ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

B.Tech. (CSE - Big Data and Cloud Engineering – Impetus Technologies)
Choice Based Credit System (CBCS)-2025-29
SEMESTER-II

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

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 OUTCOMES:

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

1. Apply the techniques to find the Solution of Linear equations.
2. Apply the basics of the calculus of the Determinants.
3. Apply the basics of the calculus of theMatrices.
4. Apply the concept of Singular value decomposition and Principal component analysis in Image Processing and Machine Learning.

SYLLABUS

UNIT I **10 HOURS**

Introduction to Matrices and Determinants**:** Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.

UNIT II **9 HOURS**

Vectors and linear combinations: Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.

UNIT III **8 HOURS**

Vector space: Dimension; Basis; Orthogonally; Projections; Gram-Schmidt or thogonali zation and QR decomposition

UNIT IV **7 HOURS**

Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices;

UNIT V **8 HOURS**

Singular value decomposition and Principal component analysis; Introduction to their applications in Image Processing and Machine Learning.

TEXTBOOKS:

1. Higher Engineering Mathematics, B. S. Grewal.

REFERENCE:

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

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1. E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley,1999.
3. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
4. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
5. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw Hill, 2001.
6. M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi,2004.
7. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw Hill2008.

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BTEC 104	**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 subtractor, Full subtractor, Parallel Adder, BCD adder, Multiplexer, De-multiplexer, Encoder and Decoder. Design of Combinational circuits using Multiplexer and Decoder.

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BTEC 104	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 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.	
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,4th 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, ZvankoVranesic, "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 demultiplexer 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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BTCS202M	DCC	Object Oriented Programming with C++	60	20	20	30	20	3	0	2	4

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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 OUTCOMES:

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

1.	Identify and describe the components of object-oriented technology and justify their relevance.
2.	Implement inheritance for code reusability and polymorphism.
3.	Implement object-oriented approach for real world scenarios.
4.	Use advance features like temples and exception to make programs supporting reusability and sophistication
5.	Develop the applications using object oriented programming with C++.

SYLLABUS

UNIT I — **10 HOURS**

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.

UNIT II — **9 HOURS**

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.

UNIT III — **8 HOURS**

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

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UNIT IV	**7 HOURS**
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++	

UNIT V	**8 HOURS**
I/O and File management: Concept of Streams, Cin and Cout Objects, C++ Stream Classes, Unformatted and Formatted I/O, Manipulators, File Stream, C++ File Stream Classes, File Management Functions, File Modes, Binary and Random Files.	

TEXTBOOKS:	
1.	David Parsons; Object oriented programming with C++; Second edition; BPB publication; 1997.
2.	Robert Lafore; Object oriented programming in C++ ; Fourth edition ; Pearson publication;2002 .
3.	E Balagurusamy; Object oriented programming with C++; Seven edition; TMH; 2017.
4.	Herbert Schildt ; Java Complete Reference;Seven edition; McGrawHill; 2006 .

REFERENCE:	
1.	John R Hubbard; Programming in C++ (Schaum); Third edition; TMH; 2000
2.	Venugopal; Mastering C++ ; second edition ;TMH; 2006.
3.	Steven Holzner; C++ Programming Black Book; First Edition; Coriolis Group,U.S;2001.
4.	E Balagurusamy; Programming with java a primer; Fourth edition; TMH ; 2011.

LIST OF PRACTICALS	
1.	Write a program to display the following output using a single cout statement. Maths=90, Physics=74, Chemistry=76
2.	Write a program to read 2 numbers from the keyboard and display the larger value on the screen.
3.	Write a function using reference variables as arguments to swap the values of a pair of integers.
4.	Write a macro that obtains the largest of 3 numbers.
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.

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BTCS202M	DCC	Object Oriented Programming with C++	60	20	20	30	20	3	0	2	4

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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.
	Design a constructor for bank account class.
	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 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.
	Improve the system design in exercise 8 to incorporate the following features: (a) The price of the books should be updated as and when required. Use a private meneber 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.
	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).
	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.

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BTCS202M	**DCC**	**Object Oriented Programming with C++**	**60**	**20**	**20**	**30**	**20**	**3**	0	**2**	4

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	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 cur*acct and sav*acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks: 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. Check for the minimum balance, impose penalty, necessary and update balance.

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Chairperson
Faculty of Studies, ShriVaishnavVidyapeeth Vishwavidyalaya, Indore

Controller of Examination
ShriVaishnavVidyapeeth Vishwavidyalaya, Indore

Registrar
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BTIT201M	DCC	Data Communication	60	20	20	0	0	3	0	0	3

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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 OUTCOMES:	
Upon completion of the subject, students will be able to:	
1.	Understand the Process and functions of data communications
2.	Understand Transmission media and Tools
3.	Understand the functions of OSI layers
4.	Understand IEEE standards in computer networking
5.	Understand different protocols and network components

SYLLABUS

UNIT I	**10 HOURS**

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

UNIT II	**9 HOURS**

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.

UNIT III	**8 HOURS**

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

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

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UNIT IV	**7 HOURS**
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.	

UNIT V	**8 HOURS**
Application Layer Protocols: Domain Name Service Protocol, File Transfer Protocol, TELNET, WWW and Hyper Text Transfer Protocol, Simple Network Management Protocol, Simple Mail Transfer Protocol, Post Office Protocol v3.	

TEXTBOOKS:

1.	Behrouz A. Forouzan, “Data communication and Networking”, Fourth Edition, Tata McGraw Hill, 2011.

REFERENCE:

1.	Larry L.Peterson, Peter S. Davie, “Computer Networks”, Fifth Edition,Elsevier, 2012
2.	William Stallings, “Data and Computer Communication”, Eighth Edition, Pearson Education,2007.
3.	James F. Kurose, Keith W. Ross, “Computer Networking: A Top–Down Approach Featuring theInternet”, Pearson Education, 2005.

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BTCS102M	DCC	Introduction to Design Thinking	60	20	20	30	20	2	0	2	3

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 learn the concepts of Business Process Manager.
2.	To emphasizing the concepts of reuse, ease of maintenance, and high-quality development strategies.
3.	To create a simple case and a business process definition (BPD) from business requirements.

COURSE OUTCOMES:	
Upon completion of the subject, students will be able to:	
1.	Define business process management (BPM)
2.	List and describe the phases in the BPM lifecycle Procedure
3.	Define process modeling
4.	Create a process application.
5.	Describe IBM Business Process Manager product components.
6.	Understand what came before Design Thinking.
7.	See how design thinking is introduced in an organization
8.	Learn how it built upon previous approaches.
9.	Get an overview of the whole approach to design thinking.
10.	Understand the principles, loop, and keys.

SYLLABUS

UNIT I	**10 HOURS**

INTRODUCTION TO BUSINESS PROCESS MANAGEMENT &AS-IS BUSINESS: PROCESS Define business process management (BPM), List and describe the phases in the BPM lifecycle procedure, Define process modeling., Describe how to use IBM Business Process Manager to accomplish process modeling goals, Explain how to create and modify process applications in the Process Center, Create a process application, Explain case management, Describe the purpose and function of Blue works Live, List and describe the core notation elements that are used in IBM Process Designer, Create a business process definition (BPD) from the process and nested process tasks and responsible, Explain how to create and modify process models with the Designer view of the IBM Process Designer..

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BTCS102M	DCC	Introduction to Design Thinking	60	20	20	30	20	2	0	2	3

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 II	**9 HOURS**
PLAYBACK 0: MODELING PROCESS: List and describe gateways as they are used in IBM Process Designer, List and describe intermediate event types that are used in IBM Process Designer, Model a business process escalation path with an attached timer intermediate event, Describe the Playback 0 validation goals and requirements, Validate that a process model meets Playback 0 goals and Requirements, Describe IBM Business Process Manager product components, Identify the integrations with other IBM products.	
UNIT III	**8 HOURS**
ENTERPRISE DESIGN THINKING – HISTORY, OVERVIEW: Understand what came before Design Thinking, Identify who did what to bring it about, Learn how it built upon previous approaches, Get an overview of the whole approach to design thinking, Understand the principles, loop, and keys, Determine what is most important.	
UNIT IV	**7 HOURS**
ENTERPRISE DESIGN THINKING –7 KEY HABITS, THE LOOP, USER RESEARCH: Learn 7 key habits of effective thinkers design, Avoid common anti-patterns, Optimize for success with these habits, Understand the importance of iteration, Learn how to observe, reflect, & make, Get ready to drill down & do tomorrow, Understand the importance of user research, Appreciate empathy through listening, Learn key methods of user research.	
UNIT V	**8 HOURS**
ENTERPRISE DESIGN THINKING – MAKE, USER FEEDBACK: Understand how Make fits into the Loop, Learn how to leverage Observe information, Learn Ideation, Storyboarding, & Prototyping, Understand user feedback and the Loop, Learn the different types of user feedback, Learn how to carry out getting feedback.	

TEXTBOOKS:	
1.	IBM COURSEWARE – SKILLS ACADEMY
REFERENCE:	
1.	IBM COURSEWARE – SKILLS ACADEMY

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Choice Based Credit System (CBCS)-2025-29
SEMESTER-II

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*				
BTCS102M	**DCC**	**Introduction to Design Thinking**	**60**	**20**	**20**	**30**	**20**	**2**	0	**2**	3

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LIST OF PRACTICALS	
1.	CREATING YOUR FIRST DISCOVERY MAP IN BLUEWORKS LIVE Study of Process Life Cycle.
2.	CREATING PROCESS MODEL IN BLUEWORKS LIVE.
3.	ADDING AND VIEWING PROCESS DETAILS IN BLUEWORKS LIVE
4.	ENTERPRISE DESIGN THINKING - LISTENING
5.	ENTERPRISE DESIGN THINKING - HMW
6.	ENTERPRISE DESIGN THINKING - USER RESEARCH
7.	ENTERPRISE DESIGN THINKING – REFLECT
8.	ENTERPRISE DESIGN THINKING – IDEATION
9.	ENTERPRISE DESIGN THINKING – STORYBOARDING
10.	ENTERPRISE DESIGN THINKING - CRAFTING HILLS
11.	ENTERPRISE DESIGN THINKING – PROTOTYPING

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BTIT208M	**SEC**	**Unix Programming**	**0**	**0**	**0**	**30**	**20**	**0**	0	**2**	1

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COURSE OBJECTIVES:	
The student will have ability to:	
1.	Provide introduction to UNIX Operating System and its File System.
2.	Gain an understanding of important aspects related to the SHELL and the process
3.	Develop the ability to formulate regular expressions and use them for pattern matching.
4.	Provide a comprehensive introduction to SHELL programming, services and utilities
5.	Develop the ability to perform different networking tasks

COURSE OUTCOMES:	
Upon completion of the subject, students will be able to:	
1.	Describe the architecture and features of UNIX Operating System .
2.	Distinguish UNIX Operating System from other Operating Systems
3.	Demonstrate UNIX commands for file handling and process control.
4.	Show the working of vi editor in all its modes using various commands
5.	Write Regular expressions for pattern matching and apply them to various filters for a specific task
6.	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem.
7.	Diagnose network using different networking utilities of UNIX

SYLLABUS

UNIT I	**10 HOURS**
Introduction to UNIX : The UNIX Operating System, The UNIX Architecture, Features of UNIX, Internal and External Commands, Command Structure.General purpose utilities: cal, date, echo, printf, bc, script, passwd, path, who, uname, tty, pwd, cd, mkdir, rmdir	
UNIT II	**9 HOURS**
Handling Files : The File System, touch, cat, cp, rm, mv, more, file, ls, wc, pg, comm, gzip, tar, zip, df, du, The vi editor.Security by file Permissions: chmod, umask . Networking commands: ping, telnet, ftp, finger, arp, rlogin.	
UNIT III	**8 HOURS**
Shell Basics : Types of shells, Shell Functionality, Work Environment, Writing script & executing basic script, Debugging script, Making interactive scripts, Variables (default variables), Mathematical expressions. Conditional statements: If-else-elif, Test command, Logical operators - AND, OR, NOT, Case –esac. Loops: While, For, Until, Break & continue.	

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BTIT208M	SEC	Unix Programming	0	0	0	30	20	0	0	2	1

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UNIT IV	**7 HOURS**
Command Line Arguments & Regular Expression: Command line arguments: Positional parameters, Set & shift, IFS. Functions & file manipulations: Processing file line by line, Functions. Regular Expression & Filters: Regular expression, grep, cut , paste, sort , head , tail , nl , pipe ,tr, tree , meta characters.	

UNIT V	**8 HOURS**
SED and AWK - SED: Scripts, Operation, Addresses, commands, Applications. AWK: Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications awk .	

TEXTBOOKS:	
1.	Sumitabha Das: “YOUR UNIX – The Ultimate Guide”, Tata McGraw Hill.

REFERENCE:	
1.	Behrouz A. Forouzan, Richard F. Gilbery, “Unix and Shell Programming”,Cengage Learning India.
2.	Graham Glass, King Ables, “Unix for programmers and users”, Pearson Education.
3.	N.B. Venkateswarlu, “Advanced Unix programming”, B S Publications.
4.	Yashavant Kanetkar, “Unix Shell programming”, 1st Edition, BPB Publisher.
5.	Stephen Prata “Advanced UNIX: A Programming's Guide”, BPB Publications
6.	Maurice J. Bach “Design of UNIX O.S. “, PHI Learning.
7.	Brian W. Kernighan & Robe Pike, “The UNIX Programming Environment”, PHI Learning.

LIST OF PRACTICALS	
1.	Perform installation of UNIX/LINUX operating system.
2.	Study of UNIX general purpose utility commands
3.	Execution of various file/directory handling commands.
4.	Working with the vi editor: Creating and editing a text file with the vi text editor using the standard vi editor commands.
5.	Write a shell script for calculator (to perform basic arithmetic and logical calculations).
6.	Write a shell script that will take an input file and remove identical lines (or duplicate lines from the file).
7.	Shell scripts to explore system variables such as PATH, HOME etc
8.	Execution of various system administrative commands.
9.	Write awk script that uses all its features
10.	Write a shell script to display list of users currently logged in

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BTIT208M	**SEC**	**Unix Programming**	**0**	**0**	**0**	**30**	**20**	**0**	0	**2**	1

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11.	Write a shell script to delete all the temporary files.
12.	Write shell script to perform different string operations of arrays.

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BTIT307N	**SEC**	**Introduction to core JAVA**	0	0	0	30	20	0	0	2	**1**

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