

Holy Cross College (Autonomous), Nagercoil

Kanyakumari District, Tamil Nadu.

Nationally Accredited with A⁺ by NAAC IV cycle – CGPA 3.35

Affiliated to

Manonmaniam Sundaranar University, Tirunelveli



**DEPARTMENT OF COMPUTER SCIENCE
SYLLABUS FOR UNDERGRADUATE PROGRAMME**



**TEACHING PLAN
EVEN SEMESTER 2024 – 2025**

Vision

To provide a high-quality graduate education in computer science that prepares students for productive careers and lifelong learning.

Mission

1. To demonstrate proficiency in problem-solving techniques using the computer.
2. To demonstrate proficiency in at least two high-level programming languages and two operating systems
3. To show the ability to analyze a problem, identify and define the computing requirements appropriate to its solution.
4. To show the ability to function effectively on teams to accomplish a common goal.
5. To sensitize the students to the social realities around them with the vision of making them responsible citizens.

Programme Educational Objectives (PEOs)

PEO	Upon completion of UG Degree Programme, the graduates will be able to:
PEO – 1	apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.
PEO – 2	inculcate practical knowledge for developing professional empowerment and entrepreneurship and societal services.
PEO – 3	pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.

Programme Outcomes (POs)

PO	Upon completion of B.Sc. Degree Programme, the graduates will be able to:
PO – 1	obtain comprehensive knowledge and skills to pursue higher studies in the relevant field of science.
PO – 2	create innovative ideas to enhance entrepreneurial skills for economic independence.
PO – 3	reflect upon green initiatives and take responsible steps to build a sustainable environment.
PO – 4	enhance leadership qualities, team spirit and communication skills to face challenging competitive examinations for a better developmental career.
PO – 5	communicate effectively and collaborate successfully with peers to become competent professionals.
PO – 6	absorb ethical, moral and social values in personal and social life leading to highly cultured and civilized personality
PO – 7	participate in learning activities throughout life, through self-paced and self-directed learning to develop knowledge and skills.

Programme Specific Outcomes (PSOs)

PSOs	Upon completion of the B.Sc. Degree Programme, the graduates will be able to:
PSO – 1	obtain sufficient knowledge and skills enabling them to undertake further studies in Computer Science and its allied areas on multiple disciplines linked with Computer Science.
PSO - 2	evaluate and apply emerging technologies in Computer Science to develop innovative solutions for real-world problems
PSO – 3	develop a range of generic skills helpful in team building, problem solving, technical ability, employment, internships, communication and societal activities.
PSO - 4	communicate effectively, work collaboratively, and demonstrate ethical and professional attitudes in diverse settings.
PSO - 5	sensitize various economic issues related to development, growth, international economics, sustainable development and environment

Department : Computer Science
Class : I B. Sc Computer Science
Title of the Course : Core Course II: Data Structure And Algorithms
Semester : II
Course Code : SU242CC1

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
SU242CC1	5	-	-	-	5	5	75	25	75	100

Learning Objectives:

1. To understand the fundamentals of data structure including linked lists, trees, binary search trees, stacks, queues and priority queues.
2. To understand the various algorithm techniques.

Course Outcomes

On the successful completion of the course, students will be able to:		
1.	define data structure and algorithms	K1
2.	describe data structures like stack, queue, tree and graph	K2
3.	apply data structures in solving the problems	K2&K3
4.	use algorithm techniques for solving problems and analyze the time complexity of algorithms.	K3&K4
5.	assess various algorithmic techniques and analyze the applications of the algorithm.	K4&K5

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyze; **K5** – Evaluate

Teaching plan

Total Contact hours: 75 (Including lectures, assignments and tests)

Unit	Module	Topic	Teaching Hours	Cognitive level	Pedagogy	Assessment/ Evaluation
I	Introduction					
	1.	History of Algorithms – Definitions – Structure and Properties of Algorithms – Development of an algorithm	2	K1(R)	Blackboard teaching	Overview
	2.	Data Structures and Algorithms – Data Structure Definition and Classification.	1	K1(R)	Flipped classroom	Simple algorithm
	3.	Analysis of Algorithms: Efficiency of Algorithms	2	K1(R)	Blended Learning	Unit Test
	4.	A priori Analysis – Asymptotic Notations – Time complexity of an Algorithm using O notation	2	K1(R)	Lecture with PPT	Calculation for simple loops
	5.	Polynomial versus Exponential Algorithms – Average, Best- and Worst-Case complexities - Analyzing recursive programs.	2	K1(R)	Group Discussion	Short essay
	6.	Arrays: Introduction	1	K1(R)	PPT	Defining terms
	7.	Array Operations – Number of elements in an array	2	K1(R)	Problem solving	Problem solving questions
	8.	Representation of arrays in memory – Applications.	3	K1(R)	Illustrative method	Drawing diagram
II	Stack, Queue and Linked List					
	1.	Stacks: Introduction	1	K2(U)	Lecture using Videos	Evaluation through short test
	2.	Stack operations - Applications.	2	K3(Ap)	Context based learning	Lab program
	3.	Queues: Introduction – Operations on Queues	2	K2(U)	Flipped Classroom	Lab program
	4.	Circular Queues	2	K3(Ap)	PPT	Slip Test

	5.	Other Types of Queues – Applications.	2	K2(U)	Lecture class	Differentiate various queues
	6.	Linked Lists: Introduction – Singly linked list	2	K2(U)	Lecture using Chalk and talk	Write algorithm
	7.	Circularly linked list – Doubly linked list	2	K2(U)	PPT	Short essay
	8.	Multiply linked list – Applications.	2	K3(Ap)	Problem Solving	Problem solving questions
III	Trees and Graphs					
	1.	Trees and Binary Trees: Introduction	1	K3(Ap)	PPT	Questioning
	2.	Trees: Definition and basic terminology – Representation of Trees	2	K2(U)	Lecture using Chalk and talk	Quiz using google classroom
	3.	Binary Trees: Basic Terminology and types – Representation of Binary Trees	2	K3(Ap)	Brainstorming	True/False using Mentimeter
	4.	Binary Tree Traversal	2	K2(U)	Inquired based Approach	Lab program
	5.	Threaded Binary Tree – Applications.	2	K2(U)	Group Discussion	MCQ using Slido
	6.	Graphs: Introduction – Definition and Basic Terminology	2	K3(Ap)	Interactive PPT	Quiz using nearpod
	7.	Representation of Graphs	2	K2(U)	Interactive PPT	Questioning
	8.	Graph Traversals – Application.	2	K2(U)	Chalk and Talk	Write algorithm
IV	Divide and Conquer & Greedy Method					
	1.	Divide and Conquer: General method-	1	K2(U)	Lecture using Chalk and talk	Concept summary
	2.	Binary Search- Finding the Maximum and Minimum	2	K3(Ap)	Lecture class	Lab Program
	3.	Merge Sort- Quick Sort.	2	K3(Ap)	Demonstration	Lab Program
	4.	The Greedy Method: General Method –	2	K2(U)	PPT	Evaluation through short test
	5.	Knapsack Problem – Tree Vertex Splitting-	2	K2(U)	Brainstorming	Concept explanation
	6.	Job Sequencing with Deadlines	2	K3(Ap)	Inquired based Approach	Evaluation through short test
	7.	Minimum Cost Spanning Trees	2	K1(R)	Problem solving	Quiz using Kahoot
	8.	Single Source Shortest Paths.	2	K3(Ap)	Interactive PPT	Slip Test

V	Dynamic Programming					
1.	Dynamic Programming: General Method	1	K1(R)	Lecture using Chalk and talk	Online Assignment	
2.	Multi Stage Graph	2	K3(Ap)	Brainstorming	Problem solving	
3.	All Pairs Shortest Paths	2	K3(Ap)	Inquired based Approach	Summarise concept	
4.	Single Source Shortest Paths	2	K3(Ap)	Demonstration	MCQ using Quizzes	
5.	0/1 Knapsack	2	K3(Ap)	Problem solving	Short essays	
6.	Reliability Design	2	K2(U)	Lecture using Chalk and talk	Seminar	
7.	Travelling Salesperson Problem	2	K2(U)	Interactive PPT	Short test	
8.	Flow Shop Scheduling	2	K2(U)	Interactive PPT	Simple examples	

Course Focussing on Employability/ Entrepreneurship/ Skill Development: Skill Development

Activities (Em/ En/SD): 1. Write Python code for Searching.

2. Write Python code for Stack.

3. Write Python code for Queues.

Assignment: Binary Tree Traversal

Seminar Topic: Circular Queue

Sample questions

Part A (1 Mark)

- Which of the following notations is used to represent the time complexity of an algorithm?
 - big omega
 - theta
 - big-O
 - sigma
- What is the correct term for removing an element from a queue?
 - Push
 - Pop
 - Enqueue
 - Dequeue
- What type of tree does not allow any node to have more than two children?
 - Binary Tree
 - Ternary Tree
 - AVL Tree
 - B-Tree
- In the Divide and Conquer strategy, which of the following sorting algorithms is commonly used?
 - Bubble Sort
 - Insertion Sort
 - Merge Sort
 - Selection Sort
- In the Divide and Conquer method, which of the following steps is NOT a part of the general approach?

- a) Divide the problem into smaller subproblems
- b) Combine the solutions of subproblems
- c) Directly solve the problem without dividing it
- d) Conquer by solving each subproblem independently

Part B (6 Marks)

- 6. Define an algorithm. Briefly explain two key properties that every algorithm should possess.
- 7. Describe the difference between a linear queue and a circular queue. Illustrate their implementations.
- 8. What is a doubly linked list, and how does it differ from a singly linked list? Explain with diagrams.
- 9. Explain the general approach of the Divide and Conquer method. Describe how it is applied in the binary search algorithm
- 10. Briefly explain the Dynamic Programming approach. How does it differ from the Divide and Conquer method in solving optimization problems?

Part C (12 Marks)

- 11. Explain how the Big- O notation helps in analyzing the efficiency of algorithms.
- 12. Explain the structure and use cases of doubly linked list. Illustrate how to insert and delete a node in a doubly linked list with diagrams.
- 13. Explain the different types of tree traversals with examples.
- 14. Describe the Greedy Method and its application to solving the Knapsack Problem.
- 15. Describe how Dynamic Programming can be used to solve the Travelling Salesperson Problem (TSP).

Head of the Department
Mrs.J.Anto Hepzie Bai

Course Instructor
Mrs. Sahaya Rose Vigita

Department : Mathematics(S.F)
Class : I B.Sc Computer Science
Semester : II
Name of the Course : Discrete Mathematics
Course code : SU232EC1

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SU232EC1	3	1	-	3	4	60	25	75	100

Pre-requisite:

Basic Concepts in Algebra and Set Theory

Learning Objectives:

1. To learn the concepts of Logic, Functions, Permutations, Combinations and Graph models
2. To motivate the students to solve practical problems using Discrete Mathematics.

Course Outcomes

On the successful completion of the course, student will be able to:		
1.	remember the basic concepts of permutations, combinations, relations and graphs	K1 & K2
2.	understand the basic concepts of functions and relations.	K2
3.	apply basic counting techniques to solve combinatorial problems.	K3 & K5
4.	represent discrete objects and relationships using abstract mathematical structures	K4 & K5
5.	apply graphs in a wide variety of models	K3 & K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5**– Evaluate

Teaching Plan

Total Contact Hours: 60 (Including lectures, assignments and tests)

Unit	Module	Topics	Teaching Hours	Cognitive level	Pedagogy	Assessment/ Evaluation
I	Logic					
	1	Logic: Propositional logic-Logical Equivalence	3	K2(U)	Brainstorming	Questioning
	2	Propositions-Conditional Statements	3	K3(Ap)	Blended Learning	Evaluation through Quiz
	3	Truth Tables of Compound Propositions	2	K4(An)	Lecture using videos	Evaluation through short test
	4	Constructing New Logical Equivalences.	3	K3(Ap)	Intractive method	Evaluation through MCQ
II	Functions					
	1	One-to-one & onto functions	3	K2(U)	Blended Learning	Questioning
	2	Inverse Functions	3	K3(Ap)	Lecture using PPT	Evaluation through Assignment
	3	Composition of functions	3	K4(An)	Flipped classroom	Evaluation through slip Test
	4	The graphs of functions	3	K3(Ap)	Heuristic method	Evaluation through quiz
III	Counting					
	1	The basics of counting	4	K3(Ap)	Lecture using PPT	Questioning
	2	Permutations	3	K2(U)	Interactive method	Evaluation through MCQ
	3	Combinations	3	K4(An)	Blended Learning	Evaluation through Assignment
IV	Relations					
	1	Relations and their Properties	2	K2(U)	Analytic method	Evaluation through quiz

	2	Functions as Relations	3	K3(Ap)	Lecture using PPT	Evaluation through slipTest
	3	Relation on a set, Properties of relation	3	K3(Ap)	Flipped classroom	Evaluation through Assignment
	4	Combining Relations	3	K4(An)	Heuristic method	Evaluation through MCQ
V	Graphs					
	1	Graph, Undirected Graph, Directed Graph	3	K2(U)	Lecture using PPT	Evaluation through slipTest
	2	Multigraph, Psdo Graph, Simple Graph, General Graph	3	K3(Ap)	Blended Learning	Questioning
	3	Degree of Vertex, Finite Graph	3	K4(An)	Peer teaching, Group Discussion	Evaluation through quiz
	4	Order of a Graph, Size of a Graph, Null Graph, Isolated graph, Isomorphic Graphs	3	K3(Ap)	Analytic method	Evaluation through Assignment

Course Focusing on Employability/Entrepreneurship/Skill Development : Employability

Activities (Em/En/SD) : Evaluation through short test, Seminar

Assignment: The basics of counting

Seminar Topic: permutation and combination

Model Questions

Part-A

1. What is the logical equivalence of "NOT (p AND q)"?

a) NOT p AND NOT q b) NOT p OR NOT q

c) p OR q d) p AND q

2. In a one-to-one function, what can be said about the images of distinct elements in the domain?

a) They are the same.

b) They are different

c) They can be the same or different.

d) There is not enough information.

3. What is the sum of the first 5 terms of the arithmetic sequence with a first term (a) of 3 and a common difference (d) of 2?

a) 15

b) 25

c) 35

d) 45

4. How many ways can a committee of 3 people be selected from a group of 8 individuals?
 a) 24 b) 56 c) 84 d) 120
5. In a directed graph, if there is a path from vertex A to vertex B, but no path from B to A, what type of relation does?

Part – B

Answer all the questions

6. Find the conjunction of the propositions p and q where p is the proposition “Today is Friday” and q is the proposition “It is raining today”.

7. Let A, B, and C be Sets. Show that $\underline{A \cup (B \cap C)} = (\underline{C \cup B}) \cap \underline{A}$

8. Show that if n is a positive integer, then

$$1 + 2 + 3 + \dots + n = \frac{n(n + 1)}{2}$$

9. If n is a positive integer and r is an integer with $1 \leq r \leq n$, then there are

$$P(n, r) = n(n - 1)(n - 2) \dots (n - r + 1).$$

10. What are the properties of relations and how are they modeled in the context of directed and undirected graph?

Part C

Answer all the question

11. “What are the contra positive, the converse, and the inverse of the conditional statement “The home team wins whenever it is raining”.

12. Prove that $\underline{A \cap B} = \underline{A} \cap \underline{B}$.

13. How many poker hands of five cards can be dealt from a standard deck of 52 cards. Also how many ways are there to select 47 cards from a standard deck of 52 cards

14. The relation R on a set A is transitive if and only if $R^n \subseteq R$ for n=1, 2, 3,

15. How do directed and undirected graphs serve as models for different types of relations?

Head of the Department

Ms. J. Anto Hepzie Bai

Course Instructor

Dr. J.Nesa Golden Flower

Department : Computer Science
Class : I B.Sc Computer Science
Title of the Course : Non-Major Elective NME II: Introduction to HTML
Semester : II
Course Code : SU232NM1

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
SU232NM1	1	1	-	-	2	2	30	25	75	100

Prerequisite:

Basic knowledge in creating websites.

Learning Objectives:

1. To create a web page, insert a graphic, link, table within a web page.
2. To insert ordered and unordered lists within a web page.

Course Outcomes

On the successful completion of the course, student will be able to:		
1.	recall and recognize HTML tags and their syntax.	K1& K2
2.	understand the use of HTML elements like headings, paragraphs, lists and links.	K2
3.	apply the concepts in creating web pages and formatting it.	K3

K1 - Remember; **K2** - Understand; **K3** – Apply

Teaching Plan

Total Contact Hours : 30 (Including lectures, Assignments and Tests)

Unit	Module	Topic	Teaching Hours	Cognitive level	Pedagogy	Assessment / Evaluation
I	Introduction to HTML					
	1	Introduction to Web Basics, Define Internet, Web Browsers	2	K1(R)	Lecture Method	PPT
	2	Define Webpage, HTML Basics, Understanding Tags	3	K1(R)	Flipped classroom	E-Content

II Tags for Document Structure						
	1	Tags for Document Structure, HTML, Head, Body-tag	3	K2(U)	Lecture Method	Brain Storm
	2	Block Level Text Elements: Headings Paragraph (<p> tag)	2	K2(U)	Integrative Teaching	Creating and Soling Puzzles
	3	Font Style Elements: bold, italic, font, small, strong, strike, big tags	2	K2(U) & K3(Ap)	Flipped classroom	Slido (Quiz)
III Types of Lists						
	1	Lists, Types of Lists, Ordered, Unordered, Nesting Lists	3	K3(Ap)	Reflective Thinking	Interactive PPT
	2	Other Tags, Marquee, HR, BR	2	K3(Ap)	Case Study	Problem Solving
	3	Using Images, Creating Hyperlinks	2	K2(U) & K3(Ap)	Hands on training through skill based course	Problem Solving
IV Tables						
	1	Tables, Creating Basic Table, Table Elements	3	K2(U)	Reflective Thinking	Prepare the tables by using html
	2	Caption, Table and Cell Alignment	2	K2(U) & K3(Ap)	Experimental Learning	Solving the problem and Slido
V Frames						
	1	Frame set , Targeted Links, No frame	3	K2(U) & K3(Ap)	Basic and Advanced lab	Problem Solving
	2	Forms, Input, Text area, Select, Option.	3	K3(Ap)	Collaboration	Self prepared application form by using html

Course Focusing on Employ ability/Entrepreneurship/skill development: Skill development

Activities (Em/En/SD): Evaluation through short test and seminar

Assignment : Creating Basic Table, Table Elements

Seminar Topic: HTML

Sample Questions

PART A

1. What is a web browser? Give two examples.
2. Name two font style tags in HTML.
3. Describe the purpose of the <marquee> tag.

4. What is the purpose of the <tr> tag?
5. What is a <noframe> tag used for?

PART B

6. Describe the <head> and <body> sections in an HTML document.
7. Explain the function of the and tags.
8. Differentiate between ordered and unordered lists.
9. Differentiate between <td> and <th> tags.
10. Describe the <select> and <option> tags.

PART C

11. Discuss the structure and purpose of HTML tags and attributes.
12. Explain the purpose and usage of font style tags in HTML (bold, italic, strong, etc.).
13. Discuss how images are added to a webpage and describe the attributes of the tag.
14. Explain the attributes of the <table>, <tr>, <td>, and <th> tags.
15. Describe how frames are used in HTML and their limitations.

Head of the Department

Ms J. Anto Hepzie Bai

Course Instructor

Ms M.Monisha

Department : Computer Science
Class : I B.Sc Computer Science
Title of the Course : Skill Enhancement Course SEC - III: Advanced Excel
Semester : II
Course Code : SU232SE1

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
SU232SE1	1	-	1	-	2	2	30	25	75	100

Pre-requisite:

Students should know the basic knowledge in office automation / Excel.

Learning Objectives:

1. To learn the advanced features of Excel.
2. To summarise, analyse, explore, and present visualisations of data in the form of charts, graphs.

Course Outcomes

On the successful completion of the course, student will be able to:		
1.	use a wide range of advanced excel functions.	K1
2.	understand data validation rules to control data entry	K2
3.	presenting data in the form of charts and graphs.	K3

K1 - Remember; **K2** - Understand; **K3** - Apply

Teaching Plan

Total Contact hours : 30 (Including lectures, Assignments and Tests)

Unit	Module	Topic	Teaching Hours	Cognitive level	Pedagogy	Assessment / Evaluation
I	Basics of Excel					
	1	Basics of Excel ,Customizing Common Options ,Absolute and Relative Cells, Protecting and Un, protecting Worksheets and Cells	2	K1(R)	Lecture Method	PPT

	2	Working with Functions, Writing Conditional Expressions, Logical Functions, Lookup and Reference Functions ,VlookUP with Exact Match, Approximate Match	3	K1(R)	Flipped classroom	PPT
	3	Nested VlookUP with Exact Match, VlookUP with Tables, Dynamic Ranges, Nested VlookUP with Exact Match, Using VLookUP to Consolidate Data from Multiple Sheets	2	K1(R)	KWL	Just a Minuet
II	Data Validations					
	1	Data Validations , Specifying a Valid Range of Values , Specifying a List of Valid Values, Specifying Custom Validations based on Formula	2	K2(U)	Lecture Method	PPT
	2	Working with Templates, Designing the Structure of a Template, Templates for Standardization of Worksheets, Sorting and Filtering Data, Sorting Tables , Multiple-level Sorting	2	K2(U)	Flipped classroom	PPT
	3	Custom Sorting , Filtering Data for Selected View , Advanced Filter Options, Working with Reports Creating Subtotals, Multiple-level Subtotal.	2	K2(U) & K3(Ap)	Lecture Method	Brain Storm
III	Creating Pivot Tables					
	1	Creating Pivot Tables, Formatting and Customizing Pivot Tables, Advanced Options of Pivot Tables, Pivot Charts ,	3	K3(Ap)	Case Study	Problem Solving

		Consolidating Data from Multiple Sheets and Files using Pivot Table				
	2	External Data Sources, Data Consolidation Feature to Consolidate Data, Show Value as % of Row, % of Column, Running Total, Compare with Specific Field, Viewing Subtotal Under Pivot, Creating Slicers.	3	K2(U) & K3(Ap)	Collaboration	Brainstorm
IV	More Functions					
	1	Date and Time Functions, Text Functions, Database Functions, Power Functions, Formatting using Auto Formatting Option for Worksheets	2	K2(U)	Demonstration	Problem Solving
	2	Using Conditional Formatting Option for Rows, Columns and Cells, WhatIf Analysis, Goal Seek, Data Tables, Scenario Manager	3	K2(U) & K3(Ap)	Collaboration	PPT
V	Charts					
	1	Formatting Charts - 3D Graphs, Bar and Line Chart Together , Secondary Axis in Graphs	3	K2(U)	Demonstration	Problem Solving
	2	Sharing Charts with PowerPoint / MS Word, Dynamically , New Features of Excel Sparklines, Inline Charts, Data Charts , Overview of all the New Features	3	K2(U) & K3(Ap)	Collaboration	PPT

Course Focusing on Employ ability/Entrepreneurship/skill development: Skill development

Activities (Em/En/SD): Evaluation through the creative excel

Assignment : Creating Pivot Tables, Formatting and Customizing Pivot Tables, Advanced Options of Pivot Tables

Seminar Topic: Bar and Line Chart

Sample Questions

PART A

1. What are absolute and relative cell references in Excel?
2. What is the purpose of the advanced filter option?
3. What is the use of slicers in pivot tables?
4. Give two examples of date functions in Excel.
5. What is a 3D graph in Excel?

PART B

6. Write the syntax and an example of a conditional expression using IF.
7. Explain how templates can be used for the standardization of worksheets.
8. What are the advanced options available for pivot tables?
9. Explain the use of NOW() and TEXT() functions in Excel.
10. What are the advantages of sharing Excel charts dynamically with PowerPoint?

PART C

11. Discuss the importance and steps for writing conditional expressions in Excel with examples.
12. Discuss the process and benefits of sorting data with multiple-level sorting and custom sorting.
13. Write an example where a pivot table is used to calculate running totals and comparisons.
14. Explain goal seek with a real-life example and its steps.
15. Write steps to create and format a 3D graph with an example.

Head of the Department

Ms J. Anto Hepzie Bai

Course Instructor

Ms M.Monisha

Department : Computer Science
Class : II B.Sc Computer Science
Title of the Course : Core Course IV: .NET Programming
Semester : IV
Course Code : SU234CC1

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SU234CC1	5	-	-	5	5	75	25	75	100

Objectives:

1. To develop ASP.NET Web application using standard controls.
2. To enable the students to understand the programming features of .Net Framework using ASP.NET and C#.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	identify and understand the basic syntax and language constructs of C# and .NET framework	PSO – 1	K1(R) K2(U)
CO -2	develop console applications using C# to solve simple programming problems.	PSO - 2	K3(AP)
CO -3	analyze existing .NET codebases to understand their structure, dependencies, and design patterns.	PSO – 3	K4(AN)
CO -4	analyze C# programming techniques in developing web applications.	PSO - 3	K4(AN)
CO -5	create web application using various controls.	PSO - 3	K6(C)

Teaching plan

Total Contact hours: 75(Including lectures, assignments and tests)

Unit	Module	Topic	Teaching hours	Cognitive level	Pedagogy	Assessment/ Evaluation
I	ASP.Net 3.5 Essentials and Web Forms: Standard Control					
	1.	New Features in ASP.Net 3.5	2	K1(R)	Brainstorming	Short Test
	2.	The ASP.Net Life Cycle and Overview of Visual Studio 2008	2	K1(R)	Flipped classroom	Quiz using kahoot

	3.	Exploring a sample ASP.Net and Creating a sample ASP.Net Website.	2	K3(AP)	Blended Learning	Upload assignment in google classroom
	4.	The Label Control, The Button Control and The Textbox	2	K2(U) K3(AP)	Lecture with PPT	Surprise Test
	5.	The Hidden Field Control and File Upload Control	2	K2(U) K3(AP)	Group Discussion	Writing programs
	6.	The Image Control and The ImageMap Control	2	K2(U) K3(AP)	Interactive PPT with gamma	Questioning
	7	The ListBox Control and The Drop-Down List Control	2	K2(U) K3(AP)	Lecture cum Demonstration	Recall
	8	The Checkbox Control and The Radio Button Control	1	K2(U) K3(AP)	Demonstration	Recall
II	Navigation Control and Validation Control					
	1.	The TreeView Control, Creating the TreeView Control and Generating TreeView from a Database	4	K3(AP)	Lecture with videos	Quiz using Nearpod
	2.	Using the Menu Class, The Menu Control, Creating Static Menus and Creating Dynamic Menus.	3	K3(AP)	Demonstration with PPT	Short Test
	3.	Introduction for validation Control, The Required Field Validation Control and The	4	K3(AP)	Project Based	Writing programs using form validations

		Range Validator Control				
	4.	The Regular Expression Validation control, The Compare Validator Control , The Custom Validator Control and The Validation Summary Control	4	K3(AP)	Project Based	Writing programs using form validations
III	Working with Database Controls and Login Controls					
	1.	The GridView Control and The DataList Control	3	K3(AP)	Context based learning	MCQ with Quizzes
	2.	The DetailsView Control, The FormView Control, The ListView Control and The Repeater Control	3	K3(AP)	Flipped Classroom	Slip Test
	3.	The SqlDataSource Control	2	K3(AP)	Lecture using PPT	Asking to create database connection
	4.	The AccessDataSource Control and The ObjectDataSource Control, XmlDataSource Control	3	K3(AP)	Blended learning	Asking to create database connection
	5.	The Login, LoginView , The LoginStatus, The LoginName, and The Password Recovery Control	4	K3(AP)	Group Discussion	Asking to create login form

IV	Introducing C# 2008 and Namespace, Classes, Objects, Structs					
1.	Need of C#, C# Preprocessor Directives, New Features of 2008 and Creating a Simple C# 2008 Console Application	2	K1(R) K2(U)	Lecture with PPT	Short test	
2.	Identifiers And Keywords, Data Types	3	K1(R)	Lecture with chalk and talk	Seminar	
3.	Variables and Constants, Expressions and Operators	3	K1(R)	Lecture with chalk and talk	Upload assignment in google classroom	
4.	Namespaces, Classes and Objects, Constructors and Destructors	3	K1(R) K2(U)	Context based learning	MCQ with slido	
5.	Properties, Indexers and Structs	4	K1(R) K2(U)	Flipped Classroom	Quiz with google classroom	
V	Object Oriented Programming, Pointers, Delegates and Events , Flow Control and Exceptional Handling					
1.	Encapsulation, Inheritance	3	K1(R) K2(U)	Brainstorming	Short test	
2.	Polymorphism, Abstraction and Interfaces	3	K1(R) K2(U)	Brainstorming	Questioning	
3.	Delegates, Events	3	K4(AN)	Inquired based Approach	Quiz with Slido	
3.	Control Flow statements	3	K6(C)	Group Discussion	Asking to write programs	
4.	Exceptional Handling	3	K4(AN)	Lecture using PPT	Concept definitions	

Course Focusing on Employability/ Entrepreneurship/ Skill Development: Skill Development

Activities (Em/ En/SD): Write a program for form validations.

Assignment: Database Controls

Seminar Topic: Inheritance, Polymorphism

Sample questions

Part A

1. ASP.NET 3.5 was released on -----
 - a) November 19, 2007
 - b) November 19, 2005
 - c) November 19, 2006
 - d) November 19, 2008
2. The ----- window helps you to recognize keywords and identifiers of the programming language is -----
 - a) Properties
 - b) Code editor
 - c) New Project
 - d) Add Existing Item
3. Which of these is not a stage of an ASP.NET Web page?
 - a) Properties
 - b) Add New Item
 - c) New Project
 - d) Add Existing Item
4. The code for a word boundary is -----
 - a) \b
 - b) \c
 - c) \p
 - d) \r
5. The ----- control displays the values of a data source in the form of a table.
 - a) GridView
 - b) Repeater
 - c) DataList
 - d) DataPager

Part B

6. Explain button control with a suitable example.
7. Explain textbox control with a suitable example.
8. Explain hidden field control with a suitable example.
9. Write a short note on ASP.NET page life cycle.
10. Explore a sample ASP.NET 3.5 web application.

Part C

11. Elaborate the new features added to ASP.NET 3.5
12. Distinguish between ASP.NET application life cycle on IIS 7.0 and ASP.NET page life cycle.
13. Construct various hotspots to navigate to other web pages using imagemap control with a suitable example.
14. Differentiate list box and drop-down list control with a suitable example.
15. Investigate checkbox and radio button with a suitable example.

Head of the Department

Mrs.J.Anto Hepzie Bai

Course Instructor

J. Anto Hepzie Bai

Department : Computer Science
Class : II B. Sc Computer Science
Title of the Course : Elective Course II: Software Engineering
Semester : IV
Course Code : SU234EC1

Course Code	L	T	P	S	Credits	Inst. Hours	Total Hours	Marks		
								CIA	External	Total
SU234EC1	4	-	-	-	3	4	60	25	75	100

Pre-requisite:

Basic knowledge in programming, software design principles and communication skills.

Learning Objectives:

1. To understand the basics of modular programming and how to create reusable code components.
2. To learn how to collaborate effectively with team members and gain proficiency in debugging techniques to identify and fix software bugs efficiently.

Course Outcomes

On the successful completion of the course, students will be able to:		
1.	recall fundamental concepts and principles of software engineering, including software development life cycle models, requirements engineering, and software design patterns.	K1
2.	understand the principles of software testing, including test planning, test case design, and test execution.	K2
3.	apply requirements engineering techniques to gather, analyze, and document software requirements for a given project.	K3
4.	analyze software requirements documents to identify inconsistencies, ambiguities, and conflicts.	K4
5.	create comprehensive test plans, test cases, and test scripts to ensure the quality and reliability of software systems.	K6

K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyze; **K6** – Create

Teaching plan
Total contact hours: 60 (Incl. lectures, assignments and test)

Unit	Section	Topics	Lecture hours	Cognitive Level	Pedagogy	Assessment/ Evaluation
I	Introduction to Software Engineering					
	1	The Evolving role of Software- Changing Nature of Software- Software Myths	3	K1(R)	Lecture with videos	Quiz using Nearpod
	2	A Generic view of process: Software Engineering – A Layered Technology	3	K2(U)	Context Based	Peer Review
	3	A process Framework – The Capability Maturity Model Integration (CMMI)	3	K2(U)	Demonstration	Group Discussion
	4	Process Models : The Waterfall Model- Spiral Model and Agile Methodology	3	K2(U)	Case Study method	Open Book Test
II	Software Requirements					
	1	Functional and Non Functional Requirements- User Requirements- System Requirements	3	K2(U)	Reflective Thinking	Group Discussions
	2	Interface Specifications- The Software Requirement Documents	3	K2(U)	Lecture method	Simple definitions Questioning
	3	Requirement Engineering Process: Feasibility Studies- Requirement Elicitation and Analysis	3	K4(An)	Inquiry based approach	Slido
	4	Requirement Validation, Requirements Management	3	K2(U)	Collaboration	Nearpod using activity
III	Design Engineering					
	1	Design Process and Design Quality-Design Concepts-The Design model	3	K2(U)	Lecture Method	Creative Writing
	2	Creating an Architectural Design: Architectural Design-Data Design- Architectural Styles and Patterns, Architectural Design	4	K3(Ap)	Context Based	Home Work

	3	Conceptual Model of UML-Basic Structural Modelling	2	K2(U)	Comparative Learning	Discussion and Questioning
	4	Class Diagram-Sequence Diagram- collaboration diagram-Use Case Diagram – Component Diagram	3	K3(Ap)	Case Study method	Formative Assesment
IV	Testing Strategies					
	1	A strategic Approach to Software Testing-Strategic Issues – Test Strategies for Conventional Software	3	K2(U)	Chalk and Talk	Assignment
	2	Test Strategies for Object Oriented Software	2	K2(U)	Interactive PPT	Group Discussion
	3	Validation Testing-System Testing- Art of debugging	3	K2(U)	Inquiry based approach	MCQ in slido
	4	Testing Tactics: Software Testing Fundamentals- White Box Testing-Basis Path Testing – Control Structure Testing-Black-box Testing	4	K2(U)	Cooperative Learning	Case Study
V	Risk Management					
	1	Reactive Vs Proactive Risk Strategies – Software Risks – Risk Identification – Risk Projection- Risk Refinement -RMMM	3	K2(U)	Context Based	Assignment
	2	Quality Management: Quality Concepts- Software Quality Assurance, software Radiality	3	K2(U)	Interactive PPT	Peer Review
	3	Software Quality Assurance – Software Reviews -Formal Technical Reviews	3	K4(An)	Construction	Slido(Quiz)
	4	Statistical Software Quality Assurance- Software Reliability – The ISO 9000 Quality Standards	3	K2(U)	Case Study Method	Slip Test

Course Focussing on Employability/ Entrepreneurship/ Skill Development: Skill Development

- Activities (Em/ En/SD):
1. Process Model Comparison Workshop
 2. Requirements Engineering Roleplay

3. UML Modelling Exercise

Assignment: Testing Tactics

Sample questions

Part A (1 Mark)

1. Which of the following software process models emphasizes iterative development and risk management?
 - a) Waterfall Model
 - b) Spiral Model
 - c) Agile Methodology
 - d) Capability Maturity Model Integration (CMMI)
2. The _____ model is a software process model that emphasizes risk management and iterative development.

3. What is the term for the process of finding and fixing defects in software?

4. Assertion:

The Agile methodology focuses on iterative development and emphasizes collaboration between cross-functional teams.

Reason:

Agile promotes adaptive planning, continuous improvement, and flexibility in responding to changing requirements.

Question:

Choose the correct option:

- a) Both Assertion and Reason are true, and Reason explains the Assertion.
 - b) Both Assertion and Reason are true, but Reason does not explain the Assertion.
 - c) Assertion is true, but Reason is false.
 - d) Assertion is false, but Reason is true.
5. The Waterfall model is a linear and sequential approach to software development. Say T/F.

Part B (5 Marks)

6. Explain the Capability Maturity Model Integration (CMMI) and its significance in software development.
7. Differentiate between functional and non-functional requirements with examples.
8. What are the core principles of Agile methodology?
9. Describe the key components of the software requirements engineering process.?
10. Compare and contrast white-box testing and black-box testing.

Part C (8 Marks)

11. Discuss the evolution of software engineering and the changing role of software over the years.

12. Analyze the strengths and weaknesses of the Waterfall, Spiral, and Agile process models.
13. Describe the requirements engineering process and its importance in software development.
14. Explain the design concepts and the design model in software engineering.
15. Examine the various software testing strategies and their significance in ensuring software quality.

Head of the Department

Mrs.J.Anto Hepzie Bai

Course Instructor

Mrs. Saravana Bala.

Department : **Computer Science**
Class : **III B.Sc Computer Science**
Title of the Course : **Major Core IX: Android Programming**
Semester : **VI**
Course Code : **SC2161**

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SC2152	4	1	-	4	5	75	25	75	100

Objectives:

1. To enable the students to build own Android Apps and to use Android's Communication APIs for SMS, telephony etc.
2. To develop mobile applications with social and ethical responsibilities in a professional working discipline.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	describe the platforms upon which the Android OS will run	PSO - 1	U
CO -2	apply the fundamental paradigms and technologies to develop mobile applications	PSO - 2	AP
CO -3	create a simple application that runs under the Android operating system	PSO - 4	C
CO -4	develop an application that uses multimedia under Android operating system	PSO - 4	C
CO -5	implement various methods in Android to create mobile applications for communication network	PSO - 2	AP

Teaching Plan

Total Contact hours : 75 (Including lectures, Assignments and Tests)

Unit	Module	Topic	Teaching Hours	Cognitive level	Pedagogy	Assessment / Evaluation
I	Fundamentals of Java for Android Application Development					
	1	Introduction to Java, Introducing Java Dalvik Virtual Machine, Developing a Simple Java Program	4	K2(U)	Lecture Method	PPT
	2	Interfaces, Inheritance, Getting an Overview of Android	4	K3(Ap)	Demonstration	PPT and Quiz
	3	Introducing Android, discussing about Android Applications, The Manifest File, Downloading and Installing Android	5	K3(Ap)	Collaboration	Interactive PPT and Slidod
	4	Exploring the Development Environment, Developing and Executing the First Android Application	5	K3(Ap)	Gamma PPT	Yes or No Questions
II	Using Activities, Fragments and Intents in Android					
	1	Working with Activities, Creating an activity, Starting an activity	5	K6(C)	Interactive PPT	Problem Solving Method
	2	Managing the Life cycle of an activity, Applying Themes and styles to an activity, Hiding the title of the activity	5	K2(U)&K3(Ap)	Case Study	Problem Solving
	3	Using Intents: Exploring Intent Objects – Fragments	5	K2(U)	Interactive PPT	Slido using Poll Marker
III	Working with the User Interface Using Views and View Groups					
	1	Working with View Groups, The Linear Layout Layout, The Relative Layout, The Frame Layout	5	K2(U) & K3(Ap)	Discussion Forum in Google Class Room	Interactive PPT and Mentimeter

	2	Working with Views, Binding Data with the Adapter View Class	4	K2(U) & K3(Ap)	Collaboration	Interactive PPT
	3	Designing the Auto Text Complete View, Implementing the Screen Orientation, Creating Menus	5	K2(U) & K3(Ap)	Case Study	Creating the Menu based Program
IV	Handling Pictures and Menus with Views					
	1	Working with Image Views, Designing Context Menu for Image View, Notifying the User	5	K3(Ap) & K6(C)	Reflective Thinking	PPT
	2	Storing the Data Persistently, Introducing the Data Storage Options, Using the Internal Storage, Using the External Storage	5	K3(Ap) & K6(C)	Lecture Method	Brain Storm
	3	Emailing and Networking in Android: Building an application to Send Email	4	K3(Ap) & K6(C)	Simulation	MCQ
V	Working with Graphics and Animation					
	1	Working with Graphics, Using the Drawable Object, Using the Shape Drawable Object, Working with Animations	5	K2(U) & K3(Ap)	Flipped Classroom	Brain Storming
	2	Audio, Video, and Camera, Role of Media Playback, Using Media Player	4	K2(U) & K3(Ap)	Reflective Thinking	Creativity of presentation

	3	Media Formats Supported by Media Player, Preparing Audio for Playback, Preparing Video for Playback	5	K2(U) & K3(Ap)	Reflective Thinking	Creative Thinking and create the video
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Course Focusing on Employ-ability/ Entrepreneurship/ Skill Development: Employ-ability

Activities (Em/ En/SD): Making the students to creating the video

Assignment: Exploring Intent Objects – Fragments

Seminar Topic: Working with Graphics

Sample Questions

Part A

1. What is the primary purpose of the Dalvik Virtual Machine (DVM) in the context of Android development?
 - a. Running Java applications on a computer
 - b. Converting Java bytecode into machine code for Android devices
 - c. Managing Android device memory
 - d. Creating graphical user interfaces
2. What is the purpose of an Intent in Android development?
3. Say True or False. The Manifest file in Android development is used to define the layout of the app.
4. Which layout in Android allows you to arrange child views either horizontally or vertically in a single line?
 - a. Relative Layout
 - b. Frame Layout
 - c. Linear Layout
 - d. Grid Layout
5. True or False: You can hide the title of an activity in Android by using the hide Title() method.

Part B

6. Explain about the Developing a Simple Java Program?
7. Elaboration the Designing Context Menu for Image View.
8. Discuss about Managing the Life cycle of an activity.
9. Different between Internal Storage and external storage.
10. Give briefly about Working with Animations.

Part C

11. Elaborate on the life cycle of an Android activity.
12. Differentiate between explicit and implicit intents, providing examples for each.

13. Discuss the role of View Groups in Android layouts.
14. Explain the role of the Drawable object in Android graphics and provide a code snippet illustrating its use in an Android application.
15. Describe the purpose of a context menu in Android. Provide an example of how to design a context menu for an Image View.

Head of the Department

Ms J. Anto Hepzie Bai

Course Instructor

Ms M.Monisha

Department : Computer Science
Class : III B. Sc Computer Science
Title of the Course : Major Core X : Computer Graphics
Semester : VI
Course Code : SC2162

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SC2162	4	-	-	4	4	60	30	70	100

Objectives:

1. Understand the basic concepts of Computer Graphics
2. Apply geometric transformations, viewing and clipping on graphical objects
3. Understand visible surface detection techniques and illumination models

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	explain the basics of graphics system	PSO – 1	U
CO -2	use the digital scan and copy systems accordingly	PSO –1	Ap
CO -3	analyze two dimensional geometric transformations and view it	PSO – 4	An
CO -4	apply three dimensional concepts for transformation and viewing	PSO – 4	Ap
CO - 5	apply various visible surface detection methods	PSO – 4	Ap

Teaching plan

Total Contact hours: 90 (Including lectures, assignments and tests)

Unit	Module	Topic	Teaching Hours	Cognitive level	Pedagogy	Assessment/ Evaluation
I	Introduction					
	1.	Overview of Graphics System.	1	K2(U)	Introductory session	Overview
	2.	Video Display Device, Refresh Cathode Ray Tube	2	K2(R)	Context Based	Simple definitions
	3.	Raster Scan Display, Random Scan Display	3	K2(U)	Lecture using Chalk and talk	Assignment
	4.	Color CRT Monitors, Direct View Storage tubes.	3	K2(U)	Demonstrative	Group Discussion
	5.	Flat Panel Displays , Three Dimensional Viewing Devices	3	K2(U)	Lecture using Chalk and talk	Surprise Test
II	Raster Scan Systems					
	1.	Raster Scan Systems, Video Controller , Random Scan Systems	2	K2(U)	Lecture using Chalk and talk	Interactive PPT
	2.	Input Devices- keyboard, Mouse, Trackball, Space ball and Joysticks, Data Glove- Digitizers-Image Scanners, Touch Panels, Light Pens	3	K2(U)	KWL(What do you know)	Online Assignment
	3.	Voice Systems, Hard Copy Devices	2	K2(U)	Blended Learning	Peer Review
	4.	Output Primitives: Line Drawing Algorithms-DDA, Bresenham's Line Algorithm	3	K3(Ap)	Integrative Teaching	Home work
	5.	Circle Drawing Algorithms,	2	K4(An)	Problem Solving	Recall steps

		Properties of Circles				
III	Two Dimensional Geometric Transformation					
	1	Basic Transformations Translation, Rotation, Scaling	3	K3(Ap)	Demonstrative	Case Study
	2	Other Transformations : Reflections	3	K2(U)	Lecture using Chalk and talk	MCQ
	3	Two-Dimensional Viewing: Windows to view point coordinate Transformations	3	K3(Ap)	Demonstrative	Recall steps
	4	Clipping Operations: Point Clipping, Line Clipping, Curve Clipping, Text Clipping, Exterior Clipping	3	K4(An)	Context based Learning	Quiz using Slido
IV	Three Dimensional Concepts					
	1	Three Dimensional Display Method, Parallel Projection, Depth Queuing, Visible Line and Surface	3	K2(U)	Lecture using Chalk and talk	Short summary
	2	Three Dimensional Geometric and modelling Transformation: Translation, Rotation, Scaling	4	K3(Ap)	Lecture using videos	Nearpod
	3	Three Dimensional Viewing : Viewing pipeline, Viewing coordinates	3	K3(A)	Reflective Thinking	Recall Steps
	4	Projections, Parallel Projections, Perspective Projections	2	K3(An)	Interactive Teaching	Preparation of Question
V	Visible Surface Detection Methods					
	1	Classification Visible Surface Detection Algorithms	3	K3(Ap)	Lecture using Chalk and talk	True/False

	2	Back Face Detection, A Buffer Method	3	K3(Ap)	Demonstration	Evaluation through problems
	3	Scan Line Method, Depth Sorting Method	3	K3(Ap)	Problem solving	Creative Writing
	4	BSP tree method, Area Subdivision Method	3	K3(Ap)	Demonstration	Activity using nearpod

Course Focusing on Employability/ Entrepreneurship/ Skill Development: Skill Development

Activities (Em/ En/SD): Graphics System Exploration

Hands-on with Input and Output Devices

Programming Line and Circle Algorithm

Assignment: Input and Output Primitives

Sample questions

Part A (1 Mark)

- Which of the following is an example of a display device that operates based on the raster-scan method?
 - Random Scan Display
 - Color CRT Monitor
 - Direct View Storage Tube
 - Three-Dimensional Viewing
- True or False: A Direct View Storage Tube (DVST) can store and display images without requiring continuous refreshing.
- In a _____ display system, images are created by directly drawing lines on the screen using an electron beam, and it is commonly used for applications like vector graphics.
- The _____ method in 3D graphics is used for detecting visible surfaces by sorting objects based on their depth, where the nearest object is drawn first.
- What is the main difference between a Raster-scan display and a Random-scan display?

Part B (4 Marks)

- Explain the working principle of a Cathode Ray Tube (CRT) and its role in raster-scan displays.
- Describe the process of line clipping using the Cohen-Sutherland algorithm. Provide an example of how it works.
- Discuss the advantages and disadvantages of using a Direct View Storage Tube (DVST) over a traditional CRT for displaying images.

9. Explain the concept of perspective projection in 3D graphics. How does it differ from parallel projection?
10. What is the purpose of the Bresenham's line algorithm? How does it improve efficiency over the DDA algorithm for line generation?

Part C (8 Marks)

11. Explain in detail the working of a Raster Scan Display system.
12. Discuss in detail the Bresenham's Line Algorithm for line generation.
13. Describe the process of Geometric Transformations in 2D computer graphics
14. Explain the concept of Visible Surface Detection and discuss the Scanline Method and Z-buffering method for determining visible surfaces in a 3D scene.
15. Explain the difference between Parallel Projections and Perspective Projections.

Head of the Department

Ms.J.Anto Hepzie Bai

Course Instructor

Ms. B.S. Saravana Bala

Department : Computer Science
Class : III B. Sc Computer Science
Title of the Course : Major Core XI: Operating Systems: Design Principles
Semester : VI
Course Code : SC2163

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SC2163	4	-	-	4	4	60	30	70	100

Objectives:

1. To introduce basic concepts and functions of operating systems and understand the concept of process, thread and resource management.
2. To understand various Memory, I/O and File management techniques.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	CL
CO -1	understand the basic concepts of an Operating System and the various system calls	PSO – 1	U
CO -2	classify the various processes and threads use for inter process communication	PSO – 2	AN
CO -3	describe the various scheduling & memory management techniques and the page replacement techniques used for memory management	PSO - 4	U
CO -4	understand the mutual exclusion deadlock detection and recovery for operating systems	PSO – 1	U
CO -5	apply the concepts of input/output and file/directory implementation	PSO – 4	AP

Teaching Plan

Total Contact hours: 60 (Including lectures, Assignments and Tests)

Unit	Module	Topics	Teaching hours	Cognitive level	Pedagogy	Assessment / Evaluation
I	INTRODUCTION					
	1	Introduction	1	K2 (U)	Lecture Introducing	Overview
	2	Different kinds of Operating System: Mainframe Operating System, Multiprocessor, Personal, Handheld Operating System.	3	K2 (U)	Discussion based lecture	Group Discussion
	3	Operating System Concepts: Processes, Address spaces, Files and Input / Output.	3	K2, K4 (U, An)	Interactive Lecture	Quiz
	4	System Calls	2	K2, K3 (U, Ap)	Lecture with examples	MCQ - Gamma
	5	Operating System Structure: Layered System, Client Server Model.	3	K2, K4 (U, An)	Visual Explanation	Written test
II	PROCESSES AND THREADS					
	1	Processes	2	K2, K3 (U, Ap)	Interactive Lecture	Quiz
	2	Threads: Thread Usage, Classical Thread Model.	3	K3, K4 (Ap, An)	Diagram based Explanation	MCQ - Metimeter
	3	Inter Process Communication: Race Condition Critical Region and Mutual Exclusion with Buzy Waiting.	5	K4 (An)	Problem Solving Excercises	Problem solving
	4	Semaphores	2	K3, K6 (Ap, C)	PPT	Assignment
III	SCHEDULING					
	1	Scheduling	1	K2, K4 (U, An)	Visual Aids	Problem solving

	2	Memory Management: Address Space, Swapping, Managing Free Memory.	2	K3 (Ap)	Demonstrations	Written test
	3	Virtual Memory: Paging and Page Table.	4	K4 (An)	Real world Examples	Quiz - Quizzes
	4	Page Replacement Algorithms.	2	K4, K6 (An, C)	Lecture method	Group Discussion
IV	DEADLOCKS					
	1	Resources, Introduction to Deadlocks and Condition for Resource Deadlock.	2	K2, K3 (U, Ap)	Lecture with examples	Short Assignment
	2	Deadlock Detection and Recovery.	4	K5 (E)	Case studies	Write code for deadlock detection
	3	Deadlock Avoidance.	2	K2 (U)	Interactive Lecture	MCQ - Slido
	4	Deadlock Prevention.	5	K3 (Ap)	Group Discussion	Seminar
	5	Multiple Processor System: Multiprocessor Hardware, Multiprocessor Operating System Types.	2	K4(An)	Comparative analysis	Short Test
V	INPUT / OUTPUT					
	1	Principles of I/O Hardware: I/O Devices, Device Controllers, Memory Mapped I/O and Direct Memory Access.	4	K4 (Ap)	Flipped Class room	Group Discussion
	2	Principles of I/O Software: Programmed I/O, Interrupt Driven I/O	4	K3 (Ap)	Visual Demonstrations	Seminar
	3	Files	3	K4 (An)	Interactive Lecture	Test
	4	Directories	4	K4 (An)	Group Discussion	Assignment
	5	File Systems Implementation.	3	K3, K5 (Ap, E)	Using visual images	Coding Task

Course Focussing on Employability/ Entrepreneurship/ Skill Development:

1. Employability – Compare different kinds of Operating System.
2. Entrepreneurship – Seminar on different Scheduling Algorithms.
3. Skill Development – Problem Solving in Paging.

Assignment : Semaphores and Directories.

Seminar Topic : Deadlock Prevention, Programmed I/O and Interrupt Driven I/O.

Sample questions:

Part - A (1 Mark)

1. What is a device controller in I/O hardware?
 - a) A software program to manage devices
 - b) A hardware component connecting devices to the computer system
 - c) An interrupt service routine
 - d) A memory block used for storing device instructions
2. Define Direct Memory Access (DMA).
 - a) A method where the CPU transfers data to devices
 - b) A hardware technique where devices access memory directly without CPU intervention
 - c) A program used for managing direct input-output operations
 - d) A type of device controller
3. What is interrupt-driven I/O?
 - a) A method where the CPU polls devices regularly
 - b) A technique where the device interrupts the CPU when it needs attention
 - c) A type of direct memory access operation
 - d) A software-based mechanism to transfer data
4. Which of the following are types of directory structures?
 - a) Paging and Segmentation
 - b) Contiguous and Linked
 - c) Single-level and Two-level
 - d) Static and Dynamic
5. What are the three main file allocation methods?
 - a) Contiguous, Indexed, Linked
 - b) Hierarchical, Single-level, Tree-based
 - c) Programmed, Interrupt-driven, DMA
 - d) Paging, Segmentation, Fragmentation

Part - B (4 Marks)

6. Compare programmed I/O and interrupt-driven I/O, highlighting their advantages and disadvantages.
7. Explain the steps involved in DMA and how it improves data transfer efficiency.
8. Describe the attributes of a file and their significance in an operating system.

9. Explain the hierarchical directory structure with an example.
10. Describe the principles of file system implementation, focusing on contiguous, linked, and indexed allocation methods.

Part - C (8 Marks)

11. Explain the architecture of memory-mapped I/O and discuss its advantages and limitations. Illustrate your answer with diagrams.
12. Discuss the process of interrupt handling in interrupt-driven I/O and compare it with programmed I/O.
13. Analyze the pros and cons of different directory structures: single-level, two-level, and tree-structured.
14. Discuss in detail the implementation of file systems, covering file allocation methods, directory management, and disk scheduling.
15. Explain the role of I/O software in operating systems, detailing the components of I/O management such as buffering, caching, and spooling.

Head of the Department

Ms. J. Anto Hepzie Bai

Course Instructor

Ms. Selvasanthi G

Department : Computer Science
Class : III B. Sc Computer Science
Title of the Course : Major Core XII: Computer Networks
Semester : VI
Course Code : SC2164

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SC2164	4	-	-	4	4	60	30	70	100

Objectives:

1. To understand the concept of Computer network
2. To impart knowledge about networking and inter networking devices.

Course Outcomes

CO	Upon completion of this course the students will be able to :	PSO addressed	CL
CO -1	independently understand basic computer network technology.	PSO – 1	U
CO -2	understand and explain Data Communications System and its components.	PSO – 2	U
CO -3	identify the different types of network topologies and protocols	PSO - 3	U
CO -4	enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.	PSO – 3	U
CO -5	apply the different types of network devices and their functions within a network	PSO – 3	AP
CO -6	familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.	PSO –4	AP

Teaching plan

Total Contact hours: 60 (Including lectures, assignments and tests)

Unit	Module	Topic	Teaching Hours	Cognitive level	Pedagogy	Assessment/ Evaluation
I	Introduction					
	1.	Introduction – Network Hardware: LAN,WAN	2	K1(R)	Introductory session	Overview

	2.	Software: Protocol Hierarchies- Design Issues for the layers	1	K1(R)	Lecture method	Simple definitions
	3.	Connection Oriented and Connectionless Services	2	K1(R)	Brainstorming	Unit Test
	4.	Reference Models – OSI and TCP/IP Models	2	K2(U)	Flipped classroom	Draw model layers
	5.	Example Network: Internet - Physical Layer	3	K2(U)	Blended Learning	Short essay
	6.	Guided Transmission Media	2	K2(U)	PPT	Concept definitions
II	Wireless Transmission					
	1.	Wireless Transmission - Communication Satellites: Geostationary Satellites	2	K2(U)	Lecture using Chalk and talk	Evaluation through short test
	2.	Medium Earth Orbit Satellites- Low Earth Orbit Satellites	2	K3(Ap)	Interactive PPT using Gamma	Slip Test
	3.	Telephone System: Structure of Telephone System	2	K2(U)	Group Discussion	MCQ using Slido
	4.	Local Loop: Modem, ADSC and Switching.	2	K3(Ap)	Demonstration	Quiz using Edmodo
	5.	Data Link Layer: Design Issues	2	K2(U)	Lecture class	Questioning
	6.	Error Detection and Correction.	2	K3(Ap)	Problem solving	Work out simple problems
III	Data Link Protocols					
	1.	Elementary Data Link Protocols: Simplex protocol	2	K2(U)	PPT	Short essays
	2.	Stop and Wait Protocol	2	K2(U)	Inquiry-based approach	Quiz using nearpod
	3.	Sliding Window Protocols	2	K3(Ap)	Team Teaching	Short test

	4.	Medium Access Layer – Channel Allocation Problem	2	K2(U)	Flipped Classroom	True/False using Quizzes
	5.	Multiple Access Protocols: Carrier Sence Multiple Access Protocols	2	K3(Ap)	Demonstration	Draw diagrams
	6.	Collision Free Protocols	2	K3(Ap)	Interactive PPT	Questioning
IV	Network Layer					
	1.	Network Layer - Design Issues: Store and Forward Packet Switching	2	K2(U)	Lecture using Chalk and talk	Short summary
	2.	Services Provided to the Transport Layer	2	K3(Ap)	Demonstrative	Concept explanations
	3.	Comparison of Virtual Circuit and Datagram Subnet	2	K3(Ap)	Inquiry -based approach	Questioning
	4.	Routing Algorithms: Shortest Path Routing, Distance Vector Routing, Hierarchical Routing	2	K2(U)	Lecture with PPT	Evaluation through short test
	5.	Congestion Control Algorithms: Principles of Congestion Control- Congestion Prevention Policy	2	K2(U)	Lecture using Chalk and talk	MCQ using Slido
	6.	IP Protocol – IP Addresses – Internet Control Protocols	2	K3(Ap)	Problem solving	Short test
V	File Handling					
	1.	Transport Layer - Services	2	K1(R)	Brainstorming	MCQ using Kahoot
	2.	Connection Management: Addressing	2	K3(Ap)	Inquiry-based learning	Questioning
	3.	Establishing and Releasing a Connection	2	K3(Ap)	Lecture with Videos	Summarise concept

	4.	Simple Transport Protocol	2	K3(Ap)	Flipped classroom	MCQ using mentimeter
	5.	Internet Transport Protocols (ITP)	2	K3(Ap)	Problem solving	Short essays
	6.	Network Security: Cryptography.	2	K2(U)	Lecture using Chalk and talk	Seminar

Course Focussing on Employability/ Entrepreneurship/ Skill Development: Skill Development

- Activities (Em/ En/SD):
1. Use basic network commands
 2. Draw OSI Reference model.
 3. Write about Network Security.

Assignment: Collision Free Protocols

Seminar Topic: Guided Transmission Media

Sample questions

Part A (1 Mark)

1. Which of the following is a characteristic of a Wide Area Network (WAN)?
 - a. It covers a small geographic area, like a single building
 - b. It is typically used to connect devices within a local office
 - c. It spans large geographic areas, often including multiple cities or countries
 - d. It operates exclusively using wired connections
2. What is wireless communication?
 - a. Sending data from one location to with the use of physical medium
 - b. Sending data from one location to another without the use of physical medium
 - c. Sending data from one location to another without the use of virtual medium
 - d. None of the mentioned
3. Which of the following statements best describes the Simplex Protocol in data communication?
 - a. It allows data transmission in both directions, but only one direction at a time.
 - b. It supports full-duplex communication where data can be sent and received simultaneously.
 - c. It allows data transmission only in one direction without any acknowledgment.
 - d. It supports error-checking and acknowledgment of received data.
4. Which of the following statements is true regarding "Store and Forward Packet Switching" in the network layer?

- a. Packets are forwarded immediately to the next node without being stored in intermediate routers.
 - b. Each router stores the entire packet, examines the header, and then forwards it to the next router.
 - c. Packets are only forwarded after receiving an acknowledgment from the destination.
 - d. This method is used only in circuit-switched networks.
5. Which of the following statements correctly describes the primary purpose of connection management in the Transport Layer?
- a. To handle data encryption and decryption for secure communication.
 - b. To ensure end-to-end delivery of packets without managing connection setup or release.
 - c. To manage the addressing, establishment, and release of connections between devices.
 - d. To route data packets through the shortest path to minimize delay

Part B (4 Marks)

- 6. Explain the differences between connection-oriented and connectionless services in network communication.
- 7. Compare and contrast the different types of satellites.
- 8. Draw and explain Simplex Protocol.
- 9. Explain the differences between Virtual Circuit and Datagram subnets in the Network Layer
- 10. Explain the process of establishing and releasing a connection in the Transport Layer

Part C (8 Marks)

- 11. Describe the OSI and TCP/IP reference models.
- 12. Illustrate error detection methods in detail.
- 13. Explain Sliding Window Protocol with a neat diagram.
- 14. Discuss the role and importance of the Network Layer in managing data transmission across networks.
- 15. Explain the role of Cryptography in Network Security.

Head of the Department

Mrs.J.Anto Hepzie Bai

Course Instructor

Mrs. Sahaya Rose Vigita

Department : Computer Science
Class : III B.Sc Computer Science
Title of the Course : Major Elective III: (a) PHP Programming
Semester : VI
Course Code : SC2165

Course Code	L	T	P	Credits	Inst. Hours	Total Hours	Marks		
							CIA	External	Total
SC2165	3	-	1	3	4	60	30	70	100

Objectives:

1. To learn and use open-source database management system MySQL
2. To create dynamic web pages and websites.
3. To connect web pages with database.

Course Outcomes

CO	Upon completion of this course the students will be able to:	PSO addressed	Cognitive Level
CO - 1	analyze PHP scripts and determine their behavior.	PSO - 2	K4 (AN)
CO - 2	design web pages with the ability to retrieve and present data from a MySQL database.	PSO - 1	K3 (AP) & K6 (C)
CO - 3	recall the basic key elements, various PHP library functions, and that manipulate files and directories.	PSO - 1	K1 (R)
CO - 4	understand the control flow statements in scripts to create dynamic web content.	PSO - 1	K2 (U)

Teaching plan

Total Contact hours: 60 (Including lectures, assignments and tests)

Unit	Module	Topic	Teaching hours	Cognitive Level	Pedagogy	Assessment/Evaluation
I	Introducing PHP, Using Variables and Operators					
	1.	Basic development Concepts, Creating first PHP Scripts	2	K1 (R), K6 (C)	Brainstorming	Evaluation through: short test
	2.	Using Variable and Operators, Storing Data in variable	3	K1 (R), K2 (U)	Flipped classroom	MCQ using google classroom

	3.	Understanding Data types, Setting and Checking variables Data types	2	K1 (R), K2 (U)	Blended Learning	Open book test
	4.	Using Constants	2	K1 (R), K2 (U)	Interactive PPT using Gamma	Questioning
	5.	Manipulating Variables with Operators	3	K1 (R), K2 (U)	Group Discussion	Slip test
II	Controlling Program Flow					
	1.	Writing Simple Conditional Statements	3	K3 (AP)	Demonstration	Short test
	2.	Writing More Complex Conditional Statements	3	K3 (AP)	Demonstration	Seminar
	3.	Repeating Action with Loops	3	K3 (AP)	Demonstrative with illustration	Ask to write programs
	4.	Working with String and Numeric Functions.	3	K3 (AP)	Lecture method	Surprise test
III	Working with Arrays					
	1.	Storing Data in Arrays	2	K1 (R), K2 (U)	Brainstorming	Quiz using slido
	2.	Processing Arrays with Loops and Iterations	2	K1 (R), K2 (U)	Group Discussion	MCQ using kahoot
	3.	Using Arrays with Forms	1	K1 (R), K2 (U)	Inquiry-based approach	Questioning
	4.	Working with Array Functions	3	K1 (R), K2 (U)	Team Teaching	Class test
	5.	Working with Dates and Times	3	K1 (R), K2 (U)	Flipped Classroom	Group Discussions
IV	Using Functions and Classes, Working with Files and Directories					
	1.	Creating User-Defined Functions	3	K3 (AP)	Demonstrative	Slip test
	2.	Creating Classes	2	K3 (AP)	Inquiry -based approach	Ask to write a program using class
	3.	Using Advanced OOP Concepts	2	K3 (AP)	Lecture with PPT	Quiz using nearpod

	4.	Working with Files and Directories: Reading Files	2	K2 (U), K3 (AP)	Flipped classroom	Ask to write a program
	5.	Writing Files, Processing Directories	3	K2 (U)	Interactive PPT	Ask to write a program
V	Working with Databases and SQL, Working with XML					
	1.	Introducing Database and SQL	3	K1 (R), K2 (U)	Brainstorming	Questioning
	2.	Adding and modifying Data	2	K1 (R), K2 (U)	Inquiry-based learning	Recalling
	3.	Handling Errors, Using SQLite Extension	2	K1 (R), K2 (U)	Lecture with Videos	Questioning
	4.	Introduction XML	2	K1 (R), K2 (U)	Flipped classroom	Group Discussion
	5.	Simple XML	2	K1 (R), K2 (U)	Lecture with illustration	Slip test
	6.	DOM Extension	2	K1 (R), K2 (U)	Interactive PPT	Quiz using quizzes

Course Focussing on Employability/ Entrepreneurship/ Skill Development: Employability

Activities (Em/ En/SD): Making students to design websites.

Assignment: Data types & Constants and uploading in Google Classroom

Seminar Topic: Writing More Complex Conditional Statements

Sample questions:

Part A

- The function ----- is used to destroy a variable.
a) inset() b) unset() c) delete() d) remove()
- Constants are defined using ----- function.
a) define() b) declare() c) const() d) def()
- Name the function to delete a file.
- An ArrayIterator provides a ready-made, extensible tool to loop over array elements.
Say “True” or “False”
- The abbreviation of XML is -----

Part B

- Discuss the various data types in PHP.
- Describe the various built-in numeric functions in PHP.
- List out the various built-in array manipulation functions with suitable examples.
- Analyze XML with a suitable example.

10. Explain the switch-case statement with a suitable example.

Part C

11. How do you create a script in PHP?

12. Elaborate the various built-in string manipulation functions in PHP.

13. How do you create a form using arrays? Discuss it with an example?

14. How do you read and write a file in PHP?

15. Describe XML and DOM extension in PHP.

Head of the Department

J. Anto Hepzie Bai

Course Instructor

J. Anto Hepzie Bai