Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

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 *				
BTCS501N	DCC	Theory of Computation	60	20	20	-	-	3	1	-	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.

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COURSE OBJECTIVES
The student will have ability to:
1. To introduce concepts in automata theory and theory of computation.
2. To identify different formal language classes and their relationships.
3. To design grammars and recognizers for different formal languages.

COURSE OUTCOMES
Upon completion of the subject, students will be able to:
1. Ability to relate practical problems to languages, automata, and computability.
2. Ability to demonstrate an increased level of mathematical sophistication.
3. Ability to apply mathematical and formal techniques for solving problems.

SYLLABUS

UNIT–I   **10 HOURS**
Introduction: Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem.

UNIT–II   **8 HOURS**
Regular Expression (RE): Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden's Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

UNIT–III   **9 HOURS**
Context Free Grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation, Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF

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BTCS501N	DCC	Theory of Computation	60	20	20	-	-	3	1	-	4

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and GNF, Closureproperties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

UNIT–IV   7 HOURS
Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG.

UNIT–V   8 HOURS
Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to undecidability, undecidable problems about TM, NP hard and NP complete problem, Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory.

TEXT BOOKS:
1. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education, 3rd edition, 2014
2. Peter Linz, "An Introduction to Formal Language and Automata", NarosaPub.House, 2011.
3. K.L.P Mishra & N.Chandrasekaran,"Theory of Computer Science", PHI Learning, 3rd edition, 2006

REFERENCES:
1. Martin J. C., "Introduction to Languages and Theory of Computations", TMH, 4th edition, 2010.
2. Papadimitriou, C. and Lewis, C. L., "Elements of the Theory of Computation", PHI, 1997.
3. Michael Sipser,"Introduction to Theory of Computation",Cengage Learning, 3rd edition,2013.

Chairperson	**Chairperson**	**Controller of Examination**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**	**Shri Vaishnav Vidyapeeth**
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Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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			THEORY			**PRACTICAL**					
BTCS203N	DCC	**Operating Systems**	60	20	20	30	20	2	-	2	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
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Course Educational Objectives (CEOs):

The student will have ability to:
1. To learn the fundamentals of Operating Systems.
2. To study the mechanisms of Operating System to handle processes and threads and their communication.
3. To gain knowledge of process management concepts that includes architecture, Mutual exclusion algorithms, deadlock detection and recovery algorithms.
4. To learn the mechanisms involved in memory management in Operating System.
5. To know the components and management aspects of disc scheduling.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to:
1. To describe the detail structure of Operating System.
2. To design and Implement Process management Techniques in Operating System.
3. To calculate CPU Scheduling criteria.
4. To understand The Memory Management of Operating System.
5. To elaborate Disc Scheduling.

Syllabus:

UNIT I 10HRS
Introduction to Operating System: Introduction and Need of operating system, Layered Architecture/Logical Structure of Operating system, Type of OS(Multiprogramming , Time Sharing, Real Time ,Networked, Distributed, Clustered, Hand Held), Operating system as Resource Manager and Virtual Machine,System Calls/Monitor Calls, Firmware- BIOS, Boot Strap Loader. Threads- processes versus threads, threading, concepts, models, kernel & user level threads, thread usage, benefits.

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UNIT II   9HRS
Process Management: Process Model, Creation, Termination, States & Transitions, Context Switching, Process Control Block, CPU and I/O bound, CPU scheduler- short, medium, long-term, dispatcher, scheduling:- preemptive and non-preemptive, Static and Dynamic Priority
Criteria/Goals/Performance Metrics, scheduling algorithms- FCFS, SJFS, shortest remaining time, Round robin, Priority scheduling, multilevel queue scheduling, multilevel feedback queue scheduling

UNIT III   8HRS
Inter Process Communication: Introduction to Message Passing, Race Condition, Critical Section Problem, Peterson's Solution, Semaphore, Classical Problems of Synchronization Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem.
Deadlock- System model, Resource types, Deadlock Problem, Deadlock Characterization, Methods for Deadlock Handling, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock Detection, Recovery from Deadlock.

UNIT IV   7HRS
Memory Management: concepts, functions, logical and physical address space, address binding, degree of multiprogramming, swapping, static & dynamic loading- creating a load module, loading, static & dynamic linking, memory allocation schemes- first fit, next fit, best fit, worst fit and quick fit.
Virtual Memory- concept, virtual address space, paging scheme, pure segmentation and segmentation with paging scheme hardware support and implementation details, memory fragmentation, demand paging ,working set model, page fault frequency, thrashing, page replacement algorithms- optimal, FIFO,LRU; Bleady's anomaly; TLB (translation look aside buffer).

UNIT V   8HRS
File Management: Concepts, Naming, Attributes, Operations, Types, Structure, File Organization & Access (Sequential, Direct ,Index Sequential) Methods, Memory Mapped Files, Directory Structures One Level, Two Level, Hierarchical/Tree, Acyclic Graph, General Graph, File System Mounting, File Sharing, Path Name, Directory Operations, Overview Of File System in Linux & Windows.
Input/output Subsystems- Concepts, Functions/Goals, Input/Output devices- Block And Character, Spooling, Disk Structure & Operation, Disk Attachment, Disk Storage Capacity, Disk Scheduling Algorithm- FCFS, SSTF, Scan Scheduling, C-Scan Schedule.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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BTCS203N	DCC	**Operating Systems**	60	20	20	30	20	2	-	2	3

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Text books:
1. Abraham Silberschatz,"Operating system concepts",10th Edition,John Willey & Sons. INC, 2018
2. Andrew S.Tannanbaum, "Modern operating system", 4th Edition,Pearson Education, 2014
3. Dhananjay M. Dhamdhere, "Operating Systems:A concept Based Approach", 3rd Edition TMH, 2017,
4. SibsankarHaldar, Alex AlagarsamyAravind,"Operating System", 8th Edition, Pearson Education India,, 2010

Reference Books:
1. Achyut S Godbole,"Operating System",3rd TMH,2017.
2. William Stalling, "operating system" 8th, Pearson Education, ,2014.
3. Vijay Shukla, "Operating System", 3[rd,] Kataria&Sons ,2013.
4. Singhal&Shivratri,"Advanced Concept in Operating Systems", 1[st ,]TataMc-Graw Hill Education, edition 2017.

List of Practical:
1. Implement and update the BIOS settings of your PC.
2. If there are 5 printers are connected in a system each process to print will take different time to complete, and CPU will give a fixed time to each process after that deadline next process will enter in CPU. If a problem not completed in a given slot then that process will be re enter as per the FCFS, on rotation basis? Apply the scheduling on this?
3. Implement Non Preemptive Priority CPU Scheduling.
4. Implement Non Preemptive Shortest Job first CPU Scheduling.
5. If there are 5 different resources like 3 printer,2 scanner are connected to a system each taking different time to complete the task. Which scheduling is best and gives best performance of CPU?
6. Implement the scheduling for that where CPU give chance to complete those process first which comes first?
7. Implement Round-Robin CPU scheduling.
8. Write a program to implement Semaphore.
9. Find the solution for the situation where 5 faculties are sitting in a round table. There are 4 ball pens are placed on this table. At a time only one pen can be picked by one faculty to writing work. What will happen if all picked the pen for writing simultaneously?
10. Find the solution for dentist checkup clinic where only one chair and one dentist is available for treatment. And having n chairs to waiting for patient.

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Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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- ▪ If there is no patient, then the doctor sleeps in his own chair.
  - ▪ When a patient arrives, he has to wake up the doctor.
  - ▪ If there are many patients and the doctor is doing treatment of him, then the remaining patients either wait if there are empty chairs in the waiting room or they leave if no chairs are empty.

1. Write a program for Memory Management Algorithms e.g. First Fit, Best Fit, Worst Fit.
12. Demonstrate Virtual memory Techniques like, LRU, FIFO etc.
13. Implement Shortest Seek Time First Disk Scheduling Algorithm.
14. Implement Scan Scheduling Disk Scheduling Algorithm.
15. Implement Circular Scan Disk Scheduling Algorithm.
16. Implement Look Disk Scheduling Algorithm.

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Shri Vaishnav Institute Of Information Technology
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B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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BTAIML504N	DCC	Deep Learning	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
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Course Educational Objectives (CEOs):

1. To provide an overview of an exciting field of Deep Learning
2. Develop an understanding of the complete process of deep learning project and its near term future direction.
3. To introduce the tools required to manage and analyse deep learning project like: Jupyter Notebook and tensor flow.
4. To teach the fundamental techniques and principles in achieving deep learning with scalability and streaming capability.
5. To enable students to have skills that will help them to solve complex real-world problems in for business decisions with neural networks.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The students will be able to
1. Understand the concept of Deep Learning from a global context.
2. To understand and apply Neural Networks in Market perspective of Deep Learning Projects. Applying and analyzing architecture of Convolution Neural Networks to achieving data learning models.
3. Be able to design and implement recurrent neural network and LSTM systems.
4. Be able to design and implement RBM sand understand auto encoders concept in deep learning. Be able to design and implement various Neural Networks model in a range of real world applications. Creating projects and research activities based on Neural Networks Deep Learning using Python.

SYLLABUS

UNIT–I   **10 HOURS**
Introduction to Deep Learning Why Deep Learning? Introduction to Neural Networks. Neural Network Architecture. Full cycle of a Deep Learning Project. Activation Functions. Gradient Descent, Derivatives.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
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Choice Based Credit System (CBCS) in the light of NEP-2020
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SEMESTER-V (2021-2025)

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UNIT–II   8 HOURS

Computation Graphs, Vectorization, Deep Learning with Keras, TensorFlow, PyTorch, predicting house prices with Regression using TensorFlow, Sentiment analysis using Keras and TensorFlow, Image noise reduction using TensorFlow.

UNIT–III   9 HOURS

Neural Network: Building blocks of Deep Neural Networks, Forward and Backward Propagation., Parameters versus Hyper-parameters, Optimization, Loss function and optimization functions.

UNIT–IV   7 HOURS

Convolutional Networks Introduction to convolutional networks. CNN Architecture. Understanding Convolutions. CNN for Classification.

UNIT–V   8 HOURS
Applications of Convolution Neural Networks: Object Detection, Face Recognition, Classification

Textbooks:

1. Deep Learning with Python by François Chollet
2. Hands-On Machine Learning with Scikit-Learn, Keras and Tensor Flow: Concepts, Tools and Techniques to Build Intelligent Systems by Aurelien Geron
3. Deep Learning (Adaptive Computation and Machine Learning series)by Ian Goodfellow.

References:

1. Machine learning with Tensor Flow For Dummies by Matthew Scarpino
2. Machine Learning for Big Data: Hands-On for Developers and Technical Professionals" by Jason Bell

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Shri Vaishnav Vidyapeeth Vishwavidyalaya
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Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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List of Practical:
1. Predicting house prices with Regression using TensorFlow
2. Image noise reduction using TensorFlow.
3. Object Detection.
4. Face Recognition.
5. Classification.

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Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

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BTCS402N	DCC	Software Engineering and Project Management	60	20	20	30	20	3	-	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
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Course Educational Objectives (CEOs):

The student will have ability to:
1. Get the knowledge of basic software engineering methods and practices.
2. Define software requirements and requirement engineering.
3. Apply approaches for various design and their principle.
4. Explore testing in various domain.
5. Development of significant teamwork and project-based experience.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes.

The students will be able to

1. Compare various software process models and identify where these models are applicable.
2. Define and analyze software project management, the framework, and the dimensions of software project management.
3. Comprehend System modeling using UML.
4. Identify software testing strategies by using testing tools.
5. Analyze software risks and risk management strategies.

Syllabus:

UNIT I   **10HRS**
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.
A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models. Process models: The waterfall model, incremental process models, evolutionary process models, unified process. Agile development-Agile Process, Extreme Programming.

UNIT II   **9HRS**
Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis,

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SEMESTER-V(2021-2025)

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BTCS402N	DCC	Software Engineering and Project Management	60	20	20	30	20	3	-	2	4

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requirements validation, requirements management.
System models: Context models, behavioural models, data models, object models, structured methods.

UNIT III   8**HRS**
Design Engineering: Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modelling, Use Case Diagrams, Class Diagrams, Interaction Diagrams, State chart Diagrams, Activity Diagrams, Package Diagrams, Component Diagrams, Deployment Diagrams

UNIT IV   **7HRS**
Software Implementation: - Structured coding Techniques, Coding Styles, Standards and Guidelines, Documentation Guidelines-Modern Programming Language Features: Type Checking-User defined data types-Data Abstraction-Exception Handling- Concurrency Mechanism.
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, Object oriented software, Web Apps-validation testing, system testing, the art of debugging.

UNIT V   **8HRS**
Metrics for Process and Products: Software measurement, metrics for software quality. Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.
MAINTENANCE: Software Maintenance-Software Supportability- Reengineering- Business Process Reengineering- Software Reengineering- Reverse Engineering- Restructuring- Forward Engineering- Economics of Reengineering

Textbooks:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.

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2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
4. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005.
5. Richard H.Thayer,"SoftwareEnginerring& Project Managements",Willey India

References:
1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.
4. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.

List of Practical:
1. Study and compare the SDLC models.
2. Prepare a SRS document in line with the IEEE recommended standards.
3. Study Requirement Engineering of project.
4. Study the UML drawing tools.
5. Draw the Entity relationship diagram of a project.
6. Draw the data flow diagrams at level 0 and level 1.
7. Draw use case diagram in argo UML.
8. Draw activity diagram in argo UML.
9. Draw class diagram in argo UML.
10. Draw the component diagram in argo UML.
11. Draw sequence diagram in argo UML.
12. Draw collaboration diagram in argo uml.
13. Use testing tool such as junit.
14. Using configuration management tool-libra.

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Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

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BTCS503N	DCC	Cyber and Network Security	60	20	20	30	20	3	0	2	4

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COURSE OBJECTIVES:
The student will have ability:
1. To gain a fundamental knowledge of Cyber crime and Network Security.
2. To gain a fundamental understanding of a Cyber-attack and Challenges in identify and prevent them from occurring.
3. To gain a fundamental knowledge of Tools and Methods used in Cyber crime for prevention.
4. To understand the need of Cyber law and the fundamental concepts of Cyber Forensic.
5. To provide the fundamental skills and understanding needed to identify Cyber Security threats.

COURSE OUTCOMES:
Upon completion of the subject, students will be able to:
1. Identify physical points of vulnerability in simple networks and security needs of an organization.
2. Evaluate the Legal Perspective of Cyber crime and Cyber Security.
3. Formulate, update and communicate short- and long-term organizational cyber-security strategies and policies.
4. Troubleshoot, maintain and update an enterprise-level information security system.
5. Investigate the Cybercrime with the help of Cyber Forensic.

SYLLABUS

UNIT–I   **10 HOURS**
Computer Security Concepts,The OSI Security Architecture, Security Attacks, Security Services, Security mechanism, Fundamental Security Design Principles, Attack Surface and Attack trees, A Model for Network Security.
Introduction to Cyber crime, Cyber crime and Information Security, Classification of Cyber crimes Cyber crime: The Legal Perspective, Cyber crime: An Indian Perspective.

UNIT–II   **9 HOURS**
Introduction to Cyber offence, How Criminal plan the attack, Social Engineering, Cyber stalkin, Cyber café and cyber crime, Botnets: The fuel of cybercrime, Attack vector, cloud computing.
Cyber crime: Mobile and Wireless devices, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

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*				
BTCS503N	DCC	Cyber and Network Security	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
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Challenges Posed by Mobile Devices, Registry Setting for Mobile Devices, Authentication Service Security, Attack on Mobile Phones.

UNIT–III   **8 HOURS**
Tools and Methods Used in Cyber crime, Proxy Server and Anonymizers, Phishing and Identity Theft, Password Cracking, Keylogger and Spyware, Virus and Worms, Trojan Horse and Backdoors, Steganography DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attack on Wireless Networks.

UNIT–IV   **9 HOURS**
Cyber crime and the Legal Landscape around the World, Why Do We Need Cyber laws, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Information Technology Act, Digital Signature and the IT Act, Cybercrime and Punishment.
Introduction to Cyber Forensics, Historical Background of Cyber Forensics, Cyber Forensics and Digital Evidence, Forensic Analysis of E-Mail, Digital Forensic Life Cycle, Approaching Computer Forensic Investigation, Relevance of OSI Model to Computer Forensic, Challenges in Computer Forensic.

UNIT–V   **8 HOURS**
Network Access Control and Cloud Security, Transport- Level Security, Wireless Network Security, Electronic Mail Security, IP Security.

TEXT BOOKS:
1. William Stallings, "Cryptography and Network Security: Principles and Practice",7th EditionPearson,2017
2. SunitBelapure, Nina Godbole"Cyber Security",1st edition, Wiley Publication, 2011

REFERENCES:
1. Carl Endorf, Eugene Schultz, Jim Mellander"Intrusion Detection&Prevention",1stEdition,TMH,2007
2. Neal, Krawetz, Introduction to Network Security,1st Edition ,Cengage Learning,2006
3. AtulKahate,"Cryptography and Network Security",McGraw Hill,,2009
4. Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, " Network Security -Private communication in a public world" ,2nd Edition,TMH,2002
5. Fourozon, "Cryptography & Network Security" 4thEdition ,TMH,2005
6. MayankBhushan "Fundamentals of Cyber Security",1st Edition ,BPB Publication, 2017.

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7. Gaurav Gupta,Sarika Gupta "Information Security and Cyber Laws",1st Edition,Khanna Book Publishing,2011.

LIST OF PRACTICALS: -
1. Study of different wireless network components and features of any one of the Mobile Security Apps.
2. Study of the features of firewall in providing network security and to set Firewall Security in windows.
3. Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
4. Study of different types of vulnerabilities for hacking a websites / Web Applications.
5. Analysis the Security Vulnerabilities of E-commerce services.
6. Analysis the security vulnerabilities of E-Mail Application.

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Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY								
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University	Teachers Assessment*				
BTDSE512N	DSE	Software Testing and Quality Assurance	60	20	20	30	20	3	-	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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COURSE OBJECTIVES
The student will have ability to:
1. Develop a skill in developing good quality in the software product.
2. Develop methods and procedures for software development that can scale up for large systems and that can be used to consistently produce high-quality software at low cost and with a small cycle time
3. Learn systematic approach to the operation, maintenance, and retirement of software.
4. Learn how to use available resources to develop software, reduce cost of software and how to maintain quality of software
5. Methods and tools of testing and maintenance of software

COURSE OUTCOMES
Upon completion of the subject, students will be able to:
1. Apply approach of Software Testing & QA concepts.
2. Apply modern software testing processes in relation to software development and project management.
3. Create test strategies and plans, design test cases prioritize and execute them.
4. Manage defects within a project.
5. Contribute to efficient delivery of software solutions and implement improvements in the software development processes.

SYLLABUS

UNIT–I   **10 HOURS**
BASIC CONCEPTS: Basic Testing Vocabulary, Quality Assurance versus Quality Control, The Cost of Quality, Software Quality Factors, Software Defect, The Multiple Roles of the Software Tester(People Relationships), Scope of Testing, Testing Constraints, Various software development Life cycles (SDLC), Independent Testing, QA Process, Levels of Testing, The "V" Concept of Testing.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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UNIT–II   9 HOURS
WHITE BOX TESTING: White box testing techniques - Statement coverage - Branch Coverage - Condition coverage - Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis.

UNIT–III   8 HOURS
BLACK BOX TESTING: Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning -Syntax testing - Finite state testing - Levels of testing – Unit testing- Integration Testing

UNIT–IV   7 HOURS
SYSTEM TESTING - Functional testing-non-Functional testing-acceptancetesting-performance testing –Factors and Methodology for Performance testing, Regression testing-Methodology for Regression-testing.Five Views of Software Quality, McCall's Quality Factors and Criteria, Quality Factors, Quality Criteria, Relationship between Quality Factors and Criteria, Quality Metrics, Quality Characteristics, Software Quality Standard

UNIT–V   8 HOURS
ADVANCE SOFTWARE TESTING METHOD (OBJECT ORIENTED TESTING):
Syntax testing - Finite State testing - Levels of testing - Unit, Integration and System Testing. Challenges - Differences from testing non-OO Software - Class testing strategies - State-based Testing Software quality Assurance: ISO 9000; CMM and Test Management Issues; Quality Assurance personnel Issues.

TEXT BOOKS:
1.KshirasagarNaik&PriyadarshiTripathy, "Software Testing & Quality Assurance", A JOHN WILEY & SONS, INC. Publication.
2. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
3. Waman S.Jawadekar,"Software Enginerring", TMH
4. Sommerville,"Software Enginerring",Pearson Education.

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Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V (2021-2025)

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5."IBM CE-Enablement Program- Essentials of Software Engineering (OOAD & SW Lifecycle)", IBM Careeer Education

REFERENCES:
1.KshirasagarNaik&PriyadarshiTripathy, "Software Testing & Quality Assurance", A JOHN WILEY & SONS, INC. Publication.
2. R S. Pressman ,"Software Engineering: A Practitioner's Approach", Sixth edition 2006, McGraw-Hill.
3. Waman S.Jawadekar,"Software Enginerring", TMH
4. Sommerville,"Software Enginerring",Pearson Education.
5. http://www.softwaretestinghelp.com/online-software-testing-course-syllabus/
6.https://amizone.net/AdminAmizone/WebForms/Academics/NewSyllabus/1217201473127725 pdf
7. http://www.tutorialspoint.com/uml/

LIST OF EXPERIMENTS:
1. Design test cases using Boundary value analysis by taking quadratic equation problem.
2. Design test cases using Equivalence class partitioning taking triangle problem.
3. Design test cases using Decision table taking triangle problem.
4. Design independent paths by calculating cyclometer complexity using date problem.
5. Design independent paths by taking DD path using date problem.
6. Design the test cases for login page of AMIZONE.
7. Manual Testing for PAN card verification.
8. Generate test case for ATM machine.
9. Overview of Testing process using Rational Robot.
10. Write a script to record verification point using Rational Robot (For GUI testing of single click on window OS).
11. Write a script to record verification point for Clip Board and alphanumeric values using Rational Robot.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE513N	DSE	Next Generation Telecommunication Networks	60	20	20	30	20	3	-	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
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COURSE OBJECTIVES
The student will have ability to:
1. Understand the importance of QoS and resource management in next generation wireless networks. 2. Describe and compare the network and protocol architectures of GPRS and EDGE and the two
2. principle 3G cellular based wireless standards: UMTS and cdma2000.
3. List and provide a high-level discussion on the key enabling technologies for next generation wireless networks.
4. Identify the relationship between WiFi, WiMAX, and 3G cellular-based wireless networks. In addition, the student will be able to outline and discuss the potential impact of these technologies upon wireless network evolution.

COURSE OUTCOMES
Upon completion of the subject, students will be able to:
1. Understand and explain the drivers of service conversion.
2. Define the term "Next Generation Network" and outline it's main characteristics.
3. Outline the main architectural elements of a Next Generation Network and explain the logic behind it.
4. Understand the concept of Voice over IP (VoIP) and explain how full featured telephony can be provisioned over an IP network.
5. Understand the portfolio of broadband access mechanisms in a fixed network and be able to explain the
relative merits of each type.
6. Understand the principles of connection-orientated and connectionless packet switching and the protocols
available to enable such networks.
7. Understand the principles of mobile networks and they relate to NGN.

SYLLABUS

UNIT–I   9HRS
Basic history of Mobile Computing Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, Wireless network architecture, Applications, Security, Concerns and Standards, Benefits, Future. Evolution of mobile computing.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

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UNIT–II   8 HRS
Next Generation Networks (NGN), Principles and definition of an NGN, The NGN architecture, Outline of technology choices, Network and implementation issues with NGN, Numbering & Addressing

UNIT–III   10 HRS
Wireless n/w. and Technologies Introduction, Different generations. Introduction to 1G, 2G, 3G and 4G, Bluetooth, Radio frequency identification(Rfid),Wireless Broadband, Mobile IP: Introduction, Advertisement, Registration, TCP connections, two level addressing, abstract mobility management model, performance issue, routing in mobile host, Adhoc networks, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. ,IPv6

UNIT–IV   9 HRS
Next Generation Core NetworkThe role of the core network, Enabling Control and Reconfigurability, Packet Switching (ATM, IP, MPLS, Ethernet), IP Multi-Media System (IMS), Principles of control for IP networks, Concept of IMS

UNIT–V   8 HRS
NGN Service AspectsServices on an NGN, Service compatibility with PSTN and IN, Use of APIs and service provider interfaces, Brief review of the principles of mobile networks, Relationship of mobile developments to NGN

TEXT BOOKS
1. VALDAR, A R: 'Understanding Telecommunications Networks', IET Telecommunications Series 52, 2006
2. Convergence Technologies for 3G Networks: IP, UMTS, EGPRS and ATM Authors: Jeffrey Bannister, Paul Mather, and Sebastian Coope. . John Wiley & Sons, Ltd. ISBN 0-470-86091-X (HB)
3. Mobile Computing ,Asoke K Telukder, Roopa R Yavagal, TMH
4. Wireless Communications and Networks, 3G and beyond, ITI SahaMisra, TMH

REFERENCES
1. M Carugi "Introduction to the ITU-T NGN focus group release 1: target environment, services,

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Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
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B.Tech. (CSE- Artificial Intelligence and Machine Learning - Microsoft)
SEMESTER-V(2021-2025)

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BTDSE513N	DSE	Next Generation Telecommunication Networks	60	20	20	30	20	3	-	2	4

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

and capabilities," Communications Magazine, IEEE, vol.43, no.10, pp. 42- 48, Oct. 2005
2. Chae-Sub Lee, Knight, D. ,"Realization of the next-generation network,"CommunicationsMagazine, IEEE, vol.43, no.10, pp. 34- 41, Oct. 2005.

List of Experiments:
1. Selection and study of various PN code (MLS, GOLD, BARKER).
2. Generate (spreading) DS-SS modulated signal.
3. To demodulate (dispreading) DS-SS modulated signal.
4. Selection & comparative study of various code modulation techniques: BPSK/ QPSK/OQPSK.
5. Modulation and Demodulation using internal generation of 2047 bit PN sequence asmodulator Input and Unmodulated carrier.
6. Spreading and Dispreading using Additive white Gaussian Noise Generator and frequency offset.
7. Voice communication using DSSS.

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Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**

| COURSE CODE | CATE GORY | 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 *				
BTCS507N	DCC	Scripting Languages	-	-	-	30	20	-	-	4	2

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit;
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COURSE OBJECTIVES
The student will have ability to:o understand different types of scripting languages.
1. To gain knowledge about client side scripts and server side scripting.
2. To learn about PHP, PERL and Python languages and their usage in implementation.
3. To build web application project using scripting languages.

COURSE OUTCOMES
Upon completion of the subject, students will be able to:
1. Student will be Able to understand difference between scripting languages.
2. Student will be able to create programs using functions, control structures.
3. Student will learn implementation of scripting languages on different tools
4. Student can apply knowledge of scripting languages for creating a web application project using scripting languages implementation.

SYLLABUS

UNIT–I   8HRS
Introduction of scripting languages, need of scripting, characteristics of scripting languages, uses of scripting languages, Introduction of client side scripting languages like JavaScript, VBScript, HTML5 (Structure), CSS3 (Designing), AJAX, jQuery, Server side scripting languages like PHP, ASP.NET (C# OR Visual Basic), C++ , Java and JSP, Python, Ruby on Rails.

UNIT–II   6 HRS
PHP basic features, Embedding php code in your web pages, outputting the data to the browser, data types, variables, constants, expressions, string interpolation, control structure, function, creating a function, function library, Arrays, String & regular expression, Web forms, Files, Authentication, Uploading file with PHP, sending email using PHP.

UNIT–III   8HRS
Python: Introduction to python languages, python syntax, statements, functions, build-in functions, methods, module in python, exception handling, integrated web application in python- Building small, efficient python web system, web application framework.

UNIT–IV   7 HRS
Introduction to perl and scripting, scripts,programs, Web scripting and PERL names , values, variable, scalar expression, control structures, arrays, list, hashes, strings, patterns, and regular expression, subroutine.

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

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BTCS507N	DCC	Scripting Languages	-	-	-	30	20	-	-	4	2

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UNIT–V   **6 HRS**
Introduction of Angular JS, Industrial usage of angular JS.benefits of Angular JS, Creation of Web application project using database, scripting, HTML, & CSS.

TEXT BOOKS:
1.   The World of Scripting Languages, David Barron, Wiley Publications.
2.   Python Web Programming, Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL, 3" Edition, Jason Gilmore, Apress Publications (Dream tech.).

REFERENCES:
1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Pen and PHP, J.Lee and B.Ware(Addison Wesley) Pearson Education.
2. Programming Python,M.Lutz,SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1,l.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.
6. Guide to Programming with Python, M.Dawson, Cengage Learning.
7. Pen by Example, E.Quigley, Pearson Education.
8. Programming Perl,Larry Wall, T.Christiansen and J.Orwant,O'Reilly, SPD.
9. Tcl and the Tk Tool kit, Ousterhout, Pearson Education.
10. PHP and MySQL by Example, E.Quigley, Prentice HalI(Pearson).
11. Perl Power, J.RFlynt, Cengage Learning.
12. PHP Programming solutions, V.Vaswani, TMH.

LIST OF EXPERIMENTS:
1. Javascript program to generate Fibonacci series and to look for motifs and patterns in sequences.
2. Javascript program to find out frequency of characters existing in nucleotide and protein sequences 6 Javascript's implementation to generate dynamic HTML pages.
3. Write PHP programs to do basic operations to deal with strings, and arrays, and to implement various mathematical functions.
4. Development of an PHP program to take set of sequences and find out conserved sequences.
5. Create a MySQL database tables and execute all SQL queries.
6. Write a PHP program to connect MySQL database and execute all SQL commands.
7. Construct a PHP interface for a given Web page and to produce its overall connectivity.

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COURSE CODE	CATE GORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
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BTCS507N	DCC	**Scripting Languages**	-	-	-	30	20	-	-	4	2

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8. Implement database and server site connectivity all together to generate complete dynamic web-based applications through PHP, HTML and MySQL.
9. Write programs in Perl to implement string handling and other functions to be implemented to deal with biological data management.
10. Write PHP programs to do basic server-side programming.

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