SYMBIOSIS INSTITUTE OF TECHNOLOGY, NAGPUR
Constituent of Symbiosis International (Deemed University), Pune
(Established under Section 3 of the UGC Act of 1956 wide notification number F-9-12/2001-U-3 of Government of India)
॥वसुधैव कुटुम्बकम्॥ Re-Accredited by NAAC with 'A++' Grade

Design and Analysis of Algorithms

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SIU Mission and Vision

VISION

• Promoting International understanding through quality education.

MISSION

•To inculcate spirit of 'Vasudhaiva Kutumbakam' (the world is one family).
•To contribute towards knowledge generation and dissemination.
•To promote ethical and value-based learning.
•To foster the spirit of national development.
•To inculcate cross cultural sensitization.
•To develop global competencies amongst students.
•To nurture creativity and encourage entrepreneurship.
•To enhance employability and contribute to human resource development.
•To promote health and wellness amongst students, staff & community.
•To instill sensitivity amongst the youth towards the community and environment.
•To produce thought provoking leaders for the society.

Course Outcomes and Program Outcome

COURSE OUTCOMES

- Analyze the complexity of an algorithm and explain algorithm analysis concepts like asymptotic, amortized analysis etc to provide a rough classification of an algorithm.
- Devise, validate and analyze algorithms using Divide and Conquer and greedy strategy.
- Develop, design and analyze algorithms using Dynamic Programming strategy.
- Develop, design and analyze backtracking and branch and bound algorithms etc.
- Explain solvability of algorithms and categorize NP-Hard and NP-Complete Problems.
- Differentiate and compare various algorithmic design strategies.

Evaluation methods

CA Details	Unit	Marks
CA – 1: MCQ	1	5
CA – 2: Assignments	2	5
CA – 3: Central Exam	3,4	10
CA – 4: Mini Project	1,2,3,4,5	10

Attendance Criteria

- To be eligible for appearing in the end-semester exam, students must maintain a minimum attendance of 75%.
- Students failing to meet the attendance criteria will receive a "Course Not Granted" (CNG) status.
- CNG status indicates ineligibility to take the end-semester exam.

Syllabus of the subject

Unit 1 Introduction Analysis of algorithm efficiency: - analysis framework asymptotic notations analysis of non-recursive and recursive algorithms, amortized analysis, writing characteristic polynomial equations, solving recurrence equations, proof techniques: by contradiction, by mathematical induction

Unit 2 Divide and Conquer and Greedy Method Characteristics, analysis methodology, merge sort, quick sort, binary search, large integer multiplication. General characteristics of greedy algorithms, Prim "s algorithm, Kruskal "s algorithm, Dijkstra "s algorithm, Heap Sort, job sequencing with deadlines/activity selection problem, optimal merge patterns, Knapsack problem

Unit 3 Dynamic Programming General strategy, principle of optimality, Warshall "s and Floyd "s algorithm, optimal binary search trees, Knapsack problem, Travelling Salesperson problem, flow shop scheduling

Unit 4 Backtracking and Branch- BoundGeneral strategy, generic recursive backtracking algorithm, iterative backtracking method, 8-queens problem, graph coloring, Hamiltonian cycle, Knapsack Problem.0/1 knapsack problem LC branch and bound and FIFO branch bound solution

Unit 5 NP-Hard And NP-Complete ProblemsAlgorithms, Non-Deterministic Polynomial time (NP) decision problems, Cooks theorem, NP-complete problems-satisfiability problem.

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Celebrating 50 Years of Excellence

Academic Calendar

Symbiosis Institute of Technology, Nagpur Campus

Academic Calendar ODD Semester 3, 5, 7th Sem

Session: 2024-25

	Mon	Tue	Wed	Thur	Fri	Sat	Sun	Days	Holidays	List of Activities	Working days	CA		
												Credit 2	Credit 3	Credit 4
Jul-24	1	2	3	4	5	6	7	6		Jul 1: (3rd, 5th and 7th Semester) Commencement and Registration	27		CA1 July 25-July 31	CA1 July 25-July 31
	8	9	10	11	12	13	14	6						
	15	16	17	18	19	20	21	6						
	22	23	24	25	26	27	28	6						
	29	30	31					3						
Aug-24				1	2	3	4	3	August 15 and 19: Independence Day and Rakshabandhan	Aug 2: Open House, Aug 26-30 : Student Mid Semester Feedback	25	CA1 Aug 21-26	CA2 Aug 21-26	CA2 Aug 21-26
	5	6	7	8	9	10	11	6						
	12	13	14	15	16	17	18	5						
	19	20	21	22	23	24	25	5						
	26	27	28	29	30	31		6						
Sep-24							1	0	Sept 7 and 17: Ganesh Chaturthi and Anant Chaturdashi		22			CA3 Sep 11-13
	2	3	4	5	6	7	8	5						
	9	10	11	12	13	14	15	6						
	16	17	18	19	20	21	22	5						
	23	24	25	26	27	28	29	6						
	30													
Oct-24		1	2	3	4	5	6	2	Oct 2 and 12: Gandhi Jayanti and Dussehra	Oct25-26: Cultural/ Technical Fest	17	CA2/ MSE Sep 30-Oct 3	CA3/ MSE Sep 30-Oct 3	CA4/ MSE Sep 30-Oct 3
	7	8	9	10	11	12	13	5						
	14	15	16	17	18	19	20	6						
	21	22	23	24	25	26	27	4						
	28	29	30	31				0						
Nov-24					1	2	3	0	Oct 27-Nov 3: Diwali Vacation	Nov 18-22: Practical End Sem Exam and Student End Semester Feedback	12	CA3 Nov 11-15	CA4 Nov 11-15	CA5 Nov 11-15
	4	5	6	7	8	9	10	6						
	11	12	13	14	15	16	17	6						
	18	19	20	21	22	23	24	0						
	25	26	27	28	29	30								
Dec-24							1		Dec 25: Christmas		0			
	2	3	4	5	6	7	8							
	9	10	11	12	13	14	15							
	16	17	18	19	20	21	22							
	23	24	25	26	27	28	29							
	30	31												
										Total Days:	103			

Academic Calendar

Particulars	Start Date	End Date	
Teaching	01-07-2024	16-11-2024	103
PL	23-11-2024	28-11-2024	6
ESE	29-11-2024	16-12-2024	15
Semester Break	17-12-2024	25-12-2024	9
Commencement of Next Sem (4th, 6th and 8th Sem)	26-12-2024		

(Verified)	(Verified)
Signature:	Signature:
Name: Dr. AYUSH CHAUHAN	Name: Dr. Lalita
Date: 17/06/2024	Date: 17/06/24
Examination Deparrtment	Academic Deparrtment

Director's Signature

Director
Symbiosis Institute of Technology
Nagpur

Total Days:	183

	Commencement of Semester
	SUNDAYS
	HOLIDAY as per SIU
	CA(Credit 4)
	CA(Credit 3)
	CA(Credit 2)
	MSE/ESE
	ESE Practical
	PL
	Last Teaching Day
	Open House
	Cultural/Technical Fest

Scope of the subject in Computer Science & Engineering, its prerequisite and other related subjects

Design and Analysis of Algorithms is a fundamental course in Computer Science & Engineering (CSE) curriculum.

KEY LEARNING OBJECTIVES:

To develop the ability to analyze the running time and prove the correctness of basic algorithms.
To be able to design efficient algorithms for moderately difficult computational problems, using various algorithm design techniques taught in the course.
To be able to prove the hardness of NP-Hard problems using simple reductions.
To be able to do performance analysis of simple approximation algorithms.

RELEVANCE TO CSE AND OTHER SUBJECTS:

DATA STRUCTURE
OPERATING SYSTEMS
DATABASE MANAGEMENT SYSTEMS
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
COMPUTER NETWORKS
COMPILER DESIGN
CRYPTOGRAPHY AND NETWORK SECURITY
SOFTWARE ENGINEERING

Importance of DAA in Industry and Entrepreneurial Ventures

Importance in Industry:

Efficiency and Performance Optimization
Scalability
Cost Reduction
Real-Time Processing
Security

Importance in Entrepreneurial Ventures:

Innovation and Competitive Advantage
Product Development
Cost-Effective Solutions
Data-Driven Decision Making
Automation and Efficiency

About yourself and your area of research

Dr. Piyush Chauhan

Education: Ph.D. (Computer Science Engineering) , M.Tech(Computer Science Engineering) , B.Tech (Information Technology)

Experience: 10+ Years

Awarded PhD degrees (supervised): 03

Expert Area: Grid Computing, Geo Computing, Mobile application development, Data Science

Research Focus: Grid Computing, Geo Computing, Machine Learning Data Science.

Publications: Journals: 13, Conferences: 10, Patents: 03.

Contact Details:

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TimeTable of Dr. Piyush Chauhan

Days			09:05-09:55	10:00-10:50	10:55-11:45	11:50-12:40	12:45-01:35	01:40-02:30	02:35-03:25	03:30-04:20	04:25-05:15
Monday	III A									DAAL (PC) (A1)Lab 4	
	VII B							DSeL (PC) (Studio-2)			
Tuesday	III A				DAA (PC) (B2) Lab 3						
	VII B							DSeL (PC) (Studio-2)			
Wednesday	III A					DAA (PC) (Lab 3)					
	VII B		DSe L PC (B2 Lab 1)								
Thursday	III A		DAA (PC) (Lab 3)								
	VII B			DSe(PC) Studio-2	DSe L PC (B1 Lab 1)						
Friday	III A		DAAL (PC) (A2)(Lab 4)								
	VII B										

LUNCH

Thank You