TYBCA Science Sem-V Framework

Course Type	Course Code	Course / Paper Title	Hours / Week	Credit	CIA	End Sem Exam	Total
DSET-1 DSET-2 DSET-3	19ScBCAU501	Programming in Core JAVA	12	12	40	60	100
	19ScBCAU502	Web Technologies-II (Java Script, AJAX, XML)			40	60	100
	19ScBCAU503	Programming Language(Python)			40	60	100
	19ScBCAU504	2D Animation with Action Script			40	60	100
DSET-8 DSET-9	19ScBCAU505	Software Development Engineering in Testing	4	4	40	60	100
	19ScBCAU506	Data Mining and Data Warehousing			40	60	100
DSEP4 DSEP5 DSEP6	19ScBCAU507	Lab I: Programming in Core JAVA	6	6	40	60	100
	19ScBCAU508	Lab II: Web Technologies-II (Java Script, AJAX, XML)			40	60	100
	19ScBCAU509	Lab III: Programming Language(Python)			40	60	100
	19ScBCAU510	Lab IV: 2D Animation with Action Script			40	60	100
Total				22	120	180	300
	Extra Credentials	Activity based Learning -V (MOOC or IIT Spoken Tutorial like courses), Programming in JAVA					

TYBCA Science Sem-VI Framework

Course Type	Course Code	Course / Paper Title	Hours / Week	Credit	CIA	End Sem Exam	Total
DSET-5 DSET-6 DSET-7	19ScBCAU601	Programming in Advanced JAVA	12	12	40	60	100
	19ScBCAU602	Mobile Technologies (Android Development)			40	60	100
	19ScBCAU603	Internet of Things (IoT)			40	60	100
	19ScBCAU604	Cloud and Grid Computing			40	60	100
DSET-8 DSET-9	19ScBCAU605	Software Project Management	4	4	40	60	100
	19ScBCAU606	Research Methodology			40	60	100
DSEP4 DSEP5 DSEP6	19ScBCAU607	Lab I: Programming in Advanced JAVA	6	6	40	60	100
	19ScBCAU608	Lab II: Mobile Technologies (Android Development), Mongo DB			40	60	100
	19ScBCAU609	Lab III: Internet of Things(IoT)			40	60	100
	19ScBCAU610	Lab IV: Project Work			40	60	100
Total				22	120	180	300
	Extra Credentials	Activity based Learning -VI (MOOC or IIT Spoken Tutorial like courses), JAVA Business Application					

Progressive Education Society's
Modern College of Arts, Science and Commerce (Autonomous) Shivajinagar, Pune -5
Science Faculty
Course Code : 19CsBCAU501
Course Name : Programming in Core JAVA

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme: CIA : 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisite:
Basic knowledge of Object Oriented Programming language

Course Objectives:
- To understand the fundamentals of object-oriented programming in Java
- To understand the concept and importance of Exception Handling

Course Outcomes:
On completion of the course, Students will be able to:
- To develop robust application using Core Java features
- To develop basic GUI based application

Course Contents:

Unit No.	Title	Lectures
Unit 1	**An Introduction to Java**	**5**
	1.1 Overview of OOP's concepts and Java Language 1.1.1 Introduction to OOP concepts 1.1.2 History of Java 1.1.3 Features of Java 1.1.4 Advantages and disadvantages of Java 1.2 Comparison of Java and C++ 1.3 Java Environment, IDE 4. Simple java program 1.5 Java Tools – jdb, javap, javadoc	
Unit 2	**An Overview of Java**	**8**
	2.1 Data Types 2.2 Usage of Final Variable 2.3 Types of Comments	

	1. 2.4 Declaring 1D, 2D array (with examples) 2.5 Accepting input using Command line argument 2.6 Accepting input from console (Using BufferedReader class)	
Unit 3	**Objects and Classes**	**14**
	3.1 Defining Your Own Classes 3.2 Access Specifiers (public, protected, private, default) 3.3 Array of Objects 3.4 Constructor, Overloading Constructors and use of 'this' Keyword 3.5 Usage of static block, static fields and static methods 3.6 Predefined class – Object class methods getClass() 3.7 Usage of built-in string functions e.g. equals(), toString() etc... and mathematical functions e.g. sqrt(), pow(), round() etc… 3.8 Inner class, anonymous class 3.9 Creating, Accessing and using Packages 3.10 Creating .jar file and .manifest file 3.11 Wrapper Classes 3.12 Garbage Collection (System.gc(), finalize() Method) 3.13 Date and time processing	
Unit 4	**Inheritance**	**8**
	4.1 Inheritance Basics (extends Keyword) and Types of Inheritance 4.2 Superclass, Subclass and use of Super Keyword 4.3 Method Overriding and runtime polymorphism 4.4 Use of final keyword related to method and class 4.5 Use of abstract class and abstract methods 4.6 Defining and Implementing Interfaces 4.7 Runtime polymorphism using interface 4.8 Object Cloning	
Unit 5	**Exception Handling**	**7**
	5.1 Dealing with Errors and Exception 5.2 Exception class, Checked and Unchecked exception 5.3 Catching and handling exception 4. Creating user defined exception 5.5 Assertions	
Unit 6	**Strings, Streams and Files**	**10**

	6.1 String class and StringBuffer Class 6.2 Formatting string data using format() method 6.3 Stream classes, Byte Stream classes Character Stream Classes 6.4 Creation of files and usage of the File class 6.5 File operations: 6.5.1 Reading characters and bytes 6.5.2 Writing characters and bytes 6.6 Handling primitive data types 6.7 Random Access files	
Unit 7	**User Interface Components with Swing**	**7**
	7.1 What is Swing? 7.2 The MVC(Model View Controller) Architecture and Swing 7.3 Layout Manager and Layouts, The JComponent class 7.4 Components – JButton, JLabel, JText, JTextArea, JCheckBox, JRadioButton, JList, JComboBox, JMenu, JPopupMenu Class, JMenuItem, CheckBoxMenuItem, JRadioButtonMenuItem, JScrollBar 7.5 Dialogs (Message, confirmation, input), JFileChooser, JColorChooser 7.6 Event Handling: 7.6.1 Event sources (Mouse, Keyword) 7.6.2 Event Listeners 7.7 Adapters 7.8 Case study	
Unit 8	**Experiential Learning**	**1**

Reference books:

1. Complete reference Java by Herbert Schildt(5th edition), **ISBN**-10 : 0070495432; **ISBN**-13 : 978-0070495432
2. Java 2 programming black books, Steven Horlzner, **ISBN**-10 : 817722655X; **ISBN**-13 : 978-8177226553
3. Programming with Java, A primer, Fourth edition, By E. Balagurusamy **ISBN**-10 : 0070702241; **ISBN**-13 : 978-0070702240
4. Core Java Volume-I-Fundamentals, Eighth Edition, Cay S. Horstmann, Gary Cornell, Prentice Hall, Sun Microsystems Press ISBN-13: 978-0-13-235476-9 ISBN-10: 0-13-235476-4

Course Code : 19CsBCAU502
Course Name : Web Technologies-II (Java Script, Ajax, XML)

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme:CIA : 40 Marks **End-Sem : 60 Marks**

Desirable Prerequisites: One must have knowledge of PHP, HTML.

Course Objectives:

- Learn different technologies used at client Side Scripting Language
- Learn XML,CSS and XML parsers.
- One PHP framework for effective design of web application.
- Learn JavaScript to program the behaviour of web pages.
- Learn AJAX to make our application more dynamic
- Learn Angular Js basic concepts and web services

Course Outcomes:
On completion of the course, Students will be able to design dynamic and interactive Web Pages using XML, JavaScript, Ajax for managing Data

Course Contents:

Unit No.	Title	Lectures
Unit 1	**Web Techniques**	**10**
	1.1 Super global Variables 1.2 Server information 1.3 Sticky forms 1.4 File Uploads 1.5 Setting response headers 1.6 Maintaining state 1.6.1. Session and Cookies	
Unit 2	**Files and Directories**	**10**
	2.1 Working with files and directories 2.2 Opening and Closing 2.3 Getting information about file 2.4 Reading and writing characters in file 2.5 Rename and delete files 2.6 Random access to file data 2.7 Getting information on file 2.8 Ownership and permission	
Unit 3	**XML**	**10**
	3.1 What is XML? 3.2 XML document Structure 3.3 PHP and XML 3.4 XML parser 3.5 The document object model 3.6 The simple XML extension 3.7 Changing a value with simple XML 3.8 DOM parser	

Unit 4	**JavaScript-DHTML**	**11**
	4.1 Overview of JavaScript, DHTML 4.2 Object Orientation and JavaScript 4.3 Basic Syntax(JS data types, JS variables) 4.4 Primitives , Operations and Expressions 4.5 Screen Output and keyboard input(Verification and Validation) 4.6 JS Control statements 4.7 JavaScript Functions 4.8 JavaScript HTML DOM(onmouseup, onmousedown, onclick, onload, onmouseover, onmouseout)	
Unit 5	**Ajax**	**8**
	5.1 Understanding java scripts for AJAX 5.2 AJAX web application model 5.3 AJAX –PHP framework 5.4 Performing AJAX validation 5.5 Handling XML data using php and AJAX 5.6 Connecting database using php and AJAX	
Unit 6	**Angular JS**	**9**
	6.1 AngularJS Overview, Basics. 6.2 Array, Objects , Strings 6.3 AngularJS Events 6.4 AngularJS Form Validation	
Unit 7	**EXPERIENTIAL LEARNING**	2
	Assignment on AngularJS	

Reference books:

1. Programming PHP By Rasmus Lerdorf and Kevin Tatroe O' Reilly publication ISBN: 9781449392772, 3rd Edition
2. Beginning PHP 5, Wrox publication ISBN-10 : 0764557831
3. ISBN-13 : 978-0764557835
4. AJAX Black Book Kogent Solutions ISBN-13978-8177228380
5. Mastering PHP BPB Publication ISBN: 9789387284203
6. Programming the World Wide Web , Robert W Sebesta (4th Edition)ISBN-10 : 8131764583 ISBN-13 : 978-8131764589
7. www.php.net.in
8. www.W3schools.com
9. www.wrox.com
10. https://api.drupal.org

Course Code : 19CsBCAU503

Course Name : Programming Language(Python)

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme: CIA : 40 Marks **End-Sem : 60 Marks**

Desirable Prerequisites:

- An understanding of programming in an Imperative Language (e.g., C/C++, Java etc…)
- Knowledge of basic algorithms and Data Structures (e.g., Sorting, Searching, Lists, Queue, Stacks)
- Knowledge of basic Discrete Mathematics (e.g., Sets, Relations, Functions)

Course Objectives:

- To enable the students to understand the core principles of the Python Language.
- To use the tools to produce well designed programs in python.

Course Outcomes:

On completion of the course, student will be able to–

- Solve problems by using Python Language

Course Contents:

Unit No.	Title	Lectures
Unit 1	**Introduction to Python**	**10**
	1.1. Python Interpreter 1.2. Python as calculator 1.3. Indentation 1.4. identifier and keywords 1.5. literals 1.6. Standard data types - basic, none, Boolean (true & False), numbers 1.7. Python strings, 1.8. Python basic operators (Arithmetic, comparison, assignment, bitwise logical) 1.9. Python membership operators (in & not in) 1.10. Python identity operators (is & is not) 1.11. Input output statement, 1.12. Control statements(Branching, looping, conditional statement, Exit function)	
Unit 2	**String manipulations**	**8**
	2.1. Subscript operator 2.2. indexing	

	2.3. slicing a string 2.4. other functions on strings 2.5. Strings and number system format functions: converting strings to numbers & Vice Versa.	
Unit 3	**Data Structures in Python**	**12**
	3.1. List: Basic list operators, replacing, inserting, removing an element, searching, Sorting lists, Comprehension of list 3.2. Tuples: Basic operations, methods and functions of tuple 3.3. Sets: Basic operations, methods and functions of Set 3.4. Dictionaries: dictionary literals, adding & removing keys, accessing & replacing values, traversing dictionaries	
Unit 4	**Design with Functions**	**8**
	4.1. hiding redundancy 4.2. complexity 4.3. arguments & return values 4.4. Formal/Actual arguments 4.5. Named arguments 4.6. Recursive functions 4.7. scope & Global statements 4.8. Importing modules: Math modules & Random modules.	
Unit 5	**Exception Handling**	**3**
	5.1. Exception handling: assert statement 5.2. Except clause - with no exceptions and multiple exceptions 5.3. Try - finally, raising exceptions, user-defined exceptions.	
Unit 6	**File Handling**	**5**
	6.1. Manipulating files & directories 6.2. OS & SYS modules 6.3. Reading, Writing text & numbers from/to file.	
Unit 7	**Python Libraries**	**10**
	7.1. Numpy 7.2. Pandas 7.3. Matplotlib	
Unit 8	**Python Database Interaction**	**1**
	8.1 Database Connection using Python	

Unit 9	EXPERIENTIAL LEARNING	1
	Use of Python Libraries	

Reference Books:

1. Python Programming using problem solving approach by Reema Thareja, Oxford University Press.2017,**ISBN**-10 : 0199480176; **ISBN**-13 : 978-0199480173
2. Introduction to Computation and Programming Using Python with application to understanding data by Guttag John V.PHI, **ISBN**-10 : 0262519631; **ISBN**-13 : 978-0262519632
3. Introduction to Computer Science using Python by Charles Dierbach, Wiley, ISBN: 9788126556014, 9788126556014

Course Code:19CsBCAU504

Course Name: 2D Animation with ActionScript

Teaching Scheme: TH: 4 Lectures/Week **Credits: 04**
Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisites:

- Basic drawing skills, visual storytelling and concept of moving images.
- Basic knowledge of object oriented programming concepts

Course Objectives:

- To define Computer-based 2D Animation.

Course Outcomes:

On completion of the course, student will be able to

- Develop skills & knowledge in 2D Animation.
- Create Flash based 2D Animation applications.

Course Contents

Unit No.	Title	Lectures
Unit 1	**Overview of Flash**	10
	1.1. Stage Setting 1.2. Layers 1.3. Timeline 1.4. Properties 1.5. Flash Tools	
Unit 2	**Symbols**	4
	2.1. Graphic Symbol 2.2. Button Symbol 2.3. Movie Clip Symbol	
Unit 3	**Animation**	13
	3.1. Frame and Keyframe 3.2. Motion Guide 3.3. Masking 3.4. Tweens	
Unit 4	**Introduction to Action script**	8
	4.1. Basic Introduction of Action script 4.2. Actions window 4.3. Output window	
Unit 5	**Action script advanced concepts**	14

	5.1. Variables and their scope in Flash 5.2. Data type Variables 5.3. Arithmetic operations 5.4. Conditional Logic 5.5. Arrays 5.6. Loops (Nested Loops, Loop Conditions, Functions)	
Unit 6	**Event Handling**	10
	6.1. Keyboard Events and Mouse Events 6.2. Event Listener 6.3. Call backs	
Unit 7	**Experiential Learning**	1
	Any application using Event Handling	

Reference books:

1. Adobe Animate CC Classroom in a Book by Chun Russell , Pearson Education **ISBN**-10 : 0135298881; **ISBN**-13 : 978-0135298886
2. Flash CS4 Professional Bible by Robert Reinhardt ,Snow Dowd Published by Wiley Publishing
3. Learning ActionScript 3.0: A Beginner's Guide Author by Rich Shupe, Second edition, Paperback publication

Course Code :19CsBCAU505

Course Name: Software Development Engineering in Testing

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisites:

- Knowledge of Software Engineering

Course Objectives:

- To introduce Testing Concepts and Evolution
- To explain Testing Strategies and their usage
- To discuss the levels of testing

Course Outcomes:

- Understand the role of tester
- Choose appropriate testing strategies

Course Contents

Unit No.	Title	Lectures
Unit 1	**Fundamentals of Testing**	**7**
	1.1. Definition of software testing 1.1.1. Objective of testing 1.1.2. Testing and Debugging 1.2. Necessity of Software Testing 1.2.1. Quality assurance and testing 1.2.2. Error, defects and failures 1.2.3. Defects, Root Causes and Effects 1.3. Seven Testing Principles 1.4. Test Process 1.4.1. Test Process in context 1.4.2. Test activities and tasks	
Unit 2	**Software Development Life Cycle**	**10**
	2.1. Definition of SDLC 2.2. Phases of SDLC 2.3. SDLC Models- Waterfall Model, V Model, Agile Model 2.4. Test Levels 2.4.1. Unit Testing 2.4.2. Component Testing	

	2.4.3. Integration Testing 2.4.4. System Testing 2.4.5. Acceptance Testing 2.4.6. Security Testing	
Unit 3	**Types of Testing**	**9**
	3.1. Functional Testing 3.2. Non-Functional Testing 3.3. White-Box Testing 3.4. Black Box Testing 3.5. Change related testing 3.6. Test type and test level 3.7. Maintenance Testing 3.7.1. Triggers for maintenance 3.7.2. Impact Analysis for maintenance	
Unit 4	**Static Testing and Dynamic Testing**	**8**
	4.1. Static Testing Basics 4.1.1. Benefits of static Testing 4.2. Dynamic Testing basics 4.2.1. Benefits of Dynamic Testing 4.3. Difference Between Static and Dynamic Testing 4.4. Review Process 4.4.1. Roles and Responsibilities in formal review 4.4.2. Review Types 4.4.3. Applying Review Techniques	
Unit 5	**Test Techniques**	**9**
	5.1. Categories of Test Techniques 5.1.1. Characteristics of Test Techniques 5.2. Black Box Test Techniques 5.2.1. Equivalence Partitioning 5.2.2. Boundary Value Analysis 5.2.3. Decision Table Testing 5.2.4. State Transition Testing 5.2.5. Use case Testing 5.3. White-Box Test Techniques 5.3.1. Statement Testing and coverage 5.3.2. Decision Testing and Coverage 5.4. Experience based Test Techniques 5.4.1. Error Guessing 5.4.2. Exploratory Testing 5.4.3. Checklist based Testing	
Unit 6	**Test Management**	**6**
	6.1. Test Organization	

	6.1.1. Independent Testing 6.1.2. Tasks of Test manager and tester 6.2. Test Planning and Estimation 6.2.1. Purpose and content of test plan 6.2.2. Test Strategy and test approach 6.2.3. Entry and Exit Criteria 6.2.4. Test Execution 6.3. Risk and Testing 6.3.1. Definition of risk 6.3.2. Product and project risk 6.3.3. Risk based testing and product quality 6.4. Defect/Bug management 6.4.1. Definition of defect 6.4.2. Defect Life Cycle	
Unit 7	**Introduction to Automation Testing**	**5**
	7.1. Definition of Automation Testing 7.2. Benefits of Automation Testing 7.3. Tool Selection Criteria	
Unit 8	**Tools Support for Testing**	**5**
	8.1. Fundamentals of tools 8.2. Test Tool Considerations 8.2.1. Test Tool classification 8.2.2. Effective use of tool 8.2.3. Success factors of tools	
Unit 9	**EXPERIENTIAL LEARNING**	**1**

Reference books:

1. Lessons Learned in Software Testing: By Cem Kaner , James Bach, Bret Pettichord, paperback publication ISBN 9781283294928
2. Software Testing by Ron Patton, Lisa Crispin, Janet Gregory,1st edition, paperback publication ISBN-13**978-0321534460**
3. Agile Testing : A Practical Guide for Testers and Agile Teams,by Lisa Crispin and Janet Gregory, paperback publication **ISBN**: 978-1847940933

Course Code :19CsBCAU506

Course Name : Data Mining and Data warehousing

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme: CIA : 40 Marks **End-Sem : 60 Marks**

Desirable Prerequisites:

The knowledge of following subject is essential to understand the subject:

1. Understand the concepts of Data Ware housing and Data Mining Concepts.
2. Explain the methodologies used for analysis of data
3. Describe various techniques which enhance the data modelling.
4. Discuss and Compare various approaches with other techniques in data mining and data ware housing

Course Objectives:

1. To understand data warehouse concepts, architecture, business analysis and tools
2. To understand data pre-processing techniques
3. To study algorithms for finding hidden and interesting patterns in data
4. To understand and apply various classification and clustering techniques using tools.

Course Outcomes:

On completion of the course, the students should be able to:

1. Design a Data warehouse system and perform business analysis with OLAP tools.
2. Apply suitable pre-processing techniques for data analysis
3. Apply frequent pattern and association rule mining techniques for data analysis
4. Apply appropriate classification and clustering techniques for data analysis

Course Contents

Unit No.	Title	Lectures
Unit 1	**Introduction to Data Mining**	**6**
	1.1. Data mining 1.2. Development of Data Mining 1.3. Knowledge Discovery in Databases 1.4. Data Mining Issues 1.5. Social Implications of Data Mining 1.6. Overview of Applications of Data Mining	
Unit 2	**Statistical understanding of data, Data Object & Attribute**	**9**
	2.1. Definition of data. 2.2. Types of data 2.3. Introduction to Basic Statistical Terms: 2.3.1. Mean	

	2.3.2. Median 2.3.3. Mode 2.4. Standard deviation 2.5. Average deviation 2.6. Variance 2.7. P value 2.8. P Coefficient 2.9. Data objects and attribute types: 2.9.1. Definition of attribute 2.9.2. Types of attributes: 2.9.3. Categorical(Qualitative):(Nominal, Ordinal) 2.9.4. Numeric (Quantitative):(Interval, Ratio)	
Unit 3	**Data Preprocessing**	**6**
	3.1. Preprocess the data 3.2. Descriptive data summarization 3.3. Data Cleaning 3.3.1. Missing value 3.3.2. Noisy data 3.3.3. Outlier 3.3.4. Data cleaning as a process 3.4. Data Integration & Transformation 3.5. Data Reduction 3.6. Data Discretization	
Unit 4	**Introduction to Data Science, Data Warehouse**	**10**
	4.1. Data Science 4.2. Artificial Intelligence 4.3. Machine Learning 4.4. Deep Learning 4.5. Pattern Matching 4.6. Data Warehouse, Data Mart 4.7. Applications of Data Warehouse 4.8. OLAP Vs OLTP 4.9. Architecture of OLAP and Data Cubes 4.10. Dimensional Data Modeling-Star, Snowflake Schemas	
Unit 5	**Data mining concepts**	**7**
	5.1. Classification 5.1.1. Regression 5.1.2. Linear Regression 5.2. Non-linear Regression 5.3. Time Series Analysis 5.4. Prediction 5.5. Clustering	

	5.6. Summarization 5.7. Association Rules 5.8. Sequence Discovery	
Unit 6	**Data Mining Techniques, Accuracy Measures**	**10**
	6.1. Frequent Item-Sets 6.2. Association Rule Mining 6.3. Rule Basic Measures – Support and Confidence 6.4. Apriori Algorithm 6.5. Use of Sampling for Frequent Item Set 6.6. Market Basket Analysis 6.7. Precision, Recall, F-measure, Confusion Matrix 6.8. Decision Tree	
Unit 7	**Clustering**	**6**
	7.1. Introduction to clustering 7.2. Hierarchical Clustering 7.3. Agglomerative Clustering 7.4. Divisive Clustering 7.5. K-Means Clustering	
Unit 8	**Advanced Techniques**	**5**
	8.1. Active Learning 8.2. Reinforcement Learning 8.3. Text Mining 8.4. Web Mining 8.5. Spatial Mining	
Unit 9	**EXPERIENTIAL LEARNING**	**1**
	Usage of DM Tool-Weka	

Reference Books:

1. Introduction to Data Mining - Pang-Ning-Tan | Vipin Kumar Michael Steinbach, paperback publication
2. Data Mining Concepts and Techniques - Jiawei Han and Micheline Kamber
3. Data Mining Introductory and Advanced Topics - Margaret H. Dunham S. Sridhar
4. S.C. Gupta -Fundamentals of Statistics, ISBN-13: 978-8183183390
5. D.N. Elhance -Fundamentals of Statistics, ISBN-13: 978-8122500332
6. Data Mining Concepts and Techniques - Jiawei Han | Micheline Kamber | Jian Pei
7. Data Mining - Pieter Adriaans , Dolf Zantinge
8. Data Warehousing in the Real World A Practical Guide for Building Decision Support Systems - Sam Anahory , Dennis Murray
9. The Data Warehouse Toolkit - Ralph Kimball, Margy Ross Amir D Aczel, Jayavel Sounderpandian -Complete Business statistics, ISBN-13: 978-0077108601

Course Code : 19CsBCAU507

Course Name : Lab I : Programming in Core JAVA

Teaching Scheme:PR: 2 Slots/Week **Credits: 2**

Examination Scheme: CIA : 40 Marks **End-Sem: 60 Marks**

Course Objective:
To understand the process of designing and implementing applications with Core Java features.

Sr. No.	Assignment Name
1.	Java Tools and IDE, simple Java programs
2.	Array of Objects and Packages
3.	Inheritance and Interfaces
4.	Exception Handling
5.	I/O and File Handling
6.	Graphical User Interface and Event handling

Course Code: 19CsBCAU508

Course Name: Lab II: Web Technologies-II (Java Script, Ajax, XML)

Teaching Scheme: PR: 2 Slots/ Week **Credit: 02**

Examination Scheme: CIA: 40 Marks **End-Sem:60 Marks**

Sr. No.	Assignment Name
1	Session and Cookies
2	File handling
3	XML
4	JavaScript
5	Ajax
6	Angular JS

Course Code :19CsBCAU509

Course Name: Lab-III: Programming Language (Python)

Teaching Scheme:PR: 2 Slots/Week **Credits: 2**

Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Sr.No.	Title of the assignment
1	Basic Python
2	Python Strings
3	Tuples
4	Sets
5	Dictionary
6	Functions
7	Files and Directories
8	Python Database Interaction

Course Code : 19CsBCAU510

Course Name: Lab IV: 2D Animation with Action Script

Teaching Scheme:PR: 2 Slots/Week **Credits: 2**

Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

S.No.	Title of the assignment
1	Drawing in Flash (2 assignments)
2	Creating symbols
3	Masking and Motion guide
4	Animation using tweens
5	Action script (Arithmetic operations, Conditional Logic, Arrays, Loops)
6	Keyboard Events
7	Mouse Events
8	Creating the Game (Basic game using ActionScript event handlers)

Course Code : 19CsBCAU601

Course Name : Programming in Advanced JAVA

Teaching Scheme: 4 Hours/Week **Credits: 4**

Examination Scheme: CIA : 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisites: Knowledge of Core Java

Course Objectives:

- To learn database programming using Java
- To study web development concept using Servlet and JSP
- To learn socket programming for developing Client-Server applications

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

- Develop robust applications with Advanced Java features

Course Contents

Unit No.	Title	Lectures
Unit 1	**Collection**	**8**
	1.1 Introduction to the Collection framework 1.2 List – ArrayList, LinkedList and Vector,Stack,Queue 1.3 Set - HashSet, TreeSet, and LinkedHashSet 1.4 Map – HashMap, LinkedHashMap, Hashtable and TreeMap 4. Interfaces such as Comparator, Iterator, ListIterator, Enumeration	
Unit 2	**Database Programming**	**10**
	2.1 JDBC design, configuration 2.2 Types of JDBC drivers 2.3 SQL statements, query execution 2.4 Scrollable and Updatable Resultset 2.5 Metadata – DatabaseMetadata, ResultSetMetadata 2.6 Transactions – commit(), rollback(), SavePoint (Database : PostgreSQL)	
Unit 3	**Servlet**	**12**

	3.1 Introduction to Servlet and hierarchy of Servlet 3.2 Servlet life cycle 3.3 Tomcat configuration (Note: Only for Lab Demonstration) 3.4 Handing GET and POST request (HTTP) 3.5 Handling data from HTML to servlet 3.6 Retrieving data from database to servlet 3.7 Session tracking 3.7.1 User Authorization 3.7.2 URL Rewriting 3.7.3 Hidden form fields 3.7.4 Cookies	
Unit 4	**Java Server Pages (JSP)**	**8**
	4.1 Introduction to JSP 4.2 JSP Lifecycle 4.3 Implicit Objects 4.4 Scripting elements – Declarations, Expressions, Scriplets, Comments 4.5 JSP Directives 4.5.1 Page Directive 4.5.2 Include directive 4.6 Simple JSP Program 4.7 Mixing Scriplets and HTML 4.8 Example of forwarding contents from database to servlet, servlet to JSP and displaying it using JSP Scriplet tag	
Unit 5	**Multithreading**	**7**
	5.1 What are threads? 5.2 Thread lifecycle 5.3 Starting and running thread (using Thread Class) 5.4 Thread priorities 5.5 Running multiple threads 5.6 Usage of Runnable interface 5.7 Synchronization and inter-thread Communication	
Unit 6	**Networking**	**12**
	6.1 Networking basics – Protocol (TCP/IP), Addressing, DNS, URL, Socket, Port 6.2 The java.net package – InetAddress, URL, URLConnection class 6.3 SocketServer and Socket class 6.4 Datagram Socket 6.5 Creating a Socket to a remote host on a port	

	(creating TCP client and server) 6.6 Simple Socket Program Example	
Unit 7	**Introduction to Frameworks**	**2**
	7.1 Spring 7.1.1 Introduction of Spring framework, Bean 7.1.2 Spring Applications 7.1.3 Spring – MVC framework 7.2 Introduction to Components of Hibernate Introduction to Struts and framework Introduction to Maven framework, MOJO, POJO	
Unit 8	**Experiential Learning**	**1**

References:

1. Complete reference Java by Herbert Schildt (5th edition), ISBN, 8938402843
2. Java 2 programming black books, Steven Horlzner, ISBN-13 : 978- 8177226553
3. Programming with Java - A primer, Fourth edition, By E. Balagurusamy,ISBN-13 : 978-0070702240
4. Core Java Volume-I-Fundamentals, Eighth Edition, Cay S. Horstmann, Gary Cornell, ISBN-13 : 978-0131482029, Prentice Hall, Sun Microsystems Press
5. Core Java Volume-II-Advanced Features, Eighth Edition, Cay S. Horstmann, Gary Cornell, Prentice Hall, Sun Microsystems Press, ISBN-13 : 978-0132354790
6. Getting started with Spring Framework: covers Spring 5 by J Sharma and Ashish Sarin,ISBN-13 : 978-1979962780
7. Spring 4 for Developing Enterprise Applications: An End-to-End Approach by Henry H.Liu, ISBN-13 : 978-0615639451

Course Code :19CsBCAU602

Course Name: Mobile Technologies (Android Development)

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisite:

- Knowledge of Java Programming

Course Objectives:

- To gain knowledge of installing Android Studio and Cross Platform Integrated Development Environment.
- To learn designing of User Interface and Layouts for Android App.
- To learn how to use intents to broadcast data within and between Applications.
- To use Content providers and Handle Databases using SQLite.

Course Outcomes:

- Design and implement user interfaces and layouts of Android Application.
- Use Intents and fragments for activity and broadcasting data in Android application.
- Develop various android application with camera and location based services.

Course Contents

Unit No.	Title	Lectures
Unit 1	**Introduction to Android**	**6**
	1.1 Overview 1.2 History 1.3 Features of Android 1.3.1 Architecture of Android 1.3.2 Overview of Stack 1.3.3 Linux Kernel 1.3.4 Native Libraries 1.3.5 Android Runtime 1.3.6 Application Framework 1.3.7 Applications 1.4 SDK Overview 1.5 Platforms 1.6 Tools (JDK, SDK, Eclipse/Android Studio, SDT, AVD, Android Emulator)	

	1.7 Versions 1.8 Creating your first Android Application	
Unit 2	**Activities, Fragments and Intents**	**7**
	2.1 Introduction to Activities 2.1.1 Activity Lifecycle 2.2 Introduction to Intents 2.2.1 Linking Activities using Intents 2.2.2 Calling Built-in applications using Intents 3.3 Introduction to Fragments 3.3.1 Adding Fragments Dynamically 3.3.2 Fragment Lifecycle 3.3.3 Interactions between fragments	
Unit 3	**Android User Interface**	**9**
	4.1 Understanding components of Screen 4.1.1 Views and ViewGroups 4.1.2 Linear Layout 4.1.3 Absolute Layout 4.1.4 Table Layout 4.1.5 Relative Layout 4.1.6 Frame Layout 4.1.7 Scroll Layout 4.1.8 Scroll View 4.2 Adapting to Display Orientation 4.2.1 Anchoring Views 4.2.2 Resizing and Repositioning 4.3 Managing changes to Screen Orientation 4.3.1 Persisting State Information during changes in configuration 4.3.2 Detecting Orientation change 4.3.3 Controlling the orientation of the Activity 4.4 Utilizing Action Bar 4.4.1 Adding action Items to the action Bar 4.4.2 Customizing the action Items and Application Icon	
Unit 4	**Designing User Interface with Views**	**6**
	5.1 Using Basic Views 5.1.1 Text View 5.1.2 Button, Image Button, EditText, CheckBox 5.1.3 ToggleButton, RadioButton, and RadioGroup Views 5.2 Using Picker Views	

	5.2.1 Time Picker view 5.2.2 Date Picker view 5.3 Using List view 5.3.1 ListView views 5.3.2 Spinner views 5.4 Understanding Fragments 5.4.1 ListFragments 5.4.2 DialogFragments 5.4.3 PreferenceFragments	
Unit 5	**Pictures and Menus**	**9**
	5.1 Image views and Display Pictures 5.1.1 Gallery and ImageView Views 5.1.2 Image Switcher 5.1.3 Grid View 5.2 Menus with Views 5.2.1 Creating Helping Methods 5.2.2 Option Views 5.2.3 Context Views	
Unit 6	**Databases- SQLite and Firebase**	**10**
	7.1 Introduction to SQLite 7.2 SQLite OpenHelper and SQLiteDatabase 7.3 Creating and Using Database 7.4 Working with Cursors 7.5 Building and Executing queries 7.6 Introduction to Firebase 7.7 Creating and using Firebase 7.8 Working on Firebase	
Unit 7	**Messaging And Email**	**5**
	8.1. SMS Messaging 8.1.1 Sending SMS Messages Programmatically 8.1.2 Receiving Feedback after sending SMS 8.1.3 Sending SMS using Intent 8.1.4 Receiving SMS messages 8.1.5 Caveats and Warnings 8.2 Sending E-mail	
Unit 8	**Location Based services and Google Map**	**7**
	9.1 Display Google Maps 9.1.1 Creating the Project 9.1.2 Obtaining the Maps API keys	

	9.1.3 Displaying the Map 9.1.4 Displaying the zoom control 9.1.5 Adding Markers 9.1.6 Geocoding and Reverse Geocoding 9.2 Getting the Location Data 9.3 Monitoring a Location	
Unit 9	**EXPERIENTIAL LEARNING**	**1**

Reference books:

1. Professional Android 4 Application Development by wrox publication, 3rd Edition, ISBN-10 : 1118102274 ISBN-13 : 978-1118102275
2. Beginning Android 4 Application Development 1st Edition, Wrox publication by Wei-Meng Lee, ISBN-10 : 1118199545 ,ISBN-13 : 978-1118199541
3. Android Application Development For Dummies, 3rd Edition by MichaelBurton, DonnFelker, ISBN-10 : 1119017920 ,ISBN-13 : 978-1119017929

Course Code :19CsBCAU603

Course Name: Internet of Things (IoT)

Teaching Scheme: 4 Lectures/Week **Credits: 4**
Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisites:

Basic knowledge of Electronics and Computer Networks.

Course Objectives:

- To study fundamental concepts of IoT
- To learn different protocols used for IoT
- To understand roles of sensors, actuators in IoT
- To learn programming Arduino and Raspberry Pi
- To learn to implement IoT systems using open source IoT platforms.

Course Outcomes:

On completion of the course, student will be able to

- Understand the various concepts, terminologies and architecture of IoT systems.
- Use sensors and actuators for design of IoT.
- Use various techniques of data storage and analytics in IoT
- Understand various applications of IoT
- Design and develop IoT systems.

Course Contents:

Unit No.	Title	Lectures
Unit 1	**Introduction to IoT and Fundamental Concepts of IoT**	**20**
	1.1 Introduction 1.1.1.Definitions and Characteristics of IoT 1.1.2. IoT Architecture 1.2. Physical Design of IoT 1.2.1 Things in IoT 1.2.2 IoT Protocols 1.2.3 Introduction to IoT Application Layer Protocols HTTP,CoAP, MQTT, XMPP, DDS, AMQP 1.3. Logical Design of IoT 1.3.1 IoT Functional Blocks 1.3.2 IoT Communication Models 1.4. IoT Enabling Technologies 1.4.1 Wireless Sensor Networks	

	1.4.2 Cloud Computing 1.4.3 Big Data Analytics 1.4.4 Communication Protocols 1.4.5 Embedded Systems 1.5. IoT Levels and Deployment Templates 1.6. Wireless and Wired Communication Technologies for IoT 1.7. Embedded Computing Basics 1.7.1 Microcontrollers 1.7.2 System-on-Chip 1.7.3 Choosing the Right Platform for your IOT Device 1.8. IoT Examples	
Unit 2	**Understanding Sensors, Actuators and WSN**	**7**
	2.1 Sensors 2.1.1 Definition 2.1.2 Types of Sensors 2.1.3 Examples of Sensors 2.2 Actuators 2.2.1 What is Actuator? 2.2.2 Types of Actuators 2.2.3 Examples of Actuators 2.3 Wireless Sensor Networks 2.3.1 Structure of a Wireless Sensor Network 2.3.2 WSN and IoT	
Unit 3	**Working with Arduino**	**10**
	3.1 Basics 3.1.1 Introduction 3.1.2 Arduino Uno Board Anatomy 3.1.3 Arduino Software (IDE) 3.2 Programming 3.2.1 Language Reference 3.2.2 Variables: Understand How to Define and Use Variables in a Sketch? 3.2.3 Functions: Learn How to Define and Use Functions in a Sketch? 3.2.4 Library: Using and Installing Arduino Libraries 3.3 Examples On Interfacing Sensors and Actuators with Arduino	
Unit 4	**Working with Raspberry Pi**	**12**
	4.1 What is Raspberry Pi? 4.2 Raspberry Pi Hardware Specifications 4.3 About Raspbian 4.4 Linux Commands 4.5 Basic Hardware Needed to Run Your Raspberry Pi	

	4.6 Setting Up Your Raspberry Pi 4.7 Using Python to Connect to the Real World via GPIO 4.8 Simple Assignments Using Raspberry Pi 4.9 Examples on Interfacing Sensors and Actuators with Raspberry Pi 4.10. IoT Cloud Platforms, Sending Sensor Data to Cloud	
Unit 5	**IoT Applications**	**5**
	5.1 Home Automation 5.2 Cities 5.3 Environment 5.4 Energy 5.5 Retail 5.6 Logistics 5.7 Industry 5.8 Agriculture 5.9 Health and Lifestyle	
Unit 6	**IoT Security and Interoperability**	**5**
	6.1 Security Requirements for IoT 6.2 IoT Security Risks and Challenges 6.3 Modes of Attacks 6.4 Tools for Security and Interoperability	
Unit 7	**Experiential Learning**	**1**
	Any small application using Arduino or Raspberry Pi	

References:

1.Arshdeep Bahga, Vijay Madisetti, “Internet of Things A Hands-On-Approach”, Universities Press, ISBN: 978 817371 954 7

2.Jan Holler, Vlasios Tsiatsis, Catherine Mulligan ,Stamatis Karnouskos ,Stefan Avesand, David Boyle, “From Machine to Machine to the Internet of Things Introduction to a New Age of Intelligence”, Elsevier Publication,ISBN: 978-0-12-407684-6

3.Adrian McEwen,Hakim Cassimally,“Designing Internet of Things”, Wiley Publication, ISBN:978-81-265-5686-1

Links:

1. https://www.arduino.cc/en/Tutorial/HomePage
2. https://www.raspberrypi.org/documentation
3. https://docs.thinger.io/
4. https://nodered.org/
5. https://thingspeak.com/

Course Code : 19CsBCAU604

Course Name: Grid and Cloud computing

Teaching Scheme: 4 Lectures/Week **Credits: 4**

Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisite:

Basic knowledge of Computer Networks

Course Objectives:

The student should be made to:

• Understand how Grid computing helps in solving large scale scientific problems.
• Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
• Learn how to program the grid and the cloud.
• Understand the security issues in the grid and the cloud environment.

Course Outcomes:

On completion of the course, student will be able to

- Apply grid computing techniques to solve large scale scientific problems.
- Apply the concept of virtualization.
- Use the grid and cloud tool kits.
- Apply the security models in the grid and the cloud environment.

Course Contents

Unit No.	Title	Lectures
Unit 1	**Grid computing –an overview**	**12**
	1.1. High-Performance Computing 1.2. Cluster Computing 1.3. Peer-to-Peer Computing 1.4. Internet Computing 1.5. Grid Computing - What Grid Computing Is, Peer-to-Peer Networks and Grid Computing, Cluster Computing and Grid Computing , Internet Computing and Grid Computing 1.6. Grid Computing Models 1.7. Open Grid Services Architecture 1.8. Types of Grids - Departmental Grids, Enterprise Grids, Extraprise Grids, Global	

	Grids, Compute Grids, Data Grids, Utility Grids 1.9. Grid Networks -Grid Network Peering Points 1.10 Grid Applications Characteristics	
Unit 2	**Benefits of Grid Computing**	**3**
	2.1. Exploiting underutilized resources 2.2. Parallel CPU capacity 2.3. Virtual resources and virtual organizations for collaboration 2.4. Access to additional resources 2.5. Resource balancing 2.6. Reliability 2.7. Management	
Unit 3	**Cloud Computing – A overview**	**12**
	3.1. Defining Cloud Computing 3.2. The NIST model 3.3. Deployment models – Public, Private, Hybrid 3.4. Service models – Infrastructure as a Service (IaaS), Platform as a service (PaaS), Software as a Service (SaaS), Cloud reference model. 3.5. Examining the characteristics of Cloud Computing 3.6. Benefits of Cloud Computing 3.7. Disadvantages of Cloud Computing	
Unit 4	**Abstraction and Virtualization**	**12**
	4.1. Using Virtualization Technology 4.2. load Balancing and Virtualization – The Google Cloud 4.3. Understating Hypervisors – Virtual Machine types 4.4. Exploring SaaS – salesforce.com, PaaS-force.com, IaaS – Amazon EC2	
Unit 5	**Programming Model**	**8**

	5.1. Open source grid middleware packages – Globus Toolkit (GT4) 5.2. Architecture , Configuration – Usage of Globus – Main components and Programming model 5.3. Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job 5.4. Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.	
Unit 6	**Security**	**12**
	6.1. Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud 6.2. Cloud computing security architecture: Architectural Considerations- General Issues, Trusted Cloud computing, Secure Execution Environments and Communications, Micro-architectures; 6.3. Identity Management and Access control Identity management, Access control, Autonomic Security 6.4. Cloud computing security challenges: Virtualization security management 6.5. virtual threats, VM Security Recommendations, VM-Specific Security techniques, 6.6. Secure Execution Environments and Communications in cloud.	
Unit 7	**Experiential Learning**	**1**
	Case Study	

Reference books:

1. Grid Computing: A practical guide to technology and applications – Ahmar Abbas, Charles River Media Inc. ISBN-10 : 1584502762
2. Introduction to Gird Computing – Bart Jacob, Michael Brown, Kentaro Fukui, Nihar Trivedi.
3. IBM International Technical Support Organization. Ibm.com/redbooks. ISBN 13-9780738494005
4. Cloud Computing Bible – Barrie Sosinsky. Willey India Edition. ISBN-13 : 978-9332535923

5. Cloud Computing Principles and Paradigms- Rajkumar Buya, James Broberg, Andrzej Goscinski. Willey publication. ISBN-13 : 978-8126541256
6. Grid Computing – Joshy Joseph, Craig Fellenstein, Pearson Education. ISBN-13: 9780131456600

Course Code :19CsBCAU605

Course Name: Software Project Management

Teaching Scheme: 4 Lectures/Week **Credits: 4**

Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Desirable Prerequisites:

- Preliminary knowledge of Software Engineering

Course Objectives:

- To learn process of software project management
- To understand details of cost estimation
- To Learn use of project Management tools
- To understand configuration management
- To learn user roles and software teams

Course Outcomes:

- Describe the principal tasks of software project managers, and basic concepts in software projects
- Plan software projects, including risk and quality management
- Explain basic concepts and principles of components of software

Course Contents :

Unit No.	Title	Lectures
Unit 1	**Introduction To Software Project Management**	**6**
	1.1. Project Definition 1.2. Contract Management 1.3. Activities covered By Software Project Management 1.4. Overview of Project Planning 1.5. Stepwise Project Planning.	
Unit 2	**Project Evaluation**	**9**
	2.1. Work Break Down for Project Estimation & setting 2.2. Milestones 2.3. Different methods of estimation 2.3.1. COCOMO model 2.3.2. Delphi cost estimation	

	2.3.3. Function point analysis. 2.4. Project Management through Microsoft Project (MS-Project) 2.5. Introduction 2.5.1. Gantt Chart 2.5.2. PERT Chart 2.6. Usage of Microsoft Project for Estimation and Management 2.7. Software Project Metrics (Size Oriented, Software Measurement, Function Oriented, Object Oriented Metrics) 2.8. Project Scheduling, tracking & Progress reporting	
Unit 3	**Activity Planning**	**9**
	3.1. Objectives 3.2. Project Schedule 3.3. Sequencing and Scheduling Activities 3.4. Network Planning Models 3.4.1. Forward Pass 3.4.2. Backward Pass 3.5. Activity Float 3.6. Shortening Project Duration 3.7. Activity on Arrow Networks	
Unit 4	**Risk Management**	**8**
	4.1. Nature Of Risk 4.2. Types of Risk 4.3. Managing Risk 4.4. Hazard Identification 4.5. Hazard Analysis 4.6. Risk Planning and Control	
Unit 5	**Software Quality Management & Control**	**7**
	5.1. Quality Assurance & Standards 5.2. The SEI Capability Maturity Model CMM 5.3. Concept of Software Quality 5.3.1. Software Quality Attributes, 5.3.2. Software Quality Metrics and Indicators, 5.4. Quality assurance & Validation plan (SQA Activities , reviews, walkthroughs, inspection, testing) Automation to improve Quality in testing 5.5. Defect Management	
Unit 6	**Configuration Management (CM)**	**7**
	6.1. Configuration management & Maintenance plan 6.2. Change Management	

	6.3. Version and Release Management 6.4. Configuration Management Tools	
Unit 7	**Managing People and Organizing Teams**	**10**
	7.1. Introduction 7.2. Understanding Behavior 7.3. Organizational Behavior (A Background Selecting The Right Person For The 7.3.1. Job Instruction In The Best Methods Motivation) 7.4. The Oldham Hackman Job Characteristics Model 7.5. Working In Groups 7.6. Becoming A Team 7.6.1. Decision Making 7.6.2. Leadership 7.6.3. Organizational Structures 7.7. Stress, Health and Safety 7.8. Case Studies	
Unit 8	**Project Management Tools**	**3**
	8.1. Project management tool like MS Project 8.2. Assignment based on the tool	
Unit 9	**EXPERIENTIAL LEARNING**	**1**
	Case study	

Reference books:

1. Software Project Management 5th Edition, McGraw. Hill. ISBN-10 : 0077122798, ISBN-13 : 978-0077122799
2. Effective Software Project Management 1st Edition Robert K. Wysocki ISBN-10 : 0764596365 , ISBN-13 : 978-0764596360
3. Information Technology Project Management by Kathy Schwalbe Thomson Publication. ISBN-10 **1285847091**
4. Software project management in practice, Pearson, 1st Edition, Pankaj Jalote ISBN-13: 9780201737219
5. Software testing and quality assurance, Theory and practice, Wiley, 1st edition, Kshirsagar Naik ISBN-10 : 0471789119 ISBN-13 : 978-0471789116
6. Software project management, A Concise Study, S. A. Kelkar. ISBN-10 : 8120347021 ISBN-13 : 978-8120347021
7. Software Engineering-A Practitioner's Approach 7th or 8th edition, Roger Pressman, McGraw Hill Publication ISBN-10 : 0071184589 ISBN-13 : 978-0071184588

Reference website http://www.pmi.org

Course Code : 19CsBCAU606

Course Name : Research Methodology

Teaching Scheme: 4 Hours/Week **Credits: 4**

Examination Scheme: CIA : 40 Marks **End-Sem: 60 Marks**

Prerequisites:
Knowledge of Basic Mathematics and Statistics

Course Objectives:

- Read, interpret and critically evaluate social research
- Identify, explain and apply the basic concepts of research, such as variable sampling, reliability and validity
- Recognize the ethical issues involved in research and practice ethical research standards
- Use a variety of research methods through hands-on experience

Course Outcomes:
On completing this course, each student will be able to:

- Demonstrate knowledge of research processes (reading, evaluating and developing)
- Prepare intellectual framework necessary to explore wide spectrum of research areas perform literature reviews
- Identify, explain, compare and prepare the key elements of a research proposal/report
- To write an effective research paper

Unit No.	Title	Lectures
Unit 1	**Research Methodology: An Introduction**	**10**
	1.1 Meaning of Research 1.2 Objective of Research 1.3 Motivation in Research 1.4 Types of Research 1.5 Significance of Research 1.6 Research Methods versus Methodology 1.7 Information Systems and Computing Disciplines 1.8 Research (products and outcomes) 1.9 Finding and choosing research topics 1.10 Evaluating the purpose and products of research	
Unit 2	**Research Process**	**10**
	2.1 Model of research process 2.2 Evaluating the research process	
Unit 3	**The Internet Research, Research Participants and Research Ethics**	**10**
	3.1 Internet Research topics 3.2 Literature Review on the Internet	

	3.3 The Internet and Research strategies and methods 3.4 Internet research, the Law and Ethics 3.5 Rights of people directly involved 3.6 Responsibilities of an Ethical Researcher 3.7 Projects (Design, creation and Ethics) 3.8 Evaluating research	
Unit 4	**Literature Review**	**8**
	4.1 Purpose of literature review 4.2 Literature Resources 4.3 The Internet and literature reviews 4.4 Conducting and evaluating literature review	
Unit 5	**Introduction to Research Strategies**	**8**
	5.1 Surveys 5.2 Design and Creation 5.3 Experiments 5.4 Case Studies 5.5 Action Research 5.6 Ethnography 5.7 Interviews 5.8 Observations 5.9 Questionnaires 5.10 Documents	
Unit 6	**Quantitative and Qualitative Data Analysis**	**10**
	6.1 Types of quantitative data 6.2 Data coding 6.3 Visual aids for quantitative data analysis 6.4 Using statistics for quantitative data analysis 6.5 Qualitative data Analysis: Analysing textual data 6.6 Analysing non-textual qualitative Data 6.7 Computer aided Qualitative Analysis 6.8 Evaluating Qualitative Data Analysis.	
Unit 7	**Experiential Learning**	**4**
	7.1 How to write an effective Research Paper 7.2 Writing of Research proposal and research report 7.3 How to select a good Research Journal 7.4 Types of Indexing for Journals, Study of Impact Factor 7.5 Poster presentation and Conference paper presentation	

References Books:

1.Research Methodology Methods and Techniques by C.R. Kothari, New Age International

Publishers
2. Researching Information Systems and Computing by Briony J. Oates,Sage Publications India Pvt. Ltd., New Delhi, ISBN 1-4129-0224-X (pbk)
3. Your research Project, A Step by step Guide for the first-time researcher by Nicholas Walliman, Vistaar Publications (A division of Sage Publications), New Delhi ISBN 81-7829-540-7
4. Research Methods by William M K Trochim, Cornel University, Biztantra, An imprint of Dreamtech Press. WILEY-dreamtech India Pvt. Ltd

Course Code : 19CsBCAU607

Course Name : Lab-I:Programming in Advanced JAVA

Teaching Scheme: 4 Hours/Week **Credits: 4**

Examination Scheme: CIA : 40 Marks **End-Sem: 60 Marks**

Course Objective :

- To learn database programming using Java
- To study web development concept using Servlet and JSP
- To learn socket programming for developing Client-Server applications

Sr. No.	Assignment Name
1.	Collections
2.	Database Programming
3.	Servlets
4.	Java Server Pages
5.	Multithreading
6.	Networking

Course Code :19CsBCAU608

Course Name: Lab II: Mobile Technologies (Android Development)

Teaching Scheme:PR: 2 Slots/Week **Credits: 2**

Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Sr.No.	Title of the assignment
1	Introduction to Android
2	Activities, Fragments and Intents
3	Android User Interface and Event Handling
4	Designing Your User Interface with Views
5	Displaying Pictures and Menus
6	Databases – SQLite
7	Messaging and E-mail
8	Location-Based Services and Google Map

Course Code :19CsBCAU609

Course Name: Lab III-Internet of Things(IoT)

Teaching Scheme:PR: 2 Slots / Week **Credit: 02**

Examination Scheme: CIA: 40 Marks **End-Sem: 60 Marks**

Assignments on Internet of Things(IoT)

Sr.No.	Assignment
1	Programming Arduino Development Board Using Simulation Software
2	Interfacing LEDs, sensors, motors with Arduino
3	Interfacing LEDs, analog and digital sensors with Raspberry Pi
4	Interfacing Servo Motors, DC motors with Raspberry Pi
5	Raspberry Pi Pulse Width Modulation(PWM)
6	Pi Camera Interface with Raspberry Pi
7	Sending Sensor Data to Cloud platform
8	IoT Device Controlling Using Cloud
9	Building Smart Home Cloud Service with Google
10	Interface Bluetooth with Arduino/Raspberry Pi to Turn LED ON/OFF when '1'/'0' is Received from Smart Phone Using Bluetooth
11	Controlling LED/Motor through Web Server
12	Mobile Application Connectivity for IoT
13	Uploading Data on Cloud using Wi-Fi ESP8266 Module
14	IBM Node-RED Tool
15	Using Google Firebase for IoT Device Configuration

Note: Assignments from 1 to 7 are Compulsory and 8 to 15 are Optional.

Course Code :19CsBCAU610

Course Name: Lab IV: Project Work

Teaching Scheme: PR: 2 Slots/Week **Credits: 2**

Examination Scheme: CIA : 40 Marks **End-Sem: 60 Marks**

Instructions:

1. Choose Project topic and Prepare problem description
2. Study of Existing System
3. Identifying users and functionalities of proposed system
4. Preparing the Design of the proposed system- Data Design Screen and Report Designs
5. Project is platform and language independent
6. Implementation

You should prepare design document using SE/UML techniques depends on your project

1. Project Report Content should as follow :
2. College certificate
3. Acknowledgement
4. Problem Definition
5. Existing System and need for the new system
6. Scope of the work
7. Feasibility study (Including H/W & S/W setup requirements)
8. Requirement Analysis (including fact finding methods used)
9. E-R diagrams
10. Decision trees/Decision tables
11. Normalized Database Design & Data Dictionary.
12. Data flow Diagrams (if applicable)
13. Use-case Diagrams
14. Class Diagrams
15. Object Diagrams
16. Sequence Diagrams
17. Collaboration Diagram
18. Activity Diagram
19. State Chart (if applicable)
20. Component Diagram
21. Deployment Diagram (if applicable)
22. Use interface design Menus Input Screens using sample data Reports, Graphs using sample data
23. Testing & Implementation plan (Should contain testing strategies, techniques used & implementation approach used.)
24. User manual
25. Drawbacks, Limitations & Proposed enhancement

26. Abbreviations used (if any)
27. Bibliography/Reference (Including book titles, authors name, editions, publications, etc)

About project Report: - The report should be typed on A4 size, executive bond paper for the final submission. The report should be in the good quality Rexene bound. We suggest, using one-and-half spaced printing, Times New Roman 12 font sizes for the normal text, 14-16 font sizes for headings & page titles.
Number of copies: For one project you should prepare 2 copies of the project report. One for yourself, one for college.

Project Progress Report

Roll No and Name of the student	
Title of the Project	
Project guide Name	

SN	From Date	To Date	Details of Project work	Project guide sign (with date)

Head, Dept. of Computer Science