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-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.

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Unit – IV: **10 Hours**

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. Dhamdhere, 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. Louden, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003

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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.
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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BTCS602N	**DCC**	**Object Oriented Analysis and Design**	**60**	**20**	**20**	**30**	**20**	**3**	**-**	**2**	**4**

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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 Orientated 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.

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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 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. Rumbugh, “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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BTICS605N	DCC	Concepts of System Security	60	20	20	30	20	2	-	2	3

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COURSE OBJECTIVES
In this course, student will learn the fundamental principles of computer by studying attacks on computer systems.Students will learn how those attacks work and how to prevent and detect them.

COURSE OUTCOMES
Upon completion of this course, the student will be able apply technical knowledge and perform specific technical skills, including:
1. Ability to understand the underlying vulnerabilities of system from a software standpoint.
2. Ability to understand the fundamental principles of computer security and techniques, authentication, and secure system design.
3. Ability to understand techniques used to hack the computer system.
4. Ability to understand the concepts of hardware security.
5. Ability to analyze and evaluate software systems for its security properties.

SYLLABUS

UNIT–I 8 HRS
Introduction to System Security: Definition ofSystem Security, Goals,characteristics and importance of system security, principle of easiest penetration, Three pillars of security CIA (Confidentiality, Integrity and Availability), basic introduction of attacks, threat, vulnerability, risk, system policy, security concepts and relationship, system security threats.

UNIT–II 9 HRS
Vulnerabilities:hardware vulnerability, software vulnerability, data vulnerability,Security vulnerability detection tools, and techniques, introduction of primary vulnerabilities in network. Multics: Fundamentals, multics protection system models, multics reference model, multics security, multics vulnerability analysis.

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UNIT–III **8 HRS**

OS Security: Introduction: Secure OS, Security Goals, Trust Model, Threat Model, Access Control. Fundamentals: Protection system, Lampson ‘s Access Matrix, Mandatory protection system.

UNIT–IV **9 HRS**

Security in ordinary operating system: UNIX security, windows security Verifiable security goals: Information flow, information flow secrecy, models, information flow integrity model, the challenges of trusted, process, covert channels

UNIT–V **7 HRS**

Smartphone Security: Introduction, importance and characteristics of Smartphone security, Access control in Android operating system,Rooting Android devices, Repackaging attacks, Attacks on apps, Whole-disk encryption.

TEXTBOOKS:

1. Trent Jaeger, Operating system security, Morgan & Claypool Publishers, 2008
2. Michael T. Goodrich and Roberto Tamassia, Introduction to Computer Security, Addison Wesley, 2011.

REFERENCES:

1. Michael Palmer, Guide to Operating system Security Thomson
2. Andrew S Tanenbaum, Modern Operating systems, 3rd Edition
3. Secure Operating Systems. John Mitchell. Multics-Orange Book-Claremont.
4. William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010.
5. William Stallings, Network Security Essentials: Applications and Standards, Prentice Hall, 4th edition, 2010.

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6. Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone, Handbook of Applied Cryptography, CRC Press, 2001.

LIST OF EXPERIMENTS:

1. Study of Virus, Malware and Worms.
2. Study of security policies for devices.
3. Study of attack on Smartphone security
4. Study of attacks on android applications.
5. Study of UNIX security architecture.
6. Study of DoS attacks.
7. Study of Physical security challenges.
8. Study of data and hardware vulnerabilities.
9. Study of Trojan Horse and trapdoor.
10. Study of different SQL injection attacks

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BTDSE611N	DSE	Block Chain	60	20	20	30	20	3	0	2	4

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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 andEthereum 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 indifferent 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 BFTAlgorithm, BFT over Asynchronous systems.

UNIT–IV **8 Hours**

Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), FoodSecurity, Mortgage over Block chain, Block chain enabled Trade, We Trade – Trade FinanceNetwork, 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 usingHyperledger Fabric, Writing smartcontract using Ethereum, Overview of Ripple and Corda.

TEXT BOOKS:

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

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6. Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build SmartContracts for Ethereum and Block Chain”, Packt Publishing.
7. 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:

1. 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/block chain/index.html
   https://console.bluemix.net/docs/containers/container_index.html#container_index
2. 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/
3. 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/
4. 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/
5. 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/
6. 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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7. Develop an IoT asset tracking app using Block chain. Use an IoT asset tracking device toimprove 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/
8. Secure art using block chain digital certificates. Node.js-based auction application can helpdemocratize the art market
   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 howcommunication service providers use block chain to enhance their value chains.
   https://developer.ibm.com/patterns/block chain-for-telecom-roaming-fraud-and-overagemanagement/
   (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 datasent from a 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 enabledhealth and fitness app with Android and Kubernetes.
   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 GlobalFinance with block chain usecase
   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'shosting 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 asmart contract through a Node.js web app
   https://developer.ibm.com/patterns/loyalty-points-fabric-evm/

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE612N	DSE	**Robotics**	**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 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 andopen-loopcontrol 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,Coordinatetransformation, DH parameters, Jacobian, Singularity, and Static 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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BTDSE612N	DSE	**Robotics**	**60**	**20**	**20**	**30**	**20**	**3**	**-**	**2**	**4**

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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:

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

LIST OF PRACTICALS:

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

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BTDSE613N	DSE	**Data Mining and Visualization**	**60**	**20**	**20**	**30**	**20**	**3**	**-**	**2**	**4**

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BTIT507N	DCC	Programming with Python	-	-	-	30	20	0	0	4	2

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

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BTIT507N	DCC	Programming with Python	-	-	-	30	20	0	0	4	2

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

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

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BTIT507N	DCC	Programming with Python	-	-	-	30	20	0	0	4	2

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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.
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

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BTIT507N	**DCC**	**Programming with Python**	**-**	**-**	**-**	**30**	**20**	**0**	**0**	**4**	**2**

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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.

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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 Information Technology.

- **Critical Analysis:**

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

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

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- analyze and model complex requirements and constraints for the purpose of designing and implementing software artifacts and ITsystems

- 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 andScholarship:**

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 relevantliterature
- Propose a solution to the task orproblem
- Develop a software and/or algorithmic solution to the task orproblem
- Implement solutions to meet high quality requirements developed by thesupervisor
- Carry out research undersupervision
- Present the research in a written form like that used for publishedpapers
- Present the research in an oralseminar.

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

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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 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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