ELEC260

Introduction to Mechatronics

S2 Day 2014

Dept of Engineering

Contents

Disclaimer

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General Information

Unit convenor and teaching staff
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Credit points
3

Prerequisites
ELEC270(P) or ENGG270 or ELEC290(P)

Corequisites

Co-badged status

Unit description
This unit introduces the basic components of mechatronic systems including sensors, actuators, mechanical elements, decision-making components and the human-machine interface. It then covers the underlying principles and limitations of common types of sensor (electrical, optical, mechanical, etc) and commonly used actuators (electrical, mechanical, pneumatic, etc). Electrical circuits for sensing and actuator systems are described, including signal conditioning techniques, and the limitations and advantages of different approaches highlighted.

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:

- Demonstrate theoretical and practical use of a variety of sensors and actuators
- Demonstrate use and theoretical understanding of a simple but modern microcontrollers
- Demonstrate theoretical understanding of DC and induction motors.
- Demonstrate creativity and initiative in building small open ended mechatronic systems.

Assessment Tasks

Name	Weighting	Due
Final Exam	30%	Exam period
In-tutorial assessments	35%	Weeks 2-13
Labs/Practicals	35%	Weeks 2-12

Final Exam

Due: **Exam period**
Weighting: **30%**

You will be permitted to bring one, double sided sheet of hand written notes. No other formulas will be given during the exam. Relevant data sheets for components may be provided.

On successful completion you will be able to:

- • Demonstrate theoretical and practical use of a variety of sensors and actuators
- • Demonstrate theoretical understanding of DC and induction motors.

In-tutorial assessments

Due: **Weeks 2-13**
Weighting: **35%**

There will be a brief in-class assessment every week (except the first). It will be based on a problem set handed out in the previous week. Your grade will be an average of your 10 best marks.

On successful completion you will be able to:

- • Demonstrate theoretical and practical use of a variety of sensors and actuators
- • Demonstrate theoretical understanding of DC and induction motors.

Labs/Practicals

Due: **Weeks 2-12**
Weighting: **35%**

Practicals will be completed in pairs, and assessed in class. In accordance with the University assessment policy each member will be individually assessed by tutors based on self reported contributions.

On successful completion you will be able to:

- • Demonstrate theoretical and practical use of a variety of sensors and actuators
- • Demonstrate use and theoretical understanding of a simple but modern microcontrollers
- • Demonstrate creativity and initiative in building small open ended mechatronic systems.

Delivery and Resources

Textbook

Introduction to Mechatronics and Measurement Systems by Alciatore and Histand. (3rd or 4th Edition is suitable)

Reference Books

Electric Motors and Drives. Fundamentals Types and Applications by Austin hughes and Bill Drury

Mechatronics. Integrated technologies for intelligent machines by A. Smaili and F Mrad

Some Web Resources

Textbook homepage: http://mechatronics.colostate.edu/

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

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.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/

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://informatics.mq.edu.au/help/.

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

Graduate Capabilities

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:

Learning outcome

- • Demonstrate creativity and initiative in building small open ended mechatronic systems.

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:

Learning outcomes

- • Demonstrate theoretical and practical use of a variety of sensors and actuators
- • Demonstrate use and theoretical understanding of a simple but modern microcontrollers
- • Demonstrate theoretical understanding of DC and induction motors.

Assessment tasks

- Final Exam
- In-tutorial assessments
- Labs/Practicals

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.

This graduate capability is supported by:

Assessment task

- Labs/Practicals

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.

This graduate capability is supported by:

Learning outcome

- • Demonstrate theoretical and practical use of a variety of sensors and actuators

Assessment task

- Labs/Practicals

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

- • Demonstrate use and theoretical understanding of a simple but modern

  microcontrollers

- • Demonstrate creativity and initiative in building small open ended mechatronic systems.

Assessment task

- Labs/Practicals

Changes since First Published

Date	Description
08/08/2014	I accidentally clicked the button for edit. There are no changes. Sorry. David
02/01/2014	The Prerequisites was updated.