CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK
BCA
(Those who have joined in the Academic year 2023-24 onwards)

PROGRAM OUTCOMES (PO)

PO 1	Understand and apply mathematical foundation, computing and domain knowledge for the conceptualization of computing models from defined problems
PO 2	Ability to demonstrate knowledge of Computer science and its applications in order to enhance basic understanding of various software technologies.
PO 3	Learn to design innovative solutions for solving real life business problems and addressing business development issues with a passion for quality competency and holistic approach.
PO 4	Ability to adapt new technologies for upgrading their skills and contributing to a lifelong learning.
PO 5	Ability to become employable in a variety of IT companies and government sector and also seek entrepreneurship opportunities for the development of an individual and society at large.

PROGRAM SPECIFIC OUTCOME (PSO)

PSO 1	To engage in professional development and to pursue post graduate education in the fields of information technology and Computer Applications.
PSO 2	Analyze and synthesis computing systems through quantitative and qualitative techniques.
PSO 3	Competence to use research, experiment, contemporary issues to solve industrial problems.
PSO 4	Expertise to face the challenges of changing trends and career opportunities as per local and global industry needs.

PO AND PEO MAPPING

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6	PEO7
PO1	S	M	S	S	M	M	S
PO2	S	M	M	S	M	M	S
PO3	M	S	S	M	S	S	S
PO4	S	S	M	S	S	S	M
PO5	M	M	M	L	S	M	M

CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK

COMPUTER APPLICATIONS

Part	Courses	Subject	Code	Cr.	Hrs
SEMESTER I					
I	Lang. – I	nghJj;jkpo; - I	230103101	3	6
II	Lang. - II	General English	231003101	3	4
III	CC – 1	Object Oriented Programming Concepts Using C++	232703101	4	5
	CC – 2	Practical : C++ Programming	232703102	4	5
	EC – I [Any One]	Multimedia Systems	232703103	3	4
		Biometrics	232703104		
		E-Commerce	232703105		
IV	SEC –I(NME)	Introduction to Computers	234603127	2	2
IV	FC	Structured Programming Language in C	234403127	2	2
	AECC- Soft Skill – 1	Soft Skill - I	236003101	2	2
	Total			**23**	**30**
SEMESTER II					
I	Lang. -I	nghJj;jkpo; - II	230103201	3	6
II	Lang. -II	General English	231003201	3	4
III	CC – 3	Python Programming	232703201	4	5
	CC - 4	Practical : Python Programming	232703202	4	5
	EC – II [Any One]	Information Security	232703203	3	4
		Cyber Forensics	232703204		
		Human Computer Interaction	232703205		
. IV	SEC –II(NME)	Introduction to internet	234603227	2	2
	SEC - III	Practical : Web Designing	234403227	2	2
	AECC –II Soft Skill -2	Soft Skill - II	236003201	2	2
				23	**30**
SEMESTER III					
I	Lang. -I	nghJj;jkpo; - III	230103301	3	6
II	Lang. -II	General English	231003301	3	4
III	CC – 5	Data Structures and Algorithms	232703301	4	5
	CC - 6	Practical : Data Structures and Algorithms	232703302	4	4
	EC –3	Allied: Mathematics – I	233103321	3	4
IV	SEC –IV	PHP Programming	234403327	1	2
	SEC – V	Practical: PHP Programming	238203327	2	2
	AECC – III Soft skill – 3	Soft Skill - 3	236003301	2	2
	EVS	Environmental Studies	234103301	1	1
				23	**30**

Part	Courses		Code	Cr.	Hrs
SEMESTER IV					
I	Lang. – I	nghJj;jkpo; - IV	230103101	3	6
II	Lang. - II	General English	231003101	3	4
III	CC – 7	.Net Programming	232703401	4	5
	CC - 8	Practical: .Net Programming	232703402	4	4
	EC – IV	Allied Mathematics : II	233103421	3	4
IV	SEC –VII	Software Engineering	234403427	2	2
IV	SEC –VIII	Practical : Linux Programming	238203427	2	2
	AECC	Soft Skill - IV	236003401	2	2
	EVS	Environmental Studies	234103401	1	1
	Total			**24**	**30**
SEMESTER V					
III	CC – 9	Operating System	232703501	4	5
	CC - 10	Java Programming	232703502	4	5
	CC - 11	Database Management System	232703503	4	5
	Core 12	Practical : Java Programming	232703504	4	4
	EC – V	Introduction to Data Science	232703505	3	5
		Artificial Neural Network	232703506		
	EC – VI	Cloud Computing	232703507	3	5
		Agile Project Management	232703508		
IV		Value Education	234303501	1	1
		Internship/Industrial Training(carried out in II year summer vacation)30 hrs	232703509	2	-
				25	**30**
SEMESTER VI					
III	CC – 13	R Programming	232703601	4	5
	CC – 14	Mini Project	232703602	4	5
	CC – 15	Practical: R programming	232703603	4	5
	EC –7	Data Mining and Warehousing	232703604	3	5
		Network Security	232703605		
	EC - 8	Computational Intelligence	232703606	3	5
		Mobile Adhoc Network	232703607		
IV	Processional competency skill enhancement course	Data Communication and Computer Networks	232703608	2	4
		Value Education	234303601	1	1
V		Extension Activity (outside college hrs)		1	-
				22	**30**

Title of the Course		**DATA STRUCTURES AND ALGORITHMS**						
PART		**III**						
Category	Core – 5	**Year**	II	**Credits**	4	**Course Code**	**232703301**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		5	-	--	5	25	75	100

Learning Objectives

- To understand the concepts of ADTs
- To learn linear data structures-lists, stacks, queues
- To learn Tree structures and application of trees
- To learn graph strutures and application of graphs
- To understand various sorting and searching

UNIT	**Details**	**No. of Periods for the Unit**
I	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation- All operations-Insertion-Deletion-Merge-Traversal	**15**
II	Stack ADT-Operations- Applications- Evaluating arithmetic expressions – Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue- Priority Queue- DeQueueapplications of queues.	**15**
III	Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees- B-Tree- B+ Tree – Heap-Applications of heap.	**15**
IV	Definition- Representation of Graph- Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits-Applications of graphs.	**15**
V	Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort-Hashing-Hash functions-Separate chaining- Open Addressing-Rehashing Extendible Hashing	**15**

Course Outcomes

Course Outcomes	On completion of this course, students will be able to;
CO1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation
CO2	Understand basic data structures such as arrays, linked lists, stacks and queues
CO3	Describe the hash function and concepts of collision and its resolution methods
CO4	Solve problem involving graphs, trees and heaps
CO5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Text Books (Latest Editions)	
1	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education 2014, 4th Edition.
2	Reema Thareja, "Data Structures Using C", Oxford Universities Press 2014, 2nd Edition
Reference Books	
1.	Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", McGraw Hill 2009, 3rd Edition.
2.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education 2003
Web Resources	
1.	NPTEL & MOOC courses titled Data Structures
2	https://nptel.ac.in/courses/106106127/

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	M	M	S	S	M
CO 2	S	S	M	L	M
CO 3	S	M	S	S	M
CO 4	S	M	M	M	M
CO 5	L	M	S	M	M

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3
CO2	3	3	2	3	2
CO3	3	3	3	2	3
CO4	3	3	2	3	3
CO5	3	3	3	3	3
weightage	14	15	13	14	14
Weighted Percentage of Course Contribution to POs	70/75=93.3%				

Title of the Course		**PRACTICAL: DATA STRUCTURE AND ALGORITHMS**						
PART		**III**						
Category	Core – 6	**Year**	II	**Credits**	4	**Course Code**	**232703302**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		-	-	4	4	25	75	100

Learning Objectives

- To understand the concepts of ADTs
- To learn linear data structures-lists, stacks, queues
- To learn Tree structures and application of trees
- To learn graph strutures and application of graphs
- To understand various sorting and searching

	Details
1	Write a C++ programs to implement the List ADT using arrays and linked lists.
2	Write a C++ programs to implement the following using a singly linked list. ● Stack ADT ● Queue ADT
3	Write a C++ program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).
4	Write a C++ program to implement priority queue ADT.
5	Write a C++ program to perform the following operations: ● Insert an element into a binary search tree. ● Delete an element from a binary search tree. ● Search for a key element in a binary search tree.
6	Write a C++ program to perform the following operations ● Insertion into an AVL-tree ● Deletion from an AVL-tree
7	Write a C++ programs for the implementation of BFS and DFS for a given graph.
8	Write a C++ programs for implementing the following searching methods: ● Linear search ● Binary search.
9	Write a C++ programs for implementing the following sorting methods: ● Bubble sort ● Selection sort ● Insertion sort ● Radix sort.

Course Outcomes	
Course Outcomes	Upon completion of the course the students would be able to:
CO1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation
CO2	Understand basic data structures such as arrays, linked lists, stacks and queues
CO3	Describe the hash function and concepts of collision and its resolution methods

CO4	Solve problem involving graphs, trees and heaps
CO5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Text Books (Latest Editions)	
1	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education 2014, 4th Edition.
2	Reema Thareja, "Data Structures Using C", Oxford Universities Press 2014, 2nd Edition
Reference Books	
1.	Thomas H.Cormen,Chales E.Leiserson,Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", McGraw Hill 2009, 3rd Edition
2.	Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education 2003

Web Resources	
1.	NPTEL & MOOC courses titled Data Structures
2	https://nptel.ac.in/courses/106106127/

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	M	M	S	S	M
CO 2	S	L	S	L	M
CO 3	S	M	S	S	S
CO 4	S	M	M	M	S
CO 5	L	S	M	M	M

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	2	3
CO2	3	3	2	3	2
CO3	3	3	3	2	3
CO4	3	2	3	3	2
CO5	3	3	3	3	3
weightage	15	14	14	13	13
Weighted Percentage of Course Contribution to POs	69/75 =92 %				

Title of the Course		**PHP PROGRAMMING**						
PART		**IV**						
Category	SEC 4	**Year**	II	**Credits**	1	**Course Code**	**234403327**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		2	-	--	2	25	75	100

Learning Objectives

- To know more about the unique features of PHP and PHP Basic Data Types
- To inculcate the programming skills in PHP
- To know about the various string functions and array operations in PHP
- To create the user defined functions and Recursive Functions in PHP
- To know about the SQL and SQLite

UNIT	**Details**	**No. of Periods for the Unit**
I	Unique Features of PHP – Basic Development Concepts – Writing and Running the Script – Understanding the Scripts – Handling the Script Errors – Mixing the PHP and HTML. Understanding the PHP Data Types – Setting and Checking variable data types – Manipulating variables with operators – Building an Interactive HTML Color Sampler.	**6**
II	Writing Simple Conditional Statements – Odd or Even Number Tester – Writing more complex conditional statements – if –elseif –else statement- The Switch – Case – Statement – The While loop – The Do..While loop - The For Loop - Interrupting and skipping loops.	**6**
III	Common PHP String Functions – Common Numeric Functions – Formatting Numbers – Storing Data in Arrays – Assigning Array values – Nesting Arrays – Processing Arrays with loops and Iterators- The for each loop – Working with Array Functions.	**6**
IV	Creating the User defined functions – Using arguments and Return the values – Understanding Variable Scope – Using Recursive functions – Defining and using the classes – Using constructors and destructors –Extending Classes.	**6**
V	Common SQL Statement – MYSQL Data Types – Adding or modifying Data – Using Prepared Statements – Introducing SQLite -Retrieving Records as arrays and objects – Adding or modifying Data in SQLite – Handling Errors in SQLite	**6**

Course Outcomes

Course Outcomes	**Course Outcomes**
	On completion of this course, students will
CO1	Know about the basic data types in PHP and unique features of PHP.
CO2	Write the programs using conditional statements and looping statements.
CO3	Know more about the Arrays and String functions
CO4	Know more about the User Defined Functions and Recursive Functions.
CO5	Compare the SQL and SQLite and to write the efficient programs in PHP and SQL.

Text Books (Latest Editions)

1. Vikram Viswani , A Beginner's Guide – Tata McGraw Hill Education, New Delhi.16.12.2008

Reference Books

1. Head First PHP and My SQL **,** Lynn Beighley , Michael Morrison
   Lynn Beighley, Michael Morrison , O'Reilly, First Edition, First December 2011.
2. Alan Forbes - A Joy of PHP - A beginner's guide- Programming Interactive web applications with PHP and My SQL, Free with unkindled Membership , 6th Edition, New Delhi. 11.10.2012
3. Robin Nixon - Learning PHP, MY SQL, Java Script, CSS and HTML, Shroff Publishers & Distributers Private Limited – Mumbai, 4th Edition,01.01.2015

Web Resources	
1.	www.w3schools.com, https://www.skillcrush.com
2	https://www.geeksforgeeks.org, https://www.freecodecamp.org
3	https://www.codeacademy.com, https:// www.hostinger.in

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	L	M	M	S	M
CO 3	S	S	M	M	M
CO 4	L	M	M	M	S
CO 5	M	S	S	S	M

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	2	2	3
CO2	3	2	2	3	2
CO3	3	3	3	3	3
CO4	2	3	3	3	3
CO5	3	3	3	3	3
weightage	**13**	**14**	**13**	**14**	**14**
Weighted Percentage of Course Contribution to POs	**68/75=90.6%**				

Title of the Course		**PRACTICAL: PHP PROGRAMMING**						
PART		**IV**						
Category	SEC – V	**Year**	II	**Credits**	2	**Course Code**	**238203327**	
		Semester	III					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		-	-	2	2	25	75	100

Learning Objectives

- To inculcate the Programming knowledge of PHP Programming .
- To know more about the basic data types , basic statements.
- To differentiate the Conditional and looping statements
- To embed the PHP Programs in HTML
- To know about the data base connection in PHP with My Sql.

Details

1. Write a PHP program for Arithmetic operations.
2. Write a PHP Program for Roll Number , Name and College Name display.
3. Write a PHP Program for Odd Number generation.
4. Write a PHP program to check the divisibility by 7 of a number.
5. Write a PHP Program for Perfect Number checking.
6. Write a PHP Program for Armstrong Number checking.
7. Write a PHP Program for Adam Number checking.
8. Write a PHP Program for String operations.
9. Write a PHP Program for Prime Number checking.
10. Write a PHP Program for displaying the multiplication table of a number.
11. Write a PHP Program for Palindrome Number Checking.
12. Write a PHP Program for Armstrong Number Checking.
13. Write a PHP Program for Adam Number Checking.
14. Write a PHP Program for String Operations.
15. Write a PHP Program for the student marks list using MYSQL Data Base.

Course Outcomes

Course Outcomes	On completion of this course, the students will be able
CO1	Know about the basic statements and basic data types in PHP .
CO2	Know the differences between the conditional statements and looping statements in PHP.
CO3	Know the looping statements in detail in PHP
CO4	Know about the string operations in PHP
CO5	Know about the PHP and My SQL and the data base operations.

Text Book (Latest Editions)

1	Vikram Viswani , A Beginner's Guide – Tata Mc Graw Hill Education, New Delhi.16.12.2008

Reference Books

1.	Head First PHP and My SQL **,** Lynn Beighley , Michael Morrison **Lynn Beighley, Michael Morrison , O'Reilly, First Edition, First December 2011.**
2.	Alan Forbes - A Joy of PHP - A beginner's guide- Programming Interactive web applications with PHP and My SQL, Free with unkindled Membership , 6th Edition, New Delhi. 11.10.2012
3.	Robin Nixon - Learning PHP, MY SQL, Java Script, CSS and HTML, Shroff Publishers & Distributers Private Limited – Mumbai, 4th Edition,01.01.2015

Web Resources	
1.	www.w3schools.com, https://www.skillcrush.com
2.	https://www.geeksforgeeks.org, https://www.freecodecamp.org
3.	https://www.codeacademy.com, https:// www.hostinger.in

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	S	S	M	M	L
CO 2	S	M	L	M	M
CO 3	S	L	M	M	M
CO 4	M	S	M	S	S
CO 5	S	S	M	S	M

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	2	3	3
CO2	3	3	3	3	3
CO3	1	3	3	3	3
CO4	3	3	3	3	3
CO5	3	2	3	3	2
weightage	13	14	14	15	14
Weighted Percentage of Course Contribution to POs	**70/75=93.35%**				

Title of the Course		**.NET PROGRAMMING**					
PART		**III**					
Category	Core 7	**Year**	II	**Credits**	4	**Course Code**	**232703401**
		Semester	IV				

Instructional Hours per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
	5	-	--	5	25	75	100

Learning Objectives

- To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.
- To develop ASP.NET Web application using standardcontrols.
- To implement file handling operations.
- To handles SQL Server Database using ADO.NET.
- Understand the Grid view control and XML classes.

UNIT	**Details**	**No. of Periods for the Unit**
I	Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library- C# Fundamentals: Primitive types and Variables – Operators - Conditional statements -Looping statements – Creating and using Objects – Arrays – String operations.	**15**
II	Introduction to ASP.NET - IDE-Languages supported Components - Working with Web Forms – Web form standard controls: Properties and its events – HTML controls -List Controls: Properties and its events.	**15**
III	Rich Controls: Properties and Events - Validation Controls : Properties and Events – File Controls - File Modes - File Share - Reading and Writing to Files - Creating , Moving , Copying and Deleting Files - File Uploading.	**15**
IV	ADO.NET Overview – Database Connections – Commands – Data Reader - Data Adapter - Data Sets - Data Controlsand its Properties – DataBinding	**15**
V	Grid View control: Deleting, editing, Sorting and Paging. XML classes – Web form to manipulate XML files - Website Security - Authentication - Authorization – Creating aWeb application.	**15**

Course Outcomes

Course Outcomes	On completion of this course, the students will be able
CO1	Develop working knowledge of C# programming constructs and the .NET Framework
CO2	To develop a software to solve real-world problems using ASP.NET
CO3	To Work On Various Controls Files
CO4	To create a web application using MicrosoftADO.NET.
CO5	To develop web applications using XML

Text Books (Latest Editions)

1	SvetlinNakov,VeselinKolev& Co, Fundamentals of Computer Programming with C#,Faber publication,2019.
2	Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill,2015.

Reference Books

1.	Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill,2017.
2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech pres,2013.
3.	Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4	DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.

5	Matthew MacDonald, Beginning ASP.NET 4 in C# 2010,APRESS,2010.

Web Resources	
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/
2.	https://www.javatpoint.com/net-framework
3.	https://www.guru99.com/asp-net-tutorial.html

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	S	L	M	S	S
CO 2	M	L	M	M	S
CO 3	S	M	M	S	S
CO 4	M	M	M	S	M
CO 5	L	S	M	M	M

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3
CO2	2	3	2	3	2
CO3	3	3	3	2	3
CO4	3	3	2	3	3
CO5	3	3	3	3	3
weightage	13	15	13	14	14
Weighted Percentage of Course Contribution to POs	**69/75=92%**				

Title of the Course		**Practical: .NET PROGRAMMING**						
PART		**III**						
Category	Core 8	**Year**	II	**Credits**	4	**Course Code**	**232703402**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		--	-	4	4	25	75	100

Learning Objectives

- To develop ASP.NET Web application using standard controls.
- To create rich database applications usingADO.NET.
- To implement file handling operations.
- To implement XML classes.
- To utilize ASP.NET security features for authenticating the website

Programs

1. Create an exposure of Web applications and tools
2. Implement the Html Controls
3. Implement the Server Controls
4. Web application using Web controls.
5. Web application using List controls.
6. Web Page design using Rich control. Validate user input using Validation controls. Working with Fileconcepts.
7. Web application using Data Controls.
8. Data binding with Web controls
9. Data binding with Data Controls.
10. Database application to perform insert, update and delete operations.
11. Database application using Data Controls to perform insert, delete, edit, paging and sorting operation.
12. Implement the Xml classes.
13. Implement Authentication – Authorization.
14. Ticket reservation using ASP.NET controls.
15. Online examination using ASP.NET controls

Course Outcomes

Course Outcomes	On completion of this course, students will able to;
CO1	To create web applications and implement various controls
CO2	Create a web pages in Rich control.
CO3	Develop knowledge about file handling operations
CO4	An ability to design XML classes
CO5	To develop a software to solve real-world problems using ASP.NET

Text Books (Latest Editions)

1	SvetlinNakov,VeselinKolev& Co, Fundamentals of Computer Programming with C#,Faber publication,2019.
2	Mathew, Mac Donald, The Complete Reference ASP.NET, Tata McGraw-Hill,2015.

Reference Books	
1.	Herbert Schildt, The Complete Reference C#.NET, TataMcGraw-Hill,2017.
2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET 4.5 Black Book, Dreamtech pres,2013.
3.	Anne Boehm, Joel Murach, Murach's C# 2015, Mike Murach& Associates Inc.2016.
4.	DenielleOtey, Michael Otey, ADO.NET: The Complete reference, McGrawHill,2008.
5.	Matthew MacDonald, Beginning ASP.NET 4 in C# 2010,APRESS,2010.
Web Resources	
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/
2.	https://www.javatpoint.com/net-framework
3.	https://dotnettutorials.net/

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	S	L	M	S	S
CO 2	M	L	M	M	S
CO 3	S	M	M	S	S
CO 4	M	M	M	S	M
CO 5	L	S	M	M	M

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3
CO2	2	3	2	2	3
CO3	3	2	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
weightage	13	14	14	14	15
Weighted Percentage of Course Contribution to POs	**70/75 = 93.3%**				

Title of the Course		**SOFTWARE ENGINEERING**					
PART		**IV**					
Category	SEC - 7	**Year**	II	**Credits**	2	**Course Code**	**234403427**
		Semester	IV				

Instructional Hours per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
	2	-	-	2	25	75	100

Learning Objectives

- To inculcate the definition of Software Engineering's Definition and its importance
- To transform the students to IT Professionals by Software Models
- To know more about the software quality factors, SRS and Formal specification Techniqu
- To know about Software Design Techniques
- To know more about the Software Verification and Validation Techniques

UNIT	**Details**	**No. of Periods for the Unit**
I	**Introduction to Software Engineering:** Some Definitions - Some Size Factors – Quality and Productivity Factors – Managerial issues – The Phased Life Cycle Model – The Cost Model – The Prototype Life Cycle model – Successive Versions - Project structure – Programming Team structure.	**6**
II	**Software Cost Estimation:** Introduction –- Software Cost Factors – Software Cost Estimation Techniques - Expert Judgment – Delphi Cost Estimation – Work Breakdown Structures – Algorithmic Cost Models - Staffing Level Estimation – Estimating Software Maintenance Costs.	**6**
III	**Software Requirements Definition:** Introduction - Software Requirements Specification - Formal Specification Techniques - Relational Notations - Implicit Equations – Recurrence Relations – Algebraic Axioms – Regular expressions – State Oriented Notations - Decision Tables – Event Tables – Transition tables – Finite State Mechanisms – Petri Nets.	**6**
IV	**Software Design:** Fundamental Design Concepts – Abstraction – Information Hiding – Structure – Modularity – Concurrency – Verification - Aesthetics – Modules and Modularization Criteria – Coupling and Cohesion - Design notations – Data Flow Diagrams – Structure Charts – HIPO Diagrams- Procedure Templates – Pseudocode – Structured Flowcharts – Structured English – Decision Tables - Design Techniques – Stepwise Refinement – Integrated Top Down Development – Jackson Structured Programming.	**6**
V	**Verification and Validation Techniques:** Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System testing- Integration testing – Acceptance testing-Source Code Metrics.	**6**

Course Outcomes	
Course Outcomes	On completion of this course, the students will be able
CO1	To know about the software development models
CO2	To know about the software cost estimation
CO3	To know about the Software Requirements Specification Techniques
CO4	To know about the Software Design
CO5	To know about the verification and validation techniques

Text Book (Latest Editions)	
1	Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill Education Private Limited, New Delhi, Tata McGraw Hill Edition, 1997. Unit I - Chapters: 1.1, 1.2, 1.3 , 2.3.1,2.3.3,2.3.4,2.3.5, 2.4.1,2.4.2 Unit II - Chapter: 3 Unit III - Chapters: 4.1, 4.2(4.2.1,4.2.2) Unit IV - Chapter: 5.1.1-5.1.7, 5.2.1, 5.3.1-5.3.8, 5.4.1,5.4.4,5.4.5 Unit V - Chapter: 8.1, 8.2, 8.5, 8.6,9.4
Reference Books	
1.	Prof. K.K. Aggarwal, Prof. Yogesh Singh,Software Engineering (Two Colour Edition) by New Age International (P) Ltd., Publishers, New Age International Private Limited
2.	Ian Sommerville, Software Engineering 9th Edition, Pearso Publishers (2013) ISBN: 9788131762165
3.	K K Aggarwal,Software Engineering, 4th Edition by New Age International Publishers.
Web Resources	
1.	https://software-engineering-books.com
2.	https://www.browswerstack.com
3.	https://www.guru99.com/Software Testing
4.	https://www.mstsolutions.com

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	M	S	M	M	L
CO 2	S	M	S	M	M
CO 3	S	L	M	S	M
CO 4	M	M	S	M	M
CO 5	S	M	S	M	S

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	2	3	1
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	2	3	3	3	3
weightage	12	14	14	15	15
Weighted Percentage of Course Contribution to POs	**70/75 = 93.3%**				

Title of the Course		**PRACTICAL: LINUX PROGRAMMING**						
PART		**IV**						
Category	SEC - VIII	**Year**	II	**Credits**	2	**Course Code**	**238203427**	
		Semester	IV					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		-	-	2	2	25	75	100

Learning Objectives

- To learn about the Basic Linux Commands.
- To know more about Advanced Linux Commands.
- To know about the Linux Programming with conditional and looping statements
- To know about the Linux files and file operations
- To write the programs using while , for and for each loops in Linux

	Details
1	Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.
2	Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.
3	Write a shell script that accepts one or more filename as arguments and converts all of them to uppercase, provided they exist in the current directory
4	Write a shell script that accepts a filename starting and ending line numbers as arguments and displays all the lines between the given line numbers.
5	Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
6	Write a shell script that accepts two integers as its arguments and computes the value of first number raised to the power of the second number
7	Write shell script that takes a login name as command – line argument and reports when that person logs in.
8	Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.
9	Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
10	Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
11	Write a shell script to generate multiplication table.
12	Write a shell script to print sum of individual digits of a number
12	Write a shell script that computes the gross salary of a employee according to the following rules: a) If basic salary <1500 then HRA=10%of the basic and DA=90% of the basic. b) If basic salary >=1500 then HRA=Rs500 and DA=98% of the basic. The basic salary is entered interactively through the key board.
14	Simulate the CP command through C Program.

Course Outcomes	
Course Outcomes	On completion of this course, the students will be able
CO1	To differentiate between the Single User OS and Multiuser OS.
CO2	To know about the basic Linux Commands.
CO3	To write the Linux Shell scripts using Conditional and Looping Statements.
CO4	To use the for loop for generation of Odd numbers, Prime numbers , Adam numbers
CO5	To simulate the various commands like grep, count, cp, rename in C language

Text Books (Latest Editions)	
1	M.G. Venkateshmurthy, INTRODUCTION TO UNIX AND SHELL PROGRAMMING, Pearson India, First Edition, 01.01.2005
2	Sumitabha Das ,UNIX : Concepts and Applications , 4th Edition , McGraw Hill Education, 01.07.201
3	Ables & Glass, UNIX for Programmers and Users , 06.02.2003,Pearson Education, 01.01.2003
Reference Book	
1.	Behrouz A. Forouzan , Richard Gilberg Behrouz A. Forouzan , UNIX and Shell Programming, First Edition, Cengage India Private Limited, 10.11.2003.
Web Resources	
1.	https://www.techtarget.com
2.	https://www.freecodecamp.org
3.	https://swcarpentry.github.io
4.	https://www.softwaretestinghelp.com

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**
CO 1	S	L	M	S	M
CO 2	S	M	S	M	S
CO 3	S	S	M	M	M
CO 4	L	S	M	M	S
CO 5	M	M	S	S	S

S-Strong M-Medium L-Low

Mapping with Programme Specific Outcomes:

CO/PO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	2	1
CO4	3	3	3	3	3
CO5	2	3	3	3	3
weightage	12	14	15	14	15
Weighted Percentage of Course Contribution to POs	**70/75 = 93.3%**				