



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSH102	BS	Statistics, Probability and Calculus	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

- To introduce fundamental concepts of statistics and probability.

COURSE ALIGNMENT WITH UNSDG:

“The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education).**”

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Collect and classify primary and secondary data for statistical analysis.
- CO2** Calculate and interpret measures of central tendency and dispersion.
- CO3** Apply Bayes' Theorem and probability distributions to solve real-world problems.
- CO4** Evaluate mathematical expectations, moments, and moment-generating functions.
- CO5** Solve problems involving integration and differentiation, including multiple integrals.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments
- ATL7** Poster
- ATL8** Oral Viva-voce examination
- ATL9** Industrial Visit Report

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PREREQUISITES:

Basic Mathematics

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Statistics: Definition and objectives of Statistics. Applications in Science. Collection of Data: Internal/External, Primary/Secondary. Population, Sample, and Representative Sample	9	ATL1 ATL3
II	Descriptive Statistics: Classification and Tabulation of Univariate Data. Graphical Representation and Frequency Curves. Measures of Central Tendency and Dispersion. Bivariate Data Summarization.	9	ATL1 ATL3 ATL6
III	Probability Theory: Experiments, Sample Space, and Events. Combinational and Conditional Probability. Bayes Theorem. Discrete & Continuous Distributions (Binomial, Poisson, Geometric, Normal, Chi-Square, T, F).	9	ATL1 ATL3 ATL6 ATL8
IV	Expected Values & Moments: Mathematical Expectation and its Properties. Variance and Moments. Interpretation of results. Moment Generating Functions.	9	ATL1 ATL3
V	Calculus: Basic Concepts of Differential and Integral Calculus. Application of Double and Triple Integrals in engineering contexts.	9	ATL1 ATL3 ATL8
TOTAL		45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

MIT OpenCourseWare, “MIT RES.6-012 Introduction to Probability, Spring 2018,” YouTube playlist. (Apr. 24, 2018). [Online]. Available:

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<https://www.youtube.com/playlist?list=PLUI4u3cNGP60hI9ATjSFgLZpbNJ7myAg6>.

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. S. M. Ross, *Introduction to Probability Models*. New York, NY, USA: Academic Press.
2. A. M. Goon, M. Gupta, and B. Dasgupta, *Fundamentals of Statistics*, Vols. I & II. Kolkata, India: World Press.

REFERENCE BOOKS:

1. B. S. Grewal, *Higher Engineering Mathematics*, 44th ed. New Delhi, India: Khanna Publishers, 2017.
2. S. M. Ross, *A First Course in Probability*, 10th ed. Upper Saddle River, NJ, USA: Prentice Hall, 2018.
3. I. R. Miller, J. E. Freund, and R. Johnson, *Probability and Statistics for Engineers*, 4th ed. New Delhi, India: PHI Learning, 2010.
4. A. M. Mood, F. A. Graybill, and D. C. Boes, *Introduction to the Theory of Statistics*, 3rd ed. New York, NY, USA: McGraw-Hill Education, 1974.
5. P. V. O'Neil, *Advanced Engineering Mathematics*, 7th ed. Stamford, CT, USA: Thomson Learning, 2011.
6. M. D. Greenberg, *Advanced Engineering Mathematics*, 2nd ed. Upper Saddle River, NJ, USA: Pearson Education, 1998.
7. P. N. Wartikar and J. N. Wartikar, *Applied Mathematics*, vols. I & II. Pune, India: Vidyarthi Prakashan, 1992.

Suggested e- resources (Websites/e- books)

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma139

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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSO _s		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	-	3	2	-	-	1	-	-	-	2	1	3	-
CO2	3	3	1	2	2	-	-	-	-	-	-	2	1	3	-
CO3	3	3	3	2	-	1	-	-	-	-	-	2	2	3	2
CO4	3	3	2	-	-	-	-	-	-	-	-	1	1	3	-
CO5	3	3	2	2	-	-	-	-	-	-	-	2	2	2	-

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BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability:

- To understand the basics of computers including hardware, software, how data is stored, and how operating systems manage daily tasks.
- To learn step-by-step problem solving using simple blocks of computational thinking, flowcharts, and basic algorithms.
- To get a friendly introduction to AI, Cyber security and Ethics.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply computational thinking frameworks and algorithmic design techniques to formulate structured solutions for engineering problems.
- CO2** Analyze fundamental AI paradigms, network architectures, and information security threats to determine appropriate use cases and defensive mechanisms.
- CO3** Evaluate digital ethics frameworks, algorithmic biases, and data privacy regulations to propose responsible technology implementations.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
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- ATL7 Poster
 ATL8 Oral Viva-voce examination
 ATL9 Industrial Visit Report

PREREQUISITES:

None

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Foundations of Computational Thinking & Logic Computational Thinking Framework: decomposition, pattern recognition, abstraction, algorithmic design. Engineering Problem-Solving methodologies. Logical Control Structures: sequence, selection, iteration. Error Classification: syntax vs. logical errors. Systematic Debugging strategies	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
II	Algorithmic Design & Problem Representation Diagrammatic Problem Solving with flowchart symbols, Structural Flowcharting for linear, conditional, and repetitive scenarios. Pseudo-code conventions and structured representation. Logic Translation: Flowcharts to pseudocode. Algorithmic Evaluation: correctness and efficiency	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination))
III	Artificial Intelligence Paradigms Historical Foundations, Core Concepts, Machine Learning Paradigms: Supervised and Unsupervised Learning. Introduction to Data Science and applications. Key AI Domains: Natural Language Processing (NLP), Computer Vision, Machine Translation and Indian Knowledge Systems (IKS).	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
IV	Cybersecurity, Information Security Computer Networks: LAN, WAN, Network Interconnecting Devices. Cybersecurity Threats: Viruses, Worms, Trojan Horses, Malware. Defensive Mechanisms: Firewalls, Antivirus Software,	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce

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	Secure Password Practices, Safe Browsing Protocols.		Examination)
V	Digital Ethics Data Pipeline, Algorithmic Fairness, Accountability, Data Privacy, Prevention of Algorithmic Bias. Generative AI and Intellectual Property: Copyright & Ownership, Hallucinations & Misinformation	9	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
	Total Hours	45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.youtube.com/watch?v=S-7LrggTfA8&list=PLZ2ps_7DhBYSzaAFqpyQKqmoni-EefS7 (IIT Madras)

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

- V. Rajaraman, *Fundamentals of Computers*, 6th ed. New Delhi, India: PHI Learning, 2014.
- R. Thareja, *Computer Fundamentals and Programming in C*, 2nd ed. Oxford, UK: Oxford University Press, 2016

Reference Books

- M. Bishop, *Computer Security: Art and Science*, 2nd ed., Boston, MA: Addison-Wesley, 2019.
- S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed., Upper Saddle River, NJ: Pearson, 2021.
- J. Wing, *Computational Thinking*, Cambridge, MA: MIT Press, 2017.
- P. Denning and M. Tedre, *Computational Thinking*, Cambridge, MA: MIT Press, 2019.
- D. Leslie, *Ethics of Artificial Intelligence: A Framework for Fairness, Transparency, and Accountability*, London: Alan Turing Institute, 2020.

Suggested e- resources (Websites/e- books)

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1. Ethics of AI Bias https://www.youtube.com/watch?v=NgaW_p7gsRc [MIT OCW]
2. <https://teachablemachine.withgoogle.com/>

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcome s	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	1	1		2							1	3	1	
CO 2	2	1			2	1						1	1	3	2
CO 3					1	3	1	3		1		2	1	2	1

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B. TECH CSE (AIML-Microsoft)

SEMESTER-I (2026-2030)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSAIML102	DCC	Python for AIML	Max	60	20	20	30	20	3	0	2	4
			Min	0	0		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the fundamentals of Python programming and problem-solving techniques.
2. To understand data structures, functions, exception handling and object-oriented concepts in Python.
3. To impart data analysis, visualization, automation and advanced Python concepts for AI/ML applications.

COURSE ALIGNMENT WITH UNSDG:

“The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education).**”

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Understand Python programming language syntax, semantics and core programming concepts.
- CO2** Apply data structures, functions, file handling and exception handling in Python programs.
- CO3** Develop programs using object-oriented programming and advanced Python features.
- CO4** Perform data analysis and visualization using NumPy, Pandas, Matplotlib and Seaborn.
- CO5** Build real-time applications, automation tools and basic AI/ML solutions using Python.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
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PREREQUISITES:

Basic computer literacy, including familiarity with operating systems, file management, keyboard usage, and internet browsing.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Python Fundamentals & Control Structures: Introduction to Python, History and Features of Python, Installation and IDE Setup, Python Syntax, Variables, Data Types, Keywords, Identifiers, Operators, Input/Output Statements, Comments, Indentation, Type Casting. Decision Making Statements: if, if-else, nested if, elif ladder. Looping Statements: for loop, while loop, nested loops, break, continue, pass. Strings: String creation, indexing, slicing, string methods, formatting.	9	ATL1 ATL3
II	Data Structures, Functions & Exception Handling: Python Data Structures: List, Tuple, Set, Dictionary and operations. Functions: Types of Functions, Arguments, Return Statement, Lambda Functions, Recursion, Scope of Variables, Docstrings. Modules and Packages. Exception Handling: Errors, Exceptions, try-except, try-except-else, finally, raise exception. File Handling: Read, Write, Append files, CSV and Text files.	9	ATL2 ATL3 ATL6

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Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

III	NumPy, Pandas & Data Visualization: NumPy Arrays: Creating Arrays, Indexing, Slicing, Reshaping, Transpose, Mathematical Operations, Statistical Functions. Pandas: Series, DataFrames, Data Cleaning, Missing Values, Merge, Join, Concatenate, Reading/Writing CSV. Data Visualization using Matplotlib and Seaborn: Line Chart, Bar Graph, Histogram, Scatter Plot, Pie Chart, Box Plot, Heatmap, Pair Plot.	9	ATL1 ATL3 ATL6
IV	Object Oriented Programming & Advanced Python: Classes and Objects, Constructors, Inheritance, Polymorphism, Encapsulation, Method Overriding. Advanced Concepts: Iterators, Generators, Decorators, Anonymous Functions, List Comprehension, Dictionary Comprehension. Regular Expressions. Multithreading Basics.	9	ATL1 ATL3
V	Python for AI, Automation & Real-Time Applications: Python for AI/ML Introduction. Libraries Overview: Scikit-learn, TensorFlow, OpenCV basics. Web Scraping using BeautifulSoup. Automation using Python Scripts. API Handling using Requests Module. Mini Projects: Chatbot, Data Analysis Dashboard, File Automation, Simple Prediction Model.	9	ATL1 ATL3 ATL8
Total Hours		45	

A. Value addition to course content/ Skill enhancement content:

<https://www.youtube.com/watch?v=xAcTmDO6NTI&list=PLU14u3cNGP62A-ynp6v6-LGBCzeH3VAQB>

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. TECH CSE (AIML-Microsoft)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSAIML102	DCC	Python for AIML	Max	60	20	20	30	20	3	0	2	4
			Min	0	0		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

1. *Python QuickStart 2026: A Practical Beginner's Guide to Python Programming with Real-World Coding Applications*. Seattle, WA, USA: Amazon Digital Services, 2026.
2. L. Porter and D. Zingaro, *Learn AI-Assisted Python Programming: With GitHub Copilot and ChatGPT*, 2nd ed. Shelter Island, NY, USA: Manning Publications, 2026.

REFERENCE BOOKS

1. F. Romano, *Learn Python Programming: A Comprehensive, Up-to-Date, and Definitive Guide to Learning Python*, 4th ed. Birmingham, UK: Packt Publishing, 2024. [Online]. Available: IEEE Xplore, <https://ieeexplore.ieee.org/document/10780975/>
2. *Python Programming: A Modular Approach*, 2nd ed. Boston, MA, USA: Educational Print Solutions, 2026.
3. M. L. Hetland and F. Nelli, *Beginning Python: From Novice to Professional*, 4th ed. Berkeley, CA, USA: Apress, 2024. [Online]. Available: SpringerLink, <https://link.springer.com/book/10.1007/979-8-8688-0196-9>

Suggested e- resources (Websites/e- books)

1. <https://www.python.org>
2. <https://www.edube.org>

LIST OF PRACTICAL

S. No	Title	CO Mapping
1	Write a Python program to perform arithmetic operations using operators.	CO1
2	Program to find the largest among three numbers using if-else.	CO1
3	Program to check whether a number is prime or not.	CO1
4	Program to generate Fibonacci series using loop.	CO1
5	Program to print patterns using nested loops	CO1
6	Program to perform list operations (append, remove, sort).	CO1
7	Program to create and manipulate dictionary.	CO1
8	Program to perform set operations (union, intersection).	CO1
9	Program using user-defined functions for calculator operations.	CO1
10	Program using recursion to find factorial of a number.	CO1
11	Program for file handling (read, write, append).	CO2
12	Program for exception handling using try-except-finally.	CO1

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B. TECH CSE (AIML-Microsoft)

SEMESTER-I (2026-2030)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSAIML102	DCC	Python for AIML	Max	60	20	20	30	20	3	0	2	4
			Min	0	0		14	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

13	Program to create NumPy array and perform arithmetic operations.	CO1
14	Program for matrix multiplication using NumPy.	CO1
15	Program to find mean, median and standard deviation using NumPy.	CO1
16	Program to create Pandas Series and DataFrame.	CO3
17	Program to read CSV file and display dataset summary.	CO3
18	Program to handle missing values using Pandas	CO3
19	Program to plot line chart and bar graph using Matplotlib.	CO3
20	Program to create histogram and scatter plot.	CO3
21	Program to create class and object for student details.	CO3
22	Program to demonstrate inheritance and polymorphism.	CO3
23	Program using list comprehension and lambda function.	CO5
24	Program using regular expressions for email/mobile validation.	CO5
25	Mini Project: Student Result Analysis / File Automation / Chatbot using Python.	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	2	2	3	1	3	-	-	-	-	2	-	1	3	2	2
CO2	2	2	3	1	3	-	-	-	-	2	-	1	3	2	2
CO3	3	3	3	2	3	-	-	-	-	2	-	1	3	3	3
CO4	2	2	2	2	3	1	-	1	-	2	-	1	2	3	2
CO5	2	2	3	1	3	-	-	-	2	3	-	1	2	3	2

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B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Identify situations where computational methods and computers would be useful.
2. Given a computational problem, identify and abstract the programming task involved.
3. Approach the programming tasks using techniques learned and write pseudo-code.
4. Choose the right data representation formats based on the requirements of the problem.
5. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand
6. Write the program on a computer, edit, compile, debug, correct, recompile and run it.
7. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Understand the basic terminologies used in computer programming.
- CO2** Proficient in using the basic constructs of C, to develop a computer program.
- CO3** Understand the use of functions, pointers, arrays and files in programming.
- CO4** Understand the fundamentals of procedure-oriented programming and be able to apply it in computer program development.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments
- ATL7** Poster

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

None

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Programming Languages: Evolution of Programming Languages, Structured Programming, The Compilation Process, Object Code, Source Code, Executable Code, Operating Systems, Interpreters, Linkers, Loaders, Fundamentals Of Algorithms, Flowcharts.	6	ATL1 ATL4 ATL8
II	Introduction to 'C' Language: Character Set. Variables and Identifiers, Built-In Data Types. Variable Definition, Arithmetic Operators and Expressions, Constants And Literals, Simple Assignment Statement, Basic Input/ Output Statement, Decision Making Within A Program, Conditions, Relational Operators, Logical Connectives, If Statement, If-Else Statement, Loops: While Loop, Do While, For Loop. Nested Loops, Switch Statement.	6	ATL1 ATL4 ATL8
III	Arrays and Pointers: Array Manipulation; Searching, Insertion, Deletion of an Element from an one dimensional Array; Finding the Largest/Smallest Element in an Array; Two Dimensional Arrays, Addition/Multiplication of Two Matrices, Transpose of a Square Matrix, Address Operators, Pointer Type Declaration, Pointer Assignment, Pointer Initialization, Pointer Arithmetic, Pointer Arrays.	6	ATL1 ATL4 ATL8
IV	Functions: Modular Programming and Functions, Prototype of a Function: Parameter List, Return Type, Function Call, Block Structure, Call by Reference, Call by Value, Recursive Functions and Arrays as Function Arguments.	6	ATL1 ATL4 ATL8

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B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

V	Structure: Structure Variables, Initialization, Structure Assignment, Structures and Arrays: Arrays of Structures.	6	ATL1 ATL4 ATL8
	Total Hours	30	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

<https://www.youtube.com/watch?v=48S8Bsh4V2w>

B. Assignments & Coding Problems:

MIT OCW 6.S096 Problem Sets

C. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. B. S. Gottfried, Programming with C, 2nd ed. New Delhi, India: Tata McGraw-Hill, 2006.
2. Head First C: A Brain-Friendly Guide

REFERENCE BOOKS:

1. A. B. Tucker, Programming Languages, 2nd ed. New Delhi, India: Tata McGraw-Hill, 1986.
2. T. W. Pratt and M. V. Zelkowitz, Programming Languages: Design and Implementation, 4th ed. New Delhi, India: Prentice Hall of India, 2001.
3. H. Schildt, C: The Complete Reference, 4th ed. New Delhi, India: Tata McGraw-Hill, 2000.
4. Y. Kanetkar, Let Us C, 16th ed. New Delhi, India: BPB Publications, 2018.
5. R. Bangia, Fundamentals of Programming Languages, 1st ed. New Delhi, India: Cyber Tech Publications, 2007.
6. G. Perry and D. Miller, C Programming Absolute Beginner's Guide, 3rd ed. Indianapolis, IN, USA: Que Publishing, 2013.

Suggested e- resources (Websites/e- books)

1. <https://ocw.mit.edu/courses/6-s096-introduction-to-c-and-c-january-iap-2013/>

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B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

2. <https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/>

LIST OF PRACTICALS		
S.No.	Title	Co Mapping
1.	Write a C program to display “This is my first C Program.	CO1
2.	Write a C program to calculate area and circumference of a circle.	CO2
3.	Write a C program to perform addition, subtraction, division and multiplication of two numbers.	CO2
4.	Write a program to calculate simple and compound interest.	CO2
5.	Write a program to swap values of two variables with and without using third variable.	CO2
6.	Write a program to display the size of every data type using “size of” operator	CO1
7.	Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.	CO2
8.	Write a program to input two numbers and display the maximum number.	CO2
9.	Write a program to find the largest of three numbers using ternary operators.	CO2
10.	Write a program to find the roots of quadratic equation.	CO2
11.	Write a program to input name, marks of 5 subjects of a student and display the name of the student.	CO2
12.	Write a Program to Check Whether a Number is Prime or not.	CO2
13.	Write a program to find the largest and smallest among three entered numbers and also display whether the Identified largest/smallest number is even or odd.	CO2
14.	Write a program to find the factorial of a number.	CO2
15.	Write a program to check number is Armstrong or not.(Hint: A number is Armstrong if the sum of cubes of individual digits of a number is equal to the number itself).	CO2
16.	Write a program to check whether a number is Palindrome or not	CO2
17.	Write a program to generate Fibonacci series.	CO2
18.	Write a program to find GCD (greatest common divisor or HCF) and LCM (least common multiple) of two numbers.	CO2
19.	Write a Program to Search an element in array.	CO3
20.	Write a Program to perform addition of all elements in Array.	CO3
21.	Write a Program to find the largest and smallest element in Array.	CO3

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B. Tech (CSE/IT): All Programs

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS107M	SEC	Program Development using C	Max	0	0	0	30	20	0	0	2	1
			Min	0	0		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

22.	Write a Program for deletion of an element from the specified location from Array.	CO3
23.	Write a Program to access an element in 2-D Array.	CO3
24.	Write a program for addition of two matrices of any order in C.	CO3
25.	Write a Program to multiply two 3 X 3 Matrices.	CO3
26.	Write a program to add, subtract, multiply and divide two integers using user-defined type function with Return type.	CO3
27.	Write a program to generate Fibonacci series using recursive function.	CO3
28.	Write a program to find the sum of all the elements of an array using pointers.	CO3
29.	Write a program to swap value of two variables using pointer.	CO3
30.	Write a program to add two numbers using pointers.	CO3
31.	Write a program to input and print array elements using pointer.	CO3
32.	Write a program to create a structure named company which has name, address, phone and Of Employee as member variables. Read name of company, its address, phone and non-employee. Finally display this member's value.	CO4
33.	Write a program to read Roll No, Name, Address, Age & average-marks of 12 students in the BCT class and display the details from function.	CO4
34.	Write a program to add two distances in feet and inches using structure.	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	1	-	-	1	-	-	-	-	-	-	2	2	1	-
CO2	3	3	2	2	3	-	-	-	-	-	-	2	3	2	1
CO3	3	3	3	2	3	-	-	-	-	-	-	2	3	2	2
CO4	3	3	3	2	2	-	-	-	-	-	-	3	3	2	1

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), CSE (AIML-M, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	0	0	0	0	50	0	0	2	1
			Min	0	0		0	23				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability:

- To understand the basics of computers including hardware, software, how data is stored, and how operating systems manage daily tasks.
- To learn step-by-step problem solving using simple blocks of computational thinking, flowcharts, and basic algorithms.
- To get a friendly introduction to AI, Cyber security and Ethics.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply computational thinking frameworks and algorithmic design techniques to formulate structured solutions for engineering problems.
- CO2** Analyze fundamental AI paradigms, network architectures, and information security threats to determine appropriate use cases and defensive mechanisms.
- CO3** Evaluate digital ethics frameworks, algorithmic biases, and data privacy regulations to propose responsible technology implementations.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments

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Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), CSE (AIML-M, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	0	0	0	0	50	0	0	2	1
			Min	0	0		0	23				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

- ATL7 Poster
 ATL8 Oral Viva-voce examination
 ATL9 Industrial Visit Report

PREREQUISITES:

None

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Foundations of Computational Thinking & Logic Computational Thinking Framework: decomposition, pattern recognition, abstraction, algorithmic design. Engineering Problem-Solving methodologies. Logical Control Structures: sequence, selection, iteration. Error Classification: syntax vs. logical errors. Systematic Debugging strategies	6	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
II	Algorithmic Design & Problem Representation Diagrammatic Problem Solving with flowchart symbols, Structural Flowcharting for linear, conditional, and repetitive scenarios. Pseudo-code conventions and structured representation. Logic Translation: Flowcharts to pseudocode. Algorithmic Evaluation: correctness and efficiency	6	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination))
III	Artificial Intelligence Paradigms Historical Foundations, Core Concepts, Machine Learning Paradigms: Supervised and Unsupervised Learning. Introduction to Data Science and applications. Key AI Domains: Natural Language Processing (NLP), Computer Vision, Machine Translation and Indian Knowledge Systems (IKS).	6	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
IV	Cybersecurity, Information Security Computer Networks: LAN, WAN, Network Interconnecting Devices. Cybersecurity Threats: Viruses, Worms, Trojan Horses, Malware. Defensive Mechanisms: Firewalls, Antivirus Software,	6	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce

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B. Tech (CSE/IT), CSE (AIML-M, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	0	0	0	0	50	0	0	2	1
			Min	0	0		0	23				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	Secure Password Practices, Safe Browsing Protocols.		Examination)
V	Digital Ethics Data Pipeline, Algorithmic Fairness, Accountability, Data Privacy, Prevention of Algorithmic Bias. Generative AI and Intellectual Property: Copyright & Ownership, Hallucinations & Misinformation	6	ATL1 (Quiz) ATL3 (Midterm Exams) ATL 8(Oral Viva-Voce Examination)
	Total Hours	30	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

https://www.youtube.com/watch?v=S-7LrggTfA8&list=PLZ2ps_7DhBYSzaAFqpyQKqmoni-EefS7 (IIT Madras)

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. V. Rajaraman, *Fundamentals of Computers*, 6th ed. New Delhi, India: PHI Learning, 2014.
2. R. Thareja, *Computer Fundamentals and Programming in C*, 2nd ed. Oxford, UK: Oxford University Press, 2016

Reference Books

1. M. Bishop, *Computer Security: Art and Science*, 2nd ed., Boston, MA: Addison-Wesley, 2019.
2. S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed., Upper Saddle River, NJ: Pearson, 2021.
3. J. Wing, *Computational Thinking*, Cambridge, MA: MIT Press, 2017.
4. P. Denning and M. Tedre, *Computational Thinking*, Cambridge, MA: MIT Press, 2019.
5. D. Leslie, *Ethics of Artificial Intelligence: A Framework for Fairness, Transparency, and Accountability*, London: Alan Turing Institute, 2020.

Suggested e- resources (Websites/e- books)

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BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	0	0	0	0	50	0	0	2	1
			Min	0	0		0	23				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

- Ethics of AI Bias https://www.youtube.com/watch?v=NgaW_p7gsRc [MIT OCW]
- <https://teachablemachine.withgoogle.com/>

LIST OF PRACTICAL

	Title	CO Mapping
1.	Design a flowchart and write corresponding pseudocode for a simple sequential calculation	CO1
2.	Develop a structural flowchart and pseudocode for a conditional decision-making process	CO1
3.	Create an algorithm using a repetitive loop structure to find the largest number in a given sequence of values.	CO1
4.	Identify and correct deliberate syntax and logical errors in a provided control structure code snippet.	CO1
5.	Conduct a conceptual mapping exercise to identify real-world applications of specific AI domains like Computer Vision and Natural Language Processing.	CO2
6.	Sketch a Local Area Network (LAN) topology diagram specifying the placement of network interconnecting devices like routers and switches.	CO2
7.	Analyze a mock system log report to detect and classify different cybersecurity threats such as Viruses, Worms, or Trojan Horses.	CO2
8.	Demonstrate secure password generation and configure basic, simulated firewall rules to block unauthorized network traffic.	CO2
9.	Examine a real-world case study on data privacy to identify vulnerabilities in the data pipeline and potential sources of algorithmic bias.	CO3
10.	Evaluate a scenario involving intellectual property to determine ownership boundaries and identify instances of misinformation or AI hallucinations.	CO3

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcome s	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	1	1		2							1	3	1	
CO 2	2	1			2	1						1	1	3	2
CO 3					1	3	1	3		1		2	1	2	1

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS101M	BEC	Introduction to Computer Science and Engineering	Max	0	0	0	0	50	0	0	2	1
			Min	0	0		0	23				

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Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech(CSE/IT), B.Tech+MBA(CSE/IT) and B.Tech+M.Tech(CSE/IT)
SEMESTER-I (2025-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC104	BEC	Digital Logic & Circuit Design	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Use of Boolean algebra and Karnaugh Map to simplify logic function.
2. Describe the operation of different Combinational and Sequential Logic Circuits.

COURSE OUTCOMES:

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

1. Design an optimal digital logic circuit to meet the given specifications.
2. Evaluate the performance of the given digital logic circuit based on specific criteria for reliable system Implementation.

SYLLABUS

UNIT I

10 HOURS

Number System: Introduction to number systems: Decimal, Binary, Octal and Hexadecimal, Base Conversion. Signed Binary Numbers: Signed magnitude, 1's Complement and 2's Complement representation and their arithmetic operations, 32-bit Floating point representation, Codes: Types of code, Binary code, BCD, Gray code, Excess-3. BCD Addition, Code Conversion, Error Detecting and Correcting code: Even and Odd Parity, Hamming code.

UNIT II

9* HOURS

Boolean algebra and Logic gates: Introduction to logic gates, Boolean Laws, De-morgan's theorem, Consensus theorem, Implementation using logic gates, Simplification of Boolean Expression using Boolean Laws, Canonical and Standard (SOP and POS) forms. Universal gates, NAND-NOR implementation of logic functions. Karnaugh Maps (K-maps), Minimization of logic functions using K-map. Don't Care Conditions.

UNIT III

8 HOURS

Combinational circuits: Arithmetic circuits- Half adder, Full adder, Half subtract or, Full subtract or, Parallel Adder, BCD adder, Multiplexer, De-multiplexer, Encoder and Decoder. Design of Combinational circuits using Multiplexer and Decoder.

UNIT IV

7 HOURS

Sequential Circuits: Introduction, Asynchronous and Synchronous Sequential circuits, Latches and Flip Flops: SR, D, JK and T. Characteristic equation, Characteristic and Excitation table. Master-Slave Flip-flop, Race around conditions, Flip flop conversion.

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Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech(CSE/IT), B.Tech+MBA(CSE/IT) and B.Tech+M.Tech(CSE/IT)
SEMESTER-I (2025-2029)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC104	BEC	Digital Logic & Circuit Design	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V

8 HOURS

Applications of Flip-flop:

Shift Register: SISO, SIPO, PISO, PIPO, Left and Right Shift Register, Bidirectional Shift Register.

Counter: Ring counter, Johnson Counter, Asynchronous Up/down counter, Synchronous Up/down counters: State diagram, state table and realization, Mod-N Counter.

TEXTBOOKS:

1. M. Morris Mano, "Digital Logic and Computer Design", Pearson Education, 2016.
2. S Salivahanan and S Arivazhagan: Digital Circuits and Design, 4 th Edition, Vikas Publishing House, 2012.

REFERENCE:

1. A. Anand Kumar, "Fundamentals of Digital Circuits", 4th Edition, PHI, 2016.
2. Floyd and Jain, "Digital Fundamentals", 10th Edition, Pearson Education India, 2011.
3. Roland J. Tocci, Widmer, Moss, "Digital Systems Principles and Applications", 10th Edition, Pearson 2009.
4. Stephen Brown, Zvanko Vranesic, "Fundamentals of Digital Logic Design", 3rd Edition, McGraw Hill, 2017.

LIST OF PRACTICALS

1. To study the operation of various logic gates and verify their truth tables.
2. To verify De Morgans theorem
3. To verify the versatility of NAND and NOR gates
4. To compare and verify standard SOP/POS expression with minimized Boolean form using K- map.
5. To design and verify Adder and subtractor circuits.
6. To design and verify multiplexer and de multiplexer using basic logic gates.
7. To realize 4-bit parallel adder circuit.
8. To design and verify encoder and decoder circuits using ICs.
9. To verify the truth table of different flip flops.
10. To verify the functionality of shift register.
11. To verify the functionality of counter circuit.

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B. Tech (CSE/IT): All Programs

SEMESTER-I/II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS102M	BEC	Introduction to Design Thinking	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. The objective of this course is to provide the new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products which useful for a student in preparing for an engineering career.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Define Design Thinking and identify its role in innovation.
- CO2** Conduct user research to empathize with stakeholders and define core problems.
- CO3** Generate creative ideas through various ideation techniques.
- CO4** Develop low-fidelity prototypes and iterate based on user feedback.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments
- ATL7** Poster
- ATL8** Oral Viva-voce examination
- ATL9** Industrial Visit Report

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B. Tech (CSE/IT): All Programs

SEMESTER-I/II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS102M	BEC	Introduction to Design Thinking	Max	60	20	20	30	20	2	0	2	3
			Min	24	16		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PREREQUISITES:

None.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Design Thinking: Definition, History, Mindset of a Design Thinker (Empathy, Optimism, Iteration), Design Thinking vs. Analytical Thinking.	9	ATL1 ATL3 ATL6 ATL8
II	Empathize Phase: User-centric research, Observation techniques, Interviewing for empathy, Immersion, Empathy Maps, Persona development.	9	ATL1 ATL3 ATL6 ATL8
III	Define Phase: Analysis and Synthesis of research, Point of View (POV) statements, "How Might We" (HMW) questions, Identifying user needs and insights.	9	ATL1 ATL3 ATL6 ATL8
IV	Ideate Phase: Rules of Ideation, Brainstorming, Mind Mapping, SCAMPER, Storyboarding, Selecting and prioritizing ideas.	9	ATL1 ATL3 ATL6 ATL8
V	Prototype & Test: Types of Prototyping (Paper, Digital, Physical), Low-fidelity vs. High-fidelity, Feedback loops, Iterative testing, Final Presentation.	9	ATL1 ATL3 ATL6 ATL8
Total Hours		45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

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B. Tech (CSE/IT): All Programs

SEMESTER-I/II (2026-30)

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https://www.youtube.com/watch?v=_r0VX-aU_T8

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

- Developing Thinking Skills (The Way to Success)

REFERENCE:

- E. Balagurusamy, Developing Thinking Skills (The Way to Success), 1st ed. New Delhi, India: Khanna Publishing House, 2022.

Suggested e- resources (Websites/e- books)

- NPTEL - Design Thinking: A Primer
- CircuitVerse - Interactive Logic Simulator

LIST OF PRACTICAL

S.No.	Title	CO Mapping
1.	To study the operation of various logic gates and verify their truth tables.	CO1
2.	To verify De Morgans theorem	CO1
3.	To verify the versatility of NAND and NOR gates	CO1
4.	To compare and verify standard SOP/POS expression with minimized Boolean form using K- map.	CO1
5.	To design and verify Adder and subtractor circuits.	CO2
6.	To design and verify multiplexer and demultiplexer using basic logic gates.	CO2
7.	To realize 4-bit parallel adder circuit.	CO2
8.	To design and verify encoder and decoder circuits using ICs.	CO2
9.	To verify the truth table of different flip flops.	CO3
10.	To verify the functionality of shift register.	CO3

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11.	To verify the functionality of counter circuit.	CO3
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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	2	1	-	-	2	-	-	-	-	-	2	1	1	-
CO2	-	3	2	3	1	3	2	2	2	2	-	2	2	2	-
CO3	2	3	3	-	-	2	-	-	3	2	1	2	2	2	-
CO4	2	2	3	3	2	-	-	-	3	3	2	2	3	2	1

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