MONASH University

Unit Guide

MEC2407
Electromechanics

Semester 2, 2017

Table of contents

Unit handbook information 4
Synopsis 4
Mode of delivery 4
Workload requirements 4
Unit relationships 4
Prerequisites 4
Prohibitions 4
Co-requisites 4
Chief Examiner(s) 4
Unit Coordinator(s) 4
Clayton/Malaysia staff contact details 4
Clayton campus 5
Malaysia campus 5
Demonstrator(s) 5
Section A: For Clayton students 6
Engineers Australia Stage 1 competencies 6
Teaching and learning method 6
Learning outcomes 7
Your feedback to us 7
Previous student evaluations of this unit 7
Unit schedule - Clayton campus 7
Assessment requirements 8
Assessment summary 8
Assessment tasks 9
Examination(s) 11
Section B: For Malaysia students 12
Academic Overview 13
Teaching and learning method 15
Learning outcomes 15
OBE requirements to learning outcomes (LOs) 15
Relationship between unit learning outcomes and program outcomes 16
Your feedback to us 17
Previous student evaluations of this unit 17
Unit schedule - Malaysia campus 18
Assessment Summary 19

Hurdle requirements 19
Relationship between Assessments and OBE Learning Outcomes (LOs) 20
Relationship between Assessments and Complex Problems/Activities 21
Assessment requirements 22
Assessment tasks 22
Examination(s) 24
Section C: All students 26
Extensions and penalties 26
Resubmission of assignments 26
Plagiarism and collusion 26
Referencing requirements 26
Assignment submission 26
Feedback to you 27
Learning resources 27
Required resources 27
Other information 27
Policies 27
Graduate Attributes Policy 27
Student Charter 27
Student Services 28
Monash University Library 28
Disability Support Services 28

Unit handbook information

Synopsis

Introduction to the design, analysis, and practical manufacture of electromechanical systems, incorporating DC and AC electrical circuit theory, simple semiconductor and amplifying components, transformers, and sensors and actuators. Mathematics of electromechanical systems is provided, including Laplace transforms and complex algebra. Computational and assignment work (via practicals) to be integrated to give student complete understanding of specific examples using modern microelectronic components, sensors, and actuators.

Mode of delivery

Clayton (Day)
Malaysia (Day)

Workload requirements

3 hours lectures, 3 hours laboratory/problem solving classes and 6 hours of private study per week

Unit relationships

Prerequisites

None

Prohibitions

None

Co-requisites

None

Chief Examiner(s)

Professor Chris Davies

Unit Coordinator(s)

Name: Assoc Professor Tuck Ng
Email: Tuck.Ng@monash.edu

Clayton/Malaysia staff contact details

Clayton campus	
Campus Coordinator	Name: Dr Tuck Wah Ng Email: Tuck.Ng@monash.edu Building: 31, Room: 133 Consultation hours: Mondays 1600-1700; Tuesdays 1100-1200; Fridays 1200-1300;
Lecturer(s)	Name: Dr Tuck Wah Ng Email: Tuck.Ng@monash.edu Building: 31, Room: 133

Malaysia campus	
Campus Coordinator	Name: Dr Surya Nurzaman Email: Surya.Nurzaman@monash.edu Building: , Room: Consultation hours: By appointment
Lecturer(s)	Name: Dr Surya Nurzaman Email: Surya.Nurzaman@monash.edu Building: , Room: Consultation hours: By appointment

Demonstrator(s)

Sewminda Samarasinghe, Dwayne Chung, Alifa Zahidi, Mayur Katariya, Ian Daryl (Malaysia)

Consultation hours: During tutorials and laboratories

Section A: For Clayton students

Academic Overview

Engineers Australia Stage 1 competencies

The Engineers Australia Policy on Accreditation of Professional Engineering Programs requires that all programs ensure that their engineering graduates develop to a substantial degree the stage 1 competencies. Listed below are the activities in this unit that will help you to achieve these competencies.

Note: that not all stage 1 competencies are relevant to each unit.

Not meant to be filled in by staff.

Teaching and learning method

Lecture and tutorials or problem classes, computer laboratory-based classes, and case-based teaching.

Students are to gain the ability to model elementary electro-mechanical systems, incorporating mechanical and electrical energy exchange and interaction, with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra. This will be conveyed through lectures and learning materials provided. Practice classes will provide the student reinforced understanding of the topics taught. The computing laboratory is meant to facilitate flip-based learning in which students will have freedom to explore on their own on how to best utilize computers (through Matlab programming) to solve circuit problems, as well as to interface with sensors and actuators. Introductory Matlab programming lessons will be given.

Tutorial allocation

There are 2-hours of practice classes scheduled each week, commencing in week 2. Students must enroll in one practice class only using Allocate Plus. Students not allocated to a particular practice class will not be accepted into that session without the written consent of the unit coordinator. Once a particular session is full, no more students will be accepted, unless evidence is shown that timetabling means that is the only session possible.

Computing laboratory allocation

There is no formal allocation for this component. Each week, commencing from week 2 and ending in week 9, a computing venue is booked for 2 hours for students to consult designated tutors for help. Beyond that, students are to make their own arrangements to use the computing facilities available in the faculty.

Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. In this unit it will take the form of group feedback via practice classes, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions in class, as well as more formal feedback related to assignment marks and grades. Students/You are encouraged to draw on a variety of feedback to enhance their/your learning.

Learning outcomes

Students are to gain the ability to model elementary electro-mechanical systems, incorporating mechanical and electrical energy exchange and interaction, with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra. Tutorial work will provide the student a reinforced understanding of electromechanics.

Your feedback to us

One of the formal ways students have to provide feedback on teaching and their learning experience is through the Student Evaluation of Teaching and Units (SETU) survey. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied with and areas for improvement.

Previous student evaluations of this unit

In response to previous SETU results of this unit, the following changes have been made:

Course has been amended to account for new changes to marking system.

Student feedback has highlighted the following strength(s) in this unit:

To be input

If you wish to view how previous students rated this unit, please go to:
https://unitevaluations.connect.monash.edu.au/unitevaluations/index.jsp

Unit schedule - Clayton campus

Week	Activities	Assessment
0	No activities are undertaken in week 0	No assessment is undertaken in week 0
1	Lecture	
2	Lecture, Tutorial, Computing Laboratory	Practice assignment
3	Lecture, Tutorial, Computing Laboratory	Practice assignment
4	Lecture, Tutorial, Computing Laboratory	Practice assignment

5	Lecture, Tutorial, Computing Laboratory, Class Test	Practice assignment, Computing lab submission I Class Test I
6	Lecture, Tutorial, Computing Laboratory	Practice assignment
7	Lecture, Tutorial, Computing Laboratory	Practice assignment, Computing lab submission 2
8	Lecture, Tutorial, Computing Laboratory	Practice assignment
9	Lecture, Tutorial, Computing Laboratory	Practice assignment, Computing lab submission 3
10	Lecture, Tutorial	Practice assignment
11	Lecture, Tutorial, Class Test	Class test 2
12	Lecture, Tutorial	Tutorial assignment

	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	LINK to Assessment Policy: www.policy.monash.edu/policybank/academic/education/assessment/assessment-in-coursework-policy.html

Assessment requirements

Assessment summary

Continuous assessment: 40%
Final Examination (2 hours): 60%
Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.

Assessment task	Value	Due date
Assignment (tutorial practice)	Assignments will make up 10% of final mark. Each of them are equally weighted.	Friday of each week
Class test 1	10% of total marks	Submitted during session
Assignment (Electronic Laboratories)	The assignments will make up 10% of final mark. Each of them are equally weighted.	Week 5 for Exercise 1. Two weeks after completing the experiment for Exercise 2.
Class test 2	10% of the total mark	During the session.
Final Examination	60%	To be advised

Assessment tasks

Assessment title: Assignment (tutorial practice)
Mode of delivery: Face to face during tutorial sessions organized.
Details of task: Students will be presented with a set of practice questions at each tutorial session. These questions are to be completed with the help of tutors in the session and submitted before the end of the session. These assessments will be graded and returned to the student at the next tutorial session.
Release dates (where applicable): Next tutorial class
Word limit (where applicable): No limit
Due date: Friday of each week
Value: Assignments will make up 10% of final mark. Each of them are equally weighted.
Presentation requirements: Grades will only be given to answers handed in during tutorials (which is compulsory). Students who are unable to attend the tutorial for a valid reason must hand in the answers before the end of the week (Friday) together with a letter explaining absence to the mailbox of the lecturer in order to have them graded.
Hurdle requirements (where applicable): None
Individual assessment in group tasks (where applicable): Individual assessments.
Criteria for marking: This practice questions evaluate the progress of students in keeping up with lecture materials and will be graded according to correctness of the answers given.
Additional remarks: None

Assessment title: Class test 1
Mode of delivery: During lecture on week 5. No materials can be brought in.
Details of task: This class test requires students to review the work on the chapters on introduction, electric circuit and components, and Laplace transform. This will be a multiple-choice plus short answer based test.
Release dates (where applicable): Graded scripts will be returned the next week
Word limit (where applicable): None
Due date: Submitted during session
Value: 10% of total marks

Presentation requirements: None
Hurdle requirements (where applicable): None
Individual assessment in group tasks (where applicable): Individual assessment
Criteria for marking: Every question is based on concepts that are taught in class up until that point.
Additional remarks: None.

Assessment title: Assignment (Electronic Laboratories)
Mode of delivery: Sessions in computer based classrooms have been organized for students to obtain help to solve the assignments given.
Details of task: This is meant to be flip-based learning exercises in which students will have freedom to explore on their own on how to best utilize computers to solve circuit problems, as well as to use controllers to drive actuators. Students are expected to do their own research in order deepen their understanding of the exercises. The tasks are to be done in groups of sizes no greater than 2 persons. The instructions on how to complete the 2 exercises included, inclusive of their respective deadlines, will be elaborated on during week 1 of lecture.

For the first exercise, students can use their own computing resources to complete the exercises. For those who do not have these resources, they can do so in classrooms with computers that have been organized. A group based report (not exceeding 4 pages including the cover sheet) is to be submitted for grading. The prescribed cover sheet must be included with the report.

For the second exercise, students will be required to attend a session in which they will complete a short exercise on the use of controllers. A group based report (not exceeding 4 pages including the cover sheet) is to be submitted for grading. The prescribed cover sheet must be included with the report.

Release dates (where applicable): Information of the exercises will be given in week 1. Consolidated grades will be notified by week 12.
Word limit (where applicable): None
Due date: Week 5 for Exercise 1. Two weeks after completing the experiment for Exercise 2.
Value: The assignments will make up 10% of final mark. Each of them are equally weighted.
Presentation requirements: None
Hurdle requirements (where applicable): None
Individual assessment in group tasks (where applicable): A group report is to be submitted on week 5 for exercise 1.

A group report is to be submitted two weeks after completing the experiment for exercise 2.

It is expected that each member of the group is to contribute to the assignment. Students are allowed to submit separate reports if they wish to do so even if the exercise is done collectively .

Criteria for marking: This is detailed in the instructions to be provided in week 1.
Additional remarks: None

Assessment title: Class test 2
Mode of delivery: During lecture in week 11. No materials can be brought in.
Details of task: Class test requires students to review the work on all chapters except actuators. This will be a multiple-choice plus short response based test.

Release dates (where applicable): Results will be released the next week.
Word limit (where applicable): None
Due date: During the session.
Value: 10% of the total mark
Presentation requirements: None
Hurdle requirements (where applicable): None
Individual assessment in group tasks (where applicable): Individual assessment.
Criteria for marking: Every question is based on concepts that are taught in class.
Additional remarks: None.

Examination(s)

Exam title: Final Examination
Weighting: 60%
Length: 3 hours
Type (Open/closed book): Closed book
Hurdle requirements (where applicable): None
Electronic devices allowed: No other electronic device except for faculty approved scientific calculator.
Remarks (where applicable): All questions in the examination are to be answered.

Calculators
A list of the Faculty of Engineering approved calculators and the process for obtaining a sticker is available online at:
http://www.eng.monash.edu.au/current-students/calculators.html

IMPORTANT: Only these listed calculators with the **authorised Monash University-Science or Monash University-Engineering STICKER** will be allowed into the examination by the invigilators.

A faculty approved calculator is permitted (meaning only scientific calculators that are not programmable and detailed in the list will be permitted in the examination. These calculators must be checked by the faculty and have either a Faculty of Engineering or a Faculty of Science approved sticker).

Section B: For Malaysia students

Academic Overview

Program Education Objectives
The Mechanical Engineering engineering discipline expects to produce graduates, who are:
1. competent in Mechanical Engineering engineering
2. responsible and effective global citizens
3. leaders in their chosen profession or society at large.

Program Outcomes
The Mechanical Engineering engineering discipline has developed a set of Program Outcomes (POs) for all of its graduates based on the competencies required by the Malaysian Engineering Accreditation Council.

Program Outcomes (POs)	Activities used in this unit to develop POs, achievement of Bloom's domains and complex problem solving
PO1 **Mechanical Engineering Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and specialisation in Mechanical Engineering engineering to the solution of complex engineering problems	Cognitive: The technical content of this unit is germane to Mechanical Engineering. Technical content of unit which includes design, analysis, and practical manufacture of electromechanical systems, incorporating DC and AC electrical circuit theory, simple semiconductor and amplifying components, transformers, and sensors and actuators. The relevant theories are presented in lectures and are more extensively available in the lecture notes and prescribed text. These theories are applied through the timetabled problem solving sessions, which will include demonstration of problem solving approaches and discussions with individual students.
PO2 **Problem Analysis:** Identify, formulate, survey research literature and analyse complex Mechanical Engineering engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences	Cognitive: In order to be able to identify, formulate, analyse and solve relevant complex engineering problems, in problem solving classes, questions are framed in an engineering context, rather than a mathematical one. Thus, the first step is to determine which techniques are required to solve the problems. Initially, this can be challenging for students and so considerable support is provided during problem solving classes. On the basis of past experience this is usually the most difficult aspect of the unit for students. At the problem solving classes the academics will illustrate the approach to framing a problem and how the theory taught is incorporated into it.
PO3 **Design/Development of Solutions:** Design solutions for complex Mechanical Engineering engineering problems and design systems, components or processes that meet specified needs.	Cognitive: Psychomotor:

Program Outcomes (POs)	Activities used in this unit to develop POs, achievement of Bloom's domains and complex problem solving
PO4 **Research-based Investigation:** Conduct investigations of complex Mechanical Engineering engineering problems using research-based knowledge and research methods including design of experiments, (analysis and interpretation of data, and synthesis of information to provide valid conclusions.	Cognitive:
PO5 **Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex Mechanical Engineering engineering problems, with an understanding of the limitations	Cognitive: Psychomotor:
PO6 **Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex Mechanical Engineering engineering problems	Affective:
PO7 **Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex Mechanical Engineering engineering problems in environmental contexts.	Cognitive: Affective:
PO8 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	Affective:
PO9 **Communication:** Communicate effectively on complex Mechanical Engineering engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions	Affective: The focus in this unit is to develop the capacity to write a concise technical report on a pneumatic system that represents the whole "sense-think-act" processes in electromechanical systems.
PO10 **Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings	Affective: In conducting the experiment and writing the technical report, students are required to work in groups and are encouraged to take different roles.
PO11 **Lifelong Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	Affective:

Program Outcomes (POs)	Activities used in this unit to develop POs, achievement of Bloom's domains and complex problem solving
PO12 **Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to manage projects	Cognitive: Affective:

Teaching and learning method

Students are to gain the ability to model elementary electro-mechanical systems, incorporating mechanical and electrical energy exchange and interaction, with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra. This will be conveyed through lectures and learning materials provided. Practice classes will provide the student reinforced understanding of the topics taught.

Tutorial allocation

There are 3-hours of practice classes scheduled each week, commencing in week 2. Students must enroll in one practice class only using Allocate Plus. Students not allocated to a particular practice class will not be accepted into that session without the written consent of the unit coordinator. Once a particular session is full, no more students will be accepted, unless evidence is shown that timetabling means that is the only session possible.

Pneumatic system laboratory exercise

This exercise will commence in Week 9 and end in Week 10. Due to limited pneumatic system trainers, groups of students have to take turn to complete this practical exercise. Laboratory manual will be available at Moodle in Week 8.

Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. In this unit it will take the form of group feedback via practice classes, individual feedback, verbal and written feedback, discussions in class, as well as more formal feedback related to assignment marks and grades.

Learning outcomes

Students are to gain the ability to model elementary electro-mechanical systems, incorporating mechanical and electrical energy exchange and interaction, with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra. Tutorial work will provide the student a reinforced understanding of electromechanics.

OBE requirements to learning outcomes (LOs)

Learning Outcomes (LOs) for Outcome Based Education (OBE) requirements	Handbook Learning Outcomes (LOs)
LO1) Students are expected to be able to recognise the role of electro-mechanical system	LO1) Students are to gain the ability to model elementary electro-mechanical systems
LO2) Students are expected to be able to analyse elementary electro-mechanical systems with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra.	LO3) Students are to gain the ability to model elementary electro-mechanical systems, with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra.
LO3) Students are expected to be able to analyse the applications of AC & DC electrical circuit theory, simple semiconductor devices, amplifiers, transformers, sensors and actuators	LO3) Students are to gain the ability to model elementary electro-mechanical systems, with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra.
LO4) Students are expected to be able to analyse mechanical and electrical energy exchange and interaction	LO2) Students are to gain the ability to incorporate mechanical and electrical energy exchange and interaction in the model of electro-mechanical systems
LO5) Students are expected to be able to report the findings of lab exercises in a professionally written report	LO4) Students are expected to have r einforced understanding of electromechanics through tutorial works
LO6) Students are expected to be able to work effectively in teams to conduct laboratory exercises	LO4) Students are expected to have reinforced understanding of electromechanics through tutorial works

Relationship between unit learning outcomes and program outcomes

No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
LO1	√											
LO2		√										
LO3		√										
LO4		√										
LO5									√			
LO6										√		

Key

Your feedback to us

One of the formal ways students have to provide feedback on teaching and their learning experience is through the Student Evaluation of Teaching and Units (SETU) survey. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied with and areas for improvement.

Previous student evaluations of this unit

In response to previous SETU results of this unit, the following changes have been made:

There was no major issue in the previous offer, so the learning activities will essentially be maintained including the availability of pre-recorded lectures. It is also important to maintain high quality tutorials and laboratory activities, as they received very positive feedback.

Student feedback has highlighted the following strength(s) in this unit:

Due to positive feedback, the learning activities will essentially be maintained including the availability of pre-recorded lectures. It is also important to maintain high quality tutorials and laboratory activities, as they received very positive feedback.

If you wish to view how previous students rated this unit, please go to:
https://emuapps.monash.edu.au/unitevaluations/index.jsp

Unit schedule - Malaysia campus

Week	Activities	Assessment
0	No activities are undertaken in week 0	No assessment is undertaken in week 0
1	Lecture (Introduction, Electric Circuits and Components)	-
2	Lecture (Electric Circuits and Components); Tutorial	Tutorial 1
3	Lecture (Electric Circuits and Components); Tutorial	Tutorial 2
4	Lecture (Laplace Transforms); Tutorial	Tutorial 3
5	Lecture (Laplace Transforms, Operational Amplifiers); Tutorial	Tutorial 4 and Class Test I
6	Lecture (Operational Amplifiers, System Modelling); Tutorial	Tutorial 5
7	Lecture (System Modelling); Tutorial	Tutorial 6
8	Lecture (System Response); Tutorial	Tutorial 7
9	Lecture (Sensors); Tutorial, Practical class	Tutorial 8
	Semester Break	
10	Lecture (Sensors); Tutorial, Practical class	Tutorial 9
11	Lecture (Actuators); Tutorial	Tutorial 10 and Class Test II
12	Lecture (Actuators); Tutorial	Tutorial 11

	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	

		LINK to Assessment Policy: www.policy.monash.edu/policybank/academic/education/assessment/assessment-in-coursework-policy.html

Assessment Summary

Continuous assessment: 40%
Final Examination (2 hours): 60%
Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.

Assessment task	Value	Due date
Final examination	60%	Week 14
Practice problems (Tutorial assignments)	10%	Every week
Class Tests (I and II, the values are equally distributed)	20%	Week 5 & week 11
Laboratory exercise / demonstration	10%	Week 10 and 11

Hurdle requirements

Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in grade in the unit.

Bloom's Taxonomy:
Three domains of educational activities have been identified under the general taxonomy known as Bloom's.

- **Cognitive**: mental skills (*Head*)
- **Affective**: growth in feelings or emotional areas (*Heart*)
- **Psychomotor**: manual or physical skills (*Hand*)

The *cognitive* domain involves knowledge and the development of intellectual skills. This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills.

The *affective* domain includes the attitudes with which someone deals with things emotionally, such as feelings, values, appreciation, enthusiasms and motivations.

The *psychomotor* domain includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.

Key for the LO-assessment relationship table above:

Cognitive

C1	C2	C3	C4	C5	C6
Knowledge: Remembers previously learned material	**Comprehension:** Grasps the meaning of material (lowest level of understanding)	**Application:** Uses learning in new and concrete situations (higher level of understanding)	**Analysis:** Understands both the content and structure of material	**Synthesis:** Formulates new structures from existing knowledge and skills	**Evaluation:** Judges the value of material for a given purpose

Psychomotor

P1	P2	P3	P4	P5	P6	P7
Perception: Senses cues that guide motor activity	**Set:** Is mentally, emotionally and physically ready to act	**Guided Response:** Imitates and practices skills, often in discrete steps	**Mechanism:** Performs acts with increasing efficiency, confidence and proficiency	**Complete Overt Response:** Performs automatically	**Adaption:** Adapts skill sets to meet a problem situation	**Organisation:** Creates new patterns for specific situations

Affective

A1	A2	A3	A4	A5
Receiving: Selectively attends to stimuli	**Responding:** Responds to stimuli	**Valuing:** Attaches value or worth to something	**Organisation:** Conceptualises the value and resolves conflict between it and other values	**Internalising:** Integrates the value into a value system that controls behaviour

Relationship between Assessments and OBE Learning Outcomes (LOs)

No.	Learning Outcomes	Assessment			
		Tests	Tutorial exercises	Laboratory activities	Final exam
1		C2	C2		C2

	Students are expected to be able to recognise the role of electro-mechanical system.				
2	Students are expected to be able to analyse elementary electro-mechanical systems with additional instruction on common applied mathematical methods used in electromechanical system analysis, including Laplace transforms and complex algebra.	C4	C4		C4
3	Students are expected to be able to analyze the applications of AC & DC electrical circuit theory, simple semiconductor devices, amplifiers, transformers, sensors and actuators.	C4	C4		C4
4	Students are expected to be able to analyze mechanical and electrical energy exchange and interaction.	C4	C4		C4
5	Students are expected to be able to report the findings of lab exercises in a professionally written report.			A2	
6	Students are expected to be able to work effectively in teams to conduct laboratory exercises.			A2	

Relationship between Assessments and Complex Problems /Activities

Complex Problems (CP) and Complex Activities (CA)

No.	Attribute Description	Assessment			
		Tests	Tutorial exercises	Laboratory activities	Final exam
CP1	Depth of knowledge required	X	X		X
CP2	Range of conflicting requirements				
CP3	Depth of analysis required				
CP4	Familiarity of issues	X	X		X
CP5	Extent of applicable codes				
CP6	Extent of stakeholder involvement and conflicting requirements				
CP7	Interdependence	X	X		X

CA1	Range of resources			X	
CA2	Level of interactions			X	
CA3	Innovation				
CA4	Consequences to society and the environment				
CA5	Familiarity			X	

Assessment requirements

Assessment tasks

Assessment title: Tutorial (Problem solving classes)
Mode of delivery: On Campus
Details of task: Students will be presented with a set of practice questions at each tutorial session. These questions are to be completed with the help of tutors in the session and submitted before the end of the session. The assessment will be marked and returned to the student at the next tutorial session.
Release dates (where applicable): Week 2
Word limit (where applicable): N/A
Due date: At the end of each tutorial session
Value: 10%
Presentation requirements: Grades will only be given to answers handed in during tutorials (which is compulsory). Students who are unable to attend the tutorial for a valid reason must hand in the answers before the end of the week (Friday) together with a valid evidence based on Monash's policy explaining absence to the mailbox of the lecturer along with notification email in order to have them graded
Hurdle requirements (where applicable): Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.

Individual assessment in group tasks (where applicable): N/A
Criteria for marking: This practice questions evaluate the progress of students in keeping up with lecture materials and will be graded according to correctness of the answers given. Students who are unable to attend the tutorial for a valid reason must hand in the answers before the end of the week (Friday) together with a valid evidence based on Monash's policy explaining absence to the mailbox of the lecturer along with notification email in order to have them graded.
Additional remarks: None

Assessment title: Practical assignment (laboratory experiment) on pneumatic system that represents the whole "sense-think-act" cycle in eletromechanical systems
Mode of delivery: On Campus
Details of task: This is a practical task that will help students understand the workings of a circuit

by using modular pneumatic system. Students will also be given an instruction manual detailing the steps to perform the task.
Release dates (where applicable): Week 8
Word limit (where applicable): N/A
Due date: One week after the experiment
Value: 10%
Presentation requirements: None
Hurdle requirements (where applicable): Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.

Individual assessment in group tasks (where applicable): None
Criteria for marking: The laboratory report will be evaluated based on presentation of results and discussion.
Additional remarks: None

Assessment title: Class test I
Mode of delivery: On campus
Details of task: This class test requires students to review the work on the chapters on introduction, electric circuit and components, and Laplace transform or as announced. The test will include multiple choice questions and short responses.
Release dates (where applicable): Week 4
Word limit (where applicable): N/A
Due date: Week 5
Value: 10%
Presentation requirements: None
Hurdle requirements (where applicable): Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.

Individual assessment in group tasks (where applicable): N/A
Criteria for marking: Every question is based on concepts that are taught in class. It will be graded according to correctness of the answers given.
Additional remarks: Estimated return date: Two weeks after the test.

Assessment title: Class test II
Mode of delivery: On campus
Details of task: Class test requires students to review the work on all chapters except actuators, or as announced. The test will include multiple choice questions and short responses.
Release dates (where applicable): Week 10
Word limit (where applicable): N/A
Due date: Week 11
Value: 10%
Presentation requirements: None
Hurdle requirements (where applicable): Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this

requirement will be given a maximum of 45% in the unit.

Individual assessment in group tasks (where applicable): N/A
Criteria for marking: Every question is based on concepts that are taught in class. It will be graded according to correctness of the answers given.
Additional remarks: Estimated return date: Two weeks after the test.

Examination(s)

Exam title: Final Exam
Weighting: 60%
Length: 120 minutes
Type (Open/closed book): Closed book
Hurdle requirements (where applicable): Students are required to achieve at least 45% in the total continuous assessment component and at least 45% in the final examination component and an overall mark of 50% to achieve a pass grade in the unit. Students failing to achieve this requirement will be given a maximum of 45% in the unit.
Electronic devices allowed: The following scientific calculators that are not programmable nor graphical are allowed to be used in this unit examination:
Caieion: FM-83
Canon: F720, F720i
Casio: fx-82, fx-83, fx-85, fx-100, fx-115, fx-350, fx-570, fx-911, fx-991 and fx-992 series
Citizen: SR-135, SR-260, SR-270, SR-275
Hewlett Packard: HP-6s, HP-8s, HP-9s, HP-10s, HP-30s
Texas instruments: TI-30 and TI-34 series
Texet: Albert 2, Albert 3, Albert 5
Sharp: EL-506, EL-509, EL-520 and EL-531WH series
The list of the Faculty of Engineering approved calculators and the process for obtaining a sticker is available online at:
http://www.eng.monash.edu.au/current-students/calculators.html
IMPORTANT: Only these listed calculators with the authorised “Monash University-Science” or “Monash University-Engineering” STICKER will be allowed into the examination by the invigilators. The sticker will be available from the School of Engineering course management office fourth floor building 5. You must bring your calculator with you to the Faculty office at any time during the semester to receive a sticker. We recommend you do this well in advance of the exam.
Remarks (where applicable): None.

Calculators

A list of the Faculty of Engineering approved calculators and the process for obtaining a sticker is available online at:
http://www.eng.monash.edu.au/current-students/calculators.html

IMPORTANT: Only these listed calculators with the **authorised Monash University-Science or Monash University-Engineering STICKER** will be allowed into the examination by the invigilators.

A faculty approved calculator is permitted (meaning only scientific calculators that are not programmable and detailed in the list will be permitted in the examination. These calculators must

be checked by the faculty and have either a Faculty of Engineering or a Faculty of Science approved sticker).

Section C: All students

Extensions and penalties

Once the solution of each tutorial released, no submission can be accepted from students. Students who missed the submission will lose the mark allocated to that specific tutorial exercise. However, students with acceptable excuse and solid evidence based on Monash's policy will be granted a chance to solve a new set of problems and submit their solutions before a new assigned dead line.

Resubmission of assignments

Students are required to discuss with the coordinator before resubmitting any assignment.

Plagiarism and collusion

Intentional plagiarism or collusion amounts to cheating under Part 7 of the Monash University (Council) Regulations.

Plagiarism: Plagiarism means taking and using another person's ideas or manner of expressing them and passing them off as one's own. For example, by failing to give appropriate acknowledgement. The material used can be from any source (staff, students or the internet, published and unpublished works).

Collusion: Collusion means unauthorised collaboration with another person on assessable written, oral or practical work and includes paying another person to complete all or part of the work. Where there are reasonable grounds for believing that intentional plagiarism or collusion has occurred, this will be reported to the Associate Dean (Education) or delegate,

Referencing requirements

N/A

To build your skills in citing and referencing, and using different referencing styles, see the online tutorial Academic Integrity: Demystifying Citing and Referencing at http://www.lib.monash.edu.au/tutorials/citing/

Assignment submission

Hard Copy Submission:

Assignments must include a cover sheet. The coversheet is accessible via the Monash portal page located at http://my.monash.edu.au under the heading 'Learning and teaching tools'. Please keep a copy of tasks completed for your records.

Online Submission: If Electronic Submission has been approved for your unit, please submit your work via the Moodle site or other; as directed by your demonstator for this unit.
Please keep a copy of tasks completed for your records.

Feedback to you

Feedback will give be given to students in this unit mainly through electronic mails. One some occasions, face-to-face meetings will be provided.

Learning resources

Prescribed textbooks

Introduction to Mechatronics & Measurement Systems 4ed Author: Alciatore D & Histand M

Monash Library Unit Reading List (if applicable to the unit):
http://readinglists.lib.monash.edu/index.html

Required resources

Students generally must be able to complete the requirements of their course without the imposition of fees that are additional to the student contribution amount or tuition fees. However, students may be charged certain incidental fees or be expected to make certain purchases to support their study. For more information about this, go to Administrative Information for Higher Education Providers: Student Support, Chapter 21, Incidental Fees at: http://www.innovation.gov.au/HigherEducation/TertiaryEducation/ResourcesAndPublications/Pages/default.aspx

Other information

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at:
http://www.policy.monash.edu/policy-bank/academic/education/index.html

Graduate Attributes Policy

http://www.monash.edu/policy-bank/academic/education/course-governance-and-design/course-design-policy

Student Charter

http://www.monash.edu/students/policies/student-charter.html

Student Services

The University provides many different kinds of services to help you gain the most from your studies. Contact your tutor if you need advice and see the range of services available at http://www.monash.edu/students.

Malaysia students go to: http://www.monash.edu.my/Student-services/.

Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research.
Go to http://www.monash.edu/library or the library tab in http://my.monash.edu.au portal for more information.

For Malaysia students the Library and Learning Commons, Monash University Malaysia Campus, provides a range of services and resources that enable you to save time and be more effective in your learning and research.
Go to http://www.lib.monash.edu.my or the library tab in my.monash portal for more information.

Disability Support Services

Students who have a disability, ongoing medical or mental health condition are welcome to contact Disability Support Services.

Disability Support Services also support students who are carers of a person who is aged and frail or has a disability, medical condition or mental health condition.

Disability Advisers visit all Victorian campuses on a regular basis.

- Website: monash.edu/disability
- Telephone: 03 9905 5704 to book an appointment with an Adviser;
- Email: disabilitysupportservices@monash.edu
- Drop In: Level 1, Western Annexe, 21 Chancellors Walk (Campus Centre) Clayton Campus

At Malaysia campus, for information and referral, telephone: Student Adviser, Student Community Services at 03 55146018 or, drop in at Student Community Services Department, Level 2 Building 2, Monash University Malaysia Campus.