Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
Choice Based Credit System (CBCS) in the light of NEP-2020
B.Tech. (CSE - Big Data and Cloud Engineering – Impetus Technologies)
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.

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

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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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BTCSIT505N	DCC	**Big Data Analytics**	**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 objectives of this course are to make the students to:
1. Introduce students to Big Data Analysis using HADOOP.
2. Introduce to Hadoop Eco System, HDFS, commands, management and map reduce.
3. Understating Spark basics and its commands
4. Spark SQL, data frames and operations

Course Outcomes:

At the end of the course, students shall be able to:
1. Install Hadoop, configure HDFS, Hbase Installation run commands
2. Develop an understanding of the complete open-source Hadoop ecosystem and its near-term future direction.
3. Understand the functions and features of HDP.
4. Understand the MapReduce model v1 and review java code.
5. Appreciate the influence of big data for business decisions and approach

SYLLABUS

UNIT–I
HADOOP: Why Hadoop or Hadoop as a solution. Custom Input and Output Formats: The Writable Interface, WritableComparable and comparators, Writable Classes: Writable wrappers for Java primitives, Text, BytesWritable, NullWritable, ObjectWritable and GenericWritable, Writable collections, Implementing a Custom Writable: Implementing a RawComparator for speed, Custom comparators. Storage Formats, Partitioner, Combiner. YARN architecture. HDFS Federation, Centralized cache management, Anatomy of read/ write in HDFS and also working of Mapreduce. Phases of Mapreduce (Map,shuffing,sorting,reduce,partitioning), Compare Hadoop vs traditional systems, Limitations and Solutions of existing Data Analytics Architecture.

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UNIT–II

Spark Basics: What is Apache Spark? What are RDDs ? In addition, refer to following link to white paper mentioned below. What are the advantages and limitations of Apache Spark when compared with MapReduce? RDD Operations - Transformations, Actions and Lazy Evaluation in RDD, Accumulators and Broadcast Variables, What is SparkConf? What is SparkContext? what is SparkSession?, How shuffling happens in Spark?, Installation of SPARK in local mode, Stand Alone Mode , on YARN cluster. How Spark works in cluster mode - concepts of Driver, Master, Slave and how it works. Spark UI - Launch Spark UI, debug a Job, Look at stderr and stdout logs. Monitor jobs, tasks, stages, memory utilization, DAG etc. Run SPARK using spark-shell and spark-submitter.

UNIT–III

Spark Commands: Follow the programming guide to spark(http://spark.apache.org/docs/latest/programming-guide.html), Follow the written examples of spark (https://spark.apache.org/examples.html , https://github.com/apache/spark/tree/master/examples/src/main/scala/org/apache/spark/examples), Follow Apache Spark API by example EBook (https://unify.impetus.co.in/BigData/_layouts/15/WopiFrame.aspx?sourcedoc=/BigData/Shared%20Documents/E-Books/SparkAPIMaster.pdf&action=default)

UNIT–IV

Spark Streaming: What is Spark Streaming? What is StreamingContext & JavaStreamingContext?, What are DStreams? Transformations on Dstreams. Windows operations, join, output, caching, persistence on DStream, Checkpointing in Spark, Integration with Kafka or any MQ for streaming, Follow the programming guide to Spark Streaming (https://spark.apache.org/docs/latest/streaming-programming-guide.html)

UNIT–V

Spark SQL and DataFrames & Spark Structued Streaming: What is Spark SQL ? What is SQLContext, HiveContext ?Differences between SQLContext and HiveContext? When to use which context, Follow the programming guide to Spark SQL (https://spark.apache.org/docs/latest/sql-programming-guide.html), What are DataFrames?

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DataFrames Concept & Operations, Create DataFrames from HDFS, RDD, Hive Table, Join, Aggregate, Filters, Group By, Order By, Persist, Window functions, Stastical, Math functions etc. in DataFrame, Integrate Hive metastore with Spark (both new and existing metastore), Limitations of using Hive in Spark, Basic Concepts (Unbounded Table, Triggers), Output Modes, Late data Arrival/Fault Tolerance Pricipals, Data Frames & Streaming Datasets, Eventtime windowing & watermarking, Stream-Stream Joins, Sinks, Stateful Operations, Deduplications.

Text Books:

1. Tom White," Hadoop: The Definitive Guide Paperback – 2015" Shroff Publishers & Distributers Private Limited - Mumbai; Fourth edition (2015).
2. V. K. Jain (Author)," Big Data and Hadoop" Khanna Publishers; 1 edition (1 June 2015)
3. Jason Bell (Author) "Machine Learning for Big Data: Hands-On for Developers and Technical Professionals" Wiley (2014)
4. Big Data Analytics & Hadoop by IBM ICE Publications

References:

1. SPARK WHITE PAPER: http://www.cs.berkeley.edu/~matei/papers/2010/hotcloud_spark.pdf
2. RDDs WHITE PAPER: https://www.cs.berkeley.edu/~matei/papers/2012/nsdi_spark.pdf
3. SPARK STREAMING WHITE PAPER: http://www.eecs.berkeley.edu/Pubs/TechRpts/2012/EECS-2012-259.pdf
4. https://spark.apache.org/docs/latest/ml-guide.html
5. https://spark.apache.org/docs/1.1.0/mllib-guide.html
6. https://acadgild.com/blog/machine-learning-using-spark/
7. http://spark.apache.org/docs/latest/ml-guide.html
8. http://spark.apache.org/docs/latest/ml-advanced.html
9. https://www.mapr.com/blog/apache-spark-machine-learning-tutorial

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BTCSIT505N	DCC	**Big Data Analytics**	**60**	**20**	**20**	**30**	**20**	**3**	0	**2**	**4**

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LIST OF EXPERIMENTS:

1. List all the movies and the number of ratings
2. List all the users and the number of ratings they have done for a movie
3. List all the Movie IDs which have been rated (Movie Id with at least one user rating it)
4. List all the Users who have rated the movies (Users who have rated at least one movie)
5. List of all the User with the max ,min ,average ratings they have given against any movie
6. List all the Movies with the max ,min, average ratings given by any user

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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;
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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.

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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;
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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.

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

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

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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.

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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BTCS504N	DCC	**Internet Of Things**	**60-**	**20**	**20**	**30**	**20**	**3**	**0**	**2**	**4**

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COURSE OBJECTIVES
The objective of this course is to impart necessary and practical knowledge of components ofInternet of Things and develop skills required to build real-life IoT based projects.

COURSE OUTCOMES
Upon completion of the subject, students will be able to:
1. Understand internet of Things and its hardware and software components
2. Interface I/O devices, sensors & communication modules
3. Remotely monitor data and control devices
4. Develop real life IoT based projects

SYLLABUS:

UNIT–I **10 HOURS**

Introduction to IoT: Architectural Overview, Design principles and needed capabilities, IoT Applications, Sensing,Actuation, Basics of Networking, M2M and IoT Technology Fundamentals- Devices andgateways, Data management, Business processes in IoT, Everything as a Service(XaaS), Role ofCloud in IoT, Security aspects in IoT.

UNIT–II **9 HOURS**

Elements of IoT: Hardware Components- Computing (Arduino, Raspberry Pi), Communication, Sensing,Actuation, I/O interfaces. Software Components- Programming API's (using Python/Node.js/Arduino) for Communication.Protocols-MQTT, ZigBee, Bluetooth, CoAP, UDP, TCP.

UNIT–III **8 HOURS**

IoT Application Development: Solution framework for IoT applications- Implementation of Device integration, Data acquisition and integration.

UNIT–IV **7 HOURS**

Device data storage: Unstructured data storage on cloud/local server,Authentication, authorization of devices.

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BTCS504N	DCC	**Internet Of Things**	**60-**	**20**	**20**	**30**	**20**	**3**	**0**	**2**	**4**

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UNIT–V **8 HOURS**

IoT Case Studies: IoT case studies and mini projects based on Industrial automation, Transportation, Agriculture,Healthcare, Home Automation

TEXT BOOKS:

1. Vijay Madisetti, ArshdeepBahga, Ïnternet of Things, "A Hands on Approach", UniversityPress.
2. Dr. SRN Reddy, RachitThukral and Manasi Mishra, "Introduction to Internet of Things: ApracticalApproach", ETI Labs.
3. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies,Platforms, and Use Cases", CRC Press
4. Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi.
5. Adrian McEwen, "Designing the Internet of Things", Wiley.
6. Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill.
7. CunoPfister, "Getting Started with the Internet of Things", O Reilly Media.

LIST OF PRACTICALS:

1. Familiarization with Arduino/Raspberry Pi and perform necessary software installation.
2. To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LEDfor 1 sec after every 2 seconds.
3. To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write aprogram to turn ON LED when push button is pressed or at sensor detection.
4. To interface DHT11 sensor with Arduino/Raspberry Pi and write a program to printtemperature and humidity readings.
5. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ONmotor when push button is pressed.
6. To interface OLED with Arduino/Raspberry Pi and write a program to print temperature andhumidity readings on it.
7. To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor datato smartphone using Bluetooth.
8. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFFwhen '1'/'0' is received from smartphone using Bluetooth.
9. Write a program on Arduino/Raspberry Pi to upload temperature and humidity data tothingspeak cloud.
10. Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data fromthingspeak cloud.
11. To install MySQL database on Raspberry Pi and perform basic SQL queries.
12. Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT broker.
13. Write a program on Arduino/Raspberry Pi to subscribe to MQTT broker for temperature dataand print it.
14. Write a program to create TCP server on Arduino/Raspberry Pi and respond with humiditydata to TCP client when requested.
15. Write a program to create UDP server on Arduino/Raspberry Pi and respond with humiditydata to UDP client when requested.

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

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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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			THEORY			PRACTICAL					
			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**

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

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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

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	0	2	4

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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

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4. Sommerville,"Software Enginerring",Pearson Education.

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/1217201473127725pdf

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	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. 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 1OHOURS

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 9HOURS

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 **8HOURS**

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 **7HOURS**

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 **8HOURS**

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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BTIT507N	SEC	**Programming with Python**	0	0	0	30	20	0	0	4	2

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COURSE OBJECTIVES
1. To develop proficiency in creating based applications using the Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to use generators for generating series like fibonacci.

COURSE OUTCOMES
Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including:
1. Ability to create robust applications using the Python programming language.
2. Ability to test and debug applications written using the Python programming language.
3. Ability to create applications for solving computational problems using the Python Programming Language.

SYLLABUS

UNIT–I **10 HOURS**

Introduction to Python: The basic elements of Python, Branching programs, Strings and Input, Iteration. Functions, Scoping and Abstraction: Functions and Scoping, Specifications, Recursion, Global variables, Modules, Files.

UNIT–II **9 HOURS**

Testing and Debugging: Testing, Debugging. Structured Types, Mutability and Higher order Functions: Tuples, Lists and Mutability, Functions as Objects, Strings, Tuples and Lists, Dictionaries.

UNIT–III **8 HOURS**

Exceptions and assertions: Handling exceptions, Exceptions as a control flow mechanism, Assertions. Classes and Object oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding.

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BTIT507N	SEC	**Programming with Python**	0	0	0	30	20	0	0	4	2

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UNIT–IV **7 HOURS**

Some simple Algorithms and Data Structures: Search Algorithms, Sorting Algorithms, Hashtables. Plotting and more about Classes: Plotting using PyLab, Plotting mortgages and extended examples.

UNIT–V **8 HOURS**

Dynamic Programming: Fibonacci sequence revisited, Dynamic programming and the 0/1 Knapsack algorithm, Dynamic programming and divide and conquer.

TEXT BOOKS:

1. John V Guttag. “Introduction to Computation and Programming Using Python”, Prentice Hall of India
2. Allen Downey, Jeffrey Elkner and Chris Meyers "How to think like a Computer Scientist, Learning with Python", Green Tea Press.
3. Mark Lutz "Learning Python" O'Reilly Media; 5 edition.
4. David Beazley "Python Cookbook, Third edition" O'Reilly Media

REFERENCES:

1. Python Essential Reference, 4th Edition Addison-Wesley Professional.
2. Mark Lutz "Programming Python: Powerful Object-Oriented Programming "David Beazley "Python Cookbook" Third edition, O'Reilly Media

LIST OF EXPERIMENTS:

1. Write a Python Program to Print Hello world!
2. Write a Program to Add Two Numbers.
3. Write a Program to Find the Square Root.
4. Write a Program to Calculate the Area of a Triangle.
5. Write a Program to Solve Quadratic Equation.
6. Write a Program to Swap Two Variables.
7. Write a Program to Generate a Random Number.
8. Write a Program to Convert Kilometers to Miles.
9. Write a Program to Convert Celsius To Fahrenheit.
10. Write a Program to check if a number is positive, negative or zero.
11. Write a Program to Check if a Number is Odd or Even.
12. Write a Program to Check Leap Year.
13. Write a Program to Find the Largest Among Three Numbers.

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BTIT507N	SEC	**Programming with Python**	0	0	0	30	20	0	0	4	2

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14. Write a Program to Check Prime Number.
15. Write a Program to Print all Prime Numbers in an Interval.
16. Write a Program to Find the Factorial of a Number.
17. Write a Program to Display the multiplication Table.
18. Write a Program to Print the Fibonacci sequence.
19. Write an English sentence with understandable semantics but incorrect syntax. Write another English sentence which has correct syntax but has semantic errors.
20. Create a program that prompts the user for a number of gallons of gasoline. Reprint that value along with its conversion equivalent number of liters.
21. Write a program that allows a user to enter his or her two favorite foods. The program should then print out the name of a new food by joining the original food names together.
22. Write a Tipper program where the user enters a restaurant bill total. The program should then display two amounts: a 15 percent tip and a 20 percent tip.
23. Write a Car Salesman program where the user enters the base price of a car. The program should add on a bunch of extra fees such as tax, license, dealer prep, and destination charge. Make tax and license a percent of the base price. The other fees should be set values. Display the actual price of the car once all the extras are applied.
24. Create a program with a function that calculates the area of a circle by taking a radius from the user.
25. Write your own sum function called mySum that takes a list as a parameter and returns the accumulated sum.