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*				
BTCSH107	BS	Linear Algebra	Max	60	20	20	0	0	3	1	0	4
			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. Know the fundamental principles of the Linear algebra.
2. Understand and apply the basics of the Matrices and Vector Space.

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 the techniques to find the Solution of Linear equations.
CO2 Apply the basics of the calculus of the Determinants.
CO3 Apply the basics of the calculus of the Matrices.
CO4 Apply the concept of Singular value decomposition and Principal component analysis in Image Processing and Machine Learning.

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

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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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					
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BTCSH107	BS	Linear Algebra	Max	60	20	20	0	0	3	1	0	4
			Min	24	16		0	0				

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ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Matrices and Determinants: Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.	9	ATL1 ATL3 ATL6
II	Vectors and linear combinations: Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices	9	ATL1 ATL3 ATL6
III	Vector space: Dimension; Basis; Orthogonally; Projections; Gram-Schmidt or thogonalization and QR decomposition	9	ATL1 ATL3 ATL6
IV	Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermit Ian and unitary matrices	9	ATL1 ATL3 ATL6
V	Singular value decomposition and Principal component analysis; Introduction to their applications in Image Processing and Machine Learning.	9	ATL1 ATL3 ATL6
	Total Hours	**45**	

ADDITIONAL RESOURCES

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

1. MIT OpenCourseWare Lecture Portal (18.06): https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/

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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*				
BTCSH107	BS	Linear Algebra	Max	60	20	20	0	0	3	1	0	4
			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.

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

1. G. Strang, *Linear Algebra and Its Applications*, 4th ed. Belmont, CA: Thomson, Brooks/Cole, 2006.

REFERENCE BOOKS:

1. E. Kreyszig, *Advanced Engineering Mathematics*, 9th ed. Hoboken, NJ, USA: Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, *Introduction to Real Analysis*, 5th ed. New York, NY, USA: Wiley, 1999.
3. J. Stewart, Calculus: *Early Transcendentals*, 5th ed. Boston, MA, USA: Thomas Learning (Brooks/Cole), 2003.

Suggested e- resources (Websites/e- books)

1. MIT OpenCourseWare: MIT 18.06 Linear Algebra, Spring 2010.
2. NPTEL: Linear Algebra.

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

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

SEMESTER-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*				
BTCS202M	BEC	Object Oriented Programming with C++	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 explain abstract data types, classes and different types of objects.
2. To analyze the public, protected and private modes of inheriting the classes.
3. To demonstrate the overloading of functions and operators to grant them a different meaning.
4. To provide complete knowledge of Object Oriented Programming through C++ and to enhance the programming skills of the students by giving practical assignments to be done in labs.

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 Identify and describe the components of object-oriented technology and justify their relevance.

CO2 Implement inheritance for code reusability and polymorphism.

CO3 Implement object-oriented approach for real world scenarios.

CO4 Use advance features like temples and exception to make programs supporting reusability and sophistication

CO5 Develop the applications using object oriented programming with C++.

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

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SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
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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.

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

PREREQUISITES:

Knowledge of Object Oriented Programming with C++ (BTCS202M)

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Concepts of OOP:** Introduction OOP, Procedural vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP. C++ Basic Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures.	9	ATL1 ATL4 ATL8
II	**C++ Functions:** The Main Function, Function prototyping, Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments.	9	ATL1 ATL4 ATL8
III	**Objects and Classes:** Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, friend function. **Inheritance:** Concept of Inheritance, types of inheritance, access modifiers, overriding, virtual base class	9	ATL1 ATL4 ATL8
IV	**Polymorphism:** Polymorphism and its types, Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism, Abstract Methods and Classes. Exception Handling, Templates function and class in C++	9	ATL1 ATL4 ATL8
V	**I/O and File management:** Concept of Streams, Cin and Cout Objects, C++ Stream Classes, Unformatted and	9	ATL1 ATL4

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SEMESTER-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*				
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	Formatted I/O, Manipulators, File Stream, C++ File Stream Classes, File Management Functions, File Modes, Binary and Random Files.		ATL8
	Total Hours	**45**	

ADDITIONAL RESOURCES

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

https://www.youtube.com/watch?v=vLnPwxZdW4Y

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOKS:

1. B. Stroustrup, Programming: *Principles and Practice Using C++*, 3rd ed. Boston, MA, USA: Addison-Wesley, 2024.
2. G. Ruggiero, *Software Architecture with C++: Design modern systems using effective architecture concepts, design patterns, and techniques with C++20*. Birmingham, UK: Packt Publishing, 2022.

REFERENCE BOOKS:

1. P. Deitel and H. Deitel, *C++ How to Program*, 11th ed. Boston, MA, USA: Pearson, 2024.
2. N. M. Josuttis, *C++23 - The Complete Guide*. Hamburg, Germany: Leanpub, 2026.
3. J. Galowicz, *C++20 STL Cookbook*. Birmingham, UK: Packt Publishing, 2020.
4. B. Cyganek, *Introduction to Programming with C++ for Engineers*. Hoboken, NJ, USA: Wiley-IEEE Press, 2020.

Suggested e- resources (Websites/e- books)

1. MIT OpenCourseWare Core Object-Oriented C++ Programming Guide: https://ocw.mit.edu/courses/6-096-introduction-to-c-january-iap-2011/pages/lecture-notes/

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SEMESTER-II (2026-30)

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			Marks	THEORY			PRACTICAL					
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LIST OF PRACTICALS

S.No.	Title	Co Mapping
1.	Write a program to display the following output using a single cout statement. Maths=90, Physics=74, Chemistry=76	CO1
2.	Write a program to read 2 numbers from the keyboard and display the larger value on the screen.	CO1
3.	Write a function using reference variables as arguments to swap the values of a pair of integers.	CO1
4.	Write a macro that obtains the largest of 3 numbers.	CO1
5.	Create two classes DM and DB which store the value of distances. DM stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and odd one object of DM with another object of DB. Use a friend function to carry out the addition operation. The object that stores the results may be a DM object or DB object, depending on the units in which the result are required. The display should be in the format of feet and inches or meters and centimeters depending on the object on display.	CO3
6.	Define a class to represent a bank account. Include the following members: Data members 1. Name of the depositor 2. Account number 3. Type of account 4. Balance amount in the account Member functions 1. To assign initial values 2. To deposit an amount 3. To withdraw an amount after checking the balance 4. To display name and balance Write a main program to test the program.	CO3
7.	Design a constructor for bank account class.	CO3
8.	A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system	CO3

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			Min	24	16		15	10				

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displays the book details and requests for the number of copies required. If the requested copies book details and requests for the number of copies required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise the message "Required copies not in stock" is displayed.
Design a system using a class called books with suitable member functions and Constructors. Use new operator in constructors to allocate memory space required.

9. Improve the system design in exercise 8 to incorporate the following features: CO3
(a) The price of the books should be updated as and when required. Use a private member function to implement this.
(b) The stock value of each book should be automatically updated as soon as a transaction is completed.
(c) The number of successful transactions should be recorded for the purpose of statistical analysis. Use static data members to keep count of transaction.

10. Design a C++ Class 'Complex' with data members for real and imaginary part. Provide default and parameterized constructors. Write a program to perform arithmetic operations of two complex numbers using operator overloading (using either member functions or friend functions). CO2, CO3

11. Create a base class shape. Use this class to store two double type values that could be used to compute area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base a member function getdata() to initialize base class data member and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine it the derived class to suit their requirements. CO2

12. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class account that stores customer name, account number and type of account. From this derive the classes curacct and savacct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks: CO2, CO5
    a. Accept deposit from a costumer and update the balance.
    b. Display the balance
    c. Compute and deposit interest.
    d. Permit withdrawal and update the balance.

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SEMESTER-II (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS202M	BEC	Object Oriented Programming with C++	Max	60	20	20	30	20	3	0	2	4
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e. Check for the minimum balance, impose penalty, necessary and update balance.

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	-	-	2	-	-	-	-	-	-	2	2	1	-
CO2	3	2	2	-	3	-	-	-	-	-	-	2	3	1	-
CO3	3	3	3	2	3	1	1	-	-	-	-	2	3	2	1
CO4	3	2	2	1	3	-	-	-	-	-	-	2	3	2	2
CO5	3	3	3	3	3	-	-	-	2	1	1	3	3	2	1

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SEMESTER-II (2026-30)

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT201M	DCC	Data Communication	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 understand the concepts of data communications.
2. To be familiar with the Transmission media and Tools.
3. To study the functions of OSI layers.
4. To learn about IEEE standards in computer networking.
5. To get familiarized with different protocols and network components.

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 Process and functions of data communications
CO2 Understand Transmission media and Tools
CO3 Understand the functions of OSI layers
CO4 Understand IEEE standards in computer networking
CO5 Understand different protocols and network components

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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B. Tech (CSE/IT), CSE (ES, MA, ICS, BDCE)

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BTIT201M	DCC	Data Communication	Max	60	20	20	0	0	3	0	0	3
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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.

ATL8 Oral Viva-voce examination
ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Introduction:** Data Communication Components, Types of Connections, Transmission Modes, Network Devices, Topologies, Protocols and Standards, OSI Model, Transmission Media, Bandwidth, Bit Rate, Bit Length, Baseband and Broadband Transmission, Attenuation, Distortion, Noise, Throughout, Delay and Jitter.	9	ATL3 ATL8 ATL6
II	**Data Encoding:** Unipolar, Polar, Bipolar, Line and Block Codes. Multiplexing: Introduction and History, FDM, TDM, WDM, Synchronous and Statistical TDM. Synchronous and Asynchronous transmission, Serial and Parallel Transmission.	9	ATL3 ATL8 ATL6
III	**Error Detection & Correction:** Correction, Introduction–Block Coding–Hamming Distance, CRC, Flow Control and Error Control, Stop and Wait, Error Detection and Error Go Back– N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, CSMA/CD, CDMA/CA.	9	ATL3 ATL8 ATL6
IV	**Network Switching Techniques:** Circuit, Message, Packet and Hybrid Switching Techniques.X.25, ISDN.Logical Addressing, Ipv4, Ipv6, Address Mapping, ARP, RARP, BOOTP and DHCP, User Datagram Protocol, Transmission Control Protocol, SCTP.	9	ATL3 ATL8 ATL6
V	**Application Layer Protocols:** Domain Name Service	9	ATL3

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*				
BTIT201M	DCC	Data Communication	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.

	Protocol, File Transfer Protocol, TELNET, WWW and Hyper Text Transfer Protocol, Simple Network Management Protocol, Simple Mail Transfer Protocol, Post Office Protocol v3.		ATL6 ATL8
	Total Hours	45	

ADDITIONAL RESOURCES

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

https://www.youtube.com/playlist?list=PLUl4u3cNGP60_JNv2MmK3wkOt9syvfQWY (MIT OCW)

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

TEXTBOOK:

1. B. A. Forouzan, *Data Communication and Networking*, 4th ed. New Delhi, India: Tata McGraw Hill, 2011.

REFERENCE BOOKS:

1. L. L. Peterson and P. S. Davie, *Computer Networks*, 5th ed. Amsterdam, Netherlands: Elsevier, 2012.
2. W. Stallings, *Data and Computer Communication*, 8th ed. Upper Saddle River, NJ, USA: Pearson Education, 2007.
3. J. F. Kurose and K. W. Ross, *Computer Networking: A Top–Down Approach Featuring the Internet*. Upper Saddle River, NJ, USA: Pearson Education, 2005.

Suggested e- resources (Websites/e- books)

1. **MIT OpenCourseWare Data Communication and Networks Companion:**
   https://ocw.mit.edu/courses/6-263j-data-communication-networks-fall-2002/

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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), CSE (ES, MA, ICS, BDCE)

SEMESTER-II (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*				
BTIT201M	DCC	Data Communication	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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	-	-	-	-	-	-	2	2	2	1
CO2	3	2	2	2	3	-	1	-	-	-	-	2	2	1	1
CO3	3	3	2	-	2	-	-	-	-	-	-	2	3	2	2
CO4	3	2	3	-	-	1	-	1	-	-	-	2	3	1	2
CO5	3	3	3	2	3	-	-	-	-	-	-	2	3	2	3

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Choice Based Credit System (CBCS)

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

SEMESTER-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*				
BTCSMO B201 N	SEC	Mobile Application Development - II	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. To introduce functions, Closures and Class in Swift Language.
2. Understand the Object oriented and Procedure oriented concepts of Swift
3. Learn the Concepts of Inheritance, Enumerations and Initializes in Swift
4. To provide knowledge of class and Structures for Mobile app development

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 functions, Closures and Class used in Swift programming Language.

CO2 Proficient in using the Object oriented and Procedure oriented concepts of Swift, to develop program

CO3 Apply the Knowledge Class and Structures for iOS App development

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 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

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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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSMOB201 N	SEC	Mobile Application Development - II	Max	0	0	0	30	20	0	0	2	1
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ATL6 Assignments
ATL7 Poster
ATL8 Oral Viva-voice examination
ATL9 Industrial Visit Report

PREREQUISITES:

Basic knowledge of Swift programming fundamentals, control statements, functions, object-oriented programming concepts, and problem-solving skills.

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	**Functions**: Defining and Calling Functions, Function Parameters and Return Values: Functions Without Return Values, Functions with Multiple Return Values, Optional Tuple Return Types Function Argument Labels and Parameter Names: Specifying Argument Labels, Omitting Argument Labels, Default Parameter Values, Variadic Parameters, Function Types, Function Types as Parameter Types.	6	ATL1 ATL2 ATL5 ATL8
II	**Closures and Enumeration:** Closure Expressions, Inferring Type From Context, Implicit Returns from Single-Expression Closures, Shorthand Argument Names, Operator Methods, Trailing Closures, Capturing Values, Escaping Closures. Enumeration: Enumeration, Enumeration with Switch Statement, Iterating Enumeration Cases, Associated Values, Raw Values, Recursive Enumerations.	6	ATL1 ATL2 ATL5 ATL8
III	**Structures and Classes:** Definition Syntax, Structure and Class Instances, Accessing Properties, Member wise, Initializers for Structure Types, Value types or Reference Types. Properties: Stored Properties, Lazy Stored Properties, Computed Properties, Property Observers. Global and Local Variables, Type Properties, Type Property Syntax, Querying and Setting Type Properties.	6	ATL1 ATL2 ATL5 ATL8
IV	**Method and Inheritance:** Methods, Instance Methods, self-		ATL1

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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			Marks	THEORY			PRACTICAL		L	T	P	CREDITS
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BTCSMOB201 N	SEC	Mobile Application Development - II	Max	0	0	0	30	20	0	0	2	1
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	Property, Mutating Method, Type Methods Inheritance: Base Class, types of Inheritance, Sub classing, Overriding: Accessing Superclass Methods, Properties, and Subscripts, Overriding Methods, Overriding Properties, Overriding Property Getters and Setters, Preventing Overrides.	6	ATL2 ATL5 ATL8
V	**Initializers: Initializers,** Default Property Values, Customizing Initialization, Initialization Parameters, Parameter Names and Argument Labels, Initializer Parameters Without Argument Labels, Optional Property Types, Default Initializers, Initializer Delegation for Value Types, Class Inheritance and Initialization, Initializer Inheritance and Overriding, Automatic Initializer Inheritance, fallible Initializers, fallible Initializers for Enumerations, Overriding a fillable Initializer.	6	ATL1 ATL2 ATL5 ATL8
	Total Hours	**30**	

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

https://medium.com/ios-os-x-development/ios-architecture-patterns-ecba4c38de52

B. Remedial classes for slow learners:

As per the SVVV SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Matthew Mathias, John Gallagher, Swift Programming: The Big Nerd Ranch Guide 2nd edition, 2015.
2. Matt Neuberg, iOS 12 Programming Fundamentals with Swift, O Reilly; 5th edition
3. App Development with Swift (as available on iBook Store).

Reference Books

1. Paris Butt field-Addison, Jonathon Manning, Tim Nugent Learning Swift: Building Apps for mac OS, iOS, and Beyond, O"Reilly Media, Inc., 3rd ad, 2018.
2. Jon Hoffman, Mastering Swift 4, Packet Publishing Limited, 4th edition, 2017

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3. Vandad Nahavandipoor. iOS 11 Swift Programming Cookbook, O "Reilly Media, 2017

4. S. Yamacli, Beginner"s Guide to iOS 11 App Development Using Swift 4: X code, Swift and App Design Fundamentals,(1e), USA: Create Space Independent Publishing Platform, 2017.

Suggested e- resources (Websites/e- books)

1. App Development with Swift (as available on iBook Store).
2. NPTEL -- MAD-II

LIST OF PRACTICAL

SNO.	Title	CO Mapping
1	Programs to demonstrate function with and without return type and parameters.	CO1
2	Program to demonstrate function returning multiple values.	CO1
3	Program to demonstrate function returning optional tuple.	CO1
4	Programs to demonstrate function with and without argument label.	CO1
5	Program to demonstrate Closures.	CO1
6	Program to demonstrate Single-Expression Closures.	CO1
7	Program to demonstrate Shorthand Argument Names.	CO1
8	Program to demonstrate Trailing Closures.	CO1
9	Program to demonstrate Enumeration.	CO2
10	Program to demonstrate with Switch case.	CO2
11	Program to demonstrate Enumeration Associated Values and Raw Values.	CO2
12	Program to demonstrate Structure.	CO3
13	Program to demonstrate Properties, Member wise and Initializers for Structure Types.	CO3
14	Programs to demonstrate Stored Properties, Lazy Stored Properties, Computed Properties, and Property Observers.	CO3
15	Programs to demonstrate different types of Inheritance in Swift.	CO2

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BTCSMOB201 N	SEC	Mobile Application Development - II	Max	0	0	0	30	20	0	0	2	1
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16	Programs to demonstrate Methods, Instance Methods, self-Property and Mutating Method.	CO2
17	Programs to demonstrate Accessing Superclass Methods, Properties, Overriding Methods and Overriding Properties.	CO3
18	Programs to demonstrate Initializers, Default Property Values and Custom Initializers.	CO4
19	Programs to demonstrate Initializer Inheritance, Overriding and Automatic Initializer Inheritance.	CO4
20	Programs to demonstrate Failable Initializers, Failable Initializers for Enumerations and Overriding a Failable Initializer.	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	1	3	1	-	1	1	-	1	-	1	1	-	-
CO2	3	3	2	2	2	-	-	-	-	-	-	1	2	1	-
CO3	3	3	3	3	2	1	-	-	-	-	-	2	3	2	1
CO4	3	3	2	2	-	-	-	-	-	-	-	1	2	-	-
CO5	3	3	3	2	1	-	-	-	-	-	-	2	2	1	-