COURSE OUTLINE

MEC335 Production Engineering

School: School of Science, Technology and Engineering

2026 | Trimester 1

UniSC Sunshine Coast
UniSC Moreton Bay

BLENDED LEARNING

Most of your course is on campus but you may be able to do some components of this course online.

Please go to unisc.edu.au 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

In our consumer-driven society the success or failure of a product depends on its design and cost. Product costs are 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 you with the fundamental theory of production systems, practices of world class manufacturers and various aspects of modern Computer Integrated Manufacturing (CIM). You will learn about technology and applications of CIM in both large multi-national companies and small, medium enterprises.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Asynchronous learning	2hrs	Week 1	12 times
Tutorial/Workshop 1 – On-campus Tutorial	2hrs	Week 2	11 times
Laboratory 1 – Workshop	2hrs	Week 2	4 times
Seminar – On campus seminar	1hr	Week 5	2 times

1.3. Course Topics

Topics may include:

- Total Quality Assurance
- Metrology – Traditional and Automated
- Production Systems – Lean, Just-in-time
- Inventory Control
- Computer Integrated Manufacturing (CIM)
- Computer Numerical Control (CNC)
- Group Technology
- Plant layout
- Industrial Robotics
- Automated Process Control

2. What level is this course?

300 Level (Graduate)

Demonstrating coherence and breadth or depth of knowledge and skills. Independent application of knowledge and skills in unfamiliar contexts. Meeting professional requirements and AQF descriptors for the degree. May require pre-requisites where discipline specific introductory or developing knowledge or skills is necessary. Normally undertaken in the third or fourth full-time study 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?

COURSE LEARNING OUTCOMES	GRADUATE QUALITIES MAPPING	PROFESSIONAL STANDARD MAPPING *
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...	Competencies from multiple Professional Bodies (see below) *
1 Demonstrate knowledge of the principles of production and storage systems, manufacturing processes and quality management systems	Knowledgeable	1, 1, 1.3.a, 1.3.a, 1.5.e, 1.5.e, 1.6.b, 1.6.b, 1.3, 1.3, 1.5, 1.5, 1.6, 1.6, 2, 2, 2.1.g, 2.1.g, 2.1.h, 2.1.h, 2.1.i, 2.1.i, 2.1, 2.1
2 Analyse case studies in Group Technology and Line Balancing algorithms	Creative and critical thinker	2, 2, 2.1.b, 2.1.b, 2.1.c, 2.1.c, 2.1, 2.1
3 Specify flexible manufacturing systems, based on lean (Just-in-Time), group technologies, Computer integrated Manufacturing (CIM).	Creative and critical thinker	1, 1, 1.2.a, 1.2.a, 1.2, 1.2, 2.2.a, 2.2.a, 2.2, 2.2
4 Apply various methods used in metrology, and undertake accurate, reliable, and repeatable measurements.	Empowered	1, 1, 1.1.a, 1.1.a, 1.2.a, 1.2.a, 1.1, 1.1, 1.2, 1.2
5 Interpret experimental and test results and present these in an appropriate engineering report format.	Creative and critical thinker Engaged	3, 3, 3.2.a, 3.2.a, 3.2.b, 3.2.b, 3.2, 3.2

COURSE LEARNING OUTCOMES	GRADUATE QUALITIES MAPPING	PROFESSIONAL STANDARD MAPPING *
On successful completion of this course, you should be able to...	Completing these tasks successfully will contribute to you becoming...	Competencies from multiple Professional Bodies (see below) *
6 Collaborate with others in a team project environment to conduct engineering investigations.	Engaged	3.6.a, 3.6.a, 3.6.c, 3.6.c, 3.6.d, 3.6.d, 3.1, 3.1, 3.6, 3.6

* Competencies by Professional Body

CODE	COMPETENCY
ENGINEERS AUSTRALIA STAGE 1 ENGINEERING TECHNOLOGIST COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.3.a	Knowledge and Skill Base - In-depth understanding of specialist bodies of knowledge within the technology domain: Proficiently applies advanced technical knowledge and skills to deliver engineering outcomes in specialist area(s) of the technology domain and associated industry, commercial and community sectors.
1.5.e	Knowledge and Skill Base - Knowledge of engineering design practice and contextual factors impacting the technology domain: Identifies the structure, roles and capabilities of the engineering workforce.
1.6.b	Knowledge and Skill Base - Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the technology domain: Appreciates the principles of safety engineering, risk management and the health and safety responsibilities of the engineering practitioner, applicable to the technology domain.
1.2.a	Knowledge and Skill Base - Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain: Fluently applies relevant investigation, analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the technology domain.
1.1.a	Knowledge and Skill Base - Systematic, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the technology domain: Engages with the technology domain at a phenomenological level, applying sciences and engineering fundamentals to systematic investigation, interpretation, analysis and innovative solution of broadly-defined problems and engineering technology practice.
1.1	Knowledge and Skill Base: Systematic, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the technology domain.
1.2	Knowledge and Skill Base: Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain.
1.3	Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the technology domain.
1.5	Knowledge and Skill Base: Knowledge of engineering design practice and contextual factors impacting the technology domain.
1.6	Knowledge and Skill Base: Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the technology domain.
2	Elements of competency: Engineering Application Ability
2.1.g	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Interprets, applies and verifies compliance with relevant standards and codes of practice as well as legislative and statutory requirements underpinning specialist practice area(s) of the technology domain.
2.1.h	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Identifies, quantifies, mitigates and manages technical, health, environmental, safety and other contextual risks associated with engineering application in the technology domain.
2.1.i	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Accesses appropriate professional knowledge resources as input to systematic problem investigation.
2.1.b	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Ensures that the application of specialist technologies are soundly based on fundamental principles by diagnosing, and taking appropriate action with data, calculations, results, proposals, processes, practices, and documented information that may be ill-founded, illogical, erroneous, unreliable or unrealistic.

CODE	COMPETENCY
2.1.c	Engineering Application Ability - Application of established engineering methods to broadly-defined problem solving within the technology domain: Within specialist practice area(s), competently addresses broadly-defined engineering technology problems which involve uncertainty, ambiguity, imprecise information and wide-ranging and sometimes conflicting technical and non-technical factors.
2.2.a	Engineering Application Ability - Application of engineering techniques, tools and resources within the technology domain: Proficiently identifies, selects and applies the materials, components, devices, systems, processes, resources, plant and equipment relevant to the technology domain.
2.1	Engineering Application Ability: Application of established engineering methods to broadly-defined problem solving within the technology domain.
2.2	Engineering Application Ability: Application of engineering techniques, tools and resources within the technology domain.
3	Elements of competency: Professional and Personal Attributes
3.2.a	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Is proficient in listening, speaking, reading and writing English.
3.2.b	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Prepares high quality engineering documents such as progress and project reports, reports of investigations and feasibility studies, proposals, specifications, design records, drawings, technical descriptions and presentations pertinent to the technology domain.
3.6.a	Professional and Personal Attributes - Effective team membership and team leadership: Understands the fundamentals of team dynamics and leadership.
3.6.c	Professional and Personal Attributes - Effective team membership and team leadership: Earns the trust and confidence of colleagues through competent and timely completion of tasks.
3.6.d	Professional and Personal Attributes - Effective team membership and team leadership: Recognises the value of alternative and diverse viewpoints, scholarly advice and the importance of professional networking.
3.1	Professional and Personal Attributes: Ethical conduct and professional accountability.
3.2	Professional and Personal Attributes: Effective oral and written communication in professional and lay domains.
3.6	Professional and Personal Attributes: Effective team membership and team leadership.
ENGINEERS AUSTRALIA STAGE 1 PROFESSIONAL ENGINEER COMPETENCY STANDARDS	
1	Elements of competency: Knowledge and Skill Base
1.3.a	Knowledge and Skill Base - In-depth understanding of specialist bodies of knowledge within the engineering discipline: Proficiently applies advanced technical knowledge and skills in at least one specialist practice domain of the engineering discipline.
1.5.e	Knowledge and Skill Base - Knowledge of engineering design practice and contextual factors impacting the engineering discipline: Is aware of the fundamentals of business and enterprise management.
1.6.b	Knowledge and Skill Base - Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline: Appreciates the principles of safety engineering, risk management and the health and safety responsibilities of the professional engineer, including legislative requirements applicable to the engineering discipline.
1.2.a	Knowledge and Skill Base - Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline: Develops and fluently applies relevant investigation analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the engineering discipline.
1.1.a	Knowledge and Skill Base - Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline: Engages with the engineering discipline at a phenomenological level, applying sciences and engineering fundamentals to systematic investigation, interpretation, analysis and innovative solution of complex problems and broader aspects of engineering practice.
1.1	Knowledge and Skill Base: Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.

CODE	COMPETENCY
1.2	Knowledge and Skill Base: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.
1.3	Knowledge and Skill Base: In-depth understanding of specialist bodies of knowledge within the engineering discipline.
1.5	Knowledge and Skill Base: Knowledge of engineering design practice and contextual factors impacting the engineering discipline.
1.6	Knowledge and Skill Base: Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.
2	Elements of competency: Engineering Application Ability
2.1.g	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Critically reviews and applies relevant standards and codes of practice underpinning the engineering discipline and nominated specialisations.
2.1.h	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Identifies, quantifies, mitigates and manages technical, health, environmental, safety and other contextual risks associated with engineering application in the designated engineering discipline.
2.1.i	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Interprets and ensures compliance with relevant legislative and statutory requirements applicable to the engineering discipline.
2.1.b	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Ensures that all aspects of an engineering activity are soundly based on fundamental principles - by diagnosing, and taking appropriate action with data, calculations, results, proposals, processes, practices, and documented information that may be ill-founded, illogical, erroneous, unreliable or unrealistic.
2.1.c	Engineering Application Ability - Application of established engineering methods to complex engineering problem solving: Competently addresses complex engineering problems which involve uncertainty, ambiguity, imprecise information and wide-ranging and sometimes conflicting technical and non-technical factors.
2.2.a	Engineering Application Ability - Fluent application of engineering techniques, tools and resources: Proficiently identifies, selects and applies the materials, components, devices, systems, processes, resources, plant and equipment relevant to the engineering discipline.
2.1	Engineering Application Ability: Application of established engineering methods to complex engineering problem solving.
2.2	Engineering Application Ability: Fluent application of engineering techniques, tools and resources.
3	Elements of competency: Professional and Personal Attributes
3.2.a	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Is proficient in listening, speaking, reading and writing English.
3.2.b	Professional and Personal Attributes - Effective oral and written communication in professional and lay domains: Prepares high quality engineering documents such as progress and project reports, reports of investigations and feasibility studies, proposals, specifications, design records, drawings, technical descriptions and presentations pertinent to the engineering discipline.
3.6.a	Professional and Personal Attributes - Effective team membership and team leadership: Understands the fundamentals of team dynamics and leadership.
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5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

MEC226

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

ENG335

5.4. Specific assumed prior knowledge and skills (where applicable)

Not applicable

5.5. Microcredential Information

Not applicable

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

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

6.2. Details of early feedback on progress

A number of multiple choices and short answer questions will be set to cover learning materials from the first three weeks. Questions include diagrams and tables. You respond using a given format. Solutions will be provided online Friday, week 5

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1	Written Piece	Individual	35%	Total 3000 words approx	Refer to Format	Online Assignment Submission with plagiarism check
All	2	Practical / Laboratory Skills, and Written Piece	Group	15%	Practical output and associated report. The report should NOT be longer than 10 pages excluding appropriate diagrams	Week 10	In Class
All	3	Examination - Centrally Scheduled	Individual	50%	2 hrs	Exam Period	Exam Venue

All - Assessment Task 1: 3 Sub Assignments

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:	Written Piece
AUTHORSHIP STATEMENT:	
FORMAT:	Submit: Week 5 (5%); Week 8 (20%); Week 11 (10%). Questions will be set for each of the assignments, from the material covered in the learning materials up to and including the week prior to the submission.
CRITERIA:	

No.		Learning Outcome assessed
1	Use of correct terminology, diagrams and methodology	2 3
2	Demonstrated understanding through use of correct formulae;	1 2 3 4
3	Inclusion of all workings showing a logical sequence to the problem solution	5

GENERIC SKILLS:	Communication, Problem solving

All - Assessment Task 2: Workshop Project

GOAL:	The project is designed as two hands-on activities that demonstrate the theory presented in the learning materials and tutorials and help you to gain a deep understanding of the underlying processes and production systems
PRODUCT:	Practical / Laboratory Skills, and Written Piece
AUTHORSHIP STATEMENT:	
FORMAT:	The practicals are completed by groups of 2-4 students. The report is to be submitted by the group. The report should NOT be longer than 10 pages excluding appropriate diagrams
CRITERIA:	

No.		Learning Outcome assessed
1	Completeness and Accuracy of results and subsequent analysis;	4 5
2	Degree to which the report adheres to the specified structure	3
3	Completeness of all components of the report within specified word count	5
4	Depth of discussion and reflection on the project.	1 2 6

GENERIC SKILLS:	Collaboration, Organisation, Information literacy

All - Assessment Task 3: Final Examination

GOAL:	You will demonstrate and apply theoretical knowledge of different production theories to solve problems and interpret the industrial engineering requirement in the factory environment.
PRODUCT:	Examination - Centrally Scheduled
AUTHORSHIP STATEMENT:	
FORMAT:	The final exam will assess the content of learning materials 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).
CRITERIA:	**No.** — **Learning Outcome assessed** 1 Use of correct terminology, diagrams, and methodology in problem-solving exercises — 1 2 3 4
GENERIC SKILLS:	Communication, Problem solving, Applying technologies

7. Directed study hours

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. Student workload is calculated at 12.5 learning hours per one unit.

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

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

8.1. Prescribed text(s) or course reader

You need regular access to the resource(s) below. Many texts are available as ebooks through the Library at no additional cost.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Recommended	Mikell Groover	0	Automation, Production Systems, and Computer-Integrated Manufacturing, Global Edition	n/a	n/a

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 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.

9. How are risks managed in this course?

Risk assessments have been conducted for the field activities being undertaken and a high level of risk has been identified. High level risk may include, boating, diving, and hot works such as welding, cutting and grinding. Where high risks exist you will be given training and advice about how to control the high level risk, however it is also your responsibility 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 and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training 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 Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

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%; and
(b) The course is graded using the Standard Grading scale

Eligibility for Supplementary Assessment Your eligibility for supplementary assessment in a course is dependent of the following conditions applying: The final mark is in the percentage range 47% to 49.4% The course is graded using the Standard Grading scale You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:
(a) One day: deduct 5%;
(b) Two days: deduct 10%;
(c) Three days: deduct 20%;
(d) Four days: deduct 40%;
(e) Five days: deduct 60%;
(f) Six days: deduct 80%;
(g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:
Less than 15 minutes: No penalty
From 15 minutes to 30 minutes: 20% penalty
More than 30 minutes: 100% penalty

10.4. 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
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.5. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.6. General Enquiries

For course-specific questions, contact your teaching staff or Course Coordinator.

For other enquiries or to access support, please contact Student Central:

- UniSC Student Central
- UniSC Adelaide Student Central