DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/B.Sc./CBC & GS/17/2024

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, **Academic Council at its meeting held on 08 April 2024 has accepted the following Syllabi under the Faculty of Science & Technology as per Choice Based Credit Grading System** as appended herewith.

Sr.No.	Courses	Semester
1.	B.Sc. Chemistry (Optional)	Vth & VIth semester
2.	B.Sc. Analytical Chemistry (Optional)	Vth & VIth semester
3.	B.Sc. Polymer Chemistry (Optional)	Vth & VIth semester
4.	B.Sc.Biochemistry (Optional)	Vth & VIth semester
5.	B.Sc.Dairy Science & Technology (Optional)	Vth & VIth semester
6.	B.Sc.Microbiology (Optional)	Vth & VIth semester
7.	B.Sc. Botany (Optional)	Vth & VIth semester
8.	B.Sc. Computer Science (Optional)	Vth & VIth semester
9.	B.Sc. Computer Science (Degree)	Vth & VIth semester
10.	B.Sc.Information Technology (Optional)	Vth & VIth semester
11.	B.Sc.Information Technology (Degree)	Vth & VIth semester
12.	Bachelor of Computer Application (Optional)	Vth & VIth semester
13.	Bachelor of Computer Application (Degree)	Vth & VIth semester

This is effective from the Academic Year 2024-25 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Chhatrapati Sambhajinagar.
-431 004.
REF.No.SU/2024/1786-94
Date:- 21.06.2024.

* * * * * *

Deputy Registrar,
Academic Section

..2..

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

1] **The Director, Board of Examinations & Evaluation,** Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar - 431004(MS) India

Undergraduate Bachelor Degree Program
In Science

BCA **(Optional Subject)**

Third Year

Course Structure and Curriculum

(Outcome based Curriculum)

Choice Based Credit System

(Effective from Academic Year 2024-25)

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar – 431004 (MS) India

Structure and Curriculum for

Bachelor of Science (B. Sc.) Third Year
Computer Application (Optional Subject)

(Choice Based Credit System)

Semester V								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 A) Discipline Specific Elective	CA-511	DSE-1A(1) (Theory Paper-IX) (Select any one paper from A1/B1)	2 hours	2	50	10	40	20
	CA-512	DSE-1A(2) (Theory Paper-X) (Select any one paper from A2/B2)	2 hours	2	50	10	40	20
	CA-521	Lab course 6 (based on CA-511)	3 hours	1.5	50	10	40	20
	CA-522	Lab course 7 (Seminar)	3 hours	1.5	50	10	40	20
Skill Enhancement course (SEC-3)	CA-513	SEC-3 **Any one skill to be chosen out of two SEC-3(E) , SEC-3 (F)** **SEC-3(E)**: Programming in SCILAB **SEC-3 (F)**: Aptitude and Reasoning	2 hours	2	50	10	40	20
Non-Credit Course	CA-514	Professional Ethics and Moral Values	2 hours					
			14	9	250	50	200	100
Total Credits for Semester V : 9 (Theory : 06 ; Laboratory : 03)								

Semester VI								
	Course Code	Course Title	Teaching time/week	Credits	Scheme of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1 B) Discipline Specific Elective	CA-611	DSE-1B(1) (Theory Paper-XI) (Select any one paper from A1/B1)	2 hours	2	50	10	40	20
	CA-612	DSE-1B(2) (Theory Paper-XII) (Select any one paper from A2/B2)	2 hours	2	50	10	40	20
	CA-621	Lab course 8 (based on CA-611)	3 hours	1.5	50	10	40	20
	CA-622	Lab course 9	3 hours	1.5	50	10	40	20

		(Project Work /Dissertation)						
Skill Enhancement course (SEC-4)	CA-613	SEC-4 **Any one skill to be chosen out of two SEC-4(G) , SEC-4 (H)** **SEC-4(G):** R Programming **SEC-4 (H):** Digital Marketing	2 hours	2	50	10	40	20
			15	9	250	50	200	100
Total Credits for Semester VI : 09 (Theory : 06 ; Laboratory : 03)								
Total Credits for three years : Sem I (11.5) + Sem II (11.5) + Sem III (15) + Sem IV (15) + Sem V (09) + Sem VI (09) = 71 Credits								

Discipline Specific Elective (Credit: 02 each)

V Semester			VI Semester		
Code	DSE Code	Title of Paper	Code	DSE Code	Title of Paper
CA-511 (Select any one paper from A1/B1)	DSE-1A(1)	Programming in Core JAVA	CA-611 (Select any one paper from A1/B1)	DSE-2A(1)	Programming in advance JAVA
	DSE-1B(1)	Python Basics		DSE-2B(1)	Advance Python
CA-512 Select any one paper from (A2/B2)	DSE-1A(2)	Basics of Computer Networks	CA-612 (Select any one paper from A2/B2)	DSE-2A(2)	Advance Computer Network
	DSE-1B(2)	Software Project Management –I		DSE-2B(2)	Software Project Management – II

Skill Enhancement Courses (Credit: 02 each)

Semester	Code	Skill Code	Title of Paper
V(SEC-III)	CA 513	**SEC-3(E):**	Programming in SCILAB
		SEC-3 (F):	Aptitude and Reasoning
VI (SEC-IV)	CA 613	**SEC-4(G):**	R Programming
		SEC-4 (H):	Digital Marketing

Curriculum for Semester V

Course Code: **CA-511 –DSE-1A(1)**
Course Title: Programming in Core Java
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

1. Introduce students to the basic concepts of Java programming
2. Introduce student to use constructors, wrapper classes, and string operations in Java.
3. Enable students to use exception handling in Java.
4. Introduce students the concept of Interface and threads in Java.

Unit-I: : (10 periods)

Introduction of Java, History of Java, how Java is different from C++. JDK Tools, class files, Java Bytecode, JVM, identifiers, Data types, Operators, Control statements, loop, arrays, Inheritance in Java, Multilevel hierarchy, method overriding, Abstract classes, Final classes.

Unit-II: : (10 periods)

Defining, Implementing and applying packages, Importing Packages, Exception handling in Java, try, catch, throw, throws and finally, Uncaught Exceptions, Multiple catch, built in exceptions.

Unit-III: (10 periods)

Constructors, types of constructors, Role of constructor in inheritance, Introduction to wrapper classes String operations in Java, Immutability, Creating and initializing strings using methods of string and string buffer classes.

Unit-IV: (10 periods)

Defining interface, abstract methods in interface, Implementing interface, extending interface, interface references, default method, Static methods in Interface, Constants in interface. Threads: Thread life cycle, Creating and implementing treads, multi-threaded programming, thread priorities, synchronization of thread, resuming and stopping threads.

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1) Black Book " Java server programming" J2EE, 1st ed., Dream Tech Publishers, 2008. 3. Kathy walrath "
2) Complete Reference J2EE by James Keogh mcgraw publication
3) Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
4) Core Java, Volume II: Advanced Features by Cay Horstmann and Gary Cornell Pearson Publication
5) Java Persistence with Hibernate by Christian Bauer, Gavin King

Course Code: **CA-521**
Course Title: **Lab course 1 (Based on CA-511 –DSE-1A(1)**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Creating a simple program in Java to print "Hello Word"
2. Implementing basic control statements such as if else switch and loops
3. Creating and using arrays in Java.
4. Implementation of inheritance in Java.
5. Overriding methods in Java
6. Implementing user –define packages and importing them.
7. Implementing exception handling in Java with try catch throw and finally block.
8. Creating and using interface in Java.
9. Staring operations in Java such as concatenation, substring and length.
10. Creating and using Interface in Java.
11. Implementing multi-threaded programming in Java.
12. Implementing tread synchronization in Java.
13. Creating and using constructor methods in Java.
14. Using string and string buffer classes in Java.
15. Creating a Java program that combines multiple concepts such as inheritance, interface, an exception handling.

Course Code: **CA-511 –DSE-1B(1)**
Course Title: **Python Basics**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

1. Enable students to understand Python's syntax and set up their programming environment.
2. Teach core programming concepts like variables, data types, control structures, and data structures.
3. Educate students about Python-specific concepts like functions, classes, exception handling, and file operations.
4. Introduce students to Python libraries and advanced topics like list comprehensions, lambda functions, and regular expressions.

Unit-I: : (10 periods)

Introduction to Python: What is Python and Why Python? , Installing Python and setting up the development environment., Understanding Python syntax and basic data types, Variables and Operators in Python, Conditional Statements: If, Else, Elif, Looping Statements: While loop and For loop, Python Data Structures: Lists, Tuples, Python Data Structures: Sets, Dictionaries.

Unit-II: : (10 periods)

Python Functions, File 1/0, and Exceptions: Introduction to Functions in Python, Defining Functions and Calling them, 3. Function Parameters, Return Values, and Scope, Introduction to Python Modules and Packages, File Operations: Opening, reading, writing, and closing files, Introduction to Exceptions and Error Handling, Try, Except, Else, Finally blocks, Raising and catching exceptions, Introduction to the 'with' statement for simplified File I/O and exception handling.

Unit-III: (10 periods)

Object-Oriented Programming in Python: Understanding the concept of Object-Oriented Programming, Classes and Objects in Python, The **kit** method, class variables, and instance variables, Inheritance in Python, Overriding and Overloading methods, Polymorphism in Python, Encapsulation: Private methods and name mangling, Abstract Classes and Interfaces, Exception Handling in OOP

Unit-IV: (10 periods)

Introduction to Python Libraries, Introduction to NumPy and its applications, Introduction to Pandas for data manipulation, Introduction to Matplotlib for data visualization, Understanding List Comprehensions, Introduction to Lambda functions and Map, Reduce, Filter functions, Generators, Decorators, and Context Managers in Python, Overview of-RegdTar-Expressions in PFfiTri, Introduction to Python's Standard Library, Practice and Review Session.

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. "Python Crash Course: A Hands-On, Project-Based Introduction to Programming" by Eric Matthes
2. "Learn Python the Hard Way" by Zed A. Shaw
3. "Automate the Boring Stuff with Python" by Al Sweigart

Additional References:

1. "Fluent Python: Clear, Concise, and Effective Programming" by Luciano Ramalho
2. "Effective Python: 90 Specific Ways to Write Better Python" by Brett Slatkin
3. "Python Cookbook: Recipes for Mastering Python 3" by David Beazley and Brian K. Jones

Course Code: **CA-521**
Course Title: **Lab course 1 (Based on CA-511 –DSE-1B(1))**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Write a Python program to print "Hello, World!"
2. Write a Python program to perform basic arithmetic operations.
3. Write a Python program to check if a number is even or odd using conditional statements.
4. Write a Python program that sorts a list of numbers in ascending order.
5. Write a Python function that checks if a number is a palindrome.
6. Create a Python module with multiple functions and then import it in another Python program
7. Write a Python program that reads a file, prints the content of the file, and counts the number of lines in the file
8. Write a Python program that copies the content from one file to another.
9. Write a Python program that uses try, except, else, and finally blocks.
10. Write a Python program to demonstrate the concept of inheritance.
11. Write a Python program to demonstrate the concept of polymorphism.
12. Write a Python program to demonstrate the concept of encapsulation.
13. Write a Python program to demonstrate the concept of abstraction.
14. Write a Python program using Pandas to read a CSV file and perform basic data manipulation.
15. Write a Python program using Matplotlib to plot a bar chart.
16. Write a Python program that uses list comprehension to create a new list based on an existing one.

Course Code: **CA-512 – DSE-1A(2)**
Course Title: Basics of Computer Network
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

1. Understand the fundamental concepts of computer networks and their applications.
2. Gain knowledge of the layered network architecture and various network protocols and services.
3. Understand the functions and operation of various network layers, including the physical, data link, network, transport, and application layers.
4. Gain knowledge of network security threats and vulnerabilities, as well as various security protocols and encryption techniques.

Unit-I: : (10 periods)

Introduction:

Overview of computer networks and their applications, Network topologies and architectures, Layered network architecture and the OS I reference model, Network protocols and services.

Unit-II: : (10 periods)

Physical Layer and Data Link Layer:

Overview of the physical layer and its functions, Transmission media and their characteristics, Data encoding and modulation techniques, Error detection and correction, Data link layer and its functions, Framing, flow control, and error control in data link layer protocols.

Unit-III: (10 periods)

Network Layer and Transport Layer:

Overview of the network layer and its functions, Routing algorithms and protocols, IPv4 and IPv6 addressing and routing, Transport layer and its functions, Reliable data transfer and flow control, TCP and UDP protocols.

Unit-IV: (10 periods)

Application Layer and Security:

Overview of the application layer and its functions, Client-server and peer-to-peer architectures, Common application layer protocols (HTTP, FTP, SMTP, DNS), Network security threats and vulnerabilities, Cryptography and encryption techniques, Security protocols (SSL/TLS, IPSec, VPN),

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. "Computer Networks" by Andrew S. Tanenbaum and David J. Wetherall
2. "Data Communications and Networking" by Behrouz A. Forouzan

Additional Reference:

1. "TCP/IP Protocol Suite" by Behrouz A. Forouzan-
2. "Computer Networking: A Top-Down Approach" by James F. Kurose and Keith W. Ross
3. "Networking Essentials" by Jeffrey S. Beasley and Piyasat Nilkaew

Course Code: **CA-512 – DSE-1B(2)**
Course Title: **Software Project Management - I**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

- Project Management is the discipline of defining and achieving targets while optimizing the use of resources (time, money, people, materials, energy, space, etc) over the course of a project (a set of activities of finite duration).
- It will also involve definite specifications and workings of an organization through proper planning.
- Project management in generally complex as it has multi- disciplinary areas included in various phases of its life span.
- A project is a series of task that is carefully planned to achieve a particular outcome.

Unit-I: : (10 periods)

Introduction to Software Project Management: Introduction, Why is Software Project Management Important? What is a Project? Software Projects versus Other Types of Project, Contract Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some Ways of Categorizing Software Projects, Project Charter, Stakeholders, Setting Objectives, The Business Case, Project Success and Failure, What is Management? Management Control, Project Management Life Cycle, Traditional versus Modern Project Management Practices.

Unit-II: : (10 periods)

Project Evaluation and Programme Management: Introduction, Business Case, Project Portfolio Management, Evaluation of Individual Projects, Cost–benefit Evaluation Techniques Risk Evaluation, Programme Management, Managing the Allocation of Resources within Programmes, Strategic Programme Management, Creating a Programme, Aids to Programme Management, Some Reservations about Programme Management, Benefits Management.

Unit-III: (10 periods)

An Overview of Project Planning: Introduction to Step Wise Project Planning, Step 0: Select Project, Step 1: Identify Project Scope and Objectives, Step 2: Identify Project Infrastructure, Step 3: Analyse Project Characteristics, Step 4: Identify Project Products and Activities, Step 5: Estimate Effort for Each Activity, Step 6: Identify Activity Risks, Step 7: Allocate Resources, Step 8: Review/Publicize Plan, Steps 9 and 10: Execute Plan/Lower Levels of Planning

Unit-IV: (10 periods)

Selection of an Appropriate Project Approach:Introduction, Build or Buy? Choosing Methodologies and Technologies, Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, The Waterfall Model, The Spiral Model, Software Prototyping, Other Ways of Categorizing Prototypes, Incremental Delivery, Atern/Dynamic Systems Development Method, Rapid Application Development, Agile Methods, Extreme Programming (XP), Scrum, Lean Software Development, Managing Iterative Processes, Selecting the Most Appropriate Process Model. Software Effort Estimation:Introduction, Where are the Estimates Done? Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Bottom-up Estimating, The Top-down Approach and Parametric Models, Expert Judgement, Estimating by Analogy, Albrecht Function Point Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb.

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. Software Project Management. Bob Hughes, Mike Cotterell, Rajib Mall TMH 6 th

2. Project Management and Tools & Technologies – An overview Shailesh Mehta SPD

3. Walker Royce, "Software Project Management – A Unified Framework", 2001, Pearson Education.

4. Roger S. Pressman, "Software Engineering", 2001, McGraw Hill.

5. S.A.Kelkar, "Software Project Management – A concise study", 2 nd Ed. PHI learning Pvt. Ltd. 2009

6. Project Management, Planning and Control by Pritam Lanjewar, Dr. UmeshKumar Malpani, Scientific International Publishing House.

Course Code: **CA-522**
Course Title: **Seminar**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

Guidelines for seminar:

1. Student should select any topic associated with current trends in computer field individually.
2. The topic should be other than the curriculum.
3. A report is to be submitted.
4. A presentation on the topic choose is to be delivered by the student in the examination.

Course Code: **CA-513 – SEC-3 (E)** Course Title: **Programming in SICLAB** Total Credits: 02 Contact Hours: 30 (Clock Hours) Marks: 50 Periods: 45 (45 minutes each)
Objective 1. To explore the various basic feature of SCILAB for a user who has never used numerical computation software. 2. Computations, graphs and illustrations are made with SCILAB
Unit-I: : (10 periods) Introduction to Programming: Components of a computer, working with numbers, Machine code, Software hierarchy. Programming Environment: SCILAB Environment, Workspace, Working Directory, Expressions, Constants, Variables and assignment statement, Arrays.
Unit-II: : (10 periods) Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save. Matrices and Some Simple Matrix Operations, Sub- Matrices. Procedures and Functions: Arguments and return values.
Unit-III: (10 periods) Control Statements: Conditional statements: If, Else, Else-if, Repetition statements: While, for loop.
Unit-IV: (10 periods) Manipulating Text: Writing to a text file, Reading from a text file, Randomising and sorting a list, searching a list.
UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. M.Affouf, SCILAB by Example , CreateSpace Independent Publishing Platform, 2012
2. H. Ramchandran, A.S. Nair, SCILAB , S.Chand, 2011

Course Code: **CA-513 – SEC-3 (F)** Course Title: **Aptitude and Logical Reasoning** Total Credits: 02 Contact Hours: 30 (Clock Hours) Marks: 50 Periods: 45 (45 minutes each)
Objective This course is designed to suit the need of the outgoing students and to acquaint them with frequently asked patterns in quantitative aptitude and logical reasoning during various examinations and campus interviews.
Unit-I: (10 periods) Quantitative Ability: LCM and HCF, Decimal Fractions, Simplification, Square Roots and Cube Roots, Average, Problems on Ages, Surds & Indices, Percentages, Problems on Numbers.
Unit-II: : (10 periods) Quantitative Ability : Logarithm, Permutation and Combinations, Probability, Profit and Loss, Simple and Compound Interest, Time, Speed and Distance,Time & Work, Ratio and Proportion, Area.
Unit-III: (10 periods) Data Interpretation: Data Interpretation, Tables, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Venn Diagrams
Unit-IV: (10 periods) Logical Reasoning: Analogy, Blood Relation, Directional Sense, Number and Letter Series, Coding – Decoding, Calendars, Clocks, Seating Arrangement
UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. A Modern Approach To Verbal & Non Verbal Reasoning By R S Agarwal
2. Analytical and Logical reasoning By Sijwali B S
3. Quantitative aptitude for Competitive examination By R S Agarwal
4. Quantitative Aptitude by Competitive Examinations by Abhijit Guha 4 th edition
5. Quantitative Aptitude & Data Interpretation – Disha Expert
6. Quantitative Aptitude for Competitive Examinations – Dinesh Khattar
7. Fast Track Objective Arithmetic – Rajesh Verma
8. Logical Reasoning and Data Interpretation for CAT by Pearson

Curriculum for Semester VI

Course Code: **CA-611 –DSE-2A(1)**
Course Title: **Programming in Advance Java**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective
To understand the Advanced Java features& Programming like .

- Implement Networking and Data base connectivity in Java for given application.
- Implement webpage with dynamic content and server side web application using Servlet and JSP.
- Use web application framework JSF to build user interfaces.
- Apply Model-View-Controller architecture to build complex
- client-server applications

Unit-I: : (10 periods)
JDBC: JDBC Introduction JDBC Architecture, Types of JDBC Drivers, Introduction to major JDBC Classes and Interface, creating simple JDBC Application, Types of Statement (Statement Interface, Prepared Statement, Callable Statement), Exploring Result Set Operations.
Socket Programming: URL class, Inet Address class, URL Connection class, Data Gram Socket class, client side & Server side program

Unit-II: : (10 periods)
Applet: Applet life cycle, applet tag, param tag, Graphics class, applet program, awt package.
Servlet API : Servlet Interface, Generic Servlet Http Servlet, Servlet Life Cycle Servlet, Example How servlet works? Servlet Request, Servlet Response, Servlet Collaboration Request Dispacher, Attribute in Servlet Session Tracking, Session Techniques, Cookies in Servlet Cookies: Login & Logout.

Unit-III: (10 periods)
Java Server Pages Introduction to JSP , Comparison with Servlet, JSP Architecture, JSP: Life Cycle, Scripting Elements, Directives, Action Tags, Implicit Objects, Expression Language(EL), JSP Standard Tag Libraries(JSTL), JST tags :Function Tags, Formatting Tags, XML Tags, SQL tags.

Unit-IV: (10 periods)
JSP Standard Tag Libraries(JSTL) : Struts2 Introduction, What is Struts Struts2 FeaturesModel1 vs Model2Struts 2Core ComponentsInterceptorsValue,StackAction,ContextAction,InvocationOGNLStruts 2 Architecture

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1) Black Book " Java server programming" J2EE, 1st ed., Dream Tech Publishers, 2008. 3. Kathy walrath "
2) Complete Reference J2EE by James Keogh mcgraw publication
3) Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
4) SCWCD, Matthew Scarpino, Hanumant Deshmukh, Jignesh Malavie, Manning publication
5) Core Java, Volume II: Advanced Features by Cay Horstmann and Gary Cornell Pearson Publication
6) Java Persistence with Hibernate by Christian Bauer, Gavin King

7) Spring in Action 3rd edition , Craig walls, Manning Publication
8) Hibernate 2nd edition, Jeff Linwood and Dave Minter, Beginning Après publication
9) Java Server Faces in Action, Kito D. Mann, Manning Publication
10) JDBCTM API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley
11) Beginning JSP, JSF andTomcat, Giulio Zambon, Apress
12) JSF2.0 CookBook, Anghel Leonard, PACKT publication
13) Advanced Java, M. T. Savaliya, dreamtech

Course Code: **CA-621**
Course Title: **Lab course 1 (Based on CA-611 –DSE-2A(1))**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1. Implement java applet to print "Hello" word.
2. Implement java applet to draw different shapes.
3. Implement java code use of jdbc statements.
4. Implement java program to connect database using DSN
5. Implement java program to print computer IP address
6. Write a java program to communicate client side and server side socket
7. Implement cookies to store firstname and lastname using Java server pages.
8. Program to demonstrate use requestdipatcher using jsp/servlet.
9. Write a Servlet program to print system date and time.
10. Write JSP code to implent JSTL tag structure

Course Code: **CA-611 –DSE-2B(1)**
Course Title: **Advance Python**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

1. Understand databases and SQL fundamentals, including sqlite3 usage in Python.
2. Master database connectivity and management using Python's sqlite3 module.
3. Execute CRUD operations, manage transactions, and ensure data integrity in sqlite3 databases with Python.
4. Design efficient database schemas and integrate sqlite3 functionalities into Python applications.

Unit-I: : (10 periods)

Introduction to Databases in Python:

- Understanding the Purpose and Types of Databases, including data storage, management, retrieval, integrity, and security, and exploring relational, NoSQL, in-memory, NewSQL, time-series, object-oriented, hierarchical, and network databases.
- Overview of sqlite3 and Its Usage in Python, encompassing the features of sqlite3 such as serverless, self-contained, and zero-configuration nature, common use cases, and the process of installing and setting up sqlite3.

Basic SQL Commands with sqlite3: Creating and Managing Databases and Tables, involving tasks like creating a new sqlite3 database, defining schema, and altering table structure.

Unit-II: : (10 periods)

Connecting to sqlite3 Database:

- **Establishing Connections to sqlite3 Databases Using Python:**
  - Importing sqlite3 module.
  - Connecting to a sqlite3 database file.
  - Handling connection errors.
- **Creating Database Connections and Cursors:**
  - Creating a cursor object.
  - Using the cursor to execute SQL commands.
  - Closing connections and cursors properly.

Unit-III: (10 periods)

CRUD Operations with Python and sqlite3:

- **Implementing CRUD (Create, Read, Update, Delete) Operations on sqlite3 Databases Using Python:**
  - Writing Python functions for each CRUD operation.
  - Executing CRUD operations through Python scripts.
  - Handling exceptions and ensuring data integrity.
- **Executing Basic SQL Commands (CREATE, INSERT, SELECT, UPDATE, DELETE) Using sqlite3:**
  - Writing and executing SQL commands in Python.
  - Inserting data into tables.
  - Selecting and querying data.
  - Updating and deleting data from tables.

Unit-IV: (10 periods)

Transactions and Error Handling:

- **Managing Transactions and Implementing Error Handling in sqlite3 Database Operations:**
  - Understanding transactions and their importance.
  - Using BEGIN, COMMIT, and ROLLBACK.
  - Implementing try-except blocks for error handling.
  - Ensuring atomicity, consistency, isolation, and durability (ACID properties).

Query Execution and Data Retrieval:

- **Executing SQL Queries with Parameters:**
  - Preventing SQL injection using parameterized queries.
  - Using placeholders and binding parameters.
- **Fetching and Processing Query Results:**
  - Retrieving data using fetchall(), fetchone(), and fetchmany().
  - Iterating over result sets.
  - Converting result sets to dictionaries or other data structures.

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. "Python SQLite3 Documentation"
2. "SQL Fundamentals" by Joe Celko

Online Resources:

1. SQLite Tutorial at SQLite.org
2. Real Python SQLite Tutorial

Course Code: **CA-621**
Course Title: **Lab course 1 (Based on CA-611 –DSE-2B(1))**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

1	Set up the sqlite3 environment in Python and verify the installation.
2	Create a new sqlite3 database file and establish a connection to it using Python.
3	Write and execute basic SQL commands (CREATE TABLE, INSERT INTO, SELECT, UPDATE, DELETE) using sqlite3 in Python.
4	Design and create a schema for a sample database using sqlite3 in Python.
5	Establish a database connection to an existing sqlite3 database file and verify the connection in Python.
6	Create and execute a Python script to retrieve data from a sqlite3 database using SELECT queries.
7	Implement error handling in Python scripts for database connection errors and SQL query execution errors.
8	Develop Python functions to perform CRUD operations (Create, Read, Update, Delete) on sqlite3 databases.
9	Implement transactions in Python scripts using sqlite3 to ensure data consistency and integrity.
10	Write a Python program to execute batch processing operations on sqlite3 databases.
11	Handle SQL exceptions in Python scripts using try-except blocks with sqlite3 operations.
12	Configure and utilize connection pooling in Python programs to optimize database connection management.
13	Develop a Python application using sqlite3 to manage a real-world dataset, including database creation, data insertion, and retrieval.

Course Code: **CA-612 – DSE-2A(2)**
Course Title: **Advance Computer Network**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

- The major components of computer based information systems is computer networks. Through computer networks we can share hardware, Software, Processing, Data and Applications besides getting global connectivity for internet based communication and services.
- To make students learn the technology of establishing, commissioning (making operational) and maintaining computer networks.

Unit-I: : (10 periods)
Protocols and Interfaces in Upper Layers of TCP/IP : Introducing, TCP/IP suite, Explaining Network Layer Protocols, Explaining Transport, Layer Protocol, Explaining Application Layer Protocol, Routing in the Internet Introduction to Intra-domain and inter-domain routings, Unicast Routing Protocols, Multicast Routing Protocols

Unit-II: : (10 periods)
Network Management and Services : Introduction to Network Management, Standard Network Management Protocol, Traffic Engineering Basics : Introduction to traffic Engineering, Requirement Definition for Traffic Engineering, Traffic Sizing, Traffic Characteristics, Protocols, Time and Delay Consideration, Connectivity, Availability, Reliability, and Maintainability, Throughput Calculation

Unit-III: (10 periods)
Multimedia over Internet : Introduction to Multimedia Services, Explaining Transmission of Multimedia over the Internet, Explaining IP Multicasting, Explaining VOIP

Unit-IV: (10 periods)
Bluetooth : Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Frame Structure.

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. "Computer Networks" by Andrew S. Tanenbaum and David J. Wetherall
2. "Data Communications and Networking" by Behrouz A. Forouzan

Additional Reference:

1. "TCP/IP Protocol Suite" by Behrouz A. Forouzan-
2. "Computer Networking: A Top-Down Approach" by James F. Kurose and Keith W. Ross
3. "Networking Essentials" by Jeffrey S. Beasley and Piyasat Nilkaew

Course Code: **CA-612 – DSE-2B(2)**
Course Title: **Software Project Management-II**
Total Credits: 02
Contact Hours: 30 (Clock Hours)
Marks: 50
Periods: 45 (45 minutes each)

Objective

- Project Management is the discipline of defining and achieving targets while optimizing the use of resources (time, money, people, materials, energy, space, etc) over the course of a project (a set of activities of finite duration).
- It will also involve definite specifications and workings of an organization through proper planning.
- Project management in generally complex as it has multi- disciplinary areas included in various phases of its life span.
- A project is a series of task that is carefully planned to achieve a particular outcome.

Unit-I: : (10 periods)

Activity Planning: Introduction, Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks. **Risk Management:** Introduction, Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Boehm"s Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts.

Unit-II: : (10 periods)

Monitoring and Control: Introduction, Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management (SCM).

Managing Contracts: Introduction, Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance.

Unit-III: (10 periods)

Managing People in Software Environments: Introduction, Understanding Behaviour, Organizational Behaviour: A Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham–Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns.

Unit-IV: (10 periods)

Working in Teams: Introduction, becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership. **Software Quality**: Introduction, The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans. **Project Closeout:** Introduction, Reasons for Project Closure, Project Closure Process, Performing a Financial Closure, Project Closeout Report.

UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1.Project management, planning and control by Pritam Lanjewar, Dr. UmeshKumar Malpani. Scientific International Publishing House.

2.Software Project Management . Bob Hughes, Mike Cotterell, Rajib Mall TMH 6 th

3. Project Management and Tools & Technologies – An overview Shailesh Mehta SPD

4. Walker Royce, "Software Project Management – A Unified Framework", 2001, Pearson Education.

5. Roger S. Pressman, "Software Engineering", 2001, McGraw Hill.

6. S.A.Kelkar, "Software Project Management – A concise study", 2 nd Ed. PHI learning Pvt. Ltd. 2009

Course Code: **CA-622**
Course Title: **Project Work / Dissertation**
Total Credits: 1.5
Contact Hours: 03 Hours (Week)
Marks: 50

Guidelines :-

1. The synopsis approval will be given by the project Guides
2. The Project work should be either an individual (one) or a group of not more than three members.
3. The project work/Dissertation will focused on survey, planning, designing, coding and testing of the project.
4. The project report will content at least following documentation
    a. Abstract of the project.
    b. Current system
    c. Proposed system.
    d. User Interview.
    e. Feasibility Study report.
    f. Data Flow Diagram
    g. E-R Diagram
    h. Data Dictionary/ Table Structure
    i. Sample Screen Layouts
    j. Limitations.
    k. Conclusion.

Course Code: **CA-613 – SEC-4 (G)** Course Title: **R-Programming** Total Credits: 02 Contact Hours: 30 (Clock Hours) Marks: 50 Periods: 45 (45 minutes each)
Objective 1. Student will learn how to program in R 2. Student will learn how to use R for effective data analysis. 3. Student will learn reading data into R, accessing R packages, 4. Student will learn writing R functions, debugging, profiling R code
Unit-I: (10 periods) Basics to get started up with R. The Background Materials lesson contains Information about course mechanics and installation of R. History of R, basic data types in R, functions for reading and writing data. Operator Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Miscellaneous Operators.
Unit-II: : (10 periods) control structures and functions. Decision Making statements if statement, if...else statement, switch statement, if...else Ladder, ifelse0 function, Loop Introduction, for loop, while Loop, repeat Loop, Break Statement, Next Statement.
Unit-III: (10 periods) loop functions and the debugging tools in R. Matrix Introduction, Matrix Construction, Addition & Subtraction, Multiplication & Division. Simulation Studio, Simulate data in R, profiler in R, data frame introduction and details.
Unit-IV: (10 periods) Filtering and sub setting data aggregate functions, profiling to optimize the R program. str function. Input types CSV, Excel files reading and writing data. Graphics procedures, plot function.
UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. R in Action By Robert L. Kabacoff paperback publisher- Dreamtech Press
2. R for Data Science By Hadley Wickham and Garrett Gorlemund, O'Reilly Publication.

Course Code: **CA-613 – SEC-3 (H)** Course Title: **Digital Marketing** Total Credits: 02 Contact Hours: 30 (Clock Hours) Marks: 50 Periods: 45 (45 minutes each)
Objective To understand the basic Concepts of Digital marketing and the road map for successful Digital marketing strategies.
Unit-I: : (10 periods) Fundamentals of Digital marketing & Its Significance, Traditional marketing Vs Digital Marketing, Evolution of Digital Marketing, Digital Marketing Landscape, Key Drivers, Digital Consumer & Communities
Unit-II: : (10 periods) The Digital users in India, Digital marketing Strategy- Consumer Decision journey, POEM Framework, Segmenting & Customizing messages, Digital advertising Market in India, Skills in Digital Marketing, Digital marketing Plan.
Unit-III: (10 periods) Terminology used in Digital Marketing, PPC and online marketing through social media, Social Media Marketing, Keyword advertising, Google web-master and analytics overview, Affiliate Marketing, Email Marketing, Mobile Marketing
Unit-IV: (10 periods) Introduction to SEO, How Search engine works, SEO Phases, History Of SEO, How SEO Works, What is Googlebot (Google Crawler), Types Of SEO technique, Keywords, Keyword Planner tools.
UNIT-5: Tutorial and Assignment (05 periods)

Core Reference:

1. Digital Marketing, S.Gupta, McGraw-Hill
2. Digital Marketing –Kamat and Kamat-Himalaya
3. Marketing Strategies for Engaging the Digital Generation, D. Ryan