# Course Outline

Lecturer

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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 18-20 (w1-3,5,7-10, Online); Tue 18-20 (w1-5,7-10, Online)<br>Timetable for all classes (/COMP9032/20T3/timetable) |
| **Consultations** | Wed 16:00-17:30, Online |
| **Units of Credit** | 6 |
| **Course Website** | http://cse.unsw.edu.au/~cs9032/20T3/ (http://cse.unsw.edu.au/~cs9032/20T3/) |
| **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 students to the basic concepts and structure of microprocessors and microcontrollers, and provide students with knowledge and skills for solving problems with the microcontroller.

## Advantageous Knowledge

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

- binary and hexadecimal numbers,
- C programming, and
- digital circuits.

They will also be briefly discussed in the course.

# Student Learning Outcomes

After completing this course, students will:

1. know the fundamentals of microprocessors and microcontrollers;
2. understand how a high level (such as C) program is converted into machine code;
3. be proficient in AVR assembly language programming;
4. understand typical interface designs between hardware and software;
5. understand how serial communication works;
6. understand how analog signals are converted into digital signals and vice versa;
7. obtain basic development skills for microcontroller applications.

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 will be conducted online through MS Teams.
- Labs will be run in a blended mode in the online and face-2-face classes. T he face-to-face classes are held in **ElecEng119** laboratory (K-J17).

# 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)

# 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: some online and some face-to-face
- Assignment: group demonstration, individual written report
-

# Course Schedule

| Week | Lectures | Labs | Assignments |
|---|---|---|---|
| 1 | Course Introduction<br>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

Texts and recommended readings:

- Fredrick M. Cady: Microcontrollers and Microcomputers —Principles of Software and Hardware Engineering, Oxford University Press, 2 nd 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.

Resource created 10 months ago (Thursday 03 September 2020, 03:56:42 PM), last modified 28 days ago (Friday 28 May 2021, 10:32:56 AM).

## Comments

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