Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
Bachelor of Technology (CSE with Specialization in Enterprise System(RedHat)
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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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.

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BTCS502N	DCC	**Artificial Intelligence**	**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. Know how computer system adapts, evolves and learns.
2. To gain expertise in one of fastest growing areas of Computer Science that covers topics related to human intelligence and its applications in industry, defense, healthcare, agriculture and many other areas.
3. Provides a rigorous, advanced and professional graduate-level foundation in Artificial Intelligence

COURSE OUTCOMES
Upon completion of the subject, students will be able to:
1. Build intelligent agents for search and games
2. Solve AI problems through programming with Python
3. Learning optimization and inference algorithms for model learning
4. Design and develop programs for an agent to learn and act in a structured environment.

SYLLABUS

UNIT–I **10 HOURS**

Introduction: Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Reviewof tree and graph structures, State space representation, Search graph and Search tree.

UNIT–II **9 HOURS**

Search Algorithms: Random search, Search with closed and open list, Depth first and Breadth first search, Heuristicsearch, Best first search, A* algorithm, Game Search.

UNIT–III **8 HOURS**

Probabilistic Reasoning: Probability, conditional probability, Bayes Rule, Bayesian Networks-representation, constructionand inference, temporal model, hidden Markov model.

UNIT–IV **7 HOURS**

Markov Decision process:MDP formulation, utility theory, utility functions, value iteration, policy iteration and partiallyobservable MDPs.

UNIT–V **8 HOURS**

Reinforcement Learning: Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporaldifference learning, active reinforcement learning- Q learning.

TEXT BOOKS:
1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach" , 3rd Edition,Prentice Hall.

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BTCS502N	DCC	**Artificial Intelligence**	**60**	**20**	**20**	**30**	**20**	**3**		**2**	**4**

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2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill.
3. Trivedi, M.C., "A Classical Approach to Artifical Intelligence", Khanna Publishing House, Delhi.
4. SarojKaushik, "Artificial Intelligence", Cengage Learning India, 2011.
5. David Poole and Alan Mackworth, "Artificial Intelligence: Foundations for Computational Agents", Cambridge University Press 2010.

WEBSITES FOR REFERENCE:
1. https://nptel.ac.in/courses/106105077
2. https://nptel.ac.in/courses/106106126
3. https://aima.cs.berkeley.edu
4. https://ai.berkeley,edu/project_overview.html (for Practicals)

LIST OF PRACTICALS:
1. Write a programme to conduct uninformed and informed search.
2. Write a programme to conduct game search.
3. Write a programme to construct a Bayesian network from given data.
4. Write a programme to infer from the Bayesian network.
5. Write a programme to run value and policy iteration in a grid world.
6. Write a programme to do reinforcement learning in a grid world.
7. Mini Project work.

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

COURSE OBJECTIVES:
The student will have ability:
1. To 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 Challenges Posed by Mobile Devices, Registry Setting for Mobile Devices, Authentication Service Security, Attack on Mobile Phones.

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

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

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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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BTCS402N	DCC	Software Engineering and Project Management	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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COURSE OBJECTIVES

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

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, requirements validation, requirements management.

System models: Context models, behavioural models, data models, object models, structured methods..

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UNIT III **8HRS**

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

TEXT BOOKS:

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

2. Software Engineering- Sommerville, 7th edition, Pearson Education.

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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.CunoPfister, "Getting Started with the Internet of Things", O Reilly Media.
5. Richard H.Thayer,"Software engineering & 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 GrawHill 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 PRACTICALS:

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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BTDSE511N	DSE	**Simulation and Modeling**	**60**	**20**	**20**	**30**	**20**	3	0	2	4

COURSE OBJECTIVES

The student will have ability to:

1.Introduce students to the simulation and modeling techniques.

2. Provide a way for students with opportunities to develop basic simulation and modeling

3. Introduce concepts of modeling layers of society's&industrialreal world problems.

4. Build tools to view and control simulations and their results.

COURSE OUTCOMES

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

1. Characterize a given engineering system in terms of its essential elements, that is, purpose, parameters, constraints, performance requirements, subsystems, interconnections and environmental context.
2. Develop a modeling strategy for a real world engineering system, which considers prediction and evaluation against design criteria, and integrates any required sub-system models.
3. Assess and select a model for an engineering system taking into consideration its suitability to facilitate engineering decision making and predicted advantages over alternative models.
4. Interpret the simulation results of an engineering system model, within the context of its capabilities and limitations, to address critical issues in an engineering project
5. Fundamentals and techniques for designing and using simulation, modeling, and optimization algorithms with applications in system performance modeling, business infrastructure modeling, and distributed and parallel computing. An introduction to advanced complex systems models.

SYLLABUS

UNIT–I **10 HOURS**

INTRODUCTION

Introduction to simulation & modeling, advantages anddisadvantages of simulation, application areas in communication, computer and softwaredesign, systems and systems environment, components of a system, discrete and continuoussystems, model of a system, types of models, discrete-event simulation, steps in a simulationstudy. Simulation Examples- Simulation of queueing systems, on-demand and inventorysystems, simulation for reliability analysis, Introduction to GPSS.

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BTDSE511N	DSE	**Simulation and Modeling**	**60**	**20**	**20**	**30**	**20**	3	0	2	4

UNIT–II **9 HOURS**

COMPUTER BASED SYSTEM SIMULATION:

Types of System Simulation, Monte Carlo Method, comparison of analytical and Simulation methods, Markov Model, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model. Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages, Hybrid simulation, Real Time simulations.

UNIT III **8 HOURS**

INTRODUCTION TO QUEUING THEORY

Characteristics of queuing system, Poisson's formula, birth-death system, equilibriumof queuing system, analysis of M/M/1 queues. Introduction to multiple server Queue models M/M/c Application of queuing theory in manufacturing and computer system, FSM, Petri-net Model.

UNIT–IV **7 HOURS**

VERIFICATION AND VALIDATION

Verification of Simulation Models, Calibration and Validation of Models, Validation of Model Assumptions , Validating Input & Output Transformations, Design of simulation experiments.

UNIT–V **8 HOURS**

SIMULATION TOOLS

Simulation Tools – Model Input – High level computer system simulation – CPU – Memory, Simulation – Comparison of systems via simulation – Simulation Programming techniques, Development of Simulation models, General Purpose Simulation Package-MATLAB, ARENA, EXTEND, Study of SIMULA, DYNAMO

TEXT BOOKS:

1 Gordon G., System simulation, PHI Learning

2.Singh V.P System Simulation and Modeling NEW AGE INTERNATIONAL, PUBLISHERS

3.Taha H, Operations Research; PHI.

4.Payer, T., Introduction to system simulation, McGraw Hill.

5.Spriet JA; Computer Aided Modeling and Simulation, Academic Press INC; USA

REFERENCES:

1. J K Sharma, Operations Research Theory and Application, Pearson Education Pvt Ltd, 2 Edition

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			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE511N	DSE	**Simulation and Modeling**	**60**	**20**	**20**	**30**	**20**	3	0	2	4

Banks J; Hand book of Simulation; John Wiley.
2.Law AM and Kelton WD; Simulation Modeling and Analysis; TMH

LIST OF EXPERIMENTS:

1. Simulate CPU scheduling algorithm using queueing system.
2. Simulate multiplexer using queuing system.
3. Simulate Network congestion control algorithms usingPetri-net Model.
4. Simulate disk scheduling algorithmsPetri-net Model.
5. Verification and validation of Petri-net Model.
6. Simulate a Manufacturing shop and write a program in GPSS.
7. Simulate Telephone system model and write a program in SIMSCRIPT.
8. Graphical Simulation and Modeling using MATLAB.
9. Study of SIMULA.
10. Study of DYNAMO.

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BTDSE613N	**DSE**	**Data mining and visualization**	60	20	20	30	20	3	0	2	4

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COURSE OBJECTIVES
The student will have ability to:

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

SYLLABUS

*In process

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BTDSE513N	DSE	**Next Generation Telecommunication Networks**	60	20	20	30	20	3	0	2	4

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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
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.

UNIT–II
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

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UNIT–III

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

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

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, 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.

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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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			THEORY			PRACTICAL					
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DO180	DCC	**RedHat OpenShift : Containers & Kubernetes**	-	-	-	-	100	0	0	4	2

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

- Understand container and OpenShift architecture.
- Deploy containerized applications on Red Hat OpenShift.
- Create, Deploy and monitor microservice-based applications.
- Deploying multi-container applications

Course Outcomes:

- Create containerized services using Podman.
- Manage containers and container images.
- Create custom container images.
- Deploy containerized applications on OpenShift.
- Deploy multi-container applications

Syllabus

Chapter 1
Introduce container technology, Orchestration : Need, Red Hat OpenShift Container Platform, Red Hat OpenShift Architecture

Chapter 2
Creating containerized services, Managing containers, Managing container images, Creating custom container images

Chapter 3
Deploying containerized applications on OpenShift, Deploying multi-container applications

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DO180	DCC	**RedHat OpenShift : Containers & Kubernetes**	-	-	-	-	100	0	0	4	2

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Chapter 4
Troubleshooting containerized applications, Errors and Solutions

Chapter 5
Comprehensive review of introduction to container, Kubernetes, and Red Hat OpenShift

References

1. https://www.redhat.com/en/services/training/do180-red-hat-openshift-I-containers-kubernetes
2. Introduction to Containers,Kubernetes, and Red HatOpenShift: Student Workbook, Ravishankar Srinivasan, Fernando Lozano, Richard Allred,Ricardo Taniguchi, Jim Rigsbee, 2017