1. General Course Information

1.1 Course Details

Course Code:	1018ENG
Course Name:	Engineering Science
Trimester:	Trimester 2, 2021
Program:	Diploma of Engineering
Credit Points:	10
Course Coordinator:	Dr James A. Kirkup
Document modified:	**26 January 2021**

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

BRM100 Essential Mathematics 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 lecturer/tutor can be contacted via the email system on the portal.

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

1.3 Staff Consultation

Your teacher is available each week for consultation outside of normal class times. Times that your teacher will be available for consultation will be found on the Moodle Course Site.

1.4 Timetable

Your timetable is available on the Griffith College Portal at Class Timetable in Student and Services.

1.5 Technical Specifications

All students must have access to a computer or suitable mobile device.

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 Generic Skills and Capabilities

For further details on the Generic Skills please refer to the Graduate Generic Skills and Capabilities policy.

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

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

Generic Skills and Capabilities		Taught	Practised	Assessed
Acquisition of discipline knowledge and skills with critical judgement		✔	✔	✔
Communication and collaboration			✔	✔
Self-directed and active learning		✔	✔	✔
Creative and future thinking		✔	✔	✔
Social responsibility and ethical awareness		✔	✔	✔
Cultural competence and awareness in a culturally diverse environment			✔	

3. Learning Resources

3.1 Required Learning Resources

Halliday, David, Robert Resnick, and Jearl Walker. (2013). Fundamentals of Physics Extended.10th edition, Somerset: Wiley.

3.2 Recommended Learning Resources

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

3.3 College Support Services and Learning Resources

The College provides many facilities and support services to assist students in their studies. Links to information about College 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 Library Databases.

MyStudy – there is a dedicated website for this course via MyStudy on the Griffith College Portal.

Griffith College is committed to ensuring academic integrity is understood and maintained by all staff and students. All students learn about academic integrity through engagement with the weighted Epigeum modules within the suite of Academic and Professional Studies courses.

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 interview preparation, 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

Attendance

You are expected to actively engage in all learning experiences and learning activities which underpin the learning content in this course. You are expected to engage with the learning content and learning activities outside of timetabled class times. This requires you to be an active agent of your learning. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook. In addition, you are encouraged to BYOD (bring your own device) to class such as a laptop or tablet. This is not a requirement as computer lab facilities are available on campus, however, the use of such devices in the classroom is encouraged with appropriate and considerate use principles being a priority.

Preparation and Participation in Learning

In order to enhance your learning, you need to prepare before participating in the learning experiences. Absorb the learning content and complete the learning activities that are provided online before you attend the scheduled learning experiences. Make sure you complete the learning activities set each week, they are designed to support your learning. 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 lecturer or tutor's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

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 MyStudy on the Griffith College Portal. The learning materials are arranged in Modules. In each Module you will find Learning Content, Learning Experiences and Learning Activities. **Learning Content** will be engaged with prior to the scheduled **Learning Experience (your weekly class)**. This will ensure you are prepared for the scheduled Learning Experience by being aware of the content to be covered and therefore will be able to actively participate in the session. **Learning Activities** are accessed after the scheduled session for purposes of review, consolidation of learning, and preparation for the Evidence of Learning tasks (assessment) in the course.

In addition, **Anytime Anywhere** learning material is provided in the course. This learning material provides support, interactive tools and directions for students who occasionally cannot attend the weekly scheduled Learning Experience (either in person or on Zoom) perhaps due to illness or other commitments. The Anytime Anywhere learning material should also be used in conjunction with Learning Content and Learning Activities resources.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and engage with the course learning content even when you are not specifically asked to do so by your lecturer or tutor. The weekly guide will be helpful to organise your learning. This involves revising the weekly course learning material and completing the learning activities. It also means you will need to find additional information to evidence your learning (assessment) 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%, 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].

Teacher and Course Evaluation

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

4. Learning Content, Learning Activities and Learning Experiences

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

	Learning Content	Learning experiences	Learning activities	Evidence of learning	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 ***Additional Homework Questions***	Online Quiz	***3***
10	Magnetism Magnetic force and field, charged particles in a magnetic field, magnetic dipoles and material, Ampere's Law	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, magnetic energy and flux	Revise theory Practice problem solving questions	Homework Activities Additional Homework Questions	Online Quiz Laboratory 2 Resistance & DC Circuits Part B (Ohm's Law) report	***3***
12	Revision of Topics 7-11	Practice problems	Homework Activities		***3***

5. Evidence of Learning (Assessment Plan)

5.1 Evidence of Learning Summary

	Evidence of learning	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 and Projects - Mechanics (Experiment 1, 2 Sessions)	15%	1, 2	5 and 6
4	Laboratory Activities and Projects - Electricity (Experiment 2, 2 Sessions)	15%	3	10 and 11
5	Final Exam	25%	3	Final Exam Week

5.2 Evidence of Learning Task Detail

On-line Quizzes
The 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. Each of the quizzes carries 4% of the total course mark.

Mid-trimester Exam
The 2 hour mid-trimester exam is a closed-book test which provides 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.

Laboratory Activities
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.
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.

Final exam
The 2 hour final exam will assess the students' knowledge and understanding of the topics covered in the course and the ability to apply that understanding to the solution of practical problems. The examination paper is devised also to test the students' computational skills, as well as the ability to apply that knowledge to engineering design problems. The final exam will be closed book. Marks will be awarded according to correctness of the procedures, accuracy of the solutions and clarity of the presentation.
Requirements to pass the course:

Students are required to complete all items of assessment and achieve an aggregate mark of at least 50% overall. Students must also achieve at least 40% of combined mid-exam and final exam, in order to achieve a grade of "Pass" or above. Failure to reach the above-mentioned 40% hurdle results in failing the course.

5.3 Late Submission

An evidence of learning (assessment) item submitted after the due date, without an approved extension from the Course Coordinator, will be penalised. The standard penalty is the reduction of the mark allocated to the assessment item by 5% of the maximum mark applicable for the assessment item, for each working day or part working day that the item is late. Evidence of learning items submitted more than five working 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 after the release of final results for the course.

Requests for extension

To apply for an extension of time for an evidence of learning item, 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 circumstances and 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 assessment.

Return of Evidence of Learning Items

1. Marks awarded for in-trimester evidence of learning tasks , except those being moderated externally with Griffith University, will be available on the Student Portal 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 item will be provided with the final course result).

2. Students will be advised of their final grade through the Student Portal. 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 items including the final exam (if applicable) will be recorded in the Moodle Course Site and made available to students through the Moodle 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 assessment-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 staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity 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 is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be 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 to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your lecturers, tutors and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you 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 may request 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 penalties and 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 Assessment – The Disability Services policy

The Disability Services policy (accessed using the Document Search' feature with the Policy Library) outlines the principles and processes that guide the College in making reasonable adjustments to assessment for students with disabilities while maintaining academic robustness of its programs.

Risk Assessment Statement

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

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