Millia Institute of Technology
Rambagh, Purnea

Affiliated to Purnea University, Purnea

NAAC Accredited & ISO 9001:2015

SYLLABUS

Department of
Master of Computer Applications

3rd SEMESTER

SEMESTER – III										
CC/ CE/ SE/ OE	**Paper Code**	**Paper Title**	**Hours Per Week**			**Credit**	**End-Term Theory Exam Marks**	**Continuous Evaluation Marks**	**End-Term Practical Exam Marks**	**Total Marks**
			L	**T**	**P**					
CC (Core Compulsory)	3MCACCC1	Software Engineering	4	1	0	5	70	30	0	100
	3MCACCC2	Java Programming	3	0	2	5	70	30	0	100
	3MCACCC3	Design and Analysis of Algorithm	4	1	0	5	70	30	0	100
	3MCACCC4	Practical Examination	-	-	-	5	0	0	100	100
CE (Select Any 2)	3MCACCE(A)	Big Data Analytics	4	0	1	5	70	30	0	100
	3MCACCE(B)	Theory of Computation	4	1	0	5	70	30	0	100
	3MCACCE(C)	Mobile Application Development	3	0	2	5	70	30	0	100
SE (Select Any 2)	3MCASEC(A)	Programming with R	3	0	2	5	70	30	0	100
	3MCASEC(B)	Management Theory and Practices	4	1	0	5	70	30	0	100
	3MCASEC(C)	Development and Operational Tools (DevOps)	3	0	2	5	70	30	0	100
	3MCASEC(D)	Enterprise Resource Planning (ERP) and CRM	4	1	0	5	70	30	0	100
OE	SWAYAM3	- - -	-	-	-	-	-	-	-	-
SEMESTER TOTAL						**40**				**800**

Definition of Credit	12 Hr. Lecture (L) = 1 credit	12 Hr. Practical (P) = 0.5 credit
	12 Hr. Tutorial (T) = 1 credit	12 Hrs. Practical (Lab) = 0.5 credit

SEMESTER – III

3MCACCC1 – SOFTWARE ENGINEERING

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CC	4	1	0	5	70	30	0	100

COURSE OBJECTIVES

- Understand, Learn and Apply the Theoretical and Practical Knowledge of Software Development Such as Software Development Paradigms, Process, Models, Tools and Techniques.
- Understand and Learn the Process of Software Requirements Identification, Analysis, Review, and also Learn Recording Requirements in the IEEE Format of the SRS Document.
- Understand the Various Types and Levels of Software Testing and Basic Approaches of Test Case Designing.
- Gain the Knowledge of the Various Models of Software Quality, Estimation, Quality Assurance and Control.

COURSE OUTCOMES

- Identify, Analyze, Review and Validate the Requirement of Software Components and System, and Also Prepare Software Requirement Specification (SRS) Documentation Using Relevant Standards, Tools and Methodologies.
- Manage a Software Project by Applying Project Management Concepts Such as Planning, Scheduling and Risk Management for Developing Qualitative and Economic Software.
- Work Effectively in Various Profiles of Software Developing Team Such as Software Analyst Architecture, Programmer, Tester, Quality Assurance and Control officer, Project Manager and Leaders.
- Communicate and Coordinate Competently by Listening, Speaking, Reading and Writing Software Documents
- Apply Coding Standards & Guidelines, and Quality Norms in Coding of Software Systems to Satisfy the Requirements and Quality.
- Design Test Cases and Optimize the Test Suite for UNIT, Integration and System-Level Testing using various Techniques and Tools for Adequately Testing the Software Components and Systems.

UNIT – WISE SYLLABUS

UNIT-I

Software: Software Characteristics, Components, and Applications, Software Engineering Layered Technology, Software Development Life Cycle, Software Process Models- Linear Sequential Model, Prototype & RAD Model, Incremental and Evolutionary Process Models. Introduction of Agile Software Development, CBSD (Component Based Software Development) Aspect Oriented Paradigm (AOP) and Green Software Development, Process and Product Metrics.

UNIT-II

Analysis Concept and Principles: Requirement Analysis, Analysis Principles, Requirement Elicitation, Information Gathering Techniques, Requirements Specification, Requirements Verification and Validation, Requirements Management. Requirements Modeling: Scenarios, Information and Analysis Classes, Flow and Behavioral Modeling, Documenting Software Requirement Specification (SRS) Characteristics of SRS, Format of SRS, Software Project Planning: Objectives, Decomposition Techniques, and Empirical Estimation Models. Project Metrics: Software Measurement-Size Oriented, Function Oriented Metrics.

UNIT-III

Design Concepts and Principles: Design Process, Design Concepts, Design Principles, Effective Modular Design, Human Computer Interface Design, Interface Design Guidelines. System Design: Design Models for Architecture, Component, Data and User Interfaces; Problem Partitioning, Abstraction, Cohesiveness, Coupling, Top-Down and Bottom-Up Design Approaches; Functional Versus Object Oriented Approach, Design Specification. Coding: Top-Down and Bottom-Up Structure Programming, Information Hiding, Programming Style, and Internal Documentation, Verification.

UNIT-IV

Software Testing: White and Black Box Testing, Levels of Testing, Unit, Integration, System Testing, Functional Testing, Structural Testing, Test Plan, Software Testing Strategies, Verification & Validation, Incremental & Non- Incremental Testing, Top-Down and Bottom-Up Integration Testing, Alpha & Beta Testing, White Box and Black Box Test Case Design Techniques, Debugging Techniques. Software Quality, Quality Models, Quality Control and Quality Assurance, ISO, SEI Capability Maturity Model (CMM) and Comparison between ISO & SEI CMM.

UNIT-V

Agile Methodology: Introduction and background, Values of Agile, Stakeholders, Challenges, Agile Manifesto and Principles, Twelve Practices of XP, Overview of Scrum, Need of scrum, working of scrum, advanced Scrum Applications, Scrum and the Organization, scrum values, Framework of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Refactoring, Pair Programming, User Stories, Characteristics and contents of User stories, Backlog Management, Agile Risk Management, Scrum roles, Agile Tools, Agile Metrics and Measurements, Agile Design Practice, Refactoring Techniques, Agile Testing, Test-Driven Development (TDD), x Unit framework and tools for TDD, Agile Configuration Management, Continuous Integration / Continuous Delivery (CI / CD), and DevOps

TEXT & REFERENCE BOOKS

- Roger S. Pressman, Software Engineering-A Practitioner's Approach, McGraw Hill International Edition,
- K. K. Aggarwal, Yogesh Singh, Software Engineering,
- Ian Sommerville, Software Engineering, Addison-Wesley Publishing Company
- James F. Peter, Software Engineering - An Engineering Approach, John Wiley
- Fairley Richard Software Engineering Concepts, Tata McGraw Hill
- Scrum Ken Schawber, Mike Beedle - Agile Software Development with Publisher: Pearson
- Lisa Crispin, Janet Gregory Agile Testing: A Practical Guide for Testers and Agile Teams Publisher: Addison Wesley.
- Kenneth S. Rubin, Essential Scrum: A Practical guide to the most popular agile process
- Robert C. Martin, Agile Software Development, Principles, Patterns and Practices, Publisher: Prentice Hall

SEMESTER – III

3MCACCC2 – JAVA PROGRAMMING

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CC	3	0	2	5	70	30	0	100

COURSE OBJECTIVES

- Introduce and Learn the Usage of the Java SDK Environment to Create, Debug and Run Java Programs.
- Understand Fundamentals of Java Programming Such as Character Set, Variables, Data Types, and Control Structures, Array, Class, and Methods.
- Understand the Concepts of (OOPs) and Learn Implementation in Java Defining Classes, Invoking Methods, Using Class Libraries.
- Introduce Strings, Vectors, Interfaces, Packages and Threads Handling in Java.
- Gain the Knowledge of Java Applets, AWT, Swings, Servlet.
- Understand the GUI Application, Web Applications, N-Tier Architecture.
- Develop the Understanding of the Basic Knowledge of File Handling, Database Connectivity, Java Servlets and Web Application.

COURSE OUTCOMES

- Explain and Apply the Object-Oriented Concepts for Solving Real Problem.
- Use the Java SDK Environment to Create, Debug and Run Simple Java Programs.
- Apply Java Technology to Develop the Small Applications, Utilities, and Web Applications.
- Apply Events Management and Layout Managers Using AWT, Swing, JDBC and Servlet for Developing the Software for Various Problems.

UNIT – WISE SYLLABUS

UNIT-I

Basics of Java: History and Basics of Java, Java Environment, JDK Tools, Java Virtual Machine, Java Program Structure, Java Language - Tokens, Keywords, Constants, Variables, and Data Types. Operators and Expressions, Statements - Decision Making, Branching and Looping, Labeled Loops Statement, Jump Statements: Break, Continue, and Return, Command Line Argument. Classes and Objects: Classes, Objects, Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Static Members, Nesting of Methods

UNIT-II

Inheritance and Polymorphism: Basics Types, Extending a Class,Using Super, Method Overloading, Method Overriding, Final Variables and Methods, Final Classes, Finalize Method, Visibility Control. One and Two Dimension Arrays, String Array, String and String Buffer Classes, Vectors, Wrapper Classes. Abstract Classes and Methods. Interfaces: Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Packages: System Packages, Naming Conventions, Creating Packages, accessing a Package, Using Package, Adding a Class to a Package, Hiding Classes. Exception Handling: Introduction to Exception Handling, Try-Catch, Finally, Throws, Java Thread Model: Life Cycle of a Thread, Thread Class, Runnable Interface

UNIT-III

Applet Programming: Creating and Executing Java Applets, Inserting Applets in a Web Page, Applet Tag, Local and Remote Applets, Applets Vs. Applications, Applets Life Cycle. AWT Classes, Event Handling, AWT Programming: Workingwith Windows, Graphics and Text, Using AWT Controls, Layout Managers and Menus, Handling Image, Animation, Sound andVideo.
Java Swing: Swing Classes, JApplet, ImageIcon, JLabel, JTextField, JButton, JRadioButton, JCheckBox, JComboBox, JList, JTabbedPane, JScrollBar, JTable.

UNIT-IV

I/O Stream: Introduction of I/O Stream, Types of Streams, Stream Class Hierarchy, Using File Class, Byte Streams Vs Character Streams, Text file Vs Binary File, Standard I/O Streams, and Random-Access File, Serialization.
Database Programming Using JDBC: Introduction to JDBC, JDBC Drivers, Types of JDBC Drivers, Connecting with Database.

UNIT-V

J2EE: Introduction of J2EE, Web Application Basics, Architecture and Challenges of Web Application, Servlet: Servlet Life Cycle, Developing and Deploying Servlets, RMI, Java Networking.
Java Server Pages (JSP): JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects.

TEXT & REFERENCE BOOKS

- E. Balagurusamy, "Programming with Java, a Primer", TMH, ISBN-13: 978-0-07-061713-1, ISBN-10: 0-07-061713-9.
- Patrick Naughton and Herbert Schildt, "Java: The Complete Reference", TMH Publication, ISBN 0-07-463769-X.
- Yashavant Kanetkar, "Let us Java", BPB Publications.
- Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI", BPB Publications
- Cay Horstmann, "Big Java", Wiley Publication
- Peter Norton, "Java Programming", Techmedia Publications.
- Joseph Weber, "Using Java 1.2", PHI, ISBN -81-203-1558-8.

LIST OF PRACTICALS

1. Write a Program in Java to Calculate the Simple Interest.
2. Write a Program in Java to Calculate Sum of Two Numbers Input from Command Line Argument.
3. Write a Program in Java to Calculate Area of Circle Using Scanner Class.
4. Write a Program in Java to Calculate Square Root of a Number.
5. Write a Program in Java to Display Name, Age, Calendar and Salary of a Person Input from the Keyboard.
6. Write a Program in Java to Display Grading of Student When His Percentage is Input from Keyboard.
7. Write a Program in Java to Display Odd Number from 1 to 100.
8. Write a Program in Java to Display the Following Patterns using Functions.

(a)	(b)	(c)	(d)
1 1 2 1 2 3 1 2 3 4 1 2 3 4 5	1 2 2 3 3 3 4 4 4 4 5 5 5 5 5	1 2 1 3 2 1 4 3 2 1 5 4 3 2 1	1 2 3 4 5 6 7 8 9 10 11 12 13

9. Write a Program in Java to Calculate the Factorial of a Number.
10. Write a Program in Java to Determine Whether a Number Input from Keyboard is Prime Number Or Not.
11. Write a Program in Java to Display the Prime Numbers from 1 to 500 Using Function.
12. Write a Program in Java to Show Accessing Class Members and use a Dot(.).
13. Write a Program in Java to Show Multilevel Inheritance.
14. Write a Program in Java to Show Single Inheritance.
15. Write a Program in Java to Concatenate Two Strings Without Using Library Function.
16. Write a Program in Java to Make First Alphabet Capital of Each Word in a String.
17. Write a Program in Java to Get the Last Index of Any Given Character in a String.
18. Write a Program in Java to Reverse Words of a String.
19. Write a Program in Java to Find Occurrences of Each Character in a String.
20. Java Program to Get String and Count Number of Words in Provided String.
21. Write a Program in Java to Check Given String is Palindrome String Or Not in Java.
22. Write a Program in Java to Reverse Each Word of Given String.
23. Write a Program in Java to Get Sub String from a Given String.
24. Java Program to Convert String to Lowercase and Uppercase.
25. Create a Java Applet and Show the use of DrawString() Function.
26. Create a Java Applet to Show How to use Various Methods of Applet Class and Graphics Class in a Java Applet.
27. Write a Program in Java to Show the use of Interface.
28. Create a Java GUI Application Using Labels and Textfields.
29. Create a Java GUI Application Using Radio buttons.
30. Create a Java GUI Application Using Checkboxes.
31. Create a Java GUI Application Using Combo boxes.
32. Create a Java GUI Application Using Listboxes.
33. Create Two Html Pages with Links to Navigate from One Page to Other Page.
34. Write a Servlet to Display Current Date and Time of Server on Client: DateServlet
35. Write a Servlet to Display Natural Numbers from 1 to 100: NumberServlet
36. Create a JSP to Display Natural Numbers from 1 to 50: Number.Jsp and Write Down the Process of Running It Step by Step.
37. Create a JSP to Display Current Date and Time of Server onClient: Date.JSP and Write Down the Process of Running it Step by Step.

GROUP ASSIGNMENTS

1. Scientific Calculator Utility
2. Chat Application

3. Time Table System
4. Student Attendance System
5. Steganography & Data Encryption System Java
6. Student Information System
7. Survey Tool System
8. Text Editor Like Notepad / Wordpad
9. Game / Puzzle Like Luddo Game
10. Game / Puzzle Like Snake Game
11. Paint Application

SEMESTER – III

3MCACCC3 – DESIGN AND ANALYSIS OF ALGORITHM

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CC	4	1	0	5	70	30	0	100

COURSE OBJECTIVES

- To develop proficiency in problem solving and programming.
- To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced study in Computer Science.

COURSE OUTCOMES

- Able to Argue the correctness of algorithms using inductive proofs and Analyze worst-case running times of algorithms using asymptotic analysis.
- Able to explain important algorithmic design paradigms (divide-and-conquer, greedy method, dynamic-programming and Backtracking) and apply when an algorithmic design situation calls for it.
- Able to Describe the classes P, NP, and NP-Complete and be able to prove that a certain problem is NP-Complete.

UNIT – WISE SYLLABUS

UNIT-I

Algorithms and Analysis: Introduction, Algorithms specification, Recursive algorithms, space and time complexity, Asymptotic Notation (O, Ω, and Θ, o) practical complexities, Best, average and worst-case performance of algorithms, examples, Introduction to recurrence relations.

UNIT-II

Divide and Conquer Methods: Selection sort, Merge sort, Quick sort. Binary search, Strassen's Matrix Multiplication and analysis of these problems.

UNIT-III

Dynamic Programming: Elements of Dynamic Programming, Assembly Line Scheduling, Matrix Chain Multiplication, Shortest paths, optimal search trees, etc.

UNIT-IV

Greedy Techniques and Randomized algorithms: Elements of Greedy Algorithms, Prim's algorithm- Kruskal's Algorithm-Dijkstra's Algorithm-Huffman Trees, Randomized Algorithms.

UNIT-V

Backtracking and Branch and Bound: Introduction, The Eight Queens Problem, Knapsack Problem, Travelling Salesman Problem, Minimax Problem.

Complexity Theory and Approximation algorithms: Introduction, P, NP, NP-Hard, NP Complete and Associated Problems, Approximation Algorithm- Vertex Cover and Travelling Salesman-Problem.

TEXT & REFERENCE BOOKS

- Sridhar, Design and Analysis of Algorithms, OUP.
- Aho, The Design and Analysis of Computer Algorithms, Addison-Wesley.
- Paneerselvam, Design and Analysis of Algorithm, PHI.
- Dave, Design and Analysis of Algorithm, PE.
- Goodman, Introduction to the Design and Analysis of Algorithms, TMH.

SEMESTER – III

3MCACCC4 – PRACTICAL EXAMINATION

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CC	-	-	-	5	0	0	100	100

Practical evaluation will be conducted from below listed papers *(whichever is / are opted by candidates)*:

1. Paper 3MCACCC2
2. Paper 3MCACCE(A)
3. Paper 3MCACCE(C)
4. Paper 3MCASEC(A)
5. Paper 3MCASEC(C)

SEMESTER – III

3MCACCE(A) – BIG DATA ANALYTICS

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CE	4	0	1	5	70	30	0	100

COURSE OBJECTIVES

- Familiarize the students with most important information technologies used in manipulating, storing, and analyzing big data
- This course gives students all around learning of the big data framework using Hadoop and spark, including yarn, HDFS and MapReduce.
- It provides an overview of approaches facilitating data analytics on huge datasets.

COURSE OUTCOMES

- Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.
- Demonstrate an ability to use Hadoop framework to efficiently store, retrieve and process Data for Analytics.
- Implement several Data Intensive tasks using the MapReduce Paradigm

UNIT – WISE SYLLABUS

UNIT-I

Big Data- Introduction, Characteristics, Types, Elements, Traditional vs. Big Data Business Approach, Big Data Analytics, Advantages, Applications, Distributed & Parallel Computing for Big Data, Components in Big Data Architecture, Virtualization Approaches.

UNIT-II

Statistics and Probability: Sampling Techniques - Data Classification, Tabulation, Frequency and Graphic Representation, Measures of Central Value - Mean, Mode, Median, Random Variable and Probability Theory.

UNIT-III

Hadoop- Introduction, Features, Advantages, Versions, Key Considerations of Hadoop, RDBMS Vs Hadoop, Hadoop Ecosystem, HDFS - Architecture, Features, Commands, Processing Data with Hadoop, Hadoop Yarn.

UNIT-IV

MapReduce Framework, Features, Uses, Working on MapReduce, MapReduce Input and Output Operations, Exploring Map and Reduce Functions, MapReduce Optimization Technique, HBASE Introduction, Architecture, HBASE in Hadoop Applications.

UNIT-V

Processing Data with MapReduce, Task Execution & Environment – Installation of Eclipse, Hadoop, Java Development Kit and Linux Ubuntu OS, MapReduce Program Steps to Obtain Word Count, Functionality of Input Format - Inputsplit, Recordreader, Fileinputformat, Output Process of Fileoutputformat – Outputformat, Recordwriter, Role of Combiner, Partitioner, Debugging MapReduce.

TEXT & REFERENCE BOOKS

- Rob Kitchin The Data Revolution: Big Data Open Data Data Infrastructures and their Consequences SAGE Publications Ltd
- Croll and B. YoskovitzLean Analytics: Use Data to Build a Better Startup Faster o'reilly
- Mayer-Schönberger and K. CukierBig Data: A Revolution That Will Transform How We Live Work and Think
- E. Siegel-Predictive Analytics: The Power to Predict Who Will Click Buy Lie or Die
- Bernard Marr-Big Data in Practice Wiley publication

SEMESTER – III

3MCACCE(B) – THEORY OF COMPUTATION

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CE	4	1	0	5	70	30	0	100

COURSE OBJECTIVES

- Learn and Understand FSA, DFA, NDFA, Turing Machine, Regular Expression, Push Down Automaton.
- Learn and Understand Properties of Languages, Grammars and Automata.
- Gain knowledge of Computing and Mathematics to Solve Problems.

COURSE OUTCOMES

- Demonstrates Models, Turing Machine, Regular Expression, Push Down Automaton.
- Model, Compare and analyze different Computational Models.
- Apply and Prove properties of Languages, Grammars and Automata.
- Apply Knowledge of Computing and Mathematics to Solve Problem
- Apply Mathematical Foundations, Algorithmic Principles and Computer Science Theory to the Modeling

UNIT – WISE SYLLABUS

UNIT-I

Introduction to Theory of Computation: Basic Computational Constructs: Finite State Systems, Non-Deterministic Finite Automata (NDFA), Deterministic Finite Automata (DFA), Equivalence of DFA and NDFA, Finite Automata with E- Moves, Limitations of FSM, Minimization of Finite Automata, Moore and Mealy Machines, Equivalence of Moore and Mealy Machines.

UNIT-II

Regular Sets, Closure Properties of Regular Sets, Pumping Lemma, Applications of Pumping Lemma. Regular Expression, Laws for Regular Expression, Equivalence of Finite Automata and Regular Expression, Introduction to Regular Grammar.

UNIT-III

Introduction to Context Free and Context Sensitive Grammar, Ambiguity, Parse Tree Representation of Derivations, Simplification of Context Free Grammar, Normal Forms (Chomsky Normal Form (CNF) and Griebach Normal Form (GNF)).

UNIT-IV

Definition, Deterministic Push Down Automaton (DPDA), Non-Equivalence of PDA & DPDA, Equivalence of CFG and PDA, Pumping Lemma for CFL's, Closure Properties of CFL, Non-CFL.

UNIT-V

Turing Machine (TM): Introduction, Types of Turing Machine, Universal Turing Machine and Other Modifications, Construction of Tm for Simple Problems, Turing Machine as Enumerators, Relation Between Languages of Classes, Computational Complexity Theory. Computable.
Functions: Partial, Total, Constant Functions, Primitive Recursive Function, Regular Function, Recursive Functions.

TEXT & REFERENCE BOOKS

- John E Hopcroft, Rajeev Motwani, Jeffrey D. Ullman. Introduction to Automation Theory, Languages & Computation
- Mishra &Chandrasekaran-Theory of Computer Science (Automata Languages and Computation PHI ISBN-81-203-1271-6
- Lewis & Papadimitriou Elements of the Theory of Computation, PHI ISBN 81-203-1016-0
- John C. Martin -Introduction to Languages and Theory of Computation ISBN – 0-07-463722-3
- Bernard M. Moret Pearson - Theory of Computation ISBN-81-7808-550
- Raymond Greenlaw & H. James Hoover (Harcount) - Fundamentals of Theory of Computation, ISBN: 81-7867-036-4

SEMESTER – III

3MCACCE(C) – MOBILE APPLICATION DEVELOPMENT

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
CE	3	0	2	5	70	30	0	100

COURSE OBJECTIVES

- To introduce Android platform and its architecture.
- To learn activity creation and Android UI designing.
- To be familiarized with Intent, Broadcast receivers and Internet services.
- To work with SQLite Database and content providers.
- To integrate multimedia, camera and Location based services & REST full web Services in Android Application.
- To explore publishing process of Android Application

COURSE OUTCOMES

- Describe Android platform, Architecture and features.
- Design User Interface and develop activity for Android App.
- Use Intent, Broadcast receivers and Internet services in Android App.
- Design and implement Database Application and Content providers.
- Use multimedia, camera and Location based services in Android App.
- Discuss various stages in Android App publishing.

UNIT – WISE SYLLABUS

UNIT-I

Various mobile platforms, introduction to android, history and versions of android, android API, android architecture, android runtime, dal vik virtual machine, features of android, introduction and installation of eclipse and ADT plugin and / or introduction and installation of android studio, requirements and installation of android SDK, SDK manager, emulator, avd, android virtual device manager, google play account, installing android app from google play, APK file.

UNIT-II

Setting up Development Environment, Installing Packages using SDK Manager, Android Project Structure, Creating Hello Android App, Deploy it on USB- connected Android device, Setting up an Emulator, Android Tool Repository, Manifest File, DDMS, File Explorer, Installing and Running Android - Hello App, Activity Life Cycle and its methods, Logcat, Components of an Android App – Activity, Service, Broadcast Receiver, Content Provider

UNIT-III

Layout – Linear Layout, Relative Layout, Scroll View Layout, Table Layout, Frame Layout, UI Resources – Layout Resources, UI Elements, Views - Text view, Edit Text, Button, Check Box, Radio Button, Image Button, Spinner, Navigating between Activities - Intent, Exchanging Data between Activities, Action Bar, Event Handling, Listeners, Notifying the User - Toast.

UNIT-IV

Using Threads, Image View, Exception Handling, Multimedia - Playing Audio using an Intent, Playing Video using an Intent, Playing Audio using Media Player, Playing Video using Video View, Fragment, Fragment Life Cycle.

UNIT-V

SQLite database, creation of database and tables, CRUD operations – create, retrieve, update and delete operations, Cursor, list view, etc. Introduction – REST full web Services, JSON, Google Play Services, location services, publishing apps.

TEXT & REFERENCE BOOKS

- Michael Burton, Donn Felker, "Android Application Development for Dummies", Dummies, ISBN: 9788126538775
- Pradeep Kothari, "Android Application Development (with Kitkat Support)", Kogent Learning Solutions Inc., Black Book, DreamTech Press, ISBN: 9789351194095
- W. Frank Ableson, Robi Sen, Et. Al., "Android in Action", Manning, ISBN: 9789350042915
- Charlie Collins, Michael Galpin, Et. Al., " Android in Practice", Manning, ISBN: 9789350042397
- Anubhav Pradhan, Anil V Deshpande, "Composing Mobile App, Learn | Explore | Apply Using Android", Wiley, ISBN : 9788126546602
- James C. Sheusi, " Android Application Development For Java Programmers", Cengage Learning, 2013.
- Wallace Jackson, "Android Apps for Absolute Beginners", Apress, ISBN: 9788132211372
- http://www.developer.android.com

LIST OF PRACTICALS

1. Installing Android Environment
2. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
3. Create an application with login module. (Check username and password).
4. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
5. Create a menu with 5 options and selected option should appear in text box.
6. Create a list of all courses in your college and on selecting a particular course teacher charge of that course should appear at the bottom of the screen.
7. Create an application with three option buttons, on selecting a button color of the screen will change.
8. Create and Login application as above. On successful login, pop up the message.
9. Create an application to Create, Insert, update, Delete and retrieve operation on the database.
10. Create a Simple Application using Android Resources.
11. Create a Simple Application using Layouts.
12. Create a Simple Application using Intents.
13. Create a Simple Application using user interfaces.
14. Create a Simple Application for playing Audio and Video files.

SEMESTER – III

3MCACSEC(A) – PROGRAMMING WITH R

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
SE	3	0	2	5	70	30	0	100

COURSE OBJECTIVES

- Provide the knowledge of Basic R Programming Language to Students.
- Prepare Students for Role of Professional Data Analyst.
- Learn about Concepts of R Programming like Control Structures, Functions, Arrays.
- This course will teach students, How to develop workflows going from raw data to graphics and statistical analysis, Using the Programming Language and Statistical Environment R.
- Over the Course of the Semester, Students will Learn the Skills to Write Scripts to automate data formatting and analysis, making their studies replicable.
- Student will be able Apply Programming Knowledge to Develop R Programs Based on Simulation.

COURSE OUTCOMES

- Learn and apply the features of R Programming Tool to Carry out Statistical Analysis of data
- Write, Compile and Execute the Programs Written in R Programming Language
- Implement Intelligent Algorithms in R to Solve Statistical and Decision-Making Problems
- Understand the basics in R programming in terms of constructs, control statements, string functions
- Understand the use of R for Big Data analytics
- Learn to apply R programming for Text processing
- Able to appreciate and apply the R programming from a statistical perspective

UNIT – WISE SYLLABUS

UNIT-I

OVERVIEW— Evolution of R, Features of R
ENVIRONMENT SETUP— Try it Option Online, Local Environment Setup
BASIC SYNTAX—R Command Prompt, R Script File, Comments
DATA TYPES—Vectors, Lists, Matrices, Arrays, Factors, Data Frames
VARIABLES—Variable Assignment, Data Type of a Variable, Finding Variables, Deleting Variables
OPERATORS—Types of Operators, Arithmetic Operators, Relational Operators, Logical
Operators, Assignment Operators, Miscellaneous Operators
DECISION MAKING—If Statement, If-Else Statement, The if. else if. else Statement, Switch Statement
LOOPS—Repeat Loop, While Loop, For Loop, Loop Control Statements, Break Statement, Next Statement

UNIT-II

FUNCTION—Function Definition, Function Components, Built-In Function, User-Defined Function, Calling a Function, Lazy Evaluation of Function, Calling a Function, Lazy Evaluation of Function
STRINGS—Rules Applied in String Construction, String Manipulation
VECTORS—Vector Creation, Accessing Vector Elements, Vector Manipulation
LISTS—Creating a List, Naming List Elements, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting List to Vector
MATRICES—Accessing Elements of a Matrix, Matrix Computations
ARRAYS—Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculations Across Array Elements
FACTORS—Factors in Data Frame, Changing the Order of Levels, Generating Factor Levels
DATA FRAMES—Extract Data from Data Frame, Expand Data Frame

UNIT-III

PACKAGES – Introductions, Uses, Install R Package
DATA RESHAPING, —Joining Columns and Rows in a Data Frame, Merging Data Frames, Melting and Casting, Melt the Data, Cast the Molten Data
CSV FILES—Getting and Setting the Working Directory, Input as CSV File, Reading a CSV File, Analyzing the CSV File, Writing into a CSV File

EXCEL FILE—Install xlsx Package, Verify and Load the "xlsx" Package, Input as xlsx File, Reading the Excel File, 21. BINARY FILES, Writing the Binary File, Reading the Binary File, XML FILES, Input Data, Reading XML File, Details of the First Node, XML to Data Frame
JSON FILE—Install rjson Package, Input Data, Read the JSON File, Convert JSON to a Data Frame
WEB DATA
DATABASES—RMySQL Package, Connecting R to MySql, Querying the Tables, Query with Filter Clause, Updating Rows in the Tables, Inserting Data into the Tables, Creating Tables in MySql, Dropping Tables in MySql

UNIT-IV

PIE CHARTS—Pie Chart Title and Colors, Slice Percentages and Chart Legend, 3D Pie Chart,
BAR CHARTS—Bar Chart Labels, Title and Colors, Group Bar Chart and Stacked Bar Chart
BOXPLOTS—Creating the Boxplot, Boxplot with Notch,
HISTOGRAMS—Range of X and Y values
LINE GRAPHS—Line Chart Title, Color and Labels, Multiple Lines in a Line Chart
SCATTERPLOTS—Creating the Scatterplot, Scatterplot Matrices

UNIT-V

MEAN, MEDIAN & MODE—Mean, Applying Trim Option, Applying NA Option, Median, Mode
LINEAR REGRESSION—Steps to Establish a Regressionlm() Functionpredict() Function
MULTIPLE REGRESSION—lm() FunctionExample
LOGISTIC REGRESSION—Create Regression Model
NORMAL DISTRIBUTION—dnorm() pnorm() qnorm() rnorm()
BINOMIAL DISTRIBUTION—dbinom() pbinom() qbinom() rbinom()
Poisson Regression, Analysis of Covariance
TIME SERIES ANALYSIS—Different Time Intervals, Multiple Time Series
Nonlinear Least Square, Decision Tree Install R Package
RANDOM FOREST—Install R Package, Survival Analysis, Chi Square Test

TEXT & REFERENCE BOOKS

- The Art of R Programming: A Tour of Statistical Software Design, by Norman Matloff, No Starch Press, 2011
- R for Everyone: Advanced Analytics and Graphics by Jared P. Lander, Addison-Wesley Data & Analytics Series, 2013
- Beginning R – The Statistical Programming Language by Mark Gardener, Wiley, 2013
- Introductory R: A Beginner's Guide to Data Visualisation, Statistical Analysis and Programming in R, by Robert Knell, Amazon Digital South Asia Services Inc, 2013
- W. N. Venables, D. M. Smith, An introduction to R, r-core team, 2015
- Alain F. Zuur, Elena n. Ieno, & Erik Meesters, A beginner’s guide to R. Use R. Springer, 2009. ISBN: 978-0-387-93836-3
- Roger D. PengR Programming for Data Science, https://leanpub. com/rprogramming
- John Verzani, chapman -Using R for introductory statistics, ISBN- 1584884509
- https://www. r-project. org/doc/bib/r-bools.html

LIST OF PRACTICALS

1. Write a program that prints ‘Hello World’ to the screen
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n.
3. Write a program that prints a multiplication table for numbers up to 12
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list
6. Write a function that tests whether a string is a palindrome
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort.
8. Implement linear search.
9. Implement binary search
10. Implement matrices addition, subtraction and Multiplication.

SEMESTER – III

3MCASEC(B) – MANAGEMENT THEORY AND PRACTICES

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
SE	4	1	0	5	70	30	0	100

COURSE OBJECTIVES

- To help the students gain understanding of the functions and responsibilities of managers.
- To provide them fundamental knowledge of Management theories and take cognizance of the importance of management
- Acquire the knowledge of different Planning, strategies, decision making and forecasting techniques and implement them to solve organizational problems.
- Learn and develop the management skills such communication, presentation, leadership and motivation skills for team building.
- To help the students to learn budgetary control, inventory control and quality control Theory with the help of case study.

COURSE OUTCOMES

- Explain the fundamental knowledge of Management theories and practice them to investigate and solve the organizational.
- Design, Develop and Implement Plans and Strategies, and take decisions to solve organizational problems.
- Demonstrate the management skills through effective communication, presentation, leadership skills and motivate team members for obtaining targets of organization and individual team member.
- Explain and apply budgetary control, inventory control and quality control Theory with the help of case study.

UNIT – WISE SYLLABUS

UNIT-I

Management practices- Meaning and Functions, Development of Management Thought, F.W. Taylor and Herry Fayol's Theories of Management, Qualities of an Efficient Management, Management Principles of Modern Times (Empowerment, Kaizen, Quality Circles, and Total Quality Management.

UNIT-II

Planning-Plan, policies, strategies and programs, steps in planning & decision making, forecasting, qualities of an effective planner, relevant case study

UNIT-III

Organizing-Organizational Design, Organizational Structure, Centralization & Decentralization, Delegation, Gantt chart and PERT / CPM, Relevant Case Study

UNIT-IV

Directing-Motivation and teambuilding, theories of motivation, factors affecting motivation.
Leadership, leadership styles, theories of leadership, qualities of an effective leader, effective communication and presentation skills, relevant case studies

UNIT-V

Controlling Meaning and basic principles, types of controls, budget and budgetary control, inventory control and quality control relevant case studies.

TEXT & REFERENCE BOOKS

- Joseph L. Massie, Essentials of Management, Prentice Hall of India
- Biswajeet Patanayak, Human Resource Management, Prentice Hall of India
- Gomes-Mejia, Balkin& Hardy, Managing Human Resource, Prentice Hall of India
- Lesslic W. Rue Llyod Byurs, Management, Tata McGraw Hill
- Joseph M. Putti, Harold Koontz, Essentials of Management, An Asian Perspective, Tata McGraw hill
- David Boddy, Management: An Introduction, Pearson
- Laurie J. Mullins with Gill Christy, Management & Organisational Behaviour, Pearson

SEMESTER – III

3MCASEC(C) – DEVELOPMENT AND OPERATIONAL TOOLS (DEVOPS)

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
SE	3	0	2	5	70	30	0	100

COURSE OBJECTIVES

- Understand the principles of continuous development and deployment.
- Understand and use AWS Services.
- Concepts of version control and using Git for version control
- Understand and use the container Technology
- Using DevOps tools like Git, Docker etc. in various aspects of DevOps delivery model.

COURSE OUTCOMES

- Explain the principles of continuous development and deployment of software.
- Using AWS Services
- Using Git for version control
- Use container Technology in Software development
- Using DevOps tools like Git, Docker etc in various aspects of DevOps delivery model.

UNIT – WISE SYLLABUS

UNIT-I

What is DevOps?, Why is DevOps is Needed?, How is DevOps different from traditional IT?, Why is DevOps used?, DevOps Lifecycle, DevOps Work Flow, DevOps Vs Agile, DevOps Principles, Roles, Responsibilities, and Skills of a DevOps Engineer, Various DevOps Tools

Amazon Web Services - Cloud Computing, Advantages, Types of Cloud Computing, Amazon Web Services Cloud Platform Overview, Features of Elastic Compute Cloud (EC2), AWS Services, AWS Management Console, AWS Command Line Interface, Region, availability Zone and edge location, Amazon EC2 root device volume, Creating and Launching EC2 windows and Linux Instances, Connecting to Linux and Windows Instances, Managing Security Group, Identity access Management (IAM), Create IAM users and Group, Assign policy to IAM users and Groups, Configure IAM roles to access AWS resources

UNIT-II

Version Control with Git - About Version Control, Local Version Control Systems, Centralized Version Control Systems, Distributed Version Control Systems, What is Git?, A Short History of Git, difference between Git and any other VCS, The Three States of Git - modified, staged, and committed, Why Git for your organization, Install and Using Git, Common commands in Git, Working with Remote Repositories

UNIT-III

Container Technology - Introduction to Containers?, Benefits of Contain erization, How Do Containers Work?, Virtual Machines vs Containers, brief intro to Container Terminology, Overview of Container Architecture, Installing Container engine tool, Creating Containerized Services, Provisioning Containerized Services

UNIT-IV

Managing Containers - What is Container management, Benefits of Container management, Container management strategy, Pull Docker images from Docker hub, Managing the Life Cycle of Containers, Attaching Persistent Storage to Containers, Accessing containers, Managing Container Images - Accessing Registries (public and Private), Manipulating Container Images

UNIT-V

Creating Custom Container Images - Designing Custom Container Images, Building Custom Container Images with Docker file Configuration Management with Ansible - Introduction to Ansible, Ansible Installation, Configuring Ansible Roles, Write Playbooks, working with playbooks, manage ansible variables, Executing adhoc command, Ansible Variables

TEXT & REFERENCE BOOKS

- DevOps For Dummies 2ndIBMLimitedEdition by Sanjeev Sharma and Bernie Coyne
- DevOps_Revealed_by_International_DevOps_Certification_Academy
- Effective DevOps by Jennifer Davis & Katherine Daniels
- The DevOps Handbook_ How to Create World- Class Agility, Reliability, and Security in Technology Organizations.

LIST OF PRACTICALS

UNIT-I

1. Create AWS Account
2. Launch Linux and Windows Instances
3. Connecting to Linux and Windows Instances
4. Create IAM users and Groups
5. Manage IAM Policy and Roles

UNIT-II

1. Create github account
2. Create public and private repository
3. Working with github repository

UNIT-III

1. Installation of Docker / Podman / Rocket
2. Creating Containerized Services (Database and webserver instances)
3. Maria DB / My Sql / Nginx / Httpd

UNIT-IV

1. Persisting a MYSQL Database
2. Managing a MYSQL Container
3. Managing Images (tags)

UNIT-V

1. Creating Custom Container Images
2. Install ansible on control node
3. Execute adhoc command
4. Working with playbooks
5. Manage ansible variables

SEMESTER – III

3MCASEC(D) – ENTERPRISE RESOURCE PLANNING (ERP) AND CRM

CC/CE/ SE/OE	L	T	P	Credit	End-Term Theory Exam Marks	Continuous Evaluation Marks	End-Term Practical Marks	Total Marks
SE	4	1	0	3	70	30	0	100

COURSE OBJECTIVES

- The Definition of ERP and CRM Integration
- Five Key ERP, CRM Integration Benefits
- Typical Challenges with ERP, CRM Integration
- How to Create a Successful ERP, CRM Integration Strategy

COURSE OUTCOMES

- **Communicate with Employees:** Don't keep all your initial information about your ERP software implementation process with just your management team. Keep your employees in the loop and get their feedback throughout all your system implementation steps.
- **Be Flexible:** Workflow conflicts may crop up as you're going through the implementation process. You can avoid ERP implementation failure by building some flexibility into your strategy.
- **Do Your Research:** An ERP software implementation plan shouldn't be done on the fly. Research different types of software platforms, your organization's processes, and software implementation phases ahead of time to reduce your risk of failure.
- **Make a Roadmap:** You can't just assume that as soon as you download the new ERP software that everything will magically work. A successful ERP implementation takes careful planning and that includes timeframes, responsibility assignments, and KPIs to measure success.

UNIT – WISE SYLLABUS

UNIT-I

ERP Overview, Benefit, Common myths and evolving realities, Business Process Reengineering, Data ware Housing, Data Mining, LAP, Supply chain Management, ERP Drivers, Decision support system, ERP Domain.

UNIT-II

ERP -A Manufacturing Perspective, ERP Module, ERP Market, ERP implementation life cycle, Options of various paradigms, Identification of suitable platforms, Role of SDLC / SSAD, Object Oriented architecture. Framework for evaluating ERP acquisition, Analytical Hierarchy Processes (AHP), Applications of AHP in evaluating ERP, Selection of Weights, Role of consultants, vendors and users in ERP implementation; Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP implementation strategies, ERP Customization

UNIT-III

Critical success and failure factors for implementation, Model for improving ERP effectiveness, ERP implementation, Hidden costs, ERP success inhibitors and accelerators, Management concern for ERP success, Strategic Grid: Useful guidelines for ERP Implementations, Technologies in ERP Systems

UNIT-IV

Introduction to CRM, Definitions - Concepts and Context of relationship Management - Evolution - Transactional Vs. Relationship Approach - CRM as a strategic marketing tool - CRM significance to the stakeholders. Understanding Customers, Customer information Database - Customer Profile Analysis - Customer perception, Expectations analysis - Customer behavior in relationship perspectives; individual and group customer's - Customer life time value – Selection of Profitable customer segments

UNIT-V

CRM Structures, Elements of CRM - CRM Process – Strategies for Customer acquisition - Retention and Prevention of defection - Models of CRM – CRM road map for business applications. CRM Planning and Implementation, Strategic CRM planning process - Implementation issues - CRM Tools- Analytical CRM – Call Center Management - Role of CRM Managers

TEXT & REFERENCE BOOKS

- Lexis Leon, "Enterprise Resource Planning", TMH
- Brady, Manu, Wegner, "Enterprise Resource Planning", TMH
- Prof. Antony Lawrence, "Customer Relationship Management", Himalaya Publishing House