1. General Course Information

1.1 Course Details

Course Code:	**1018ENG**
Course Name:	**Engineering Science**
Trimester:	**Trimester 2, 2024**
Program:	**Diploma of Engineering**
Credit Points:	**10**
Course Coordinator:	**Dr James A. Kirkup**
Document modified:	**15/05/2023**

Course Description

This experiential learning-based course introduces the natural and physical sciences that underpin the practice of engineering. Through experiments and projects students will identify, discuss, apply, analyse and evaluate science fundamentals through systematic investigation, interpretation, and analysis of some engineering problems. Topics covered include basic Newtonian mechanics, electrical and magnetics principles.

Assumed Knowledge

Core Maths Skills CME100 is a prerequisite for this course and must be completed successfully before you can be eligible to undertake this course.

1.2 Teaching Team

Your teacher/s can be contacted via email as below:

You will also find their email in the Teacher's tile on your Course Site.

Name	Email
Dr James Kirkup	james.kirkup@griffithcollege.edu.au

1.3 Meet with your teacher

Your teacher is available each week to meet outside of normal class times. This is called consultation. Times that your teacher will be available for consultation will be found on the Teacher's tile on your Course Site.

1.4 Timetable

Your timetable is available on the Griffith College Digital Campus at My Apps, Timetable.

1.5 Technical Specifications

All students must have access to a computer or suitable mobile device such as laptop or tablet (mobile phones are not suitable). In addition, up-to-date browser access, a reliable high-speed internet connection with enough upload and download capacity, a webcam and headset including microphone are needed.

2. Aims, Outcomes & Generic Skills

2.1 Course Aims

This course aims to expose students from a variety of educational backgrounds to the power of physics in understanding and control of natural phenomena, both at an empirical and experimental level, as well as at a deductive, theoretical and mathematical level. A variety of essential principles and rules, such as Newton's laws, Vector operations, Kinematics, Electricity and Magnetics, covering a wide range and varied spectrum of necessary knowledge of Physics, are taught and their application into other branches of engineering are explained through hands-on activities and laboratory experimentation. The course further aims to develop insights to practical tools for analysis of problems in applied science disciplines such as statics, dynamics, mechanics of materials, kinematics, electromagnetism, materials science, earth sciences, engineering physics.

2.2 Learning Outcomes

After successfully completing this course you should be able to:

1. Apply mathematical techniques and fundamentals of physics to the analysis of simple engineering systems.
2. Analyse important physical science concepts in Newtonian mechanics and critically analyse the data received to support a science theory or experimental objective.
3. Analyse important physical science concepts in electricity and magnetics, and critically analyse the data received to support a science theory or experimental objective.

2.3 Graduate Capabilities and Employability Skills

For further details on the Graduate Capabilities and Employability Skills please refer to the Graduate Generic Skills and Abilities Policy.

Griffith College is committed to producing graduates who are able to demonstrate progress toward the development of a number of generic skills / capabilities that will allow them to successfully continue their studies at the tertiary level. This set of skills includes employability related skills that will ensure graduates are capable in the workplace of the future.

Studies in this course will give you opportunities to begin to develop the following skills:

Graduate Capabilities and Employability Skills			Focus within this course
Interacting with People	Teamwork		
	Communication		✓
	Respect for Culture and Diversity		
Readiness for the Workplace	Problem Solving		✓
	Planning and Organisation		
	Creativity and Future Thinking		

3. Learning Resources

3.1 Required Learning Resources

Halliday, David et al. (2020). Halliday's Fundamentals of Physics, 1st Australian & New Zealand Edition Wiley.

3.2 Recommended Learning Resources

Mazur, Eric. (2015) Principles & Practice of Physics, Global Edition, Pearson

3.3 College Support Services and Learning Resources

Griffith College provides many facilities and support services to assist students in their studies. Links to information about support resources that are available to students are included below for easy reference.

- Digital Library – Databases to which Griffith College students have access to through the Griffith LibraryDatabases.
- Study Toolbox – there is a dedicated website for this course on the Griffith College Digital Campus.
- Academic Integrity - Griffith College is committed to ensuring academic integrity is understood and maintained byall staff and students. All students learn about academic integrity through engagement with Academic Integrity online modules within the Academic and Professional Studies course.
- Services and Support provides a range of services to support students throughout their studies including academic advice and assignment help from Student Learning Advisors, and personal and welfare support from Student Counsellors.
- Jobs and Employment in the Student Hub can assist students with career direction, resume and interviewpreparation, job search tips, and more.
- IT Support provides details of accessing support, information on s numbers and internet access and computer lab rules.

3.4 Other Information about your Learning

Preparation and Participation in Learning

You need to prepare before attending your scheduled Learning Experience (In Class). Work through the Learning Content (Before Class) prepared by your teacher which is found on the course site. Make sure you complete the Learning Activities (After Class) set each week. Active participation in your learning will enhance your success. Ask questions when something is unclear or when you want to bring some issue to your teacher's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

Attendance

You are expected to actively engage in all learning experiences which underpin the learning content in this course. Attendance will be recorded by your teacher in each learning experience to ensure you are meeting the requirements of the program you are studying and/or your visa conditions. You are expected to engage with the learning content and learning activities outside of timetabled class times. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook.

Consultation Sessions

Teachers offer extra time each week to assist students outside the classroom. This is known as 'consultation time.' You may seek assistance from your teacher on email or in person according to how the teacher has explained this to the class. Attendance during consultation time is optional but you are encouraged to use this extra help to improve your learning outcomes.

Course Learning Materials

Learning materials are made available to you in the course site. The learning materials are arranged in Modules. In each Module you will find Learning Content (Before Class), Learning Experiences (In Class) and Learning Activities (After Class). **Learning Content (Before Class)** will be engaged with prior to the scheduled **Learning Experience (In Class)**. This will ensure you are prepared for the scheduled Learning Experience (In Class) by being aware of the content to be covered and therefore will be able to actively participate in the session. **Learning Activities (After Class)** are accessed after the scheduled session for purposes of review, consolidation of learning, and preparation for the Evidence of Learning Tasks (Assessments) in the course.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and engage with the course Learning Content (Before Class) even when you are not specifically asked to do so by your teacher. The weekly guide (below) will be helpful to organise your learning. This involves revising the weekly course Learning Content (Before Class) and completing the Learning A ctivities (After Class). It also means you will need to find additional information to evidence your learning beyond that given to you, and to construct your own response to a question or topic. All of this requires careful planning of your time. Expect to spend, on average, at least 10 hours per week including class time for each of your courses.

Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, students are engaged in their learning and that GPA is maintained at equal to or greater than 3.5 [please see Griffith College Policy Library - Program Progression Policy - for more information].

International students enrolled in Language Development Modules (LDM100 / LDM200 or LDH100 / LDH200)

Successful completion of LDM100 and LDM200 or LDH100 and LDH200 is **required** to graduate with your Diploma award and progress to your Bachelor. If you do not achieve non-graded passes for these language modules your progression to your Bachelor will be affected. Please attend all your classes and submit your assessment.

Teacher and Course Evaluation

Your feedback is respected and valued by your teachers. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your teacher or by completing course and teacher evaluations via Griffith College's evaluation tool whenever these are available.

4. Weekly Guide: Learning Content, Learning Experiences and Learning Activities

The information below lays out how your learning will be organised throughout the trimester:

4.1 Modules for Learning and Weekly Learning Content, Learning Experiences and Learning Activities

Week	Learning Content (Before Class)	Learning Experiences (In Class)	Learning Activities (After Class)	Evidence of Learning (Assessment)	Learning Outcome
					
	Module 1: Units, Measurement, Uncertainties and Vectors				
1	Part A) Units, Measurement and Uncertainties, and Part B) Vectors and Operations Online mini lessons	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions		1
	Module 2: Motion, Forces and Energy				
2	One Dimensional Motion and Motion in plane	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Online Quiz	2
3	Part A) Forces and Motion I (Newton's Laws) Part B) Linear Momentum and Impulse	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions		2
4	Part A) Forces and Motion II (Friction), Part B) Energy and Work	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Online Quiz	2
5	Part A) Uniform Circular Motion and Part B) Rotational motion and Torque	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Preliminary Lab 1 Quiz Part A Laboratory 1 Part A report	2

6	Revision of Topics 1-5	Practice problems	Homework Activities Additional Homework Questions	Preliminary Lab 1 Quiz Part B Laboratory 1 Part B report Online Quiz	2
	Module 3: Electricity and Magnetics				
7	Field and Potential Coulomb's Law, Electric	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Mid-Trimester Exam (Mechanics)	3
8	Capacitance, Current and Resistance	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions		3
9	Circuits, Electromotive Force, Kirchoff's Laws and multi-loop circuits	Revise theory Practice problem solving questions	Homework Activities	Online Quiz	3
10	Magnetism Magnetic force and field, charged particles in a magnetic field, magnetic dipoles and material.	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Preliminary Lab 2 Quiz Laboratory 2 Resistance & DC Circuits Part A (Ohm's Law) report	3
11	Electromagnetic Induction Induced currents, Faraday's and Lenz's Law, induced EMF, inductance	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Online Quiz Laboratory 2 Resistance & DC Circuits Part B (Kirchhoff's law) report	3
12	Revision of Topics 7-11	Practice problems	Homework Activities		3

4.2. Practical Laboratory Classes

Practical laboratory classes are delivered in weeks 5, 6 and 10,11. Topics are detailed in 4.1 Learning Experience Laboratory sessions. Please look out for the timetable details.

5. Evidence of Learning (Assessment)

5.1 Evidence of Learning Summary

	Evidence of Learning (Assessment)	Weighting	Learning Outcome	Due Date
1	On-line Quizzes	20%	1, 2, 3	2, 4, 6, 9, 12
2	Mid-trimester Exam	25%	1, 2	7
3	Laboratory Activities - Mechanics (Experiment 1/2	15%	1, 2	5 and 6
4	Laboratory Activities - Electricity (Experiment 2/2 parts)	15%	1, 3	10 and 11
5	Final Exam	25%	1, 3	Final Exam Week

5.2 Evidence of Learning Task Detail

You are required to **submit your own work** for marking. All planning, notes and drafts need to be retained so they can be presented to your teacher if requested.

Tools that generate course content or extensively enhance a student's English language capability are not permitted to be used. Web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for outright assessment creation, translation, or extensive language assistance purposes. In addition, Wikipedia, Baidu, Weibo and WeTalk are not permitted to be used.

Students should follow all teacher directions about the use of Generative Artificial Intelligence (Gen-AI) tools in relation to formative and summative assessment tasks (including how to cite Gen-AI tools, if relevant). It should be noted that Turnitin provides teaching staff with a Gen-AI percentage indicator as well as an Originality Report which detects plagiarism.

1. Evidence of Learning Task 1: On-line Quizzes (20%)

Task Type: Online multiple-choice quizzes (5)
Due Date: Weeks 2, 4, 6, 9, 12
Weight: 20%, Marked out of: varies
Length: 3hr maximum during personal study time for each online quiz.

Task Description: The five on-line quizzes will assess students' knowledge and understanding of the physics science concepts covered in the course and the ability to apply that understanding to the solution of practical problems.
Criteria and Marking: Students are assessed on their knowledge of material covered. Each of the quizzes carries 4% of the total course mark.
Submission: online quiz

2. Evidence of Learning Task 2: Mid-Trimester Exam (25%)

Task Type: Examination
Due Date: Week 7 (To be advised in class)
Weight: 25%, Marked out of: 25

Length: N/A
Duration: 2 hours 10 minutes

Task Description: This is a closed book 2-hour quiz assessment item which covers weeks 1 to 6 of the course content. It will be made up of both multiple choice and small worked questions. This assessment will provide feedback to both the students and the teaching team regarding progress and conduct of the course halfway through the course. This exam also encourages the students to keep up to date with their work.
Criteria and Marking: Students are assessed on their knowledge of material covered in weeks 1 to 6 which is counted towards a maximum worth of 25%
Submission: in-class exam

3. Evidence of Learning Task 3: Laboratory Activities (30%)

Task Type: Written Laboratory Report
Due Date: Mechanics (Experiment 1 – 2 sessions in weeks 5 & 6), Electricity (Experiment 2 – 2 sessions in weeks 10 & 11). Four reports in total. Each due 1 week after each session.
Weight: 30% combined, Marked out of:100% for each Experiment
Length: N/A
Duration: 2 hours

Task Description: The laboratory activities assess the ability of the students to apply the taught principles to design, conduct, analyse and interpret actual experimental data. Also, the laboratory activities will allow students to verify the fundamental laws of various systems and to compare the predicted response to the theoretically calculated behaviour of those systems. Experiment 1 (Mechanics) deals with the concept of momentum, energy conservation and collision in two separate sessions. Experiment 2 (Electricity) deals with the concept of resistors, currents and circuits in two separate sessions.
Criteria and Marking: Each experiment has a pre-lab quiz valued 20% of the experiment mark. The data needed to prepare the laboratory report will be shared. (i.e. two reports for each experiment and four reports in total). The reports carry a total of 80% mark for each experiment.
Submission: online via the course site

4. Evidence of Learning Task 4: Final Examination (25%)

Task Type: Examination
Due Date: Examination Period
Weight: 25%, Marked out of: 25
Length: N/A
Duration: 2 hours 10 minutes

Task Description: This is a closed book 2-hour quiz assessment item which covers weeks 7 to 12 of the course content. The final exam will assess the students' knowledge and understanding of the topics covered in weeks 7-12 in the course and the ability to apply that understanding to the solution of practical problems.
Criteria and Marking: The examination paper is devised to test the students' computational skills, as well as the ability to apply that knowledge to engineering design problems. Marks will be awarded according to correctness of the procedures, accuracy of the solutions and clarity of the presentation.
Submission: centralised exam

5. Evidence of Learning Task 1: On-line Quizzes (20%)

Task Type: Online multiple-choice quizzes (5)
Due Date: Weeks 2, 4, 6, 9, 12
Weight: 20%, Marked out of: varies
Length: 3hr maximum during personal study time for each online quiz.

Task Description: The five on-line quizzes will assess students' knowledge and understanding of the physics science concepts covered in the course and the ability to apply that understanding to the solution of practical problems.
Criteria and Marking: Students are assessed on their knowledge of material covered. Each of the quizzes carries 4% of the total course mark.
Submission: online quiz

6. Evidence of Learning Task 2: Mid-Trimester Exam (25%)

Task Type: Examination
Due Date: Week 7 (To be advised in class)
Weight: 25%, Marked out of: 25
Length: N/A
Duration: 2 hours 10 minutes

Task Description: This is a closed book 2-hour quiz assessment item which covers weeks 1 to 6 of the course content. It will be made up of both multiple choice and small worked questions. This assessment will provide feedback to both the students and the teaching team regarding progress and conduct of the course halfway through the course. This exam also encourages the students to keep up to date with their work.
Criteria and Marking: Students are assessed on their knowledge of material covered in weeks 1 to 6 which is counted towards a maximum worth of 25%
Submission: in-class exam

7. Evidence of Learning Task 3: Laboratory Activities (30%)

Task Type: Written Laboratory Report
Due Date: Mechanics (Experiment 1 – 2 sessions in weeks 5 & 6), Electricity (Experiment 2 – 2 sessions in weeks 10 & 11). Four reports in total. Each due 1 week after each session.
Weight: 30% combined, Marked out of:100% for each Experiment
Length: N/A
Duration: 2 hours

Task Description: The laboratory activities assess the ability of the students to apply the taught principles to design, conduct, analyse and interpret actual experimental data. Also, the laboratory activities will allow students to verify the fundamental laws of various systems and to compare the predicted response to the theoretically calculated behaviour of those systems. Experiment 1 (Mechanics) deals with the concept of momentum, energy conservation and collision in two separate sessions. Experiment 2 (Electricity) deals with the concept of resistors, currents and circuits in two separate sessions.
Criteria and Marking: Each experiment has a pre-lab quiz valued 20% of the experiment mark. The data needed to prepare the laboratory report will be shared. (i.e. two reports for each experiment and four reports in total). The reports carry a total of 80% mark for each experiment.
Submission: online via the course site

8. Evidence of Learning Task 4: Final Examination (25%)

Task Type: Examination
Due Date: Examination Period
Weight: 25%, Marked out of: 25
Length: N/A
Duration: 2 hours 10 minutes

Task Description: This is a closed book 2-hour quiz assessment item which covers weeks 7 to 12 of the course content. The final exam will assess the students' knowledge and understanding of the topics covered in weeks 7-12 in the course and the ability to apply that understanding to the solution of practical problems.
Criteria and Marking: The examination paper is devised to test the students' computational skills, as well as the ability to apply that knowledge to engineering design problems. Marks will be awarded according to correctness of the procedures, accuracy of the solutions and clarity of the presentation.
Submission: centralised exam

In order to pass this Course, students must:

A. Achieve an aggregate mark of at least 50% overall.
B. Achieve at least 40% of the combined mid-exam and final exam total available marks to achieve a grade of "Pass" or above. Failure to reach this 40% hurdle results in failing the course.

5.3 Late Submission

An Evidence of Learning Task submitted after the due date, without an approved extension from the teacher, will be penalised. The standard penalty is the reduction of the mark allocated to the Evidence of Learning Task by 5% of the maximum mark applicable for the Evidence of Learning Task, for each calendar day that the task is late. Evidence of learning tasks submitted more than seven calendar days after the due date are awarded zero marks.

Please refer to the Griffith College website - Policy Library > Assessment Policy for guidelines and penalties for late submission.

5.4 Other Information about Evidence of Learning

Retention of Originals

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until afterthe release of final results for the Course.

Requests for extension

To apply for an extension of time for an evidence of learning task, you must submit an Application for Extension of Assignment form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstancesand must be able to be substantiated with relevant documentation [e.g. Griffith College Student Medical Certificate]. Please refer to the Griffith College website – Policy Library for guidelines regarding extensions and deferred Evidence of Learning Tasks.

Return of Evidence of Learning Tasks

1. Marks awarded for in-trimester evidence of learning tasks, except those being moderated externally with Griffith University, will be available on the course site within fourteen [14] days of the due date. This does not apply to the final evidence of learning task in this course (marks for this task will be provided with the final course result).

2. Students will be advised of their final grade through the Digital Campus. Students can review their final exam papers after student grades have been published. Review of final exam papers will not be permitted after the final date to enrol.

3. Marks for **all** evidence of learning tasks including the final exam (if applicable) will be recorded in the Course Site and made available to students through the Course Site.

The sum of your marks of evidence of learning *tasks in this course does not necessarily imply your final grade for the course. Standard grade cut off scores can be varied for particular courses, so you need to wait for the official release of grades to be sure of your grade for this course.*

6. Policies & Guidelines

Griffith College Evidence of Learning Tasks-related policies can be found in the Griffith College Policy Library which include the following policies:

Assessment Policy, Special Consideration, Deferred Assessment, Alternate Exam Sittings, Medical Certificates,Academic Integrity, Finalisation of Results, Review of Marks, Moderation of Assessment, Turn-it-in Software Use. These policies can be accessed within the Policy Library

Academic Integrity Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staffto act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academicintegrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and isunacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre- meditated form of cheating is considered one of the most serious forms of fraudulent academic behaviour,for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent todeceive. In these cases, students may be required to undertake additional educational activities to remediatetheir behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your teachers and academic advisors will provide you with guidanceto understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and whenyou are unsure about appropriate academic conduct.

In the case of an allegation of a breach of academic integrity being made against a student he or she mayrequest the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the Griffith College Academic Integrity Policy; this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penaltiesand processes involved when a breach is identified.

For further information please refer to the Griffith College website - Policy Library > Academic Integrity Policy

Reasonable Adjustments for Evidence of Learning Tasks –

The Disability Services Policy (accessed within the Policy Library) outlines the principles and processes that guide the College in making reasonable adjustments to Evidence of Learning Tasks for students with disabilitieswhile maintaining academic robustness of its programs.

Risk Assessment Statement

There are no out of the ordinary risks associated with this course.

Note: Griffith College acknowledges content derived from Griffith University in Diploma level courses, as applicable.