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 Information and Cyber Security)
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;
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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	**Introduction to 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.

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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.

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach" , 3rd Edition,Prentice Hall.
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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BTCS303N	DCC	Computer Graphics and Multimedia	60	20	20	30	20	3	-	2	4

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Course Educational Objectives (CEOs):

The student will have ability to:

1. Understood basic concepts of computer graphics.
2. Extract the various computer graphics hardware and display technologies.
3. Evaluate various algorithms for scan conversion and filling of basic objects and their comparative analysis.
4. Acquire knowledge about drawing basic shapes such as lines, circle, ellipse, polygon.
5. Remembering knowledge about two- and three-dimensional transformations.
6. Analyze the line and polygon clipping algorithms of the basic shapes.
7. Understood the various Multimedia Operation and file formats.

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. Apply basic concepts of computer graphics.
2. Able to perform processing of basic shapes by various processing algorithms /techniques.
3. Design two and three-dimensional graphics.
4. Analyze all the types of clipping algorithms for line and polygon.
5. Apply the acquire knowledge about Visible Surface Detection methods, Illumination Models and Surface Rendering.
6. Able to perform various types of color model implication.
7. Acquire knowledge to apply advanced techniques such as fractals, introduction to open GL and Multimedia Systems.

Syllabus:

UNIT I **9HRS**

Introduction to Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, CRT color monitors,Beam Penetration CRT, The Shadow - Mask CRT, DVST, Graphics input devices, Graphics software and standards.

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UNIT II **10HRS**

Points and Lines,DDA line drawing algorithm, Bresenham's drawing algorithm, Mid-point Circle drawing algorithm, Mid-point circle drawing algorithm, Mid-point Ellipse drawing algorithm, Parametric Cubic Curves: - Bezier and B-Spline curves, Filled Area Primitives: -Scan line polygon fill algorithm, Pattern fill algorithm Inside-Outside Tests, Boundary fill algorithms, Flood fill algorithms

UNIT III 10**HRS**

2D transformation: Translation, Rotation, Scaling, Shearing, Reflection. Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation.
3D transformations: translation, rotation, scaling. Parallel & Perspective Projection, Types of Parallel & Perspective Projection.Composite transformations Projections, Back Surface detection method Depth Buffer method Scan line method BSP tree method, Area Subdivision method.

UNIT IV **8HRS**

Windowing & Clipping: World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping, Cohen Sutherland, Midpoint Line clipping algorithms, Polygon Clipping: Sutherland –Hodgeman, Weiler-Atherton algorithms.
Basic Illumination Model, Diffuse reflection, Specular reflection, Phong Shading Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV.

UNIT V **9HRS**

Multimedia System: An Introduction, Multimedia hardware, Multimedia System Architecture. Data & File Format standards. i.e RTF, TIFF, MIDI, JPEG, DIB, MPEG, Audio: digital audio, MIDI, processing sound, sampling, compression. Video: Avi, 3GP, MOV, MPEG, compression standards, compression through spatial and temporal redundancy. Multimedia Authoring.

Textbooks:

1. John F. Hughes, Andries Van Dam, Morgan Mc Guire ,David F. Sklar , James D. Foley, Steven K.
Feiner and Kurt Akeley ,"Computer Graphics: Principles and Practice", , 3rd Edition, Addison-
Wesley Professional,2013.
2. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007.

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BTCS303N	**DCC**	**Computer Graphics and Multimedia**	**60**	**20**	**20**	**30**	**20**	3	-	2	4

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References:

1. Computer Graphics, C Version, 2e Paperback – 2002
2. Foley, Vandam, Feiner, Huges, "Computer Graphics: Principles & Practice", Pearson Education, second edition 2003.
3. Judith Jeffcoate, "Multimedia in practice technology and Applications", PHI, 1998.
4. David F Rogers, "Procedural elements for Computer Graphics", Tata McGraw Hill, Second Edition.
5. Foley, VanDam, Feiner and Hughes, "Computer Graphics Principles & Practice in C", Second edition, Pearson Education.
6. David Hillmaa, "Multimedia Technology & Applications, Delmar, 1998

List of Practical:

1. Implement DDA Line Drawing algorithm
2. Implement Bresenham's line drawing algorithm.
3. Implement Mid-Point circle drawing algorithm.
4. Implement Mid-Point ellipse drawing algorithm.
5. Implement cubic Bezier curve.
6. Implement a menu-driven program for 2D transformations.
7. Implement Line clipping algorithm using Cohen-Sutherland
8. Implement Polygon Clipping using Sutherland Hodgeman.
9. Implement Scan line fill algorithm.
10. Study of Multimedia and Program for Flash.

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BTICS504N	DCC	**Network Security and Cryptography**	**60-**	**20**	**20**	**30**	**20**	**3**	**-**	**2**	**4**

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Course Objectives:

The student will have ability:

1. To understand the different aspects of Network Security.
2. To learn about different Cryptography Encryption and Decryption Technique.

Course Outcomes:

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

1. Understand Need of Security in and Type of threats.
2. Understand Security mechanism and basic and Advance Ciphers.
3. Understand Advance encryption Techniques.
4. Understand the Key exchange protocols used in Public Key Cryptography.
5. Understand the Authentication and Steganography concept.

Syllabus:

UNIT I Introduction to Network Security: 8HRS

Introduction, Need for Security, Security in Networks : Threats in networks, Network Security Controls – Architecture, Attacks on Computers & Computer Security, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honey pots.

UNIT II Security Mechanism: 9HRS

Proxy Servers and Anonymizers, Firewall, Types of firewall, Password Cracking Techniques.

Cryptography: Concepts & Techniques:

Introduction, Plaintext & Cipher text, Creaser Cipher, Substitution Techniques, Substitution Boxes (S-Boxes), Permutation Cipher, Transposition Techniques, Encryption & Decryption, Symmetric & Asymmetric key Cryptography, Key Range & Key Size.

UNIT III Symmetric Key Algorithm: 8HRS

Introduction of Block Ciphers, Overview of Symmetric Key Cryptography, DES(Data Encryption Standard) algorithm, Double DES Triple DES, AES,IDEA(International Data Encryption Algorithm) algorithm.

UNIT IV Asymmetric Key Algorithm: 10HRS

Overview of Asymmetric key Cryptography, RSA algorithm, Symmetric & Asymmetric key Cryptography together, Diffie-Hellman Key Exchange, Digital Signature, Basic concepts of Message Digest and Hash Function. Man in Middle Attack,DoS and DDoS Attacks.

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BTICS504N	DCC	**Network Security and Cryptography**	**60-**	**20**	**20**	**30**	**20**	**3**	**-**	**2**	**4**

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UNIT V Internet Security Protocols: 9HRS

User Authentication Basic Concepts, SSL protocol, Authentication Basics, Password, Authentication Token, Certificate based Authentication, Biometric Authentication.Steganography it'simportance.Basics of mail security, Pretty Good Privacy, S/MIME.

Text Books:

1."Cryptography and Network Security", William Stallings, 2nd Edition, Pearson Education Asia
2. "Network Security private communication in a public world", C. Kaufman, R. Perlman and M. Speciner,Pearson
3. Cryptography & Network Security: Atul Kahate, TMH

References:

1.Cryptography And Network Security Principles And Practice Fourth Edition, William Stallings, Pearson Education
2. Modern Cryptography: Theory and Practice, by Wenbo Mao, Prentice Hall PTR
3. Network Security Essentials: Applications and Standards, by William Stallings. Prentice Hall
4. Cryptography: Theory and Practice by Douglas R. Stinson, CRC press.
5."Building Internet Firewalls", Elizabeth D. Zwicky, Simon Cooper, D. Brent Chapman, 2nd Edition, Oreilly.
6.http://nptel.ac.in/

List of Practical:

1. Write a Program to implement Ceaser Cipher
2. Write a Program to implement Substitution Cipher with equation c=3x+12
3. Write a Program to implement polyalphabetic Cipher
4. Write a Program to implement Rail fence technique
5. Write a Program to implement Simple Columner Transposition technique
6. Write a Program to implement Advanced Columner Transposition technique
7. Write a Program to implement Rotation Cipher
8. Create a Virtual Private Network.
9. Write a Program to implement Simple RSA Algorithm with small numbers.
10. Write a Program to implement Simple Diffie- Hellman Key Exchange Algorithms with small numbers.

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BTDSE511	DSE	**Simulation and Modeling**	**60**	**20**	**20**	**30**	**20**	3	-	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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BTDSE511	DSE	**Simulation and Modeling**	**60**	**20**	**20**	**30**	**20**	3	-	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

Banks J; Hand book of Simulation; John Wiley.

2.Law AM and Kelton WD; Simulation Modeling and Analysis; TMH

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BTDSE511	DSE	**Simulation and Modeling**	**60**	**20**	**20**	**30**	**20**	3	-	2	4

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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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.

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

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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.

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BTDSE513N	DSE	**Next Generation Telecommunication Networks**	60	20	20	30	20	3	-	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 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.

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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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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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BTICS508N	DCC	**Ethical Hacking Lab-II**	-	-	-	30	20	-	-	4	2

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COURSE OBJECTIVES

In this course, student will learn the fundamental principles with advance tools and techniques of Hacking. Students will learn how those secure the world by these attacks.

COURSE OUTCOMES

1. Understand the fundamentals of Wire shark.
2. Acquire the knowledge about malicious software.
3. Apply security concepts to real world cases.
4. Acquire the knowledge about malicious software.

SYLLABUS

UNIT–I **6 HRS**

Introduction to Wire shark: Introduction, Functionalities, Uses, features of Wire shark, color coding in wire shark, installation. Concepts of network traffic, filters used in wore shark.

UNIT–II **7 HRS**

System hacking: System hacking methodology, steganography, steganalysis attacks, and covering tracks. Different types of Trojans, Trojan analysis, and Trojan countermeasures.

UNIT–III **6 HRS**

Packet Sniffing: Introduction, types of sniffing, Packet Sniffing tools and techniques and how to defend against Sniffing. Network scanning techniques and scanning countermeasures.

UNIT–IV **5 HRS**

ARP and DNS Poisoning: Introduction, ARP spoofing, Introduction of MITM, defenses against DNS Poisoning.

UNIT–V **8 HRS**

SQL Injection: Introduction, working of SQL injection, SQL injection types and attacks, automation tools for SQL injection and Prevention techniques from SQL injection.

TEXT BOOKS:

1. Stuart McClure, Joel Scambray and Goerge Kurtz, Hacking Exposed 7: Network Security Secrets & Solutions, Tata McGraw Hill Publishers, 2010.
2. Bensmith, and Brian Komer, Microsoft Windows Security Resource Kit, Prentice Hall of India, 2010.

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1. Stuart McClure, Joel Scambray and Goerge Kurtz, ―Hacking Exposed Network Security Secrets & Solutions‖, 5th Edition, Tata McGraw Hill Publishers, 2010.
2. Rafay Baloch, ―A Beginners Guide to Ethical Hacking‖.
3. Allen Harper, Shon Harris, Jonathan Ness, Chris Eagle, ―Gray Hat Hacking The Ethical Hackers Handbook‖, 3rd Edition, McGraw-Hill Osborne Media Paperback (January 27, 2011).

LIST OF EXPERIMENTS:

1. Study and Installation of WIreshark.
2. Wireshark: Experiment to monitor live network capturing packets and analyzing over the live network.
3. LOIC: DoS attack using LOIC.
4. FTK: Bit level forensic analysis of evidential image and reporting the same.
5. Darkcomet : Develop a malware using Remote Access Tool Darkcomet to take a remote access over network.
6. HTTrack: Website mirroring using Httrack and hosting on a local network.
7. XSS: Inject a client side script to a web application
8. Emailtrackerpro: Email analysis involving header check, tracing the route. Also perform a check on a spam mail and non-spam mail.
9. Stduy different ARP and DNS poisoning tools.
10. Study different Packet sniffing tools.