Progressive Education Society's

Modern College Of Arts, Science and Commerce, Ganeshkhind, Pune – 411 016

(Autonomous)

Syllabus for

T. Y. B.B.A(CA)

Introduction:

The degree shall be titled as Bachelor of Business Administration (B.B.A.)(Computer Application) under the Faculty of Commerce and Management. First Year B.B.A.(CA) Based on Credit System is implemented w.e.f. the academic year 2022-2023 , Second Year B.B.A.(CA) is implemented w.e.f. 2023-2024 ,Third Year B.B.A.(CA) will be w.e.f. 2024-2025.

Programme Objectives:

BBA (CA) Graduate's will be able to

Po1: The BBA (CA) Programme provides sound academic base to develop an advanced career in Computer Application with various Management and Business skills.

Po2: This course focus on conceptual grounding of computer usage as well as its practical Business Application.

Po3: BBA (CA) inculcates basic programming ability amongst students which can help them to become a good programmer.

Po4: This course nurtures good Soft Skills and Managerial Skill in the students which create noble IT Professionals.

Po5: Students get excellent exposure to learn the process of Software development in the Vth and VIth semester by developing their own projects which helps them in campus placement.

Suggested internal assessment tools for courses:

The concerned teacher shall announce the units for which internal assessment will take place. A teacher may choose one of the methods given below for the assessment.

1. Library notes
2. Students Seminar
3. Short Quizzes / MCQ Test
4. Home Assignments
5. Tutorials/ Practical
6. Oral test
7. Research Project
8. Group Discussion
9. Open Book Test
10. Written Test
11. PPT presentation
12. Industrial Visit
13. Viva

Teaching Methodology:

1. Classroom Teaching
2. Guest Lectures
3. Group Discussions
4. Surveys
5. Power Point Presentations
6. Visit to Industries
7. Research Papers & Projects
8. E-content

Subject List

TYBBA(CA) Sem V

Course Type	Sr. No.	Course(Subject) Title	Course (Subject) code	Credits	Weightage for Internal Marks	Weightage For External Marks	Weightage for practical	Total Marks
CCT-1	1	Cyber Security	24-BBACA351	3	30	70		100
CCT-2	2	OOSE	24-BBACA352	3	30	70		100
CCT-3	3	Core Java	24-BBACA353	3	30	70		100
CCT-4	4	Python	24-BBACA354	3	30	70		100
PJ-1	5	Project	24-BBACA355	4	30	70		100
PR-1	6	Computer Laboratory based on 353 & 354	24-BBACA356	4			100	100
SEC-1	7	Add-On (IOT)	24-BBACA357	2	50			50
Total				22				650

TYBBA(CA) Sem VI

Course Type	Sr. No.	Course (Subject) Title	Course (Subject) code	Credits	Weightage for Internal Marks	Weightage For External Marks	Weightage for practical	Total Marks
CCT-1	1	Recent Trends in information Technology	24-BBACA361	3 +1	30	70		100
CCT-2	2	Software Testing	24-BBACA362	3	30	70		100
CCT-3	3	Advanced Java	24-BBACA363	3	30	70		100
CCT-4	4	Android Programming	24-BBACA364	3	30	70		100
PJ-1	5	Dissertation Project	24-BBACA365	4	30	70		100
PR-1	6	Computer Laboratory based on 363 & 364	24-BBACA366	4			100	100
SEC-1	7	Add-On (Soft skill training)	24-BBACA367	2	50			50
Total				23				650

Credit Allocation: - CC-Core Course, EC-Elective Course, PR-Practical, PJ-Project, AECC-Ability Enhancement Compulsory Courses, SEC-Skill Enhancement Courses.

Total - 132 Credits for Three years Programme.

T.Y.B.B.A (C.A.) Semester –V
Course Code: 24-BBACA351
Subject Name: Cyber Security
Total lectures: 45 lectures **Total Credits: 03**

Prerequisites: -

- Student should know basic security constraints.

Course Objectives:

- To understand the fundamentals of cyber security.
- To understand various categories of Cybercrime, Cyber-attacks.
- Recognizing the importance of data security, maintaining data integrity, and confidentiality
- To have an overview of the Cyber laws and concepts of Cyber forensics.
- Analyzing and evaluating the cybersecurity needs of an organization

Course Outcome:-

- Students will understand the aspects related to personal data privacy and security
- Identify the different types of Cyber Crimes.
- Students will understand the legal framework that exist in India for cybercrimes and penalties and punishments for such crime.
- Identify attacks, security policies and credit card frauds in mobile and Wireless Computing Era.

Unit	Topic	No of lectures
1	**Chapter 1:- Introduction to Cyber Crime and Cyber Security** 1.1 Introduction 1.2 Cybercrime: Definition and Origin of the Word 1.3 Cybercrime and Information Security 1.4 Who are Cybercriminals? 1.5 Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling,Forgery, Web Jacking, Newsgroup, Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage,Hacking-Ethical hacking, types of hacking ,advantages and disadvantages of hacking, OnlineFrauds,Computer Sabotage, Email Bombing/Mail Bombs, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft 1.6 Definition of Cyber Security 1.7 Vulnerability, Threats and Harmful acts 1.8 CIA Triad 1.9 Cyber Security Policy and Domains of Cyber Security Policy	07

2	**Chapter 2 :- Cyber offenses and Cyberstalking** 2.1 Criminals Plan: Categories of Cybercrime Cyber Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, and Classification of Social Engineering. 2.2 Cyberstalking: Types of Stalkers, Cases Reported on Cyberstalking, Working of Stalking 2.3 Real-Life Incident of Cyber stalking 2.4 Cybercafe and Cybercrimes 2.5 Botnets: The Fuel for Cybercrime, Botnet, Attack Vector 2.6 Cybercrime: Mobile and Wireless Devices – Proliferation - Trends in Mobility 2.7 Credit Card Frauds in Mobile and Wireless Computing Era 2.8 Security Challenges Posed by Mobile Devices 2.9 Authentication Service Security Attacks on Mobile/Cell Phones	10
3	**Chapter 3 :- Tools and Methods Used in Cybercrime** 3.1 Introduction 3.2 Proxy Servers and Anonymizers 3.3 Phishing 3.4 Password Cracking 3.5 Keyloggers and Spywares 3.6 Virus and Worms 3.7 Trojan Horses and Backdoors 3.8 Steganography 3.9 DoS and DDoS Attacks SQL Injection 3.10 Web crawling vs. web scraping	5
4	**Chapter 4 :- Cybercrimes and Cyber security: The Regulatory Perspectives** 4.1 Introduction 4.2 Cybercrime and the Legal Landscape around the World 4.3 Why Do We Need Cyberlaws: The Indian Context 4.4 The Indian IT Act 4.5 Challenges to Indian Law and Cybercrime Scenario in India 4.6 Consequences of not Addressing the Weakness in Information Technology Act 4.7 Digital Signatures and the Indian IT Act 4.8 Amendments to the Indian IT Act 4.9 Cybercrime and Punishment Cyberlaw, Technology and Students: Indian Scenario	7

5	**Chapter 5:- Cyber Forensics** 5.1 Introduction 5.2 Historical background of Cyber forensics 5.3 Digital Forensics Science 5.4 The Need for Computer Forensics 5.5 Cyber Forensics and Digital evidence 5.6 Forensics Analysis of Email 5.7 Digital Forensics Lifecycle Challenges in Computer Forensics	6
6	**Chapter 6:- Cybersecurity: Organizational Implications** 6.1 Organizational Implications: Cost of cybercrimes and IPR issues 6.2 Web threats for organizations 6.3 Security and Privacy Implications from Cloud Computing and Risk of Cloud Computing. 6.4 Social media marketing 6.5 Social computing and the associated challenges for organizations, Protecting people's privacy in the organization Organizational guide 6.6 delines for Internet usage and safe computing guidelines and computer usage policy 6.7 Incident handling Intellectual property in the cyberspace of cyber security.	6
7	**Chapter 7:- Cybercrime: Illustrations, Examples and Mini-Cases** 7.1 Real-Life Examples 7.2 Mini-Cases 7.3 Illustrations of Financial Frauds in Cyber Domain 7.4 Digital Signature-Related Crime Scenarios 7.5 Digital Forensics Case Illustrations Online Scams	3
	Total Hours	45

References Books:

1) Enterprise Cybersecurity in Digital Business-Taylor & Francis Group by Ariel Evans
2) Principles of Information Security-Michael E Whitman, Herbert J Mattord, 3rd Edition, 2011.
3) Computer Security: Principles and Practice -William Stallings and Lawrie Brown, 3rd edition, Pearson, 2015.
4) Ethical Hacking – by Daniel G. Graham

Subject Code-24-BBACA352

Subject Name: Object Oriented Software Engineering

Total Contact Hours: 45 **Total Credits: 3**

Pre-Requisite:

- Students shall have the Basic Knowledge of Software Engineering

Course Objectives:

1. To understand the fundamentals of object modeling
2. To understand and differentiate Unified Process from other approaches.
3. To design with static UML diagrams.
4. To design with the UML dynamic and implementation diagrams.
5. To improve the software design with design patterns.
6. To test the software against its requirements specification.

Course Outcome:-

1. Students will be able to give Design Specifications for Project.
2. Students will acquire Knowledge in Basic Modeling.
3. Students will acquire Project Management Skills.

Chapter	Course Content	No of lectures
1	**Introduction and basics of Software Modelling and UML** 1.1 Importance of modeling 1.2 Principles of modeling 1.3 Object oriented modeling 1.4 Overview of UML 1.5 Conceptual model of the UML 1.6 Architecture 1.7 Software development life cycle	**08**
2	**Object Oriented Concepts and Principles** 2.1 What is Object Orientation? - Introduction, Object, Classes andInstance, Polymorphism, Inheritance 2.2 Object Oriented System Development- Introduction, Function/Data Methods (With Visibility), Object Oriented Analysis, Object OrientedConstruction 2.3 Identifying the Elements of an Object Model	**05**

	2.4 Identifying Classes and Objects 2.5 Specifying the Attributes (With Visibility) Defining OperationsFinalizing the Object Definition	
3	**Structural Modeling** 3.1 Classes 3.2 Relationship 3.3 Common Mechanism 3.4 Class Diagram (Minimum three examplesshouldbe covered) 3.5 Advanced Classes 3.6 Advanced Relationship 3.7 Interface 3.8 Types and Roles 3.9 Packages Object Diagram (Minimum three examples should becovered)	06
4	**Basic Behavioral Modeling** 4.1 Interactions 4.2 Use Cases and Use Case Diagram with stereo types(Minimum three examples should be covered) 4.3 Interaction Diagram (Minimum two examples should becovered) 4.4 Sequence Diagram (Minimum two examples should becovered) Activity Diagram (Minimum two examples should becovered)State Chart Diagram (Minimum two examples should becovered)	10
5	**Architectural Modelling** 5.1 Component 5.2 Components Diagram (Minimum two examples should becovered) Deployment Diagram (Minimum two examples should becovered) Collaboration Diagram (Minimum two examples should becovered)	**10**
6	**Object Oriented Analysis** 6.1 Iterative Development and the Rational Unified Process 6.2 Inception 6.3 Understanding Requirements 6.4 Use Case Model from Inception to Elaboration 6.5 Elaboration 6.6 The Booch Method, The Coad and Yourdon Method andJacobsonMethod and Raumbaugh Method The Generic Components of the OO Design Model	6
	Total Hours	**45**

Reference Books:

Sr. No.	Title of the Book	Author's Name	Publication
1	The Unified Modeling LanguageUser/Reference Guide,	Grady Booch, James Rambaugh	Pearson EducationInc
2	The Unified software developmentProcess	Ivar Jacobson,Grady Booch, James Rambaugh	Pearson Education
3	Agile Software development	Alistair Cockbair	Pearson Education

Subject Code-24-BBACA353
Subject Name: Core Java

Total Contact Hours: 45 **Total Credits: 3**

Pre-Requisite:

- Students shall have the Knowledge of Core Java Programming Language.

Course Objectives:

- To understand object-oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design ofabstract classes.
- To introduce the implementation of packages and interfaces.
- To introduce the concepts of exception handling.
- To introduce the design of Graphical User Interface using and swing controls.

Course Outcomes:

- Student will be able to solve real world problems using OOP techniques.
- Student will be able to solve problems using java collection framework and I/O classes.
- Student will be able to design GUI based applications.

Unit No.	Topic	No. of Hours
1	**Java Fundamentals** 1.1 Introduction to Java. 1.1 Features of Java 1.2 Basics of Java: - Data types, variable, expression, operators, constant. 1.3 Structure of Java Program. 1.4 Execution Process of java Program. 1.5 JDK Tools. 1.6 Command Line Arguments. 1.7 Array and String: 1.7.1 Single Array & Multidimensional Array 1.7.2 String, String Buffer 1.8 Built In Packages and Classes: 1.8.1 java.util: - Scanner, Date, Math etc. 1.8.2 java.lang	8
2	**Classes, Objects and Methods** 2.1 Class and Object 2.2 Object reference 2.3 Constructor: Constructor Overloading 2.4 Method: Method Overloading, Recursion, Passing and Returning object form Method 2.5 new operator, this and static keyword, finalize() method 2.6 Nested class, Inner class, and Anonymous inner class	8

3	**Inheritance, Package and Collection** 3.1 Overview of Inheritance 3.2 inheritance in constructor 3.3 Inheriting Data members and Methods, 3.4 Multilevel Inheritance – method overriding Handle multilevelconstructors 3.5 Use of super and final keyword 3.6 Interface: 3.7 Creation and Implementation of an interface, Interfacereference 3.8 Interface inheritance 3.9 Dynamic method dispatch 3.10 Abstract class 3.11 Comparison between Abstract Class and interface 3.12 Access control 3.13 Packages **3.13.1** Packages Concept **3.13.2** Creating user defined packages **3.13.3** Java Built in packages **3.13.4** Import statement, Static import 3.14 Collection **3.14.1** Collection Framework. **3.14.2** Interfaces: Collection, List, Set **3.14.3** Navigation: Enumeration, Iterator, ListIterator **3.14.4** Classes: LinkedList, ArrayList, Vector, HashSet. 3.15 Reflection in Java **3.15.1** Reflection API. **3.15.2** NewInstance() & Determining the class object **3.15.3** Javap tool, Creating javap tool	14
4	**File and Exception Handling** **Exception** 4.1 Exception and Error 4.2 Use of try, catch, throw, throws and finally 4.3 Built in Exception 4.4 Custom exception 4.5 Throwable Class. **File Handling: Introduction to file handling** 4.6 Overview of Different Stream (Byte Stream, Character stream) 4.7 Readers and Writers class 4.8 File Class 4.9 File Input Stream, File Output Stream 4.10 Input Stream Reader and Output Stream Writerclass 4.11 FineReader and FileWriter class 4.12 Buffered Reader class.	8

5	**AWT, Event and Swing Programming** **5.1 AWT** 5.1.1 Components and container used in AWT 5.1.2 Layout managers 5.1.3 Listeners and Adapterclasses 5.1.4 Event Delegationmodel **5.2 Swing** 5.2.1 Introduction to Swing ComponentandContainer Classes 5.2.2 Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JTable, JComboBox, Swing Menus, Dialogs, JFileOpen, JColorChooser.	07
	Total Hours	**45**

Reference Books:

1. Programming with JAVA - EBalgurusamy
2. The Complete Reference – JAVA HerbertSchildt
3. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
4. Java Programming and Object-oriented Application Development, R. A. Johnson, Ceng.

Subject Code: - 24-BBACA354
Subject Name -: Python

Total Hours :- 45 **Total Credits: 03**

Prerequisites:

1. Experience with a high-level language (C/C++, Java, MATLAB) is suggested.
2. Prior knowledge of a scripting language (Perl, UNIX/Linux shells) and Object-Oriented concepts is helpful butnot mandatory.

Course Objectives:

1. To learn and understand Python programming basics and paradigm.
2. To learn and understand python looping, control statements and string manipulations.
3. Students should be made familiar with the concepts of GUI controls and designing GUI applications.
4. To learn and know the concepts of file handling, exception handling.

Course Outcomes: On completion of the course, student will be able

1. Define and demonstrate the use of built-in data structures "lists" and "dictionary".
2. Design and implement a program to solve a real world problem.
3. Design and implement GUI application and how to handle exceptions and files.

Unit	Details	Lectures
I	**Unit 1: Introduction to Python** 1.1 History, feature of Python, setting up path, working with python Interpreter, basicsyntax, variable and data types, operators 1.2 **Conditional statements**-If, If-Else, nested if-else, Examples. 1.3 **Looping**-For, While, Nested loops, range() Examples 1.4 **Control Statements**-Break, Continue, Pass. 1.5 **String Manipulation**-Accessing String, Basic Operations, String Slices,string inbuild Function and Methods, Examples. 1.6 **Lists**-Introduction, accessing list, operations, working with lists, list inbuildfunction & methods. 1.7 **Tuple**-Introduction, Accessing tuples, operations working, tuple inbuild function &methods, Examples. 1.8 **Dictionaries**-Introduction, Accessing values in dictionaries, working withdictionaries(update, delete, properties) function, Examples. 1.9 **Python Functions**-Defining a function, calling a function, types of function,function arguments, anonymous function, global & local variable, Examples.	**16**

II	**Unit 2: Modules and Packages** **2.1 Built in Modules** 2.1.1 Importing modules in python program 2.1.2 Working with Random Modules. 2.1.3 E.g. - built-ins, time, date time, calendar, sys, etc **2.2 User Defined functions** 2.2.1 Structure of Python Modules **2.3 Packages** 2.3.1 Predefined Packages 2.3.2User defined Packages **2.1 Module** 2.1.1 What is module? 2.1.2 How to create module? 2.1.3 built-ins module 2.1.4 Structure of Modules	**6**
III	**Unit 3: Classes ,Objects and Inheritance** **3.2 Classes and Objects** 3.2.1 Classes as User Defined Data Type 3.2.2 Objects as Instances of Classes 3.2.3 Creating Class and Objects 3.2.4 Creating Objects By Passing Values 3.2.5 Variables & Methods in a Class **3.3 Inheritance** 3.3.1 Single Inheritance 3.3.2 Multilevel Inheritance 3.3.3 Multiple Inheritance 3.3.4 Hybrid Inheritance 3.3.5 Hierarchical Inheritance IS-A Relationship and HAS-A Relationship	**6**
IV	**Unit 4: Exception Handling and File Handling** **4.1 Exception Handling** 4.1.1 Python Exception 4.1.2 Common Exception 4.1.3 Exception handling in Python (try-except-else) 4.1.4 The except statement with no exception 4.1.5 Multiple Exception 4.1.6 The try-finally clause 4.1.7 Custom Exception and assert statement **4.2 File Handling** 4.2.1 File handling Modes 4.2.2 Writing& Appending to Files 4.2.3 Reading Files Handling File Exceptions	**5**
V	**Unit 5: GUI Programming with Tkinter** 5.1 Introduction 5.2 Tkinter programming 5.4 Tkinter widgets 5.5 Frame 5.6 Button 5.7 Label Entry	**7**

VI	**Unit 6: Python Libraries** 6.1 Statistical Analysis- NumPy, SciPy, Pandas, StatsModels 6.2 Data Visualization- Matplotlib, Seaborn, Plotly 6.3 Data Modelling and Machine Learning- Scikit-learn, XGBoost, Eli5 6.4 Deep Learning- TensorFlow, Pytorch, Keras 6.5 Natural Language Processing (NLP)- NLTK, SpaCy, GensimUnit 6. Python SQL Database Access and Libraries 6.1 Introduction of Database and Libraries(NumPy,SciPy,Pandas) 6.2 Installation 6.3 DB Connection 6.4 Creating DB Table 6.5 INSERT, READ, UPDATE, DELETE operations COMMIT & ROLLBACK operation	**5**
	Total Hours	**45**

Reference Books:

1. Mark Lutz, Programming Python, O`Reilly, 4th Edition, 2010
2. Dive into Python, Mike
3. Learning Python, 4th Edition by Mark Lutz
4. Programming Python, 4th Edition by Mark Lutz
5. Python Programming:An introduction to computer,John Zelle,3rd Edition.

Subject Code: 24-BBACA355

Subject : Project(04 credit course)

Guidelines:

- Students should work in a team of maximum 2 students.
- Students can choose a project topic without any restriction on technology or domain.
- The student group will work independently throughout the project work including: problem identification, information searching, literature study, design and analysis, implementation, testing, and the final reporting.
- Project guide must conduct project presentations (minimum 4) to monitor the progress of the project groups.
- At the end of the project, the group should prepare a report which should conform to international academic standards. The report should follow the style in academic journals and books, with clear elements such as: abstract, background, aim, design and implementation, testing, conclusion and full references, Tables and figures should be numbered and referenced to in the report.
- The final project presentation with demonstration (UE) will be evaluated by the project guide (appointed by the college) and one external examiner (appointed by the University).

Evaluation guidelines:

CI (30 marks)			**CE (70 marks)**		
First presentation	Second presentation	Documentation	Project Logic/Presentation	Documentation	Viva
10	10	10	40	10	20

Recommended Documentation contents:

Abstract

Introduction

-motivation
-problem statement
-purpose/objective and goals
-literature survey
-project scope and limitations

System analysis

-Existing systems
- scope and limitations of existing systems
-project perspective, features
- stakeholders

-Requirement analysis - Functional requirements, performance requirements, security requirements etc.

System Design

- Design constraints
- System Model: DFD
- Data Model

-User interfaces

Implementation details

-Software/hardware specifications

Outputs and Reports Testing

Test Plan, Black Box Testing or Data Validation Test Cases, White Box Testing or Functional Validation Test cases and results

Conclusion and Recommendations

Future Scope

Bibliography and References

Subject Code: 24-BBACA356

Subject : Computer lab based on 353 & 354

(2 Credit each= 04 credit course)

(Total Practical= 30 P (30x2hrs. for each course)

Sr. No.	Assignment Name	No of Practical's
1	Introduction to Java	**5**
2	Classes, Objects and Methods	**5**
3	Inheritance, Package and Collection	**7**
4	File and Exception Handling	**6**
5	AWT, Event & Swing Programming	**7**
Total		**30**

Sr. No.	Assignment Name	No of Practical's
1	Introduction to Basic Python	**2**
2	Working with Strings and List	**3**
3	Working with Tuples, Sets and Dictionaries	**4**
4	Working with Functions, Modules and Packages	**7**
5	Python Classes and Objects	**4**
6	Inheritance	**3**
7	Exception Handling	3
8	Python GUI Programming using Tkinter	**6**
Total		**30**

Subject Code-24-BBACA357

Subject Name: IOT

Total Contact Hours: 30 **Total Credits: 2**

Course Objectives:

1. To understand technical aspects of Internet of things.
2. To describe smart objects and IoT Architecture.
3. To study and compare different Application protocols of IoT.
4. To understand IoT platform using Arduino Uno.

Course Outcomes: Students will be able

1. To explain key technologies, smart objects, IoT Architecture and security in Internet of Things.
2. To illustrate the role of IoT protocols for efficient network communication.
3. To understand IoT platform such as Arduino Uno.

Unit No.	Contents Theory	No. of Lectures
1	**Fundamentals of IoT** 1.1 Basic Concepts of IoT 1.2 Major components of IoT devices 1.3 IOT Architecture 1.4 Pros & Cons of IOT	03
2	**Communication Technologies** 2.1 Wireless Communication: Bluetooth, ZigBee, WiFi, RF Links 2.2 Wired Communication: Ethernet 2.3 IOT Protocol: MQTT, CoAP, XMPP, OSGi	05
3	**Microcontroller Fundamental and Arduino uno** 3.1 System on Chip & Microcontroller 3.2 Arduino UNO: Introduction to Arduino, Arduino UNO, Arduino Board, The Anatomy of an Arduino Board 3.3 The Development Environment of Arduino Board 3.4 Writing Arduino Software, The Arduino Sketch 3.5 Fundamentals of Arduino Programming 3.6 Trying the code on an Arduino Emulator 3.7 Arduino Libraries 25 Programming & Interfacing 3.8 Application of IoT 3.9 Case studies: Home Automation, Smart Parking, etc.	07
Total		**15**
Practical Please Refer Lab Book		**15**

Reference Books:

1. Learning internet of things by Waher, Peter -Packt Publishing Ltd, 2015
2. "Fundamentals of Wireless Sensor Networks: Theory and Practice" by WaltenegusDargie,
   Christian Poellabauer
3. Internet of Things (A Hands-on-Approach) by Vijay Madisetti , ArshdeepBahga
4. Designing the Internet of Things by Adrian McEwen, Hakim Cassimally
5. Internet of Things with Arduino Cookbook by Schwartz, M. - Packt Publishing Ltd.
6. "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, 1stEdition, Pearson Education (Cisco Press Indian Reprint)
7. "Internet of Things" by Srinivasa K G, CENGAGE Leaning India, 2017
8. Computer Networks by Tanenbaum, Andrew S - Pearson Education Pte. Ltd., Delhi, 4th Edition
9. Data and Computer Communications; By: Stallings, William - Pearson Education Pte. Ltd., Delhi, 6th Edition

Semester -VI
Subject Code-24-BBACA461
Subject Name: Recent Trends in IT

Total Contact Hours: 45 **Total Credits: 3+1**

Pre-Requisite: Students shall have the Basic Knowledge of Software Engineering

Course Objectives:

1. To understand the fundamentals of object modeling
2. To understand and differentiate Unified Process from other approaches.
3. To design with static UML diagrams.
4. To design with the UML dynamic and implementation diagrams.
5. To improve the software design with design patterns.
6. To test the software against its requirements specification.

Course Outcomes:

1. Students will be able to give Design Specifications for Project.
2. Students will acquire Knowledge in Basic Modeling.
3. Students will acquire Project Management Skills.

Chapter	Course Content	No of lectures
1	**Introduction to recent trends** 1.1 Artificial Intelligence 1.2 Data Warehouse 1.3 Data Mining Blockchain Technology	**02**
2	**Artificial Intelligence** 2.1 Introduction& Concept of AI 2.2 Applications of AI 2.3 Artificial Intelligence, Intelligent Systems, Knowledge –based Systems, AI Techniques 2.4 Early work in AI & related fields. 2.5 Defining AI problems as a State Space Search 2.6 Search and Control Strategies 2.7 Problem Characteristics	**08**

	AI Problem: Water Jug Problem, Tower of Hanoi, Missionaries& Cannibal Problem	
3	**AI Search Techniques** 3.1 Blind Search Techniques: BFS, DFS, DLS, Iterative deepening Search, Bidirectional Search, and Uniform cost Search 3.2 Heuristic search techniques: Generate and test, Hill Climbing, Best First search, Constraint Satisfaction, Mean-End Analysis, A*, AO*	**08**
4	**Data Warehousing** 4.1 Introduction to Data warehouse 4.2 Structure of Data Warehouse 4.3 Advantages & uses of Data Warehouse 4.4 Architecture of Data Warehouse 4.5 Multidimensional data model 4.6 OLAP Vs. OLTP 4.7 OLAP Operations 4.8 Types of OLAP Servers: ROLAP versus MOLAP versusHOLAP	**07**
5	**Data Mining** 5.1 Introduction to Data Mining 5.2 Data mining Task 5.3 Data mining issues 5.4 Data Mining versus Knowledge Discovery in Databases 5.5 Data Mining Verification vs. Discovery 5.6 Data Pre-processing – Need, Data Cleaning, Data Integration & Transformation, Data Reduction 5.7 Accuracy Measures: Precision, recall, F-measure, confusion matrix, cross-validation, bootstrap 5.8 Data Mining Techniques 5.9 Frequent item-sets and Association rule mining: Apriori algorithm, FP tree algorithm 5.10 Graph Mining: Frequent sub-graph mining 5.11 Software for data mining: R, Weka, Sample applications of data mining 5.12 Introduction to Text Mining, Web Mining, Spatial Mining, Temporal Mining	**10**

6	**Introduction to Blockchain Technology** 6.1 Foundational Computing Concepts (Client-Server systems vs Peer to Peer Systems) 6.2 Evolution of Blockchain 6.3 Blockchain Vs Database 6.4 Essentials of Blockchain (Blockchain generations, types of blockchain, benefits and challenges of blockchain usage) 6.5 Types of Networks 6.6 Layered Architecture of Blockchain Ecosystem 6.7 Components of blockchain	**10**
	Total hours	**45**

Reference Books:

1. Artificial Intelligence by Elaine Rich, Kevin Knight - Tata McGraw Hill, 2nd Edition
2. Artificial Intelligence: A new Synthesis, Nilsson, Elsevier,ISBN 9788181471901
3. Data Mining Concepts and Techniques, by Jiawei Micheline Kamber, Morgan KaufMann Publishers.
4. Beginning Blockchain : A Beginner's Guide to Building Blockchain Solutions By Bikramaditya Singhal, Gautam Dhameja, Priyansu Sekhar Panda, Apress Media Reference Books:

Mastering Blockchain by Imran Bashir, Third Edition, Packt Publication

Subject Code :24-BBACA362
Subject Name: Software Testing

Total Contact Hours: -45 **Total Credits: - 03**

Pre requisite:

1.Students shall have basic Knowledge of Software Engineering.
2.Students shall have basic Knowledge of OOSE.

Objectives:1. To provide skills to design basic Test Cases
2. To understand how testing methods can be used as an effective tool in providing Quality Assurance for software

Course Outcomes:

1.Students will be introduced to testing tools.
2.Students will acquire Knowledge of Basic SQA.
3.Students will be able to design basic Test Cases

Unit No.	Contents	No of hours
1	**Introduction** 1.1 Introduction, Natures of errors 1.2 Testing Objectives 1.3 Testing principles 1.4 Testing Fundamentals 1.5 Software reviews, Formal Technical reviews 1.6 Inspection and Walkthrough 1.7 Testing Life Cycle	06
2	**Approaches to Testing-Testing Methods** 2.1 White Box Testing and Types of White Box Testing 2.2 Black Box Testing and Types of Black Box Testing 2.3 Gray Box Testing	09
3	**Software Testing Strategies and Levels of Testing** **3.1 Functional Testing:** 3.1.1 Integration Testing and Types-Top down, Bottom Up, Non Incremental, System Testing 3.1.2 Acceptance Testing-Alpha and Beta, Smoke Testing 3.1.3 Regression Testing-Unit Testing, Regional Testing, Full **3.2 Non Functional Testing:** 3.2.1 Adhoc Testing 3.2.2 Performance Testing-Load Testing, Stress Testing, volume Testing, Soak Testing, Recovery Testing 3.2.3 Test case design Techniques-Test case and Types, Test case Template, write a Test case and examples, Preparing Review Report	12
4	**Software Metrics and Testing for Specialised Environments** 4.1 Writing Test Plan, Preparing Traceability matrix, Writing Test Execution Report and Summary Report. 4.2 Agile Testing/Methodology 4.2.1 Agile model 4.2.2 Principles of Agile Testing, 4.2.3 Advantages and Disadvantages 4.2.4 Scrum Technology 4.2.5 Agile/Scrum Framework 4.2.6 Test Management tool: Jira Tool	10
5	**Introduction to Automated Testing:**	08

	5.1 Difference between Manual and Automated Testing 5.2 Install and configure Testing Tool 5.3 Case Study through selenium tool 5.3.1 Design Test Case for Email Login Page 5.3.2 Internet Banking Login 5.3.3 Online Shopping	
	Total	45

References:

Sr.No.	Title Of the Book	Author Name	Publication
1	Software Engineering- A Practitioner's approach	Roger S Pressman	7th Edition Tata McGraw-Hill
2	Effective Methods of Software Testing	William E Perry	Wiley Publishing Inc
3	Software Testing Principles and Practices	Srinivasan Desikan, Gopalswamy Ramesh	Pearson Publication
4	Total Quality Management	Dale H.Besterfield	Prentice Hall,2003
5	Website:WWW.W3Schools.com		

Subject Teacher BOS Chairman Vice Principal

Subject Code-24-BBACA363

Subject Name: Advance Java

Total Contact Hours: 45 **Total Credits: 3**

Course Objectives :-

1. To know the concept of Java Programming.
2. To understand how to use programming in day to day applications.
3. To develop programming logic.

Course Outcomes :-

1. Students will know the concepts of JDBC Programming.
2. Students will know the concepts of Multithreading and Socket Programming.
3. Students will know the concepts of Spring and Hibernate.
4. Students will develop the project by using JSP and JDBC.
5. Students will develop applications in Spring and hibernate.

Sr. No	**Topic**	Number Of Lectures
1.	**JDBC** 1.1 Introduction 1.2 JDBC Architecture. 1.3 JDBC Process **1.4 Working with ResultSet Interface.**	**8**
2	**Multithreading:** 2.1 Introduction to Multithreading. 2.2 Thread creation: Thread Class, Runnable Interface. 2.3 Life cycle of Thread. 2.4 Thread Priority. 2.5 Execution of Thread Application. 2.6 Synchronization and Interthread communication.	**10**
3	**Networking:** 3.1 Overview of Networking. 3.2 Networking Basics: Port Number, Protocols and classes. 3.3 Sockets, Reading from and Writing to a Socket.	**5**
4	**Servlet and JSP** 4.1 Introduction to Servlet 4.2 Types of Servlet: Generic Servlet and Http Servlet 4.3 Life cycle of servlet 4.4 Session Tracking. 4.5 Servlet with database. **JSP** 4.6 Introduction to JSP. 4.7 JSP Life Cycle. 4.8 Components of JSP. 4.9 JSP with Database.	**12**

5	**Spring & Hibernate** **Spring:** 5.1 Introduction 5.2 Applications and Benefits of spring 5.3 Architecture and Environment Setup 5.4 Hello World Example 5.5 Core Spring- IoC Containers, Spring Bean Definition, Scope, Lifecycle **Hibernate** 5.6 Architecture and Environment 5.7 Configuration, Sessions, Persistent Class 5.8 Mapping Files, Mapping Types 5.9 Examples	**10**
	Total Hours	**45**

Reference Books:

1. The Complete Reference – JAVA Herbert Schildt
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by WileyPublishing, Inc.,ISBN: 0-7645-7677-1
3. Spring In Action, Craig Walls, Ryan Breidenbach, ManningPublishing Co., ISBN: 1-932394- 35-4
4. Head First Servlets and JSP: Passing the Sun Certified Web Component DeveloperExam -2nd Edition-Bryan Basham, KathySierra, Bert Bates- O'REILLY.

Subject Code: - 24-BBACA364

Subject Name -: Android Programming

Total Hours :- 45 **Total Credits: 03**

Pre-requisite:

1. Concepts of OOP's.
2. Basic Knowledge About JAVA Programming

Course Objective:

1. To understand the Android Operating System and develop applications using Google's Android open-source platform.
2. To understand the issues relating to Wireless applications.

Course Outcome:

After completion of this course, student will be able to

1. Demonstrate the Understanding of fundamental of Android Programming. (Understand)
2. Build their ability to develop software with reasonable complexity on mobile platform. (Apply)
3. Discover the life cycles of Activities, Applications, intents and fragments. (Evaluate)
4. Design the Android apps by using Java Concepts. (Create)

Unit	Topic	No. of lectures
1	**INTRODUCTION TO Android Programming** 1.1 What is Android? 1.2 Android Architecture 1.3 Basic Building Blocks 1.4 Android API Levels 1.5 Application Structure 1.6 First Hello World Program **1.7 Emulator-Android Virtual Device** Launching emulator Editing emulator settings Emulator shortcuts	**04**

2	**ACTIVITY, INTENT AND LAYOUT** 2.1 Introduction to Activity 2.2 Activity life cycle 2.3 Introduction to Intent 2.4 Types of Intent (Implicit and Explicit Intent) 2.5 Layout Manager 2.5.1 View and View Group 2.5.2 Linear Layout 2.5.3 Relative Layout 2.5.4 Table Layout 2.5.5 Grid Layout 2.5.6 Constraint Layout 2.5.7 Frame Layout 2.5.8 Scroll Layout	**07**
3	**BASIC UI DESIGN** 3.1 Button(Push Button, Check Box, Radio Button, Toggle Button, Image Button) 3.2 Text Fields 3.3 Spinner 3.4 List View 3.5 Toast 3.6 Scroll View 3.6 ProgressBar View 3.7 Auto Complete Text View 3.8 Dialog Box 3.8.1 Alert Dialog. 3.8.2 DatePicker Dialog. 3.8.3 TimePicker Dialog. Custom Dialog.	**10**
4	**ADAPTER AND MENU** 4.1 Base Adapter 4.2 Array Adapter 4.3 ListView using Adapter 4.4GridView using Adapter 4.5Photo Gallery using Adapter 4.6 Using Menu with Views 4.6.1 Option Menu 4.6.2 Context Menu Popup Menu	**05**

5	**THREADS AND NOTIFICATION** 5.1 Worker thread 5.2 Handlers & Runnable 5.3 AsynTask (in detail) 5.4 Broadcast Receiver 5.5 Services 5.5.1 Service life Cycle 5.5.2 Bounded Service 5.5.2 Unbounded Service 5.6 Notification 5.7 Alarm Accessing Phone services(Call,SMS)	**06**
6	**CONTENT PROVIDER** 6.1 Content Providers 6.2 SQLite Programming 6.3 SQLiteOpenHelper 6.4 SQLiteDatabse 6.5 Cursor 6.6 Searching for content 6.7 Adding, changing, and removing content 6.8 Building and executing queries Android JSON	**07**
7	**LOCATION BASED SERVICES AND GOOGLE MAP** **7.1** Display Google Maps 7.1.1 Creating the project 7.1.2 Obtaining the Maps API Key 7.1.3 Displaying the Map 7.1.4 Displaying the Zoom Control 7.1.5 Changing Views 7.1.6 Navigating to a specific location 7.1.7 Adding Markers 7.1.8 Getting the location that was touched 7.1.9 Geocoding and Reverse Geocoding 7.2. Getting Location Data Monitoring a Location	**06**
	Total Hours	**45**

Reference Books:

1. Beginning Android4 Application Development, By Wei-Meng Lee WILEY India Edition WROXPublication
2. Professional Android 4 Application Development, By Reto Meier WROX Publication
3. The official site for Android developers - https://developer.android.com

Subject Code: 24-BBACA365

Subject : Dissertation Project(04 credit course)

Guidelines:

- Students should work in a team of maximum 2 students.
- Students can choose a project topic without any restriction on technology or domain.
- The student group will work independently throughout the project work including: problem identification, information searching, literature study, design and analysis, implementation, testing, and the final reporting.
- Project guide must conduct project presentations (minimum 4) to monitor the progress of the project groups.
- At the end of the project, the group should prepare a report which should conform to international academic standards. The report should follow the style in academic journals and books, with clear elements such as: abstract, background, aim, design and implementation, testing, conclusion and full references, Tables and figures should be numbered and referenced to in the report.
- The final project presentation with demonstration (UE) will be evaluated by the project guide (appointed by the college) and one external examiner (appointed by the University).

Evaluation guidelines:

CI (30 marks)			**CE (70 marks)**		
First presentation	Second presentation	Documentation	Project Logic/Presentation	Documentation	Viva
10	10	10	40	10	20

Recommended Documentation contents:

Abstract

Introduction

-motivation
-problem statement
-purpose/objective and goals
-literature survey
-project scope and limitations

System analysis

-Existing systems
- scope and limitations of existing systems
-project perspective, features
- stakeholders

-Requirement analysis - Functional requirements, performance requirements, security requirements etc.

System Design

- Design constraints
- System Model: DFD
- Data Model
-User interfaces

Implementation details

-Software/hardware specifications

Outputs and Reports Testing

Test Plan, Black Box Testing or Data Validation Test Cases, White Box Testing or Functional Validation Test cases and results

Conclusion and Recommendations

Future Scope

Bibliography and References

Subject Code: 24-BBACA366

Subject : Computer lab based on 363 & 364

(2 Credit each= 04 credit course)

(Total Practical= 30 P (30x2hrs. for each course)

Sr. No.	Assignment Name	No of Practical's
1	JDBC Programming	**5**
2	Multithreading	**5**
3	Socket Programming	**7**
4	JSP and Servlet	**6**
5	Spring and Hibernate	**7**
Total		**30**

Sr. No.	Assignment Name	No of Practical's
1	Introduction to Android	**2**
2	Activity, Layout and Intent	**4**
3	Android User Interface and Event Handling	**5**
4	Android TimePicker, DatePicker, Alert Dailog	**5**
5	Android Adapter and Menu	**4**
6	Android Threads and Services	**3**
7	Android Databases – Sqlite	3
8	Location-Based Services and Google Maps	**4**
Total		**30**

Subject Code-24-BBACA367

Subject Name: Add On(Soft Skill Training)

Total Hours: 30 **Total Credits: 2**

Course O**bjectives:**

1. It helps participants to communicate effectively and to carry themselves confidently.
2. They also learn how to identify and overcome the barriers in interpersonalrelationships.
3. To improve oral and written communication, teamwork, leadership, problem-solving and decision-making skills, to gain best results.
4. This course is useful for landing a great job, building a career and also findingemployment as softskills trainers.

Course Outcomes:

1. Understand the significance and essence of a wide range of soft skills
2. Learn how to apply soft skills in a wide range of routine social and professional settings.
3. Learn how to employ soft skills to improve interpersonal relationships.
4. Learn how to employ soft skills to enhance employability and ensure workplace andcareer success.

Unit	Topics	No. of Lectures
1	**Introduction to Soft Skills** 1.1 An Introduction to Soft skill - 1.1.1 Definition and Significance of Soft Skills 1.1.2 Soft skill Process 1.1.3 Uses of Soft Skill Development.	02
2	**Communication Skills** 2.1 Introduction - Components of communication process, Communication process , Effective communication process. 2.2 Types of communication – 2.2.1 Verbal Communication – • Punctuation • Meaning & opposites , vocabulary • Real Life conversations 2.2.2 Non – Verbal Communication - • Facial Expression , Posture , Gesture , Eye contact • appearance (dress code), Body Language, listening skills • essential formal writing skills.	04

3	**Skills Development** 3.1 Interview Skills – Interviewer and Interviewee – in-depth perspectives. Before, During and After the Interview. Tips for Success. 3.2 Presentation Skills - Types, Content, Audience Analysis, Essential Tips Before, During and After, Overcoming Nervousness. 3.3 Etiquette and Manners - Social and Business 3.4 Time Management - Concept, Essentials, Tips Personality Development - Meaning, Nature, Features, Stages, Models, Learning Skills, Adaptability Skills.	05
4	**Skill Implementation** 4.1 Resume writing – 4.1.1 How to write your resume. • Contact details. • Opening statement. • List of key skills. • List of technical/software skills. • Personal attributes/career overview. • Educational qualifications. • Employment history /volunteering/work placements. • References/referees. 4.1.2 Types of resume 4.2 Group Discussion - Importance, Planning, Elements, and Skills assessed, Effectively disagreeing, Initiating, Summarizing and Attaining the Objective. Teamwork and Leadership Skills - Concept of Teams, Building effective teams, Concept of Leadership and honingLeadership skills , A Good Leader, Leaders and Managers , Types of Leaders , Leadership Behaviour.	04
	Total Hours	15
	Practical Please Refer Lab Book	15

Reference Books :

1. Managing Soft Skills for Personality Development – edited by B.N.Ghosh, McGrawHill India, 2012.
2. English and Soft Skills – S.P.Dhanavel, Orient Blackswan India, 2010.
3. Soft skills Training – A workbook to develop
skills foremployment by Fredrick H.Wentz .
4. Personality Development and Soft skills, Oxford University Press by Barun K. Mitra
5. The Time Trap : the Classic book on Time Management by R. Alec Mackenzie