Course Outline

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Course Details

Course Code	COMP9032
Course Title	Microprocessors and Interfacing
Convenor	Hui Guo (/users/z3068443)
Admin	Hui Guo (/users/z3068443)
Classes	**Lectures** : Mon 16-18 (w1-3,5,7-10, Online); Tue 16-18 (w1-5,7-10, Online) Timetable for all classes (/COMP9032/21T3/timetable)
Consultations	Wed 11:30-12:30, Online
Units of Credit	6
Course Website	http://www.cse.unsw.edu.au/~cs9032/ (http://www.cse.unsw.edu.au/~cs9032/)
Handbook Entry	http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9032.html (http://www.handbook.unsw.edu.au/postgraduate/courses/current/COMP9032.html)

Course Summary

This course is to introduce the students to the basics of microprocessors. It covers microprocessor architecture, assembling programming, I/O interfacing and microprocessor/microcontroller applications.

Advantageous Knowledge

It is helpful for students, before commencing this course, to have some knowledge about

- binary and hexadecimal number
- C language programming
- digital circuit

They will also be briefly discussed in the course.

Student Learning Outcomes

After completing this course, students will:

1. be able to explain the basic microprocessor architecture and the interface between software and hardware;
2. be familiar with assembly programming (based on the AVR microprocessor);
3. be able to explain how the communication between microprocessor and I/O devices works (based on the AVR microcontroller)
4. understand how analog signals are converted into digital signals and vice versa;
5. demonstrate the ability to solve various problems with the AVR microcontroller;
6. demonstrate the ability to work in teams for lab tasks and design project.

This course contributes to the development of the following graduate capabilities:

Graduate Capability	Acquired in

Scholars capable of independent and collaborative enquiry, rigorous in their analysis, critique and reflection, and able to innovate by applying their knowledge and skills to the solution of novel as well as routine problems	lecture discussions, lab exercises, and assignment
Entrepreneurial leaders capable of initiating and embracing innovation and change, as well as engaging and enabling others to contribute to change	lab exercises and assignment
Professionals capable of ethical, self- directed practice and independent lifelong learning	lab exercises and assignment
Global citizens who are culturally adept and capable of respecting diversity and acting in a socially just and responsible way	lecture discussions, lab exercises, and assignment

Teaching Strategies

- Lectures - introduce concepts and show examples
- Labs - provide students the opportunities to explore concepts through practical lab exercises and to work with other students
- Assignments - allow students to solve significant problems by using what they have learnt in the course

Special arrangements due to COVID-19 Pandemic:

- All Lectures and labs will be conducted online via MS Teams.
- For the design project and some lab exercises, students work in groups. Each group consists of two types of members: students located in Australia and students currently outside of Australia.

Teaching Rationale

This course is taught the way it is because both knowledge and skills have to be gained. The lab work brings the theory alive and clarifies deeper issues. Without the theory, the lab work is difficult to master. Each therefore complements the other. Students have to keep up with the theory and complete the lab exercises in order to make learning efficient.

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives.

Plagiarism is defined as (https://student.unsw.edu.au/plagiarism) using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- Plagiarism Policy Statement (https://www.gs.unsw.edu.au/policy/documents/plagiarismpolicy.pdf)
- Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Lab Kits:

We use the in-house built AVR microcontroller lab boards. We will have one lab kit for each group. All members in a group work together for the design project and some lab exercises that involve the lab board. The board should be returned in Week 10. Should you discontinue the course, please return your kit as soon as practical to avoid inconvenience to yourself and the School. We may seek to recover from you the replacement cost of lost or unreturned kits (currently AUD 200). In addition, you may have your mark in the course held at 00FL and/or be blocked from further enrolment at UNSW until the kit is returned.

Assessment

Item	Topics	Due	Marks
Assignment	Project design	Week 10	15%
Labs	All topics	All Weeks	25%
Final Exam	All topics	Exam period	60%

Assessment format:

- Final Exam: online
- Labs: online demonstration
- Assignment: group demonstration, individual written report

Course Schedule

Week	Lectures	Labs	Assignments
1	Course Introduction Processor Fundamentals & ISA	Install AVR Studio, form lab groups	-
2	AVR Assembly Programming	Lab 1	-
3	AVR Assembly Programming	Lab 1	-
4	Parallel Input/Output	Lab 2	
5	Input/Output Devices	Lab 3	Project released
6	Project Design Consultation		-
7	Interrupt	Lab 4	-
8	Analog Input/Output	Lab 4	
9	Serial Communications	Project design	-
10	Course Review	Project demo	Project report due

Resources for Students

Main references and recommended readings:

- Fredrick M. Cady: Microcontrollers and Microcomputers —Principles of Software and Hardware Engineering, Oxford University Press, 2nd Edition, 2010
- AVR data sheet and instruction manual (online)
- Lab board I/O connection diagrams (online)
- Other resources (e.g. links to on-line documentation)

Course Evaluation and Development

This course is evaluated each session using the myExperience system. Your feedback is highly appreciated.

The major issue raised from the last term is lack of sufficient support from the tutors because they were busy with marking in the lab classes. To address this issue, this term, we will hire more tutors to have some help sessions.

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Comments (/COMP9032/21T3/forums/search?forum_choice=resource/65453) (/COMP9032/21T3/forums/resource/65453)

There are no comments yet.