



## 1. General Course Information

### 1.1 Course Details

<b>Course Code:</b>	<b>1502ENG</b>
<b>Course Name:</b>	<b>Engineering Materials</b>
<b>Trimester:</b>	<b>Trimester 3, 2021</b>
<b>Program:</b>	Diploma of Engineering
<b>Credit Points:</b>	10
<b>Course Coordinator:</b>	Mahyar Masaeli
<b>Document modified:</b>	11 February 2021

### Course Description

The course is designed for first year students enrolled in engineering programs. It considers the fundamental properties of metals and non-metallic materials. Students are introduced to the atomic and microstructure of materials and their relationship to mechanical and electrical properties. The course explores the mechanical concepts of stress, strain, elongation, and material failure (including testing) and the phenomenon of electrical conduction.

Engineering Materials is a 10 credit point course within the Diploma of Engineering. The course is situated within the second semester of the program. The Diploma of Engineering is designed to provide students with a pathway to further university studies in Engineering and related degrees; or direct employment.

### Assumed Knowledge

There are no prerequisites for this course.

## 1.2 Teaching Team

Your teacher can be contacted via the email system on the portal.

Name	Email
Mahyar Masaeli	<a href="mailto:mahyar.masaeli@staff.griffithcollege.edu.au">mahyar.masaeli@staff.griffithcollege.edu.au</a>

## 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 a suitable mobile device.

## 2. Aims, Outcomes & Generic Skills

### 2.1 Course Aims

This course aims to provide students with an understanding of the fundamental properties of basic engineering materials such as metals, ceramic, polymeric and composite materials, and their applications to 'real world' engineering problems.



### 2.2 Learning Outcomes

After successfully completing this course you should be able to:

1. Analyse various materials (metals, ceramics, polymers, and composites) in the laboratory environment and present the advantages and limitations of each type of materials when used in a particular application.
2. Consider standard material property tests such as the tensile test and use the provided data to analyse mechanical and elastic properties of various engineering materials.
3. Work independently, or as a team member, to manage materials science and engineering activities and research projects that include the effects of stress, temperature, deterioration, electrical conductivities, and environmental and sustainability issues in engineering materials.



## 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

Callister, WD, and Rethwisch, DG. (2018) Materials Science and Engineering: An Introduction 10e, Wiley.

### 3.2 Recommended Learning Resources

Askeland, DR, and Wright WJ. (2016) The Science and Engineering of Materials 7e, Cengage Learning.

### 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 - 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 Academic Integrity online 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 teacher. 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 teacher. 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 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 Experience and Learning Activities





	Learning Content 	Learning experiences 	Learning activities 	Evidence of learning 	Learning outcome 
<b>Module 1 Engineering materials and corresponding structures</b>					
1	Topic 1: Introduction to Materials  Online mini lessons	Practice problem solving questions on classification of materials	Homework activities on classification of materials		1
2	Topic 2: Atomic Structure and Interatomic Bonding  Online mini lessons	Practice problem solving questions on atomic structure	Homework activities on atomic structure		1
3	Topic 3: Structure of Crystalline Solids and Imperfections in Solids  Online mini lessons	Practice problem solving questions on crystalline solids;  Preparation for PROJECT 1: Materials Characterization & Selection	Homework activities on crystalline structures;  <b>Laboratory session 1</b>	PROJECT 1: Materials Characterization & Selection due in week 5	1
<b>Module 2 Mechanical Properties and failures of engineering materials</b>					
4	Topic 4: Mechanical Properties of Metals  Online mini lessons	Practice problem solving questions on mechanical properties	Homework activities on mechanical properties		2
5	Topic 5: Failure of Engineering Materials  Online mini lessons	Practice problem solving questions on failure of materials	Homework activities on failure of materials;  <b>Laboratory session 2a</b>		2
6	Topic 6: Phase Diagrams  Online mini lessons	Practice problem solving questions on phase diagrams	Homework activities on phase diagrams;  <b>Laboratory session 2b</b>		2

<b>7</b>	Revision of the Topics 1, 2, 3, 4, 5 and 6	Practice test on topics 1, 2, 3, 4, 5 and 6	Preparation for PROJECT 2:- Mechanical Properties of Material	Mid-Trimester Exam & PROJECT 2: Mechanical Properties of Material due in week 8	<b>2</b>
<b><i>Module 3 Ceramics, Polymers, Composites and some other non-mechanical properties of engineering materials</i></b>					
<b>8</b>	Topic 7 and 8: Ceramics and Polymers Online mini lessons	Practice problem solving questions on ceramics and polymers	Homework activities on ceramics and polymers;		<b>3</b>
<b>9</b>	Topic 9: Composites Online mini lessons	Practice problem solving questions on composites;  Preparation for Project 3 - Research on Properties of Materials	Homework activities on composites;		<b>3</b>
<b>10</b>	Topic 10: Degradation and Corrosion of Materials Online mini lessons	Practice problem solving questions on corrosion	Homework activities on corrosion		<b>3</b>
<b>11</b>	Topic 11: Electrical Properties Online mini lessons	Practice problem solving questions on electrical properties	Homework activities on electrical properties	PROJECT 3: Research on Properties of Materials	<b>3</b>
<b>12</b>	Revision of the Topics 7, 8, 9, 10 and 11	Practice test on topics 7, 8, 9, 10 and 11	Homework activities on topics 7, 8, 9, 10 and 11		<b>3</b>



## 5. Evidence of Learning (Assessment Plan)

### 5.1 Evidence of Learning Summary

	 Evidence of learning	 Weighting	 Learning outcome	 Due Date
1	PROJECT 1: Materials Characterization & Selection	20%	1	Week 5
2	Mid-Trimester Online Exam	10%	1, 2	Week 7
3	PROJECT 2: Mechanical Properties of Material	30%	2	Week 8
4	PROJECT 3: Research on Properties of Materials	20%	3	Week 11
5	End of Trimester Online Exam	20%	3	Exam week

### 5.2 Evidence of Learning Task Detail

#### **Title:** PROJECT 1: Materials Characterisation & Selection

Classification of various engineering materials samples (Part A - worth 5%) and video presentation (Part B - worth 15%). Atomic structure, composition, bonding, and properties of common engineering materials are components of this project that students will be required to complete.

#### **Title:** Mid-Trimester and Final Exams

Open book Mid-Trimester and Final exams worth 10% and 20%, respectively will assess the student's knowledge and understanding of the topics covered in the course and the ability to apply that understanding to the solution of practical problems. The exams devised also to test the student's computational skills, as well as the ability to apply that knowledge to engineering design problems.

#### **Title:** PROJECT 2: Mechanical Properties of Materials

You will be required to produce a Project Report worth 30% investigating various types of materials and their corresponding mechanical properties. During the laboratory sessions in weeks, 6 and 7 tensile tests of various materials (metals, ceramics, polymers, and composite materials) will be demonstrated and the corresponding data needed for Project 2 will be shared.

#### **Title:** PROJECT 3: Research on Properties of Materials

In this project, you will be required to conduct a literature review on properties and applications of an engineering material (or a group of materials) on one topic chosen from a set list. The report is worth 20% and should cover the specific aspects and applications of the materials as appropriate to the selected topic.

#### **Requirements to pass    Module 2 and Module 3:**

Students are required to achieve at least 40% of combined mid-exam and final exams. Failure to reach to 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 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 evidence of learning 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 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 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 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 within 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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