



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 in association with RedHat)

SEMESTER-VI (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*				
BTCS601N	DCC	Compiler Design	60	20	20	30	20	2	1	2	4

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

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Course Objectives:

- To introduce the major concept areas of language translation and compiler design
- To enrich the knowledge in various phases of compiler and its use
- To provide understanding of steps of programming necessary for constructing a compiler

Course Outcomes:

- Ability to apply the knowledge of lex tool & yacc tool to develop a scanner & parser
- Ability to design and develop software system for backend of the compiler
- Ability to comprehend and adapt to new tools and technologies in compiler design

Syllabus

Unit – I:

8 Hours

Introduction: Compiler, Compilers analysis of the source program, Phases of a compiler, Cousins of the Compiler, Grouping of Phases and Compiler construction tools, Lexical Analysis, Role of Lexical Analyzer, Input Buffering and Specification of Tokens.

Unit – II:

10 Hours

Syntax Analysis: Role of the parser, Writing Grammars, Context-Free Grammars, Top Down parsing, Recursive Descent Parsing, Predictive Parsing, Bottom-up parsing, Shift Reduce Parsing, Operator Precedent Parsing, LR Parsers, SLR Parser – Canonical LR Parser – LALR Parser.

Unit – III:

9 Hours

Intermediate Code Generation: Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate languages, Declarations, Assignment Statements, Boolean Expressions, Case Statements, Three Address code, Back patching, Procedure calls.

Unit – IV:

10 Hours

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Code Optimization and Run Time Environments: Introduction, Principal Sources of Optimization, Optimization of basic Blocks, DAG representation of Basic Blocks - Introduction to Global Data Flow Analysis, Runtime Environments, Source Language issues, Storage Organization, Storage Allocation strategies, Access to non-local names, Parameter Passing, Error detection and recovery.

Unit – V:

9 Hours

Code Generation: Issues in the design of code generator, The target machine, Runtime Storage management, Basic Blocks and Flow Graphs, Next-use Information, A simple Code generator, Peephole Optimization.

Text Books:

1. Alfred V. Aho, Jeffrey D Ullman, “Compilers: Principles, Techniques and Tools”, Pearson Education Asia, 2012
2. Jean Paul Tremblay, Paul G Serenson, "The Theory and Practice of Compiler Writing", BS Publications, 2005
3. Dhamdhare, D. M., "Compiler Construction Principles and Practice", 2nd edition, Macmillan India Ltd., New Delhi, 2008

References:

1. Allen I. Holub, “Compiler Design in C”, Prentice Hall of India, 2003
2. C. N. Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003
3. HenkAlblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
4. Kenneth C. Loudon, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003

List of Experiments:

1. To study the Lex Tool.
2. To study the Yacc Tool.
3. Write a program to implement Lexical Analyzer to recognize few patterns of C.

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4. Write a program to implement the Recursive Descent Parser.
5. Write a program to implement the Computation of FIRST and FOLLOW of variables of grammar.
6. Write a program to compute the leading and trailing symbols of grammar.
7. Write a program to implement Operator Precedence Parser.
8. Write a program to implement SLR parser.
9. Write a program to check the data types.
10. Write a program to implement the generation of three address code.
11. Write a program to implement the computation of postfix notation.
12. Write a program to implement the computation of Quadruple.

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COURSE OBJECTIVES:

1. To learn the concept of Object Oriented Software Development Process
2. To get acquainted with UML Diagrams
3. To understand Object Oriented Analysis Processes

COURSE OUTCOMES:

1. Understand Object Oriented Software Development Process
2. Gain exposure to Object Oriented Methodologies & UML Diagrams
3. To apply Object Oriented Analysis Processes for projects

SYLLABUS

UNIT-I

10 HOURS

Introduction: About Object Oriented Technology, Development and OO Modeling History. Modeling Concepts: Modeling design Technique, Three models, Class Model, State model and Interaction model.

UNIT-II

9 HOURS

Class Modeling: Object and class concepts, link and association, Generalization and Inheritance, Advanced class modeling- aggregation, Abstract class meta data, constraints. State Modeling: Event, state, Transition and conditions, state diagram, state diagram behavior, concurrency, Relation of Class and State models. Interaction Modeling: Use case Models, sequence models, activity models

UNIT-III

8 HOURS

Analysis and Design: Development Life cycle, Development stages, Domain Analysis-Domain class model, domain state model, domain interaction model, Iterating and analysis. Application Interaction model, Application class model, Application state Model, Adding operation.

UNIT-IV

7 HOURS

System Design: Estimating Performance, Making a reuse plan, breaking system into sub systems identifying concurrency, allocation of subsystems, management of data storage, Handling Global

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resources, choosing a software control strategy, Handling boundary condition, common Architectural style.

UNIT-V

8 HOURS

Class design: Overview of class design, designing algorithms recursing downward, refactoring, design optimization, Adjustment of Inheritance, Rectification of Behavior.

TEXT BOOKS:

1. Michael Blaha and J. Rumbaugh, "Object oriented Modeling and design with UML", Pearson Education

REFERENCES:

1. Satzinger, Jackson and Burd, "Object oriented Analysis and design with the Unified Process", CENGAGE Learning.
2. O'Docherty, "Object Oriented Analysis and Design Understanding, System Development with UML2.0", Wiley India.

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LIST OF EXPERIMENTS

1. How to write a Problem Statement
2. Perform the system analysis: Requirement analysis, SRS.
3. Perform the function oriented diagram: DFD and Structured chart.
4. Perform the user's view analysis: Use case diagram.
5. Draw the structural view diagram: Class diagram, object diagram.
6. Draw the behavioral view diagram: Sequence diagram, Collaboration diagram.
7. Draw the behavioral view diagram: State-chart diagram, Activity diagram.
8. Draw the implementation view diagram: Component diagram.
9. Draw the environmental view diagram: Deployment diagram.

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COURSE OBJECTIVES

The student will have ability to:

1. Analyze the SAAS, PAAS IAAS services of Cloud Computing to represent how engineering agility in an organization can be created.
2. Assess the exploitation of web services from cloud computing.
3. Configure essential infrastructural components used for implementing Cloud.
4. Significantly study case studies to derive the most excellent practice model to be appropriate when deploying cloud-based applications.

COURSE OUTCOMES

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

1. Investigate the trade-offs among deploying applications in the cloud and over the local infrastructure.
2. Compute real-world problems security, privacy issues using cloud computing through group collaboration.
3. Development and Deployment applications over commercial cloud computing infrastructures.
4. Analyze and investigation of application & hardware performance, scalability, and availability of the underlying cloud technologies and software.

SYLLABUS

UNIT-I:

10 Hours

Overview of Cloud Computing

Introduction- Evolution, Shift from distributed computing to cloud computing; principles and characteristics of cloud computing- IaaS, PaaS, SaaS; service-oriented computing and cloud environment, Advantages, Service & Deployment Models, Infrastructure, and Consumer View, Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services, Industrial Applications.

UNIT-II:

8 Hours

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Cloud Computing Technology-

Client systems, Networks, server systems and security from services perspectives, security and privacy issues; accessing the cloud with platforms and applications; Cloud storage

UNIT–III:

9 Hours

Working with Cloud

Infrastructure as a Service – conceptual model and working, Platform as a Service – conceptual model and functionalities. Software as a Service – conceptual model and working. Trends in Service provisioning with clouds. Working on Microsoft Azure & IBM SmartCloud.

UNIT–IV:

9 Hours

Using Cloud Services

Cloud collaborative applications and services – case studies with calendars, schedulers, and event management; cloud applications in project management. Amazon Web Services & applications, AWS EC2, S3, Cloud Analytics, Cloud Open Stack

UNIT–V:

8 Hours

Case studies- Microsoft Azure, Google App Engine, IBM Smart Cloud and Open source clouds, - Open-Nebula, Sales force and Eucalyptus, Cloud Simulation

TEXT BOOKS:

1. Cloud Computing: A Practical Approach by Anthony T. Velte Toby J. Velte, Robert Elsenpeter, 2010 by The McGraw-Hill.
2. Buyya, Selvi, Mastering Cloud Computing, TMHPub.
3. Michael Miller, Cloud computing – Web based Applications, Pearson Publishing, 2011

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REFERENCES:

1. Kumar Saurabh, “Cloud Computing”, WileyPub,2012.
2. Krutz , Vines, “Cloud Security , WileyPub,2013.
3. Sosinsky, “Cloud Computing”, WileyPub,2012.
4. Murray Woodside; John Chinneck; Marin Litiou on “Adaptive Cloud Deployment Using Persistence Strategies and Application Awareness”IEEEExplore, Year: 2017, Page(s):277 – 290.

LIST OF PRACTICALS:

1. Service deployment & Usage over cloud using VirtualBox.
2. Performance evaluation of services over cloud using VMwaretool.
3. Working of Goggle Drive to makespreadsheet.
4. Working on Herokufor Cloud applicationdeployment.
5. Working on Anekasevices for Cloudapplication.
6. Working on services of Google AppEngine.
7. Working on Application deployment & services of MicrosoftAzure.
8. Working on Application deployment & services of IBM SmartCloud.
9. Working and configuration ofEuceliptus.
10. Deployment &Services of Amazon WebServices.

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COURSE OBJECTIVES

The student will have ability to:

1. Provide conceptual understanding of how block chain technology can be used to innovate and improve business processes.
2. Covers the technological underpinning of block Chain operations in both theoretical and practical implementation of solutions using block Chain technology.

COURSE OUTCOMES

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

1. Understand block chain technology.
2. Develop block chain based solutions and write smart contract using Hyperledger Fabric and Ethereum frameworks.
3. Build and deploy block chain application for on premise and cloud based architecture.
4. Integrate ideas from various domains and implement them using block chain technology in different perspectives.

SYLLABUS:

UNIT-I

10 Hours

Introduction: Overview of Block chain, Public Ledgers, Bitcoin, Smart Contracts, Block in a Blockchain, Transactions, Distributed Consensus, Public vs Private Block chain, Understanding Cryptocurrency to Block chain, Permissioned Model of Block chain, Overview of Security aspects of Block chain.

Basic Crypto Primitives: Cryptographic Hash Function, Properties of a hash function, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography, A basic cryptocurrency.

UNIT-II

10 Hours

Understanding Block chain with Crypto currency: Bitcoin and Block chain: Creation of coins, Payments and double spending, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay.

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Working with Consensus in Bitcoin: Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW) – basic introduction, HashcashPoW, Bitcoin PoW, Attacks on PoW and the monopoly problem, Proof of Stake, Proof of Burn and Proof of Elapsed Time, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool.

UNIT–III

9 Hours

Understanding Block chain for Enterprises: Permissioned Block chain: Permissioned model and usecases, Design issues for Permissioned block chains, Execute contracts, State machine replication, Overview of Consensus models for permissioned block chain- Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.

UNIT–IV

8 Hours

Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), Food Security, Mortgage over Block chain, Block chain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Identity on Block chain.

UNIT–V

8 Hours

Block chain application development: Hyperledger Fabric- Architecture, Identities and Policies, Membership and Access Control, Channels, Transaction Validation, Writing smart contract using Hyperledger Fabric, Writing smart contract using Ethereum, Overview of Ripple and Corda.

TEXT BOOKS:

- Melanie Swan, “Block Chain: Blueprint for a New Economy”, O’Reilly, 2015
- Josh Thompsons, “Block Chain: The Block Chain for Beginners- Guide to Block chain Technology and Leveraging Block Chain Programming”.
- Daniel Drescher, “Block Chain Basics”, Apress; 1st edition, 2017.
- Anshul Kaushik, “Block Chain and Crypto Currencies”, Khanna Publishing House, Delhi.
- Imran Bashir, “Mastering Block Chain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained”, Packt Publishing.

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- Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build SmartContracts for Ethereum and Block Chain”, Packt Publishing.
- Salman Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O’Dowd, Venkatraman.Ramakrishna, “Hands-On Block Chain with Hyperledger: Building Decentralized Applications with Hyperledger Fabric and Composer”, Import, 2018

LIST OF PRACTICALS:

- Install and understand Docker container, Node.js, Java and Hyperledger Fabric, Ethereum and perform necessary software installation on local machine/create instance on Cloud torun.
<https://github.com/hyperledger/>
<https://docs.docker.com/get-started/https://console.ng.bluemix.net/docs/services/blockchain/index.html>
https://console.bluemix.net/docs/containers/container_index.html#container_index
- Create and deploy a block chain network using Hyperledger Fabric SDK for Java Set up and initialize the channel, install and instantiate chaincode, and perform invoke and queryon your block chain network
<https://developer.ibm.com/patterns/create-and-deploy-block-chain-network-using-fabric-sdk-java/>
- Interact with a block chain network. Execute transactions and requests against a block chainnetwork by creating an app to test the network and its rules.
<https://developer.ibm.com/patterns/interacting-with-a-block-chain-network/>
- Deploy an asset-transfer app using block chain. Learn app development within aHyperledger Fabric network.
<https://developer.ibm.com/patterns/deploy-an-asset-transfer-app-using-block-chain/>
- Use block chain to track fitness club rewardsBuild a web app that uses Hyperledger Fabric to track and trace member rewards.
<https://developer.ibm.com/patterns/fitness-club-rewards-points-iot-and-retail-integration/>
- Car auction network: A Hello World example with Hyperledger Fabric Node SDK and IBM Block chain Starter Plan. Use Hyperledger Fabric to invoke chaincode while storing resultsand data in the starter plan.
<https://developer.ibm.com/patterns/car-auction-network-hyperledger-fabric-node-sdk-starter-plan/>

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SEMESTER-VI (2021-2025)

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE611N	DSE	Block Chain	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.

7. Develop an IoT asset tracking app using Block chain. Use an IoT asset tracking device to improve a supply chain by using Block chain, IoT devices, and Node-RED.

[https://developer.ibm.com/patterns/develop-an-iot-asset-tracking-app-using-block chain/](https://developer.ibm.com/patterns/develop-an-iot-asset-tracking-app-using-block-chain/)

8. Secure art using block chain digital certificates. Node.js-based auction application can help democratize the art market

[https://developer.ibm.com/patterns/securing-art-using-block chain-digital-certificates/](https://developer.ibm.com/patterns/securing-art-using-block-chain-digital-certificates/)

9. Mini projects such as :

(i) Block chain for telecom roaming, fraud, and overage management. See how communication service providers use block chain to enhance their value chains.

[https://developer.ibm.com/patterns/block chain-for-telecom-roaming-fraud-and-overage-management/](https://developer.ibm.com/patterns/block-chain-for-telecom-roaming-fraud-and-overage-management/)

(ii) Use IoT dashboards to analyze data sent from a Block chain network. Build an IoT app and IoT dashboards with Watson IoT Platform and Node-RED to analyze IoT data sent from a Block chain network.

[https://developer.ibm.com/patterns/iot-dashboards-analyze-data-block chain-network/](https://developer.ibm.com/patterns/iot-dashboards-analyze-data-block-chain-network/)

(iii) Create an Android app with Block chain integration. Build a Block chain enabled health and fitness app with Android and Kubernetes.

[https://developer.ibm.com/patterns/create-an-android-app-with-block chain-integration/](https://developer.ibm.com/patterns/create-an-android-app-with-block-chain-integration/)

(iv) Create a global finance block chain application with IBM Block chain Platform Extension for VS Code. Develop a Node.js smart contract and web app for a Global Finance with block chain usecase

[https://developer.ibm.com/patterns/global-financing-use-case-for-block chain/](https://developer.ibm.com/patterns/global-financing-use-case-for-block-chain/)

(v) Develop a voting application using Hyperledger and Ethereum. Build a decentralized app that combines Ethereum's Web3 and Solidity smart contracts with Hyperledger's hosting Fabric and Chaincode EVM

<https://developer.ibm.com/patterns/voting-app-hyperledger-ethereum/>

(vi) Create a block chain app for loyalty points with Hyperledger Fabric Ethereum Virtual Machine. Deploy Fabric locally with EVM and create a proxy for interacting with a smart contract through a Node.js web app

<https://developer.ibm.com/patterns/loyalty-points-fabric-vm/>

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BTDSE612 N	DSE	Robotics	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 objective of this course is to impart knowledge about industrial robots for their control and design.

COURSE OUTCOMES

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

1. Perform kinematic and dynamic analyses with simulation.
2. Design control laws for a robot.
3. Integrate mechanical and electrical hardware for a real prototype of robotic device.
4. Select a robotic system for given application.

SYLLABUS

UNIT-I

8 Hours

Introduction to Robotics:Types and components of a robot, Classification of robots, closed-loop and open-loop control systems.

Kinematics systems; Definition of mechanisms and manipulators, Social issues and safety.

UNIT-II

8 Hours

Robot Kinematics and Dynamics:Kinematic Modelling: Translation and Rotation Representation, Coordinate transformation, DH parameters, Jacobian, Singularity, and Statics Dynamic Modelling: Equations of motion: Euler-Lagrange formulation

UNIT-III

9 Hours

Sensors and Vision System:Sensor: Contact and Proximity, Position, Velocity, Force, Tactile etc.

Introduction to Cameras, Camera calibration, Geometry of Image formation, Euclidean/Similarity/Affine/Projective transformations. Vision applications in robotics.

UNIT-IV

8 Hours

Robot Control:Basics of control: Transfer functions, Control laws: P, PD, PID. Non-linear and advanced controls.

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UNIT-V

9 Hours

Robot Actuation Systems: Actuators: Electric, Hydraulic and Pneumatic; Transmission: Gears, Timing Belts and Bearings, Parameters for selection of actuators.

Control Hardware and Interfacing: Embedded systems: Architecture and integration with sensors, actuators, components, Programming for Robot Applications.

TEXT BOOKS:

- Saha, S.K., “Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, NewDelhi, 2014.
- Ghosal, A., “Robotics”, Oxford, New Delhi, 2006.
- Niku Saeed B., “Introduction to Robotics: Analysis, Systems, Applications”, PHI, NewDelhi.
- Mittal R.K. and Nagrath I.J., “Robotics and Control”, Tata McGraw Hill.
- Mukherjee S., “Robotics and Automation”, Khanna Publishing House, Delhi.
- Craig, J.J., “Introduction to Robotics: Mechanics and Control”, Pearson, New Delhi, 2009
- Mark W. Spong, Seth Hutchinson, and M. Vidyasagar, “Robot Modelling and Control”, John Wiley and Sons Inc, 2005
- Steve Heath, “Embedded System Design”, 2nd Edition, Newnes, Burlington, 2003.
- Merzouki R., Samantaray A.K., Phathak P.M. and Bouamama B. Ould, “Intelligent Mechatronic System: Modeling, Control and Diagnosis”, Springer.

LIST OF PRACTICALS:

- Study components of a real robot and its DH parameters.
- Forward kinematics and validate using a software (Robo Analyser or any other freesoftware tool).
- Inverse kinematics of the real robot and validation using any software.
- Use of open source computer vision programming tool openCV.
- Image Processing using openCV.
- Image Processing for color/shape detection.
- Positioning and orientation of robot arm.
- Control experiment using available hardware or software.
- Integration of assorted sensors (IR, Potentiometer, strain gages etc.), micro controllers and ROS (Robot Operating System) in a robotic system.
- Project

work.

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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.

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BTDSE512 N	DSE	Software Testing and Quality Assurance	60	20	20	30	20	3	0	2	4

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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 Engineering”, TMH
4. Sommerville,”Software Engineering”,Pearson Education.
- 5.“IBM CE-Enablement Program- Essentials of Software Engineering (OOAD & SW Lifecycle)”, IBM Career 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 Engineering”, TMH
4. Sommerville,”Software Engineering”,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/>

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BTDSE512 N	DSE	Software Testing and Quality Assurance	60	20	20	30	20	3	0	2	4

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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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BTCS607N	PW	Minor Project	0	0	0	60	40	0	0	4	2

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:

This course is the masters by coursework Minor Project.

A Minor Project is a substantial work of supervised research or development, requiring the equivalent of about four to six months full-time work from start to finish. A Project involves identifying a task or problem, searching and reviewing relevant literature, a proposed, implemented, and critically analyzed solution to the task or problem, and a written report describing the problem, the relevant literature, the solution, and its relation to other work in the area.

Note: This course includes a work integrated learning experience in which your knowledge and skillswill be applied and assessed in a real or simulated workplace context and where feedback from industry and/ or community is integral to your experience.

Objectives/Learning Outcomes/Capability

Development Program Learning Outcomes

This course contributes to the following program learning outcomes:

- **EnablingKnowledge:**

You will gain skills as you apply knowledge with creativity and initiative to new situations. In doing so, you will:

- Demonstrate mastery of a body of knowledge that includes recent developments in Information Technology
- Recognize and use research principles and methods applicable to InformationTechnology.

- **CriticalAnalysis:**



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BTCS607N	PW	Minor Project	0	0	0	60	40	0	0	4	2

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You will learn to accurately and objectively examine, and critically investigate Information Technology (IT) concepts, evidence, theories or situations, in particular to:

- analyze and model complex requirements and constraints for the purpose of designing and implementing software artifacts and IT systems
- Evaluate and compare designs of software artifacts and IT systems on the basis of organizational and user requirements.

• **Problem Solving:**

Your capability to analyze complex problems and provide suitable solutions will be extended as you learn to: design and implement software solutions that accommodate specified requirements and constraints, based on analysis or modeling or requirements specification.

• **Communication:**

You will learn to communicate effectively with a variety of audiences through a range of modes and media, in particular to: interpret abstract theoretical propositions, choose methodologies, justify conclusions and defend professional decisions to both IT and non-IT personnel via technical reports of professional standard and technical presentations.

• **Responsibility:**

You will be required to accept responsibility for your own learning and make informed decisions about judging and adopting appropriate behaviour in professional and social situations. This includes accepting the responsibility for independent life-long learning and a high level of accountability. Specifically, you will learn to: effectively apply relevant standards, ethical considerations, and an understanding of legal and privacy issues to designing software applications and IT systems.

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BTCS607N	PW	Minor Project	0	0	0	60	40	0	0	4	2

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• **Research and Scholarship:**

You will have technical and communication skills to design, evaluate, implement, analyze and theorize about developments that contribute to professional practice or scholarship; specifically you will have cognitive skills:

- To demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice or scholarship
- To plan and execute a substantial research-based project, capstone experience and/or piece of scholarship.

Course Learning Outcomes

Upon successful completion of this course you should be able to:

- Identify a task or problem relevant to /orIT
- Search and review of the relevant literature
- Propose a solution to the task or problem
- Develop a software and/or algorithmic solution to the task or problem
- Implement solutions to meet high quality requirements developed by the supervisor
- Carry out research under supervision
- Present the research in a written form like that used for published papers
- Present the research in an oral seminar.

Overview of Learning Activities

A Minor project is a substantial work of supervised research or software development. You will choose an academic staff member as your supervisor to work on a research project. To

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successfully complete the course, you must demonstrate research skills: ability to undertake research under supervision, ability to analyze, develop, and present the research in a written form like that used for published papers, and ability to present the research in an oralseminar.

In this course, you are expected to carry out research activities including implementing a complete solution to the problems identified by the supervisor, critical analysis of results, and completing a written Project. The major deadline for this course is the delivery of the Minor Project by the end of the semester.

Overview of Assessment

You must satisfactorily complete each of the following assessment tasks for this course:

- Research project comprising an implemented and critically analyzed solution to the task or problem
- Written report (final Project) describing the problem, the relevant literature, the solution, and its relation to other work in the area
- Seminar on your research (of 20 minutes) soon after your Project is submitted.

The Minor Project is assessed on its merits as a research publication. Each Project is examined by two academics, usually from within the Institute.

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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 in association with RedHat)
SEMESTER-VI (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*				
DO180	SEC	Red Hat Microservices	-	-	-	-	100	0	0	2	1

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:

- Design a microservices-based architecture for an enterprise application.
- Implement fault tolerance and health checks for microservices.
- Secure microservices to prevent unauthorized access.

Course Outcomes:

- Deploy and monitor microservice-based applications.
- Implement a microservice with MicroProfile.
- Implement unit and integration tests for microservices.

Syllabus

Chapter 1

Introduction to Microservices, Monolithic Architecture, SOA Architecture, Benefits of Microservices
 Challenges in Microservices

Chapter 2:

Microservices Design Patterns, Integration Patterns for Microservices, API Gateway Pattern, Aggregator Pattern, Proxy Pattern, Gateway Routing Pattern, Chained Microservice Pattern, Branch Pattern, Client-Side UI Composition Pattern

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Chapter 3:

Database Patterns, Database per Service, Command Query Responsibility Segregation (CQRS)

Chapter 4:

Event Sourcing, Design an E-commerce application with Microservice architecture

Chapter 5:

Basics of python, Python with database, Flask Framework, API Creation in Flask, Docker

References:

- <https://www.fastlanemea.com/course/redhat-do283>
- <https://www.redhat.com/en/topics/microservices>
- <https://www.redhat.com/en/topics/microservices/what-are-microservices>
- <https://www.redhat.com/en/blog/intro-microservices>

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