ELEC8250

System on Chip Design

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Engineering

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General Information

Unit convenor and teaching staff Unit Convenor Alan Kan alan.kan@mq.edu.au Contact via Private message on iLearn Level 1, 50 Waterloo Road Friday 2-3:30 pm
Credit points 10
Prerequisites (ELEC3043 or ELEC343 or ELEC643) or (ELEC3042 or ELEC342) or Admission to MEngElecEng
Corequisites
Co-badged status
Unit description This unit aims to provide an understanding of the concepts, architectures, design tools and methods for developing System-on-Chip (SoC) solutions. The unit culminates in a project where students develop a SoC solution from high-level functional specifications through to design, implementation and testing on real hardware using industry standard hardware description and software programming languages and tools.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Demonstrate understanding of what a System-on-Chip system is, and its constituent components.

ULO2: Demonstrate understanding of issues in hardware/software interface design.

ULO3: Work within the constraints imposed by the availability of resources on the System-on-Chip platform to produce designs that meet user requirements.

ULO4: Design and test System-on-Chip solutions on using standard hardware

description and software programming languages.

ULO5: Prepare design documents and reports and communicate and explain design decisions.

General Assessment Information

There are two quizzes, one assignment and one design project for this unit. Quizzes will be conducted on iLearn. Assessment of the assignment is through a written report and code. Assessment of the project is through a written report, code, demonstration and oral defense. They will be due according to the given schedule.

In order to pass this unit, a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD).

For further details about grading, please refer to the policies and procedures section.

Late Assessment Submission Penalty

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following university standard late penalty applied. Please see https://students.mq.edu.au/study/assessment-exams/assessments for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at **11:55 pm**. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

Assessments where Late Submissions will be accepted

In this unit, late submissions will be accepted as follows:

- Quizzes - NO, unless Special Consideration is granted
- Assignment Report - YES, Standard Late Penalty applies
- Project Report - YES, Standard Late Penalty applies
- Project Defense and Demonstration - NO, unless Special Consideration is granted

Assessment Tasks

Name	Weighting	Hurdle	Due
Quiz	30%	No	Weeks 4 & 8
Project Report (2000-word equivalent)	20%	No	Week 7

Name	Weighting	Hurdle	Due
Assignment Report (1000 word equivalent)	20%	No	Week 12
Project Defence and Demonstration	30%	No	Weeks 12 & 13

Quiz

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Weeks 4 & 8**
Weighting: **30%**

Quiz

On successful completion you will be able to:

- Demonstrate understanding of what a System-on-Chip system is, and its constituent components.

Project Report (2000-word equivalent)

Assessment Type [1]: Report
Indicative Time on Task [2]: 40 hours
Due: **Week 7**
Weighting: **20%**

Project Report (2000-word equivalent)

On successful completion you will be able to:

- Demonstrate understanding of issues in hardware/software interface design.
- Work within the constraints imposed by the availability of resources on the System-on-Chip platform to produce designs that meet user requirements.
- Prepare design documents and reports and communicate and explain design decisions.

Assignment Report (1000 word equivalent)

Assessment Type [1]: Report
Indicative Time on Task [2]: 25 hours
Due: **Week 12**

Weighting: **20%**

Assignment 1 Report (1000 word equivalent)

On successful completion you will be able to:

- Demonstrate understanding of what a System-on-Chip system is, and its constituent components.
- Demonstrate understanding of issues in hardware/software interface design.
- Work within the constraints imposed by the availability of resources on the System-on-Chip platform to produce designs that meet user requirements.
- Design and test System-on-Chip solutions on using standard hardware description and software programming languages.
- Prepare design documents and reports and communicate and explain design decisions.

Project Defence and Demonstration

Assessment Type [1]: Viva/oral examination
Indicative Time on Task [2]: 10 hours
Due: **Weeks 12 & 13**
Weighting: **30%**

Project Defence and Demonstration

On successful completion you will be able to:

- Demonstrate understanding of what a System-on-Chip system is, and its constituent components.
- Demonstrate understanding of issues in hardware/software interface design.
- Work within the constraints imposed by the availability of resources on the System-on-Chip platform to produce designs that meet user requirements.
- Design and test System-on-Chip solutions on using standard hardware description and software programming languages.
- Prepare design documents and reports and communicate and explain design decisions.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

This unit consists of a four-hour weekly workshop that combines lecture and practical. Students are expected to complete the necessary pre-work prior to attending the workshop.

You will be using the Xilinx Vivado HL Design Edition to program a Zynq Ultrascale+ MPSoC (on a Ultra96 development board) for your practicals and assessments. The Vivado design tools will be available on the computers in the lab but you should also install it onto your own laptop so that you can work on the assignment and project at home. You will need access to a Windows laptop with at least 8 GB RAM and ~41 GB of free hard drive space.

Access to the Ultra96 development board will only be available during the weekly workshop. Hence, it is important to attend all workshops to ensure you have sufficient time to complete the practicals and assessments.

Additional learning resources will be provided through the unit's iLearn page.

Unit Schedule

This unit covers high level synthesis, hardware/software partitioning, and Zynq Ultrascale+ MPSoC Architecture. Students are expected to be able to program, and have an understanding of computing architecture prior to attempting this unit.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about

throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

Assessment weightings have changed in response to last year's student survey. An additional quiz has been added earlier in the semester to provide students with more feedback on their learning progress.