1. General Course Information

1.1 Course Details

Course Code:	1018ENG
Course Name:	Engineering Science
Trimester:	Trimester 3, 2019
Program:	Diploma of Engineering
	In Person
	Mt Gravatt / Gold Coast
Credit Points:	10
Course Coordinator:	Dr Nima Talebian and Dr James A. Kirkup
Document modified:	13 Aug 2019

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 magnetic 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
Dr James A. Kirkup	james.kirkup@staff.griffithcollege.edu.au
Dr. Nima Talebian	nima.talebian@staff.griffithcollege.edu.au

1.3 Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week of lectures. A list of times and rooms will be published on the Griffith College Portal under the "Support and Services/Teacher Consultation Times" link.

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. Analyse important physical science concepts that underpin the engineering profession such as Newtonian mechanics, electricity and magnetics.
2. Apply mathematical techniques to the analysis of simple engineering systems.
3. Perform experiments and critically analyse the data received to support a science theory or experimental objective.
4. Work independently, or as a team member to develop simple engineering projects.
5. Use oral and written communication skills to convey engineering and science concepts.

2.3 Generic skills

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	Taught	Practised	Assessed
Written Communication	Yes	Yes	Yes
Oral Communication		Yes	Yes
Information Literacy	Yes	Yes	Yes
Secondary Research			
Critical and Innovative Thinking	Yes	Yes	Yes
Academic Integrity	Yes	Yes	Yes
Self-directed Learning		Yes	Yes
Team Work		Yes	Yes
Cultural Intelligence		Yes	Yes
English Language Proficiency		Yes	

3. Learning Resources

3.1 Required Resources

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

3.2 Recommended 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.

Academic Integrity Tutorial - this tutorial helps students to understand what academic integrity is and why it matters. You will be able to identify types of breaches of academic integrity, understand what skills you will need in order to maintain academic integrity, and learn about the processes of referencing styles.

Services and Support provides a range of services to support students throughout their studies including personal support such as Counselling; Academic support; and Welfare support.

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 Learning Information

Attendance

You are expected to attend all lectures and tutorials and to actively engage in learning during these sessions. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook. In addition, you may 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 Class

In order to enhance learning, prepare before lectures and tutorials. Read the relevant section of your text book before a lecture, and for a tutorial read both the textbook and the relevant lecture notes. If you have been given tutorial exercises, make sure you complete them. Active participation in lectures and tutorials will improve your learning. 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 Materials

Lecture notes will be made available to you in MyStudy on the Griffith College Portal and you are advised to either print these out and bring them to each class so that extra notes can be added or BYOD (bring your own device) and add extra notes digitally.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and learn the course content even when you are not specifically asked to do so by your lecturer or tutor. This involves revising the weekly course material. It also means you will need to find additional information for some assessment items beyond that given to you in textbooks and lecture notes, 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 and Teaching Activities

4.1 Weekly Learning Activities

Weeks	Topics	Activities	Readings*	Learning Outcomes
1	Part A) Coulomb's Law (charges and forces), and Part B) Electric Field and Potential	Lecture / Tutorial	Ch. 21, 22 and 24	1, 2, 4
	No session	Workshop	-	

Weeks	Topics	Activities	Readings*	Learning Outcomes
2	Part A) Capacitance (capacitors and dielectrics) and Part B) Current, Resistance, and Ohm's law	Lecture / Tutorial	Ch. 26	1, 2, 4
	Part A) Coulomb's Law (charges and forces), and Part B) Electric Field and Potential	Workshop	-	
3	Circuits, electromotive force, Kirchhoff's laws and multi-loop circuits	Lecture / Tutorial	Ch. 25 and 27	1, 2, 4
	Part A) Capacitance (capacitors and dielectrics) and Part B) Current, Resistance, and Ohm's law	Workshop	-	
4	Magnetism (magnetic force and field, charged particles in a magnetic field, magnetic dipoles and material, Ampere's Law)	Lecture / Tutorial	Ch. 28 and 29	1, 2, 4
	Circuits, electromotive force, Kirchhoff's laws and multi-loop circuits	Workshop	-	
5	Electromagnetic Induction (Induced currents, Faraday's and Lenz's Law, induced EMF, inductance, magnetic energy and flux)	Lecture / Tutorial	Ch. 30	1, 2, 3, 4, 5
	Magnetism (magnetic force and field, charged particles in a magnetic field, magnetic dipoles and material, Ampere's Law)	Workshop	-	
	Experiment 1 – First Session**	Laboratory	-	
6	Review of Electricity and Magnetism	Lecture / Tutorial	-	1, 2, 3, 4, 5
	Electromagnetic Induction (Induced currents, Faraday's and Lenz's Law, induced EMF, inductance, magnetic energy and flux)	Workshop	-	
	Experiment 1 – Second Session	Laboratory	-	
7	Part A) Units, Measurement and Uncertainties, and Part B) Vectors and Operations	Lecture / Tutorial	Ch. 1 and 3	1 and 2
	Review of Electricity and Magnetism	Workshop	-	
8	One Dimensional Motion (Average motion, instantaneous motion, constant acceleration, acceleration due to gravity), and Motion in plane	Lecture / Tutorial	Ch. 2	1, 2, 4
	Part A) Units, Measurement and Uncertainties, and Part B) Vectors Operations	Workshop	-	
9	Part A) Forces and Motion I (Newton's Laws) Part B) Linear Momentum (conservation of momentum), Collision (elastic and inelastic) and Impulse	Lecture / Tutorial	Ch. 5 and 9	1, 2, 4
	One Dimensional Motion (Average motion, instantaneous motion, constant acceleration, acceleration due to gravity), and Motion in plane	Workshop	-	
10	Part A) Forces and Motion II (Friction), Part B) Energy (kinetic and potential energy, conservation of mechanical energy) and Work, and	Lecture / Tutorial	Ch. 6 and 8	1, 2, 3, 4, 5
	Part A) Forces and Motion I (Newton's Laws) Part B) Linear Momentum (conservation of momentum), Collision (elastic and inelastic) and Impulse	Workshop	-	
	Experiment 2 – First Session	Laboratory	-	
11	Part A) Uniform Circular Motion (angular displacement, velocity and acceleration), and Part B) Rotational motion (rotational inertia, rotational energy, rolling motion) and Torque	Lecture / Tutorial	Ch. 10 and 11	1, 2, 3, 4, 5

Weeks	Topics	Activities	Readings*	Learning Outcomes
	Part A) Forces and Motion II (Friction), Part B) Energy (kinetic and potential energy, conservation of mechanical energy) and Work, and	Workshop	-	
	Experiment 2 – Second Session	Laboratory	-	
12	Review of weeks 7 to 12	Lecture / Tutorial	-	1, 2, 4
	Part A) Uniform Circular Motion (angular displacement, velocity and acceleration), and Part B) Rotational motion (rotational inertia, rotational energy, rolling motion) and Torque	Workshop	-	

* The chapter numbers refer to the course textbook (see "3.1 Required Resources" above).
** Laboratory sessions may be scheduled in different weeks. Check Student Portal for up-to-date information.

5. Assessment Plan

5.1 Assessment Summary

Item	Assessment Task	Weighting	Learning Outcomes	Due Weeks
1	In-class Quizzes	10%	1, 2 and 3	1, 3, 6, 8, 10
2	On-line Quizzes	10%	1, 2 and 3	2, 4, 7, 9, 11
2	Mid-trimester Exam	25%	1,2, and 3	7
3	Laboratory Activities and Projects - Mechanics (Experiment 1, 2 Sessions)	15%	1, 2, 3, 4 and 5	4 and 6
4	Laboratory Activities and Projects - Electricity (Experiment 2, 2 Sessions)	15%	1, 2, 3, 4 and 5	10 and 11
5	Final Exam	25%	1, 2 and 3	TBA

5.2 Assessment Detail

In-class and On-line Quizzes

The in-class and 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 2% of the total course mark.

Mid-trimester Exam

The 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 system. Experiment 1 (Electricity) deals with the concept of resistors, currents and circuits in two separate sessions. Experiment 2 (Mechanics) deals with the concept of momentum, energy conservation and collision in two separate sessions.
Each experiment has a pre-lab quiz valued 20% of the experiment mark. A 20% mark for full attendance and performance in each experiment is recorded for each student by the lab demonstrator. The data collected in each lab session is analysed and reported through separate lab reports for each session (i.e. two reports for each experiments and four reports in total). The reports carry a total of 60% mark for each experiment.

Final exam

The 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% combined in the mid-trimester and final exams, in order to achieve a grade of "Pass" or above. Failure to reach to the above-mentioned 40% hurdle results in failing the course.

5.3 Late Submission

An 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. Assessment 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 Assessment Information

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 assignment, 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 Assessment Items

1. Marks awarded for in-trimester assessment items, 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 assessment item 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 exam papers after student grades have been published (see relevant Griffith College Fact Sheet for allocated times at Support> Factsheets). Review of exam papers will not be permitted after the final date to enrol.

3. Marks for **all** assessment 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 overall assessment items 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 Sitting, Medical Certificates, Academic Integrity, Finalisation of Results, Review of Marks, Moderation of Assessment, Turn-it-in Software Use. These policies can be accessed using the 'Document Search' feature 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.

Note: For all Diploma level programs, Griffith College acknowledges content derived from Griffith University.