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:

1. 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

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.

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:

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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.

https://www.youtube.com/playlist?list=PLUl4u3cNGP60hI9ATjSFgLZpbNJ7myAg6.

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

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 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	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	-

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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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								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
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:

1. To understand the basics of computers including hardware, software, how data is stored, and how operating systems manage daily tasks.
2. To learn step-by-step problem solving using simple blocks of computational thinking, flowcharts, and basic algorithms.
3. 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

Chairperson	Chairperson	Controller of Examination	Registrar
Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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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*				
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.

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

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	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.

	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

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)

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								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
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.

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 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
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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Board of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Faculty of Studies, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, 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*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

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 understand the basic model of a modern computer with its various processing units.
2. To impart knowledge on CPU and it's processing of programs.
3. To provide the information for hardware utilization methodology.
4. To impart knowledge of Multiprocessor and inter-process communication.

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 the architecture of a modern computer.

CO2 Explain the functional behavior of CPU and its other processing units.

CO3 Knowledge of the Peripherals of a Computer System.

CO4 Give the information to speed-up the working of Computer System.

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

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

B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, 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*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

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.

ATL9 Industrial Visit Report

PREREQUISITES:

Knowledge of Computer System Organization (BTCS103M)

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Computer Basics:** Von Newman model, CPU, Memory, I/O, Bus, Memory registers, Program Counter, Accumulator, Instruction register, Micro-operations, Register Transfer Language, Instruction cycle, Instruction formats and addressing modes.	9	ATL1 ATL3 ATL4 ATL8
II	**Control Unit Organization:** Hardwired control unit, Micro-programmed control unit, Control Memory, Address Sequencing, Micro Instruction formats, Micro program sequencer, Microprogramming. **Arithmetic and Logic Unit**: Arithmetic Processor, Addition, subtraction, multiplication, and division, Floating point, and decimal arithmetic.	9	ATL1 ATL3 ATL4 ATL8
III	**Input Output Organization:** Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor, Data transferring approaches and modes.	9	ATL1 ATL3 ATL4 ATL8
IV	**Memory organization:** Memory Hierarchy, Cache Memory - Organization and types of cache mappings, Virtual memory, Memory Management Hardware.	9	ATL1 ATL3 ATL4 ATL8
V	**Multiprocessors:** Pipeline and Vector processing, Instruction and arithmetic	9	ATL1 ATL3

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B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, MLCC, ICS, BDCE)

SEMESTER-I (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

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.

	pipelines, Vector and array processors, Interconnection structure and inter-processor communication.		ATL4 ATL8
		Total	**45**	

ADDITIONAL RESOURCES

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

https://www.youtube.com/watch?v=4TzMyXmzL8M

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. M. Morris Mano, Computer System Architecture, Fourth edition, Pearson Education, 2015.
2. William Stallings, Computer Organization and Architecture, Seventh Edition, PHI, 2009.

REFERENCES:

1. A. S. Tanenbaum, Structured Computer Organization, 6th ed. Boston, MA, USA: Pearson Education, 2016.
2. J. P. Hayes, Computer Architecture and Organization, 3rd ed. New Delhi, India: McGraw-Hill, 2017.
3. J. L. Hennessy and D. A. Patterson, Computer Architecture: A Quantitative Approach, 4th ed. San Francisco, CA, USA: Morgan Kaufmann / Elsevier, 2007.
4. R. S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th ed. New Delhi, India: Penram International Publishing / Prentice Hall, 2015.
5. N. Carter, Computer Architecture (Schaum's Outlines), 3rd ed. New Delhi, India: Tata McGraw-Hill, 2012.
6. C. Hamacher, Z. Vranesic, and S. Zaky, Computer Organization, 5th ed. New Delhi, India: Tata McGraw-Hill, 2002.

Suggested e- resources (Websites/e- books)

1. https://inst.eecs.berkeley.edu/~cs152/sp26/152_policies/
2. https://ocw.mit.edu/courses/6-823-computer-system-architecture-fall/

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B. Tech (CSE/IT), CSE (ES, MA, AIML-IBM, DS, FSDB, GenAI, 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*				
BTCS103M	DCC	Computer System Organization	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	10				

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.

LIST OF PRACTICAL

S.No.	Title	Co Mapping
1.	Study of peripherals, components of a Computer System.	CO3
2.	Write a C program for sum of two binary numbers.	CO2
3.	Write a C program for multiplication of two binary numbers.	CO2
4.	Write a C program to implement Booth's algorithm for multiplication.	CO2
5.	Write a C program to implement Restoring Division Algorithm.	CO2
6.	Write the working of 8085 simulator GNUsim8085 and basic architecture of 8085 along with small introduction.	CO1
7.	Study the complete instruction set of 8085 and write the instructions in the instruction set of 8085 along with examples.	CO1
8.	Write an assembly language code in GNUsim8085 to implement data transfer instruction.	CO1
9.	Write an assembly language code in GNUsim8085 to store numbers in reverse order in memory location.	CO1
10.	Write an assembly language code in GNUsim8085 to add two 8 bit numbers stored in memory and also storing the carry.	CO1,CO2

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	3	2	1	-	-	-	-	-	-	-	-	2	2	1	1
CO2	3	3	2	-	1	-	-	-	-	-	-	2	3	2	2
CO3	3	2	2	2	-	-	-	-	-	-	-	1	2	-	1
CO4	3	3	3	2	2	-	-	-	-	-	-	3	3	3	2

Chairperson	Chairperson	Controller of Examination	Registrar
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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*				
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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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.

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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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.

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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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.

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	PO10	PO11	PO12	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 with Specialization in AI Powered Mobile Application - Apple Authorized Training Center

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*				
BTCSMOB101N	SEC	Mobile Application Development - I	Max	0			30	20	0	0	2	1
			Min				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. To introduce the Swift Language
2. Understanding the basic concepts and features of Swift
3. Learning the Concepts of Variables, Data types and Control flow in Swift
4. To provide knowledge of Swift for Mobile app development using X code

COURSE ALIGNMENT WITH UNSDG:

"The Course aims to fulfill the United Nations Sustainable Development Goals, SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure)."

COURSE OUTCOMES:

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

CO1 Understand the basic terminologies used in Swift programming Language

CO2 Proficient in using the basic constructs of Swift, to develop program

CO3 Code and debug Swift programs using X code and Playground

CO4 Understand the fundamentals of Swift and be able to apply it in iOS app development

TEACHING PEDAGOGY:

T1 "Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching"

T2 Hands-on lab sessions, Assignments, Peer-coding, Quizzes, Oral Viva-voce examination.

ASSESSMENT TOOLS:

ATL1 Quiz

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

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

B.Tech. CSE with Specialization in AI Powered Mobile Application - Apple Authorized Training Center

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*				
BTCSMOB101N	SEC	Mobile Application Development - I	Max	0			30	20	0	0	2	1
			Min				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.

ATL6 Assignments
ATL7 Poster
ATL8 Oral Viva-voice examination
ATL9 Industrial Visit Report

PREREQUISITES:

Basic knowledge of computer fundamentals, programming concepts, operating systems, and familiarity with any high-level programming language.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Installation of Swift: Installation of Swift on mac OS and Linux, REPL, Package manager, creating a package, Building an Executable, Working with multiple Source File.	6	ATL1 ATL2 ATL5 ATL8
II	Introduction to X code and Swift Playgrounds: Installation of X code, Working with X code, create a simple program and execute it using X code, Working with swift playgrounds, create a simple program and execute it using swift playgrounds.	6	ATL1 ATL2 ATL5 ATL8
III	Introduction to Swift: Introduction of Swift, features of Swift, Data types, constant and variables, operators, Type Annotations, Naming Constants and Variables, Printing Constants and Variables, Semicolons, Integers: Integer Bounds, Into, UInt. Floating-Point Numbers: Double, Float. Type Safety and Type Inference. Numeric Literals, Numeric Type Conversion, Integer Conversion, Integer and Floating-Point Conversion, Boolean.	6	ATL1 ATL2 ATL5 ATL8
IV	Strings and Characters: String Literals, Multiline String Literals, Special Characters in String Literals, Initializing an Empty String, String Mutability, Working with Characters, Concatenating Strings and Characters, String Interpolation, Counting Characters, Substrings, Comparing Strings,	6	ATL1 ATL2 ATL5 ATL8

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

B.Tech. CSE with Specialization in AI Powered Mobile Application - Apple Authorized Training Center

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*				
BTCSMOB101N	SEC	Mobile Application Development - I	Max	0			30	20	0	0	2	1
			Min				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.

	Prefix and Suffix Equality		
V	Control Flow: For-In Loops, While Loops: While, Repeat-While. Conditional Statements: if-else, Switch, Control Transfer Statements: continue, break, fall through, return, and throw.	6	ATL1 ATL2 ATL5 ATL8
	Total Hours	**30**	

ADDITIONAL RESOURCES

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

https://developer.apple.com/swift/

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Swift Matthew Mathias, John Gallagher, Swift Programming: The Big Nerd Ranch Guide 2nd edition, 2015

Reference Books

1. Mastering Swift 4, Jon Hoffman, Packt Publishing Limited, 4th Edition, 2017.
2. Learning Swift: Building Apps for macOS, iOS, and Beyond, Paris Buttfield-Addison, Jonathon Manning, and Tim Nugent, O'Reilly Media, 3rd Edition, 2018.
3. The Swift Programming Language, Apple Documentation (Latest Edition available via Swift.org).

Suggested e- resources (Websites/e- books)

1. Swift.org Documentation
2. Hacking with Swift (100 Days of Swift).

LIST OF PRACTICAL		
SNO.	**Title**	**CO Mapping**
1.	Installation of Swift, X code and Playground.	CO1, CO3

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

B.Tech. CSE with Specialization in AI Powered Mobile Application - Apple Authorized Training Center

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*				
BTCSMOB101N	SEC	Mobile Application Development - I	Max	0			30	20	0	0	2	1
			Min				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.	Program to print Hello world (Using terminal and X code)	CO1, CO3
3.	Program to demonstrate variable and constant declaration in Swift	CO1, CO2
4.	Program to demonstrate different arithmetic operators in Swift.	CO2
5.	Program to demonstrate type Annotations and type Inference in Swift	CO1, CO2
6.	Program to demonstrate numeric type and other conversions in Swift	CO2
7.	Program to demonstrate String Literals, Multiline string and special characters	CO2
8.	Program to demonstrate String mutability, Empty String and String Interpolation	CO2
9.	Program to demonstrate Characters in Swift	CO2
10.	Program to demonstrate various String comparisons in Swift.	CO2
11.	Program to demonstrate For-In loop in Swift	CO2
12.	Program to demonstrate While loop in Swift	CO2
13.	Program to demonstrate Repeat-While in Swift.	CO2
14.	Programs to demonstrate various control statements in Swift	CO2, CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSO		
	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	1	-	-	-	-	-	-	1	1	-	-
CO2	3	2	2	3	2	-	-	-	-	-	-	1	3	2	-
CO3	3	2	3	3	3	1	-	-	-	-	-	2	3	3	1
CO4	2	1	2	3	2	-	-	-	-	-	-	1	2	3	2

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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

Chairperson	Chairperson	Controller of Examination	Registrar
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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:

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.

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:

1. Developing Thinking Skills (The Way to Success)

REFERENCE:

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

Suggested e- resources (Websites/e- books)

1. NPTEL - Design Thinking: A Primer
2. 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

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	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