Creative Problem Solving (Professional Readiness) - Fall 2024

Course Objectives

Provide a foundation for our graduates to enter the professional world with ease, predictability, and confidence. Students will learn how to solve unfamiliar and tricky problems. They will also develop the ideation skills and systems knowledge that will help them go from real world problems to execution.

Faculty

Mr. Harsh Goel, Email : harsh@sitare.org
Ms. Geeta Chaudhry, Email : geeta@sitare.org

When

Lectures: Tuesdays and Fridays, 9:00 AM to 11:30 AM
Office Hours: Will be announced as needed.

Course Outlines

Sub Code	Subject	L	T	P	CIE	ESE	Total	C
305	Creative Problem Solving	3	2		70	30	100	4

Syllabus

- Creative problem solving: via Algorithms problems.
- Industry onboarding: Learn the basic knowledge and skills needed to design complex and high level systems.
- Entrepreneurship: Learn the business and product side of software development.
- Professional mindset: Communication, productivity, confidence.Prerequisites

Prerequisites

Algorithms and data structures, foundational programming skills, and at least one systems course.

Course Learning Outcomes

- CLO1: Learn research-backed practices to attempt difficult and unfamiliar problems.
- CLO2: Get familiar with the key software engineering technologies and their terminology. Learn how to understand, evaluate, and communicate large distributed systems. Learn how testing and debugging works in complex codebases.
- CLO3: Learn how to identify salient real world problems and how to develop as well as evaluate solution ideas. Practice how to pitch them to investors and customers.
- CLO4: Learn science backed techniques to manage time as well as energy, communicate effectively, and build confidence.

Teaching Methodology

The classes will be a mix of lectures, discussions, tutorials, student presentations, and mock interviews so that students can get hands-on experience of the various aspects of professional readiness.

Weekly Session Plan

Week	Topics	Course Learning Objective
1	Science of Learning and Creative Problem Solving	CLO1: Research backed practices to attempt difficult and unfamiliar problems.
2	Life Cycle of a problem, Coding Fluency	
3	Universe Class Engineering: What, Why, and How	
4	Introduction to Web Application Architecture	CLO2: Basic systems knowledge. s/w technologies, terminology. Understand and evaluate large distributed systems.
5	Horizontal Scaling - Sharding, Databases and the CAP Theorem	
6	Distributed Processing - MapReduce, Sorting Large Data	
7	Design a Scalable Social Network	
8	Design a Scalable eCommerce Application	

9	Identifying Problems and Validating Solutions	CLO3: Entrepreneurship. Ideation, startups, pitching.
10	Startup Terminology and Concepts - Valuations, Funding Rounds, etc.	
11	Creating a Pitch, Brainstorming Pitch Ideas	
12	Communication, Presentation skills, Confidence	CLO4: Communication, Presentations, Confidence, Mocks
13	Pitch Presentations	
14	Pitch Presentations	
15	Pitch Presentations and Wrapup	

Assessment Structure

1. Continuous assessment: 15/100
    a. Class Participation, Attendance
2. IA: Mid-term type internal assessments: 55/100
    a. 10 - Coding Fluency
    b. 10 - Mindset exploration and reflection
    c. 10 - System Design
    d. 15 - System Design
    e. 10 - Entrepreneurship
3. Final: Pitch Presentations: 30/100
    a. 30 - Individual Pitch Presentations - Communication Skills, Entrepreneurial Problem Solving

Assessment Philosophy

- Continuous assessment
    - Accounts for a sizable portion of your grade. Assessment of communication and presentation skills.
    - Class participation will matter since we are preparing students to transition to working in teams where they will have meetings and discussions with groups of varying sizes. We want the students to be able to listen well and determine the main takeaways from any discussion.
    - There will also be mini-quizzes in class or otherwise and a few assignments and student mini-presentations.
- Exams: IA and Final
    - These will test your knowledge and understanding of the various concepts and ideas covered in the lectures. These will also include some problem solving questions.

Unfair means policy

Any incidence of copying or cheating in assignments from any source or in exams will lead to an F grade in the course.

AI Use Policy

Avoid chatGPT for this phase of your learning journey! Ok, that's not a policy. You will be expected to clearly explain and defend your work and answer any and all follow up queries or questions.