



Course Outline

Code: ENG226

Title: Manufacturing Technology

School of:	Science & Engineering
Teaching Session:	Semester 2
Year:	2019
Course Coordinator:	Rezwanul Haque Email: rhaque@usc.edu.au
Course Moderator:	Selvan Pather

Please go to the USC website for up to date information on the teaching sessions and campuses where this course is usually offered

1. What is this course about?

1.1 Description

Manufacturing involves the transformation of metals, ceramics and plastics into functional products. Manufacturing engineering focuses on the technologies and integrated production systems required for the manufacture of high-quality, economically competitive consumer products. This course introduces the knowledge and skills of modern manufacturing processes, production systems and quality management practices to turn a conceptual idea into a globally competitive the finished product. The theoretical knowledge is reinforced with practical work, demonstrations and factory visits.

1.2 Course topics

- Overview of manufacturing processes
- Quality Control Systems
- Cost of Manufacture
- Rapid Prototyping
- Principles of Metal Cutting
- Turning and Milling
- Other machining processes (Broaching, Shaping, Grinding, Drilling, Electro-discharge, chemical, etc.)
- Casting Processes
- Forming (Deformation)Processes
- Hot and Cold working processes
- Powder Metallurgy
- Processing of Polymers, Ceramics and Composites

2. What level is this course?

200 level Developing - Applying broad and/or deep knowledge and skills to new contexts. May require pre-requisites and introductory level knowledge/skills. Normally undertaken in the 2nd or 3rd year of an undergraduate program

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

Specific Learning Outcomes On successful completion of this course you should be able to:	Assessment Tasks You will be assessed on the learning outcome in task/s:	Graduate Qualities or Professional Standards mapping Completing these tasks successfully will contribute to you becoming:
Demonstrate an understanding of the principles of modern manufacturing processes, production systems and quality management systems	Task 1 – Assignment Solutions Task 2 - Practical Reports Task 3 – Final Examination	Knowledgeable. Empowered.
Interpret experimental and test results and present these in an appropriate engineering report format	Task 1 Assignment Solutions Task 2 – Practical Reports	Creative and critical thinkers. Knowledgeable.
Collaborate with others in a team project environment to conduct engineering investigations and produce engineering reports	Task 2 – Practical Reports	Empowered. Engaged.

5. Am I eligible to enrol in this course?

Refer to the [USC Glossary of terms](#) for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1 Enrolment restrictions

Must be enrolled in Program SC410, SC411, AB101,UU301, UU302 or XU301

5.2 Pre-requisites

ENG225 or MEC1201 (USQ Course)

5.3 Co-requisites

Nil

5.4 Anti-requisites

MEC2202 (USQ course)

5.5 Specific assumed prior knowledge and skills (where applicable)

Nil

6. How am I going to be assessed?

6.1 Grading scale

Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)

6.2 Details of early feedback on progress

The delivery and facilitation of the tutorials and workshop projects will provide regular feedback throughout the semester.

6.3 Assessment tasks

Task No.	Assessment Tasks	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1	Assignments – two assignments which covers Course topics up to and including the week prior to submission	Individual	Total 35% (15%; 20%)	Answers to ALL assignment questions	Monday – Week 5 Monday – Week 10	Blackboard
2	Practical Report – (1) Group task and submission	Group	15%	Practical output and associated report (max 500 words + appropriate diagrams)	End of Week 11;	In Class
3	Final Examination	Individual	50%	2 hrs	Centrally Scheduled – Exam Period	
			100%			

Assessment Task 1: Assignments (35% of final grade)

Goal:	The assignments allow you to demonstrate your understanding of the theory and also enable you to identify any problem areas in your understanding
Product:	Solutions to the Assignment questions.
Format:	Questions will be set for each of the assignments, from the material covered in the lectures up to and including the week prior to the submission. You are required to use the theory introduced in the lectures to respond to the assignment questions. The assignments will be provided to you on Blackboard. You are required to complete the assignments and submit by the Monday of each submission week. The assignments have varying weighting:- Assignment 1 = 15%; and Assignment 2 = 20%. Assignment submissions can either be hand-written or word-processed, showing all working and calculations (where relevant). You must scan and submit your assignment via Blackboard (Instructions will be provided on Blackboard).
Criteria:	<p>Assessment Criteria:</p> <ul style="list-style-type: none"> • Correct responses to the questions; • Use of correct terminology, diagrams and methodology; • Demonstrated understanding through use of correct formulae; and • Inclusion of all workings showing a logical sequence to the problem solution.
Engineers Australia competencies assessed in this task:	
1.4 Discernment of knowledge development and research directions within the engineering discipline.	
1.5 Knowledge of contextual factors impacting the engineering discipline.	
2.2 Fluent application of engineering techniques, tools and resources	

Assessment Task 2: Workshop Projects and Practical Reports (15% of final grade)

Goal:	The five projects are designed as hands-on activities that demonstrate the theory presented in the lectures and tutorials and help you to gain a deep understanding of the underlying manufacturing processes and production systems
Product:	A practical report and associated material (detailed information about each project will be distributed in class and on Blackboard)
Format:	The practical activities are completed by groups of 4 students. The final report (and, where applicable, accompanying documentation) is to be submitted by the group. The report should NOT be longer than 10 pages (see Report Writing Guidelines in Practical folder on Portal).
Criteria:	Practical Report - Assessment Criteria: <ul style="list-style-type: none"> • Completeness and Accuracy of results and subsequent analysis • Degree to which the report adheres to the specified structure; • Completeness of all components of the report within specified page limit, and • Depth of discussion and reflection on the project.
Engineers Australia competencies assessed in this task:	
1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	
3.1 Ethical conduct and professional accountability.	
3.6 Effective team membership and team leadership.	

Assessment Task 3: Final Examination (2 hrs – 50% of final grade)

Goal:	The final exam will allow you to demonstrate your understanding of the theory learnt during the course.
Product:	Solutions to final examination questions.
Format:	The final exam will assess the content of lectures covered in the whole course. The duration of the final exam will be 2 hours (during centrally scheduled exam period, closed book, programmable calculators are NOT permitted to be used). You will be required to provide responses to a number of typical problems similar to those given in the tutorial and assignment questions throughout the semester. Your exam solutions will be used to evaluate your understanding of the total course material.
Criteria:	Assessment Criteria: <ul style="list-style-type: none"> • Correct answers to the problems • Use of correct terminology, diagrams and methodology
Engineers Australia competencies assessed in this task:	
1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	
1.5 Knowledge of contextual factors impacting the engineering discipline.	
2.1 Application of established engineering methods to complex engineering problem solving.	
2.2 Fluent application of engineering techniques, tools and resources.	

7. What are the course activities?

7.1 Directed study hours

The directed study hours listed here are a portion of the workload for this course. A 12 unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Directed study hours may vary by location. Student workload is calculated at 12.5 learning hours per one unit.

Location: Specific Campus(es) or online:	Directed study hours for location:
USC Sunshine Coast	13 x 2 hrs Lectures 13x 1 hr Tutorials 12 x 2hr Workshop sessions 2 x Half-day Field trips

7.2 Course content

Week # / Module #	What key concepts/content will I learn?
Week 1	Introduction, Revision of Engineering Materials, Classification of Manufacturing Processes
Week 2	Total Quality Management (TQM)
Week 3	Introduction to Quality Control and Quality Assurance
Week 4	Cost of Manufacture
Week 5	Rapid Prototyping
Week 6	Principles of Metal Cutting
Week 7	Turning and Milling
Week 8	Other machining processes
Week 9	Casting Processes
Week 10	Forming Processes
Week 11	Hot and Cold Working Processes
Week 12	Powder Metallurgy
Week 13	Processing of Polymers, Ceramics and Composites

Please note - course content is subject to change.

8. What resources do I need to undertake this course?

Please note that course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Blackboard site. Please log in as soon as possible.

8.1 Prescribed text(s)

Please note that you need to have regular access to the resource(s) listed below as they are required:

Author	Year	Title	Publisher
Groover, Mikell P	2012	Introduction to Manufacturing Processes	Wiley

8.2 Specific requirements

Fully enclosed shoes (preferably safety shoes/boots) must be worn in the engineering laboratory. If you do not have the correct footwear you will not be allowed to do the workshop practical. You must also undertake the laboratory induction before you can undertake any practical. It is advisable to use a dust-coat (or overall) when in the laboratory.

9. Risk management

Health and safety risks for this course have been assessed as low. Detailed site-specific Risk Assessment and Management will be conducted prior to any field trip and documented in HAZNET.

It is your responsibility as a student to review course material, search online, discuss with lecturers and peers, and understand the health and safety risks associated with your specific course of study. It is also your responsibility to familiarise yourself with the University's general health and safety principles by reviewing the [online Health Safety and Wellbeing training module for students](#), and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1 Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Blackboard, are electronically checked through SafeAssign. This software allows for text comparisons to be made between your submitted assessment item and all other work that SafeAssign has access to.

10.2 Assessment: Additional requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

- a) The final mark is in the percentage range 47% to 49.4%
- b) The course is graded using the Standard Grading scale
- c) You have not failed an assessment task in the course due to academic misconduct

10.3 Assessment: Submission penalties

Late submission of assessment tasks will be penalised at the following maximum rate:

- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day
- 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.

To request an extension, you must contact your Course Coordinator and supply the required documentation to negotiate an outcome.

10.4 Study help

In the first instance, you should contact your tutor, then the Course Coordinator. Additional assistance is provided to all students through Academic Skills Advisers. To book an appointment or find a drop-in session go to [Student Hub](#).

Contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au

10.5 Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Administration of Central Examinations
- Deferred Examinations
- Student Academic Misconduct
- Students with a Disability

Visit the USC website:

<http://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching>

10.6 General Enquiries

In person:

- **USC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **USC South Bank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **USC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au