Varendra University
Department of Computer Science and Engineering
Course Outline

Course Title: Computer Algorithms Lab
Course Code: CSE 2204
Course Type: Lab
Credits: 1.5
Prerequisite Knowledge: Object Oriented Programming Lab, Data Structure Lab
Year and Semester: 2nd Year, 4th Semester
Session: Summer-2025

Instructors' details:

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Motivation of Course:
To implement and analyze the algorithms learned in the Computer Algorithms theory course.

Course Objective:
The objective of this course is to provide hands-on experience in implementing various algorithms and utilizing previously learned data structures to improve algorithmic efficiency. It emphasizes the application of algorithm design techniques to analyze and solve new problems. Students will examine the trade-offs involved in choosing different data structures for algorithm implementation and gain an understanding of the strengths and limitations of various algorithms in solving computational problems. Additionally, students will learn to adapt good coding practices while implementing sophisticated algorithms.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

COs	Description	Taxonomy domain/level	POs	K	P	A
CO1	Identify the usage of data structures in solving algorithmic problems.	Cognitive/ Apply	1	K3		
CO2	Analyze the stepwise execution of algorithms.	Cognitive/ Analyze	2	K2		
CO3	Solve real life problems using the knowledge of algorithms.	Cognitive/ Apply	2	K4	P1, P2, P5	

Teaching-Learning Strategy

COs	Teaching-Learning strategy	Assessment strategy
CO1	Demonstration & Hands-on-Implementation	Final Lab Test
CO2	Demonstration & Hands-on-Implementation	Continuous Assessment
CO3	Demonstration & Hands-on-Implementation	Final Lab Test

Assessment Detail

Assessment Tools		Marks (%)	
Continuous Assessment (CA)	Lab Participation	10%	50%
	Continuous Assessment (Report & Viva, Regular Assessment)	40%	
Summative Assessment (SA)	Final Examination (Lab Test, Quiz/Project, Viva)	50%	50%
	Total	**100%**	

Text Book:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein : **Introduction to Algorithms**, *The MIT Press.*

Reference Books:

1. Jon Kleinberg, Eva Tardos : **Algorithm Design,** *Pearson*
2. Sartaj Sahni, Ellis Horrowitz, Rajasekara : **Fundamentals of Computer Algorithms,** *Universities Press (India) Private Limited*

Course Policies:

1. It is the student's responsibility to gather information about the assigned lab tasks and covered topics if he/she does miss the lab.
2. Regular lab attendance is mandatory. Points will be taken off for missing lab classes.
3. Without **50% of** attendance, sitting for final exam is **NOT allowed**.
4. The students must enter the **lab in time** to get the attendance. **No student** will be allowed to enter the lab after the attendance has been done.
5. Once the attendance is done, a student can leave the lab if he or she thinks that he or she is not getting benefits from the lab.

6. The course materials for this course will be available at Microsoft Teams (inside the Course Materials section of a Team dedicated to this course).
7. The date and syllabus of assessment/quiz/lab test will be announced in time in Microsoft Team
8. Students will be **notified** in due time for lab cancelation, extra lab, make-up lab and tutorial lab.
9. Students are encouraged to participate in the lab discussion and to **ask questions**. The student can ask any question without any hesitation as long as he or she can't understand the topics being discussed; please keep in mind that if you don't understand, it's not your fault, it's my limitation that I could not make you understand. The lab is expected to be interactive.
10. It is expected that the student will also provide some new knowledge related to the curriculum and then make the lab class as a **place of knowledge sharing among all participants, both teacher and students**.
11. Any attempt for **unfair means** in the regular assessment/lab test is **strictly prohibited**.

Lecture Plan:

Sessions.	Topics
Week-1	Introduction to Algorithms Lab, Language Skill Testing on Conditional Statements, Loops, Class, Functions, Data Structure Tools: Array, Tree.
Week-2	Implementation and Analysis of Different Searching Algorithms.
Week-3	Implementation and Analysis of Different Sorting Algorithms.
Week-4	Implementation and Analysis of the Merge Sort Algorithm.
Week-5	Implementation and Analysis of the Quick Sort Algorithm.
Week-6	Implementation and Analysis of the Maximum Subarray Sum Problem.
Week-7	Implementation and Analysis of the Fractional Knapsack Problem.
Week-8	Implementation and Analysis of the Activity Scheduling & Selection Problem.
Week-9	Implementation and Analysis of the Graph Algorithms.
Week-10	Implementation and Analysis of the Graph Algorithms.
Week-11	Implementation and Analysis of the Longest Common Subsequent Problem.
Week-12	Implementation and Analysis of the Weighted Activity Scheduling/Discrete Knapsack Problem.
Week-13	Lab Final (Quiz/Project and Viva)
Week-14	Lab Final (Problem Solving)