

PROGRAMME SPECIFIC OUTCOMES

PSO1: Demonstrate a deep understanding of advanced topics in computer science, such as artificial intelligence, cyber security, big data, and software engineering, and utilize this knowledge to design, implement, and optimize sophisticated computing solutions and technological innovations, effectively addressing complex and emerging problems.

PSO2: Convey complex technical concepts, research findings, and project results clearly and accurately. Prepare and present comprehensive technical reports, research papers, and documentation with precision, adhering to professional and academic standards.

PSO3: Apply advanced analytical and critical thinking skills to evaluate and address complex computing challenges, using empirical evidence and systematic methods. Develop and implement innovative solutions to novel problems.

PSO4: Design, conduct, and manage high-impact research projects, recognizing and predicting cause-and-effect relationships within computer science.

PSO5: Demonstrate a strong understanding of ethical principles in technology, formulate and defend positions on ethical issues from multiple perspectives, and integrate environmental and sustainability considerations into computing practices, promoting the development of eco-friendly and responsible technology solutions.

PSO6: Collaborate effectively within teams, utilizing strong leadership and management skills to guide team efforts toward successful project completion.

PSO7: Engage in continuous self-directed learning to stay abreast of emerging technologies, industry trends, and academic advancements in computer science. Utilize digital tools and resources for ongoing professional development, leveraging ICT skills to enhance expertise and adapt to evolving technological landscapes.

Department : Computer Science

Programme Code: PSCS

(Common Course Structure – PG - 2023 - 2024)

SEMESTER – I

Part	Course Type	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
I	CC – I	Analysis & Design of Algorithms	6	5	3	25	75	100
I	CC – II	Object Oriented Analysis and Design & C++	6	5	3	25	75	100
I	CC – III	Python Programming	6	5	3	25	75	100
I	EC – I	i. Algorithm and OOPS Practical ii. Open Source Practical	6	3	3	40	60	100
I	EC – II	i. Python Programming Practical ii. Web Application Development Practical	4	3	3	40	60	100
II	SEC – I	Web Application and Development	2	1	3	25	75	100
		Total	30	22				600

SEMESTER – II

Part	Course Type	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
I	CC – IV	Data Mining and Warehousing	6	5	3	25	75	100
I	CC – V	Compiler Design	6	5	3	25	75	100
I	CC – VI	Advanced Java Programming	6	5	3	25	75	100
I	EC – III	i. Data Mining using R Practical ii. Compiler Design Practical	5	3	3	40	60	100
I	EC – IV	i. Advanced Java Programming Practical ii. Software Testing Practical	5	3	3	40	60	100
II	SEC – II	Software Testing	2	1	3	25	75	100
II	ECC – I	Moocs / Swayam Courses	-	2/3				
		Internship/Industrial training*						
		Total	30	22				600

*Internship/industrial training during summer vacation. The credits shall be awarded in Semester III statement of marks.

SEMESTER – III

Part	Course Type	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
I	CC – VII	Advanced Operating Systems	6	5	3	25	75	100
I	CC – VIII	Network Security and Cryptography	6	5	3	25	75	100
I	CC –IX	Big Data Analytics	6	5	3	25	75	100
I	CC – X	Cloud Computing	6	4	3	25	75	100
I	EC – V	i. Cloud Computing Practical ii. Big Data Analytics Practical	4	3	3	40	60	100
II	IDSEC	Cyber Security	2	2	3	25	75	100
II	ECC – II	MOOCs / Swayam Courses	-	2/3				
II	ECC-III	General Studies for Research Fellowships and Lecturership	-	2	3	-	-	100
II	AEC	Internship / Industrial training	-	2				
		Total	30	26				700

SEMESTER – IV

Part	Course Type	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
I	CC – XI	Advanced Machine Learning	6	5	3	25	75	100
I	CC – XII	Internet of Things	5	5	3	25	75	100
I	CC –XIII	Project with Viva-Voce	8	5	3	20	80	100
I	EC – VI	i. Advanced Machine Learning Practical ii. Internet of Things Practical	6	3	3	40	60	100
II	AEC – II	Professional competency skill - Computer Science for NET / SET Examinations	5	2	3	25	75	100
II	EA	Extension Activity	-	2				100
		Total	30	22				600
		OVERALL TOTAL	120	92				2500

PG – List of Elective Courses

S. No	Title of the Paper	Credits
1.	Algorithm and OOPS Practical	3
2.	Open Source Practical	3
3.	Python Programming Practical	3
4.	Web Application Development Practical	3
5.	Data Mining using R Practical	3
6.	Compiler Design Practical	3
7.	Advanced Java Programming Practical	3
8.	Software Testing Practical	3
9.	Cloud Computing Practical	3
10.	Big Data Analytics Practical	3
11.	Advanced Machine Learning Practical	3
12.	Internet of Things Practical	3
13.	Advanced Database Systems	3
14.	Block Chain Technology	3
15.	Robotic Process Automation for Business	3
16.	Mobile Computing	3

Semester – I – Core Course - CC - I

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
U23CSC101										
CC1	ANALYSIS & DESIGN OF ALGORITHMS	Core	6	-	-	-	5	25	75	100

Unit:1	INTRODUCTION
Introduction:-Algorithm Definition and Specification – Space complexity-Time Complexity- Asymptotic Notations - Elementary Data Structure: Stacks and Queues – Binary Tree - Binary Search Tree - Heap – Heap sort- Graph.	
Unit:2	TRAVERSAL AND SEARCH TECHNIQUES
Basic Traversal And Search Techniques: Techniques for Binary Trees-Techniques for Graphs -Divide and Conquer: - General Method – Binary Search – Merge Sort – Quick Sort.	
Unit:3	GREEDY METHOD
The Greedy Method:- General Method – Knapsack Problem – Minimum Cost Spanning Tree – Single Source Shortest Path.	
Unit:4	DYNAMIC PROGRAMMING
Dynamic Programming-General Method-Multi stage Graphs-All Pair Shortest Path-Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling.	
Unit:5	BACKTRACKING
Backtracking:-General Method – 8-Queens Problem – Sum Of Subsets – Graph Coloring – Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.	
Text Books	
1	Ellis Horowitz, "Computer Algorithms", Galgotia Publications.
2	Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman, "Data Structures and Algorithms".
Reference Books	
1	Goodrich, "Data Structures & Algorithms in Java", Wiley 3rd edition.
2	Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008
3	Anany Levith, "Introduction to the Design and Analysis of algorithm", Pearson Education Asia, 2003.

4	Robert Sedgewick, Phillipe Flajolet, "An Introduction to the Analysis of Algorithms", Addison - Wesley Publishing Company, 1996.
Web References :	
1	https://nptel.ac.in/courses/106/106/106106131/
2	https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3	https://www.javatpoint.com/daa-tutorial

Expected Course Outcomes:

On the successful completion of the course, student will be able to:		
CO 1	Gain and specify algorithms, understand space complexity, time complexity, and asymptotic notations, and identify elementary data structures.	K1
CO 2	Understand and explain basic traversal and search techniques for binary trees and graphs, and the divide and conquer methods such as binary search, merge sort, and quick sort.	K2
CO 3	Apply the greedy method to solve problems like the knapsack problem, minimum cost spanning tree, and single source shortest path.	K3
CO 4	Analyze dynamic programming techniques for solving problems such as multi-stage graphs, all-pairs shortest path, and the traveling salesman problem.	K4
CO 5	Evaluate and create solutions using backtracking for problems like the 8-Queens problem, sum of subsets, and Hamiltonian cycles, and apply branch and bound methods.	K5&K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	2	1
CO2	3	3	3	1	1	2	2
CO3	4	2	4	2	1	2	2
CO4	4	2	3	3	1	2	2
CO5	3	2	3	3	4	3	2

Very Strong = 4 Strong=3 Medium=2 Low=1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice questions from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1 question from each unit (3x10=30)

Semester – I – Core Course - CC - II

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC102										
CCII	OBJECT ORIENTED ANALYSIS AND DESIGN & C++	Core	6	-	-	-	5	25	75	100

Unit:1	OBJECT MODEL
The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.	
Unit:2	CLASSES AND OBJECTS
Classes and Object: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification – identifying classes and objects –Key Abstractions and Mechanism.	
Unit:3	C++ INTRODUCTION
Introduction to C++ - Input and output statements in C++ - Declarations –control structures - Functions in C++.	
Unit:4	INHERITANCE AND OVERLOADING
Classes and Objects – Constructors and Destructors – operators overloading–Type Conversion- Inheritance – Pointers and Arrays.	
Unit:5	POLYMORPHISM AND FILES
Memory Management Operators – Polymorphism – Virtual functions – Files – Exception Handling – String Handling -Templates.	
Text Books	
1	“Object Oriented Analysis and Design with Applications”, Grady Booch, Second Edition, Pearson Education.
2	“Object-Oriented Programming with ANSI & Turbo C++”, Ashok N.Kamthane, First Indian Print -2003, Pearson Education.
Reference Books	
1	Balagurusamy “Object Oriented Programming with C++”,

TMH, Second Edition, 2003.

Web References :

1	https://onlinecourses.nptel.ac.in/noc19_cs48/preview
2	https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/
3	https://www.tutorialspoint.com/object_oriented_analysis_design/ood/object_oriented_analysis.htm

Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	Understand and recall the basic concepts and elements of the object model, including classes and objects.	K1
CO2	Understand and explain the nature of classes and objects, including their relationships and classification.	K2
CO3	Apply basic C++ programming concepts, including input/output statements, declarations, control structures, and functions	K3
CO4	Analyze and implement object-oriented programming features in C++, such as inheritance, operator overloading, and type conversion	K4
CO5	Evaluate and create advanced C++ features, including polymorphism, exception handling, and templates	K5&K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create**Mapping of Course Outcomes with PSO**

COS/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	1	1	2	2
CO2	3	4	3	2	1	2	2
CO3	2	3	4	1	1	2	2
CO4	3	2	4	3	1	2	2
CO5	4	2	3	3	2	3	3

Very Strong = 4 Strong=3 Medium=2 Low=1**Question Pattern:**

Section A		Section B		Section C
2 Multiple choice questions from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1 question from each unit (3x10=30)



Semester – I – Core Course - CC - III

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC103										
CC1	PYTHON PROGRAMMING	Core	6	-	-	-	5	25	75	100
Unit:1	INTRODUCTION									
Python: Introduction–Numbers–Strings–Variables–Lists–Tuples–Dictionaries–Sets–Comparison.										
Unit:2	CODE STRUCTURES									
Code Structures: if, elseif, and else – Repeat with while – Iterate with for – Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions.										
Unit:3	MODULES, PACKAGES AND CLASSES									
Modules, Packages, and Programs: Standalone Programs – Command-Line Arguments – Modules and the import Statement – The Python Standard Library. Objects and Classes: Define a Class with class – Inheritance – Override a Method – Add a Method – Get Help from Parent with super – Inself Defense – GetandSet Attribute Values with Properties – Name Mangling for Privacy – Method Types – Duck Typing – Special Methods –Composition.										
Unit:4	DATA TYPES AND WEB									
DataTypes: Text Strings – Binary Data. Storing and Retrieving Data : File Input / Output - Structured Text Files – Structured Binary Files - Relational Databases – No SQL Data Stores. Web: Web Clients –Web Servers–Web Services and Automation										
Unit:5	SYSTEMS AND NETWORKS									
Systems: Files–Directories–Programs and Processes–Calendars and Clocks. Concurrency: Queues– Processes–Threads–Green Threads and event–twisted–Redis. Networks: Patterns – The Publish-Subscribe Model – TCP/IP – Sockets – ZeroMQ –Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and Map Reduce – Working in the Clouds.										
Text Books										
1	Bill Lubanovic, “Introducing Python”, O’Reilly, First Edition – Second Release, 2014.									
2	Mark Lutz, “Learning Python”, O’Reilly, Fifth Edition, 2013.									

Reference Books

1	David M. Beazley, “Python Essential Edition, 2009.
2	Sheetal Taneja, NaveenKumar, Approach”, Pearson Publications.

Web References:

1	https://www.programiz.com/python-programming/
2	https://www.tutorialspoint.com/python/index.htm
3	https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Course Outcomes:

On the successful completion of the course, student will be able to:

CO 1	Recall basic Python programming concepts, including variables, data types, and basic operations.	K1
CO 2	Understand and explain code structures and error handling mechanisms in Python, including conditionals, loops, functions, and exception handling.	K2
CO 3	Apply object-oriented programming principles in Python, including classes, inheritance, and special methods.	K3
CO 4	Analyze and manage data types and storage mechanisms in Python, including file operations and databases, as well as web-related technologies.	K4
CO 5	Evaluate and create solutions involving systems, networks, concurrency, and web services using Python, including advanced data processing and cloud computing.	K5&K6
K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create		

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	1	2	2	1	1	1	2
CO2	2	3	3	2	1	2	2
CO3	3	2	3	2	1	1	2
CO4	3	2	3	3	1	2	2
CO5	4	3	4	4	2	3	3

Very Strong=4

Strong=3

Medium=2

Low=1

Question Pattern:

Section A		Section B		Section C
2 Multiplechoice questions from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1question from each unit (3x10=30)

Semester – I – Elective Course EC – I

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSDE1P										
	1.ALGORITHM AND OOPS PRACTICAL	Core		-	6	-	3	40	60	100

LIST OF PROGRAMS

- 1) Write a program to solve the tower of Hanoi using recursion.
- 2) Write a program to traverse through binary search tree using traversals.
- 3) Write a program to perform various operations on stack using linked list.
- 4) Write a program to perform various operation in circular queue.
- 5) Write a program to sort an array of an elements using quick sort.
- 6) Write a program to solve number of elements in ascending order using heap sort.
- 7) Write a program to solve the knap sack problem using greedy method
- 8) Write a program to search for an element in a tree using divide & conquer strategy.
- 9) Write a program to place the 8 queen son an 8 x 8 matrix so that no two queens Attack.
- 10) Write a C++ program to perform Virtual Function
- 11) Write a C++ program to perform Parameterized constructor
- 12) Write a C++ program to perform Friend Function
- 13) Write a C++ program to perform Function Overloading
- 14) Write a C++ program to perform Single Inheritance
- 15) Write a C++ program to perform Employee Details using files.

Text Books

1	Goodrich, "Data Structures & Algorithms in Java", Wiley 3rd edition.
2	Skiena,"The Algorithm Design Manual",Second Edition, Springer, 2008

Reference Books

1	Anany Levith, "Introduction to the Design and Analysis of algorithm", Pearson Education Asia, 2003.
2	Robert Sedgewick, Phillipe Flajolet, "An Introduction to the Analysis of Algorithms", Addison - Wesley Publishing Company,1996.

Web References

1	https://onlinecourses.nptel.ac.in/noc19_cs48/preview
2	https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/
3	https://www.tutorialspoint.com/object_oriented_analysis_design/ood_obje ct_oriented_analysis.htm

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO 1	Recall the concepts of object oriented with respect to C++	K1
CO 2	Demonstrate OOPS concepts	K2
CO 3	Apply of data structures like Stack, Queue, Tree, List using C++	K3
CO 4	Implement the application of the data structures for Sorting, Searching using different techniques.	K4
CO 5	Develop the concepts of object oriented with respect to C++	K5&K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	2	2
CO2	4	3	3	2	1	2	3
CO3	3	2	3	2	1	2	3
CO4	4	3	4	3	2	2	4
CO5	4	3	3	2	1	2	3

Very Strong=4

Strong=3

Medium=2

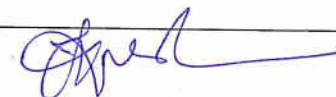
Low=1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External – 60



SEMESTER-I
Elective Course EC – I

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	2. OPEN SOURCE PRACTICAL	Core	-	-	6	-	3	40	60	100

LIST OF PROGRAMS :
I. PHP- HTML

- 1) Write a PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.

II. PHP with Database

- 2) Write a PHP program to access the data stored in a MY SQL table.
- 3) a) Write a PHP program interface to create a database and to insert a table into it.
b) Write a PHP program using classes to create a table.

III. Shell program

- 4) Write a shell program to find the details of a user session.
- 5) Write a shell program to change the extension of a given file.
- 6) Check whether the given number is prime or not.

IV. Shell program using functions

- 7) Find the biggest of given two numbers.
- 8) Write a program to check the given number is odd or even.
- 9) Write a program to generate Fibonacci Series.

V-MY SQL LAB

- 10) Create a MySQL table and write queries to add, insert, delete and modify the data.

Books for Reference

- 1 Open Source Technology Paperback – 1 January 2009 by Kailash Vadera (Author), Bhavyesh Gandhi (Author)
2. Gary Cornell, *Core Java 2 Volume I – Fundamentals*, Addison Wesley, 1999.

Web References

1. https://www.w3schools.com/php/php_syntax.asp
2. <https://www.geeksforgeeks.org/how-to-use-php-in-html/>
3. <https://www.cloudways.com/blog/connect-mysql-with-php/>

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

CO1	Show a PHP program that displays marks, total, and grade of a student in tabular format by accepting user inputs for name, number, and marks from a HTML form	K1
CO2	Demonstrate a PHP program to access the data stored in a MySQL table, explain a PHP program interface for creating a database and inserting a table into it, and illustrate a PHP program using classes to create a table."	K2
CO3	Apply a shell program to find the details of a user session, utilize another shell program to change the extension of a given file, and solve the problem of determining whether the given number is prime or not	K3
CO4	Determine the largest of two given numbers, judge whether a given number is odd or even, and generate the Fibonacci Series using a program	K4
CO5	Construct a MySQL table and devise queries to add, insert, delete, and modify the data.	K5 & K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	1	2	2
CO2	4	3	3	3	1	2	3
CO3	3	2	4	2	1	2	3
CO4	2	2	3	1	1	2	2
CO5	4	3	3	3	1	2	3

Very Strong-4 Strong=3

Medium-2

Low-1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

Semester – I – Elective Course - EC – II

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSDE2P										
	1. PYTHON PROGRAMMING PRACTICAL	Core		-	4	-	3	40	60	100

LIST OF PROGRAMS

Implement the following in Python:

1. Programs using elementary data items, lists, dictionaries and tuples
2. Programs using conditional branches,
3. Programs using loops.
4. Programs using functions
5. Programs using exception handling
6. Programs using inheritance
7. Programs using polymorphism
8. Programs to implement file operations.
9. Programs using modules.
10. Programs for creating dynamic and interactive webpages using forms.

Text Books

1	Bill Lubanovic, "Introducing Python", O'Reilly, First Edition – Second Release, 2014.
2	Mark Lutz, "Learning Python", O'Reilly, Fifth Edition, 2013.

Reference Books :

1	David M. Beazley, "Python Essential Edition, 2009.
2	Sheetal Taneja, Naveen Kumar, Approach", Pearson Publications.

Web References :

1	https://www.programiz.com/python-programming/
2	https://www.tutorialspoint.com/python/index.htm
3	https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO 1	Able to write programs in Python using OOPS concepts	K1
CO 2	To understand the concepts of File operations and Modules in Python	K2
CO 3	Implementation of lists, dictionaries, sets and tuples as programs	K3
CO 4	To develop web applications using Python	K4
CO 5	Develop the OOPS concepts available in Python	K5 & K6

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	2	1	2	2
CO2	3	3	2	2	1	2	2
CO3	2	2	3	1	1	2	2
CO4	4	3	4	4	2	3	3
CO5	4	2	3	2	1	2	2

Very Strong=4 Strong=3 Medium=2 Low=1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

Semester – I –Elective Course - EC – II

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	Externa	Total
	2. WEB APPLICATION DEVELOPMENT PRACTICAL	Core	-	-	4	-	3	40	60	100

List of Exercises

1. Write a ASP.Net program to do arithmetic operations.
2. Write an ASP.Net Program using Response and Request Object.
3. Write an ASP.Net Program using AdRotator Component
4. Write an ASP.Net program for currency converter
5. Write a ASP.Net Program for a simple shopping cart.
6. Write an ASP.Net program for multiple select list control.
7. Write an ASP.Net program using check box, list box controls.
8. Write ASP.Net Program for user authentication.
9. Write ASP.Net.Net program for online application form
10. Write delegates function program using C#.
11. Write ASP.Net Program to prepare a bio data and store it in database.
12. Write an ASP.Net program using database connectivity for student's record.

Books for References :

1. Crouch Matt J, "ASP.NET and VB.NET Web Programming", Addison Wesley 2002.
2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, EILLY, 2006.

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

CO1	Gain the knowledge about simple logics	K1
CO2	Demonstrate how to develop programs for real time applications.	K2
CO3	Apply the knowledge using various data controls	K3
CO4	Evaluatethe knowledge using the Online application forms	K4
CO5	Create the database connectivity in ASP.NET.	K5&K6
K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create		

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	1	2	1	1	1	2
CO2	4	3	4	3	2	3	3
CO3	3	3	3	2	1	2	3
CO4	3	3	3	2	1	2	3
CO5	4	4	4	3	2	2	3

Very Strong-4

Strong=3

Medium-2

Low-1

Question Paper Pattern

All the Programs are considered from the given list.

Internal – 40

External – 60.

Semester – I – Skill Based Elective Course - SEC – I

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CS1SE1										
	WEB APPLICATION AND DEVELOPMENT	Core	2	-	-	-	1	25	75	100
Units	INTRODUCTION									
I	HTML: HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphs and line break. Emphasizing test- heading and horizontal rules-list-font size, face and color-alignment- links-tables-frames.									
II	Forms & Images Using Html: Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with html forms textbox, password, list box, combo box, text area, tools for building web page front page.									
III	XML & DHTML: Cascading style sheet (CSS)-what is CSS-Why we use CSS-adding CSS to your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Document object model (DCOM)-Accessing HTML & CSS through DCOM Dynamic content styles & positioning-Event bubbling-data binding.									
IV	JavaScript : Client side scripting, What is JavaScript, How to develop JavaScript, simple JavaScript, variables, functions, conditions, loops and repetition, Advance script, JavaScript and objects, JavaScript own objects, the DOM and web browser environments, forms and validations.									
V	Ajax: Introduction, advantages &disadvantages, Purpose of it, ajax based web application, alternatives of ajax Java Script & AJAX: Introduction to array-operators, making statements-date & time-mathematics- strings-Event handling-form properties. AJAX. Introduction to jQuery and AngularJS.									
Learning Resources:										
• Recommended Texts										

1. Pankaj Sharma, "Web Technology", Sk Kataria & Sons Bangalore, 2011. (UNIT I, II, III & IV).
 2. Achyut S Godbole & Atul Kahate, "Web Technologies", 2002, 2nd Edition. (UNIT V:AJAX)
- **Reference Books**
1. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, "Mastering HTML, CSS & Javascript Web Publishing", 2016.
 2. DT Editorial Services (Author), "HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery)", Paperback 2016, 2nd Edition.

Course Outcomes:

CO1	Describe the basic structure and elements of HTML, including tags, page structure, text formatting, and links.	K1
CO2	Explain how to work with images, forms, and multimedia in HTML, including image maps, form elements, and multimedia integration.	K2
CO3	Apply CSS and XML to style and structure web pages, and use DHTML for dynamic content and interaction.	K3
CO4	Analyze and develop JavaScript code for client-side scripting, including handling variables, functions, loops, and advanced scripting techniques.	K4
CO5	Evaluate the advantages and disadvantages of AJAX, and assess its use in web applications compared to alternative technologies.	K5 & K6

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	2	1	1	2	2
CO2	2	3	3	1	1	2	2
CO3	3	3	3	2	2	3	3
CO4	3	3	3	2	2	3	3
CO5	4	4	4	3	2	3	3

Very Strong=4

Strong=3

Medium=2

Low=1

Question Pattern:

Section A
1 (a & b) question from each unit (5x15=75)

PSC204

Semester – II – Core Course - CC - IV

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC204										
	DATAMINING AND WAREHOUSING	Core	6	-	-	-	5	25	75	100
Unit:1		BASICS AND TECHNIQUES								
Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective.Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.										
Unit:2		ALGORITHMS								
Classification : Introduction –Statistical –based algorithms -distance–based algorithms - decision tree-based algorithms-neural network – based algorithms – rule – based algorithms – combining techniques.										
Unit:3		CLUSTERING AND ASSOCIATION								
Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms.Association rules: Introduction - large item sets - basic algorithms – parallel &distributed algorithms – comparing approaches- incremental rules – advanced association rules techniques – measuring the quality of rules.										
Unit:4		DATAWAREHOUSING AND MODELING								
Dataware housing: introduction – characteristics of a data ware house – data marts – other aspects of datamart. Online analytical processing : introduction – OLTP & OLAP systems. Data modeling – star schema for multidimensional view – data modeling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.										
Unit:5		APPLICATIONS OF DATA WAREHOUSE								
Developing a data WAREHOUSE: why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse. Applications of data warehousing and data mining in government: Introduction - national data warehouses – other areas for data warehousing and data mining.										
Text Books										
1	Margaret H.Dunham, “Data Mining:Introductory and Advanced Topics”, Pearson education, 2003.									

2	C.S.R. Prabhu, “Data Warehousing Concepts, Techniques, Products and Applications”, PHI, Second Edition.
Reference Books	
1	Arun K.Pujari, “Data Mining Techniques”, Universities Press (India) Pvt. Ltd., 2003.
2	Alex Berson, Stephen J. Smith, “Data Warehousing, Data Mining and OLAP”, TMCH, 2001.
3	Jiawei Han & Micheline Kamber, Academic press.
Web Resources :	
1	https://www.javatpoint.com/data-warehouse
2	https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/
3	https://www.btechguru.com/training-it-database-management-systems-file-structures-introduction-to-data-warehousing-and-olap-2-video-lecture-12054-26-151.html
Expected Course Outcomes:	
On the successful completion of the course, student will be able to:	
CO 1	Recall the basic data mining techniques and algorithms K1
CO 2	Illustrate the Statistical based, distance based and decision tree based algorithms. K2
CO 3	Apply the knowledge of Association rules, Clustering techniques and Data warehousing contents K3
CO 4	Design data warehouse with dimensional modeling and apply OLAP operations K4
CO 5	Develop data mining algorithms to solve real world problems K5& K6
K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create	

Mapping of Course Outcomes with PSO

COS/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	3	2	1	2	2
CO2	4	3	4	3	1	3	2
CO3	4	3	4	3	2	3	3
CO4	4	3	4	3	2	3	3
CO5	4	4	4	4	3	4	4

Very Strong=4

Strong=3

Medium=2

Low=1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1 question from each unit (3x10=30)

PSC 205

Semester – II – Core Course - CC – V

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC205										
	COMPILER DESIGN	Core	6	-	-	-	5	25	75	100

Unit:1	INTRODUCTION
Introduction to the phase of the Compilers – Lexical Analysis, Regular expression, Non-Deterministic automata, deterministic automata equivalent to NFA – Minimizing the states of DFA – implementation of Lexical analyzer.	
Unit:2	SYNTAX ANALYSIS
Syntax Analysis – Top down parsing concepts – Bottom up parsing, handle pruning, shift reducing parsing.	
Unit:3	INTERMEDIATE CODE GENERATION
Intermediate code generation: syntax directed definition, construction of syntax trees – Top down translation, bottom up evaluation of inherited and attributed recursive evaluations, assigning space of compiler construction time – Type checking.	
Unit:4	STORAGE ORGANIZATION
Storage Organization: Storage organization, storage allocation strategies, parameter parsing – Symbol tables – Dynamic storage allocation, Intermediate languages – Representation of declarations – Assigning statement, Boolean expressions – Back Patching, procedure calls.	
Unit:5	CODE GENERATION & OPTIMIZATION
Code generation & Optimization: Design of a code generators – Run time	

storage management, basic blocks and flow graphs, register allocation & assignment, DAG representation of basic blocks, peep hole optimization, code optimization – the principle source of optimization, optimization of basic blocks, global data flow analysis, loop optimization

Text Books

1. "Compilers Principles Technical and Tools" – Alfred Aho, Ravi
2. "Compiler construction Principle" – Dhamdare

Reference Books

1. "Compiler Design" – Reinhard Wilhelm 1995 edition.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

CO1	To describe the design of a compiler including its phases and components	K1
CO 2	Demonstrate the Top down parsing and Bottom up parsing	K2
CO 3	Apply Intermediate code generation	K3
CO 4	Evaluate storage organization, symbol tables and dynamic storage allocation	K4
CO 5	Implement the code generation and optimization.	K5&K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	2	2	2
CO2	3	3	4	2	2	3	2
CO3	4	3	4	3	2	3	3
CO4	3	3	4	3	2	3	3
CO5	4	4	4	4	3	4	4

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)		1 question from each unit (5x2=10)		1 question from each unit (3x10=30)

Semester – II – Core Course - CC – VI

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC206										
	ADVANCED JAVA PROGRAMMING	Core	6	-	-	-	5	25	75	100

Unit:1	BASICS OF JAVA
Java Basics Review: Components and event handling – Threading concepts – Networking features – Media techniques	
Unit:2	REMOTE METHOD INVOCATION
Remote Method Invocation-Distributed Application Architecture- Creating stubs and skeletons- Defining Remote objects- Remote Object Activation-Object Serialization-Java Spaces	
Unit:3	DATA BASE
Java in Databases- JDBC principles–database access-Interacting-database search–Creating multimedia databases – Database support in web applications	
Unit:4	SERVLETS
Java Servlets: Java Servlet and CGI programming- A simple java Servlet-Anatomy of a java Servlet-Reading data from a client-Reading http request header-sending data to a client and writing the http response header-working with cookies Java Server Pages: JSP Overview-Installation-JSP tags-Components of a JSP page-Expressions- Scriptlets-Directives-Declarations-A complete example	
Unit:5	ADVANCED TECHNIQUES
JAR file format creation–Internationalization–Swing Programming – Advanced java techniques	
Text Books	
1	Jamie Jaworski, “Java Unleashed”,SAMSTechmediaPublications, 1999.
2	Campione, Walrath and Huml, “The Java Tutorial”, Addison Wesley,1999.
Reference Books	
1	JimKeogh,”The Complete Reference J2EE”,Tata McGraw Hill Publishing Company Ltd, 2010.

2	David Sawyer McFarland, “Java Script AndjQuery – The Missing Manual”, Oreilly Publications, 3rd Edition,2011.
3	Deiteland Deitel, “Java How to Program”, Third Edition, PHI / Pearson Education Asia.

Web References :

1	https://www.javatpoint.com/servlet-tutorial
2	https://www.tutorialspoint.com/java/index.htm
3	https://onlinecourses.nptel.ac.in/noc19_cs84/preview

Course Outcomes:

On the successful completion of the course, student will be able to:

CO 1	Recall the basic concepts of Java Programming	K1
CO 2	Understand JDBC and RMI concepts	K2
CO 3	Apply and analyze JDBC	K3
CO 4	Design interactive applications using JavaServlet, JSP and JDBC	K4
CO 5	Implement JAR file format and Swing Programming and advanced Java techniques	K5 &K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	2	1	2	2
CO2	3	3	4	3	2	3	3
CO3	4	3	4	3	2	3	3
CO4	4	4	4	4	2	4	4
CO5	4	4	4	3	2	4	3

Very Strong=4

Strong=3

Medium=2

Low=1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1question from each unit (3x10=30)	

Semester – II –Elective Course - EC – III

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSDE3P										
	1. DATA MINING USING R PRACTICAL	Core		-	5	-	3	40	60	100

LIST OF PROGRAMS

1. Implement Apriori algorithm to extract association rule of data mining.
2. Implement k-means clustering technique.
3. Implement anyone Hierarchal Clustering.
4. Implement Classification algorithm.
5. Implement Decision Tree.
6. Linear Regression.
7. Data Visualization.

Text Books

- 1 Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson education,2003.
- 2 C.S.R. Prabhu, "Data Warehousing Concepts, Techniques, Products and Applications", PHI, Second Edition

Reference Books

- 1 Arun K.Pujari, "Data Mining Techniques", Universities Press(India) Pvt. Ltd., 2003.
- 2 AlexBerson, StephenJ.Smith, "Data Warehousing, Data Mining and OLAP", TMCH, 2001.

Web References :

- 1 <https://www.javatpoint.com/data-warehouse>

- 2 <https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/>
- 3 <https://www.btechguru.com/training--it--database-management-systems--file-structures--introduction-to-data-warehousing-and-olap-2-video-lecture--12054--26--151.html>

Course Outcomes:

CO 1	Able to write Programs using R for Association rules	K1
CO 2	Demonstrate Clustering techniques	K2
CO 3	Apply data mining techniques like classification algorithms	K3
CO 4	Evaluate decision tree and Linear regressionvisualizations techniques using R	K4
CO 5	Develop different data visualizations	K5&K6

K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	4	3	2	3	3
CO2	4	3	4	4	2	3	3
CO3	4	3	4	4	2	3	3
CO4	4	4	4	4	2	4	3
CO5	4	4	4	3	2	4	4

Very Strong=4

Strong=3

Medium=2

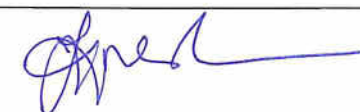
Low=1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60



Semester – II – Elective Course - EC – III

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	2. COMPILER DESIGN PRACTICAL	Core	-	-	5	-	3	40	60	100

Course Contents

LIST OF PROGRAMS :

1. Write a C program to identify whether a given line is a comment or not
2. Write a C program to recognize strings under 'a', 'a*b+', 'abb'.
3. Write a C program to test whether a given identifier is valid or not
4. Write a C program to simulate lexical analyzer for validating operators
5. Implement the lexical analyzer using JLex, flex or other lexical analyzer generating tools.
6. Write a C program for implementing the functionalities of predictive parser for the mini language specified in Note 1.
7. a) *Write a C program for constructing of LL (1) parsing.
b) *Write a C program for constructing recursive descent parsing.
8. Write a C program to implement LALR parsing
9. a) *Write a C program to implement operator precedence parsing.
b) *Write a C program to implement Program semantic rules to calculate the expression that takes an expression with digits, + and * and computes the value.
10. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree for the mini language specified in Note 1.
11. Write a C program to generate machine code from abstract syntax tree generated by the parser. The instruction set specified in Note 2 may be considered as the target code.

1	Books for Reference : B.Beizer. "Software Testing Techniques", IIEdn.Dream Tech
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	India,New Delhi,2003.
2.	K.V.K.Prasad,"Software Testing Toolds",DreamTech,India,New Delhi,2005.

Web References

<https://test-design.org/practical-exercises/>
<https://www.softwaretestinghelp.com/answers-to-the-software-testing-exercise->

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

CO1	Recall the basics of lexical analysis and comment detection.	K1
CO2	Understand and summarize the process of recognizing strings with specific patterns.	K2
CO3	Apply knowledge to test the validity of identifiers in C programs.	K3
CO4	Analyze and simulate lexical analysis for operator validation.	K4
CO5	Evaluate and implement a lexical analyzer using tools like JLex or Flex, and create various parsing techniques.	K5 & K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	1	2	1	1	1	1
CO2	3	2	3	2	2	1	2
CO3	3	2	4	2	2	1	2
CO4	4	2	4	3	2	2	2
CO5	4	3	5	4	3	3	3
Weighted% of course contribution to each PSO							

Very Strong-4	Strong=3	Medium-2	Low-1
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Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

[Signature]

PSCE 2:3P

Semester – II –Elective Course - EC – IV

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSDE4P										
	1. ADVANCED JAVA PROGRAMMING PRACTICAL	Core		-	5	-	3	40	60	100

LIST OF PROGRAMS

1. Display a welcome message using Servlet.
2. Design a Purchase Order form using Html form and Servlet.
3. Develop a program for calculating the percentage of marks of a student using JSP.
4. Design a Purchase Order form using Html form and JSP.
5. Prepare a Employee payslip using JSP.
6. Write a program using JDBC for creating a table, Inserting, Deleting records and list out the records.
7. Write a program using Javaserlet to handle form data.
8. Write a simple Servlet program to create a table of all the headers it receives along with their associated values.
9. Write a program in JSP by using session object.
10. Write a program to build a simple Client Server application using RMI.
11. Create an applet for a calculator application.

12. Program to send a text message to another system and receive the text message from the system (use socket programming).

Text Books

1. Jamie Jaworski, "Java Unleashed", SAMS Techmedia Publications, 1999.
2. Campione, Walrath and Huml, "The Java Tutorial", Addison Wesley, 1999.

Reference Books

1. Jim Keogh, "The Complete Reference J2EE", Tata McGraw Hill Publishing Company Ltd, 2010.
2. David Sawyer McFarland, "Java Script And JQuery – The Missing Manual", O'Reilly Publications, 3rd Edition, 2011.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. <https://www.javatpoint.com/servlet-tutorial>
2. <https://www.tutorialspoint.com/java/index.htm>
3. https://onlinecourses.nptel.ac.in/noc19_cs84/preview

Course Outcomes:

On the successful completion of the course, student will be able to:

CO 1	Understand to the implement concepts of Java using HTML forms, JSP & JAR	K1
CO 2	Demonstrate JDBC and RMI concepts	K2
CO 3	Apply Event handling mechanism	K3
CO 4	Implement Servlet programs	K4
CO 5	Develop Client Server application using RMI	K5&K6

K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create

Mapping of Course Outcomes with PSO

COS/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	3	3	2	3	3
CO2	4	3	4	4	2	3	3
CO3	3	3	3	3	2	3	3
CO4	4	3	4	4	2	3	3
CO5	4	3	4	4	2	3	3

Very Strong=4

Strong=3

Medium=2

Low=1

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

Semester – II –Elective Course - EC – IV

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	2. SOFTWARE TESTING PRACTICAL	Core	-	-	5	-	3	40	60	100

Course Contents**LIST OF PROGRAMS :**

1. Introduction to winrunner.
2. Recording test in analog and context sensitive mode
3. Synchronizing test
4. Checking GUI Objects
5. Checking Bitmap Objects
6. Test with TSL
7. Creating data driven test
8. Manual Testing

1	Books for Reference
	1. B.Beizer. "Software Testing Techniques",II Edn,Dream Tech India,New Delhi,2003.
2.	K.V.K.Prasad, "Software Testing Tools",DreamTech,India,New Delhi,2005.

Web References

<https://test-design.org/practical-exercises/>
<https://www.softwaretestinghelp.com/answers-to-the-software-testing-exercise->

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

CO1	Understand the basics of WinRunner, including its interface, functions, and usage.	K1
CO2	Summarize the process of recording tests in analog and context-sensitive modes.	K2
CO3	Apply synchronization techniques in test scripts.	K3
CO4	Analyze the methods for checking GUI and bitmap objects in tests.	K4
CO5	Evaluate and apply data-driven testing techniques.	K5 & K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	3	2	2	1	1	1
CO2	3	3	3	2	1	1	2
CO3	3	2	4	2	1	1	2
CO4	3	2	4	3	1	1	2
CO5	3	3	4	3	1	1	2

Very Strong-4**Strong=3****Medium-2****Low-1**

Question Pattern:

All the programs are considered from the given list

Internal – 40

External - 60

PS# 2SE2

Semester – II – Skill Based Elective Course - SEC –II

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CS2SE2										
	Software Testing	Core	2	-	-	-	1	25	75	100

Units	INTRODUCTION
I	Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.
II	Flow / Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques
III	Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing.
IV	Linguistic – Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases.
V	Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.
Recommended Texts 1. B. Beizer, "Software Testing Techniques", IIEdn., Dream Tech India, New Delhi, 2003. 2. K. V. K. Prasad, "Software Testing Tools", Dream Tech. India, New Delhi, 2005.	
Reference Books 1. Burnstein, 2003, "Practical Software Testing", Springer International Edn. 2. Kit, 1995, "Software Testing in the Real World: Improving the Process", Pearson Education, Delhi.	

3. R. Rajani, and P. P. Oak, 2004, "Software Testing", Tata Mcgraw Hill, New Delhi.	
Course Outcomes:	
CO1	Gain the basic knowledge of testing and Bugs
CO2	Demonstrate transaction Flow testing techniques
CO2	Apply the Data Flow Testing Strategies
CO3	Evaluate Metrics and test cases
CO4	Design logic based testing
K1-Remember; K2-Understand; K3-Apply; K4-Analyze; K5-Evaluate; K6-Create	

Mapping of Course Outcomes with PSO

COS/ PSO	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	3	3	2	2	3	3
CO2	3	3	4	3	2	3	3
CO3	3	3	4	3	2	3	3
CO4	3	4	4	3	2	3	3
CO5	3	3	4	3	2	3	3

Very Strong=4

Strong=3

Medium=2

Low=1

Question Pattern:

Section A
1 (a & b) question from each unit (5x15=75)

PGC - 6th Sem
PSC 307

Semester – III – Core Course - CC - VII

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC307										
	ADVANCED OPERATING SYSTEMS	Core	6	-	-	-	5	25	75	100

Course Contents

Unit I : Introduction: What Operating Systems Do – Operating System Operations - Resource Management - Security and Protection - Virtualization - Distributed Systems - Kernel Data Structures - Computing Environments . **Operating System Structures:** Operating System Services - Operating System Structure. **CPU Scheduling :** Basic Concepts – Real Time CPU Scheduling. **Deadlocks:-** System Model -Deadlock in Multithreaded Applications - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance -Deadlock Detection -Recovery from Deadlock.

Unit II : Virtual Memory: Background - Demand Paging - Copy-on-Write - Page Replacement - Allocation of Frames -Thrashing - **File-System Interface:**File Concept - Access Methods - Directory Structure - **File-System Internals:** File Systems - File-System Mounting - Partitions and Mounting - File Sharing - Virtual File Systems - Remote File Systems .

Unit III :Security And Protection: **Security** - The Security Problem - Program Threats - System and Network Threats-Cryptography as a Security Tool - User Authentication - Implementing Security Defences - **Protection:** - Goals of Protection -Principles of Protection - Protection Rings -Domain of Protection -Access Matrix -Implementation of the Access Matrix - Revocation of Access Rights - Role-Based Access Control - Mandatory Access Control(MAC).

Unit IV : Advanced Topics: Virtual Machines - Overview - History - Benefits and Features - Building Blocks - Types of VMs and Their Implementations - Virtualization and Operating-System Components .**Networks and Distributed Systems** - Advantages of Distributed Systems - Network and Distributed Operating Systems - Distributed File Systems - Remote File Access - Final Thoughts on Distributed File Systems

Unit V : Case Studies

Case Studies - Linux History - Design Principles - Kernel Modules - Process Management - Scheduling -Memory Management - File Systems - Input and Output - Interprocess Communication - Network Structure - Security -Summary.

Text Books :

1. "Operating System Concepts", Abraham Silberschatz, Peter B Galvin., Greg Gagne, Wiley Publications, 10th edition

Reference Book :

1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.
2. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.
3. Pramod Chandra P.Bhatt, An introduction to operating systems, concept and practice, PHI, Third edition, 2010.
4. Daniel.P.Bovet&MarcoCesati,"Understandingthe Linuxkernel",3rd edition,O'Reilly,2005
5. NeilSmyth,"iPhoneiOS4DevelopmentEssentials-Xcode", Fourth Edition, Payload media, 2011.

Web References :

1. https://onlinecourses.nptel.ac.in/noc20_cs04/preview
2. <https://www.udacity.com/course/advanced-operating-systems--ud189>
3. <https://minnie.tuhs.org/CompArch/Resources/os-notes.pdf>

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

CO1	Recall the design issues associated with operating systems	K1
CO2	Demonstrate various concepts of memory and file systems	K2
CO3	Make use of Security and Protection Techniques in Operating Systems.	K3
CO4	Analyze Operating Systems for Advanced Topics Of Virtual Machines and Networks and Distributed systems.	K4
CO5	Interpret the LINUX Operating System.	K5&K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	3	2	3	2	3
CO2	4	3	3	2	3	2	3
CO3	4	3	2	1	2	-	2
CO4	4	3	2	-	3	1	3
CO5	4	3	3	1	2	1	3

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiplechoice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1question from each unit (3x10=30)

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Semester – III – Core Course - CC - VIII

PSC308

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC308										
	NETWORK SECURITY AND CRYPTOGRAPHY	Core	6	-	-	-	5	25	75	100

Course Contents

Unit I :Overview: Computer Security Concepts – The OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms –A Model for Network Security – Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Rotor Machines – Steganography.

Unit II :Block Ciphers and the Data Encryption Standard: Traditional Block Cipher Structure –The Data Encryption Standard – The DES Example – The Strength of DES – Block Cipher Design Principles –Basic Concepts in Number Theory and Finite Fields: Divisibility and the Division Algorithm – The Euclidean Algorithm – Modular Arithmetic – Groups, Rings, and Fields – Finite Fields of the Form GF(p) – Polynomial Arithmetic.

Unit III :Advanced Encryption Standard: Finite Field Arithmetic– AES Structure – AES Transformation Functions – AES Key Expansion –Block Cipher Operation: Multiple Encryption and Triple DES – Stream Ciphers – RC4 – Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems – The RSA Algorithm –Diffie-Hellman Key Exchange – Elgamal Cryptographic System – Elliptic Curve Arithmetic – Elliptic Curve Cryptography – Pseudorandom Number Generation Based on an Asymmetric Cipher.

Unit IV :Cryptographic Hash Functions: Applications of Cryptographic Hash Functions – Two Simple Hash Functions – Requirements and Security – Hash Functions Based on Cipher Block Chaining – Secure Hash Algorithm(SHA) – SHA-3 – Message Authentication Codes: Requirements – Functions – Security of MACs – MACs Based on Hash Functions: HMAC – MACs based on Block Ciphers: DAA and CMAC – Authenticated Encryption: CCM and GCM – Key Wrapping.

Unit V : Digital Signatures – Elgamal Digital Signature Scheme – Schnorr Digital Signature Scheme – NIST Digital Signature Algorithm – Elliptic Curve

Digital Signature Algorithm – RSA-PSS Digital Signature Algorithm – Key Management and Distribution: Symmetric Key Distribution Using Symmetric Encryption – Symmetric Key Distribution Using Asymmetric Encryption – Distribution of Public Keys – X.509 Certificates – Public-Key Infrastructure.

Text Books :

2. William Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education / PHI, 7th Edition.

Reference Book :

1. Bernard Menezes, "Network Security and Cryptography", Cengage, 1st Edition, 2010.
2. William Stallings, "Cryptography and Network Security", Pearson Education India, Sixth Edition, 2016.
3. V.K. Jain, "Cryptography and Network Security", Khanna Book Publishing, New Delhi, 2016.
4. C.K. Shyamala, N. Harini, Dr. T. R. Padmanabhan, "Cryptography and Security", Wiley India Pvt. Ltd., 2011

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

CO1	Understand basic computer security concepts within the OSI security model.	K1
CO2	Demonstrate proficiency in applying cryptographic techniques for securing data transmission and storage.	K2
CO3	Apply skills in creating and assessing cryptographic algorithms for secure data transmission and storage.	K3
CO4	Analyze cryptographic hash functions and message authentication codes to ensure and uphold data integrity and confidentiality at a mastery level.	K4
CO5	Achieve mastery in digital signatures for authentication and proficiently manage keys within a public-key infrastructure (PKI) .	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	1	1	1	1	1	2
CO2	3	2	3	2	2	1	3
CO3	4	2	4	3	2	1	3
CO4	4	2	4	2	2	1	3
CO5	4	2	4	3	2	1	3

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1 question from each unit (3x10=30)

PSC309

Semester – III – Core Course - CC - IX

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC309										
CC1	BIG DATA ANALYTICS	Core	6	-	-	-	5	25	75	100

Course Contents

Unit I : Fundamentals of Big Data : The Evolution of Data Management – Understanding the waves of managing Data – Defining the Big Data - Big Data Management Architecture – Examining Big Data Types : Structured Data and Unstructured Data – Integrated Data types into Big Data Environment – Distributed Computing – Need of Distributed Computing Big Data

Unit II : Technology Foundation for Big Data : Big Data Technology Components - Exploring the Big Data stack - Big Data Analytics - Big Data Applications – Understanding the Basics of Virtualization – The importance and Virtualization to Big Data – Network Virtualization – Processor and Memory Virtualization – Data and Storage Virtualization – Examining the Cloud and Big Data – Making use of the Cloud for Big Data

Unit III : Big Data Management : RDBMS are Importance in a Big Data Environment – Non-Relational Database – Key Value Pair Database – Document Database – Columnar Database – Graph Database – Spatial Database – Map Reduced Fundamentals – Exploring the world of Hadoop – Explaining Hadoop – HDFS Hadoop Map Reduce

Unit IV : Analytics and Big Data : Using Big Data to get Results – Basic Analytics - Advanced Analytics – Operationalized Analytics – Modifying Business Intelligence Products to handle Big Data - Big Data Analytics Solution – Understanding Text Analytics and Big Data : Exploring Unstructured Data – Understanding Text Analytics - Text Analytics Tools for Big Data

Unit V : Big Data Implementation : Integrating Data Sources – Identifying the Data you Need – Understanding the Fundamentals of Big Data Integration – Defining Traditional ETL - Understanding ELT, Extract, Load and Transform –

Prioritizing Big Data Quality – Best Practices for Data Integration in a Big Data world

Text Books : 1. “Big Data for Dummies” – by Judith Hurwitz, Alan Nugent- Dr. Fern Halper and Marcia Kaufman

Reference Book :

1. Big Data Fundamentals Concepts, Drivers & Techniques – Thomas Erl, Pearson India.
3. Big Data In Practice – Bernard Marr, Wiley.
4. Big Data And Analytics – Seema Acharya, Subhashini Chellappan, Wiley

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

CO1	Recall the concepts and techniques of Data Science, Big Data Analytics and its tools	K1
CO2	Understand Big Data Technology Components and Making use of the Cloud for Big Data	K2
CO3	Apply and review the computing technology for big data in Hadoop, and NoSQL environment	K3
CO4	Analyze the concepts of data science and big data analytics and techniques	K4
CO5	Explore the Big Data implementation and best practices for data integration in a Big Data world	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	2	-	1	-	3
CO2	4	3	2	-	2	1	3
CO3	4	3	3	2	2	1	3
CO4	3	2	3	2	1	1	2
CO5	4	3	3	2	2	1	3

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1 question from each unit (3x10=30)

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PSC 310

Semester – III – Core Course - CC - X

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSC310										
	CLOUD COMPUTING	Core	6	-	-	-	5	25	75	100

Course Contents

UNIT I: INTRODUCTION

Cloud Computing Introduction, From, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.

UNIT II: CLOUD COMPUTING FOR EVERYONE

Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping, schedules, managing projects, presenting on road.

UNIT III: USING CLOUD SERVICES

Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets and databases.

UNIT IV: OUTSIDE THE CLOUD

Evaluating web mail services, Evaluating instant messaging, Evaluating web conferencing tools, creating groups on social networks, Evaluating online groupware, collaborating via blogs and wikis

UNIT V: STORING AND SHARING

Understanding cloud storage, evaluating online file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.

Text Book:

1. Michael Miller's "Cloud Computing", Pearson Education, New Delhi, 2009.

Books for Reference:

1. Anthony T. Velte, "Cloud Computing: A Practical Approach", 1st Edition, Tata McGraw – Hill Education Private Limited, 2009.

Web Reference:

1. <https://nptel.ac.in/courses/106/105/106105167/>
2. https://www.tutorialspoint.com/cloud_computing/index.htm
3. <https://www.javatpoint.com/cloud-computing-tutorial>

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

CO1	Define the concepts of Cloud and its services	K1
CO2	Summarizing the activities involved in Event & Project Management	K2
CO3	Make use of Cloud applications in Word Processing, Spreadsheets, Mail, Calendar, Database.	K3
CO4	Analyze the importance of cloud in social networks	K4
CO5	Adapting cloud storage and specifying the importance of file sharing.	K5 & K6

Course outcome should cover the entire Syllabus.

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	-	2	2	3	2	2
CO2	4	-	2	1	3	1	-
CO3	3	3	4	1	2	1	-
CO4	3	2	3	4	3	1	1
CO5	3	3	2	1	1	-	-

Very Strong-4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1 question from each unit (3x10=30)	

PSC E3:IP

Semester – III – Elective Course EC – V

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CSDE4P										
	1. CLOUD COMPUTING PRACTICAL	Core		-	4	-	3	40	60	100

List of Exercises

1. Working with Google drive to create spread sheet and notes
2. Create a Invitation for a Workshop using Google Slides
3. Build an Feedback form for an lecture using Google Forms
4. To implement program on SAAS to create an word document of your cloud computing assignment and store locally and on cloud with DOC and PDF format.
5. Creating a To-Do List in cloud platform .
6. To Implement web services by create customized BlogSpot and Collaborating via Wikis
7. Host a Static Webpage
8. Create a Inventory report in cloud platform
9. Working with a Image Editor in cloud.
10. Creating a resume using an application in cloud.

Books for Reference:

1. U Michael Miller's "Cloud Computing", Pearson Education, New Delhi, 2009.
2. Anthony T. Velte, "Cloud Computing: A Practical Approach", 1st Edition,

Tata McGraw – Hill Education Private Limited, 2009.

Web Reference:

1. <https://nptel.ac.in/courses/106/105/106105167/>
2. https://www.tutorialspoint.com/cloud_computing/index.htm
3. <https://www.javatpoint.com/cloud-computing-tutorial>

Course Outcomes : On completion of the course, students will be able to:		Level
CO1	Gain the concepts of Google drive for creating spread sheets	K1
CO2	Demonstrate the Google slides creation in Cloud Environment.	K2
CO3	Identify the different styles using Google forms.	K3
CO4	Analyze To-Do list in Cloud platform.	K4
CO5	Evaluate the customized BlogSpot and host a Static webpage.	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	1	3	-	1	3	2
CO2	4	1	2	-	1	2	-
CO3	3	2	2	-	1	1	-
CO4	3	-	-	1	-	3	1
CO5	-	-	3	2	-	-	-

Very Strong-4

Strong-3

Medium-2

Low-1

Question Paper Pattern

All the Programs are considered from the given list.

Internal – 40

External – 60.

Semester – III – Elective Course EC – V

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	Externa	Total
	2.BIG DATA ANALYTICS PRACTICAL	Core	-	-	4	-	3	40	60	100

List of Exercises

1. Install Apache Hadoop
2. Develop a MapReduce program to calculate the frequency of a given word in a given file.
3. Develop a MapReduce program to find the maximum temperature in each year.
4. Develop a MapReduce program to find the grades of student's.
5. Develop a MapReduce program to implement Matrix Multiplication.
6. Develop a MapReduce to find the maximum electrical consumption in each year given electrical consumption for each month in each year.
7. Develop a MapReduce to analyze weather data set and print whether the day is shinny or cool day.
8. Develop a MapReduce program to analyze Titanic ship data and to find the average age of the people (both male and female) who died in the tragedy. How many persons are survived in each class.

The titanic data will be..

Column 1 :PassengerId Column 2 : Survived (survived=0 &died=1)

Column 3 :Pclass Column 4 : Name

Column 5 : Sex Column 6 : Age

Column 7 :SibSp Column 8 :Parch

Column 9 : Ticket Column 10 : Fare

Column 11 :Cabin Column 12 : Embarked

Books for References :

1. Big Data Fundamentals Concepts, Drivers & Techniques – Thomas Erl, Pearson India.
2. Big Data In Practice – Bernard Marr, Wiley.
3. Big Data And Analytics – Seema Acharya, SubhashiniChellappan, Wiley.

Web References:

<https://www.geeksforgeeks.org/what-is-big-data-analytics/>
<https://www.simplilearn.com/what-is-big-data-analytics-article>

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

CO1	Get familiar with Hadoop distributions, configuring Hadoop and performing File management tasks	K1
CO2	Demonstrate MapReduce in Hadoop frameworks	K2
CO3	Implement MapReduce programs in variety applications	K3
CO4	Explore MapReduce support for debugging	K4
CO5	Build different approaches for building Hadoop MapReduce programs for real-time	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	3	2	3	3	3
CO2	4	2	2	1	3	3	3
CO3	4	3	3	2	3	3	2
CO4	4	2	2	3	2	3	2
CO5	4	3	3	3	2	3	3

Very Strong-4

Strong-3

Medium-2

Low-1

Question Paper Pattern

All the Programs are considered from the given list.

Internal – 40

External – 60.

SEMESTER-III-INTERDISCIPLINARY SKILL ENHANCEMENT COURSE

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
P23CS31DC										
	CYBER SECURITY	Core	2	-	-	-	1	25	75	100

Course Contents

UNIT I : Cyber security basics-Steps to Improve Computer Security-Stay safe from spyware threats with a specialized security solution-Keeping Windows operating system and vulnerable applications up to date Use a standard user account in Windows operating system to go online-UAC-Going online with a secure browser-About trust public and free Wi-fi networks-log out- posting private information on your social media accounts-accessing Questionable web locations

UNIT II : Internet Security Myths-Internet Security Myths That You Need To Forget-Master basic security terms: Essential cyber security terms-Antispyware Software-Antivirus Software-Cyber-Attack-Drivebydownload-Exploit-Keylogging-Malvertising-Malware-Patching-Phishing-Ransomware-Social engineering-Spam-Trojan-URL or web content filtering-Virus-Vulnerability-Zero-Day virus.

UNIT III : Mastering password security: The 7 Deadly Sins of Password Management- creating a good password in easy steps-safely store your passwords-Next-generation anti-hacking tools-Steps to Bulletproof Your Digital Security.

UNIT IV : Guidelines for safe internet browsing-safe browsing-tips for buying online-clearing cache for browsers: Clearing cache for Chrome Browsers above version 10-9.3.2 Clearing cache for Chrome Browsers from version 1 to 9-Clearing cache for Safari for iOS, iPhone and iPad-Clearing cache for Safari for Mac OS x-Clearing cache for Safari for windows.

UNIT V : Wireless security: what is Wireless LAN?- major issues with WLAN-Email and social media security : Safe browsing guidelines for

social networking sites.

References :

1. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf (Unit I, II, III)
2. <http://www.uou.ac.in/sites/default/files/slm/FCS.pdf> (Unit-IV, V)

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

CO1	Recall basics of cyber security and Wi-Fi measures	K1
CO2	Infer and interpret the knowledge about internet security myths	K2
CO3	Apply the password management techniques and protect the passwords	K3
CO4	Learn and analyze the concept of safe internet browsing with different kinds of browsers	K4
CO5	Adapt the knowledge about wireless LAN, Email and social media security.	K5 & K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	1	-	1	-	3
CO2	4	3	2	-	1	-	3
CO3	4	2	2	1	1	-	3
CO4	4	3	2	1	1	2	2
CO5	4	3	3	2	2	1	2

Very Strong-4 Strong-3

Medium-2

Low-1

Question Pattern:

Section A

1 (a & b) question from each unit (5x15=75)

P23C8C411 IVth sem

Semester – IV – Core Course - CC - XI

PSC411

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	ADVANCED MACHINE LEARNING	Core	6	-	-	-	5	25	75	100

Course Contents

Unit I: Introducing Machine Learning: The Origins of Machine Learning, Uses and Abuses of Machine Learning_Basics of Machine Learning Algorithm Model Works – Steps to apply Machine Learning - Choosing a Machine Learning Algorithm - Using Machine Learning concepts.

Managing and Understanding Data: Data Structures, Vectors And Factors: Lists, Data frames, Matrixes and arrays - Managing Data - Exploring and Understanding Data: Exploring the Structure of Data, Exploring Numeric variables – Exploring Categorical Variables- Exploring Relationships between Variables.

Unit II : Lazy Learning–Classification Using Nearest Neighbors: The KNN Algorithm – Diagnosing Breast Cancer with the KNN Algorithm-Probabilistic Learning – Classification Using Naive Bayes: Basic concepts of Bayesian Methods- The Naïve Bayes Algorithm- Example – filtering Mobile Phone Spam with the Naive Bayes Algorithm.

Divide and Conquer – Classification Using Decision Trees and Rules: Understanding Decision Trees – Example–Identifying Risky Bank Loans using C5.0 Decision Trees-Understanding Classification Rules- Example – Identifying Poisonous Mushrooms with Rule Learners.

Unit III : Black Box Methods Neural Networks and Support Vector Machines: Understanding Neural Networks from Biological to Artificial Neurons, Activation Functions, Network Topology, Training Neural Networks with Back propagation - Modeling the Strength of Concrete with ANNs- Understanding Support Vector Machines- Performing OCR with SVMs- Finding Patterns – Market Basket Analysis Using Association Rules: Understanding Association Rules – Example – Identifying Frequently Purchased Groceries with Association Rules.

Unit IV : Historical trends in Deep Learning, Machine Learning Basics: Learning algorithms Supervised Learning algorithms, Unsupervised Learning algorithms,

Challenges Motivating Deep Learning.

Deep forward Networks: Learning XOR, Gradient based learning, Hidden Units, Architecture design, Back propagation and differentiation Algorithms.

Unit V : Convolutional networks: Convolutional operation, motivation, Pooling, Convolution and Pooling as an infinitely strong prior, variants of the basic Convolution function, auto encoders, application of Deep learning.

Text Book :

1. Brett Lantz, “Machine Learning with R”, Addison-Wesley Packt Publishing, 2013.
2. Taweh Beysolow, “Introduction to Deep Learning Using R: A Step-by-Step Guide to Learning and Implementing Deep Learning Models Using R”, San Francisco, California, USA, 2017.

Books for Reference:

1. Daniel T.Larose, Chantal D.Larose, “Data mining and Predictive analytics”, Second Ed., Wiley Publication, 2015.
2. Bertt Lantz, “Machine Learning with R:Expert techniques for predictive modeling”, 3rd Edition, April 15, 2019,
3. Jason Bell, “Machine Learning: Hands-On for Developers and Technical Professionals”, Wiley Publication, 2015.

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

CO1	Recall the Machine Learning Algorithms	K1
CO2	Understand the Risky Bank Loans using C5.0 Decision Trees- Understanding Classification Rules.	K2
CO3	Identify the Purchased Groceries with Association Rules.	K3
CO4	Analyze the Supervised Learning algorithms, Unsupervised Learning algorithms and Deep Learning.	K4
CO5	Adapt the variants of the basic Convolution function, auto encoders, application of Deep learning.	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	2	3	2	2	2	3
CO2	4	3	4	3	3	3	3
CO3	3	2	3	2	2	2	3
CO4	4	3	4	3	2	3	4
CO5	4	3	4	4	2	3	4

Very Strong- 4

Strong-3

Medium-2

Low-1

Question Pattern:

Section A	Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (3x10=30)

[Signature]

P23CSC412

Semester – IV – Core Course - CC - XII

P3C412

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	INTERNET OF THINGS	Core	5	-	-	-	5	25	75	100

Unit I: Introduction to Internet of Things– Introduction – Physical Design of IoT –Logical Design of IoT – IoT Enabling Technologies – IoT Levels & Deployment Templates.

Unit II : Domain Specific IoTs –Introduction – Home Automation – Cities – Environment –Energy – Retail – Logistics – Agriculture – Industry – Health & Life Style.

Unit III : IoT and M2M – Introduction – M2M – Difference between IoT and M2M –SDN and NFV for IoT. IoT System Management with NETCONF-YANG –Need for IoT Systems Management –Simple Network Management Protocol(SNMP) -Network Operator Requirements -NETCONF – YANG – IoT Systems Management with NETCONF-YANG.

Unit IV : IoT Platforms Design Methodology –Introduction – IoT Design Methodology –Case Study on IoT System for Weather Monitoring – Motivation for using Python– IoT Physical Devices & Endpoints – What is an IoT Device – Exemplary Device : Raspberry Pi – About the Board – Linux on Raspberry Pi – Raspberry Pi Interfaces–Programming Raspberry Pi with Python – Other IoT Devices.

Unit V : Case Studies Illustrating IoT Design – Cities –Environment – Agriculture – Productivity Applications.

Text Book:

1. ArshdeepBahga and Vijay Madiseti, "Internet of Things: (A Hands-on Approach)", Universities Press (INDIA) Private Limited 2015.

Books for Reference:

1. Michael Miller, "The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World", kindle version.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", Apress Publications 2013, 1st Edition,.
3. WalteneagusDargie, ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"
4. CunoPfister, "Getting Started with the Internet of Things", O'Reilly Media 2011

Web Resources:

1. <https://www.simplilearn.com>
2. <https://www.javatpoint.com>
3. <https://www.w3schools.com>

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

CO1	Recall the IoT Devices, Gateways and Data Management in IoT.	K1
CO2	Demonstrate IoT applications in different domain and be able to analyze their performance	K2
CO3	Analyze basic IoT applications on embedded platform	K3
CO4	Evaluate the IoT applications for Industry.	K4
CO5	Adapt the privacy and Security issues in IoT	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	2	2	1	1	2
CO2	4	3	4	3	2	2	3
CO3	3	2	3	3	1	1	2
CO4	4	3	4	4	2	2	3
CO5	4	2	3	2	4	1	2

Very Strong-4 Strong=3

Medium-2

Low-1

Question Pattern:

Section A	Section B	Section C
2 Multiplechoice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (3x10=30)

P23CSE4:1P

SEMESTER – IV- Elective Course EC -VI

PSC-E4:1P

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	Exter	Total
P23CSDE4P										
	1. ADVANCED MACHINE LEARNING PRACTICAL	Core		-	6	-	3	40	60	100

List of Exercises

1. To plot various types of charts to visualize data using matplotlib lib library in Python.
2. Perform machine learning process with linear regression algorithm using built-in dataset iris and evaluate it.
3. To Use Function Operations.
4. To Use List and Tuple Operations.
5. To Use Dictionary Operations in Python
6. To Use Perform String Operations.
7. To Use CSV and JSON file processing using Pandas Library in Python
8. To Use String Operations.
9. To Use CSV and JSON file processing using Pandas Library in Python
10. To Use Pandas Library Operations in Python.
11. To Use machine learning process with KNeighbors Classifier algorithm using built- in dataset iris and visualize it.
12. To Use Numpy Library Operations in Python

Books for References:

1. Brett Lantz, "Machine Learning with R", Addison-Wesley Packt Publishing, 2013.
- T. Taweh Beysolow, "Introduction to Deep Learning Using R: A Step-by-Step Guide to Learning and Implementing Deep Learning Models Using R", San Francisco, California, USA, 2017.
2. Daniel T. Larose, Chantal D. Larose, "Data mining and Predictive analytics", Second Ed., Wiley Publication, 2015
3. Bertt Lantz, "Machine Learning with R: Expert techniques for predictive modeling",

3rd Edition, April 15,2019,

4. Jason Bell, "Machine Learning: Hands-On for Developers and Technical Professionals", Wiley Publication,2015

Web Reference:

1. [https://www.javatpoint.com/advanced machine learning.](https://www.javatpoint.com/advanced-machine-learning)
2. [https://teachics.org/machine learning/simple-programs-for machine learning python/](https://teachics.org/machine-learning/simple-programs-for-machine-learning-python/)

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

CO1	Recall the plot various types of charts and Machine learning process with linear regression algorithm using dataset iris	K1
CO2	Able to implement List, Tuple and Dictionary operations.	K2
CO3	Apply String Operations.	K3
CO4	Implement Pandas Library Operations and Machine learning process with K-Nearest Neighbour Classifier algorithm	K4
CO5	Design the Numpy Library Operations in Python.	K5&k6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	4	3	4	3	2	2	3
CO2	3	2	3	2	1	2	3
CO3	2	2	2	2	1	2	2
CO4	4	3	4	3	2	3	4
CO5	4	3	4	3	2	3	4

Very Strong – 4 Strong-3

Medium-2

Low-1

Question Paper Pattern

All the Programs are considered from the given list.

Internal – 40

External – 60.

PSCE 4:2P

SEMESTER – IV- Elective Course EC -VI

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	Externa	Total
	2. INTERNET OF THINGS PRACTICAL	Core	-	6	-	3		40	60	100

List of Exercises

1. Blinking two LEDs
2. Fading LED
3. Choosing LED to blink
4. Implementing traffic signal using LEDs
5. Sketch to use touch sensor
6. Sketch to use Vibration sensor
7. Sketch to use Ultrasonic sensor
8. Sketch to use gas sensor
9. Sketch to use water level sensor
10. Sketch to use PIR sensor
11. Sketch to use IR sensor
12. Sketch to use Sound sensor
13. Sketch to use humidity sensor

Books For References:

1. The Future and IoT: Building the Internet of Things, Author: Jesse Tate, Elliott Dianm, Sold by: Amazon Asia – Pacific Holdings Private Limited.
2. Programming Arduino: Getting Started with Sketches, Second Edition (Tab) 2nd Edition, Author: Simon Monk, Sold by: Amazon Asia-Pacific Holdings Private Ltd.
3. The Internet of Things: Applications to the Smart Grid and Building Automation by – Olivier Hersent, Omar Elloumi and David Boswarthick.

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

CO1	Recall the importance of internet of things in present scenario	K1
CO2	Able to implement the functions of various sensors and its connections	K2
CO3	Identify the design the circuits for Arduino programming	K3
CO4	Analyze the circuit diagram of various sensors using duino sketch	K4
CO5	Develop Arduino sketch for home and industrial applications	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	1	2
CO2	4	2	3	3	1	2	3
CO3	4	2	3	3	1	2	3
CO4	4	2	3	3	1	2	3
CO5	4	3	4	4	2	2	4

Very Strong-4

Strong=3

Medium-2

Low-1

Question Paper Pattern

All the Programs are considered from the given list.

Internal – 40

External – 60.

ELECTIVE COURSE- EC

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	ADVANCED DATABASE SYSTEMS	Core	4	-	-	-	3	25	75	100

Course Contents

UNIT -I : Relational and parallel Database Design: Basics, Entity Types, Relationship Types, ER Model, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF and 5NF. Architecture, I/O Parallelism, Inter query Parallelism, Intra query Parallelism, Intra operation Parallelism, Interoperation Parallelism

UNIT -II : Distributed and Object based Databases: Architecture, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control, Query Processing. Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multi set, Object Identity and Reference Types, Object Oriented versus Object Relational.

UNIT -III : Spatial Database: Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing.

UNIT -IV : XML Databases: XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying, XHTML, and Illustrative Experiments.

UNIT -V : Temporal Databases: Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design, Integrity Constraints, Multimedia Databases: Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.

Text Book:

- Abraham Silberschatz, Henry F Korth , S Sudarshan, "Database System Concepts", 6th edition , McGraw-Hill International Edition , 2011.
- C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education Reprint 2016.

Books for Reference:

- RamezElmasri, Shamkant B Navathe, "Fundamental of Database Systems", Pearson, 7th edition 2016.
- Thomas Connolly, Carolyn Begg., "Database Systems a practical approach to Design, Implementation and Management ", Pearson Education, 2014.

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

CO1	Get the knowledge of ER model and the need of normalization	K1
CO2	Summarize the mechanisms used in distributed databases	K2
CO3	Identify the Spatial Database Characteristics and Recursive Query Processing	K3
CO4	Evaluate the routing metrics and protocols of Network layer	K4
CO5	Develop the basics of temporal and multimedia databases	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	2	1	1	2
CO2	4	3	3	3	2	2	3
CO3	4	3	4	3	2	2	3
CO4	4	3	4	4	2	2	3
CO5	4	3	3	3	2	2	2

Very Strong-4 Strong = 3

Medium-2

Low-1

Question Pattern:

Section A		Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1 question from each unit (3x10=30)

ELECTIVE COURSE- EC

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	BLOCK CHAIN TECHNOLOGY	Core	4	-	-	-	3	25	75	100

Course Contents

Unit: I : Introduction to Block chain – The big picture of the industry – size, growth, structure, players. Bit coin versus Crypto currencies versus Block chain – Distributed Ledger Technology (DLT). Strategic analysis of the space – Block chain platforms, regulators, application providers. The major application: currency, identity, chain of custody.

Unit: II : Advantage over conventional distributed database, Block chain Network, Mining Mechanism, Distributed Consensus, Block chain 1.0, 2.0 and 3.0 – transition, advancements and features. Privacy, Security issues in Block chain..

Unit: III : Crypto currency – History, Distributed Ledger, Bit coin protocols – Symmetric-key cryptography – Public-key cryptography – Digital Signatures – High and Low trust societies – Types of Trust model: Peer-to-Peer, Leviathan, and Intermediary. Application of Cryptography to Block chain

Unit: IV : Crypto currency Regulation– Stakeholders, Roots of Bit coin, Legal views– exchange of crypto currency–Black Market– Global Economy. Crypto economics – assets, supply and demand, inflation and deflation – Regulation.

Unit: V : Opportunities and challenges in Block Chain – Application of block chain: Industry 4.0 – machine to machine communication –Data management in industry 4.0–future prospects. Block chain in Health 4.0 – Block chain properties – Healthcare Costs – Healthcare Quality – Healthcare Value – Challenges for using block chain for healthcare data.

Text Book:

- Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, “Bit coin and Crypto currency Technologies: A Comprehensive Introduction”, Princeton University Press (July 19, 2016).
- Antonopoulos, “Mastering Bit coin: Unlocking Digital Crypto currencies.

Books for Reference:

- Satoshi Nakamoto, “Bit coin: A Peer-to-Peer Electronic Cash System”
- Rodri goda Rosa Righi, Antonio Marcos Alberti, Madhusudan Singh, “Block chain Technology for Industry 4.0” Springer 2020.

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

CO1	Recall block chain technology and crypto currency	K1
CO2	Illustrate mining mechanism in block chain	K2
CO3	Apply and identify security measures, and various types of services that allow people to trade and transact with bit coins	K3
CO4	Interpret and analyze Block chain in health care industry	K4
CO5	Develop security, privacy, and efficiency of a given Block chain system	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	2	1	4	1	2
CO2	3	3	3	2	2	2	3
CO3	4	3	4	3	3	2	3
CO4	4	4	4	4	3	3	3
CO5	4	4	4	4	3	3	4

Very Strong-4

Strong=3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1 question from each unit (3x10=30)	

ELECTIVE COURSE- EC

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	ROBOTIC PROCESS AUTOMATION FOR BUSINESS	Core	4	-	-	-	3	25	75	100
Unit: I : Introduction to RPA – Overview of RPA – Benefits of RPA in a business environment – Industries & domains fit for RPA – Identification of process for automation – Types of Robots – Ethics of RPA & Best Practices – Automation and RPA Concepts – Different business models for implementing RPA – Centre of Excellence –Types and their applications – Building an RPA team – Approach for implementing RPA initiatives										
Unit: II : Role of a Business Manager in Automation initiatives – Skills required by a Business Manager for successful automation – The importance of a Business Manager in automation – Analyzing different business processes – Process Mapping frameworks – Role of a Business Manager in successful implementation – Understanding the Automation cycle – First 3 automation stages and activities performed by different people.										
Unit: III : Evaluating the Automation Implementation Detailed description of last 3 stages and activities performed by different people – Role of a Business Manager in successful completion – Activities to be performed post – implementation – Guidelines for tracking the implementation success – Metrics/Parameters to be considered for gauging success – Choosing the right licensing option – Sending emails – Publishing and Running Workflows.										
Unit: IV : Ability to process information through scopes/systems – Understand the skill of information processing and its use in business – Leveraging automation – Creating a Robot – New Processes. Establish causality by variable behaviour – Understand the skill of drawing inference or establishing causality by tracking the behaviour of a variable as it varies across time/referenced variable – Leveraging automation for this skill – Robot & new process creation.										
Unit: V : Inference from snapshots of curated terms – Omni – source data										

curation – Multisource trend tracking – Understand the skill of drawing inference from the behavior of curated terms by taking snapshots across systems in reference to time/variable(s) – Leveraging automation for this skill – Robot creation and new process creation for this skill.

Text Book:

- Alok Mani Tripathi” Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool” Packet Publishing Limited March 2018.
- Tom Taulli “ The Robotic Process Automation Handbook” Apress, February 2020.

Books for Reference:

Steve Kaelble” Robotic Process Automation” John Wiley & Sons, Ltd., 2018.

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

CO1	Recall the the benefits and ethics of RPA	K1
CO2	Summarize the Automation cycle and its techniques	K2
CO3	Identify the inferences and information processing of RPA	K3
CO4	Evaluate Apply RPA in Business Scenarios	K4
CO5	Implement Robots & leveraging automation	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2	2	2	1	4	1	2
CO2	3	3	3	2	2	2	3
CO3	4	3	4	3	3	2	3
CO4	4	4	4	4	3	3	3
CO5	4	4	4	4	3	3	4

Very Strong-4

Strong=3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)		1question from each unit (3x10=30)

ELECTIVE COURSE-EC

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	MOBILE COMPUTING	Core	4	-	-	-	3	25	75	100
Unit: I : Introduction: Advantages of Digital Information – Introduction to Telephone Systems – Mobile communication: Need for Mobile Communication – Requirements of Mobile Communication – History of Mobile Communication.										
Unit: II : Introduction to Cellular Mobile Communication – Mobile Communication Standards – Mobility Management – Frequency Management – Cordless Mobile Communication Systems.										
Unit: III : Mobile Computing: History of data networks – Classification of Mobile data networks – CDPD System – Satellites in Mobile Communication: Satellite classification – Global Satellite Communication – Changeover from one satellite to other – Global Mobile Communication – Interferences in Cellular Mobile Communication.										
Unit: IV : Important Parameters of Mobile Communication System – Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Local Loop Architecture: Components in WLL – Problems-in WLL – Modern Wireless Local Loop – Local Multipoint Distribution Service – Wireless Application Protocol.										
Unit: V : CDMA Technology and Fiber Optic Microcellular Mobile Communication – Ad hoc Network and Bluetooth technology – Intelligent Mobile Communication system – Fourth Generation Mobile Communication systems.										

Text Book:

- T.G. Palanivelu, R. Nakkeeran, "Wireless and Mobile Communication", PHI Limited, 2009. Campione, Walrath and Huml, "The Java Tutorial", Addison Wesley, 1999.
- Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2007.

Books for Reference:

- Asoke K Talukder, Hasan Ahmed, Roopa Yavagal, "Mobile Computing", TMH, 2010.

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

CO1	Recall the need and requirements of mobile communication	K1
CO2	Infer mobile computing applications and techniques	K2
CO3	Analyze satellite communication in mobile computing	K3
CO4	Explore wireless local loop architecture	K4
CO5	Develop various mobile communication technologies	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	2	1	2
CO2	4	3	4	2	2	2	3
CO3	4	3	4	2	2	2	3
CO4	4	3	4	3	2	2	3
CO5	4	4	4	4	3	3	4

Very Strong-4

Strong=3

Medium-2

Low-1

Question Pattern:

Section A		Section B		Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 (a & b) question from each unit (5x5=25)	1question from each unit (3x10=30)	

VALUE ADDED COURSE

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	OPEN SOURCE TECHNOLOGIES	Core	2	-	-	-	2	25	75	100

Course Contents

Unit I :Open Source - Introduction : Open Source – Open Source vs. Commercial Software – Linux: Introduction - Download and Install - Decisions, Decisions – Linux Partition Sizes - Accounts - Security - Basic UNIX: Shell - Owner, Groups, Permissions, Ownership - Processes - PATH and Environment - Commands-Basic File System Essentials - Useful Programs.

Unit II :Apache Web server: Starting and Stopping and Restarting Apache-Configuration – Securing Apache - Create the Web Site- Apache Log Files.

Unit III:My SQL: Commands - Database Independent Interface - Tables – Loading and Dumping Database.

Unit IV :PHP: Embedding PHP into HTML -Configuration - Language Syntax: Variables - Data Types - Web variables - Operators - Flow Control Constructs Writing PHP Papers.

Unit V :Built in PHP function - Important Functions - Array Functions – String Functions – Other Functions - PHP and MySQL: MySQL Functions.

Text Books :

James Lee and Brent Lee “Open Source Development with LAMP - Using Linux, Apache, MySQL ,Perl and PHP”, Pearson Education , 2009.

Reference Book :

1. Json Gerner, Elizabeth Naramore, Morgan Owens and Matt Warden,

“Professional LAMP -Using Linux, Apache, My SQL and PHP5Web development”, Wiley Publisher, 2006.

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

CO1	Gain knowledge in Linux administration and developing application based on Linux.	K1
CO2	Infer the knowledge about Installation and configuration of Apache	K2
CO3	Examine the basic MYSQL commands and some of the administrative details.	K3
CO4	Identify PHP variables ,operators and flow control	K4
CO5	Adapt the Array functions and string functions and MYSQL functions.	K5&K6

Mapping of Course Outcomes with PSO

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	2	1	2	1	2
CO2	4	3	4	2	2	2	3
CO3	4	3	4	3	2	2	3
CO4	3	2	3	3	2	2	2
CO5	4	4	4	4	3	3	4

Very Strong-3

Strong=3

Medium-2

Low-1

Question Pattern:

Section A	Section B	Section C
2 Multiple choice question from Each unit (10x1=10)	1 question from each unit (5x2=10)	1 question from each unit (3x10=30)

