



FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550121

Course Title: Java – beginner to professional

Course Group: CORE COURSES

Course Objectives:

- To learn computer programming using the Java programming language and the Java Platform, Standard Edition (Java SE).
- To learn the fundamentals of object-oriented programming.
- Learning to write object-oriented programs in Java. Knowledge of important features of the Java SE platform
- Learning to develop graphical programs using Java.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Concepts of Object Oriented Programming (OOP): Object and Class, Encapsulation, Data Abstraction, Inheritance, Polymorphism, Dynamic Binding, Message Communication, Benefits of OOP, Applications of OOP . Introduction to Java : History of Java, Salient features of Java, How Java Differs from C, Java and Internet, Java and World Wide Web, Java Development Kit, Using JDK's Command-line tools, Application Programming Interface. A Simple Java Program, Identifying a Class, Using predefined classes, Defining your own Class, Object Construction, Access Specifiers, Data types, Variables and Constants, Operators, Strings & String Buffer, Input & Output, Control Flow, Arrays, Conversions, Static Fields & Methods, Constructors, Packages, Documentation Comments	15



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2	Introduction to Object-Oriented Programming :Classes, Super Classes & Subclasses, Object – The Universal Superclass, Wrapper Classes, Inheritance and polymorphism, method overriding - Final and abstract classes, abstract methods, Interface Concept, Properties of Interfaces, Interfaces and Abstract Classes, Static and Private Methods, Default Methods, Interfaces and Callbacks, Object Cloning, The Comparator Interface, Generics, enumeration, Inner classes and anonymous classes , Class loaders, class path	15
3	More Features of the Java Platform :Java Collection Framework: Separating Collection Interfaces and Implementations, Exception handling ,Input-output and file handling, Multithreading, Lambda Expression: Why Lambdas?, Syntax Of Lambda Expression, Functional Interfaces, Method References, Constructor References, Variable Scope, Processing Lambda Expressions	15
4	Developing Graphical Programs : An introduction to graphics in Java ,Brief introduction to AWT, The Swing library , Writing graphical programs using Swing , Using various Swing components , Managing layout using Swing , Event handling using Swing Java Networking : Introduction to Networking, Introduction to Client/Server Programming, Introduction to Socket Programming.	15

Reference Books:

1	Java the complete reference, 8 th edition by Herbert Schildt
2	E Balagurusamy, Programming with Java; Tata McGraw Hill
3	Y. Danial Liang, Introduction to Java Programming; Pearson
4	Rajkumar Buyya, Object Oriented Programming with Java; Tata McGraw Hill
5	Cays Horstmann, Gary Cornell, Core Java volume I & II; 11th ed.; Pearson Education

Supplementary learning Material:

1	www.javatpoint.com
2	https://docs.oracle.com/javaee/6/tutorial/doc/bnafd.html
3	www.tutorialspoint.com
4	www.geeksforgeeks.org/java
5	https://www.edureka.co/blog/advanced-java-tutorial

Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.



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2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
10	40	20	10	10	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Develop computer programs using the Java programming language and the Java SE platform.	25
CO-2	Gain an understanding of fundamental object-oriented programming concepts. Develop object-oriented software in java.	25
CO-3	Display knowledge of multithreading, file handling and network programming in Java	25
CO-4	Develop GUI programs in Java.	25

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	December 2023
Last Reviewed on (Month-Year):	January 2024
Next Review on (Month-Year):	January 2025



FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550122

Course Title: Python – Beginner to Professional

Course Group: CORE COURSES

Course Objectives:

1. To test and debug code written in python
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To perform file operations to read and write data in files; To perform object oriented programming and build up python programs.
4. To be able to draw various kinds of data visualization techniques using Numpy, Pandas and matplotlib

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to Python Programming: Getting Familiar with Python Overview; Installing Python on Windows; Anaconda and Jupyter Notebooks; Comments; Python Syntax; Line Structure; Joining Lines; Multiple Statements on a Single Line; Indentation; Basic Data Types: Basic Data Types Overview; String Overview; String Manipulation; String Indexing; String Slicing; Printing; Python Variables; Integers and Floats; Booleans Python Operators: Python Operators Overview ; Comparison Operators; Arithmetic Operators; Assignment Operators; Logical Operators; Identity Operators; Membership Operators; Bitwise Operators	15



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2	Advanced Data Types : Python Advanced Data Types Overview; Sets; List Overview; List Slicing and Indexing; Tuples; Dictionaries Control Flow Part: Intro to Control Flow; Conditional Statements; For Loops; While Loops; Break Statements; Continue Statements; List Comprehension Python Functions: Introduction to Functions; Python help Function; Defining Functions; Variable Scope; Lambda Functions; Functions args; Iterators; Map Function; Filter Function; User Input & Error Handling: Introduction to Error handling; User input; Syntax Errors; Exceptions;	15
3	Python File Handling: Python Read Files; Python Write/Create Files; Python Delete Files Python OOP Programming: Python OOPs Concepts; Python Classes and Objects; Constructors in Python; Destructors in Python; Inheritance in Python; Types of inheritance Python; Encapsulation in Python; Polymorphism in Python; Class or Static Variables in Python; Class method vs Static method in Python; Python Polymorphism	13
4	Modules & Packages: Working with Modules; Working with Packages; Data Science and Data Visualization using Python Python Libraries: Standard Libraries; Third Party Libraries Introduction to Numpy; Use of Numpy; NumPy Creating Arrays; NumPy Array; Indexing; NumPy Array Slicing; NumPy Data Types; NumPy Array Shape; NumPy Array Reshape; NumPy Array Iterating; NumPy Array Join; NumPy Array Split; NumPy Array Search; NumPy Array Sort; NumPy Array Filter Introduction to Pandas; Use of Pandas; Pandas Series; Pandas DataFrames; Pandas Read CSV; Pandas Analyzing Data Cleaning ; Cleaning Empty Cells; Cleaning Wrong Format; Cleaning Wrong Data; Removing Duplicates; Pandas Plotting Introduction to Matplotlib: Use of IntroMatplotlib; Get StartedMatplotlib Pyplot; Matplotlib Plotting; Matplotlib Markers; Matplotlib Line; Matplotlib Labels; Matplotlib Grid; Matplotlib Subplot; Matplotlib Scatter; Matplotlib Bars; Matplotlib Histograms; Matplotlib Pie Charts	17

Reference Books:

1	John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2	Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall
3	Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication
4	Luke Sneeringer, "Professional Python", Wrox
5	Daniel Y Chen, Pandas for Everyone: Python Data Analysis, 1st Edition, Pearson Education

Supplementary learning Material:

1	Charles Severance, Python for informatics: www.pythonlearn.com
2	Swaroop C H. "A Byte of Python", http://www.swaroopch.com/notes/python
3	"Python Programming", http://en.wikibooks.org/wiki/Python_Programming
4	"The Python Tutorial", http://docs.python.org/release/3.0.1/tutorial/
5	"Learn Python the Hard way", http://learnpythonthehardway.org/
6	Dive into Python 3: http://www.diveintopython.net/



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Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Papers are part of the internal evaluation.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	40	15	15	5	5	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Ability to create robust applications using the Python programming language	25
CO-2	Ability to create applications for solving computational problems using the Python Programming Language	25
CO-3	Ability to perform file operations to read and write data in files; To apply object oriented programming concepts and build up python programs.	25
CO-4	Ability to apply Data Science and Data Visualization using Python	25

Curriculum Revision:

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550123

Course Title: Operating System

Course Group: Core Courses

Course Objectives:

- a) Understanding of Operating System concepts like:
- b) Architecture, Structure, Operations
- c) Services, Interface, System calls, Design and Implementation
- d) Process Management, Multithreading, Process Scheduling, Synchronization, Deadlock and Memory management

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction: Define: Operating System (OS), Computer-system: Organization, Architecture, OS Structure and Operations System Structure: OS Services, User Operating System Interface, System calls, System services, OS: Design and Implementation Processes: Concept and Scheduling, Operations on Processes, Interprocess communication Thread and Concurrency: Overview, Multicore programming, Multithreading models	20
2	CPU Scheduling: Basic concepts, Scheduling criteria and algorithms, Thread scheduling Synchronization Tools: Introduction, The criteria-section problem, Peterson's solution, Hardware support for synchronization, Mutex locks, Semaphores, Monitors, Synchronization examples	20



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3	Deadlocks: System Model, Deadlock in multithreaded applications, Deadlock characterization, Methods for handling deadlocks, Deadlock: Prevention, Avoidance, Detection and Recovery	10
4	Memory Management: Main Memory – Introduction, Contiguous memory allocation, Paging, Structure of Page Table, Swapping Virtual Memory – Introduction, Demand paging, Copy-on write, Page replacement, Allocation frames, Thrashing and Memory compression	10

Reference Books/Audio-visual Course:

1	Operating System Principles, ABRAHAM SILBERSCHATZ, PETER BAER GALVIN, GREG GAGNE, WILEY-INDIA EDITION
2	Tanenbaum A.S., “Modern Operating Systems”, 4th Edition, PHI, 2001
3	Flynn I.M, “Understanding Operating Systems”, Cengage India Publication
4	Bach M J, “The Design of UNIX Operating System”, Prentice Hall India, 1993.

Supplementary learning Material:

1	https://nptel.ac.in/courses/106105214
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Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom’s Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	40	15	15	5	5	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Basic of Operating System, Role and purpose of OS, Interaction between user application, OS and hardware architecture.	25
CO-2	Operating System – Process Management in details	25
CO-3	Ability to understand: Synchronization and deadlock	25
CO-4	Optimize Memory Operations and Optimization, Application of Virtual Memory	25

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)
Semester: I
Course Code: 101550124
Course Title: Practical based on Java – Beginner to Professional
Course Group: CORE COURSES

Course Objectives:

1. To prepare students to become familiar with the Standard Java technologies of J2SE and OOPs concepts.
2. To provide Students with a solid foundation in Core Java to Advanced Java.
3. To train Students with good java programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
4. To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
5. To provide student with an academic environment aware of excellence, written ethical codes and guidelines and lifelong learning needed for a successful professional career.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorials	Practicals		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	8	4	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P: Practical

List of Practicals / Tutorials:

To practice basic problem definitions, refer “w3schools” learning portal. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

Reference Books:



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1	Java the complete reference, 8 th edition by Herbert Schildt
2	E Balagurusamy, Programming with Java; Tata McGraw Hill
3	Y. Danial Liang, Introduction to Java Programming; Pearson
4	Rajkumar Buyya, Object Oriented Programming with Java; Tata McGraw Hill
5	Cays Horstmann, Gary Cornell, Core Java volume I & II; 11th ed.; Pearson Education

Supplementary learning Material:	
1	https://www.w3schools.com/java
2	https://docs.oracle.com/javaee/6/tutorial/doc/bnafd.html
3	www.tutorialspoint.com
4	www.javatpoint.com
5	https://www.edureka.co/blog/advanced-java-tutorial

Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation.
5. The course includes a laboratory, where students have an opportunity to build a lab index for the concepts being taught in lectures/lab demonstrations.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Implement Java programs using the Java Programming language	20



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CO-2	Gain an understanding of fundamental object-oriented programming concepts. Develop object-oriented software in java.	40
CO-3	Demonstrate multithreading, file handling, network programming, exception handling etc.	25
CO-4	Develop GUI programs in Java.	15

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FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550125

Course Title: Practical Based on Python – Beginner to Professional

Course Group: CORE COURSES

Course Objectives:

- Strong foundation in the Python Programming
- To test and debug code written in python
- To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
- To perform file operations to read and write data in files; To perform object oriented programming and build up python programs.
- To be able to draw various kinds of data visualization techniques using Numpy, Pandas and matplotlib

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P:Practical

List of Practical:

To practice <https://www.python.org/doc/>. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

Reference Books:

1	Beginning Python, wrox
2	Let Us Python, Yashavant Kanetkar and Aditya Kanetkar, bpb
3	Programming in Python 3- A Complete Introduction to Python Language, Mark Addition-Wesley

Supplementary learning Material:

1	https://www.python.org/doc/
2	https://www.coursera.org/
3	https://nptel.ac.in/courses/106106145

Pedagogy:



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- Explain / justify all the Program Definitions and correlate to real world problems and solution
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Basic Python Programming & different models of Programming. Understand and implement identifiers, keyword, variables, Data types and Input / Output	25
CO-2	Understanding and able to implement: String and their operations, Flow Control Programs, Built-in & User-defined function with or without recursion.	25
CO-3	Learn application and implementation File handling and OOPS concepts.	25
CO-4	Able to understand and use built-in modules and packages, and efficiently Practice for namespace.	25

Curriculum Revision:

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550126

Course Title: WEB PROGRAMMING CONCEPTS - BEGINNER TO PROFESSIONAL

Course Group: CORE COURSES

Course Objectives:

- Understand the various concepts of the javascript at client side operation managing. Use the JavaScript to develop the validation in web pages.
- Understanding the jQuery – A javascript library with its various concepts like event, effects, callback, chaining and etc.
- Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
- Understands the Advanced PHP and implement the cookies, sessions and OOP concepts.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P:Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to JavaScript: Features, DOM, Methods to Implement JavaScript, Arrays, Functions, Dialogue Boxes, Events, Methods and Validations in JavaScript Introduction to jQuery: jQuery Intro, jQuery Syntax, jQuery Selectors jQuery Events: mouse events, key events, other event	12
2	jQuery HTML/CSS: html(), text(), val(), css(), attr(), prepend(), append(), insert(), remove() jQuery Effects: hide, show, fade, slide, animate, callback, chaining	15
3	Server Side Programming with PHP : Introduction to Open Source , Advantages and Capabilities of Open Source , Introduction to PHP ,Data Types, Variables, Constants, Operators, Flow Control and Looping ,Strings, Arrays, Functions ,Working with Forms PHP and MySQL: Introduction to MySQL: Features, Connection to Server, Creating Database, Selecting A Database, Listing Database, Listing Table Names, Creating a Table, Inserting Data, Altering Tables, Queries, Deleting Database, Deleting Data and Tables, PHP Myadmin And Database Bugs	18



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4	Advanced PHP: Cookies: Creating Cookies, Reading from Cookies, Adding Parameters to a Cookie, Deleting a Cookie Sessions: Creating a Session, Accessing Session Variables, Deleting a Session, File Handling, Error Handling, Exception	15
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Reference Books:

1	Beginning PHP6, Apache, MySQL Web development, wrox – Wiley India Pvt. Ltd.
2	Professional PHP Programming, wrox – Wiley India Pvt. Ltd.
3	PHP and MySQL Create – Modify – Reuse, wrox – Wiley India Pvt. Ltd.
4	jQuery Cookbook – O’ reily – Shroff Publishers & Distributers Pvt. Ltd.
5	Web Development with jQuery, wrox – Wiley India Pvt. Ltd.

Supplementary learning Material:

1	https://www.w3schools.com/php/default.asp
2	https://spoken-tutorial.org/tutorial-search/?search_foss=PHP+and+MySQL&search_language=English
3	https://www.javatpoint.com/php-tutorial
4	https://www.javatpoint.com/jquery-tutorial

PHP and

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom’s Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	40	15	15	5	5	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Applying JavaScript in web design principles to make pages effective at client side operations.	25
CO-2	Developing interactive web page applying the various techniques and concepts of the jQuery(javascript library).	25
CO-3	Develop the server side PHP scripts using various features for creating customized web applications using database connectivity.	25
CO-4	Develop a web application using advanced web programming features.	25

Curriculum Revision:

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Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550127

Course Title: PRACTICAL BASED ON WEB PROGRAMMING CONCEPTS - BEGINNER TO PROFESSIONAL

Course Group: CORE COURSES

Course Objectives:

- Understand the various concepts of the javascript at client side operation managing. Use the JavaScript to develop the validation in web pages.
- Understanding the jQuery – A javascript library with its various concepts like event, effects, callback, chaining and etc.
- Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
- Understands the Advanced PHP and implement the cookies, sessions and OOP concepts.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P:Practical

List of Practical:

Below mentioned problem definitions are for basic practice. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

1	To implement an arrays in JavaScript.
2	To implement functions in JavaScript.
3	Develop and demonstrate JavaScript with POP-UP boxes.
4	Write the HTML and JavaScript code to validate the required items using regular expression only.
5	To implement an events in JavaScript.
6	Alert the appropriate message when document is fully loaded and in ready state.
7	Hide all the <p> elements immediately after document loaded.
8	Hide all the tag whose id is "selected" when document is loaded (Take different tab with same id like h2,h3,p, etc.).
9	Hide all the tag whose class is "selected" when document is loaded (Take different tab with same class like h2,h3,p, etc.).
10	Change the text of <p> tag whose id is "msg" when document is loaded.



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Aegis: Charutar Vidya Mandal (Estd.1945)

11	Change the text of <p> tag whose class is "msg" when document is loaded.
12	Change the text of <p> tag when button is clicked.
13	Swap the value of two <p> tags when button is clicked.
14	Set any value in input box when document is loaded.
15	Set any value in input box when user got focus on it (focus()).
16	Take value from the user in input box and display it in the <p> tag when text box lost the focus (blur()).
17	Demonstrate the function of three buttons for three different selectors (like element, id, class). First button is for hide elements, second is for hide ids, and third is for hide class.
18	Take any element as value in input box and hide all that elements when user clicked.
19	Take color as a value from user in input box and change background color when user clicked the button.
20	Change the background color as per selection of radio button among four radio button as red, blue, green, none (white).
21	To Install and configure PHP, web server and MYSQL.
22	To implement the data types in PHP.
23	To implement a PHP program to demonstrate the use of Decision making control structures using a. If statement b. If-else statement c. Switch statement
24	To implement a PHP program to demonstrate the use of Looping structures using a. While statement b. Do-while statement c. For statement d. Foreach statement
25	To implement a PHP program for creating and manipulating a. Indexed array b. Associative array c. Multidimensional array
26	To implement a Registration form and apply validation in PHP
27	To Implement the web applications with Database using (a) PHP
28	To implement the cookies in PHP program.
29	To implement the session in PHP program.
30	To implement an object oriented programming in PHP.

Reference Books:

1	Beginning PHP6, Apache, MySQL Web development, wrox – Wiley India Pvt. Ltd.
2	Professional PHP Programming, wrox – Wiley India Pvt. Ltd.
3	PHP and MySQL Create – Modify – Reuse, wrox – Wiley India Pvt. Ltd.

Supplementary learning Material:

1	https://www.w3schools.com/php/default.asp
2	https://spoken-tutorial.org/tutorial-search/?search_foss=PHP+and+MySQL&search_language=English
3	https://www.javatpoint.com/php-tutorial
4	https://www.w3schools.com/css/default.asp
5	https://www.w3schools.com/js/default.asp

Pedagogy:



CVM UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

- Explain / justify all the Program Definitions and correlate to real world problems and solution
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Applying JavaScript in web design principles to make pages effective at client side operations.	25
CO-2	Developing interactive web page applying the various techniques and concepts of the jQuery(javascript library).	25
CO-3	Develop the server side PHP scripts using various features for creating customized web applications using database connectivity.	25
CO-4	Develop a web application using advanced web programming features.	25

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	December 2023
Last Reviewed on (Month-Year):	January 2024
Next Review on (Month-Year):	January 2025



CVM
UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550128

Course Title: Data Structure

Course Group: Elective Courses

Course Objectives:

- a) Application of different Data Structure.
- b) Ability to implement different Data Structure operations.
- c) Understand Sorting and Searching Techniques.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Data Structure: Introduction, Data Types – primitive and non-primitive, Constants, Variables and Expressions, Types of Data Structure – Linear and Nonlinear Data Structure	05
2	Linear Data Structure: Array, Structure, Stack – Definition, Operations, Polish Expressions, Queue, Circular Queue, Priority Queue, Singly Linked List, Doubly Linked List, Application of Linked List	18
3	Nonlinear Data Structure: Tree – Definition and concepts, Operations on Binary Tree, Storage representation and manipulation of Binary Tree, Conversion of General Tree to Binary Tree, Applications of Binary Tree, Multilinked Structures – Sparse Matrix and Index Generation Graphs – Definition and concepts, Matrix representation, List structure, Breadth First Search, Depth First Search, Applications of Graphs	20



4	Sorting and Searching: Introduction, Sort – Bubble, Selection, Merge, Quick, Search – Sequential, Binary, Hash-Table Methods	17
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Reference Books/Audio-visual Course:

1	An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill
2	Data Structures using C & C++ -By Ten Baum Publisher – Prentice-Hall International
3	Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub. 2001 ed.
4	Fundamentals of Data Structures in C++-By Sartaj Sahani
5	Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher Thomson Learning

Supplementary learning Material:

1	https://www.javatpoint.com/data-structure-tutorial
2	https://www.tutorialspoint.com/data_structures_algorithms/index.htm
3	https://www.programiz.com/dsa/data-structure-types

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	40	15	15	5	5	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Basic understanding as well revision of DBMS, RDBMS, Normalization, DQL, DDL, DML and DCL, Able to perform CRUD Operation with some advanced case studies regarding RDBMS	25
CO-2	Understanding: Indexing and its application, view and sequences. Able to manage access of data to different users, Advantage of PL/SQL over SQL	25
CO-3	Transaction with dataset, Manage control over data through locking to avoid data loss or data inconsistency, Exception handling	25
CO-4	Application of Procedure, Function and Trigger	25

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	December 2023
Last Reviewed on (Month-Year):	January 2024
Next Review on (Month-Year):	January 2025



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UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: I

Course Code: 101550129

Course Title: Practical Based on Data Structure

Course Group: Elective Courses

Course Objectives:

- a) Application of different Data Structure.
- b) Ability to implement different Data Structure operations.
- c) Understand Sorting and Searching Techniques.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P: Practical

List of Practical:

Implement all the Programs in C / C++:

Below mentioned problem definitions are for basic practice. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

1	Write a program to do the operations on Stack: PUSH, POP, ISEMPY, ISFULL, PEEP
2	Write a program to do the following: a. Convert infix arithmetic expression into prefix arithmetic expression Convert infix arithmetic expression into postfix arithmetic expression
3	Write a program to evaluate Prefix, Postfix and Infix arithmetic expression.
4	Write a program to insert and remove an element from Queue and Circular Queue a. Using array Using Linked List
5	Write a program to perform following operations on singly linked list and doubly linked list: Insert an element, Remove an element, Count number of nodes, Search an element, Copy of linked list
6	Write a program to create a binary tree and print it's elements in inorder, preorder and postorder



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7	Write a program to do following sorting: Bubble, Selection, Quick, Merge
8	Write a program to search an element in a given list: Linear Search, Binary Search
9	Write a program to demonstrate Hashing and Collision Resolution

Reference Books/Audio-visual Course:

1	An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill
2	Data Structures using C & C++ -By Ten Baum Publisher – Prentice-Hall International
3	Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub. 2001 ed.
4	Fundamentals of Data Structures in C++-By Sartaj Sahani
5	Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher Thomson Learning

Supplementary learning Material:

1	https://www.javatpoint.com/data-structure-tutorial
2	https://www.tutorialspoint.com/data_structures_algorithms/index.htm
3	https://www.programiz.com/dsa/data-structure-types

Pedagogy:

- Explain / justify all the Program Definitions and correlate to real world problems and solution
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Skill to classify different data structures and required operations	25
CO-2	Different linear data structures with their representation, applications and operations on them	25
CO-3	Different nonlinear data structures with their representation, applications and operations on them	25
CO-4	Applications of Sorting and Searching Techniques	25

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	December 2023
Last Reviewed on (Month-Year):	January 2024
Next Review on (Month-Year):	January 2025



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UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550221

Course Title: Databases – Beginner to Professional

Course Group: Core Courses

Course Objectives:

- Implement different features of Databases based on software application
- It helps to developer to build applications, administrators to protect data integrity and build fault-tolerance environments
- Exploring knowledge of Relational Databases and NoSQL Databases.
- Application of RDBMS and NoSQL

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100 / 40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Basics Introduction, History Getting Started Architectural Fundamental, Creating Database, Accessing Database, Introduction Concepts of SQL Language The SQL Language – I [PostgreSQL] SQL Syntax Lexical Structure, Value Expression, Calling Function Data Types Numeric, Monetary, Character, Binary, Date/Time, Boolean, Enumerated, Geometric, Network Address, Bit String, Text Search, UUID, XML, JSON, Arrays, Composite, Range, Domain, Object Identifier, pg_Isn, Pseudo Data Definition Table Basics, Default Values, Generated Columns, Constraints, System Columns, Modifying Tables, Privileges, Row Security Policies, Schemas, Inheritance, Table Partitioning, Foreign Data, Other Database Object Data Manipulation Insert, Update, Delete, Returning Data from Modified Rows	15



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Aegis: Charutar Vidya Mandal (Estd.1945)

2	The SQL Language – II [PostgreSQL] Queries Table Expression, Select Lists, Combining Query, Sorting Rows, LIMIT and OFFSET, Values List, WITH Queries Operators & Built-in Functions Logical Operators, Comparison Operators, Mathematical Functions and Operators, Mathematical Functions and Operators, String Functions, Data Types Formatting Functions, Date / Time Functions	15
3	NoSQL Introduction, Definition, History, ACID vs BASE, Advantages and Disadvantages, SQL vs NoSQL, Categories of NoSQL Mongo DB Introduction, History, Design Philosophy, Compare with SQL, Data Model, Installation and configuration Mongo DB Shell Basic Querying, Conditional operators, Regular expression, MapReduce, Relational data modeling approach and normalization, Document data model approach	15
4	Mongo DB Architecture Core processes: mongod, mongo, mongos, Mongo DB tools, Standard deployment, Replication, Sharding, Production cluster architecture Mongo DB Data storage engine, Data file, Reads and writes, Data written using Journaling, GridFS – Mongo DB File System, Indexing Administering Mongo DB Tools, Backup and Recovery, Importing and Exporting, Managing the server, Monitoring	15

Reference Books:

1	PostgreSQL 15.3 Documentation, The PostgreSQL Global Development Group, https://www.postgresql.org/docs
2	PostgreSQL – A comprehensive guide to building, programming, and administering PostgreSQL databases, Korry Douglas, Susan Douglas, SAMS
3	Practical Mongo DB – Architecting, Developing, Administering Mongo DB, Shakuntala Gupta Edward Navin Sabharwal, Apress
4	Mongo DB in Action, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garret, Tim Hawkins, MANNING Shelter Island

Supplementary learning Material:

1	https://spoken-tutorial.org/
2	https://swayam.gov.in/explorer
3	MongoDB Documentation
4	MongoDB Tutorial (w3schools.com)
5	MongoDB Tutorial: What It is and Features - javatpoint

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):



CVM UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
15	15	20	30	10	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	% weightage
CO-1	Learn basics of PostgreSQL and SQL Syntax with required terms, Exploring data types Understanding with hands-on, to explore – Data Definition and Data Manipulation based on case studies and practical examples	25
CO-2	Understanding with hands-on, to explore – Operators & Built-in Functions	25
CO-3	Introduction of NoSQL and comparison of SQL and NoSQL. Understanding of NoSQL data model.	25
CO-4	Understanding of MongoDB Architecture and Shell. Concept of MongoDB Administration.	25

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	December 2023
Last Reviewed on (Month-Year):	January 2024
Next Review on (Month-Year):	January 2025



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550222

Course Title: Full Stack Web Development

Course Group: CORE COURSES

Course Objectives:

- a) React makes painless to create interactive UIs and efficiently update & render just the right components when data changes.
- b) Build Interactive Single Page Web Sites / Web Applications as per IT Industry requirements.
- c) Understand technical concepts of Node JS and Construct a Node application in modules.
- d) Build Node JS Web Server, Manage NPM and Database Connectivity, and Build Interactive Single Page Web Sites / Web Applications as per IT Industry requirements.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction: Define React, Concepts and terminology ES6: Class, constructor, functions, arrow function, variables, modules, operators JSX: Introduction and fundamentals, JSX Transformer, Attributes Core React: Syntax, Components, Components - Properties and Methods, Lifecycle and rendering, Elements, Factories	12
2	Flux: Introduction, Components, Structure a React Application Applications: Create React elements with JS and JSX, Create and update React components, Use React components with another library, Test React Application	15
3	Introduction: What is Node JS?, Advantages & Features of Node JS, REPL Terminal Node Package Manager (NPM):	18

	Introduction, Install & uninstall modules [Globally and Locally], Application of package.json, Create, Update and Search modules Function and Event: Introduction, Callback concepts, Events and Event Emitter Buffers: Introduction, Buffer: Create, Write, Read, Copy, Slice, Concatenate, Convert buffer to JSON Streams: Introduction, Read, Write, Piping and Chaining Streams	
4	File System: Introduction, Get file information, Read, Write, Truncate, Delete file, Directory: Create, Read and Remove Global Objects: Introduction, Types of object: Global, Console, Process Modules: Introduction, Utility Modules: Path, OS, Net, DNS, Domain, Web Modules: Introduction, Create, Make a request Debugging & Error Handling: Introduction & implementation: Debugging and Error Handling Database Connectivity: Introduction, CRUD Operation	15

Reference Books:

1	React.js Essentials, PACKT, Alex Bush
2	Introduction to React, Apress, Cory Gackenhimer
3	Learning React, O'REILLY, Alex Banks, Eve Porcello
4	Beginning Node.js, Apress, Basarat Ali Syed
5	Pro Node.js for Developers, Apress, Colin J. Ihrig
6	Learning Node.js Development, Packt, Andrew Mead
7	Mastering Node.js, Packt, Sandro Pasquali

Supplementary learning Material:

1	https://reactjs.org/
2	https://www.w3schools.com/REACT/DEFAULT.ASP
3	https://www.javatpoint.com/reactjs-tutorial
4	https://nodejs.org/en/docs/
5	https://www.w3schools.com/nodejs/
6	https://www.javatpoint.com/nodejs-tutorial

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	



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20	40	15	15	5	5
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Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	React helps in development by easing common tasks in the majority of web projects. Applying ES6, JSX, and Virtual DOM concepts in web projects.	25
CO-2	React is helpful to make web project more reliable because it offers variety in terms of tools and resources. Understanding the architecture and case studies.	25
CO-3	Basic of Node.js & its terminal, NPM to manage different Node.js modules and packages. Application and implementation of Function, Event, Buffer and Stream.	25
CO-4	Handle the File-System, Global objects, Module(s) and Errors, Debug the Node.js Program. Modules and Database connectivity discussion.	25

Curriculum Revision:

Version:	1.0
Drafted on (Month-Year):	December-2022
Last Reviewed on (Month-Year):	January-2023
Next Review on (Month-Year):	April-2023



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UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550223

Course Title: Software Testing and Quality Assurance

Course Group: CORE COURSES

Course Objectives:

- a) To learn Basic Concepts of Software Testing and Software Quality Assurance.
- b) To learn the concept White box testing techniques and black box testing techniques.
- c) Learning the System test design, planning and automation.
- d) Learning to various standards of Software quality

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Basic Concepts of Software Testing and Software Quality Assurance : Introduction to testing and its importance in software development, software testing role, responsibilities and principles, concept of quality, Verification and Validation, Design test case, Introduction to Static Techniques and Dynamic test case design techniques .Concept of Software Quality, Design test case: Stateless and State oriented test cases sources of Information for Test Case Selection, brief outline of levels of testing, overview of White Box, Black Box and Grey Box Testing.	16



2	White Box Testing Techniques : Overview of White Box, Control flow testing: Statement Coverage Testing, Branch Coverage Testing, Path Coverage Testing, Conditional Coverage Testing Data flow testing: Data Flow Anomaly, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms, Data Flow Testing Criteria. Black Box Testing Techniques: Overview of Black Box: Equivalence Class Partition, Boundary Value Analysis, Pairwise Technique, Cause Effective Graph, Decision Table.	14
3	System Test Design, Planning & Automation : Test Design Factors, Requirement Identification, Characteristics of Testable Requirements, Test Design Preparedness Metrics, Test Case Design Effectiveness Structure of a System Test Plan, Introduction and Feature Description, Assumptions, Test Approach, Test Suite Structure, Test Environment, Test Execution Strategy, Test Effort Estimation, Scheduling and Test Milestones, System Test Automation, Evaluation and Selection of Test Automation Tools, Test Selection Guidelines for Automation, Characteristics of Automated Test Cases, Structure of an Automated Test Case, Test Automation Infrastructure	12
4	System Test Execution & Acceptance Testing : Preparedness to Start System Testing, Metrics for Tracking System Test, Metrics for Monitoring Test Execution, Beta Testing, First Customer Shipment, System Test Report, Product Sustaining, Measuring Test Effectiveness. Types of Acceptance Testing, Acceptance Criteria, Selection of Acceptance Criteria, Acceptance Test Plan, Acceptance Test Execution, Acceptance Test Report, Acceptance Testing in extreme Programming. Software Quality Assurance: Five Views of Software Quality, McCall's Quality Factors and Criteria, Quality Factors Quality Criteria, Relationship between Quality Factors and Criteria, Quality Metrics, Quality Characteristics, Software Quality ISO Standards. Elements of Software Quality Assurance, SQA Task, Goals and Metrics, Formal approaches to SQA, Statistical Software Quality Assurance, Software Reliability, SQA Plan.	18

Reference Books:

1	Sagar Naik, Piyu Tripathy: Software Testing and Quality Assurance, Theory and Practice, Wiley, 2008.
2	Roger S Pressman: Software Engineering - A Practitioner's Approach, 7th Edition, McGRAW HILL International Edition, 2010
3	Lee Copeland: A Practitioner's Guide to Software Test Design, Artech House Publishers, 2004.
4	Software Testing Principles and Practices - By Naresh Chauhan, Oxford
5	Effective Methods of Software Testing (3rd Edition) - By William E Perry Wiley, India
6	Paul C. Jorgensen : Software Testing: A Craftsman's Approach, 4th Edition by , CRC press, Taylor and Francis Group, 2014

Supplementary learning Material:

1	https://www.geeksforgeeks.org/software-engineering-white-box-testing/?ref=lbp [Introduction to Software Testing]
2	https://www.cs.ccu.edu.tw/~naiwei/cs5812/st7.pdf [Finite State Machine Testing]
3	http://tryqa.com/what-is-software-testing [Basic of Software Testing]
4	https://www.guru99.com/functional-testing.html [Functional Testing]



5	http://www.softwaretestinggenius.com/download/bgstpadmini.pdf [Software Testing Life Cycle]
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Pedagogy:

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed. The assessment and evaluation process will be broadly classified with the following 02 components viz.,:

1. In- Semester continuous Internal assessment and evaluation, and
2. End- Semester final examination

The weightage of internal assessment for theory/practical course will be 40%.

However, the remaining 60% weightage for theory/practical courses will be for End-Semester final examination, both evaluation two (02) hours duration for theory and three (03) hours for practical.

In-Semester Continuous internal evaluation:

1. One Internal exam will be conducted as a part of internal theory/practical evaluation.
2. Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
3. Weekly Tests/Quizzes/Seminar/Attendance will be considered in the overall internal evaluation.
4. Presentation/Online Course Work/Research Paper are part of the internal evaluation.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
10	40	20	10	10	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Able to understand basic concepts of software quality and testing	25
CO-2	Familiar with concept of white box testing techniques and black box testing techniques.	25
CO-3	Familiar with different concepts of software testing techniques ,System Test Design, Planning & Automation	25
CO-4	Able to understand various standards of quality	25

Curriculum Revision:

Version:	1
Drafted on (Month-Year):	December 2023
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Next Review on (Month-Year):	January 2025



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550224

Course Title: Practical Based on Databases – Beginner to Professional

CourseGroup: CORE COURSES

Course Objectives:

- Exploring knowledge of Relational Databases and NoSQL Databases.
- Application of RDBMS and NoSQL
- Implement different features of Databases based on software application
- It helps to developer to build applications, administrators to protect data integrity and build fault-tolerance environments

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P:Practical

List of Practical:

To practice basic problem definitions, refer “w3schools” learning portal. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

Reference Books:

1	PostgreSQL 15.3 Documentation, The PostgreSQL Global Development Group, https://www.postgresql.org/docs
2	PostgreSQL – A comprehensive guide to building, programming, and administering PostgreSQL databases, Korrry Douglas, Susan Douglas, SAMS
3	Practical Mongo DB – Architecting, Developing, Administering Mongo DB, Shakuntala Gupta Edward Navin Sabharwal, Apress
4	Mongo DB in Action, Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garret, Tim Hawkins, MANNING Shelter Island

Supplementary learning Material:



CVM UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

1	https://spoken-tutorial.org/
2	https://swayam.gov.in/explorer
3	MongoDB Documentation
4	MongoDB Tutorial (w3schools.com)
5	MongoDB Tutorial: What It is and Features - javatpoint
Pedagogy:	
• Explain / justify all the Program Definitions and correlate to real world problems and solution • Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment • Internal / External Examination as per the norms of CVM University	

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn basics of PostgreSQL and SQL Syntax with required terms, Exploring data types Understanding with hands-on, to explore – Data Definition and Data Manipulation based on case studies and practical examples	25
CO-2	Understanding with hands-on, to explore – Operators & Built-in Functions	25
CO-3	Introduction of NoSQL and comparison of SQL and NoSQL. Understanding of NoSQL data model.	25
CO-4	Understanding of MongoDB Architecture and Shell. Concept of MongoDB Administration.	25

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Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550225

Course Title: Practical Based on Full Stack Development

CourseGroup: CORE COURSES

Course Objectives:

- React makes painless to create interactive UIs and efficiently update & render just the right components when data changes.
- Build Interactive Single Page Web Sites / Web Applications as per IT Industry requirements.
- Understand technical concepts of Node JS and Construct a Node application in modules.
- Build Node JS Web Server, Manage NPM and Database Connectivity, and Build Interactive Single Page Web Sites / Web Applications as per IT Industry requirements.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P: Practical

List of Practical:

To practice basic problem definitions, refer “w3schools” learning portal. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

Reference Books:

1	Beginning PHP6, Apache, MySQL Web development, wrox – Wiley India Pvt. Ltd.
2	Professional PHP Programming, wrox – Wiley India Pvt. Ltd.
3	PHP and MySQL Create – Modify – Reuse, wrox – Wiley India Pvt. Ltd.

Supplementary learning Material:

1	https://www.w3schools.com/php/default.asp
2	https://spoken-tutorial.org/tutorial-search/?search_foss=PHP+and+MySQL&search_language=English
3	https://www.javatpoint.com/php-tutorial
4	https://www.w3schools.com/css/default.asp



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5	https://www.w3schools.com/js/default.asp
Pedagogy:	
• Explain / justify all the Program Definitions and correlate to real world problems and solution • Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment • Internal / External Examination as per the norms of CVM University	

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	React helps in development by easing common tasks in the majority of web projects. Applying ES6, JSX, and Virtual DOM concepts in web projects.	25
CO-2	React is helpful to make web project more reliable because it offers variety in terms of tools and resources. Understanding the architecture and case studies.	25
CO-3	Basic of Node.js & its terminal, NPM to manage different Node.js modules and packages. Application and implementation of Function, Event, Buffer and Stream.	25
CO-4	Handle the File-System, Global objects, Module(s) and Errors, Debug the Node.js Program. Modules and Database connectivity discussion.	25

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550226

Course Title: PHP FRAMEWORK

Course Group: Core Courses

Course Objectives:

- Understand technical concepts of Laravel Framework
- To learn built-in authentication and authorization
- Artisan console & Task scheduling and MVC
- Build Interactive Single Page Web Sites / Web Applications as per IT Industry requirements

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100/40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction: Use of Laravel, How it Works!, Configure Laravel Environment, Directory Structure Route and Controllers: Route: Definitions, Group, Signed route, Model binding, Caching Controller: User input, Inject dependencies Form method spoofing, Redirects, Aborting the request, Custom Response	15
2	Control Structure: Echoing data, Conditions and Loops, Template inheritance, View composer and Service Injection Databases and Eloquent: Configuration, Seeding, Query builder, Eloquent: Introduction, Create & define model, Retrieve data, Insert, update and delete data, Scopes, Collections, Serialization, Relationship, Events	15



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3	Frontend Components: Laravel mix, Frontend Presets and Auth Scaffolding, Pagination, Named error bags, String Helpers, Pluralization and Localization Collecting and Handling User Data: Injecting a request object, Route data, Upload files, Validation, Form requests, Eloquent model mass assignment	15
4	Artisan and Tinker: Introduction, Basic commands, Custom commands, Calling commands in Normal Code, Tinker and Laravel dump server Request, Response and Middleware: Request life cycle, Request object, Response object, Laravel and Middleware	15

Reference Books/Audio-visual Course:

1	Beginning Laravel, Apress, Sanjib Sinha
2	Design Patterns in PHP and Laravel, Apress, Kelt Dockins
3	A Laravel Up & Running (A framework for Building Modern PHP Apps), O'REILLY, Matt Stauffer

Supplementary learning Material:

1	https://laravel.com/docs/9.x/readme
2	https://www.tutorialspoint.com/laravel/laravel_overview.htm
3	https://github.com/laravel/laravel
4	https://www.javatpoint.com/laravel

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20	40	15	15	5	5	

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Laravel framework helps in development by easing common tasks in the majority of web projects using routs and controls functionality of it.	25
CO-2	This framework is helpful to make web project more reliable because it offers variety in terms of tools and resources which includes working with databases.	25
CO-3	Understanding Front-end components and various features of the laravel.	25



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CO-4	Applying Artisan and Tinker. Also understanding the concept of Request, Response and Middleware	25
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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550227

Course Title: PRACTICAL BASED ON PHP FRAMEWORK

Course Group: ELECTIVE

Course Objectives:

- Understand the various concepts of the javascript at client side operation managing. Use the JavaScript to develop the validation in web pages.
- Understanding the jQuery – A javascript library with its various concepts like event, effects, callback, chaining and etc.
- Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
- Understands the Advanced PHP and implement the cookies, sessions and OOP concepts.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
--	--	6	3	--	--	50/20	50/20	100/40

* J: Jury; V: Viva; P:Practical

List of Practical:

Below mentioned problem definitions are for basic practice. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

1	To implement an arrays in JavaScript.
2	To implement functions in JavaScript.
3	Develop and demonstrate JavaScript with POP-UP boxes.
4	Write the HTML and JavaScript code to validate the required items using regular expression only.
5	To implement an events in JavaScript.
6	Alert the appropriate message when document is fully loaded and in ready state.
7	Hide all the <p> elements immediately after document loaded.
8	Hide all the tag whose id is "selected" when document is loaded (Take different tab with same id like h2,h3,p, etc.).
9	Hide all the tag whose class is "selected" when document is loaded (Take different tab with same class like h2,h3,p, etc.).
10	Change the text of <p> tag whose id is "msg" when document is loaded.



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11	Change the text of <p> tag whose class is “msg” when document is loaded.
12	Change the text of <p> tag when button is clicked.
13	Swap the value of two <p> tags when button is clicked.
14	Set any value in input box when document is loaded.
15	Set any value in input box when user got focus on it (focus()).
16	Take value from the user in input box and display it in the <p> tag when text box lost the focus (blur()).
17	Demonstrate the function of three buttons for three different selectors (like element, id, class). First button is for hide elements, second is for hide ids, and third is for hide class.
18	Take any element as value in input box and hide all that elements when user clicked.
19	Take color as a value from user in input box and change background color when user clicked the button.
20	Change the background color as per selection of radio button among four radio button as red, blue, green, none (white).
21	To Install and configure PHP, web server and MYSQL.
22	To implement the data types in PHP.
23	To implement a PHP program to demonstrate the use of Decision making control structures using a. If statement b. If-else statement c. Switch statement
24	To implement a PHP program to demonstrate the use of Looping structures using a. While statement b. Do-while statement c. For statement d. Foreach statement
25	To implement a PHP program for creating and manipulating a. Indexed array b. Associative array c. Multidimensional array
26	To implement a Registration form and apply validation in PHP
27	To Implement the web applications with Database using (a) PHP
28	To implement the cookies in PHP program.
29	To implement the session in PHP program.
30	To implement an object oriented programming in PHP.

Reference Books:

1	Beginning PHP6, Apache, MySQL Web development, wrox – Wiley India Pvt. Ltd.
2	Professional PHP Programming, wrox – Wiley India Pvt. Ltd.
3	PHP and MySQL Create – Modify – Reuse, wrox – Wiley India Pvt. Ltd.

Supplementary learning Material:

1	https://www.w3schools.com/php/default.asp
2	https://spoken-tutorial.org/tutorial-search/?search_foss=PHP+and+MySQL&search_language=English
3	https://www.javatpoint.com/php-tutorial
4	https://www.w3schools.com/css/default.asp
5	https://www.w3schools.com/js/default.asp

Pedagogy:



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- Explain / justify all the Program Definitions and correlate to real world problems and solution
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Applying JavaScript in web design principles to make pages effective at client side operations.	25
CO-2	Developing interactive web page applying the various techniques and concepts of the jQuery(javascript library).	25
CO-3	Develop the server side PHP scripts using various features for creating customized web applications using database connectivity.	25
CO-4	Develop a web application using advanced web programming features.	25

Curriculum Revision:

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FACULTY OF SCIENCE

Effective from Academic Batch: 2024-25

Programme: Master of Compute Application (MCA)
Semester: II
Course Code: 101550228
Course Title: Linux Programming and Shell Scripting
Course Group: ELECTIVE

Course Objectives:

- The goal of the course is the study of scripting languages such as PERL, TCL/TK and BASH
- Creation of programs in the Linux environment
- The study of the principles of scripting languages
- The study of usage of scripting languages in IC design flow

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
4	--	--	4	50/20	50/20	--	--	100 / 40

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Linux Basics Introduction to Linux, File System of the Linux, General usage of Linux kernel & basic commands, Linux users and group, Permissions for file, directory and users, Searching a file & directory, zipping and unzipping concepts	15
2	Linux Networking Introduction to Networking in Linux, Network basics & tools, File transfer protocol in Linux, Network file system, Domain Naming Services, Dynamic hosting configuration Protocol & Network information Services.	15
3	Perl Scripting Introduction to Perl Scripting, working with Simple Values, Lists and Hashes, Loops and Decisions, Regular Expressions, Files and Data in Perl Scripting, References & Subroutines, Running and Debugging Perl, Modules, Object-Oriented Perl.	15



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4	Tcl / tk Scripting Tcl Fundamentals,String and Pattern Matching, Tcl Data Structures, Control Flow Commands, Procedures and Scope,Evel, Working With UNIX, Reflection and Debugging,Script Libraries, Tk Fundamentals, Tk by Examples, The Pack Geometry Manager,Binding Commands to X Events,Buttons and Menus,Simple Tk Widgets, Entry and Listbox Widgets Focus, Grabs and Dialogs	15
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Reference Books:

1	Red Hat Enterprise Linux 4: System Administration Guide Copyright 2005 Red Hat, Inc
2	Teach Yourself Perl 5 in 21 days by David Till
3	Practical Programming in Tcl and Tk by Brent Welch , Updated for Tcl 7.4 and Tk 4.0

Supplementary learning Material:

1	https://nptel.ac.in/courses/117106113
2	https://archive.nptel.ac.in/courses/117/106/117106113/
3	https://spoken-tutorial.org/

Pedagogy:

- Justify all the topics unit-wise
- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
15	15	20	30	10	10	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	% weightage
CO-1	Learn and implement basics of Linux OS	25
CO-2	Learn concepts of Networking in Linux OS	25
CO-3	Learn application and implementation of Perl Scripting in Linux OS	25
CO-4	Learn application and implementation of Tcl / tk Scripting in Linux OS	25

Curriculum Revision:

Version:	1
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FACULTY OF SCIENCE

Effective from Academic Batch:2024-25

Programme: Master of Computer Application (MCA)

Semester: II

Course Code: 101550229

Course Title: Practical Based on Databases – Linux Programming and Shell Scripting

Course Group: ELECTIVE

Course Objectives:

- The goal of the course is the study of scripting languages such as PERL, TCL/TK and BASH
- Creation of programs in the Linux environment
- The study of the principles of scripting languages
- The study of usage of scripting languages in IC design flow

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
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--	--	6	3	--	--	50/20	50/20	100/40

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List of Practical:

To practice basic problem definitions, refer “w3schools” learning portal. More problem definitions will be assigned for practice during theory / practical / tutorial sessions. Students should maintain records for all the problem definitions either in digital or hard-copy format.

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2	Teach Yourself Perl 5 in 21 days by David Till
3	Practical Programming in Tcl and Tk by Brent Welch , Updated for Tcl 7.4 and Tk 4.0

Supplementary learning Material:

1	https://nptel.ac.in/courses/117106113
2	https://archive.nptel.ac.in/courses/117/106/117106113/
3	https://spoken-tutorial.org/

Pedagogy:

- Explain / justify all the Program Definitions and correlate to real world problems and



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Aegis: Charutar Vidya Mandal (Estd.1945)

solution

- Assignments / Quiz / Presentation / Participation for continuous evaluation and assessment
- Internal / External Examination as per the norms of CVM University

Suggested Specification table with Marks (Practical) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
5	15	20	10	20	30	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Learn and implement basics of Linux OS	25
CO-2	Learn concepts of Networking in Linux OS	25
CO-3	Learn application and implementation of Perl Scripting in Linux OS	25
CO-4	Learn application and implementation of Tcl / tk Scripting in Linux OS	25

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