MONASH University

Unit Guide

ECE4094
Project A

Semester 2, 2017

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Unit handbook information

Synopsis

Together with ECE4095 Project B, this unit is a challenging opportunity to pursue independently an individual project and is likely to require extended effort. The two units together normally include a preparatory literature survey and developmental work such as design, construction and programming. Students choose a project that interests them, and are assigned to a team of two supervising staff members.

Mode of delivery

Clayton (Day)
Malaysia (Day)

Workload requirements

12 hours per week working on the project

Unit relationships

Prerequisites

ECE3091 or completion of 132 credit points

Prohibitions

ECE4911, ECE5094

Co-requisites

None

Chief Examiner(s)

Professor Manos Varvarigos

Unit Coordinator(s)

Name: Dr Jonathan Li
Email: Jonathan.Li@monash.edu

Clayton/Malaysia staff contact details

Clayton campus	
Campus Coordinator	Name: Dr Jonathan Li Email: Jonathan.Li@monash.edu Building: 72, Room: 226 Consultation hours: Email for appointment
Lecturer(s)	Name: None Email: Building: , Room: Consultation hours: None

Malaysia campus	
Campus Coordinator	Name: Dr Narayanan Ramakrishnan Email: ramakrishnan@monash.edu Building: 2, Room: 37 Consultation hours: Email for appointment
Lecturer(s)	Name: None Email: Building: , Room: Consultation hours: None

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
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

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
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
	b) Interprets and applies selected research literature to inform engineering application in at least one specialist domain of the engineering discipline.	1
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.	1
	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.	1
	c) Appreciates the issues associated with international engineering practice and global operating contexts.	1
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.	1
	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.	1
	c) Appreciates the social, environmental and economic principles of sustainable engineering practice.	1

	d) Understands the fundamental principles of engineering project management as a basis for planning, organising and managing resources.	1
	e) Appreciates the formal structures and methodologies of systems engineering as a holistic basis for managing complexity and sustainability in engineering practice.	1
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.	1,5
	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.	1,5
	c) Competently addresses engineering problems involving uncertainty, ambiguity, imprecise information and wide-ranging and sometimes conflicting technical and non-technical factors.	1,5
	d) Investigates complex problems using research-based knowledge and research methods.	1,5
	e) Partitions problems, processes or systems into manageable elements for the purposes of analysis,modelling or design and then re-combines to form a whole, with the integrity and performance of the overall system as the paramount consideration.	1,5
	f) Conceptualises alternative engineering approaches and evaluates potential outcomes against appropriate criteria to justify an optimal solution choice.	1,3,5

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.	1,5
	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.	1,5
	c) Determines properties, performance, safe working limits, failure modes, and other inherent parameters of materials, components and systems relevant to the engineering discipline.	1,5
	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.	1,5
	e) Applies formal systems engineering methods to address the planning and execution of complex, problem solving and engineering projects.	1,5
	f) Designs and conducts experiments, analyses and interprets result data and formulates reliable conclusions.	1,5
	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.	1,5
	h) Safely applies laboratory, test and experimental procedures appropriate to the engineering discipline.	1,5
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.	1,5

	b) Addresses broad contextual constraints such as social, cultural, environmental, commercial, legal political and human factors, as well as health, safety and sustainability imperatives as an integral part of the design process.	1,5
	c) Executes and leads a whole systems design cycle approach.	1,5
	d) Is aware of the accountabilities of the professional engineer in relation to the 'design authority' role.	1,5
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.	1,5
	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.	1,5
	d) Proficiently applies basic systems engineering and/or project management tools and processes to the planning and execution of project work, targeting the delivery of a significant outcome to a professional standard.	1,5
	e) Is aware of the need to plan and quantify performance over the full life-cycle of a project, managing engineering performance within the overall implementation context.	1,5
3. Professional and personal attributes		
3.2 Effective oral and written communication in professional and lay domains.	**a)** Is proficient in listening, speaking, reading and writing English	6
	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.	6

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.	2,5
	b) Seeks out new developments in the engineering discipline and specialisations and applies fundamental knowledge and systematic processes to evaluate and report potential.	2,5
	c) Is aware of broader fields of science, engineering, technology and commerce from which new ideas and interfaces may be drawn and readily engages with professionals from these fields to exchange ideas.	4
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.	1
	b) Critically assesses the accuracy, reliability and authenticity of information.	1
	c) Is aware of common document identification, tracking and control procedures.	1
3.5 Orderly management of self, and professional conduct.	**a)** Demonstrates commitment to critical self-review and performance evaluation against appropriatecriteria as a primary means of tracking personal development needs and achievements.	2,5
	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.	2
	e) Thinks critically and applies an appropriate balance of logic and intellectual criteria to analysis, judgement and decision making.	3
	f) Presents a professional image in all circumstances, including relations with clients, stakeholders, as well as with professional and technical colleagues across wide ranging disciplines.	6
3.6 Effective team membership and team leadership.	**a)** Understands the fundamentals of team dynamics and leadership.	1
	b) Functions as an effective member or leader of diverse engineering teams, including those with multi-level, multi-disciplinary and multi-cultural dimensions.	1
	c) Earns the trust and confidence of colleagues through competent and timely completion of tasks.	1
	d) Recognises the value of alternative and diverse viewpoints, scholarly advice and the importance of professional networking.	1
	e) Confidently pursues and discerns expert assistance and professional advice.	1
	f) Takes initiative and fulfils the leadership role whilst respecting the agreed roles of others.	1

Teaching and learning method

The student in coordination with the immediate supervisor and the unit coordinator will undertake a project in their area of interest from the different fields of Electrical and Computer Systems Engineering. The exercise will be a self study project where the student will undertake research, experimentation, design, construction and evaluation under the guidance of a member of ECSE staff.

Learning outcomes

At the successful completion of this unit you will be able to:

1. Demonstrate a sound technical knowledge of their selected project topic.
2. Demonstrate problem identification, formulation and solution.
3. Design and evaluate engineering solutions to complex problems utilising a systems approach.
4. Plan, execute and assess an engineering project.
5. Generate professional written reports and oral presentations to communicate project outcomes to engineering colleagues and the community at large
6. Demonstrate the knowledge, skills and attitudes of a professional engineer.

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:

- A more streamlined process for students to find projects and supervisors.
- Rubric for overall project performance

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

- The opportunity to work closely with a departmental academic on interesting and challenging projects.

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

Project A (ECE4094) Unit schedule

Week	Assignment activity
3	Students who do not yet have a project will be allocated to a supervisor on Wednesday of week 3. While every effort will be made to place remaining students in an area of their preference, final determination will be made by the unit coordinator in consideration of available supervisors.

4	**Risk Analysis** This Milestone is an initial investigation of the Safety Risks involved in the project. This item is continually updated during the life of the project to reflect new or changed risk circumstances as the project progresses. It is a legal requirement of all projects. **Requirements Analysis** This Milestone is used to ensure both the student and supervisor have a common understanding of the direction, focus and outcomes intended from the project. It will be used as benchmark during the final presentation of findings.
12	**Design Specification** This Milestone is used to compare and contrast the final project result with initial expectations. The review panel will use this Milestone to examine what has been delivered and what was originally expected. **Progress Report** This Milestone is a brief report on the progress to date of the project. It should be no more than 5 pages.
SWOT VAC	**Progress Interview (if necessary)** If the supervisor or student determines that it is necessary, students will need to attend an interview with a panel of experts to present evidence of their progress and justify why their project should be allowed to continue into its second half (Project B).

Project B (ECE4095) Unit schedule

Week	Assignment activity
ongoing	**Risk Analysis Review** This Milestone is a review investigation of the Safety Risks involved in the project. This item is continually updated during the life of the project to reflect new or changed risk circumstances as the project progresses. It is a legal requirement of all projects.
11	**Poster** Students are to submit a summary poster of their work at the end of Week 11. **Project Video** Students are to submit a link to a video that they create and upload to YouTube. The video must not exceed 15 minutes and summarise the purpose, execution and results of their project. Video production skills will not be assessed, but clarity, conciseness and engagement are expected.
12	**Industry Night** Students are expected to attend an industry night in the middle of Week 12 of second semester, to present their projects, demonstrations and posters to industry, academics and fellow students. This is a celebration of the entire final year project and a showcase of student efforts. **Final Report** This milestone includes all aspects of the project including but not limited to literature review, final design, project limitations, comparison and contrast of original goals and expectations to final delivered items. The body of work should include everything which the student presents in their final review and is relevant to the project. This may include written material as well as pictures, schematics, charts, diagrams graphs and analysis of results as well as conclusions. This body of work is a collection of all the items required to justify the results achieved during the course of the project. The body of work must be submitted as a single PDF via Moodle at the end of Week 12.

SWOT VA C	**Final Presentation:** This Milestone is the Final Project Review. Students will need to present to an open audience including a panel of experts evidence of their progress and justify the outcomes of their project. The panel will at this time consider all aspects of the project including the relative merits of all the milestones and the project deliverable items in making their determination of a mark for the entire project. Marking will be in accordance with the assessment details and criteria specified in the rubrics below. The presentation will consist of • a viewing of the 15 minute Project Video with the students and assessment panel • a 10-15 minute interview of students along with their posters

Assessment requirements

Assessment summary

Panel assessment of the achievement of the student in the project, as evidenced by a presentation, a poster and a written report (100%)

Assessment task	Value	Due date
Project	100%	Week 12

Hurdle requirements

At the end of Project A, students will present the results of their project to date. This will be in the form of a written progress report. If the supervisor and student are

Should the supervisor (or student) have any concerns regarding progress to date, a panel of academics including the project supervisor and independent academics, to be determined by the unit coordinator, will interview the student(s) and assess the milestones and progress at which time the student(s) must defend their efforts and justify why the project should be allowed to continue.

The panel will take into consideration all of the required submissions in the Unit Schedule above. If the project is to continue the student will be notified via Moodle following the release of results according to faculty policy. As the project is only half complete at this stage, the official result for ECE4094 will indicate Result Withheld (WH) temporarily until the project is complete at the end of ECE4095 Project B.

In the event a project is not permitted to continue, the mid project review will record a fail against Project A ECE4094. A numerical mark will be returned based on the evidence presented to the

mid point of the project for Project A only. No mark will be recorded against ECE4095 for a project which fails to meet requirements at the end of ECE4094.

Students whose projects are not permitted to continue must dis-enrol from Project B and recommence a new project beginning with Project A ECE4094 in a subsequent semester.

The project is marked at its conclusion with consideration to the rubric below.

Assessment tasks

Assessment title: Project
Mode of delivery: On Campus
Details of task: A two semester project in an area of ECSE, supervised by a member of ECSE academic staff.

There are a number of deliverables, outlined in the unit schedule.

Release dates (where applicable): Consult Moodle for details
Word limit (where applicable): Consult Moodle for details
Due date: Week 12
Value: 100%
Presentation requirements: In Project A, an interview may be required if there are concerns with student progress.

In Project B, students must submit a 15 minute video summarising their project, and attend a 10-15 minute interview with a panel explaining their project using their poster submission.

Hurdle requirements (where applicable): All deliverables are hurdles that must be submitted.
Individual assessment in group tasks (where applicable): Where a project is completed as a team, students and supervisors will determine the method of individual assessment.

Examples could be the CATME peer assessment system.

Criteria for marking:

100% of the mark is allocated to the outcome of the project.

Each project is open-ended. There is no one correct answer, however there are levels of expectation and outcomes associated with all projects. Examples of the type of performance which will earn different marks are given below. Note the review panel may adjust the mark above or below these ranges at their discretion.

The attached rubric is an indicative guide to the required level of achievement generally associated with each grade level.

Facet of work	Example Tasks	Fail	Pass	Credit/Distinction	High Distinction
Understanding of project	Objectives stated Define context and scope of project Project Significance	The student **does not understand** the project topic.	The student demonstrates **understanding of the main points** of the project topic.	The student demonstrates **clear understanding of their project topic** and the work presented **meets criteria specified in the project description**.	The student demonstrates **clear understanding of their project topic** and **formulates the research questions with minimal guidance** from their supervisor in an **innovative fresh perspective**.
Review of literature	Identifying technical challenges Usage of references and citations Identify broader (social and/or cultural) implications of project	Technical challenges are **vaguely specified**. Consults **minimal** sources or sources considered **inappropriate** to problem solve and justify approach used. Little or no evidence of awareness of project's ethical / social / cultural implications	Technical challenges are **clearly identified and explained**. Consults **some appropriate** sources to problem solve and justify approach used. Some evidence of awareness of project's ethical / social / cultural implications	Technical challenges are **clearly identified and explained in context**. Consults **numerous appropriate** sources to problem solve and justify approach used. Clear evidence of awareness of project's ethical / social / cultural implications	Technical challenges are **clearly identified, explained in context and justified**. Consults **numerous appropriate** sources to problem solve and justify approach used **systematically and comprehensively**. Extensive evidence of awareness of project's ethical / social / cultural implications

Project execution	Risk Analysis Project planning Delivery of project objectives Documentation	In the opinion of the review panel the project **does not have adequate technical content** or **does not meet reasonable expectations** of effort for a project of this size and length. **Only trivial or partial completion** of project objectives. No ongoing documentation of project progress	Outcomes of the project **are not clearly evident** to the review panel. Demonstrations are **not repeatable** in a reasonable time frame. The student presents work which **almost meets the specifications** set out in the various milestones. Little ongoing documentation of project progress	**Demonstration of project outcomes is evident** to the review panel, **repeatable** with some difficulty but still **in line with most predictions and expectations** made in the various milestones. The student presents work which **meets the specifications** set out in the various milestones. Clear ongoing documentation of project progress	Project **outcomes are clearly evident** to the review panel, **repeatable**, **in line with predictions and expectations** made in the various milestones. The student presents work which **demonstrates significant initiative and original thought** in their solution to **achieve all specifications** outlined in the report. Clear and professional level ongoing documentation of project progress

Facet of work	Example Tasks	Fail	Pass	Credit/Distinction	High Distinction
Problem solving approach	Formulation of solutions to identified problems Identification of strengths and weaknesses of project approach	The solutions provided demonstrate **very unsystematic approaches** to problem solving. **Project goals are not met**. No evidence of critical reflection and evaluation of the strengths and weaknesses of the project approach	The solutions provided demonstrate reasonable attempts to solve the project problems. Adequate but **unsophisticated and unwise use of technical skills** to solve the problem. Some evidence of critical reflection and evaluation of the strengths and weaknesses of the project approach	The solutions provided demonstrate good adherence to professional practice and problem solving. Evidence of critical reflection and evaluation of the strengths and weaknesses of the project approach	The **elegant solutions** provided demonstrate **significant initiative** and **evidence of original thought** in the resolution of the project goals. Clear evidence of critical reflection and evaluation of the strengths and weaknesses of the project approach

Presentation	Oral presentations Video presentation Panel Interview	Unengaging, laboured, disjointed Questions answered poorly, with little evidence of knowledge of the project.	Mildly engaging, need improvements for the future Questions answered adequately, with some evidence of knowledge of the project.	Strongly engaging, well presented Questions answered adequately, with clear evidence of knowledge of the project.	Exceptionally engaging, brilliantly presented, highly professional Questions answered confidently and convincingly, with clear evidence of knowledge of the project.
Communication	Requirements Analysis Design specification Progress Report Final Report Poster	The reports and milestones are **not clearly written,** are **grammatically incorrect** and **poorly documented**. The report is **poorly formatted and fails to meet the conventions**.	The reports and milestones are **adequately written, grammatically satisfactory and adequately documented,** sufficiently meeting the criteria for writing reports. The report is **adequately formatted** and meets the conventions.	The reports and milestones are **proficiently written, grammatically correct and accurately documented**, and sufficiently meets the criteria for writing reports. The report is **accurately and clearly formatted** .	The reports and milestones are **clearly written, grammatically correct, well documented**, utilising **professional language** to meet all of the criteria for writing reports. Close attention has been observed to meet the **report formatting conventions at a professional standard**. The produced report is likely to result in an externally peer reviewed publication in a conference or journal as an additional output.

Additional remarks: None

Section B: For Malaysia students

Academic Overview

Program Education Objectives

The electrical and computer systems engineering discipline expects to produce graduates, who are:

1. competent in electrical and computer systems 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 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 Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and specialisation in electrical and computer systems engineering to the solution of complex engineering problems	Cognitive: Evaluate and apply fundamental principles to complex engineering problems. Assessed using design document, final report and final presentation.
PO2 **Problem Analysis:** Identify, formulate, survey research literature and analyse complex electrical and computer systems engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences	Cognitive: Critically assess and formulate a problem through analysis of relevant published literature. Assessed through design document and final report.
PO3 **Design/Development of Solutions:** Design solutions for complex electrical and computer systems engineering problems and design systems, components or processes that meet specified needs.	Cognitive: Develop/Design an appropriate solution to solve a complex engineering problem. Assessed through design document. Psychomotor:
PO4 **Research-based Investigation:** Conduct investigations of complex electrical and computer systems 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: Assess and synthesize results of investigation to provide valid conclusions. Assessed through final presentation and final report.
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 problems, with an understanding of the limitations	Cognitive: Create/Select and apply appropriate resources and tools to work over an extended period on a complex engineering problem. Assessed through design document, final report and final presentation. Psychomotor:

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 problems	Affective: Projects are required to demonstrate an observance of safety requirements involved in the project. Assessed using the risk analysis appended in the design document.
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 problems in environmental contexts.	Cognitive: Affective: Students are required to follow environmental guidelines as necessary. Assessed using the environmental assessment document appended in the design document.
PO8 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	Affective: The engineering profession requires a commitment to ethical behaviour. Students are required to comply with research integrity and other ethical aspects such human ethics, animal ethics and biosafety relevant to the project. Assessed through ethics assessment forms in design document and final report.
PO9 **Communication:** Communicate effectively on complex electrical and computer systems 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: Written communication is assessed using design document and final report. Oral communication with the engineering community and the society at large is assessed using the final presentation and project demonstration.
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: NA
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: Initiate ideas to solve complex problems and have the desire to work independently. Assessed using life-long learning assessment form appended in the final report.
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: Measured at the project demonstration on completion of the project within time and allocated budget. Assessed using timely submission of design document and final report.

Teaching and learning method

The student in coordination with the immediate supervisor and the unit coordinator will undertake a project in their area of interest from the different fields of Electrical and Computer Systems Engineering. The exercise will be a self study project where the student will undertake research, experimentation, design, construction and evaluation under the guidance of a member of ECSE staff.

Learning outcomes

At the successful completion of this unit you will be able to:

1. Demonstrate a sound technical knowledge of their selected project topic.
2. Demonstrate problem identification, formulation and solution.
3. Design and evaluate engineering solutions to complex problems utilising a systems approach.
4. Plan, execute and assess an engineering project.
5. Generate professional written reports and oral presentations to communicate project outcomes to engineering colleagues and the community at large
6. Demonstrate the knowledge, skills and attitudes of a professional engineer.

OBE requirements to learning outcomes (LOs)

LOs for OBE	Handbook LOs
1. Critically assess and formulate a problem through analysis of relevant published literature. 2. Create/Select and apply appropriate resources and tools to work over an extended period on a complex engineering problem. 3. Organise complex technical information and communicate both orally and in writing. 4. Evaluate and apply fundamental principles of electrical and computer systems engineering to a complex engineering problem 5. Develop/Design an appropriate solution to solve a complex engineering problem 6. Assess and synthesize results of investigation to provide valid conclusions 7. Assume responsibility and comply with safety aspects of the project 8. Adopt environmental guidelines as required 9. Comply with ethical principles relevant to the project	1. explore in greater depth a chosen field of engineering with a practical emphasis 2. demonstrate an ability to self manage and organize and to investigate and evaluate a problem of interest 3. demonstrate an ability to logically assess different alternatives and investigate prior work in the field of interest, compare and contrast such work to develop a solution to a problem of interest 4. explore the importance of self-sufficiency and self-review of efforts and outcomes 5. demonstrate skills acquired during the course of the degree in an area of interest to the student and supervisor and use the tools and equipment applicable in the chosen area with greater efficacy 6. relate findings and outcomes to a panel of review

10. Initiate ideas to solve complex problems and have the desire to work independently 11. Organise and manage a project of significant duration to an agreed timetable and budget	

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				√								
LO7						√						
LO8							√					
LO9								√				
LO10											√	
LO11												√

Key

√	Emphasized and assessed in the unit
	No Emphasis

Malaysia General Studies Unit

This unit has been approved as a General Studies (GS) unit under the U4 cluster by the Malaysian Qualifications Agency (MQA). The objective of the U4 cluster is to produce students who can apply soft skills. A range of learning outcomes have been developed by the Ministry of Higher Education (MOHE) for the U4 cluster.

U4 Cluster Learning outcomes

At the end of this course, students will be able to:

1. apply social skills and responsibility;
2. apply values, attitudes and professionalism;
3. apply communication and leadership skills and the ability to work in teams;
4. apply information management and lifelong learning skills;
5. apply management and entrepreneurial skills.

Mapping of OBE Learning Outcomes to U4 Cluster Learning Outcomes

OBE LO1.	U4 LO1.
	U4 LO2.
OBE LO2.	U4 LO1.

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:

- 1. Maybe change the way the topics are allocated. It should be done in a more fair way. - This has been discussed at ECSE discipline meetings and the current system was adopted as it allows the freedom to choose a topic of their choice.
- 2. Increase the speed of the computers in FYP lab. 16GB RAM also not enough - An odd comment. Worstations provided should be really good for the most tasks at undergraduate level. If a student requires even faster workstation, the student should talk to the supervisor and could seek access to the HPC.
- 3. The difficulty level of all projects should be similiar- Difficulty level should be comparable but it is very difficult to assess the degree of difficultiness as it is quite subjective.

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

- The opportunity to work closely with a departmental academic on interesting and challenging projects.

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

Project A (ECE4094) Unit schedule

UNIT SCHEDULE ECE4094 Project A

Week	Date	Training Workshop	Venue Time	Assignment/Submission
Week 1	26 July, 2017 (Wed)	Meeting with FYP coordinator	FYP Lab 2.30 pm	Introduction: The Goals of the Unit, Project Selection.
Week 2	August 2,2017 (Wed)	Risk Assessment Workshop	LT6005 2:00-3:00 pm	Students who do not yet have a project will be allocated to a supervisor on Wednesday of week 2. While every effort will be made to place remaining students in an area of their preference, final determination will be made by the unit coordinator in consideration of available supervisors. **Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 3	August 9, 2017 (Wed)	Literature Review workshop	Venue: LT 6005 Time : 4:30 PM to 5:30 PM	**Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 4	August 9, 2017 (Wed)			**Submission of Risk Analysis:** This Milestone is an initial investigation of the Safety Risks involved in the project. This item is continually updated during the life of the project to reflect new or changed risk circumstances as the project progresses. It is a legal requirement of all projects. A soft copy should be submitted to Moodle before 5 PM of Aug 9, 2017. **Weekly report submission to Supervisor:**

				A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 5	August 16, 2017 (Wed)	Managing references with EndNote	Venue MA_Computer Lab 9405 Time 2:00 PM to 3:00 PM	**Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 6	August 30, 2017 (Wed)	Technical Writing	LT6008 2:00-3:00 pm	**Submission of Requirement Analysis:** This Milestone is used to ensure both the student and supervisor have a common understanding of the direction, focus and outcomes intended from the project. It will be used as benchmark during the final presentation of findings. A Hard copy should be submitted to pigeon hole (2-4-37) at Level 4, Building 2, Pigeon Hole and soft copy to Moodle before 5 PM of Aug 30, 2017. **Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 8	September 13, 2017 (Wed)	Presentation Skill and Structuring report	LT6005 2:00-3:00 pm	**Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 8	September 13, 2017 (Wed)			**Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
Week 9	September 20, 2017 (Wed)	MS report formating	Venue: Computer Lab 9406 Time : 2:00 PM to 3:00 PM	**Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor

Week 12	October 20,2017 (Wed)			**Submission of Design Specification:** This Milestone is used to compare and contrast the final project result with initial expectations. The review panel will use this Milestone to examine what has been delivered and what was originally expected. A brief report on the progress to date of the project should be included. A Hard copy should be submitted to pigeon hole (2-4-37) at Level 4, Building 2, Pigeon Hole and soft copy to Moodle before 5 PM of October 20, 2017. **Weekly report submission to Supervisor:** A one page report (hard copy) following the format in the moodle site should be submitted during weekly meeting with the supervisor
SWOT V AC				**Progress Interview (if necessary)** If the supervisor or student determines that it is necessary, students will need to attend an interview with a panel of experts to present evidence of their progress and justify why their project should be allowed to continue into its second half (Project B).
	Examination Period			LINK to Assessment Policy: http://www.policy.monash.edu/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html

Assessment Summary

Panel assessment of the achievement of the student in the project, as evidenced by a presentation, a poster and a written report (100%)

Assessment task	Value	Due date
Overall Task : Project . Following are the sub assessments, **ECE4094- Project A - Assessment Task** 1. Design Document. 2. Weekly Report. **ECE4095- Project B- Assessment Task** 1. Final Report. 2. Final Presentation. 3. Viva-Voce/Demonstration. 4. Weekly Report. Visit the unit moodle site for the details on the task, marking scheme and rubrics.	100%	Week 12

Hurdle requirements

At the end of Project A, students will present the results of their project to date. This will be in the form of a written progress report. If the supervisor and student are

Should the supervisor (or student) have any concerns regarding progress to date, a panel of academics including the project supervisor and independent academics, to be determined by the unit coordinator, will interview the student(s) and assess the milestones and progress at which time the student(s) must defend their efforts and justify why the project should be allowed to continue.

The panel will take into consideration all of the required submissions in the Unit Schedule above. If the project is to continue the student will be notified via Moodle following the release of results according to faculty policy. As the project is only half complete at this stage, the official result for ECE4094 will indicate Result Withheld (WH) temporarily until the project is complete at the end of ECE4095 Project B.

In the event a project is not permitted to continue, the mid project review will record a fail against Project A ECE4094. A numerical mark will be returned based on the evidence presented to the mid point of the project for Project A only. No mark will be recorded against ECE4095 for a project which fails to meet requirements at the end of ECE4094.

Students whose projects are not permitted to continue must dis-enrol from Project B and recommence a new project beginning with Project A ECE4094 in a subsequent semester.

The project is marked at its conclusion with consideration to the rubric posted under the unit moodle site.

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)

Assessment		Learning Outcomes											Open ended Labs
		LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	
1	Design Documentation (Project A)	C6	C6	A4	C6	C5		A3	A3	A2		A4	
2	Final Presentation (Project B)		C6	A4	C6								
3	Final Report (Project B)	C6	C6	A4	C6		C6			A2	A3	A4	
4	Viva-Voce /Demonstration (Project B)				C6								x
5	Weekly Report (Project A and B)											A3	

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	Design Documentation	x	x	x	x	x		x	x	x	x	x	x
2	Final Presentation	x	x	x	x	x				x			
3	Final Report	x	x	x	x	x		x	x	x	x	x	x
4	Viva-Voce /Demonstration	x		x									

Assessment requirements

Assessment tasks

Assessment title: Project
Mode of delivery: On Campus
Details of task: A two semester project in an area of ECSE, supervised by a member of ECSE academic staff.
Release dates (where applicable): Consult Moodle for details
Word limit (where applicable): Consult Moodle for details
Due date: Week 12
Value: 100%
Presentation requirements: Consult Moodle for details
Hurdle requirements (where applicable): Consult Moodle for details
Individual assessment in group tasks (where applicable): Consult Moodle for details
Criteria for marking: Marking criteria for all assessments are available in the Moodle.
Additional remarks: Consult Moodle for details

Section C: All students

Extensions and penalties

Extensions should be approved by your supervisor and unit coordinator.

Returning assignments

Feedback is provided, but all submissions are retained by your supervisor.

Resubmission of assignments

No resubmission of assignments is permitted in this unit.

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

Please consult your supervisor on referencing requirements. It is most likely that you will be using the IEEE referencing style.

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:

None

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.

Use only the Moodle assignment submit tool. Do not submit files attached to email. Log into Moodle and select the unit for which you wish to submit work.

- You will receive a confirmation message within Moodle once you have successfully submitted your assignment within the electronic dropbox.
- Comments and grading of your assessment will be communicated to you either by Moodle, email, or in person.

Feedback to you

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

Students may receive feedback in several ways:

- In response to weekly journal entries made by students placed on the Moodle page
- Through weekly contact with supervisors
- Through email discussion with supervisors or the unit coordinator
- Through oral discussions conducted in laboratories or places of testing and demonstration with their project supervisor
- Throggh direct oral interaction with the assessment panel
- Through written or oral comments associated with each milestone

Students will receive regular verbal feedback from their project supervisor. To facilitate this, students should hold regular meetings with their supervisor.

Feedback may take the form of advice, direction, suggestion or an indication that a task may or may not be to the satisfaction of the supervisor or unit coordinator.

Since the majority of projects are conducted with close association with a supervisor and there is significant opportunity for the student to meet with their supervisor on many occasions not all feedback will be documented. This unit provides a mechanism through direct weekly meetings, journal entries, presentations and impromptu meetings for students to gain significant feedback. Students are encouraged to document each meeting they have with their supervisor as part of their weekly journal. Failure to update the journal on a weekly basis may substantially limit the kind and type and delivery of feedback available. Students have a responsibility if they require feedback to ask for it at the time it is needed. There is of course no guarantee the feedback received will be to the students liking.

You can also find information on inclusive teaching practices for students with learning disabilities or mental health conditions at: www.monash.edu.au/lls/inclusivity/

Learning resources

Recommended textbooks

Please consult your supervisor

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

Please consult your supervisor

Technological requirements

Please consult your supervisor

Additional unit costs

It may be necessary to purchase components in the course of your project. This should be done in consultation your supervisor. **All purchases requests must have written (e- mail) approval from your supervisor and follow the departmental procurement process**. The department will NOT approve reimbursements for parts purchased outside of this process.

Field trips

Please consult your supervisor

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.