COL788: Advanced Topics in Embedded Computing

Lecture 0 - Course Introduction

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Semester I
2022-2023

Advanced Topics in Embedded Computing

- Code
  - COL788
- Credit
  - 3 (3-0-0)
- Lecture Time (H-slot)
  - Monday, Wednesday (11 am to 12 pm)
  - Thursday (12 pm to 1 pm)
- Venue
  - LH 612

Organizational Details

- Instructor
  - Vireshwar Kumar (viresh@cse.iitd.ac.in)

- Teaching Assistant
  - Priyanka Chauhan (priyanka.chauhan@cse.iitd.ac.in)

Prerequisites

- Basic Course
  - COL216: Computer Architecture
  - COL331: Operating Systems

- Programming
  - C/Python

Grading (Subject to Minor Changes)

Component	Details	Weight	Total Weight
Minor Exam	-	15%	15%
Major Exam	-	25%	25%
Assignments	Assignment-1	5%	25%
	Assignment-2	10%	
	Assignment-3	10%	
Paper Reading	Paper-1	5%	5%
Project	Proposal Report	5%	30%
	Midterm Report	5%	
	Midterm Presentation	5%	
	Final Report	10%	
	Final Presentation	5%	

Grading Policy

- Letter grades
  - No absolute limits for final letter grades
- Audit
  - For audit pass, score in each component >= 30%
- Attendance
  - No attendance will be taken in the class

Useful Links

- Microsoft Teams
  - Communication
- Moodle
  - Slides, Assignments, Project, Reading Material
- Gradescope
  - Assignments, Project
- Piazza
  - Query, Discussion
  - Access Code: col788

Reading Material

- Book
  - Edward Ashford Lee and Sanjit Arunkumar Seshia, “Introduction to Embedded Systems: A Cyber-Physical Systems Approach,” Second Edition, MIT Press, 2017.
    - The PDF copy of this book is available at the authors’ website.
  - More reference books will be shared as we go along with the course

- Lecture Slides
  - Posted after Class

- Research Articles
  - Top-Tier Conferences and Journals

Honor Code

- Discussion and collaboration are encouraged

- Copying may result into
  - Zero marks
  - Reduction in letter grade
  - F grade
  - Reportage to disciplinary committee

What are Embedded Systems?

- Not general-purpose computers

- Computers which interact with the physical world and perform specific functions
  - Car, airplanes, drones, printer, TV, fridge, wearables

- Distinguishing feature: Limited resources
  - Storage
  - Computation
  - Communication

Course Objectives

- Learn about embedded systems
- Design techniques for efficient usage of storage, computational and communication
- Develop practical real-world embedded system

Syllabus

- Embedded platform
- Embedded processor architecture
- Embedded operating system
- Device Drivers
- Real-time scheduling
- Memory management
- Embedded systems for ML applications
  - Graphic acceleration
- Embedded system security
  - Trusted Computing

Questions

- How many have any experience working on embedded platforms?
- How many have done COP315 Embedded System Design Project?

What’s Next?

- After this Lecture
  - Make sure you have access to Teams, Moodle, Gradescope, Piazza
  - Get access to the suggested book

- Next Lecture (August 4, 12 pm – 1 pm)
  - Lecture 1 – Introduction to Embedded Systems