MONASH University

Unit Guide

ECE3121
Engineering electromagnetics

Semester 2, 2017

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Unit handbook information

Synopsis

This unit explores electrostatic, magnetostatic and electromagnetic fields, and their use to create devices and systems. Mathematical concepts are used to describe the fields, and examine the basic laws governing the generation of fields and their interactions with dielectric and magnetic materials. This study results in Maxwell's field equations, and related Laplace, Poisson and continuity equations. The real life applications of electromagnetic fields in radio communications and devices such as scanners, printers and mass spectrometers are also explored in this unit. Finally, plane wave propagation is analysed briefly as an extension of Maxwell's field equations.

Mode of delivery

Malaysia (Day)
Clayton (Day)

Workload requirements

2 hours lectures, 3 hours laboratories/tutorials and 7 hours private study per week.

Unit relationships

Prerequisites

ENG2005

Prohibitions

ECE2021

Co-requisites

None

Chief Examiner(s)

Professor Manos Varvarigos

Unit Coordinator(s)

Name: Professor Malin Premaratne
Email: malin.premaratne@monash.edu

Clayton/Malaysia staff contact details

Clayton campus	
Campus Coordinator	Name: Professor Malin Premaratne Email: malin.premaratne@monash.edu Building: 82, Room: 114 Consultation hours: 12pm to 1pm on Fridays (by email appointment)
Lecturer(s)	Name: Professor Malin Premaratne Email: malin.premaratne@monash.edu Building: 82, Room: 114 Consultation hours: 12pm to 1pm on Fridays (by email appointment)

Malaysia campus	
Campus Coordinator	Name: Dr Tridib Saha Email: tridib.saha@monash.edu Building: 2, Room: 2-4-39B Consultation hours: 1pm to 2 pm on Mondays (by email appointment)
Lecturer(s)	Name: Dr Tridib Saha Email: tridib.saha@monash.edu Building: 2, Room: 2-4-39B Consultation hours: 1pm to 2 pm on Mondays (by email appointment)

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.

Element of competency	Indicators of attainment	Learning outcomes
1 Knowledge and skill base		
1.1 Engages with the engineering discipline at a phenomenological level, applying sciences and engineering fundamentals to systematic investigation, interpretation, analysis and innovative solution of complex problems and broader aspects of engineering practice.	**a)** Engages with the engineering discipline at a phenomenological level, applying sciences and engineering fundamentals to systematic investigation, interpretation, analysis and innovative solution of complex problems and broader aspects of engineering practice.	1,2,3,4,5
1.2 Develops and fluently applies relevant investigation analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the engineering discipline.	**a)** Develops and fluently applies relevant investigation analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the engineering discipline.	1,2,3,4,5

1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline.	**a)** Proficiently applies advanced technical knowledge and skills in at least one specialist practice domain of the engineering discipline.	1,2,3,4,5
1.4 Discernment of knowledge development and research directions within the engineering discipline.	**a)** Identifies and critically appraises current developments, advanced technologies,emerging issues and interdisciplinary linkages in at least one specialist practice domain of the engineering discipline.	1,2,3,4,5
	b) Interprets and applies selected research literature to inform engineering application in at least one specialist domain of the engineering discipline.	1,2,3,4,5
1.5 Identifies and applies systematic principles of engineering design relevant to the engineering discipline.	**a)** Identifies and applies systematic principles of engineering design relevant to the engineering discipline.	4,5
	b) Identifies and understands the interactions between engineering systems and people in the social, cultural, environmental, commercial, legal and political contexts in which they operate, including both the positive role of engineering in sustainable development and the potentially adverse impacts of engineering activity in the engineering discipline.	4,5
1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.	**a)** Appreciates the basis and relevance of standards and codes of practice, as well as legislative and statutory requirements applicable to the engineering discipline.	4,5
	b) Appreciates the principles of safety engineering, risk management and the health and safety responsibilities of the professional engineer, including legislative requirements applicable to the engineering discipline.	4,5
	c) Appreciates the social, environmental and economic principles of sustainable engineering practice.	1,2,3,4,5

	d) Understands the fundamental principles of engineering project management as a basis for planning, organising and managing resources.	4,5
2. Engineering application ability		
2.1 Application of established engineering methods to complex engineering problem solving.	**a)** Identifies, discerns and characterises salient issues, determines and analyses causes and effects, justifies and applies appropriate simplifying assumptions, predicts performance and behaviour, synthesises solution strategies and develops substantiated conclusions.	1,2,4,5
	b) Ensures that all aspects of an engineering activity are soundly based on fundamental principles - by diagnosing, and taking appropriate action with data, calculations, results, proposals, processes, practices, and documented information that may be ill-founded, illogical, erroneous, unreliable or unrealistic.	1,2,3,4,5
	c) Competently addresses engineering problems involving uncertainty, ambiguity, imprecise information and wide-ranging and sometimes conflicting technical and non-technical factors.	2,4,5
	h) Identifies, quantifies, mitigates and manages technical, health, environmental, safety and other contextual risks associated with engineering application in the designated engineering discipline.	4,5
2.2 Fluent application of engineering techniques, tools and resources.	**a)** Proficiently identifies, selects and applies the materials, components, devices, systems, processes, resources, plant and equipment relevant to the engineering discipline.	1,2,4,5
	b) Constructs or selects and applies from a qualitative description of a phenomenon, process, system, component or device a mathematical, physical or computational model based on fundamental scientific principles and justifiable simplifying assumptions.	1,2,4,5
	c) Determines properties, performance, safe working limits, failure modes, and other inherent parameters of materials, components and systems relevant to the engineering discipline.	1,2,4,5

	d) Applies a wide range of engineering tools for analysis, simulation, visualisation, synthesis and design, including assessing the accuracy and limitations of such tools, and validation of their results.	1,2,4,5
	e) Applies formal systems engineering methods to address the planning and execution of complex, problem solving and engineering projects.	1,2,4,4,5
	f) Designs and conducts experiments, analyses and interprets result data and formulates reliable conclusions.	1,2,5
	g) Analyses sources of error in applied models and experiments; eliminates, minimises or compensates for such errors; quantifies significance of errors to any conclusions drawn.	1,2,4,5
	h) Safely applies laboratory, test and experimental procedures appropriate to the engineering discipline.	4,5
2.3 Application of systematic engineering synthesis and design processes.	**a)** Proficiently applies technical knowledge and open ended problem solving skills as well as appropriate tools and resources to design components, elements, systems, plant, facilities and/or processes to satisfy user requirements.	1,2,3,4,5
2.4 Application of systematic approaches to the conduct and management of engineering projects.	**a)** Contributes to and/or manages complex engineering project activity, as a member and/or as the leader of an engineering team.	5
	b) Seeks out the requirements and associated resources and realistically assesses the scope, dimensions, scale of effort and indicative costs of a complex engineering project.	5
3. Professional and personal attributes		
3.1 Ethical conduct and professional accountability.	**a)** Demonstrates commitment to uphold the Engineers Australia - Code of Ethics, and established norms of professional conduct pertinent to the engineering discipline	5
	b) Understands the need for due-diligence in certification, compliance and risk management processes.	5

	c) Understands the accountabilities of the professional engineer and the broader engineering team for the safety of other people and for protection of the environment.	5
	d) Is aware of the fundamental principles of intellectual property rights and protection.	5
3.2 Effective oral and written communication in professional and lay domains.	**a)** Is proficient in listening, speaking, reading and writing English	5
	b) Prepares high quality engineering documents such as progress and project reports, reports of investigations and feasibility studies, proposals, specifications, design records, drawings, technical descriptions and presentations pertinent to the engineering discipline.	5
3.3 Creative, innovative and pro-active demeanour.	**a)** Applies creative approaches to identify and develop alternative concepts, solutions and procedures, appropriately challenges engineering practices from technical and non-technical viewpoints; identifies new technological opportunities.	5
3.4 Professional use and management of information.	**a)** Is proficient in locating and utilising information - including accessing, systematically searching,analysing, evaluating and referencing relevant published works and data; is proficient in the use of indexes, bibliographic databases and other search facilities.	5
	b) Critically assesses the accuracy, reliability and authenticity of information.	5
3.5 Orderly management of self, and professional conduct.	**b)** Understands the importance of being a member of a professional and intellectual community,learning from its knowledge and standards, and contributing to their maintenance and advancement.	5
	c) Demonstrates commitment to life-long learning and professional development.	5
	d) Manages time and processes effectively, prioritises competing demands to achieve personal,career and organisational goals and objectives.	5

	e) Thinks critically and applies an appropriate balance of logic and intellectual criteria to analysis, judgement and decision making.	5
3.6 Effective team membership and team leadership.	**a)** Understands the fundamentals of team dynamics and leadership.	5
	b) Functions as an effective member or leader of diverse engineering teams, including those with multi-level, multi-disciplinary and multi-cultural dimensions.	5
	c) Earns the trust and confidence of colleagues through competent and timely completion of tasks.	5
	d) Recognises the value of alternative and diverse viewpoints, scholarly advice and the importance of professional networking.	5
	e) Confidently pursues and discerns expert assistance and professional advice.	5

Teaching and learning method

The teaching is based on lectures and tutorial which are coupled with the laboratory classes as scheduled in the moodle site.

Learning outcomes

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

1. Apply knowledge of mathematics to examine the behaviour of electric and magnetic fields and relate them to suitable applications.
2. Interpret Maxwell's equations and associated Laplace, Poisson and continuity equations using mathematical principles.
3. Describe electric and magnetic properties of metals, dielectrics and semiconductors.
4. Select and use appropriate tools to complete electrical and magnetic fields related laboratory tasks.
5. Communicate their work effectively in teams.

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:

This is the first time this unit is offered so the unit is designed from ground up. Any feedback is welcomed to improve the delivery of the content and to enhance the learning.

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

This is the first time this unit is offered so the unit is designed from ground up. Any feedback is welcomed to improve the delivery of the content and to enhance the learning.

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 1 - Lectures only. Lab time will be used to demonstrate some cool experiments.

Week 2 to 11 - Lectures, Tutorial and Laboratories as per schedule of each student.

Week 12 - Lectures and Tutorial time. No laboratory classes.

Week 7 - there will be a class test of 10% during the first hour of the lecture time.

Assessment requirements

Assessment summary

Continuous assessment: 40%
Examination (2 hours): 60%
Students are required to achieve at least 45% in the total continuous assessment component (assignments, tests, mid-semester exams, laboratory reports) 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
Laboratory	total labs sum to 30% of the final mark.	one week after the laboratory session.
Class Test	10% of the final mark	Just after the test is conducted.
Final exam	60%	To be advised

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 the unit.

Assessment tasks

Assessment title: Laboratory
Mode of delivery: 2hr Laboratory classes starting from 2nd week of the semester. Students must attend the allocated laboratory session and complete the allocated tasks. No marks will be given if students attend unallocated laboratory classes.
Details of task: The students must submit the laboratory report within one week of completing the laboratory. The marks will be made available through Moodle within 2 weeks of completing laboratory. The total weight for all the laboratory exercises constitute 30% of the final mark.
Release dates (where applicable): From second week onwards - weekly
Word limit (where applicable): 10000
Due date: one week after the laboratory session.
Value: total labs sum to 30% of the final mark.
Presentation requirements: Report
Hurdle requirements (where applicable): Hurdle requirements are for the total lab component and not for an individual lab component.
Individual assessment in group tasks (where applicable): The laboratory are done as a group and the marks will be given to each member based on the report provided.
Criteria for marking: There is a marking scheme for each laboratory which available for instructors only.
Additional remarks: none.

Assessment title: Class Test
Mode of delivery: 1hr examination in 7th week during first hour of the lecture.
Details of task: Set of problems very much similar to the final examination.
Release dates (where applicable): 7 Week
Word limit (where applicable): 10000
Due date: Just after the test is conducted.
Value: 10% of the final mark
Presentation requirements: None
Hurdle requirements (where applicable): None. The both laboratory and class test are combined when hurdles are applied.

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): NA

Criteria for marking: A marking scheme is provided for this test.
Additional remarks: none.

Exam title: Final exam
Weighting: 60%
Length: 2hrs
Type (Open/closed book): closed book
Hurdle requirements (where applicable): 45%
Electronic devices allowed: Faculty approved calculators are allowed.
Remarks (where applicable): The formulae sheet will be provided.

Examination material or equipment

Faculty approved calculators and formulae sheet available in the moodle site are allowed in the exam. The latter sheet will be printed at the end of the final exam paper.

Section B: For Malaysia students

Academic Overview

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

Program Outcomes
The Electrical and Computer Systems 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 **Electrical and Computer Systems Engineering Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and specialisation in Electrical and Computer Systems Engineering engineering to the solution of complex engineering problems	Cognitive: Lab experiments, class test, and final exam
PO2 **Problem Analysis:** Identify, formulate, survey research literature and analyse complex Electrical and Computer Systems Engineering engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences	Cognitive: Class test and final exam
PO3 **Design/Development of Solutions:** Design solutions for complex Electrical and Computer Systems Engineering engineering problems and design systems, components or processes that meet specified needs.	Cognitive: Class test, and final exam Psychomotor:
PO4 **Research-based Investigation:** Conduct investigations of complex Electrical and Computer Systems 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 Electrical and Computer Systems Engineering engineering problems, with an understanding of the limitations	Cognitive: Psychomotor: Lab experiments

Program Outcomes (POs)	Activities used in this unit to develop POs, achievement of Bloom's domains and complex problem solving
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 Electrical and Computer Systems Engineering engineering problems	Affective:
PO7 **Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex Electrical and Computer Systems 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 Electrical and Computer Systems 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:
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:
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:
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

The teaching approach for this unit is primarily problem-based learning. The teaching is based on lectures and tutorials which are coupled with the laboratory classes as scheduled in the moodle site.

Learning outcomes

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

1. Apply knowledge of mathematics to examine the behaviour of electric and magnetic fields and relate them to suitable applications.
2. Interpret Maxwell's equations and associated Laplace, Poisson and continuity equations using mathematical principles.
3. Describe electric and magnetic properties of metals, dielectrics and semiconductors.
4. Select and use appropriate tools to complete electrical and magnetic fields related laboratory tasks.
5. Communicate their work effectively in teams.

OBE requirements to learning outcomes (LOs)

Learning Outcomes (LOs) for Outcome Based Education (OBE) requirements	Handbook Learning Outcomes (LOs)
LO1) Apply knowledge of mathematics, physics and engineering fundamentals to solving complex problems	LO1) Apply knowledge of mathematics to examine the behaviour of electric and magnetic fields and relate them to suitable applications.
LO2) Interpret solutions to complex electromagnetic problems using mathematics, physics and other equations	LO2) Interpret Maxwell's equations and associated Laplace, Poisson and continuity equations using mathematical principles.
LO3) Design solutions for complex engineering problems in electromagnetism by interpreting the electric and magnetic properties of metals, dielectrics and semiconductors	LO3) Describe electric and magnetic properties of metals, dielectrics and semiconductors.
LO4) Select and use appropriate software and hardware tools to demonstrate related laboratory tasks	LO4) Select and use appropriate tools to complete electrical and magnetic fields related laboratory tasks.
LO5) Communicate technical contents related to electromagnetic theory effectively individually and in a group	LO5) Communicate their work effectively in teams.

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									√			

Keys

	No Emphasis
√	Emphasized and assessed in the unit

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:

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

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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 1 - Lectures only.

Week 2 to 11 - Lectures, Tutorial and Laboratories as per schedule of each student.

Week 12 - Lectures and Tutorial time. No laboratory classes.

Week 7 - 1 hour class test of 10% during lecture.

Assessment Summary

Continuous assessment: 40%
Examination (2 hours): 60%
Students are required to achieve at least 45% in the total continuous assessment component (assignments, tests, mid-semester exams, laboratory reports) 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
Laboratory	30 %	One week after the laboratory session.
Class test	10 %	Just after the test is conducted.
Final Exam	60 %	To be advised.

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 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		
		Labs	Mid sem test	Final exam
1	Apply knowledge of mathematics, physics and engineering fundamentals to solving complex problems		C3	C6
2	Interpret solutions to complex electromagnetic problems using mathematics, physics and other equations		C3	C6
3	Design solutions for complex engineering problems in electromagnetism by interpreting the electric and magnetic properties of metals, dielectrics and semiconductors	C3	C4	C6
4	Select and use appropriate software and hardware tools to demonstrate related laboratory tasks	P4		
5	Communicate technical contents related to electromagnetic theory effectively individually and in a group	A2		

Relationship between Assessments and Complex Problems /Activities

	Assessment	Complex Problems							Complex Activities				
		Depth of Knowledge	Range of Requirements	Depth of Analysis	Infrequent Issues	Extent of Codes	Stakeholder Involvement	Components or Sub-problems	Range of Resources	Level of Interactions	Innovation	Consequences to Society and Environment	Unfamiliarity
1	Laboratory	x		x				x	x				
2	Class test	x		x				x	x				
3	Final exam	x		x				x	x				

Assessment requirements

Assessment tasks

Assessment title: Laboratory
Mode of delivery: 2hr Laboratory classes starting from 2nd week of the semester. Students must attend the allocated laboratory session and complete the allocated tasks. No marks will be given if students attend unallocated laboratory classes.
Details of task: The students must submit the laboratory report within one week of completing the laboratory. The marks will be made available through Moodle within 2 weeks of completing laboratory. The total weight for all the laboratory exercises constitute 30% of the final mark.
Release dates (where applicable): From second week onwards - weekly
Word limit (where applicable): 10000
Due date: one week after the laboratory session.
Value: total lab sums up to 30 % of final marks
Presentation requirements: Report
Hurdle requirements (where applicable): Hurdle requirements are for the total lab component and not for an individual lab component.
Individual assessment in group tasks (where applicable): The laboratory are done as a group and the marks will be given to each member based on the report provided.
Criteria for marking: There is a marking scheme for each laboratory which available for instructors only.
Additional remarks: None.

Assessment title: Class test
Mode of delivery: 1hr examination in 7th week during lecture hours.
Details of task: Set of problems very much similar to the final examination.
Release dates (where applicable): Week 7
Word limit (where applicable): 10000
Due date: Just after the test has concluded
Value: 10 % of the final mark.
Presentation requirements: None.
Hurdle requirements (where applicable): None. The both laboratory and class test are combined when hurdles are applied.

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: A marking scheme will be provided.
Additional remarks: None.

Exam title: Final Exam
Weighting: 60 %
Length: 2 hrs
Type (Open/closed book): Closed book
Hurdle requirements (where applicable): 45 %
Electronic devices allowed: Faculty approved calculators are allowed.

Remarks (where applicable): The formulae sheet will be provided.

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.

Only faculty approved calculators will be allowed.

Examination material or equipment

Faculty approved calculators and formulae sheet available in the moodle site are allowed in the exam. The latter sheet will be printed at the end of the final exam paper.

Section C: All students

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

All formulae and other details not covered in the lectures must be either derived from fundamentals or referred published literature.

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:

Please email a copy of the laboratory reports within one week of the laboratory completion to the demonstrator assigned to your class.

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

All the laboratory report marks and class test results will be made available within 2 weeks of completing the laboratory assignment/test.

Learning resources

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.