MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12

SYLLABUS

PG - COURSES – AFFILIATED COLLEGES

Course Structure for M. Sc. Computer Science
(Choice Based Credit System)

(with effect from the academic year 2023-2024 onwards)

Semester-I				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
3	Core	ANALYSIS & DESIGN OF ALGORITHMS	DCSM11	4
3	Core	OBJECT ORIENTED ANALYSIS AND DESIGN & C++	DCSM12	4
3	Core	PYTHON PROGRAMMING	DCSM13	4
3	Elective	ADVANCED SOFTWARE ENGINEERING	DCSM14	3
3	Elective	ADVANCED COMPUTER NETWORKS	DCSE11	3
3	Practical	ALGORITHM AND OOPS LAB	DCSL11	2
3	Practical	PYTHON PROGRAMMING LAB	DCSL12	2
	AEC-I	EFFECTIVE COMMUNICATION IN ENGLISH		1
	SEC I	BASICS OF WEB DESIGN		1

Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

A. **Scheme for internal Assessment**:
Maximum marks for written test: **15 marks**
3 internal tests, each of **I hour** duration shall be conducted every semester.
To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks and Seminar for 5 marks

The break up for internal assessment shall be:
Written test- 15 marks; Assignment -5 marks; Seminar-5 Marks Total - 25 marks

B. Scheme of External Examination
3 hrs. examination at the end of the semester
A – Part : 1 mark question two - from each unit
B – Part : 5 marks question one - from each unit
C – Part : 8 marks question one - from each unit

➢ Conversion of Marks into Grade Points and Letter Grades

S.No.	Percentage of Marks	Letter Grade	Grade Point	Performance
1	90 - 100	O+	10	Outstanding
2	80 - 89	O	9	Excellent
3	70 - 79	A+	8	Very Good
4	60 - 69	A	7	Good
5	55 - 59	B+	6	Above Average
6	50 - 54	B	5	Pass
7	0 - 49	RA	-	ReAppear
8	Absent	AA	-	Absent

➢ Cumulative Grade Point Average (CGPA)

$$\mathbf{CGPA} = \frac{\mathbf{\Sigma\,(GP \times C)}}{\mathbf{\Sigma C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

➢ Classification

a) First Class with Distinction : CGPA $\geq$ 7.5*****
b) First Class : CGPA $\geq$ 6.0
c) Second Class : CGPA $\geq$ 5.0 and $<$ 6.0
d) Third Class : CGPA$<$ 5.0

ANALYSIS & DESIGN OF ALGORITHMS

Course Objectives:

The main objectives of this course are to:

- Enable the students to learn the Elementary Data Structures and algorithms.
- Presents an introduction to the algorithms, their analysis and design
- Discuss various methods like Basic Traversal And Search Techniques, divide and conquer method, Dynamic programming, backtracking
- Understood the various design and analysis of the algorithms.

Unit:1 INTRODUCTION

Introduction: - Algorithm Definition and Specification – Space complexity-Time Complexity- Asymptotic Notations - Elementary Data Structure: Stacks and Queues – Binary Tree – Binary Search Tree - Heap – Heapsort- Graph.

Unit:2 TRAVERSALANDSEARCHTECHNIQUES

Basic Traversal And Search Techniques: Techniques for Binary Trees-Techniques for Graphs - Divide and Conquer: - General Method – Binary Search – Merge Sort – Quick Sort.

Unit:3 GREEDY METHOD

The Greedy Method:-General Method–Knapsack Problem–Minimum Cost Spanning Tree– Single Source Shortest Path.

Unit:4 DYNAMICPROGRAMMING

Dynamic Programming-General Method–Multistage Graphs–All Pair Shortest Path–Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling.

Unit:5 BACKTRACKING

Backtracking:-GeneralMethod–8-QueensProblem–SumOfSubsets–GraphColoring–Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.

Unit:6 Contemporary Issues

Expert lectures, on line seminars– webinars

Text Books

1. Ellis Horowitz, “Computer Algorithms”, Galgotia Publications.
2. Alfred V. Aho, John E . Hopcroft, Jeffrey D. Ullman, "Data Structures and Algorithms".

Reference Books

1. Goodrich, "Data Structures& Algorithms in Java",Wiley3rd edition.
2. Skiena,"The Algorithm Design Manual",SecondEdition,Springer,2008
3. Anany Levith,"Introduction to the Design and Analysis of algorithm", Pearson Education Asia, 2003.
4. Robert Sedgewick, Phillipe Flajolet, "An Introduction to the Analysis of Algorithms", Addison-Wesley Publishing Company,1996.

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

1. https://nptel.ac.in/courses/106/106/106106131/
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://www.javatpoint.com/daa-tutorial

OBJECT ORIENTED ANALYSIS AND DESIGN & C++

Course Objectives:

The main objectives of this course are to:

- Present the object model, classes and objects, object orientation, machine view and model management view.
- Enables the students to learn the basic functions, principles and concepts of object oriented analysis and design.
- Enable the students to understand C++ language with respect to OOAD

Unit:1 OBJECT MODEL

The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.

Unit:2 CLASSES AND OBJECTS

Classes and Object: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. **Classification**: The importance of Proper Classification – identifying classes and objects – Key Abstractions and Mechanism.

Unit:3 C++INTRODUCTION

Introduction to C++-Input and output statements in C++-Declarations-control structures– Functions in C++.

Unit:4 INHERITANCE AND OVERLOADING

Classes and Objects–Constructors and Destructors–operators over loading–Type Conversion- Inheritance – Pointers and Arrays.

Unit:5 POLYMORPHISM AND FILES

Memory Management Operators-Polymorphism–Virtual functions–Files–Exception Handling – String Handling -Templates.

Unit:6 Contemporary Issues

Expert lectures, online seminars – webinars

Text Books

1. "Object Oriented Analysis and Design with Applications", Grady Booch, Second Edition, Pearson Education.
2. "Object-Oriented Programming with ANSI & Turbo C++", Ashok N.Kamthane, First Indian Print -2003, Pearson Education.

Reference Books

1. Balagurusamy "Object Oriented Programming with C++",TMH, Second Edition,2003.

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

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

PYTHON PROGRAMMING

Course Objectives:

The main objectives of this course are to:

- Presents an introduction to Python, creation of web applications, network applications and working in the clouds
- Use functions for structuring Python programs
- Understand different Data Structures of Python
- Represent compound data using Python lists, tuples and dictionaries

Unit:1 INTRODUCTION

Python: Introduction–Numbers–Strings–Variables–Lists–Tuples–Dictionaries–Sets–Comparison.

Unit:2 CODE STRUCTURES

Code Structures: if, else if, and else – Repeat with while – Iterate with for – Comprehensions – Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions.

Unit:3 MODULES, PACKAGES AND CLASSES

Modules, Packages, and Programs: Standalone Programs – Command-Line Arguments – Modules and the import Statement – The Python Standard Library. Objects and Classes: Define a Class with class – Inheritance – Override a Method – Add a Method – Get Help from Parent with super–Inself Defense –Get and Set Attribute Values with Properties –Name Mangling for Privacy – Method Types – Duck Typing – Special Methods –Composition.

Unit:4 DATA TYPES AND WEB

Data Types: Text Strings–Binary Data. Storing and Retrieving Data: File Input/Output– Structured Text Files – Structured Binary Files - Relational Databases – NoSQL Data Stores.

Web: Web Clients –Web Servers–Web Services and Automation

Unit:5 SYSTEMS AND NETWORKS

Systems: Files–Directories–Programs and Processes–Calendars and Clocks.

Concurrency: Queues– Processes–Threads–Green Threads and event–twisted–Redis.

Networks: Patterns – The Publish-Subscribe Model – TCP/IP – Sockets – ZeroMQ – Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and Map Reduce – Working in the Clouds.

Unit:6 Contemporary Issues

Expert lectures, online seminars –webinars

Text Books

1. Bill Lubanovic, “Introducing Python”, O’Reilly, First Edition-Second Release, 2014.
2. Mark Lutz, “Learning Python”, O’Reilly, Fifth Edition, 2013.

Reference Books

1. David M. Beazley, “Python Essential Edition,2009. Reference”, Developer’s Library, Fourth
2. Sheetal Taneja, Naveen Kumar, Approach”, Pearson Publications. “Python Programming- A Modular

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

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

ALGORITHM AND OOPS LAB

Course Objectives:

- The main objectives of this course are to:
- This course covers the basic data structures like Stack, Queue, Tree, and List.
- This course enables the students to learn the applications of the data structures using various techniques
- It also enable the students to understand C ++ language with respect to OOAD concepts
- Application of OOPS concepts.

LIST OF PROGRAMS

1) Write a program to solve the tower of Hanoi using recursion.
2) Write a program to traverse through binary search tree using traversals.
3) Write a program to perform various operations on stack using linked list.
4) Write a program to perform various operation in circular queue.
5) Write a program to sort an array of an elements using quick sort.
6) Write a program to solve number of elements in ascending order using heap sort.
7) Write a program to solve the knap sack problem using greedy method
8) Write a program to search for an element in a tree using divide& conquer strategy.
9) Write a program to place the 8 queens on an 8X8 matrix so that no two queens Attack.
10) Write a C++ program to perform Virtual Function
11) Write a C++ program to perform Parameterized constructor
12) Write a C++ program to perform Friend Function
13) Write a C++ program to perform Function Overloading
14) Write a C++ program to perform Single Inheritance
15) Write a C++ program to perform Employee Details using files.

Text Books

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

Reference Books

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

Related Online Contents [MOOC, SWAYAM, NPTEL, Web sites etc.]

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

PYTHON PROGRAMMING LAB

Course Objectives:

The main objectives of this course are to:

- This course presents an overview of elementary data items, lists, dictionaries, sets and tuples
- To understand and write simple Python programs
- To Understand the OOPS concepts of Python
- To develop web applications using Python

LIST OF PROGRAMS

Implement the following in Python:

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

Text Books

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

Reference Books

1. David M. Beazley, "Python Essential Reference", Developer's Library, Fourth Edition, 2009.
2. Sheetal Taneja, Naveen Kumar, "Python Programming -A Modular Approach", Pearson Publications.

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

AEC – 1 EFFECTIVE COMMUNICATION IN ENGLISH

Course Objectives:

- To help the students develop communication skills and self confidence
- To motivate the students to acquire employability skills
- To introduce various interview techniques to the students
- To motivate the students to becomes good public speakers
- To develop leadership qualities in the students
- To guide the students how to tackle interviews
- To help the students to enhance their writing skills
- To teach the students how to write a good CV
- To introduce various articles in writing to the students

Course Contents

Public Speaking

The power of Public Speaking, • Developing confidence, • Planning • Preparation • Successful and effective delivery of speech

Group Discussion

What is group discussion? • Why are group discussions held? • Preparation for a group discussion • Skills for effective participation • Traits tested in a group discussion • Initiating a group discussion • Non-verbal communication in group discussion • Types of group discussions

Interviews

Interviewing in the 21st century • Developing an Interview Strategy • Taking Care of the Details • Practicing for the Interview • During the Interview • Stress Interviews • Traditional Interviews

Writing Skills

• Basics of writing • Writing paragraphs • Writing research articles • Report writing • Writing a CV

Skill Enhancement Course (SEC 2)
Basics of Web Design

UNIT I

Introduction to Web Design Introduction of Internet, WWW, Website, Working of Websites, Webpages, Front End, Back End, Client and Server Scripting Languages, Responsive Web Designing, Types of Websites (Static and Dynamic Websites).

UNIT II

HTML Basics HTML: Introduction, Basic Structure of HTML, Head Section and Elements of Head Section, HTML 5 Introduction, HTML5 New Elements: Section, Nav, Article, Aside, Audio Tag, Video Tag, HTML5 Form Validations: Require Attribute. Autofocus Attribute, email, number type, date type , Range type, HTML embed multimedia, HTML Layout, HTML Iframe

Unit III

CSS Introduction to CSS, Types of CSS, CSS Selectors: Universal Selector, ID selector, Tag Selector, Class Selector, Sub Selector, Attribute Selector, Group Selector, CSS Properties: Back Ground properties, Block Properties, Box properties, List properties, Border Properties, Positioning Properties, CSS Lists CSS Tables, CSS Menu Design CSS Image Gallery

Unit IV

JavaScript and Angular JS Introduction to Client Side Scripting Language, Variables in Java Script, Operators in JS, Conditions Statements, JS Popup Boxes.

Unit V

JS Events, Basic Form Validations in JavaScript. Introduction to Angular JS: Expressions, Modules and Directives.

Books for Reference:

1. HTML5, Black Book, Kagent Learning Solution Inc, 2014
2. Mastering HTML, CSS &JavaScript Web Publishing by Lemay Laura, BPB publications
3. HTML & CSS: The Complete Reference by Thomas Powell