



SASURIE
COLLEGE OF ENGINEERING
(Autonomous)
Vijayamangalam, Tiruppur - 638056



CURRICULUM AND SYLLABI

REGULATION 2026

DEPARTMENT OF
INFORMATION TECHNOLOGY



SASURIE COLLEGE OF ENGINEERING

(Autonomous Institution Affiliated to Anna University, Chennai)



CURRICULUM and SYLLABI – 2026

**(CHOICE BASED CREDIT SYSTEM AND OUTCOME
BASED EDUCATION)**

(For the students admitted from the academic year 2026 - 2027)

BACHELOR OF TECHNOLOGY

IN

INFORMATION TECHNOLOGY

Vision and Mission of the Institute

Our Vision

Our ambition is to develop a centre for imparting technical education with creativity and perform research with practical values to meet challenges of the engineering environment and to achieve rural empowerment.

Our Mission

The institute aims to produce innovative professionals with sound subject knowledge, research experience and social character for a sustainable growth of the nation by providing adequate training to develop education with leadership qualities.

Vision and Mission of the Department

Vision

To be a globally recognized center of excellence in the field of Information Technology that nurtures innovative professionals, technology leaders, and research experts capable of addressing complex real-world challenges through emerging technologies and contributing to the digital transformation and development of the nation.

Mission

- To provide quality education in the field of Information Technology that integrates cutting-edge technologies with ethical, professional, and moral values.
- To foster strong collaborations with industries, research organizations, and technology communities to promote innovation, practical learning, and excellence in emerging areas of Information Technology.
- To develop socially responsible professionals who leverage Information Technology to create sustainable, inclusive, and impactful solutions for the betterment of society.
- To nurture entrepreneurship and innovation by inspiring students to develop an entrepreneurial mindset, creative thinking, problem-solving abilities, and technology-driven solutions.

Program Educational Objectives (PEOs)

PEO 1. Technical Proficiency: Graduates will establish successful careers and pursue higher education by applying their knowledge and skills in Information Technology, computing, and emerging technologies, with a commitment to lifelong learning.

PEO 2. Technology Professionals: Graduates will analyze, design, develop, and implement innovative Information Technology solutions to address complex industrial and societal challenges using appropriate tools, technologies, and methodologies.

PEO 3. Professionalism, Social Responsibility and Ethics: Graduates will demonstrate effective communication, teamwork, leadership, and problem-solving skills while upholding professional, ethical, and social values in their personal and professional endeavors.

Program Specific Outcomes (PSOs)

PSO 1. Apply IT tools and emerging technologies to design, develop, and implement effective software, networking, database, and computing solutions.

PSO 2. Develop innovative and scalable technology-driven solutions using software development, cloud computing, data management, AI, and emerging technologies.

**B.TECH INFORMATION TECHNOLOGY
REGULATIONS 2026
For the students admitted from 2026 onwards
CHOICE BASED CREDIT SYSTEM
CURRICULUM FOR 1 – VIII SEMESTERS
SEMESTER I**

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1	U26EN121	English Proficiency - I	L	HSMC	0	0	2	0	1
2	U26MA101	Matrices And Calculus	T	BSC	3	1	0	0	4
3	U26PH111	Physics for Computer Systems	TWL	BSC	2	0	2	0	3
4	U26CS111	Problem Solving and C Programming	TWL	PCC	2	0	2	0	3
5	U26CS101	Fundamentals of Computing	T	BSC	3	0	0	0	3
6	U26CS102	Digital Technologies - I	T	ESC	1	0	0	0	1
7	U26CS121	Computer Hardware Essentials	L	PCC	0	0	4	0	2
8	U26ME121	Engineering Practices Laboratory	L	PCC	0	0	4	0	2
9	U26CEC01	Design Thinking	T	PCC	1	0	2	0	2
Total					13	1	14	0	21
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
11	U26MC101	Induction Program – Universal human Values I	T	MCC	Three Weeks				3
12	U26TA101	தமிழர்மரபு / Heritage of Tamils	T	MCC	1	0	0	0	1

SEMESTER II

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1	U26EN221	English Proficiency II	L	HSMC	0	0	2	0	1
2	U26MA201	Linear Algebra and Number Theory	T	BSC	3	1	0	0	4
3	U26CY211	Chemistry for Computer Systems	TwL	BSC	2	0	2	0	3
4	U26CS211	Digital Principles And Computer Organization	T	BSC	3	0	0	0	3
5	U26IT201	IT Essentials	T	PCC	3	0	0	0	3
6	U26CS212	Problem Solving using Python Programming	TwL	BSC	2	0	2	0	3
7	U26EE201	Basics of Electrical and Electronics Engineering	TwL	BSC	2	0	2	0	3
8	U26CS201	Digital Technologies - II	T	PCC	1	0	0	0	1
Total					16	1	8	0	21
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
9	U26MC201	Universal Human Values II	T	MCC	3	0	0	0	3
10	U26TA201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	T	MCC	1	0	0	0	1

B.Tech-IT-R2026-CBCS**SEMESTER III**

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE*	CATEGORY	L	T	P	J	C
1		English Proficiency - III	L	HSMC	0	0	2	0	1
2		Probability And Statistics	T	BSC	3	1	0	0	4
3		Object Oriented programming language	TwL	ESC	2	0	2	0	3
4		Foundation and Applications of AI	TwL	ESC	2	0	2	0	3
5		Data Structures using C Programming	TwL	ESC	2	0	2	0	3
6		Design and analysis of Algorithms	TwL	ESC	2	0	2	0	3
7		Computer Networks	T	PCC	3	0	0	0	3
8		Computer Networks Lab	L	PCC	0	0	4	0	2
9		Environmental Science and Sustainability	T	ESC	2	0	0	0	2
10		Information Technology Problem Solving & Mini-Project	L	PCC	0	0	0	2	1
Total					15	1	14	2	25
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
11		Constitution of India	T	MNC	2	0	0	0	1
12		Heritage of Tamil - தமிழ்*	T	MCC	1	0	0	0	1

SEMESTER IV

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1		English Proficiency-IV	L	HSMC	0	0	2	0	1
2		Linear Algebra and Number Theory	T	BSC	3	1	0	0	4
3		Artificial Intelligence and Machine Learning	TWL	BSC	2	0	2	0	3
4		Operating Systems	T	ESC	2	0	0	0	2
5		Embedded Systems and IoT	TwL	ESC	2	0	2	0	3
6		Database Management and System	TwL	ESC	3	0	0	0	3
7		Operating System laboratory	L	ESC	0	0	4	0	2
8		Open Elective - I	T	OEC	3	0	0	0	3
9		IT Solution Design & Rapid Prototyping – I	L	PCC	0	0	0	2	1
10		Professional Skill Training - I	L	EEC	0	0	4	0	2
Total					15	1	8	2	24
MANDATORY CREDIT COURSES (MCC - Non CGPA) / MANDATORY NON-CREDIT COURSES (MNC)									
11		Essentials of Indian Traditional Knowledge	T	MCC	2	0	0	0	1

SEMESTER V

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1		Full Stack Development	TwL	PCC	3	0	0	0	3
2		Cryptography and Cyber Security	T	ESC	3	0	0	0	3
3		Introduction to DevOps	T	PCC	3	0	0	0	3
4		Professional Elective – I	T	PCC	3	0	0	0	3
5		Data Communication and Coding Techniques	T	PCC	3	0	0	0	3
6		Open Elective – II	T	OEC	3	0	0	0	3
7		IT Solution Design & Rapid Prototyping – II	T	EEC	0	0	0	4	2
8		Software Design & Rapid Prototyping – II	L	ESC	0	0	4	0	2
9		Professional Skill Training - II	L	PCC	0	0	2	0	2
Total					19	0	8	0	24

SEMESTER VI

Sl.NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1		Compiler Design	TwL	PCC	2	0	2	0	3
2		Cloud Computing technologies	TWL	ESC	2	0	2	0	3
3		Big Data Analytics	TwL	ESC	2	0	2	0	3
4		Fundamentals of Deep Learning	TwL	ESC	2	0	2	0	3
5		Network security and cryptography	T	BSC	3	0	0	0	3
6		Professional Elective – II	T	PCC	3	0	0	0	3
7		Mobile Application Development	TwL	PCC	3	0	2	0	3
8		Software Engineering	T	PCC	3	0	0	0	3
Total					18	0	2	0	24

SEMESTER VII

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1		Human Values and Ethics	T	HSMC	3	0	0	0	3
2		Cyber Attack Simulation and Security Testing	T	PCC	3	0	0	0	3
3		Agile Methodologies	T	PCC	3	0	0	0	3
4		Professional Elective–III	T	PCC	3	0	0	0	3
5		Professional Elective–IV	T	PCC	3	0	0	0	3
6		Project work Phase –I	P	EEC	0	0	0	4	2
Total					15	0	0	4	17

SEMESTER VIII

Sl. NO.	COURSE CODE	COURSE TITLE	COURSE TYPE	CATEGORY	L	T	P	J	C
1		Software Project Management	T	HSMC	3	0	0	0	3
2		Block Chain Technologies	TwL	ESC	2	0	0	2	3
4		Design Patterns	T	PCC	3	0	0	0	3
5		Professional Elective –III	T	PCC	3	0	0	0	3
6		Professional Elective – IV	T	PCC	3	0	0	0	3
7		Project work Phase – I	P	EEC	0	0	0	4	2
Total					18	0	2	0	17

Sl. NO.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	J	C
1		Internship / Industrial Training*	EEC	0	0	0	4	2
2		Project work Phase – II	EEC	0	0	0	20	10
TOTAL				0	0	0	24	12

*4- Weeks duration any Semester vacation from II to VI Semester

TOTAL CREDITS: 165

SEMESTER I

U26EN121	ENGLISH PROFICIENCY – I (common to all programmes)	CATEGORY: HSMC				
		L	T	P	J	C
		0	0	2	0	1

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To build basic English communication skills through practical language activities.
- To improve pronunciation, vocabulary, and grammar for effective communication.

COURSE OUTCOMES:

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Demonstrate the ability to understand and use basic English in everyday communication.	Understand
CO2	Apply appropriate grammar, vocabulary, and pronunciation in simple spoken and written contexts.	Apply
CO3	Interpret technical documents and case studies and communicate key insights gained from the life stories of scientists, innovators and entrepreneurs	Analyse

CO PO MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	2	-	-	-	-	-	2	2	-	-	1	1
CO2	-	1	-	-	2	-	-	1	3	-	-	2	-
CO3	1	3	-	3	-	-	-	2	3	-	1	-	2
Correlation Levels; 1.Slight (low) 2. Moderate (Medium) 3. Substantial (High)													

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SYLLABUS:

UNIT I READING AND INTERPRETATION 9

Vocabulary in Context – Discourse Markers – Reading Techniques – Oral, Reading: Rhythm and Intonation – Analytical Interpretation - Comprehension and Story Analysis – Evaluative Reading of Summaries and Findings from Journals / Articles / Online Content.

UNIT II PRINT MEDIA AND LITERATURE 9

Print Media Study: Editorials, Views and Feature Articles – Short Story: “*The Last Leaf*” – O. Henry – Science Fiction: “*The Time Machine*” – H.G. Wells.

UNIT III CASE STUDIES AND INSPIRING INNOVATORS 9

Reading Technical Documents (Guidelines & Manuals) – Case Study Review (Field- Based Learning) - A Case Analysis – Life Stories of Renowned Scientists and Innovators – Inspiring Journeys of Entrepreneurs and Emerging Ventures.

Contact Periods:

Lecture: - Periods	Tutorial: - Periods	Practical: 30 Periods	Total: 30 Periods
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TEXT BOOKS:

1. O. Henry. *The Complete Short Stories of O. Henry*. Dover Publications, 1996. Comprehensive collection of O. Henry’s stories, including *The Last Leaf*.
2. H. G. Wells. *The Time Machine*. Penguin Classics, 2005. Standard academic edition with notes and analysis for study

REFERENCES:

- Wells, H. G. *The Time Machine*. Penguin Classics, 2012. https://openlibrary.org/books/OL26970973M/The_Time_Machine_%28Penguin_Classics%29
- McWhorter, Kathleen, and Brette M. Sember. *College Reading and StudySkills*. 14th ed., Pearson, 2021. <https://www.pearson.com/en-us/pearsonplus/p/9780137530809>

B.Tech-IT-R2026-CBCS**EVALUATION PATTERN:**

Continuous Internal Assessments		End Semester Examinations (practical)	
		Test/Report Evaluation	Presentation & Viva
Practical			
Evaluation of students work, Observation, Record, etc.	Lab test (model practical)		
45(100)	15(100)	30(80)	10(20)
60		40	
Total		100	

B.Tech-IT-R2026-CBCS

U26MA101	MATRICES AND CALCULUS (Common for all Programmes))	Category: BSC				
		L	T	P	J	C
		3	1	0	0	4

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications
- To familiarize the students with differential calculus
- Analyze vector fields using gradient, divergence, and curl; verify and apply Green's, Gauss divergence in practical problems
- To make the students understand various techniques of integration
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

COURSE OUTCOMES:

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Use the matrix algebra methods for solving practical problems	Apply
CO2	Apply differential calculus tools in solving various application problems.	Apply
CO3	Compute the total derivatives and extreme values of multivariable functions	Apply
CO4	Compute double and triple integrals in Cartesian coordinates to determine geometric areas and volumes.	Apply
CO5	Analyze vector fields using gradient, divergence, and curl; verify and apply Green's, Gauss divergence in engineering problems	Apply

SYLLABUS:**UNIT -I MATRICES****9**

Characteristic equation - Eigen values and Eigenvectors of a real matrix – Properties of Eigen Values and Eigen Vectors - Cayley - Hamilton theorem – Orthogonal transformation of a real symmetric matrix to the diagonal form – Quadratic form – Nature of Quadratic forms - Reduction of quadratic form to the canonical form by orthogonal transformation. – Applications : Stretching of an elastic membrane.

UNIT-II DIFFERENTIAL CALCULUS**9**

Functions - graph of functions - Limit of a function – Continuity - Limits at infinity - Maxima and Minima of functions of single variable - Mean value theorem - Effect of derivatives on the shape of a graph.

UNIT III FUNCTIONS OF SEVERAL VARIABLES**9**

Functions of two or more variables – Partial derivatives – Homogeneous functions and Euler's theorem- Total differential –Chain Rule- Applications: Maxima and minima – Constrained maxima and minima – Lagrange's multiplier method.

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UNIT IV MULTIPLE INTEGRALS 9

Double integration in cartesian coordinates – Change of order of integration – Application: Area between two curves – Triple integration in cartesian coordinates – Volume as triple integrals.

UNIT V VECTOR CALCULUS 9

Gradient, divergence and curl – Directional derivative – Irrotational and Solenoid vector fields - Green's theorem in a plane - Gauss divergence theorem (excluding proofs) – Verification of theorem and simple applications.

Contact Periods:

Lecture: 45 Periods

Tutorial: 15 Periods

Practical: - Periods

Total: 60 Periods

TEXT BOOKS:

1. George B. Thomas Jr., Maurice D. Weir and Joel R. Hass, Thomas' Calculus: Early Transcendentals, 13th Edition, Pearson Education, 2014
2. P. Kandasamy, K. Thilagavathi and K. Gunavathi, Engineering Mathematics, Reprint Edition, S.Chand and Co., New Delhi, 2026

REFERENCES:

1. Engineering Mathematics – S. Narayanan, T. K. Manicavachagom Pillay & G. Ramanaiah, (Latest Reprint), S. Viswanathan Publishers.
2. Engineering Mathematics – B. K. Pal & K. Das, (Latest Edition), Oxford University Press India.
3. Advanced Engineering Mathematics, Erwin Kreyszig, 10th Edition (2018), Wiley India
4. Grewal B.S., “Higher Engineering Mathematics” 45th Edition, Khanna Publishers, New Delhi, 2024

EVALUATION PATTERN:

Continuous Assessments			End Semester Examinations
CIAT 1	CIAT 2	Activities	
40%			60%
16(60)	16(60)	8(40)	60(100)

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U26CS111	Problem Solving and C Programming (Common for all branches)	CATEGORY : PCC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

To provide exposure to problem-solving through programming

To develop computational thinking perspective of one's own discipline

To write, compile and debug programs using C language

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Formulate the algorithmic solutions for a given computational problem	(Apply)
CO2	Describe modularization, structures and pointers in C language	(Apply)
CO3	Design and implement algorithms for a given problem using C control structures	(Apply)
CO4	Apply the C programming constructs for searching and sorting techniques	(Apply)
CO5	Solve real time problems using suitable non-primitive data structures in C	(Apply)

CO-PO MAPPING

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO2
CO1	2	1	1	2	-	-	-	1	2	2	-	2	-	-
CO2	2	1	1	2	-	-	-	2	2	2	-	1	-	-
CO3	3	2	2	2	-	2	-	1	2	2	-	2	-	-
CO4	2	2	2	2	-	-	-	1	2	2	-	2	-	-
CO5	2	2	2	2	-	-	-	1	2	2	-	2	-	-

Correlation levels: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SYLLABUS:**UNIT -I COMPUTATIONAL THINKING**

6

Functions, graph of functions, Limit of a function, Continuity, Limits at infinity, Derivative as a function, Maxima and Minima of functions of single variable, Mean value theorem, Effect of derivatives on the shape of a graph.

UNIT-II ALGORITHMIC APPROACH

6

Logic - Boolean Logic - Applications of Propositional logic - Problem Definition - Logical Reasoning and Algorithmic thinking - Pseudo code and Flow chart - Constituents of algorithms - Sequence, Selection and Repetition - Problem understanding and analysis - Control structures in C - Algorithm design and implementation using control structures.

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UNIT III SEARCHING, SORTING, AND MODULARIZATION 6

Data Organization - Arrays - Introduction to Searching and Sorting - Linear Search, Binary Search - Basic sorting techniques - Two-dimensional arrays - Matrix manipulation - Modularization - Functions - Function prototype - Function definition - Function call - Built-in functions (string functions and math functions) - Recursion.

UNIT IV STRUCTURES AND POINTERS 6

Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers - Example Program - Sorting of names - Parameter passing - Pass by value - Pass by reference - Structure - Nested structures - Pointer and Structures - Array of structures - Example Program using structures and pointers - Unions.

UNIT V FILES 6

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

LIST OF EXPERIMENTS / EXERCISES:

- 1 Using IO Statements, get higher secondary marks of a student. Calculate and display the medical and engineering cut-off marks. [Assume the calculation formula]
- 2 Develop a C program to emulate the operations of an ATM using control structures. Authentication, Deposit, Withdrawal, and Balance check and pin change operations are to be supported
- 3 Develop a calculator to perform the operations including addition, subtraction, multiplication, division and square of a number.
Given different prices of a vegetable which is varying through the day (from morning to evening), find out
- 4 the best buy price and sell price for the maximum profit. Eg. For the prices [33, 35, 28, 36, 39, 25, 22, 31], best buy is at 28 and best sell is at 39.
- 5 Collect height and weight of 4 of your friends and calculate their body mass index. Use 2 dimensional arrays to store the values.
- 6 Weights of 10 students of your class who are standing in a line is given in a random order. Find out if there is a heavy person whose weight is the sum of previous Mo persons.
- 7 Solve Towers of Hanoi using recursion
- 8 Develop an expense manager which reads date, product, price and product category. The program should display the total expense amount based on product category or date as per user's selection. Use structures

Contact Periods:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** 15 Periods **Total:** 60 Periods

TEXT BOOKS:

- 1 David D. Railey and Kenny A.Hunt , “Computational Thinking for Modern problem Solver!”, 4st Edition, CRC Press, 2021.
- 2 Brian W. Kernighan and Dennis Ritchie, “The C Programming Language” 5rd Edition, Pearson, 2020

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REFERENCE BOOKS

- 1 Paolo Ferragina and FabrizioLuccio, “Computational Thinking First Algorithms”, Then Code”, 1st Edition, Springer International Publishing, 2018.
- 2 ReemaThareja, “Programming in C", 2nd Edition, Oxford University Press, 2016.
- 3 Paul Deitel and Harvey Deitel, "C How to Program”, 7th Edition, Pearson Publication
- 4 Juneja, B. L and Anita Seth, “Programming in C”,1*t Edition, Cengage Learning India

EVALUATION PATTERN

Continuous Assessments					End Semester Examinations
Theory			Practical / Project		Theory
CIAT 1	CIAT 2	Activities	Evaluation of Student’s work, Observation, Record, etc.	Lab Test	
35%			15%		50%
15(60)	15(60)	5(40)	10(75)	5(25)	50(100)

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U26CS101	FUNDAMENTALS OF COMPUTING	CATEGORY:BSC				
		L	T	P	J	C
		3	0	0	0	3

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- Understand the fundamental digital logics behind computations of computer systems.
- Develop simple assembly language programs with respect to arithmetic operations.
- Understand the program execution process and basics of software development methodologies.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Infer the hidden languages and inner structures of computer hardware and software through codes and combinations.	Understand
CO2	Interpret the organizational and architectural issues of a digital computer with concepts of various data transfer techniques in digital computers and the I/O interfaces.	Understand
CO3	Analyze programming problems and apply assembly instructions to solve Simple problems.	Analyze
CO4	Infer the fundamentals of operating system and System programs basics.	Understand
CO5	Apply the software development methodologies to various real life scenarios.	Apply

CO-PO MAPPING

[illegible]

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SYLLABUS:

UNIT I CODES AND COMBINATIONS 8

Communication using Mores and Braille binary codes – Digitizing letters, numbers and objects using binary codes - Performing simple operations: addition through binary codes.

UNIT-II COMPUTATION USING COMPUTER 9

Communication to computing devices through various input sources - Computational operation - flow, functions and controls - communication to output devices - Basic communication protocol.

UNIT III ASSEMBLY LANGUAGE PROGRAMMING 11

Little Man Computing (LMC) Model-Instruction Set-Labels-Calculation-Branching-Input- Output - Loops - Simple programs.

UNIT IV OPERATING SYSTEM AND APPLICATION GENERATION 9

BIOS-Device Drivers-Resources-Scheduler-Applications Generation and Creation-Stages of Compilation - Linkers, Loaders and Libraries.

UNIT V SOFTWARE DEVELOPMENT 8

Phases of application life cycle management-Software Development Methodologies-Web Page development.

Total:45 Periods

Contact Periods:

Lecture: 45 Periods	Tutorial: - Periods	Practical: Periods	Total: 45 Periods
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TEXT BOOKS:

1. David Riley and Kenny A. Hunt, Computational Thinking for the Modern Problem Solver, 2nd Edition, Chapman & Hall/CRC, 2022.
- J. Glenn Brookshear and Dennis Brylow, Computer Science: An Overview, 13th Edition Pearson, 2021.

REFERENCE BOOKS

1. William Stallings, Computer Organization and Architecture: Designing for Performance, 11th Edition, Pearson, 2022.
- 3 . Randal E. Bryant and David R. O'Hallaron, Computer Systems: A Programmer's Perspective, 3rd Edition (Reprint), Pearson, 2021.
4. Harvey M. Deitel and Paul Deitel, Internet and World Wide Web: How to Program, 6th Edition (Reprint), Pearson, 2020

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EVALUATION PATTERN

Continuous Assessments			End Semester Examinations
CIAT 1	CIAT 2	Activities	
40%			60%
16(60)	16(60)	8(40)	60(100)

U26PH111	PHYSICS FOR COMPUTER SYSTEMS (Applicable for CSE, CSE(CS), IT & AI & DS)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- Explain the fundamental concepts of photonics, semiconductor materials, and magnetic materials.
- Understand the working principles of fibre optics and quantum physics in modern engineering applications.
- Apply the principles of lasers, semiconductor devices, and optical systems in solving basic engineering problems.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Explain the principles of photonics including reflection, refraction, and laser operation.	Understand
CO2	Analyze the working of optical fibres and their role in communication and sensing applications.	Analyze
CO3	Understand semiconductor physics and evaluate carrier transport and device behaviour.	Apply
CO4	Classify magnetic materials and explain their applications in modern devices.	Understand
CO5	Apply quantum mechanical principles to explain microscopic physical phenomena.	Apply

CO PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	—	—	2	—	—	—	—	—	—	—	—
CO2	3	3	2	2	3	1	—	—	—	—	—	—	—
CO3	3	3	2	2	3	—	—	—	—	—	—	—	—
CO4	3	2	2	—	2	1	—	—	—	—	—	—	—
CO5	3	3	—	2	2	—	—	—	—	—	—	—	—

Correlation Levels; 1.Slight (low) 2. Moderate (Medium) 3. Substantial (High)

UNIT -I PHOTONICS 6

UNIT-II FIBRE OPTICS AND APPLICATIONS 6

UNIT III SEMICONDUCTORS 6

UNIT IV MAGNETIC MATERIALS 6

UNIT V QUANTUM PHYSICS 6

LIST OF EXPERIMENTS :

- ### Contact Periods:

Lecture: 30 Periods Tutorial: - Periods Practical: 30 Periods **Total: 60 Periods**

B.Tech-IT-R2026-CBCS

TEXT BOOKS:

- 1 M.N. Avadhanulu, P.G. Kshirsagar, and T.V.S. Arun Murthy, "A Textbook of Engineering Physics", 11th edition, S. Chand Publishing, New Delhi, 2022.
- 2 Tamilarasan K and Prabu K, "Physics for Engineering I", 1st Edition, McGraw Hill Education Pvt. Ltd., New Delhi, 2023

REFERENCE BOOKS

- 1 Arthur Beiser Concepts of Modern Physics, "Concepts of Modern Physics", 7th edition, McGraw Hill, 2020.
- 2 Euth Ortiz Ortega, Hamed Hosseinian, Ingrid Berenice Aguilar Meza, Maria Jose Rosales Lopez, Andrea Rodriguez Vera, Samira Hosseini, "Material Characterization Techniques and Applications", Springer, 2022.
- 3 NPTEL, "Engineering Physics", Online Course, IIT, 2019.
- 4 SWAYAM, "Physics & Nanotechnology Courses", Online Platform, Govt. of India, 2019.

EVALUATION PATTERN

Continuous Assessments					End Semester Examinations
Theory			Practical / Project		Theory
CIAT 1	CIAT 2	Activities	Evaluation of Student's work, Observation, Record, etc.	Lab Test	
35%			15%		50%
15(60)	15(60)	5(40)	10(75)	5(25)	50(100)

B.Tech-IT-R2026-CBCS

U26ME121	ENGINEERING PRACTICES LABORATORY	CATEGORY : PCC				
		L	T	P	J	C
		0	0	4	0	2

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- The main learning objective of this course is to provide hands on training to the students in

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Draw pipe line plan; lay and connect various pipe fittings used in common house hold plumbing work; Saw; plan; make joints in wood materials used in common household woodwork.	Apply
CO2	Wire various electrical joints in common household electrical wire work.	Apply
CO3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	Apply
CO4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	Apply

CO PO MAPPING:

[illegible]

SYLLABUS:

GROUP – A

(CIVIL & ELECTRICAL)

PART I

CIVIL ENGINEERING PRACTICES

15

PLUMBING WORK:

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

WOOD WORK:

- a) Sawing.
- b) Planing.
- c) Making joints like T-Joint, Mortise joint, Tenon joint and Dovetail joint. Wood Work Study:
 - a) Studying joints in door panels and wooden furniture.
 - b) Studying common industrial trusses using models.

PART II

ELECTRICAL ENGINEERING PRACTICES

15

- a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
- b) Staircase wiring
- c) Fluorescent Lamp wiring with introduction to CFL and LED types.
- d) Energy meter wiring and related calculations/ calibration
- e) Study of Iron Box wiring and assembly
- f) Study of Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac)
- g) Study of emergency lamp wiring/Water heater

GROUP – B

(MECHANICAL AND ELECTRONICS)

PART III

MECHANICAL ENGINEERING PRACTICES

15

WELDING WORK:

- a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
- b) Practicing gas welding.

BASIC MACHINING WORK:

- a)(simple)Turning.
- b) (simple)Drilling.
- c)(simple)Tapping.

ASSEMBLY WORK:

- a)Assembling a centrifugal pump.
- b) Assembling a household mixer.
- c)Assembling an airconditioner.

SHEET METAL WORK:

- a)Making of a square tray

FOUNDRY WORK:

- a) Demonstrating basic foundry operations.

PART IV ELECTRONIC ENGINEERING PRACTICES

15

SOLDERING WORK:

- a)Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

- a)Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

- a)Study an elements of smart phone.
- b) Assembly and dismantle of LED TV.
- c)Assembly and dismantle of computer/ laptop

B.Tech-IT-R2026-CBCS

Contact Periods:

Lecture: 0

Tutorial: 0

Practical: 60 Periods

Total: 60 Periods

EVALUATION PATTERN:

Continuous Internal Assessments		End Semester Examinations (practical)	
		Test/Report Evaluation	Presentation & Viva
Evaluation of students work, Observation, Record, etc.	Lab test (model practical)		
45(100)	15(100)	30(80)	10(20)
60		40	
Total		100	

B.Tech-IT-R2026-CBCS

U26CS121	COMPUTER HARDWARE ESSENTIALS	CATEGORY : PCC				
		L	T	P	J	C
		0	0	4	0	2

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To introduce the fundamental components and architecture of personal computers
- To understand the role of BIOS, UEFI, and systems of hardware in hardware initialization and boot processes
- To explore device interfaces, drivers, and troubleshooting techniques for effective system maintenance.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Describe the architecture and functions of key PC hardware components including memory types, CPU, Understand.	Understand
CO2	Explain the role of BIOS/UEFI and system software in boot processes and hardware initialization Understand	Understand
CO3	Apply troubleshooting techniques and manage device interfaces and drivers for effective system Apply Maintenance.	Apply

CO PO MAPPING :

[illegible]

B.Tech-IT-R2026-CBCS

LIST OF EXPERIMENTS / EXERCISES:

- 1 Identification and Study of Basic PC Hardware Components
- 2 Hard Disk Partitioning and Disk Defragmentation
- 3 BIOS Setup and Boot Configuration
- 4 Creating a Bootable USB and Installing Windows OS
- 5 Installing Ubuntu OS and Configuring Dual Boot System
- 6 Assembling and Upgrading a PC System
- 7 Installing and Configuring Printers and Scanners
- 8 Setting Up External Devices and Peripherals
- 9 BIOS Update and Troubleshooting BIOS Issues
- 10 Diagnostic and Troubleshooting of PC Hardware Systems

Contact Periods:

Lecture: 30

Tutorial: 0

Practical: 30 Periods

Total: 30 Periods

EVALUATION PATTERN:

Continuous Internal Assessments		End Semester Examinations (practical)	
		Test/Report Evaluation	Presentation & Viva
Practical			
Evaluation of students work, Observation, Record, etc.	Lab test (model practical)		
45(100)	15(100)	30(80)	10(20)
60		40	
Total		100	

B.Tech-IT-R2026-CBCS

U26CS10 2	DIGITAL TECHNOLOGIES- I	CATEGORY : BSC				
		L	T	P	J	C
		1	0	0	0	1

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To explain the foundational concepts of AI, IoT, cloud, cybersecurity, and blockchain technologies
- To apply practical knowledge of OpenAI, RPA, and digital marketing strategies effectively
- To analyse interconnected smart systems, big data, and evolving digital landscapes

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Understand the foundational concepts of AI, ML, DL, and key OpenAI generative tools	Understand
CO2	Explain the interplay of AI, wearables, and big data in emerging technologies like the Metaverse and Edge Understand AI	Apply
CO3	Describe the key components and uses of IoT, cloud computing, and cybersecurity, including common Understand threats	Apply
CO4	Interpret the core principles and practical uses of blockchain, RPA, and digital marketing strategies-	Understand
CO5	Recognize the key concepts and applications of 3D printing, digital manufacturing, AR/VR, Metaverse, and Understand ethical considerations in AI	Remember

CO-PO MAPPING

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1	-	2	-	1	2	2	2	-	3
CO2	2	2	1	1	-	3	-	1	2	2	2	1	2
CO3	2	3	2	2	1	2	-	1	2	2	2	-	3
CO4	2	2	1	2	-	2	-	1	2	2	2	2	2
CO5	2	2	2	1	2	3	-	1	2	2	2	2	2

B.Tech-IT-R2026-CBCS

SYLLABUS:

UNIT -I MODERN ARTIFICIAL INTELLIGENCE AND OPEN AI TOOLS 6

An Overview of Artificial Intelligence - Introduction to Machine Learning and Deep Learning - ChatGPT- GPT 4 - OpenAI Tools: AI Text Classifier - OpenAI Tools: Point-E - Text to Image Generator - DALL-

UNIT-II MART SYSTEMS AND ANALYTICS 6

Intelligent Wearables - AI and Metaverse - Edge AI / TinyML - Evolution of Big Data Analytics -Applications of Big Data Analytics

UNIT III MART SYSTEMS AND ANALYTICS 6

Internet of Things - Applications of IoT - Industrial Internet of Things or IIoT - Digital Payments -Overview of Cloud Computing - Applications of Cloud Computing - Service Models in Cloud Computing - Overview of Cybersecurity - Applications of Cybersecurity - Types of Cyber Attacks - Data Privacy and User Data Control - Deepfake

UNIT IV DIGITAL INNOVATION AND AUTOMATION 6

Evolution of Blockchain - Applications of Blockchain in Finance Industry - Impact of Blockchain on Workforce & Workplace - Getting Started with Robotic Process Automation - Applications of Robotic Process Automation in Banking & Insurance Industry - Web, Mobile Development and Marketing - 5Ds of Digital Marketing - Digital Storytelling

UNIT V DIGITAL DESIGN AND RESPONSIBILITY 6

F3D Printing Modelling - Digital Manufacturing - Augmented Reality and Virtual Reality - Pre-requisites for Augmented Reality & Virtual Reality - Metaverse - Applications of Augmented Reality - Virtual Reality in - AI Ethics - Ethical Considerations of Generative AI

Total:30 Periods

TEXT BOOKS:

- 1 Faheem Syeed Masoodi, Zubair Sayeed Masoodi, Khalid Bashir Dar, "Digital and Technological Solutions: Exploring the Foundations of Digitization", 1st Edition, BPB Publications, 2024

REFERENCE BOOKS

- 1 Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach", 4th Edition, Pearson, 2020
- 2 Arshdeep Bahga, Vijay Madisetti, "Internet of Things: A Hands-On Approach" Universities Press, 2014

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EVALUATION PATTERN

Continuous Internal Assessments
Assessment 1 (100 Marks)
Total 100

B.Tech-IT-R2026-CBCS

U26MC101	Induction Program - Universal Human Values I (Common to all programmes)	Category				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- Understanding (or developing clarity) of the harmony in the human being, family, society, and nature/existence Strengthening of self-reflection
- Development of commitment and courage to act

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Recognize the essentials of human values and skills	Understand
CO2	Analyse connection between profession and happiness Understand	Understand
CO3	Develop appropriate technologies and management patterns to create harmony in family and society	Understand
CO4	Develop appropriate technologies and management patterns to create harmony in family and society	Understand
CO5	Demonstrate professional and ethical responsibility	Understand

CO-PO MAPPING

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	-	-	-	2	-	1	2	-	2	-	3
CO2	2	-	-	-	-	3	-	1	2	-	2	1	2
CO3	2	-	-	-	-	2	-	1	2	-	2	-	3
CO4	2	-	-	-	-	2	-	1	2	-	2	2	2
CO5	2	-	-	-	-	3	-	1	2	-	2	2	2

SYLLABUS:

UNIT -I INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT, AND PROCESS 9
FOR VALUE EDUCATION

Purpose and motivation for the course - Self-Exploration: what is it - Its content and process; 'Natural Acceptance' and Experiential Validation as the mechanism for self-exploration - Continuous Happiness and Prosperity - A look at basic Human Aspirations - Right understanding, Relationship, and Physical Facilities - the basic requirements for the fulfillment of aspirations of every human being with their correct priority - Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT-II HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF 9

Understanding human beings as a co-existence of the sentient 'I' and the material 'Body' - Understanding the needs of Self ('I') and 'Body' - Happiness and Convenience - Understanding the Body as an instrument of 'I' (I being the doer, seer, and enjoyer) - Understanding the harmony of I with the Body: Self-control and Welfare; correct appraisal of Physical needs - Meaning of Prosperity in detail - Programs to ensure Self-control and Welfare

UNIT III HARMONY IN THE FAMILY AND SOCIETY S 9

Understanding values in human - Human relationships; the meaning of Justice (nine universal values in relationships) and the program for its fulfillment to ensure satisfaction - Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust - Difference between intention and competence - Understanding the meaning of Respect - The Difference between respect and differentiation; and the other salient values in relationship - Understanding the harmony in the society (society being an extension of the family): Peace, Prosperity, Courage, and Coexistence as comprehensive Human Goals - Visualizing a universal harmonious order in society - Undivided Society - Universal Order from family to world family

UNIT IV HARMONY IN THE NATURE AND EXISTENCE 9

Understanding the harmony in Nature, Interconnectedness, and mutual fulfillment among the four orders of nature - Recyclability and self-regulation in nature - Understanding Existence as a Co-existence of mutually interacting units in an allpervasive space - Holistic perception of harmony at all levels of existence - Practice sessions to discuss human beings as the cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology, etc

UNIT V HARMONY ON PROFESSIONAL ETHICS 9

Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basic for Humanistic Education Humanistic Constitution, and Humanistic Universal Order Competence in professional ethics - Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people, friendly and eco-friendly production systems, and Ability to identify and develop appropriate technologies and management patterns for the above production systems

Total:45 Periods

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TEXT BOOKS:

- 1 RR Gaur, R. Asthana, GP Bagaria, A Foundation course in Human Values and Professional Ethics, 3rd Edition, Books, New Delhi, 2024

REFERENCE BOOKS

- 1 Ivan Illich, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA, 197

EVALUATION PATTERN:

Continuous Internal Assessments
Assessment 1 (100 Marks)
Total 100

U26TA01	தமிழர் மரபு / Heritage of Tamils (Common to all programmes)	CATEGORY :MCC				
		L	T	P	J	C
		1	0	0	0	1

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- Learn the extensive literature of classical Tamil
- Review the fine arts heritage of Tamil culture
- Realize the contribution of Tamils in Indian freedom struggle

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Understand the extensive literature of Tamil and its classical nature	Understand
CO2	Understand the heritage of sculpture, painting and musical instruments of ancient people	Understand
CO3	Review on folk and martial arts of Tamil people	Understand
CO4	Realization of Thinaï concepts, trade and victory of Chozha dynasty	Understand
CO5	Understand the contribution of Tamils in Indian freedom struggle, Self-esteem movement and siddha	Understand

CO-PO MAPPING:

[illegible]

B.Tech-IT-R2026-CBCS

SYLLABUS:

UNIT -I LANGUAGE AND LITERATURE

3

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

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

3

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

UNIT III FOLK AND MARTIAL ARTS

3

Tattooing, basket weaving, Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils .

UNIT IV THINAI CONCEPT OF TAMILS

3

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

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

3

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

Total:15 Periods

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EVALUATION PATTERN:

Continuous Internal Assessments
Assessment 1 (100 Marks)
Total 100

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U26CEC01	DESIGN THINKING	Category: MCC				
		L	T	P	J	C
		1	0	2	0	2

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To introduce the fundamental principles, mindset, and phases of Design Thinking for problem-solving.
- To develop the ability to understand user needs through empathy-driven research methods.
- To enable students to apply creative ideation and experimentation techniques for innovative solutions.
- To equip learners with skills to engage stakeholders and communicate ideas effectively.
- To provide knowledge on evaluating, refining, and implementing solutions using strategic and analytical tools.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Explain the principles, phases, and tools of Design Thinking and apply them to real-world problems .	Understand
CO2	Apply empathy-based techniques such as field observation, interviews, and persona development to identify user needs	Apply
CO3	Generate innovative ideas using ideation techniques like SCAMPER and develop prototypes.	Apply
CO4	Demonstrate effective communication through storytelling, storyboarding, and user engagement methods .	Apply
CO5	Analyze and evaluate solutions using strategic tools such as viability analysis, activity systems, and innovation frameworks	Analyze

CO-PO MAPPING:

[illegible]

B.Tech-IT-R2026-CBCS

SYLLABUS:

UNIT -I DESIGN THINKING

3

Key Principles and Mindset – Five Phases, Methods and Tools of Design Thinking – User Guide – Foundation Building for Design Thinking – Explore: Methods & Tools – STEEP Analysis – Strategic Priorities – Activity System – Stakeholder Mapping – Opportunity Framing.

UNIT-II EMPATHIZE

3

Methods & Tools – Field Observation – Deep User Interview – Empathy Map – User Journey Map - Need Finding – User Insights - User Persona Development.

UNIT III EXPERIMENT

3

Methods & Tools – Ideation – SCAMPER – Analogous Inspiration – Deconstruct & Reconstruct – User Experience Journey – Prototyping– Idea Refinement.

UNIT IV ENGAGE

3

Methods & Tools – Story Telling – Art of Story Telling – Storyboarding – Co-Creation with Users – Collect Feedback from Users.

UNIT V THE COMMUNICATION STAGE

3

Methods & Tools – Concept Synthesis – Strategic Requirements – Evolved Activity Systems – Activity System Integration – Viability Analysis – Innovation Tools using User Needs, CAP, 4S – Change Management - Quick Wins.

B.Tech-IT-R2026-CBCS

LIST OF EXPERIMENTS / PRACTICAL EXERCISES

1. Study and analysis of a real-world problem using STEEP Analysis.
2. Perform Stakeholder Mapping for a selected case study.
3. Develop an Activity System Map for an existing product/service.
4. Conduct Field Observation and document findings.
5. Perform a Deep User Interview and analyze responses.
6. Create an Empathy Map based on collected data.
7. Generate ideas using Brainstorming and SCAMPER techniques.
8. Apply Analogous Inspiration for innovative thinking.
9. Perform Deconstruct & Reconstruct exercise on an existing product.
10. Develop a Storytelling script for a design solution.
11. Create a Storyboard representing the user experience.
12. Conduct Co-creation sessions with users.
13. Perform Concept Synthesis for final solution design.
14. Define Strategic Requirements for implementation.
15. Develop an Evolved Activity System.

Total:45 Periods

TEXT BOOKS:

- 1 Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, HarperCollins Publishers Ltd., 2018

REFERENCE BOOKS

- 1 Roger Martin, The Design of Business: Why Design Thinking is the Next Competitive Advantage, Harvard Business Press, 2009

EVALUATION PATTERN:

Continuous Assessments					End Semester Examinations	
Theory			Practical / Project		Practical	
CIAT 1	CIAT 2	Activities	Evaluation of Student's work, Observation, Record, etc.	Lab Test	Test / Report Evaluation	Presentation & Viva
25%			25 %		50%	
10(30)	10(30)	5(40)	15(75)	10(25)	40(80)	10(20)

SEMESTER II

U26EN221	ENGLISH PROFICIENCY–II (common to all programs)	CATEGORY:HSMC				
		L	T	P	J	C
		0	0	2	0	1

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To develop students' ability to comprehend, analyze, and articulate complex ideas effectively.
- To enable students to use English proficiently for research, presentations, technical documentation, and collaborative projects.

COURSE OUTCOMES:

COURSE OUTCOMES:		BT Mapped (Highest Level)
On completion of the course, the students will be able to		
CO1	Interpret advanced texts ,research articles, and multimedia content to identify key ideas ,arguments, and perspectives.	Apply
CO2	To do clear and well-structured oral presentations that effectively communicate ideas in academic and workplace contexts.	Understand
CO3	Analyse research findings, interpret data and communicate results effectively through written and oral communication.	Analyze

CO PO MAPPING

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	-	2	-	-	-	-	-	2	3	-	-	-	2
CO2	1	2	-	-	-	-	1	2	2	-	-	1	2
CO3	1	3	-	3	-	-	-	3	3	-	1	1	3

Correlation Levels; 1.Slight (low) 2. Moderate (Medium) 3. Substantial (High)

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SYLLABUS:

10

UNIT -I LISTENING & SPEAKING SKILLS

Oral presentations: structuring arguments and persuasive speech - Listening comprehension: podcasts , interviews, and webinars analysis -Debatesandrole- playson contemporary issues.

UNIT-II MEDIA & LITERATURE EXPLORATION

10

Science communication - Multimedia content: analysing podcasts, TED Talks, and webinars - Film and documentary reviews: narrative techniques and critical perspectives.

UNIT III RESEARCH & PRESENTATION SKILLS

10

Conducting mini - research in labor field environments -Data interpretation and reporting findings in written and oral forms - Peer review sessions to enhance collaborative learning.

Contact Periods:

Lecture: 45 Periods

Tutorial: 15 Periods

Practical: - Periods

Total: 30 Periods

TEXT BOOKS:

1. Ur, Penny. A Course in English Language Teaching. 3rd ed., Cambridge University Press, 2024.
2. Harmer, Jeremy. The Practice of English Language Teaching. 6th ed., Pearson, 2024.

REFERENCES:

1. Markel, Mike H., and Stuart A. Selber. Technical Communication. 12th ed., Bedford/St. Martin's, 2023.
2. Hall, Lynn, and Leah Wahlin. A Guide to Technical Communications: Strategies & Applications. Ohio State University Libraries, 2021.

EVALUATION PATTERN:

Continuous Internal Assessments		End Semester Examinations (practical)	
		Test/Report Evaluation	Presentation & Viva
Practical			
Evaluation of students work, Observation, Record, etc.	Lab test (model practical)		
45(100)	15(100)	30(80)	10(20)
60		40	
Total		100	

B.Tech-IT-R2026-CBCS

U21EN221	CHEMISTRY FOR COMPUTER SYSTEMS (Applicable only for AI&DS, CSE,CSE (CS) and IT)	Category: BSC				
		L	T	P	J	C
		2	0	2	0	3

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To introduce materials chemistry relevant to computer hardware and electronics.
- To impart knowledge on electrochemical energy systems used in modern devices
- To understand nanomaterials, semiconductors and their applications in the engineering field.
- To create awareness about e-waste, its environmental impact and management practices.
- To familiarize insulating materials and their applications in electrical and electronic systems

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Explain the types and properties of materials used in computer hardware components.	(Apply)
CO2	Analyze the working of batteries, fuel cells and energy storage devices.	(Analyze)
CO3	Illustrate the basic concepts of semiconductors and nanomaterials and their applications.	(Apply)
CO4	Analyze e-waste management techniques and their environmental impact.	(Analyze)
CO5	Apply knowledge of insulating materials in electrical and electronic applications.	(Apply)

CO PO MAPPING

[illegible]

B.Tech-IT-R2026-CBCS

SYLLABUS

UNIT -I MATERIALS FOR HARDWARE 6

Types of materials – metals, plastics, ceramics – Conductors and insulators – Simple idea of semiconductors – Materials used in wires, chips and circuit boards – Thermal management materials in CPUs.

UNIT-II ELECTROCHEMISTRY AND ENERGY STORAGE DEVICES 6

Batteries – Types: dry cell, lithium-ion battery – Working principal of mobile and laptop batteries Charging and safety – Introduction to supercapacitors – Fuel cells – Energy storage in portable electronics and computers.

UNIT III SEMICONDUCTORS AND NANOMATERIALS 6

Intrinsic and extrinsic semiconductors – p-n junction – Introduction to semiconductor devices (diodes, transistors – concept only) – Types (0D, 1D, 2D) – Synthesis methods (top-down, bottom-up) – Properties and applications

UNIT IV E-WASTE AND ITS MANAGEMENT 6

Introduction, sources of e-waste, hazardous substances and their effects on environment and human health; e-waste handling rules, management, recycling and disposal treatment methods. Mechanism of extraction of precious metals from leaching solution; global and Indian e-waste scenario with case studies.

UNIT V INSULATING MATERIALS 6

Introduction - requirements - classification (Solid, Liquid & Gas) - solid inorganic insulators (glass, ceramics), organic insulator (epoxy resin), liquid insulator (transformer oil), and gas insulator (SF₆). - Electrical resistivity and factors affecting it- high-resistivity materials including molybdenum disilicide and nichrome—composition, characteristics, and uses- - molybdenum disilicide and nichrome - polymers an electrical insulators - non-polar polymers - polar polymers - polarization of polymers.

LIST OF EXPERIMENTS :

- 1 Estimation of total hardness of water by EDTA method.
- 2 Determination of rate of corrosion of mild steel by weight loss method.
- 3 Determination of chloride content in water samples by argentometric method.
- 4 Determination of pK_a of a weak acid using glass electrode (pH sensor).
- 5 Determination of strength of HCl acid by using pH meter.
- 6 Estimation of Ferrous iron by potentiometric Titration.
- 7 To find Viscosity of a Transparent Liquid (Virtual lab).(<https://bop-iitk.vlabs.ac.in/exp/liquid-viscosity/index.html>)

Contact Periods:

Lecture: 30 Periods

Tutorial: - Periods

Practical: 30 Periods

Total: 60 Periods

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TEXT BOOKS:

- 1 Engineering Chemistry, P. C. Jain & Trishla Jain, 2023, 17th Edition, Dhanpat Rai & Co. (P) Ltd., New Delhi. ISBN-13: 978-9352165728
- 2 Engineering Chemistry, S. S. Dara & S. S. Umare, 2022 Edition, S. Chand Publications, New Delhi. ISBN-13: 978-9352533241.

REFERENCE BOOKS

- 1 Friedrich Emich, "Engineering Chemistry", 2nd Edition, Scientific International Pvt. Ltd, New Delhi, 2014.
- 2 Prasanta Rath, "*Engineering Chemistry*", 1st Edition, Cengage Learning India, Pvt. Ltd, Delhi, 2015
- 3 V. Raghavan & J. R. Gopalakrishnan, *Engineering Chemistry*, McGraw-Hill Education.
- 4 Linden & Reddy, Handbook of Batteries, McGraw-Hill Education.
- 5 *Energy storage and conversion devices*, Anurag Gaur, A. L. Sharma, Anil Arya, 1st Edition, 2021, CRC Press, Taylor and Francis Group, ISBN: 9781003141761.
- 6 <https://nptel.ac.in/courses/113/104/113104008>
- 7 https://onlinecourses.nptel.ac.in/noc24_me34/preview%20%20
- 8 <https://www.vlab.co.in/broad-area-chemical-sciences>

EVALUATION PATTERN

Continuous Assessments					End Semester Examinations
Theory			Practical / Project		Theory
CIAT 1	CIAT 2	Activities	Evaluation of Student's work, Observation, Record, etc.	Lab Test	
35%			15%		50%
15(60)	15(60)	5(40)	10(75)	5(25)	50(100)

B.Tech-IT-R2026-CBCS

U26MA201	DISCRETE MATHEMATICS (Applicable for CSE,CSE(CS)& AI&DS,IT)	Category: BSC				
		L	T	P	J	C
		3	1	0	0	4

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- Understand fundamental concepts of discrete structures such as sets and relations.
- Develop logical reasoning and problem-solving skills using propositional and predicate logic.
- Apply combinatorial techniques and counting principles in real-world problems.
- Analyze graphs for modeling and solving computational problems.
- Use Algebraic structures and their applications in computer science.

COURSE OUTCOMES:

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Apply logical reasoning to solve computational problems	Apply
CO2	Solve combinatorial problems using counting techniques	Apply
CO3	Model and analyze problems using graph theory concepts.	Apply
CO4	Possess knowledge of various set theoretic concepts.	Understand
CO5	Understand algebraic structures and their applications.	Understand

CO PO MAPPING

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

Correlation Levels; 1.Slight (low) 2. Moderate (Medium) 3. Substantial (High)

SYLLBUS

UNIT -I LOGIC AND PROOFS 9

Propositional Calculus: Propositions – Logical connectives – Compound propositions – Conditional and bi conditional propositions – Truth tables – Tautologies and contradictions – Theory of Inference – Rules of inference – Arguments – Validity of arguments.

Predicate Calculus: Predicates – Statement function – Variables – Quantifiers – Universe of discourse – Theory of inference for Predicate calculus – Rules of universal specification and generalization – Rules of Existential specification and generalization – Validity of arguments.

UNIT-II COMBINATORICS 9

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions.

UNIT III GRAPHS 9

Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths-Dijkstra's shortest path algorithm – Warshall's algorithm

UNIT IV RELATIONS 9

Cartesian product of sets – Relations on sets – Types of relations and their properties – Matrix representation of a relation - Graph of a relation – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices – Properties of lattices.

UNIT V ALGEBRAIC STRUCTURES 9

Algebraic systems – Semi groups and monoids – Groups – Subgroups –Homomorphism's

Normal subgroup and cosets– Lagrange's theorem–Definitions and examples of Rings and Fields

Contact Periods:

Lecture: 45 Periods Tutorial: 15 Periods

Practical: - Periods

Total: 60 Periods

TEXT BOOKS:

1. T. Veerarajan, Discrete Mathematics, McGraw Hill Education (India) Pvt. Ltd., Reprint 2026
2. Discrete Mathematics and Its Applications, Kenneth H. Rosen ,8th Edition (2019),McGraw-Hill Education

REFERENCES:

1. Discrete Mathematics, S.Chandrasekaran, M.Umaparvathi, Latest edition (2018),PHI Learning
2. Discrete Mathematics with Applications, Susanna S.Epp, 4th Edition (reprint 2018),Cengage learning.
3. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", 5th Edition, Pearson Education, USA, 2019.

B.Tech-IT-R2026-CBCS**EVALUATION PATTERN:**

Continuous Assessments			End Semester Examinations
CIAT 1	CIAT 2	Activities	
40%			60%
16(60)	16(60)	8(40)	60(100)

B.Tech-IT-R2026-CBCS

U26IT201	IT ESSENTIALS	CATEGORY : PCC				
		L	T	P	J	C
		3	0	0	0	3

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- To provide foundational knowledge of computer hardware, data communication methods, networking concepts, and server classifications
- To enable students to design responsive web pages using HTML5 and CSS3 styling properties To introduce core programming constructs of JavaScript including data types, control structures, functions, and event-driven programming
- To familiarize students with ReactJS concepts such as components, state handling, lifecycle methods, and routing
- To examine mobile communication systems, information systems, and application design with privacy considerations

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Explain computer hardware, data transmission, and networking technologies	Understand
CO2	Design and develop web applications using HTML5 and CSS3	Create
CO3	Analyze JavaScript syntax, structures, and dynamic programming concepts	Apply
CO4	Demonstrate ReactJS components, state, lifecycle, and routing	Analyze
CO5	Explain mobile communication systems and application development factors	Understand

CO-PO MAPPING

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1	2	1	1	1	1	1	1	—	3
CO2	3	2	3	1	3	1	1	1	1	2	1	1	3
CO3	3	3	2	2	3	1	1	1	1	2	1	—	3
CO4	3	2	3	2	3	1	1	1	2	2	1	1	3
CO5	2	2	2	1	2	1	1	1	1	2	1	—	2

Correlation levels: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

B.Tech-IT-R2026-CBCS

HARDWARE AND NETWORK ESSENTIALS

9

UNIT -I

Basics of Computer System – Motherboard – Processors – Memory & Storage – Computer Ports – Memory Hierarchy – I/O Devices – Servers – Types of Servers – Web Server – Database Server – Communication Medium – Fundamentals of Computer Networking – Types of Computer Networks – Network Topologies – Network Standards (OSI Model, TCP/IP Model) – Network Components

UNIT-II WEB AND SCRIPTING ESSENTIALS

9

Internet Basics – Browser Fundamentals – Introduction to HTML5 – HTML5 Tags – HTML5 Forms – HTML Graphics – HTML Media – CSS3 Fundamentals – CSS Properties – CSS Styling (Background, Text, Fonts) – Lists and Tables – CSS ID and Class – Box Model – Positioning

UNIT III JAVASCRIPT

9

Introduction to JavaScript – Variables – Datatypes – Type Conversions – Comparisons – Assignments – Conditional Statements – Loops – Arrays – Functions – Built-in Methods – Function Expressions – Arrow Functions – Objects – Promises – Async/Await – Modules – Error Handling – DOM Tree – Event Handling – Event Delegation – Bubbling and Capturing

UNIT IV FRONT-END ESSENTIALS

9

ReactJS Introduction – JSX – Components and Props – React State – Component Lifecycle – React Hooks – Event Handling – React Forms – React CSS – React Router – State Management with Redux – Fetch API – Error Handling in React Applications

UNIT V MOBILE AND APPLICATION ESSENTIALS

9

Generations of Cellular Networks – GSM – Introduction to Information Systems – Personal Information Systems – Ethics and Privacy – Information Retrieval Systems – Relevance Feedback – Evaluation Techniques – Social Networking Applications

Total: 45 Periods

TEXT BOOKS:

- 1 James Kurose & Keith Ross, *Computer Networking: A Top-Down Approach*, 8th Edition, 2021
- 2 T. Greg Lim, *Beginning MERN Stack*, 2021
- 3 Jennifer Niederst Robbins, *Learning Web Design*, 5th Edition, 2018

REFERENCE BOOKS

- 1 Nabendu Biswas, *MERN Projects for Beginners*, 2021
- 2 Vasan Subramanian, *Pro MERN Stack*, 2019

B.Tech-IT-R2026-CBCS**EVALUATION PATTERN**

Continuous Assessments			End Semester Examinations
CIAT 1	CIAT 2	Activities	
40%			60%
16(60)	16(60)	8(40)	60(100)

B.Tech-IT-R2026-CBCS

	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	Category: PCC				
		L	T	P	J	C
		3	0	0	0	3

PRE-REQUISITES:

Nil

COURSE OBJECTIVES:

The course aims to

- To introduce the basics of electric circuits and analysis
- To impart knowledge in the basics of working principles and application of electrical machines
- To introduce analog devices and their characteristics
- To educate on the fundamental concepts of digital electronics
- To introduce the functional elements and working of measuring instruments

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Compute the electric circuit parameters for simple problems.	Apply
CO2	Explain the working principle and applications of electrical machines.	Understand
CO3	Analyze the characteristics of analog electronic devices.	Apply
CO4	Explain the basic concepts of digital electronics.	Understand
CO5	Explain the operating principles of measuring instruments.	Understand

CO PO MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	1	-	-	-	-	1	-	-	2	1	-
CO2	2	2	1	-	-	-	-	1	-	-	2	1	-
CO3	2	1	1	-	-	-	-	1	-	-	2	2	-
CO4	2	2	1	-	-	-	-	1	-	-	2	2	-
CO5	2	2	1	-	-	-	-	1	-	-	2	2	-

Correlation Levels; 1.Slight (low) 2. Moderate (Medium) 3. Substantial (High)

SYLLABUS:

UNIT -I ELECTRICAL CIRCUITS 9

DC Circuits: Circuit components – conductor, resistor, inductor, capacitor – Ohm’s law – Kirchhoff’s laws – independent and dependent sources– nodal analysis – mesh analysis with independent sources only. Introduction to AC circuits and parameters: waveforms – average value – RMS value – instantaneous value , real power, reactive power and apparent power, power factor – steady state analysis of RLC circuits.

UNIT-II ELECTRICAL MACHINES 9

Construction and working principle of DC Generator– EMF equation, types and applications. Working principle of DC motor –Torque Equation,types and applications. Construction, working principle and applications of Transformer, Alternator,Synchronous motor and Three phase Induction motors.

UNIT III ANALOG ELECTRONICS 9

Semiconductor materials: silicon and germanium – PN junction diode, Zener diode – characteristics and applications – BJT, JFET, SCR, MOSFET, IGBT-types,characteristics and applications. Rectifier and Inverters.

UNIT IV DIGITAL ELECTRONICS 9

Review of number systems ,binary codes ,error detection and correction codes, combinational logic – representation of logic functions – SOP and POS forms ,K-map representations – minimization using K-maps.

UNIT V MEASUREMENTS AND INSTRUMENTATION 9

Functional elements of an instrument – operating principle,types – moving coil and moving iron meters – measurement of three phase power, energy meter — DSO- block diagram – data acquisition.

Contact Periods:

Lecture: 45 Periods	Tutorial: -	Practical: -	Total: 45 Periods
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TEXT BOOKS

1. Kothari DP and I.J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020
2. S.K.Bhattacharya “Basic Electrical and Electronics Engineering”, Pearson Education, Second Edition, 2017.
3. A.K. Sawhney, PuneetSawhney ‘A Course in Electrical & Electronic Measurements & Instrumentation’, Dhanpat Rai and Co, 2015.

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REFERENCES:

1. Kothari DP and I.J Nagrath, “Basic Electrical Engineering”, Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, ‘Digital Fundamentals’, 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, ‘Electronic Principles, McGraw Hill Education; 7th edition, 2017

EVALUATION PATTERN:

Continuous Assessments			End Semester Examinations
CIAT 1	CIAT 2	Activities	
40%			60%
16(60)	16(60)	8(40)	60(100)

B.Tech-IT-R2026-CBCS

U26CS211	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION	CATEGORY:BSC				
		L	T	P	J	C
		3	0	2	0	4

PRE-REQUISITES:

Nil

COURSE OBJECTIVES:

- To understand the fundamentals of digital logic, Boolean algebra, and the design of combinational and sequential circuits.
- To gain knowledge of computer organization, including instruction execution, arithmetic operations, and processor architecture.
- To analyze memory systems, pipelining, and input/output organization in modern computer systems.

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Convert numbers between different number systems and simplify Boolean expressions using Boolean algebra and K-Map to realize logic functions using logic gates.	Apply
CO2	Design and analyze combinational and sequential circuits such as adders, subtractors, multiplexers, decoders, flip-flops, registers and counters.	Analyze
CO3	Explain the functional units of a computer system and perform arithmetic operations using addition, subtraction, multiplication and division algorithms.	Apply
CO4	Analyze processor organization, control unit design, pipelining hazards and memory hierarchy techniques including cache and virtual memory.	Analyze
CO5	Describe I/O organization, interrupt handling, DMA, bus arbitration and interconnection standards used for interfacing peripheral devices.	Understand

CO PO MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	-	-	2	-
CO2	3	3	2	-	2	-	-	-	1	-	-	2	1
CO3	3	2	1	-	-	-	-	-	-	-	-	2	-
CO4	2	3	2	1	1	-	-	-	-	-	-	2	1
CO5	2	2	1	-	1	-	-	-	-	-	-	1	-

Correlation Levels: 1.Slight (low) 2. Moderate (Medium) 3. Substantial (High)

B.Tech-IT-R2026-CBCS

SYLLABUS:

UNIT-I DIGITAL LOGIC FOUNDATIONS

9

Number Systems – Binary, Octal, Hexadecimal – Signed Binary Numbers – Binary Codes – Boolean Algebra: Basic Laws and Theorems – Logic Gates – Universal Gates (NAND, NOR) – Realization of Boolean Functions using Logic Gates.

UNIT-II DIGITAL CIRCUIT DESIGN

9

Canonical and Standard Forms – K-Map Simplification - Don't Care Conditions – Combinational Circuits: Adders, Subtractors, Multiplexers, Demultiplexers, Encoders, Decoders – Sequential Circuits: Flip-Flops, Registers, Counters – Shift Registers.

UNIT III COMPUTER SYSTEM ORGANIZATION

9

Functional Units of Computer – Instruction Cycle – Data Representation – Memory Locations and Addresses – RISC vs CISC – Arithmetic Operations: Addition and Subtraction – Fast Adders – Multiplication (Signed & Unsigned) – Division Algorithms – Floating Point Representation.

UNIT IV PROCESSING AND MEMORY ARCHITECTURE

9

Processor Organization – Instruction Execution – Control Unit (Hardwired Control) – Pipelining: Concepts, Stages, Hazards – Memory System: RAM, ROM – Cache Memory – Memory Mapping Techniques – Performance Considerations – Virtual Memory.

UNIT V I/O AND INTERFACING

9

Input/ Output Organization – Interrupts – DMA - Bus Structure – Bus Arbitration – Inter connection Standards (USB) – Handling Multiple Devices – Data Transfer Techniques.

Total: 30 Periods

LIST OF EXPERIMENTS / EXERCISES:

- 1 Simple I/O and arithmetic operations
- 2 Displaying sensor names and ranges
- 3 Writing simple math programs for basic mechanical formulas
- 4 Logic-based mechanical system emulation
- 5 Writing control logic for robot movement
- 6 Simulating conditional operations of an automated gate
- 7 File handling for sensor data logs
- 8 Storing sensor data in lists/dictionaries
- 9 Logging data from a virtual sensor to a CSV file
- 10 OOP-based actuator control mock-ups

Contact Periods:

Lecture: 45 Periods

Tutorial: -Periods

Practical: -Periods

Total: 45 Period

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TEXT BOOKS:

1. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, RISC-V Edition, 2nd Edition, Morgan Kaufmann, 2020.
2. Sarah Harris and David Harris, Digital Design and Computer Architecture: RISC-V Edition, 1st Edition, Morgan Kaufmann, 2021.

REFERENCE BOOKS:

1. J. Clark Scott, But How Do It Know? – The Basic Principles of Computers for Everyone, 2nd Edition, No Starch Press, 2020.
2. BehroozParhami, Computer Architecture: From Microprocessors to Supercomputers, Oxford University Press, 2020.
3. Sarah Harris and David Harris, Digital Design and Computer Architecture: RISC-V Edition, Morgan Kaufmann, 2021.
4. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, RISC-V Edition, 2nd Edition, Morgan Kaufmann, 2020.

EVALUATION PATTERN:

Continuous Assessments					End Semester Examinations
Theory			Practical / Project		Theory
CIAT 1	CIAT 2	Activities	Evaluation of Student's work, Observation, Record, etc.	Lab Test	
35 %			15 %		50%
15(60)	15(60)	5(40)	10(75)	5(25)	50(100)

B.Tech-IT-R2026-CBCS

U26CS201	Digital Technologies- II (For CSE, CSE(CS), IT & AI&DS)	CATEGORY : BSC				
		L	T	P	J	C
		1	0	0	0	1

PRE REQUISITES:

Nil

COURSE OBJECTIVES:

- To explain the foundational concepts of AI, IoT, cloud, cybersecurity, and blockchain technologies
- To apply practical knowledge of OpenAI, RPA, and digital marketing strategies effectively
- To analyse interconnected smart systems, big data, and evolving digital landscape

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Understand the foundational concepts of AI, ML, DL, and key OpenAI generative tools	Understand
CO2	Explain the interplay of AI, wearables, and big data in emerging technologies like the Metaverse and Edge Understand AI	Apply
CO3	Describe the key components and uses of IoT, cloud computing, and cybersecurity, including common Understand threats	Understand
CO4	Interpret the core principles and practical uses of blockchain, RPA, and digital marketing strategies-	Understand
CO5	Recognize the key concepts and applications of 3D printing, digital manufacturing, AR/VR, Metaverse, and Understand ethical considerations in AI	Remember

CO PO MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	3	1	1	-	-	-	-	-	-	-
CO2	3	3	3	2	3	2	1	-	-	-	-	-	-	-
CO3	3	3	3	2	3	3	2	-	-	-	-	-	-	-
CO4	2	3	3	2	3	2	2	-	-	-	-	-	-	-
CO5	2	2	3	2	3	3	3	-	-	-	-	-	-	-
Correlation levels:1:Slight(Low)2:Moderate(Medium) 3:Substantial(High)														

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SYLLABUS:

UNIT-I MODERN ARTIFICIAL INTELLIGENCE AND OPENAI TOOLS 3

An Overview of Artificial Intelligence- Introduction to Machine Learning and Deep Learning- Chat GPT-GPT4 - Open AI Tools:AI Text Classifier – Open AI Tools:Point-E-Text to Image Generator - DALL

UNIT - II MART SYSTEMSANDANALYTICS 3

Intelligent Wearables –AI and Metaverse–EdgeAI/ Tiny ML-Evolution of Big Data Analytics- Applications of Big Data Analytics

UNIT-III MART SYSTEMS AND ANALYTICS 3

Internet of Things - Applications of IoT - Industrial Internet of Things or IIoT - Digital Payments -Overview of Cloud Computing - Applications of Cloud Computing – Service Models in Cloud Computing - Overview of Cybersecurity - Applications of Cybersecurity - Types of Cyber Attacks - Data Privacy and UserDataControl- Deepfake

UNIT IV DIGITAL INNOVATION AND AUTOMATION 3

Evolution of Blockchain - Applications of Blockchain in Finance Industry - Impact of Blockchain on Workforce & Workplace - Getting Started with Robotic Process Automation - ApplicationsofRoboticProcessAutomationinBanking&InsuranceIndustry- Web,MobileDevelopmentandMarketing-5DsofDigitalMarketing-DigitalStorytelling

UNIT V DIGITALDESIGNAND RESPONSIBILITY 3

F3DPrintingModelling- DigitalManufacturing-AugmentedRealityandVirtualReality-Pre-RequisitesforAugmentedReality&VirtualReality-Metaverse-ApplicationsofAugmented Reality - Virtual Reality in - AI Ethics - Ethical Considerations of Generative AI.

Contact Periods

Lecture: 15 Periods Tutorial: -Periods Practical: -Periods Total: 15 Periods

EVALUATION PATTERN

Continuous Internal Assessments
Assessment 1 (100 Marks)
Total 100

B.Tech-IT-R2026-CBCS

U26MC201	Induction Program - Universal Human Values II (Common to all programmes)	CATEGORY : BSC				
		L	T	P	J	C
		1	0	0	0	0

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

- Understanding (or developing clarity) of the harmony in the human being, family, society, and nature/existence Strengthening of self-reflection
- Development of commitment and courage to act

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Recognize the essentials of human values and skills	Understand
CO2	Analyse connection between profession and happiness Understand	Understand
CO3	Develop appropriate technologies and management patterns to create harmony in family and society	Understand
CO4	Develop appropriate technologies and management patterns to create harmony in family and society	Understand
CO5	Demonstrate professional and ethical responsibility	Understand

UNIT -I INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT, AND PROCESS 9 FOR VALUE EDUCATION

Purpose and motivation for the course - Self-Exploration: what is it - Its content and process; 'Natural Acceptance' and Experiential Validation as the mechanism for self-exploration - Continuous Happiness and Prosperity - A look at basic Human Aspirations - Right understanding, Relationship, and Physical Facilities - the basic requirements for the fulfillment of aspirations of every human being with their correct priority - Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT-II HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF 9

Understanding human beings as a co-existence of the sentient 'I' and the material 'Body' - Understanding the needs of Self ('I') and 'Body' - Happiness and Convenience - Understanding the Body as an instrument of 'I' (I being the doer, seer, and enjoyer) - Understanding the harmony of I with the Body: Self-control and Welfare; correct appraisal of Physical needs - Meaning of Prosperity in detail - Programs to ensure Self-control and Welfare

B.Tech-IT-R2026-CBCS

UNIT III HARMONY IN THE FAMILY AND SOCIETY S

9

Understanding values in human - Human relationships; the meaning of Justice (nine universal values in relationships) and the program for its fulfillment to ensure satisfaction - Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust - Difference between intention and competence - Understanding the meaning of Respect - The Difference between respect and differentiation; and the other salient values in relationship - Understanding the harmony in the society (society being an extension of the family): Peace, Prosperity, Courage, and Coexistence as comprehensive Human Goals - Visualizing a universal harmonious order in society - Undivided Society - Universal Order from family to world family

UNIT IV HARMONY IN THE NATURE AND EXISTENCE

9

Understanding the harmony in Nature, Interconnectedness, and mutual fulfillment among the four orders of nature - Recyclability and self-regulation in nature - Understanding Existence as a Co-existence of mutually interacting units in an allpervasive space - Holistic perception of harmony at all levels of existence - Practice sessions to discuss human beings as the cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology, etc

UNIT V HARMONY ON PROFESSIONAL ETHICS

9

Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basic for Humanistic Education Humanistic Constitution, and Humanistic Universal Order Competence in professional ethics - Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people, friendly and eco-friendly production systems, and Ability to identify and develop appropriate technologies and management patterns for the above production systems - Case studies of typical holistic technologies, management models, and production systems - Strategy for a transition from the present state to Universal Human Order - At the level of the individual: as socially and ecologically responsible engineers, technologists, and managers - At the level of society: as mutually enriching institutions and organizations

Total:45 Periods

TEXT BOOKS:

- 1 RR Gaur, R. Asthana, GP Bagaria, A Foundation course in Human Values and Professional Ethics, 3rd Edition, Books, New Delhi, 2024

REFERENCE BOOKS

- 1 Ivan Illich, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA, 197

EVALUATION PATTERN:

Continuous Internal Assessments
Assessment 1 (100 Marks)
Total 100

B.Tech-IT-R2026-CBCS

26TA201	தமிழரும் தொழில்நுட்பமும் Tamils and Technology (For CSE, CSE(CS), IT & AI&DS)	CATEGORY : BSC				
		L	T	P	J	C
		1	0	0	0	1

PRE-REQUISITES:

- Nil

COURSE OBJECTIVES:

To learn weaving, ceramic and construction technology of Tamils

To understand the agriculture, irrigation and manufacturing technology of Tamils

To realize the development of scientific Tamil and Tamil computing

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Understand the weaving and ceramic technology of ancient Tamil people nature	Understand
CO2	Understand the construction technology, building materials in Sangam period and case studies	Understand
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence	Understand
CO4	Realize the agriculture methods, irrigation technology and pearl diving	Understand
CO5	Apply the knowledge of scientific Tamil and Tamil computing	Understand

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

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

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

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

UNIT III MANUFACTURING TECHNOLOGY**3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel, Copper and gold - Coins as source of history 3 - Minting of Coins - Beads making-industries Stone beads - Glass beads - Terracotta beads - Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY**3**

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

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UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

3

Development of Scientific Tamil - The role of journals in the development of scientific Tamil - Scientific Tamil vocabulary - Tamil computing - Digitalization of Tamil Books - Development of Tamil Software - Tamil Virtual Academy - Tamil Digital Library - Online Tamil Dictionaries - Sorkuvai Project

Total:15 Periods

TEXT BOOKS:

- 1 Tamils and Technology, K. Jayanthi Ravikrishna, Sri Krishna publications, Mahalakshmi Nagar, Velappanchavadi, Chennai - 600 007, First Edition 2023
- 2 Tamils and Technology, S. Priyadharshini, V. K. Publications, 55, Gopuram Colony, Sivakasi - 626 124

EVALUATION PATTERN:

Continuous Internal Assessments
Assessment 1 (100 Marks)
Total 100

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U26CS212	PROBLEM SOLVING USING PYTHON PROGRAMMING (FOR CSE, CSE(CS), IT & AI&DS)	CATEGORY : BSC				
		L	T	P	J	C
		2	0	2	0	3

COURSE OBJECTIVES:

- To understand basic programming concepts using Python
- To apply Python for solving Mechatronics problems involving sensors, actuators, and automation
- To build logical thinking and problem-solving skills applicable to real-world engineering systems

COURSE OUTCOMES: On completion of the course, the students will be able to		BT Mapped (Highest Level)
CO1	Apply basic Python programming constructs using IDEs to develop simple applications	(Understand)
CO2	Apply control structures and user-defined functions to solve computational problems using Python	(Understand)
CO3	Apply Python data structures and file handling techniques to manage and process data effectively	(Apply)
CO4	Apply concepts of object - oriented and modular programming in Python	(Analyze)
CO5	Analyze sensor data and system responses using Python libraries such as NumPy and Matplotlib	(Understand)

CO-PO MAPPING

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	2	-	-	1	2	2	-	2	3	-
CO2	3	3	2	2	2	-	-	1	2	2	-	2	3	-
CO3	3	2	2	2	2	-	-	1	2	2	-	2	3	1
CO4	3	2	2	2	2	-	-	1	2	2	-	2	3	1
CO5	2	3	2	2	3	1	-	1	2	2	-	2	2	2

Correlation levels: 1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

UNIT -I INTRODUCTION TO PYTHON PROGRAMMING & DEVELOPMENT TOOLS 6

History and features of Python - Python IDEs: Thonny, PyCharm, Jupyter - Data types: Numbers, Strings, Lists, Tuples, Sets, Dictionaries - Variables, Constants, Operators, Expressions - Input and Output functions - Type casting and basic programs

UNIT-II CONTROL STRUCTURES AND FUNCTIONS 6

Decision Making: if, if-else, elif -Loops: while, for, range) - Loop control: break, continue, pass - Functions: definition, arguments, return values - Scope and recursion

UNIT III PYTHON DATA STRUCTURES AND FILE HANDLING 6

Lists: operations, slicing, methods - Dictionaries: creation, methods - Sets and Tuples - File handling: opening, reading.

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UNIT IV OBJECT-ORIENTED PROGRAMMING AND MODULES 6

Classes and Objects - Constructor and Destructor- Inheritance and Polymorphism - Creating and importing modules Exception handling

UNIT V INTRODUCTION TO MECHATRONICS APPLICATIONS USING PYTHON 6

Introduction to interfacing with hardware (simulation or via PySerial) - Basics of numpy and matplotlib for data visualization - Plotting sensor data Simple control system simulation - Basic AI models - Mini project: line follower algorithm logic/ temperature control system

Total:30 Periods

LIST OF EXPERIMENTS / EXERCISES:

- 1 Simple I/O and arithmetic operations
- 2 Displaying sensor names and ranges
- 3 Writing simple math programs for basic mechanical formulas
- 4 Logic-based mechanical system emulati
- 5 Writing control logic for robot movement
- 6 Simulating conditional operations of an automated gate
- 7 File handling for sensor data logs
- 8 Storing sensor data in lists/dictionaries
- 9 Logging data from a virtual sensor to a CSV file
- 10 OOP-based actuator control mock-ups

Total:30 Periods

TEXT BOOKS:

1. Reema Thareja, Python Programming: Using Problem Solving Approach, 3rd edition, Oxford University Press, New Delhi, 2023
2. John V. Guttag, 2. John V. Guttag, Introduction to Computation and Programming Using
3. Python, 3rd edition, MIT Press, Cambridge, Massachusetts, 2021

REFERENCE BOOKS

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", Updated for Python 3, 2nd edition, Shroff/O'Reilly Publishers, Mumbai, 2016
2. obert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", 1st edition, Pearson India Education Services Pvt. Ltd., Bengaluru, 2016

B.Tech-IT-R2026-CBCS**EVALUATION PATTERN:**

Continuous Assessments					End Semester Examinations
Theory			Practical / Project		Theory
CIAT 1	CIAT 2	Activities	Evaluation of Student's work, Observation, Record, etc.	Lab Test	
35%			15%		50%
15(60)	15(60)	5(40)	10(75)	5(25)	50(100)