

Course outline

Code: ENG335

Title: Production Engineering

Faculty of: Science, Health, Education and Engineering

Teaching Session: Semester 1

Year: 2017

Course Coordinator: Rezwanul Haque Email: rhaque@usc.edu.au

Course Moderator: Selvan Pather Email: spather@usc.edu.au

1. What is this course about?

1.1 Course description

In our consumer-driven society the success or failure of a product depends on its design and cost. The products cost is influenced by the manufacturing cost; which in turn is determined by effective use of raw materials and the efficiency of production systems. This course provides the fundamental theory of production systems and practices of world class manufacturers. Most modern manufacturers have adopted various aspects of Computer Integrated Manufacture. The course provides knowledge, technology and applications of CIM in both large multi-national companies and small, medium enterprises.

1.2 Course content

- Total Quality Assurance
- Metrology – Traditional and Automated
- Production Systems – Lean, Just-in-time
- Inventory Control
- Work Study – Method Study / Work measurement
- Group Technology
- Plant layout
- Industrial Robotics
- Automated Process Control

2. Unit value

12 units

3. 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 Completing these tasks successfully will contribute to you becoming:
Demonstrate an understanding of the principles of production systems, manufacturing processes and quality management systems	Task 1 – Assignments Task 3 – Final Exam	Knowledgeable. Empowered.
Analyse various methods used in metrology, and undertake accurate, reliable, and repeatable measurements.	Task 2 – Workshop Practicals	Knowledgeable.
Specify flexible manufacturing systems, based on lean (Just-in-Time), group technologies, Computer integrated Manufacturing (CIM).	Task 1 - Assignments	Creative and critical thinkers. Knowledgeable.
Demonstrate an understanding of work measurements by analysing case studies.	Task 1 - Assignment	Knowledgeable.
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.

4. Am I eligible to enrol in this course?

Refer to the **Coursework Programs and Awards - Academic Policy** for definitions of “pre-requisites, co-requisites and anti-requisites”

4.1 Enrolment restrictions

Must be enrolled in Program SC410 or SC411

4.2 Pre-requisites

ENG226 Manufacturing Technology [or MEC2202 Manufacturing Processes (USQ course)]

4.3 Co-requisites

Nil

4.4 Anti-requisites

MEC3204 (USQ course)

4.5 Specific assumed prior knowledge and skills (optional)

Nil

5. How am I going to be assessed?

5.1 Grading scale

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

5.2 Assessment tasks

Task No.	ENG335 Assessment Tasks	Individual or Group	Weighting %	What is the duration / length?	When should I submit?	Where should I submit it?
1	Assignments – Three assignments which cover course content up to and including the week prior to submission	Individual	Total 30% (5%; 10%; 15%)	Answers to ALL assignment questions	Monday Week 5; Monday Week 8; Monday Week 12	Blackboard
2	Workshop Project	Group	Total 20%	Practical output and associated report (max 500 words + appropriate diagrams)	End of Week 10	In class
3	Final Examination	Individual	50%	2 hrs	Centrally Scheduled Exam Period	Exam Collection
			100%			

Assessment Task 1: Assignments (30% 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 = 5%; Assignment 2 = 10% and Assignment 3 = 15%. Assignment submissions can either be hand-written or word-processed, showing all working and calculations (where relevant). You must scan and submit your assignment online (Instructions will be provided on Blackboard).
Criteria	Assessment Criteria: <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.
Generic skill assessed	
Skill assessment level	
Problem solving	Graduate
Engineers Australia competencies assessed in this task: 1.3 In depth understanding of specialist bodies of knowledge within the engineering discipline. 2.2 Fluent application of engineering techniques, tools and resources. 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the engineering discipline.	

Assessment Task 2: Workshop Project (20% of the final grade)

Goal:	The project is designed as two hands-on activities that demonstrate the theory presented in the lectures and tutorials and help you to gain a deep understanding of the underlying 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 are completed by groups of 2 students. The report 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	Short 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 word count; and • Depth of discussion and reflection on the project.
Generic skill assessed	
Skill assessment level	
Collaboration	
Graduate	
Engineers Australia competencies assessed in this task: <ul style="list-style-type: none"> 1.1 Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline. 2.2 Fluent application of engineering techniques, tools and resources. 2.3 Application of systematic engineering synthesis and design processes. 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, by accurately answering short problem-based question.
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.
Generic skill assessed	
Skill assessment level	
Problem solving	
Developing	
Engineers Australia competencies assessed in this task: <ul style="list-style-type: none"> 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. 	

5.3 Additional assessment requirements

Blackboard

As a student enrolled in this course you will have access to course information on the Blackboard site. You are strongly recommended to log onto the course site on a regular basis. All course announcements, course changes, posting of course materials and grades (via My Interim Results) will be accessed through Blackboard. It is your responsibility to ensure you have adequate internet access (either off campus or on-campus) in order to access Blackboard regularly and to complete required assessment tasks.

Safe Assign

In order to minimise incidents of plagiarism and collusion, this course may require that some of its assessment tasks are submitted electronically via Safe Assign. This software allows for text comparisons to be made between your submitted assessment item and all other work that Safe Assign has access to. If required, details of how to submit via Safe Assign will be provided on the Blackboard site of the course.

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

5.4 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 to negotiate an outcome.

6. How is the course offered?

6.1 Directed study hours

13 x 2 hrs Lectures

13 x 1 hr Tutorial

13 x 2hr Workshop sessions

2 x half-day field trips weeks 5 & 9

6.2 Teaching semester/session(s) offered

Semester 2

6.3 Course activities

Teaching Week / Module	What key concepts/content will I learn?	What activities will I engage in to learn the concepts/content?	
		Directed Study Activities	Independent Study Activities
Week 1	Introduction, Revision of Manufacturing Technology	Lectures and tutorials Workshop Induction:	Revise Manufacturing Technology
Week 2	Metrology – Measurements	Lectures and tutorials Workshop Project 1 Metrology	Tutorial exercise, and revision examples
Week 3	Metrology – Limit gauges and surface finish	Lectures and tutorials Workshop Project 1 Metrology	Tutorial exercise, and revision examples
Week 4	Production Systems	Lectures and tutorials Workshop Project 1 Metrology	Tutorial exercise, and revision examples
Week 5	Inventory Control	Lectures and tutorials Workshop Project 1 Metrology Field Trip	Tutorial exercise, and revision examples
Week 6	Work Study ; Group Technology	Lectures and tutorials Workshop Project 2 CAD/CAM	Tutorial exercise, and revision examples
Week 7	Plant Layout	Lectures and tutorials Workshop Project 2 CAD/CAM	Tutorial exercise, and revision examples
Week 8	Industrial Robotics	Lectures and tutorials Workshop Project 2 CAD/CAM	Tutorial exercise, and revision examples
Week 9	Industrial Robotics	Lectures and tutorials Workshop Project 2 ABB Robot Arm Field Trip	Tutorial exercise, and revision examples
Week 10	Automated Control Systems	Lectures and tutorials Workshop Project 2 ABB Robot Arm	Tutorial exercise, and revision examples
Week 11	Automated Control Systems	Lectures and tutorials Workshop Project 2 ABB Robot Arm	Tutorial exercise, and revision examples
Week 12	CIM	Lectures and tutorials Workshop Project 2 ABB Robot Arm	Tutorial exercise, and revision examples
Week 13	CIM	Lectures and tutorials Workshop Project 2 ABB Robot Arm	Tutorial exercise, and revision examples

Please note that the course activities may be subject to variation.

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

7.1 Prescribed text(s)

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

Author	Year	Title	Publisher
Mikell P. Groover	2015	Automation, Production Systems, and Computer-Integrated Manufacturing	Pearson

7.2 Required and recommended readings

Lists of required and recommended readings may be found for this course on its Blackboard site. These materials/readings will assist you in preparing for tutorials and assignments, and will provide further information regarding particular aspects of your course.

7.3 Specific requirements

Fully enclosed shoes (preferably safety shoes/boots) must be worn in the engineering laboratory. If you do not have the correct shoes 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.

7.4 Risk management

There is minimal health and safety risk in this course. It is your responsibility to familiarise yourself with the Health and Safety policies and procedures applicable within campus areas. Detailed site-specific Risk Assessment and Management will be conducted prior to any field trip and documented in HAZNET.

8. How can I obtain help with my studies?

In the first instance you should contact your tutor, then the Course Coordinator. Additional assistance is available to all students through Peer Advisors and Academic Skills Advisors. You can drop in or book an appointment. To book: Tel: +61 7 5430 2890 or Email: studentcentral@usc.edu.au

9. Links to relevant University policies 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

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

10. Faculty specific information

In person:

- **Sippy Downs** - Student Central, Ground Floor, Building C
- **USC SouthBank** - Student Central, Building B, Ground floor (level 1)
- **USC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **USC Fraser Coast** - Student Central, Building A

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au