ENGG450

Systems Design and Engineering

S1 Day 2016

Dept of Engineering

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General Information

Unit convenor and teaching staff
Unit Convenor
Graham Town
graham.town@mq.edu.au
Contact via graham.town@mq.edu.au
E6B 133
9-11am Tuesdays.

Credit points
3

Prerequisites
69cp including ENGG300(P) and admission to BE or BE(Hons) or BEBA or BE(Hons)BA or BEBBA or BEBCom or BE(Hons)BCom or BEBSc or BE(Hons)BSc

Corequisites

Co-badged status
ENGG650

Unit description
This unit deals with the design of complex systems from a top-down integrated perspective, concentrating on methods for maximising system performance. The unit includes elements of system design covering the complete life cycle of engineering systems, including: needs identification; functional analysis, detailed design and development; system modelling and optimisation techniques; decision analysis and economic evaluation of alternatives; design for reliability and usability, system test and evaluation; and project management techniques.

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:

Introduce students to the process and practice of designing engineering systems

Ability to use appropriate tools to perform critical analysis, decision making, and problem solving.

Development of project management and group work skills

Development of self-learning and information retrieval skills

Development of oral and written communication tools and skills used in system design and engineering

Provide an understanding of the role and impact of engineers in society

Assessment Tasks

Name	Weighting	Due
Participation	15%	Weekly
Quizzes	5%	Prior to relevant class
Major Assignments	30%	as per unit schedule
Presentation	10%	as per unit schedule
Final Exam	40%	to be advised

Participation

Due: **Weekly**
Weighting: **15%**

Students are expected to actively participate in and contribute to class discussions, based on their experience and/or weekly readings.

Late arrival or lack of attendance or lack of participation in more than 3 out of 13 weekly classes will result in less than full marks for this component of the assessment.

Attendance at guest lectures is compulsory, and will count for 2 out of the 10 classes at which participation will be assessed.

On successful completion you will be able to:

- Introduce students to the process and practice of designing engineering systems
- Ability to use appropriate tools to perform critical analysis, decision making, and problem solving.
- Development of project management and group work skills
- Development of self-learning and information retrieval skills
- Development of oral and written communication tools and skills used in system design and engineering
- Provide an understanding of the role and impact of engineers in society

Quizzes

Due: **Prior to relevant class**
Weighting: **5%**

Weekly quizzes reviewing material for the coming week to be completed before class each week.

On successful completion you will be able to:

- Introduce students to the process and practice of designing engineering systems
- Development of self-learning and information retrieval skills

Major Assignments

Due: **as per unit schedule**
Weighting: **30%**

Three major system analysis and/or design assignments (each 10 %) to be completed during the semester.

On successful completion you will be able to:

- Introduce students to the process and practice of designing engineering systems
- Ability to use appropriate tools to perform critical analysis, decision making, and problem solving.
- Development of project management and group work skills
- Development of self-learning and information retrieval skills
- Development of oral and written communication tools and skills used in system design and engineering
- Provide an understanding of the role and impact of engineers in society

Presentation

Due: **as per unit schedule**
Weighting: **10%**

Presentation of course material to class

On successful completion you will be able to:

- Introduce students to the process and practice of designing engineering systems
- Development of project management and group work skills
- Development of self-learning and information retrieval skills
- Development of oral and written communication tools and skills used in system design and engineering

- Provide an understanding of the role and impact of engineers in society

Final Exam

Due: **to be advised**
Weighting: **40%**

Final Exam

On successful completion you will be able to:

- Introduce students to the process and practice of designing engineering systems
- Ability to use appropriate tools to perform critical analysis, decision making, and problem solving.
- Development of oral and written communication tools and skills used in system design and engineering

Delivery and Resources

TEXTBOOK

B. S. Blanchard & W. J. Fabrycky, Systems Engineering and Analysis, Pearson Prentice-Hall, 5th edition, 2010.

It is expected that every student will have access to this textbook - weekly readings are assigned (see the unit schedule on the unit's iLearn website) and must be completed before class.

OTHER RESOURCES

The iLearn web page for this unit can be found at: https://ilearn.mq.edu.au/login/MQ/

All unit resources and communications relating to this unit, including a week-by-week schedule of learning and assessment activities, will be provided via the iLearn unit website.

CLASS ARRANGEMENTS

In most weeks classes are run as 3 hour small group tutorial/discussions. To ensure the small group numbers remain balanced, you must seek permission from the Unit Convenor if you wish to transfer between designated classes.

On a small number of weeks all groups will meet together at one place and time, e.g. for guest lectures. These weeks will be Week 1, and other weeks as per the unit schedule prepared by the Unit Convenor (available on the iLearn unit web page).

Reading and assignments will be given instead of lecture/laboratory classes. Students are expected to spend at least 3 hours per week on these activities, i.e. in lieu of additional class time.

ASSESSMENT

To complete this unit satisfactorily all assessable tasks must be completed - inadequate performance or attendance in any part of the assessment may result in failure.

Assessable tasks are to be completed by the due date indicated in the unit schedule - requests for extension must be submitted to the unit coordinator before the due date.

Assessable work should conform to accepted standards for professional communication (e.g. in formatting, presentation, spelling, clarity, etc.) A useful resource on Engineering Communications may be found at

http://www.engineering.utoronto.ca/Directory/students/ecp/handbook.htm

TECHNOLOGY USED

The iLearn web page for this unit can be found at: https://ilearn.mq.edu.au/login/MQ/

All unit resources and communications relating to this unit will be provided via the iLearn unit website.

CHANGES SINCE LAST OFFERING

Unit schedule revised. All assessable tasks have changed.

Unit Schedule

Classes in ENGG450 involve pre-reading of the text followed by class discussions of the material, and working through of example problems. In later weeks students take the role of lecturer, moderating the presentation and discussions. This mode of teaching and learning is used to develop self-learning and communication skills, which are particularly important when working as a professional engineer.

Please refer to the unit schedule in the iLearn unit webpage for week-by-week details of class learning and assessment activities, and other relevant information.

Learning and Teaching Activities

Weekly classes

Tutorial/discussion of course material.

Guest lectures

Guest lectures on how system design and engineering is practiced in specific industries (e.g. telecommunications, medical devices, etc).

Assignments

Three major system analysis or system design tasks or problems to be completed during semester.

Student presentations

Student presentations of course material to class.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, 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.

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops

- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

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.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Introduce students to the process and practice of designing engineering systems
- Ability to use appropriate tools to perform critical analysis, decision making, and problem solving.
- Development of self-learning and information retrieval skills
- Provide an understanding of the role and impact of engineers in society

Assessment tasks

- Participation
- Major Assignments
- Presentation

Learning and teaching activities

- Three major system analysis or system design tasks or problems to be completed during semester.

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

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Assessment tasks

- Participation
- Major Assignments
- Presentation
- Final Exam

Learning and teaching activities

- Tutorial/discussion of course material.
- Guest lectures on how system design and engineering is practiced in specific industries (e.g. telecommunications, medical devices, etc).
- Three major system analysis or system design tasks or problems to be completed during semester.
- Student presentations of course material to class.

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

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- Participation
- Quizzes
- Major Assignments
- Presentation

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Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

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Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

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Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

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Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to

read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

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Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

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Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Introduce students to the process and practice of designing engineering systems
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