



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Operating System
Course Group:	CORE COURSES
Course Objectives: Understanding of Operating System concepts like: <ul style="list-style-type: none"> • Architecture, Structure, Operations • Services, Interface, System calls, Design and Implementation • 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



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:

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	

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 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

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Python Programming
CourseGroup:	CORE COURSES
Course Objectives: <ul style="list-style-type: none"> • Build and understand basic programming and their control flow • Able to implement built-in packages / libraries • Able to build own functions / packages • Efficiently implement OOPs concepts for codebase flexibility • Build Interactive Programs/ 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: What is Python?, Paradigms of Programming, Functional Programming Model, Procedural Programming Model, Object-Oriented Programming Model, Event-driven Programming Model, Third-party Packages, Python Programming Modes Python Basics: Identifiers and Keywords, Data types – Basic, Container, User-defined, Variable Type and assignment, Arithmetic Operators, Precedence and Associative Operators, Conversions, Built-in functions and modules, Comments and Indentation, Multi-lining Console Input / Output: Console Input: split(), Console Output: print(), Formatted Printing String: Accessing String Element, Properties, Built-in functions, Methods, Conversions, Comparison	15



	<p>Decision Control Instruction: if block, else block, elif block, Logical Operators, Conditional Expression, all(), any(), pass Statement</p> <p>Repetition Control Instruction: for Statement, while Statement, break and continue Statement</p>	
2	<p>Container Types: List, Tuples, Sets, Dictionary, Accessing elements of each Container type, Operations for each Container type, Comprehensions: List, Sets, Dictionary</p> <p>Functions: Definition, Built-in functions, User-defined function, Arguments in a Python function: Positional arguments, Keyword arguments, Variable-length positional arguments, Variable-length keyword arguments</p> <p>Recursion: Recursive function, Why recursion function?, Recursive factorial function, Types of recursion, Recursion limit, Iteration</p>	12
3	<p>Functional Programming: first-class data values, Lambda functions, Higher order functions, map(), filter(), reduce()</p> <p>Modules and Packages: Main module, Multiple modules, Importing module, Packages: Third-party packages</p> <p>Namespace: Symbol table, globals(), locals(), Scope and LEGB Rules</p>	15
4	<p>Classes and Object: Paradigms, Define: Class and Object, User-define class, Access convention, Object initialization, Class variables and methods, vars(), dir(), Intricacies of Classes and Objects, Containership and Inheritance</p> <p>Exception Handling: Syntax error, Exceptions, User-defined exception</p>	18

Reference Books:

1	https://www.python.org/doc/
2	Beginning Python, wrox – Wiley India Pvt. Ltd.
3	Let Us Python, YashavantKanetkar and Aditya Kanetkar, bpb
4	Programming in Python 3- A Complete Introduction to Python Language, Mark Summerfield, Addition-Wesley

Supplementary learning Material:

1	https://www.coursera.org/
2	https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English
3	https://nptel.ac.in/courses/106106145

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



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

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
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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	Basic of Python Programming & different models of Programming. Understand and implement identifiers, keyword, variables, Data types and Input/Output, Understanding and able to implement: String and their operations, Flow control of Programs	25
CO-2	Understanding and able to implement: Container types and accessing their elements, Built-in function and user-defined function with or without recursion	25
CO-3	Able to understand and use built-in modules and packages, and efficiently practice for namespace	25
CO-4	Ability to build OOPs Programs, Efficiently handle exception	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





	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	PHP Programming
CourseGroup:	CORE COURSES

Course Objectives:

- Understand the various HTML tags and CSS with its types and use them to develop the user friendly web pages.
- Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications. Use the JavaScript to develop the dynamic web pages.
- Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
- Develop the modern Web applications using the client and server side technologies and the web design fundamentals.
- 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	HTML Fundamentals: HTML Structure, HTML Tags and Attributes, HTML Forms, Introduction to HTML5 DHTML Fundamentals: Introduction, Applications, CSS and its Types, Properties and Attributes, Class Introduction to JavaScript: Features, DOM, Methods to Implement JavaScript, Arrays, Functions, Dialogue Boxes, Events, Methods and Validations in JavaScript	12
2	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 , Form Validation, Input Validation, Regular Expression Functions	15
3	PHP and MySQL: Introduction to MySQL: Features, Merits and Demerits Basic Commands with PHP Examples, 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



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 Handling Object Oriented Programming with PHP: Classes, Objects, Inheritance, Polymorphism	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.

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

Pedagogy:

- Justify all the topics unit-wise
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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	Use the various HTML tags with appropriate styles to display the various types of contents effectively. Develop the dynamic web pages using HTML, CSS and JavaScript applying web design principles to make pages effective.	25
CO-2	Develop the server side PHP scripts using various features for creating customized web services.	25
CO-3	Write the server side scripts for designing web based services with database connectivity.	25
CO-4	Develop a web application using advanced web programming features.	25

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	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Practical Based on Python Programming
CourseGroup:	CORE COURSES
Course Objectives:	
<ul style="list-style-type: none"> • Strong foundation in the Python Programming • Provide platform to build professional and excellent career in the IT industry 	

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	Write a Program to demonstrate built-in functions: abs(), pow(), min(), max(), divmod(), bin(), oct(), hex(), round()
2	Write a program that makes use of functions in the math module: math.pi, math.e, ,ath.sqrt, math.factorial, math.fabs, math.log, math.log10, math.exp, math.trunc, math.floor, math.ceil, math.modf
3	Write a program that swaps the values of variables a and b, with or without use of third variable.
4	Write a program that generates float and integer random numbers.
5	Write a program that generates 5 random numbers in the range 10 to 50.
8	Write a program to convert temperature from centigrade degree into Fahrenheit degree and vice-versa.
9	Print decimal equivalent of binary number 10101100
10	Evaluate $2 ** 6 // 8 \% 2$
11	Write a program to convert the following string: 'Visit ykanetkar.com for online courses in programming' into 'Visit Ykanetkar.com For Online Courses In Programming'
12	Write a program to determine Maximum number among three numbers



13	A year is entered through the keyboard, write a program to determine whether the year is leap or not.
14	Write a program to print first 25 odd numbers using range().
15	Write a program to count the number of alphabets and number of digits in the string 'Nagpur-440010'
16	Write a program to find the factorial value of any number entered through the keyboard.
17	Write a program to print all prime numbers from 1 to 300.
18	Write a program to find the mean, median and mode of a list of numbers.
19	Write a program that reads a string from the keyboard and creates dictionary containing frequency of each character occurring in the string.
20	Write a program that defines a function count_lower_upper() that accepts a string and calculates the number of uppercase and lowercase alphabets in it. It should return these values as a dictionary. Call this function for some sample strings.
21	Write a recursive function that reverses the list of numbers that it receives.
22	Write a recursive function that calculate factorial of the number.

Reference Books:

1	https://www.python.org/doc/
2	Beginning Python, wrox
3	Let Us Python, Yashavant Kanetkar and Aditya Kanetkar, bpb
4	Programming in Python 3- A Complete Introduction to Python Language, Mark Summerfield, Addition-Wesley

Supplementary learning Material:

1	https://www.coursera.org/
2	https://spoken-tutorial.org/tutorial-search/?search_foss=Python+3.4.3&search_language=English
3	https://nptel.ac.in/courses/106106145

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):

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Aegis: Charutar Vidya Mandal (Estd.1945)

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Basic of 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 of Programs, Container types and accessing their elements	25
CO-3	Able to implement built-in function and user-defined function with or without recursion	25
CO-4	Able to understand and use built-in modules and packages, and efficiently practice for namespace	25

Curriculum Revision:

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





	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Practical Based on PHP Programming
CourseGroup:	CORE COURSES

Course Objectives:

- Understand the various HTML tags and CSS with its types and use them to develop the user friendly web pages.
- Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications. Use the JavaScript to develop the dynamic web pages.
- Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
- Develop the modern Web applications using the client and server side technologies and the web design fundamentals.
- 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 the Basic Html Tags with their attributes.
2	To implement the Basic Html Tags with their attributes.
3	To implement a table by applying appropriate tags of table.
4	To create an html file to link to different html pages which contains images, tables, and also link within a page.
5	Develop and demonstrate the usage of inline, internal and external style sheet using CSS.
6	To implement an arrays in JavaScript.
7	To implement functions in JavaScript.
8	Develop and demonstrate JavaScript with POP-UP boxes.
9	Write the HTML and JavaScript code to validate the required items using regular expression only.
10	To implement an events in JavaScript.
11	To Install and configure PHP, web server and MYSQL.



12	To implement the data types in PHP.
13	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
14	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
15	To implement a PHP program for creating and manipulating a. Indexed array b. Associative array c. Multidimensional array
16	To implement a Registration form and apply validation in PHP
17	To Implement the web applications with Database using (a) PHP
18	To implement the cookies in PHP program.
19	To implement the session in PHP program.
20	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:

- 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

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Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Use the various HTML tags with appropriate styles to display the various types of contents effectively. Develop the dynamic web pages using HTML, CSS and JavaScript applying web design principles to make pages effective.	25
CO-2	Develop the server side PHP scripts using various features for creating customized web services.	25
CO-3	Write the server side scripts for designing web based services with database connectivity.	25
CO-4	Develop a web application using advanced web programming features.	25

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FACULTY OF SCIENCE	
Effective from Academic Batch:2022-23	
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Advanced Web Programming
CourseGroup:	ELECTIVE COURSES
Course Objectives:	
<ul style="list-style-type: none"> • Ability to design, understand and implement JSON in web development. • Ability to design, understand and implement jQuery in web development. • Writing jQuery with HTML. • Understanding events and effects in jQuery. 	

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	JSON: Introduction to JSON, What is JSON, JSON vs XML, JSON Example, JSON Object, JSON Array, JSON Comments, JSON Compare, JSON Beautifier, JSON Server, JSON vs BSON, JSON Placeholder PHP JSON: PHP JSON Example	10
2	jQuery: jQuery Intro, jQuery Syntax, jQuery Selectors jQuery Events: jQuery Events, jQuery click(), jQuery bind(), jQuery unbind() method, jQuery blur(), jQuery focus(), jQuery select(), jQuery change(), jQuery submit(), jQuery keydown(), jQuery keypress(), jQuery keyup(), jQuery mouseenter(), jQuery mouseleave(), jQuery hover(), jQuery mousedown(), jQuery mouseup(), jQuery mouseover(), jQuery mouseout(), jQuery load(), jQuery unload(), jQuery delegate()	10
3	jQuery Effects: jQuery Hide/Show, jQuery Fade, jQuery Slide, jQuery Animate, jQuery stop(), jQuery Callback, jQuery Chaining jQuery Traversing: jQuery Traversing, jQuery Ancestors, jQuery Descendants, jQuery Siblings, jQuery Filtering	10



4	jQuery HTML: jQuery Get, jQuery Set, jQuery Add, jQuery Remove, jQuery CSS Classes, jQuery css(), jQuery Dimensions jQuery Form: jQuery serialize(), jQuery serializeArray() jQuery AJAX: jQuery AJAX Intro, jQuery Load, jQuery Get/Post	15
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Reference Books:	
1	Introduction to JavaScript Object Notation, O'reilly publication.
2	Web Development with jQuery, Wrox WILEY Publishing Inc.
3	jQuery Animation techniques, Dan wellman, PACKT publishing
4	jQuery in action, Manning publication.
Supplementary learning Material:	
1	https://www.w3schools.com/js/js_json_intro.asp
2	https://www.javatpoint.com/json-tutorial
3	https://www.w3schools.com/jquery/default.asp
4	https://www.javatpoint.com/jquery-tutorial
Pedagogy:	
<ul style="list-style-type: none"> 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
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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	Understand and able to design and implement JSON technology.	25
CO-2	Understand and able to implement jQuery technology from the Scratch	25
CO-3	Implementing jQuery in HTML and jQuery traversing.	25
CO-4	Applying events using jQuery.	25

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FACULTY OF SCIENCE	
Effective from Academic Batch:2022-23	
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Practical Based on Advanced Web Programming
CourseGroup:	ELECTIVE COURSES
Course Objectives: <ul style="list-style-type: none"> • Ability to design, understand and implement JSON in web development. • Ability to design, understand and implement jQuery in web development. • Writing jQuery with HTML. • Understanding events and effects with jQuery. 	

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:

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.

	Demonstrate JSON Program:
1	Create object as student and store the mno, name, city as element. Also write a code to access these values.
2	Create and access JSON array.
3	Demonstrate JSON.parse() method.
4	Demonstrate JSON.stringify() method.
5	Demonstrate PHP with JSON.
6	Create JSON file from data provided by user.
	Demonstrate jQuery Program:
1	Hide all <p> elements using different jQuerySelectors
2	jQuery Event: click()
3	hide(), show() and toggll()
4	Fade: fadeIn(), fadeout(), fadeToggle(), fadeTo()



5	Slide: slideDown(), slideUp(),slideToggle()
6	Animation to slide a square
7	Get and SetHTML content and attribute
8	Add HTML element and content
9	Get and Set CSS Classes
10	Change in Dimension: width(), height(), innerWidth(), innerHeight(),outerWidth(), outerHeight()
11	Traversing: Ancestors, Descendants, Sibling, Filtering
12	Retrieve textbox value using jQuery and Display in alert message
13	Demonstrate Prop() method in jQuery
14	Retrieve Single check box value using jQuery
15	Retrieving radio button values using jQuery
16	Retrieving dropdown values using jQuery
17	Demonstrate jQuery hover() event
18	Replace the html element's content with the text of external file. (AJAX)
19	Send an HTTP GET request to a page and get the result back.
20	Send an HTTP POST request to a page and get the result back.

Reference Books:

1	Introduction to JavaScript Object Notation, O'reilly publication.
2	Web Development with jQuery, Wrox WILEY Publishing Inc.
3	jQuery Animation techniques, Dan wellman, PACKT publishing
4	jQuery in action, Manning publication.

Supplementary learning Material:

1	https://www.w3schools.com/js/js_json_intro.asp
2	https://www.javatpoint.com/json-tutorial
3	https://www.w3schools.com/jquery/default.asp
4	https://www.javatpoint.com/jquery-tutorial

Pedagogy:

- Justify all the topics unit-wise
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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	Understand and able to design and implement JSON technology.	25
CO-2	Understand and able to implement jQuery technology from the Scratch	25
CO-3	Implementing jQuery in HTML and jQuery traversing.	25
CO-4	Applying events using jQuery.	25



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Aegis: Charutar Vidya Mandal (Estd.1945)

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Relational Database Management System
Course Group:	ELECTIVE COURSES
Course Objectives:	<ul style="list-style-type: none">Ability to understand and implement CRUD operation through SQL, PL/SQL, Function / Procedure and Trigger, before learning “NoSQL” in the subsequent semester.

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: Paradigms, Define: DBMS and RDBMS, Normalization Interactive SQL: DQL, DDL, DML and DCL, Constraints, Joins, Sub-query, Group-by, Built-in functions	10
2	SQL Performance Tuning: Indexes: Single and Multiple, View, Sequences Security Management using SQL: Grant and Revoke PL/SQL Introduction: Advantage of PL/SQL, PL/SQL Block, Control Structure	13
3	PL/SQL Transactions and Security: CURSOR, Locks, Error Handling	10
4	PL/SQL Database Objects: Procedure, Function, Trigger	12



Reference Books:

1	SQL, PL/SQL - THE PROGRAMMING LANGUAGE ORACLE, IVAN BAYROSS, bpb Publication
2	Mastering Oracle SQL, Sanjay Mishra, Alan Beaulieu, O'REILLY
3	Oracle – The Complete Reference, Oracle Press

Supplementary learning Material:

1	https://www.javatpoint.com/sql-tutorial
2	https://www.tutorialspoint.com/sql/index.htm
3	https://www.javatpoint.com/pl-sql-tutorial
4	https://www.tutorialspoint.com/plsql/index.htm

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Practical Based on Relational Database Management System
Course Group:	ELECTIVE COURSES
Course Objectives:	
<ul style="list-style-type: none"> Ability to understand and implement CRUD operation through SQL, PL/SQL, Function / Procedure and Trigger, before learning “NoSQL” in the subsequent semester. 	

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	<p>Tables:</p> <p>CUSTOMER(Custno, cname, state, phone) ITEM(Itemno, Itemname, Itemprice, Qty_hand) INVOICE(Invno, invDate, Custno) INVITEM(Invno, Itemno, Qty)</p> <p>Queries:</p> <ol style="list-style-type: none"> Create all the above tables with necessary constraints. Insert appropriate records. Add a column to the ITEM table, which will allow us to store Item Color field. Write SELECT Query: <ol style="list-style-type: none"> Display Item name, Price in sentence form using concatenation Find total value of each item based on quantity on hand Find customers who are from state of Gujarat.
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Aegis: Charutar Vidya Mandal (Estd.1945)

	<ul style="list-style-type: none">d. Display items with unit price of at least Rs. 100e. List items whose range lies between Rs. 200 and Rs. 500f. Which customers are from lalbaug area of Ahmedabad, Baroda and Patan.g. Find all customers whose name start with Letter 'P'.h. Find name of items with 'W' in their name.i. Sort all customers alphabeticallyj. Sort all items in descending order by their prices.k. Display all customers from M.P alphabeticallyl. Display invoices dates in 'September 05, 2007' format.m. Find total, average, highest and lowest unit pricen. Count number of items ordered in each invoiceo. Find invoices in which three or more items are ordered.p. Find all possible combination of customers and items (use Cartesian product)q. Display all item quantity and item price for invoices (natural join)r. Find total price amount for each invoice.s. Use outer join to display items ordered as well as not ordered so far.t. Find invoices with 'Gear' in their item name.u. Display name of items ordered in invoice number 1001v. Find the items that are cheaper than 'Bullet'.w. Create a table (namely guj_cust) for all Gujarat customer based on existing customer tablex. Copy all M.P customers to the table with Gujarat customersy. Rename Guj_cust table to MP_cust table.z. Find the customers who are not in Gujarat or M.Paa. Delete rows from customer table that are also in MP_cust tablebb. Find the items with top three pricescc. Find two items with lowest quantity on handdd. Create a simple view with item names and item price onlyee. Create a sequence that can be used to enter new items into item tableff. Add a new item into item table with sequence just created.gg. Create a index file to speed up a search based on customer namehh. Lock customer Mr. Shah record to update the state and phone no.ii. Give everybody select and insert rights on your item tablejj. Revoke the insert option on item table from user 'Arjun'
2	<p>Tables:</p> <p>STUDENT(rollno,name,class,birthdate) COURSE(courseno, coursename, max_marks, pass_marks) SC(rollno,courseno,marks)</p> <p>Queries:</p> <ul style="list-style-type: none">1. Add constraint that marks entered are between 0 to 100 only.2. While creating COURSE table, primary key constraint was forgotten. Add the primary key now.3. Display details of student where course is 'Data Base Management System'.4. Select student names who have scored more than 70% in Computer Networks and have not failed in any subject.5. Select names and class of students whose names begin with 'A' or 'B'.6. Display average marks obtained by each student.7. Select all course where passing marks are more than 30% of average maximum marks.



	8. Select the course where second and third characters are 'AT'. 9. Display details of students born in 1975 or 1976.
3	<p>Tables:</p> <p>Screen(screen_id,location ,seating_cap) Movie(movie_id,movie_name,date_of_release) Current(screen_id,movie_id,date_of_arrival,date_of_closure)</p> <p style="margin-left: 40px;">Value of screen_id must start with letters 'S'. Attribute location can be any one of 'FF', 'SF', or 'TF'. Date_of_arrival must be less than date_of_closure.</p> <p>Queries:</p> <ol style="list-style-type: none"> 1. Get the name of movie which has run the longest in the multiplex so far. 2. Get the average duration of a movie on screen number 'S4'. 3. Get the details of movie that closed on date 24-november-2004. 4. Movie 'star wars III ' was released in the 7th week of 2005. Find out the date of its release considering that a movie releases only on Friday. 5. Get the full outer join of the relations screen and current.
4	Write a PL/SQL program, to display 'Hello World' message on the screen
5	Write a PL/SQL program, to get radius of circle as an input from the user and calculate & print area of circle.
8	Write a PL/SQL Program, to demonstrate basic arithmetic operations like addition, subtraction, multiplication, division etc.
9	Write a PL/SQL Program, to determine maximum and minimum number among three numbers.
10	Write a PL/SQL Program, to print odd, even and prime number between specific range of numbers.
11	Write a function in PL/SQL, to computes and returns the maximum of two values.
12	Write a row level trigger in PL/SQL, when Employee Department will be updated.

Reference Books:

1	SQL, PL/SQL - THE PROGRAMMING LANGUAGE ORACLE, IVAN BAYROSS, bpb Publication
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Supplementary learning Material:

1	https://www.javatpoint.com/sql-tutorial
2	https://www.tutorialspoint.com/sql/index.htm
3	https://www.javatpoint.com/pl-sql-tutorial
4	https://www.tutorialspoint.com/plsql/index.htm

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	



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Aegis: Charutar Vidya Mandal (Estd.1945)

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	To understand and implement: <ul style="list-style-type: none">○ SQL – DDL, DML, DCL○ Inner and Outer Joins	25
CO-2	<ul style="list-style-type: none">○ Indexing the tables○ PL/SQL Block and CURSOR	25
CO-3	<ul style="list-style-type: none">○ Function / Procedure and Trigger	25
CO-4		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





	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Data Structure
Course Group:	ELECTIVE COURSES
Course Objectives:	
<ul style="list-style-type: none"> • Application of different Data Structure. • Ability to implement different Data Structure operations. • 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



Reference Books:

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	

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Practical Based on Data Structure
CourseGroup:	ELECTIVE COURSES
Course Objectives:	
<ul style="list-style-type: none"> • Application of different Data Structure. • Ability to implement different Data Structure operations. • 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, ISEMPTY, ISFULL, PEEP
2	Write a program to do the following: a. Convert infix arithmetic expression into prefix arithmetic expression b. 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 b. 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
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:

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Advanced Java
Course Group:	ELECTIVE COURSES

Course Objectives:

- This course introduces the generic, multithreaded and GUI-based programming and understands concepts of database connectivity using Java Database Connectivity (JDBC).
- Students will be able to do develop server side applications with database handling using Servlets, JSP, and JDBC.
- Understanding the basics of the Spring Framework. Develop Web Application using spring framework and Handling crosscutting concerns using Spring AOP.
- Understand the role of EJB in the broader Java EE platform. Describe the features that are implemented by an EJB container on behalf of application components.

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	<p>Multithreading: Life Cycle of a Thread, Creating Thread and Running it, Creating Multiple Threads, Waiting for Threads, Thread Group, Thread Priorities, Synchronization</p> <p>Introduction to J2EE Technology: Introduction to J2EE Platform, J2EE Architecture, Introduction to J2EE APIs</p> <p>Java Database Connectivity (JDBC): JDBC Overview & Architecture, Introduction to JDBC, JDBC Architecture, Database Connectivity using JDBC</p>	05
2	<p>Servlets: Introduction to Java Servlet, Servlet Interface and the Servlet Life Cycle, Handling HTTP Get and Post Requests, Session Tracking, Cookies</p> <p>Java Server Pages (JSP): Introduction, Java Server Pages Overview, JSP Architecture & Life Cycle, JSP Directives, JSP Scripting Elements, JSP Action Elements, JSP Implicit Objects</p>	18
3	<p>The Spring Framework: Introduction to The Spring Framework and Architecture, Beans (Definition, Scope, Lifestyle), Aspect- Oriented Spring, Spring MVC, Security, JDBC Framework</p> <p>Web Service: Introduction About Restful Web Service</p>	20



4	Enterprise Java Beans (EJB): Introduction to Enterprise Java Beans, Enterprise Bean Architecture, Benefits of Enterprise Bean, Types of Enterprise Bean, Accessing Enterprise Beans, Enterprise Bean Application, Entity Beans, Session Beans, Message Driven Beans	17
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Reference Books:

1	Java the complete reference, 8th edition by Herbert Schildt
2	Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
3	Bayross Ivan, Shah Sharanam, Bayross Cynthia and Shah Vaishali: Java Server Programming, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., 2008
4	“Restful Java Web Services”, Jose Sandoval, Packt Publication
5	“Spring MVC Beginner’s Guide”, Amuthan Ganeshan, Packt Publication
6	“Advanced Java 2 Platform HOW TO PROGRAM” by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall Java the complete reference , 8th Edition by Herbert Schildt
7	Panda, Rahman and Lane : EJB 3 in Action, Dreamtech Press, 2010
8	Java the complete reference, 8th edition by Herbert Schildt

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:

- 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	Implement thread and Learn the fundamental of Connecting to the database	25
CO-2	Designing HTML pages to demonstrate Java Servlets, JSP, Bean, Spring and EJB programs. Implementing Dynamic HTML using Servlet and demonstration of service methods, auto web page refresh, Session tracking using cookie and Http Session in Servlet.	25
CO-3	Demonstrate JSP (page attributes, action tags and all basic tags), Develop the Application using Spring Framework. Understand the MVC concept in Spring Framework.	25
CO-4	Develop the types of EJB application.	25

Curriculum Revision:

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	I
Course Code:	
Course Title:	Practical Based on Advanced Java
CourseGroup:	ELECTIVE COURSES

Course Objectives:

- To prepare students to become familiar with the Standard Java technologies of J2SE, J2EE, HTML and JavaScript.
- To provide Students with a solid foundation in Advanced Java topics like Servlet, JSP and Spring Framework.
- To train Students with good advanced java programming breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problems.
- To inculcate in students professional and ethical attitude, multidisciplinary approach and an ability to relate java programming issues to broader application context.
- 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	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 Netbeans/Eclips:

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 the Thread programs using class and interface.
2	To implement the methods of Thread class.
3	To implement the JDBC programs using Statement
4	To implement the JDBC programs using PreparedStatement.
5	To implement the Servlet Program



6	Write a Servlet Program to implement a dynamic HTML using Servlet (Username and Password should be accepted using HTML and displayed using a Servlet).
7	Write a Servlet Program to implement and demonstrate get() and Post methods(Using HTTP Servlet Class).
8	To implement a Servlet Program using cookies to remember user preferences.
9	Write a Servlet program to implement sessions(Using http session interface).
10	To implement a Servlet and JSP Program to insert data into Student DATA BASE and retrieve info based on particular queries(For example update, delete, search etc...).
11	To implement the JSP Program
12	Write a JSP program to implement verification of a particular user login and display a welcome page.
13	To implement a JSP program to demonstrate the page directive nine predefined attributes.
14	To implement a JSP Program which uses jsp:include and jsp:forward action to display a Webpage.
15	To implement the implicit objects in JSP.
16	To implement the program using Spring Framework.
17	An EJB Application that demonstrates Session Bean(with Appropriate Business Logic)

Reference Books:

1	Java the complete reference, 8th edition by Herbert Schildt
2	Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
3	Bayross Ivan, Shah Sharanam, Bayross Cynthia and Shah Vaishali: Java Server Programming, 2nd Edition, Shroff Publishers and Distributors Pvt. Ltd., 2008
4	“Restful Java Web Services”, Jose Sandoval, Packt Publication
5	“Spring MVC Beginner’s Guide”, Amuthan Ganeshan, Packt Publication
6	“Advanced Java 2 Platform HOW TO PROGRAM” by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice Hall Java the complete reference , 8th Edition by Herbert Schildt
7	Panda, Rahman and Lane : EJB 3 in Action, Dreamtech Press, 2010
8	Java the complete reference, 8th edition by Herbert Schildt

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:

- 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 (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.



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Aegis: Charutar Vidya Mandal (Estd.1945)

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





	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Cloud Computing
Course Group:	CORE COURSES
Course Objectives:	
<ul style="list-style-type: none"> This course will provide an opportunity to study the new area of cloud computing, its infrastructure, architecture and services and provide an insight into the various delivery models and service providers. 	

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 Cloud Computing; Characteristics of Cloud Computing; Cloud Service Models - Infrastructure as a Service, Platform as a Service, Software as a Service and Anything as a Service; Cloud Deployment Models - Private Cloud, Community Cloud, Public Cloud and Hybrid Cloud ; Difference Between Traditional Computing and Cloud Computing ; Virtualization; Need of Virtualization; Types of Virtualization ; Virtualization in Cloud Computing	10
2	Cloud Infrastructure and Architectures; Cloud Computing Stack ; Composability ; Infrastructure ; Platforms ; Virtual Applications ; Communication Protocols ; Applications; Cloud Data Center Architecture 2.3 Conceptual View of Networking in Cloud Computing; Cloud Data Storage (Overview of SAN, DFS, etc.) ; Computing Cluster in Cloud ;Service Level Agreement and Cloud Pricing Model ; Cloud Security Concepts; Industrial Platforms and New Developments: Amazon Web Services, Google App Engine, Microsoft Azure	17
3	Service Offerings by Cloud Providers; Introduction to Amazon Cloud Services ;EC2 – Elastic Cloud Compute ;Elastic Container Service ; Elastic Kubernetes Service ; Lambda – Serverless Computing ; VPC – Virtual Private Cloud ; S3 – Simple Storage Service ; EBS – Elastic Block Storage ; RDS – Relational Database Service ; ; Introduction to Microsoft Azure ; Service Fabric ; AKS – Azure Kubernetes Service ; Container Instances ; Azure SQL ; Azure DevOps ;Security Center ; Azure IoT Hub ; Traffic Manager ; Cognitive Services ; Introduction to Google Cloud Services ; Google App Engine ; Google Compute Engine ; Google Kubernetes Engine ; Cloud ; Cloud SQ	18



4	Cloud Delivery Model Considerations: Cloud Delivery Models: The Cloud Provider Perspective, Cloud Delivery Models: The Cloud Consumer Perspective, Cost Metrics and Pricing Models: Business Cost Metrics, Cloud Usage Cost Metrics, Cost Management Considerations, Service Quality Metrics and SLAs: Service Quality Metrics, SLA Guidelines	15
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Reference Books:

1	Cloud Computing and Virtualization by Dac-Nhuong Le, Raghvendra Kumar, Gia Nhu Nguyen, Jyotir Moy Chatterjee, WILEY, 2018
2	Cloud Computing : A Practical Approach by Anthony Velte, Toby Velte, Robert Elsenpeter, Mc Graw Hill, 2017
3	Cloud Computing – Black Book by Kailash Jayaswal, Jagannath kallakurchi, Donald Houde, Deven Shah, Dreamtech Press, 2014
4	Architecting The Cloud by Michael Kavis, WILEY, 2014
5	Learning AWS by Aurobindo Sarkar, Amit Shah, Packt Publication, 2015
6	Google Cloud Platform Cookbook by LegorieRajan, Packt Publication, 2018
7	Building Your Next Big Thing with Google Cloud Platform by S.P.T. Krishnan, Jose L. Ugia Gonzalez, Apress, 2015
8	Microsoft Azure Fundamentals by Jim Cheshire, Pearson, 2019

Supplementary learning Material:

1	https://www.coursera.org/learn/introduction-to-cloud
2	https://onlinecourses.nptel.ac.in/noc22_cs20/preview
3	https://www.tutorialspoint.com/cloud_computing/index.htm

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	Students will learn basics of cloud computing, types of cloud computing difference between traditional and cloud computing.	25
CO-2	The students will be familiar with various cloud infrastructures, architectures and services.	25
CO-3	They will get the knowledge of various services offering by cloud providers.	25
CO-4	Students will get various business aspects of cloud delivery models considerations.	25

Curriculum Revision:

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Full Stack Web Development
Course Group:	CORE COURSES
Course Objectives: <ul style="list-style-type: none"> • Understand technical concepts of Node JS • Construct a Node application in modules • Build Node JS Web Server • Manage NPM and Database Connectivity • 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: What is Node JS?, Advantages & Features of Node JS, REPL Terminal Node Package Manager (NPM): Introduction, Install & uninstall modules [Globally and Locally], Application of package.json, Create, Update and Search modules	15
2	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	12



3	<p>File System: Introduction, Get file information, Read, Write, Truncate, Delete file, Directory: Create, Read and Remove</p> <p>Global Objects: Introduction, Types of object: Global, Console, Process</p> <p>Modules: Introduction, Utility Modules: Path, OS, Net, DNS, Domain, Web Modules: Introduction, Create, Make a request</p> <p>Debugging & Error Handling: Introduction & implementation: Debugging and Error Handling</p>	18
4	<p>Express Framework: Introduction, Request and Response, Request and Response object, Basic routing, Serving static files, GET and POST Method, Cookie Management</p> <p>Database Connectivity: Introduction, CRUD Operation</p>	15

Reference Books:

1	Beginning Node.js, Apress, Basarat Ali Syed
2	Pro Node.js for Developers, Apress, Colin J. Ihrig
3	Learning Node.js Development, Packt, Andrew Mead
4	Mastering Node.js, Packt, Sandro Pasquali

Supplementary learning Material:

1	https://nodejs.org/en/docs/
2	https://nodejs.org/en/docs/guides/
3	https://nodejs.dev/en/learn/
4	https://www.w3schools.com/nodejs/
5	https://www.tutorialspoint.com/nodejs/index.htm
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	
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.



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Basic of Node.js & its terminal, NPM to manage different Node.js modules and packages	25
CO-2	Application and implementation of Function, Event, Buffer and Stream	25
CO-3	Handle the File-System, Global objects, Module(s) and Errors, Debug the Node.js Program	25
CO-4	Express Framework application and Database connectivity	25

Curriculum Revision:

Version:	1.0
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	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	User Interface Development using React
Course Group:	CORE COURSES
Course Objectives:	
<ul style="list-style-type: none"> • React makes it painless to create interactive UIs. • React will efficiently update and render just the right components when your data changes. • React can also render on the server using Node and power mobile apps using React Native. • 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 Core React: Syntax, Components, Components – Properties and Methods, Lifecycle and rendering, Elements, Factories	15
2	JSX: Introduction and fundamentals, JSX Transformer, Attributes	15
3	Flux: Introduction, Components, Structure a React Application	15
4	Applications: Create React elements with JS and JSX, Create and update React components, Use React components with another library, Test React Application	15



Reference Books:

1	React.js Essentials, PACKT, Alex Bush
2	Introduction to React, Apress, Cory Gackenheimer
3	Learning React, O'REILLY, Alex Banks, Eve Porcello

Supplementary learning Material:

1	https://reactjs.org/
2	https://www.w3schools.com/REACT/DEFAULT.ASP
3	https://www.javatpoint.com/reactjs-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):

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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	React helps in development by easing common tasks in the majority of web projects. This is helpful to make web project more reliable because it offers variety in terms of tools and resources.	25
CO-2		25
CO-3		25
CO-4		25

Curriculum Revision:

Version:	1.0
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	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Practical Based on Full Stack Web Development
Course Group:	CORE COURSES
Course Objectives:	
<ul style="list-style-type: none"> Strong foundation in the Python Programming Provide platform to build professional and excellent career in the IT industry 	

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 Node.js, Apress, Basarat Ali Syed
2	Pro Node.js for Developers, Apress, Colin J. Ihrig
3	Learning Node.js Development, Packt, Andrew Mead
4	Mastering Node.js, Packt, Sandro Pasquali
Supplementary learning Material:	
1	https://nodejs.org/en/docs/
2	https://nodejs.org/en/docs/guides/
3	https://nodejs.dev/en/learn/
4	https://www.w3schools.com/nodejs/
5	https://www.tutorialspoint.com/nodejs/index.htm
6	https://www.javatpoint.com/nodejs-tutorial
Pedagogy:	
<ul style="list-style-type: none"> 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 	



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

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	Basic of Node.js & its terminal, NPM to manage different Node.js modules and packages	25
CO-2	Application and implementation of Function, Event, Buffer and Stream	25
CO-3	Handle the File-System, Global objects, Module(s) and Errors, Debug the Node.js Program	25
CO-4	Express Framework application and Database connectivity	25

Curriculum Revision:

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	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Practical Based on User Interface Development using React
Course Group:	CORE COURSES
Course Objectives:	
<ul style="list-style-type: none"> Strong foundation in the Django and Flaks Framework Programming Provide platform to build professional and excellent career in the IT industry 	

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 “javapoints and 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	React.js Essentials, PACKT, Alex Bush
2	Introduction to React, Apress, Cory Gackenheimer
3	Learning React, O'REILLY, Alex Banks, Eve Porcello
Supplementary learning Material:	
1	https://reactjs.org/
2	https://www.w3schools.com/REACT/DEFAULT.ASP
3	https://www.javatpoint.com/reactjs-tutorial
Pedagogy:	
<ul style="list-style-type: none"> 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 	



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

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

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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. This is helpful to make web project more reliable because it offers variety in terms of tools and resources.	25
CO-2		25
CO-3		25
CO-4		25

Curriculum Revision:

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



	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Data Science using Python and R
Course Group:	ELECTIVE COURSES

Course Objectives:

- To learn about Data Science, understand the data science areas, Data Processing, Visualization and Analytical techniques on data set.
- To develop proficiency in creating based applications using the Python Programming Language and understand to draw various kinds of data visualization techniques using matplotlib and Pandas.
- To learn creating modules and data structures like List, Tuples and Dictionaries.
- To handle exceptions and work with the built in standard libraries. To learn to Manipulate primitive data types in the R programming language using RStudio or Jupyter Notebooks.
- To understand the Control program flow with conditions and loops, write functions, perform character string operations. To learn the Construct and manipulate R data structures, including vectors, factors, lists, and data frames. To understand the data preparation using Python and R.

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 Data Science: Introduction and Methodology, Data Science Tasks, Description, Estimation, Basic ML Algorithms (Classification, Clustering, Prediction, Association), Applications of Data Science, Technologies for visualization, Data Science toolkit, Types of data	15
2	Python for Data Science: Python Environment Setup and Essentials, Mathematical Computing with Python (NumPy), Scientific computing with Python (Scipy), Data Manipulation with Pandas, Data Visualization in Python using matplotlib	15



3	R Programming for Data Science: Basics of R programming, Essentials of R programming, Exploratory Data Analysis, Data Manipulation, Data Visualization in R	15
4	Data Preparation Using Python and R: The Problem Understanding Phase, Data Preparation Phase, Adding an Index Field Using R and Python, Changing Misleading Field Values, Re-expression of Categorical Data as Numeric, Standardizing the Numeric Fields, Identifying Outliers	15

Reference Books:

1	Mark Lutz, "Learning Python", 4th Edition, O'Reilly, 2009
2	Wes McKinney, "Python for Data Analysis", O'Reilly, 2013
3	Robert I. Kabacoff, "R in Action: Data Analysis and Graphics with R", Manning, 2011
4	Field Cady, 'The Data Science Handbook ', Wiley Publication ISBN-13: 978-1119092940
5	Jake VanderPlas, 'Python Data Science Handbook ESSENTIAL TOOLS FOR WORKING WITH DATA', O'REILLY ISBN:978-1-491-91205-8
6	Rachel Schutt and Cathy O'Neil, Doing Data Science, O'REILLY
7	Wes McKinney, Python for Data Analysis Data Wrangling with Pandas, NumPy, and IPython, 2nd Edition , O'REILLY

Supplementary learning Material:

1	https://www.coursera.org/learn/python-data-analysis
2	https://nptel.ac.in/courses/106106212
3	https://www.kaggle.com/datasets
4	https://www.programiz.com/python-programming
5	https://www.coursera.org/learn/introducton-r-programming-data-science

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.



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Describe the various areas where data science is applied. Identify the data types, relation between data and visualization technique for data.	25
CO-2	Understand the fundamental of Python syntax and be fluent in the use of Python control flow statements. Learn methods to create and manipulate Python programs by utilizing the data structures like dictionaries, tuples, Lists and sets. Understand the Pandas and Numpy library for data science operation and plotting various Biosignal using Matplotlib.	25
CO-3	Study and use basic fundamental concepts to solve the real world problem using R programming language. Design and implement the solution using scalar, vectors ,matrices and statistical problems in R program.	25
CO-4	Understand the data preparation various phases using python and R	25

Curriculum Revision:

Version:	1.0
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	FACULTY OF SCIENCE
	Effective from Academic Batch:2022-23
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Practical Based on Data Science using Python and R
Course Group:	ELECTIVE COURSES
Course Objectives:	
<ul style="list-style-type: none"> Understand the Python and R Programming Language. Exposure on solving of data science problems. To understand to draw various kinds of data visualization techniques using matplotlib and Pandas. To study and employ different datatypes, operators, and control statements. To learn creating modules and data structures like List, Tuples and Dictionaries. To handle exceptions and work with the built in standard libraries. To learn to Manipulate primitive data types in the R programming language using RStudio or Jupyter Notebooks. To understand the Control program flow with conditions and loops, write functions, perform character string operations. To learn the Construct and manipulate R data structures, including vectors, factors, lists, and data frames. 	

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 “javapoints and tutorialpoints” 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.

1	To implement mathematical Computing with Python using Numpy.
2	To implement Scientific Computing with Python using Scipy.
3	To implement Data Manipulation in Python using Pandas.
4	To implement Data Visualization in Python using matplotlib.
5	Perform following operations on a CSV file a. Create a data frame from csv file, dictionary, List of tuples b. Operations on Data Frame Shape, head, tail c. Retrieving rows / columns from data frame d. Finding maximum and minimum values e. Displaying statistical information f. Performing queries g. Handling missing data



6	R AS CALCULATOR APPLICATION a. Using with and without R objects on console b. Using mathematical functions on console c. Write an R script, to create R objects for calculator application and save in a specified location in disk.
7	DESCRIPTIVE STATISTICS IN R a. Write an R script to find basic descriptive statistics using summary, str, quartile function on mtcars& cars datasets. b. Write an R script to find subset of dataset by using subset (), aggregate () functions
8	READING AND WRITING DIFFERENT TYPES OF DATASETS a. Reading different types of data sets (.txt, .csv) from web and disk and writing in file in specific disk location.
9	Perform a following Data Visualization : a. R Pie Charts b. R Bar Charts c. R Boxplot d. R Histogram e. R Line Graphs f. R Scatterplots
10	Perform a following Vector operations : a. Combining vectors b. Arithmetic operations c. Logical Index vector d. Numeric Index e. Duplicate Index f. Range Indexes g. Out-of-order Indexes h. Named vectors members

Reference Books:

1	Mark Lutz, "Learning Python", 4th Edition, O'Reilly, 2009
2	Wes McKinney, "Python for Data Analysis", O'Reilly, 2013
3	Robert I. Kabacoff, "R in Action: Data Analysis and Graphics with R", Manning, 2011
4	Field Cady, 'The Data Science Handbook ', Wiley Publication ISBN-13: 978-1119092940
5	Jake VanderPlas, 'Python Data Science Handbook ESSENTIAL TOOLS FOR WORKING WITH DATA', O'REILLY ISBN:978-1-491-91205-8
6	Rachel Schutt and Cathy O'Neil, Doing Data Science, O'REILLY
7	Wes McKinney, Python for Data Analysis Data Wrangling with Pandas, NumPy, and IPython, 2nd Edition , O'REILLY

Supplementary learning Material:

1	https://www.coursera.org/learn/python-data-analysis
2	https://nptel.ac.in/courses/106106212
3	https://www.kaggle.com/datasets
4	https://www.programiz.com/python-programming
5	https://www.coursera.org/learn/introducton-r-programming-data-science

Pedagogy:

- Justify all the topics unit-wise
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5	15	20	10	20	30	

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CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Describe the various areas where data science is applied. Identify the data types, relation between data and visualization technique for data.	25
CO-2	Understand the fundamental of Python syntax and be fluent in the use of Python control flow statements. Learn methods to create and manipulate Python programs by utilizing the data structures like dictionaries, tuples, Lists and sets. Understand the Pandas and Numpy library for data science operation and plotting various Biosignal using Matplotlib.	25
CO-3	Study and use basic fundamental concepts to solve the real world problem using R programming language. Design and implement the solution using scalar, vectors ,matrices and statistical problems in R program.	25
CO-4	Understand the data preparation various phases using python and R	25

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FACULTY OF SCIENCE	
Effective from Academic Batch:2022-23	
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	User Interface Development using Vue
Course Group:	ELECTIVE COURSES
Course Objectives:	
<ul style="list-style-type: none"> Vue helps in development by easing common tasks in the majority of web projects. This is helpful to make web project more reliable because it offers variety in terms of tools and resources. 	

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: Concepts and terminology Vue Basics: Options – El, Template, Render, Data, Methods, Computed properties Template Binding Conditional Rendering: v-show: v-if, v-else, v-else-if, v-if v-else v-else-if Lists: Objects, Accessing object properties, Index and parent properties	15
2	Events: Introduction, Listeners and handlers, Modifiers Binding: Forms: v-model, inputs, Textarea elements, Select and multiple select, Styling	15
3	State Management: Introduction, Simple data object, DIY data store, Vuex Components: Introduction, Develop first component, Passing data, Events, Slots	15
4	Reusable Code: Mixins, Custom directives, Render function, Custom Functionalities and Routers: Plug-ins, Filters, DIY Router, Vue-Router	15



Reference Books:	
1	Getting to Know Vue.js , Apress , Bret Nelson
2	Pro Vue.js, Apress, Adam Freeman
3	Vue.js Up & Runing, O'REILLY, Callum Macrae
Supplementary learning Material:	
1	https://vuejs.org/
2	https://www.w3schools.com/whatis/whatis_vue.asp
3	https://www.javatpoint.com/vue-js
Pedagogy:	
<ul style="list-style-type: none">• 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	Vue helps in development by easing common tasks in the majority of web projects. This is helpful to make web project more reliable because it offers variety in terms of tools and resources.	25
CO-2		25
CO-3		25
CO-4		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



FACULTY OF SCIENCE	
Effective from Academic Batch:2022-23	
Programme:	Master of Computer Application (MCA)
Semester:	II
Course Code:	
Course Title:	Practical Based on User Interface Development using Vue
Course Group:	ELECTIVE COURSES
Course Objectives: <ul style="list-style-type: none">• Vue helps in development by easing common tasks in the majority of web projects. This is helpful to make web project more reliable because it offers variety in terms of tools and resources.	

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 “javapoints and 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	Getting to Know Vue.js , Apress , Bret Nelson
2	Pro Vue.js, Apress, Adam Freeman
3	Vue.js Up & Runing, O'REILLY, Callum Macrae
Supplementary learning Material:	
1	https://vuejs.org/
2	https://www.w3schools.com/whatis/whatis_vue.asp
3	https://www.javatpoint.com/vue-js
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CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

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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.

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