

CSC9006: Real-Time Systems

Course Overview

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NATIONAL TAIWAN NORMAL UNIVERSITY

Course logistics



- Course website: <https://wangc86.github.io/csc9006/>
 - Homework submission: via NTNU Moodle (<https://moodle.ntnu.edu.tw/>)
- Course meetings: Thursdays 9:10-12:10 in S403, Gongguan Campus
- Instructor: Chao Wang 王超 (<https://wangc86.github.io/>)
 - Email: cw@ntnu.edu.tw
 - Office: Room 511, Applied Science Building, Gongguan Campus
 - Office hours: Tuesdays and Wednesdays, 9-11am

Course organization

- Intended audience:
 - graduate students and junior/senior undergraduates
- Learning objectives of this course:
 - Real-time computing theory and practice
 - Real-time software engineering
 - Recent advances in real-time systems research

Textbooks and other references

- Required textbook:
 - Kopetz, Hermann. Real-Time Systems: Design Principles for Distributed Embedded Applications. Springer; 2nd ed. 2011 edition. ISBN 978-1441982360
- Reference text:
 - Gomaa, Hassan. Real-Time Software Design for Embedded Systems. Cambridge University Press, 2016. ISBN 978-1107041097
 - McConnell, Steve. Code Complete: A Practical Handbook of Software Construction. Microsoft Press; 2nd edition (June 19, 2004). ISBN 978-0735619678
- See the course webpage for further reference materials

Grading policy

- Homework 40% (submit via Moodle <https://moodle.ntnu.edu.tw/>)
 - Project 50%
 - Participation 5%
 - Attendance 5%
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- No late homework submission

Course structure

- Lecture + Paper Critique + Lab + Group Project
- Paper Critiques
 - Study three papers from research literature and provide your thoughts
- Lab
 - Hands-on development and evaluation of elements in real-time systems
- Group Project
 - Build something *real* from what you've learned in this course!
 - Each Lab is designed to help you grow your group project at each stage

Critique guideline

- About 500 words of ideas/comments for each paper.
- Write your own thoughts. Do not simply summarize the paper.
- Identify open issues and limitations of the paper (think of yourself as a reviewer or a researcher on the same subject).
- Sample points to include in your critique:
 - Are the assumptions reasonable and realistic?
 - Is the proposed solution practical?
 - Any problems with the experiments? Do the results support the claims?
 - Any technical errors or limitations? Any way to improve the work?

This guideline is derived from one for the CSE521S course taught at Washington University in St. Louis, USA:

<https://www.cse.wustl.edu/~lu/cse521s/critique.html>

Academic integrity



本校校訓由第三任劉真校長所訂，於民國41年2月20日第27次行政會議通過。劉校長希望同學們從內心的修養到生活的實踐，都能切切實實地做到這四個字，以樹立良好的學風，進一步達到改造社會的目的。

誠

不虛偽、不欺妄。

凡事能做到始終如一、擇善固執。

正

不偏私、不枉曲。

凡事能做到光明正大，貞固剛毅。

勤

不怠惰、不因循。

凡事能做到自強不息、鍥而不捨。

樸

不奢靡、不浮華。

凡事能做到質樸無華，闇然尚絅。

- Sincerity
- Integrity
- Diligence
- Simplicity

http://archives.lib.ntnu.edu.tw/c2/c2_1.jsp

Introducing real-time systems

- Real-time systems are computing systems with timing constraints
- Timing constraints arise because a computing system often needs to react to the physical world and/or control physical devices
 - Example 1: emergency notification for fire, tornado, tsunami, etc.
 - Example 2: anti-lock breaking system in a car (ABS)
- Real-time system is a critical part of a Cyber-Physical System (CPS)
 - CPS is a system that integrates computation and physical process
 - Learn more at: <https://zh.wikipedia.org/zh-tw/網宇實體系統>

Summary of today's course overview



The QR code for
the course website

- Course logistics
 - Visit the course website for latest information
 - Submit your homework assignments and view scores via Moodle
- TODOs
 - Start to work on Lab 0 (environment setup)
 - Form project teams of 2-3 students and e-mail me your team info (cw@ntnu.edu.tw)