocabulary - Wikipedia
3.	https://www.slideshare.net/slideshow/asking-and-giving-opinion-agreeing-and-disagreeingpptx/265509737
4.	https://l1nk.dev/9y4g0vq
5.	https://blog.bit.ai/technical-writing/

COs/POs/PSOs Mapping :

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	-	-	-	1	-	-	1	2	3	-	2	1	-	3
2	1	1	1	1	2	-	-	1	1	3	2	2	2	1	3
3	-	-	-	-	1	1	-	2	3	3	2	2	1	1	3
4	-	-	1	1	3	-	-	1	2	3	2	2	2	3	2
5	-	-	-	-	1	2	1	3	3	2	2	3	1	1	3

Correlation Level: 1-Low, 2-Medium, 3- High, '-' - no correlation

BoS Chairman

U25MA08T	Multiple Integrals and Transforms	L	T	P	C	Total
		3	1	0	4	60

COURSE OBJECTIVES:

• To develop logical thinking and analytic skills in evaluating multiple integrals
• To equip them familiar with Laplace, transform and solve the differential equations using Laplace transform techniques
• To enable the students to expand functions into Fourier series using change of intervals
• To gain good knowledge in application of Fourier transforms
• To inculcate the computational knowledge in Z-transforms.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Understand the concept of double and triple integrals.
CO2 :	Find Laplace transform and inverse transform of simple functions.
CO3 :	Convert a periodic function into series form.
CO4 :	Compute Fourier transforms of various functions.
CO5 :	Solve difference equations using Z- transforms.

UNIT I: Multiple Integrals	12 Hrs.
Change of order of integration and change of variables in double integrals (Cartesian only). Applications: Areas by double integration and volumes by triple integration (Cartesian only).	

UNIT II: Laplace Transforms and Inverse Laplace Transforms	12 Hrs.
Definition - Transforms of elementary functions – properties - Transform of derivatives and Integrals - Transform of periodic Function - Initial and final value theorems - Inverse Laplace Transforms - Convolution theorem.	

UNIT III: Fourier Series	12 Hrs.
Dirichlet's conditions – General Fourier series – Fourier series for odd and even functions – Half-range Fourier cosine and sine series.	

UNIT IV: Fourier Transforms	12 Hrs.
Fourier Integral theorem (Statement only). Fourier transform and its inverse, properties - Fourier sine and cosine transform their properties.	

UNIT V: Z - Transforms	12 Hrs.
Z-transforms - definition, Standard z-Transforms - Initial value and final value theorems and problems, Inverse z-transform - Applications of z-transforms to solve difference equations.	

Total Hours: 60

TEXTBOOKS:	
1.	B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 45 th edition, 2024.
2.	N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, 11th Edition, Laxmi Publications, New Delhi, 2022.

REFERENCE BOOKS:	
1.	R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5th Edition, Narosa Publishing House, New Delhi, 2021.
2.	H. K. Dass and Rajnish Verma, Higher Engineering Mathematics, 1st Edition, S. Chand Publishing, New Delhi, 2023.
3.	B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education India, 2022.
4.	T. Veerarajan, Engineering Mathematics – Volume II, Revised Edition, McGraw Hill Education, 2021.
5.	Dr. V. Sundarapandian, Engineering Mathematics – Volume II, 1st Edition, PHI Learning Pvt. Ltd., New Delhi, 2021.

WEB REFERENCES:	
1.	https://nptel.ac.in/courses/111105121/
2.	https://nptel.ac.in/courses/111105035/
3.	https://nptel.ac.in/courses/111107119/
4.	https://swayam.gov.in/nd1_noc20_ma17/preview
5.	https://nptel.ac.in/courses/111/103/111103021/

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	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	1	1	-	-	-	-	-	-	1	2	2	2	3
2	3	3	2	2	1	-	-	-	-	-	1	3	2	2	3
3	3	2	1	1	-	-	-	-	-	-	1	-	3	2	3
4	3	3	2	2	1	-	-	-	-	-	1	2	3	3	3
5	3	3	2	2	2	-	-	-	-	1	1	1	3	3	3

Correlation Level:1-Low,2-Medium,3-High, '-' - no correlation

BoS Chairman

U25GE03T	Biology for Engineers	L	T	P	C	Total
		3	0	0	3	45

COURSE OBJECTIVES:

To introduce the fundamental concepts of biology relevant for engineers
To explain cellular structures, functions, and energy mechanisms
To examine the principles of organismal physiology, immunity, infectious diseases, and pathogen biology
To analyse the applications of biology in medicine, environmental science, and bio-inspired engineering
To evaluate recent advances in structural biology, biochemistry, biophysics, and emerging biological technologies

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1:	Explain basic concepts of cell structure, function, and energy processes.
CO2:	Understand DNA, RNA, protein synthesis, and genetic control.
CO3:	Relate biological processes like immunity, infection, and diseases with human health.
CO4:	Identify applications of biology in medicine, environment, and engineering (drug design, biomimicry, biosafety).
CO5:	Appreciate major discoveries (e.g., Nobel Prizes) and current advances in biology that inspire engineering solutions.

UNIT I: Foundations of Biology	9 Hrs.
Origin of life and evolution (Darwinian perspective) - Classification of living organisms - Cell as the basic unit of life: structure and function of prokaryotic & eukaryotic cells - Energy and metabolism in cells.	

UNIT II : Genetic Information & Protein Synthesis	9 Hrs.
DNA - RNA structure and function - Central dogma: replication – Transcription - Translation, Gene regulation – Mutations - and applications of stem cells -Developmental biology basics.	

UNIT III: Physiology and Immunology	9 Hrs.
Organismal physiology: Energy and constraints – Human immune system: self vs non-self – Antigens, Antibodies, Vaccines and Infectious Diseases, Pathogen biology basics	

UNIT IV: Applied Biology in Medicine & Engineering	9 Hrs.
Cancer biology – Aging – Apoptosis – Stem cell therapy – Drug design basics –Environmental biosafety – Biodiversity and bioremediation – Bio mimicry: Engineering inspired by biology.	

UNIT V: Advances in Biology	9 Hrs.
Structural biology: proteins and large molecules - Techniques in biochemistry and biophysics (basic overview only) - Recent advances in biology and their impact on technology.	

Total Hours: 45

TEXT BOOKS :	
1.	Lodish, H., Berk, A., Kaiser, C. A., et al. Molecular Cell Biology. 10th Edition, W. H. Freeman, 2025.
2.	Reece, J. B., Urry, L. A., Cain, M. L., et al. Campbell Biology. 13th Edition, Pearson, 2024.
3.	Alberts, B., Johnson, A., Lewis, J., et al. Essential Cell Biology. 6th Edition, W. W. Norton & Company, 2024.

REFERENCE BOOKS :	
1.	Alberts, B., Hopkin, K., Johnson, A., et al. Essential Cell Biology: Student Companion. 6th Edition, W. W. Norton, 2024.
2.	Madigan, M. T., Bender, K. S., Buckley, D. H., et al. <i>Brock Biology of Microorganisms</i> . 17th Edition, Pearson, 2024.
3.	Cooper, G. M., & Hausman, R. E. <i>The Cell: A Molecular Approach</i> . 10th Edition, Oxford University Press, 2024.
4.	Berg, J. M., Tymoczko, J. L., Gatto, G. J., & Stryer, L. Biochemistry. 10th Edition, W. H. Freeman, 2023.
5.	Raven, P. H., Johnson, G. B., Mason, K. A., et al. Biology. 13th Edition, McGraw-Hill Education, 2023.

WEB REFERENCES:

1.	https://openstax.org/details/books/biology-2e
2.	https://www.ncbi.nlm.nih.gov/books
3.	https://www.nih.gov
4.	https://www.nature.com/scitable
5.	https://www.biointeractive.org

COs/POs/PSOs Mapping:

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	-	-	-	-	1	-	-	-	-	2	-	1	-
2	3	3	1	1	1	-	-	-	-	-	-	2	1	2	-
3	3	2	1	1	-	2	1	1	-	1	-	2	-	1	2
4	3	2	3	2	2	2	3	1	-	1	-	2	2	3	2
5	2	2	2	1	1	1	2	1	-	1	-	3	1	2	3

Correlation Level: 1-Low, 2-Medium, 3- High, '-' - no correlation

BoS Chairman

U25EC02B	Basic Electrical And Electronics Engineering	L	T	P	C	Total
		2	0	2	3	60

COURSE OBJECTIVES:

•	To introduce the basics of electric circuits and analysis
•	To learn the basic concepts and behavior of AC circuits
•	To learn the basic concepts of semiconductor theory
•	To introduce basic concepts of diodes and its applications
•	To educate on the fundamental concepts of Transistors

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Compute the electric circuit parameters for simple problems
CO2 :	Explain the working principle and applications of AC Circuits
CO3 :	Analyze and execute the characteristics of semiconductor devices
CO4 :	Explain and implement the basic concepts of diodes and its applications
CO5 :	Explain and demonstrate the operating principles of Transistors

UNIT I : DC Circuits	6 Hrs.
Circuit components: Resistor, Inductor, Capacitor – E.M.F, potential difference, power, energy Ohm's Law, series parallel connections of resistance, voltage and current division rules- Kirchhoff's Laws - Nodal and Mesh analysis.	

UNIT II : AC Circuits	6 Hrs.
Alternating current, Alternating EMFs, Waveforms - Cycle, period, frequency, instantaneous, peak, average, RMS values, peak factor, form factor, phase difference, leading, lagging and in phase quantities. instantaneous power - real power - reactive power - apparent power - power factor, RC, RL and RLC circuits.	

UNIT III : Semiconductor Theory	6 Hrs.
Introduction to Electronics-Study of Semiconductor Physics – semiconductor materials, structure of atom, metals, insulators and semiconductors, Intrinsic Semiconductors, Extrinsic Semiconductors – Theory of Bandgap	

UNIT IV : Semiconductor Diodes and its Applications	6 Hrs.
Theory of PN Junction diode, Volt-Ampere Characteristic, Diode Equation. Zener Diode, LED, Rectifiers: Half wave and Full Wave Rectifiers	

UNIT V: Transistors	6 Hrs.
Bipolar Junction Transistor- Operation of PNP and NPN transistors – configurations, V-I characteristics, BJT as a switch and amplifier, Operation of JFET, MOSFET – Types, I-V Characteristics	

Total Hours: 30

List of Experiments

1. Verification of KCL and KVL.
2. Verification of Superposition theorem
3. Study of DSO
4. Verification of ohms and Kirchhoff's laws
5. Measuring the steady-state and transient time-response of R-L, R-C, and R-L-C circuits
6. Characteristics of PN Junction Diode
7. Characteristics of Zener Diode
8. Half wave Rectifier
9. Full Wave Rectifier
10. Characteristics of BJT under CE configuration
11. Characteristics of JFET
12. Characteristics of MOSFET

Total Hours: 30

**TEXT BOOKS:
REFERENCE BOOKS:**

1.	Kothari D.P. and I.J. Nagrath – “Basic Electrical and Electronics Engineering ” 2nd Edition – McGraw Hill Education, 2020.
1.	McGraw Hill Education, “Electric Circuit Analysis and Design”, Tata McGraw Hill, 3rd Edition, 2010.
2.	S.K. Bhattacharya- “Basic Electrical and Electronics Engineering-” 2nd Edition- Pearson Education- 2017.
2.	S. Sathyanarayanan, N. Suresh Kumar, " Basic Electrical, Electronics and Measurement Engineering", Sedha R.S. - "A Textbook of Applied Electronics-” S. Chand & Co.- 2008.
3.	Tata McGraw-Hill Education, 5th Edition, 2018.
4.	James A. Svoboda and Richard C. Dorf- “Dorf’s Introduction to Electric Circuits-” Wiley- 2018.
3.	Albert Malvino, David Bates, “Electronic Principles, McGraw-Hill Education, 7th edition, 2017, David A. Ben, “Electronic Devices and Circuits”, Oxford Higher Education press, 5th Edition, 2010.
4.	Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGrawHill, 2002.

WEB REFERENCES :

1.	https://nptel.ac.in/courses/117106108
2.	https://nptel.ac.in/courses/108105479
3.	https://nptel.ac.in/courses/108106181
4.	https://nptel.ac.in/courses/108106084

COs/POs/PSOs Mapping:

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	2	2	-	-	-	-	-	-	1	3	-	-
2	3	2	1	2	2	-	-	-	-	-	-	1	3	-	-
3	3	3	2	3	2	-	-	-	-	-	-	1	3	1	-
4	3	2	3	2	2	-	-	-	-	-	-	1	3	2	-
5	3	3	3	3	2	-	-	-	-	-	-	1	3	2	1

Correlation Level: 1 – Low, 2 - Medium, 3 – High

BoS Chairman

U25CE02B	Programming for Problem Solving Using C	L	T	P	C	Total
		3	0	2	4	75

COURSE OBJECTIVES:

• To develop logical thinking and algorithmic skills for solving simple computational problems
• To introduce the fundamentals of C programming, data types, operators, and control flow
• To teach modular programming through user-defined functions and recursion
• To provide knowledge of arrays and strings for handling collections of data
• To enable students to use pointers, structures, and file handling in real-world applications

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1:	Apply problem-solving techniques to design algorithms, flowcharts, and pseudocode for solving computational problems.
CO2:	Develop C programs using fundamental programming concepts, input/output operations, and control structures.
CO3:	Implement modular C programs using functions, recursion, parameter passing, and preprocessor directives.
CO4:	Construct C programs using arrays and strings to solve data processing and manipulation problems.
CO5:	Develop C applications using pointers, structures, dynamic memory allocation, file handling, and case-study-based solutions.

UNIT I: Problem Solving & Algorithm Design	9 Hrs.
Introduction to Problem Solving – Algorithms - Analysis of algorithms – Flowcharts –Pseudocode - Basic Computational Problems - Number theory – Series – Matrix operations – Set operations	

UNIT II: C Basics & Control Structures	9 Hrs.
Introduction to C Programming - C Tokens - Input and Output in C - Control Structures: Decision Making - Control Structures: Looping - Simple Programs	

UNIT III: Functions & Modular Design	9 Hrs.
Introduction to Functions - Defining and Calling Functions - Parameter Passing - Recursion - Scope, Lifetime, and Storage Classes - Preprocessor Directives	

UNIT IV: Arrays & Strings	9 Hrs.
Introduction to Arrays - One-Dimensional Arrays (1D Arrays) - Two-Dimensional Arrays (2D Arrays) - Multidimensional Arrays - Strings (Character Arrays) - Array and String Applications	

UNIT V – Pointers, Structures, Files & Case Studies	9 Hrs.
Pointers – Introduction and Basics - Pointers and Functions - Dynamic Memory Allocation - Structures and Unions - Enumerated Data Types and Typedef - File Handling in C - Case Studies: Data File Processing: Student record management system (add, search, update, delete), Simple Compiler Design: Tokenizer and expression evaluation	

Total Hours: 45

List of Experiments:

1. Write a C Program to display “Hello World”.
2. Write a C Program to Print additional, subtraction, multiplication, and division of two numbers.
3. Write a C Program to swap two numbers using a third variable.
4. Write a C Program to calculate Simple Interest.
5. Write a C Program to find whether a given number is even or odd.
6. Write a C Program to calculate the sum of first n natural numbers
7. Write a C Program to design a simple calculator using Switch case.
8. Write a C Program to display Fibonacci Series.
9. Write a C Program to print sum of diagonal elements of a matrix.
10. Write a C Program to swap 2 numbers by creating a function using call by value.

Total Hours: 30

TEXT BOOKS:	
1.	E. Balagurusamy, Programming in ANSI C, 9th Edition, McGraw Hill, 2024.
2.	Paul Deitel and Harvey Deitel, C How to Program: With Case Studies in Applications and Systems Programming, 9th Edition, Pearson, 2024.

REFERENCE BOOKS:	
1.	Robert C. Seacord, Effective C: An Introduction to Professional C Programming, 2nd Edition, No Starch Press, 2024.
2.	Jens Gustedt, Modern C, 2nd Edition, Manning Publications, 2024.

3.	Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition (Pearson Reprint), Pearson, 2021.
4.	Jeri R. Hanly and Elliot B. Koffman, Problem Solving and Program Design in C, 8th Edition, Pearson, 2019.

WEB REFERENCES:

1.	https://en.cppreference.com
2.	https://gcc.gnu.org/onlinedocs
3.	https://www.geeksforgeeks.org/c-programming-language
4.	https://learn.microsoft.com/en-us/cpp/c-language/?view=msvc-170
5.	https://www.open-std.org/jtc1/sc22/wg14

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	2	-	-	-	1	-	2	3	2	2	3
2	3	3	2	2	2	-	-	-	1	-	2	3	2	2	3
3	3	3	3	2	2	-	-	-	1	-	2	3	3	2	3
4	3	3	3	3	2	1	-	-	1	-	2	3	3	3	3
5	3	2	2	2	3	1	-	-	1	-	2	3	3	2	3

Correlation Level: 1-Low, 2-Medium, 3- High, '-' - no correlation

BoS Chairman

U25CE03T	Computer Architecture	L	T	P	C	Total
		3	0	0	3	45

COURSE OBJECTIVES:

•	To understand the basic structure and operation of a digital computer
•	To learn the fundamentals of organizational and architectural aspects of control unit
•	To acquire knowledge about processor and memory design of a digital computer
•	To have a broad understanding of various system interfaces and Input output devices
•	To obtain knowledge on recent processors

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Identify and explain the basic structure of a computer and instruction sets with addressing modes and discuss the design of ALU.
CO2 :	Identify the mechanism in Hardwired control and micro programmed control unit
CO3 :	Using pipelining Concepts and applications in real world.
CO4 :	Illustrate the memory mapping procedure to enhance the performance of the system.
CO5 :	Discuss the standard I/O interfaces and peripheral devices.

UNIT I: Basic Structure of Computers	9 Hrs.
Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architecture – Addressing modes – RISC – CISC. ALU design – Fixed point and floating point operations.	

UNIT II: Basic Processing Unit	9 Hrs.
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Fundamental concepts – Execution of a complete instruction – Multiple bus organization– Hardwired control – Micro programmed control – Nano programming

UNIT III: Pipelining

9 Hrs.

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance Considerations-Exception handling.

UNIT IV: Memory System

9 Hrs.

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – secondary storage devices

UNIT V: I/O Systems

9 Hrs.

Accessing I/O devices – Programmed Input/Output - Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors

Total Hours: 45

TEXT BOOKS :

1. Patterson, David A., and John L. Hennessy. Computer Architecture: A Quantitative Approach. 6th ed., Morgan Kaufmann, 2019.
2. Patterson, David A., and John L. Hennessy. Computer Organization and Design: The Hardware/Software Interface. 6th ed., Morgan Kaufmann, 2021.
3. Patterson, David A., and John L. Hennessy. Computer Organization and Design. 6th ed., Morgan Kaufmann, 2021.
4. Stallings, William. Computer Organization and Architecture: Designing for Performance. 11th ed., Pearson, 2023.

REFERENCE BOOKS :

1. Harris, David, and Sarah Harris. Digital Design and Computer Architecture. 2nd ed., Morgan Kaufmann, 2013.

2.	Hwang, Kai. Advanced Computer Architecture. McGraw-Hill Education, 2018.
3.	Mano, M. Morris. Computer System Architecture. 3rd ed., Pearson, 2017.
4.	Shen, John Paul, and Mikko H. Lipasti. Modern Processor Design: Fundamentals of Superscalar Processors. Waveland Press, 2013.
5.	Sima, Dezső, Terence Fountain, and Peter Kacsuk. Advanced Computer Architectures: A Design Space Approach. Pearson, 2018.
6.	Tanenbaum, Andrew S., and Todd Austin. <i>Structured Computer Organization</i> . 6th ed., Pearson, 2013.

WEB REFERENCES :

1.	https://asq.org/
2.	https://www.iso.org/standard/70397.html
3.	https://www.isixsigma.com/
4.	https://www.quality.org/
5.	https://www.nist.gov/mep

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	2	-	-	-	1	-	2	3	2	2	3
2	3	3	2	2	2	-	-	-	1	-	2	3	2	2	3
3	3	3	3	2	2	-	-	-	1	-	2	3	3	2	3
4	3	3	3	3	2	1	-	-	1	-	2	3	3	3	3
5	3	2	2	2	3	1	-	-	1	-	2	3	3	2	3

Correlation Level: 1 – Low, 2 - Medium, 3 – High

BoS Chairman

U25VA04T	Introduction to Indian Knowledge System	L	T	P	C	Total
		0	0	2	1	30

COURSE OBJECTIVES:

• To provide an overview of India's intellectual, cultural, and scientific heritage
• To develop understanding of Indian philosophical systems and their relevance today
• To introduce India's contributions to mathematics, science, medicine, arts, and governance
• To promote appreciation for holistic knowledge traditions and sustainability practices
• To connect ancient Indian knowledge with contemporary challenges and modern disciplines

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1:	Explain the scope, sources, and foundational concepts of Indian Knowledge Systems.
CO2:	Compare various Indian philosophical traditions and their epistemologies.
CO3:	Identify and discuss major scientific and technological contributions of ancient India.
CO4:	Analyze Indian aesthetic theories, literature, and art traditions.
CO5:	Evaluate Indian socio-political systems, ethical frameworks, and ecological wisdom.

UNIT I: Foundations of Indian Knowledge Systems	6 Hrs.
Definition, nature, and scope of IKS-Sources of IKS: Vedas, Upanishads, Puranas, Epics, Agamas-Guru-Shishya Parampara, oral & written traditions-Concepts of Rita, Dharma, Purusharthas, Samskaras-Indian worldview and holistic knowledge orientation.	

UNIT II: Indian Philosophical and Intellectual Traditions	6 Hrs.
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Overview of Indian Darshanas: Nyaya, Vaisheshika, Sankhya, Yoga, Mimamsa, Vedanta-Heterodox traditions: Buddhism & Jainism-Theory of knowledge (Pramanas): perception, inference, verbal testimony, etc.-Concepts of self, consciousness, and mind.-Ethical models from Upanishads, Gita, Buddhist and Jain texts.

UNIT III: Indian Scientific Knowledge – Mathematics, Astronomy, Health & Technology	6 Hrs.
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Mathematics & Astronomy:Zero, decimal system, algebra, geometry-Aryabhata, Brahmagupta, Bhaskaracharya, Kerala School of Mathematics-Timekeeping, Panchanga, cosmology.Ayurveda & Health Sciences:Tridosha theory, Panchamahabhutas-Contributions of Charaka and Sushruta-Yoga as a science of well-being Metallurgy, Chemistry & Technology:Iron pillar, metallurgy, Rasashastra-Architecture and engineering traditions.

UNIT IV: Indian Arts, Literature, Culture & Aesthetics	6 Hrs.
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Classical literature: Sanskrit & regional texts-Performing arts: music, dance, drama traditions-Natyashastra and Rasa theory-Temple architecture, iconography, and symbolism-Aesthetic principles: Alankara Shastra, artistic consciousness.

UNIT V - Society, Governance, Environment & Contemporary Relevance	6 Hrs.
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Society & Governance:Ancient education systems: Nalanda, Takshashila, Gurukula-Concepts of Varna, Jati, Ashrama-Leadership and ethics from Arthashastra, Tirukkural, Panchatantra-Role of women in IKS, Ecology, Sustainability & Indigenous Practices:Environmental ethics in Vedic and tribal traditions-Traditional agriculture, water systems, biodiversity conservation-Vriksha Ayurveda, holistic living, Contemporary Applications:NEP 2020 and IKS integration-Yoga and mindfulness in modern life-Traditional knowledge and modern innovation - Relevance of IKS for global challenges.

Total Hours: 30

TEXT BOOKS:

- | | |
|----|---|
| 1. | Indian Knowledge Systems: Concepts and Applications – Kapil Kapoor (Ed.),1st Edition, 2023. |
| 2. | Indian Philosophy – S. Radhakrishnan,2nd Edition (Reprint), 2020. |
| 3. | Science and Technology in Ancient India – Debiprasad Chattopadhyaya,Reprint Edition, 2019. |
| 4. | Indian Aesthetics – Coomaraswamy & others,Reprint Edition, 2019. |
| 5. | Indian Knowledge Systems and Sustainable Development – N. Ganesan & M. Soundarapandian (Eds.),1st Edition, 2023 |
| 6. | Arthashastra – Kautilya (Trans. R. Shamasastri),Reprint Edition, 2019. |

REFERENCE BOOKS:

1.	Indian Philosophy: A Very Short Introduction – Sue Hamilton, 2nd Edition, 2020
2.	Classical Indian Philosophy – Peter Adamson & Jonardon Ganeri, 1st Edition, 2020.
3.	The Crest of the Peacock: Non-European Roots of Mathematics – George Gheverghese Joseph, 3rd Edition, 2020.
4.	An Introduction to Indian Art (Part I & II) – NCERT, Revised Edition, 2022.
5.	Tirukkural – Thiruvalluvar (Trans. G.U. Pope), Reprint Edition, 2018

WEB REFERENCES :

1.	https://iks.aicte-india.org/
2.	https://www.education.gov.in/en/indian-knowledge-systems
3.	https://onlinecourses.nptel.ac.in/noc25_ge58/preview
4.	https://sanskritdocuments.org/

COs/POs/PSOs Mapping:

Cos	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	1	2	-	1	-	2	1	1	2	2
2	2	2	-	-	-	2	3	1	2	-	2	1	2	2	2
3	3	2	1	1	-	1	1	-	1	-	2	2	2	2	3
4	2	2	1	-	-	2	2	1	2	-	2	1	2	2	2
5	2	3	1	1	-	3	3	2	2	-	3	2	3	3	2

Correlation Level: 1-Low, 2-Medium, 3- High, '-' - no correlation

BoS Chairman

U25SE01P	Skill Enhancement Course- I	L	T	P	C	Total
		0	0	2	1	30

The students must select certification courses from reputed organizations like Google, Microsoft, AWS, Red Hat, Oracle, Palo Alto Networks, Unity, Raspberry Pi, NPTEL etc., with 40-50 hours duration specified in the curriculum, offered through Centers of Excellence.

Course Duration and Evaluation

- The duration is 40-50 hours as specified in the curriculum, which will be offered through Centre of Excellence.
- Pass/Fail will be determined on the basis of participation, attendance, performance, and completion of the course.
- If a student fails/he has to repeat the course in the subsequent years. Pass this course is mandatory for the award of degree.

Provider	Sample Courses (40-50 hrs)	Platform/Link
Google	Introduction to Generative AI	grow.google/certificates
Microsoft	AI & ML Engineering Professional Certificate	coursera.org/professional-certificates/microsoft-ai-and-ml-engineering
AWS	AWS Cloud Practitioner Essentials	aws.training
Red Hat	Red Hat OpenShift Fundamentals	redhat.com/learning
Oracle	Oracle Cloud Infrastructure Foundations	oracle.com/cloud/training

Provider	Sample Courses (40-50 hrs)	Platform/Link
Google	Introduction to Generative AI	grow.google/certificates
Microsoft	AI & ML Engineering Professional Certificate	coursera.org/professional-certificates/microsoft-ai-and-ml-engineering
Palo Alto	Cybersecurity Essentials (PCNSA Intro)	paloaltonetworks.com/cyber academy
Unity	Unity Certified Developer (AR/VR Basics)	learn.unity.com
Raspberry Pi	IoT and Embedded Systems	projects.raspberrypi.org

BoS Chairman