# MECH4005

Production Processes

Session 1, In person-scheduled-weekday, North Ryde 2024

School of Engineering

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## Disclaimer

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General Information

Unit convenor and teaching staff
Unit Convenor
June Ho
june.ho@mq.edu.au
Contact via Via-email
50 Waterloo Road, Level 1
By appointment via email

Credit points
10

Prerequisites
MECH3005 and (MECH3003 or MECH303)

Corequisites

Co-badged status

Unit description
This unit covers the skills and knowledge in production processes. Students will learn and apply the fundamental principles and practices of just-in-time and lean production as well as six-sigma approach to competitive manufacturing and to optimise production processes. At the end of the unit, students are expected to demonstrate the ability to gather, analyse and apply data to plan, control and improve production processes, to manage and optimise production flow, and to apply mathematical science to design and refine product/service functionality and quality.

Important Academic Dates
Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes
On successful completion of this unit, you will be able to:

UL01: Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planing, controlling, and optimising production systems.

UL02: Apply mathematical science to model and control production systems/flow.

UL03: Design and refine product/service functionality and quality.
ULO4: Present and communicate engineering solutions for production processes effectively.

**General Assessment Information**

A. **Requirements to Pass this Unit**

To pass this unit you must: Achieve a total mark equal to or greater than 50%

B. **Late Assessment Submission Penalty:**

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration.

**Assessments where Late Submissions will be accepted**

- Assessment: Assignment and Fieldtrip report – YES, Standard Late Penalty applies
- Assessment: Quizzes, Projects and final exam - NO, unless Special Consideration is granted

C. **Special Consideration**

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period, typically about 3 to 4 weeks after the normal exam period. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

D. **Descriptions of Assessment Activities and other information**

- There will be one-day compulsory field trip in week 8.
### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation in SGTA</td>
<td>5%</td>
<td>No</td>
<td>Weekly</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20%</td>
<td>No</td>
<td>Week 5, 11</td>
</tr>
<tr>
<td>Project 1</td>
<td>15%</td>
<td>No</td>
<td>Week 9</td>
</tr>
<tr>
<td>Project 2</td>
<td>15%</td>
<td>No</td>
<td>Week 13</td>
</tr>
<tr>
<td>Fieldtrip Report</td>
<td>20%</td>
<td>No</td>
<td>Week 10</td>
</tr>
<tr>
<td>Final examination</td>
<td>25%</td>
<td>No</td>
<td>Exam period</td>
</tr>
</tbody>
</table>

**Participation in SGTA**

Assessment Type: Practice-based task  
Indicative Time on Task: 0 hours  
Due: Weekly  
Weighting: 5%

Development of knowledge and skills in engineering requires continual practice at authentic tasks. In each weekly SGTA class, you will undertake a range of relevant problems and discussion. Contribution to these tasks will be recorded by teaching staff to constitute this grade.

On successful completion you will be able to:
- Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planning, controlling, and optimising production systems.
- Apply mathematical science to model and control production systems/flow.
- Design and refine product/service functionality and quality.
- Present and communicate engineering solutions for production processes effectively.

**Quizzes**

Assessment Type: Quiz/Test  
Indicative Time on Task: 20 hours  
Due: Week 5, 11  
Weighting: 20%
This Assessment Task includes two quizzes that cover lecture contents.

On successful completion you will be able to:

- Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planning, controlling, and optimising production systems.
- Apply mathematical science to model and control production systems/flow.
- Design and refine product/service functionality and quality.
- Present and communicate engineering solutions for production processes effectively.

Project 1
Assessment Type: Problem set
Indicative Time on Task: 13 hours
Due: Week 9
Weighting: 15%

Assignment to reinforce skills or concept that is taught in class. This assignment requires students to work in a group to analyze a real-world problem and propose improvement alternatives.

On successful completion you will be able to:

- Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planning, controlling, and optimising production systems.
- Apply mathematical science to model and control production systems/flow.
- Design and refine product/service functionality and quality.
- Present and communicate engineering solutions for production processes effectively.

Project 2
Assessment Type: Problem set
Indicative Time on Task: 13 hours
Due: Week 13
Weighting: 15%
Assignment to reinforce skills or concept that is taught in class. This assignment requires students to work in a group to analyze a real-world problem and propose improvement alternatives.

On successful completion you will be able to:
- Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planning, controlling, and optimising production systems.
- Apply mathematical science to model and control production systems/flow.
- Design and refine product/service functionality and quality.
- Present and communicate engineering solutions for production processes effectively.

Fieldtrip Report
Assessment Type 1: Report
Indicative Time on Task 2: 10 hours
Due: Week 10
Weighting: 20%

This activity helps students to understand the modern manufacturing systems covered in the lectures. Students will learn how applicable their skills are to the different roles in an organization so they can visualize themselves in this field. Each student is expected to submit a report which gives them a chance to reflect on how the trip complements the class discussions and illustrates basic principles presented in the lectures. This assessment task is compulsory.

On successful completion you will be able to:
- Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planning, controlling, and optimising production systems.
- Design and refine product/service functionality and quality.
- Present and communicate engineering solutions for production processes effectively.

Final examination
Assessment Type 1: Examination
Indicative Time on Task 2: 30 hours
Due: Exam period
Weighting: 25%
Final examination will cover all the content taught in the unit.

On successful completion you will be able to:

- Convey fundamental knowledge of the just-in-time and lean production as well as six-sigma approach and how to apply it in planning, controlling, and optimising production systems.
- Apply mathematical science to model and control production systems/flow.
- Design and refine product/service functionality and quality.
- Present and communicate engineering solutions for production processes effectively.

1 If you need help with your assignment, please contact:
   - the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
   - the Writing Centre for academic skills support.

2 Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

- **Learning materials**: please refer to iLearn page
- **Methods of Communication**: We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent from your university email address.
- **COVID Information**: For the latest information on the University’s response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: [https://www.mq.edu.au/about/coronavirus-faqs](https://www.mq.edu.au/about/coronavirus-faqs). Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Please refer to iLearn site.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central ([https://policies.mq.edu.au](https://policies.mq.edu.au)). Students should be aware of the following policies in particular with regard to
Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) and use the search tool.

**Student Code of Conduct**

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: [https://students.mq.edu.au/admin/other-resources/student-conduct](https://students.mq.edu.au/admin/other-resources/student-conduct)

**Results**

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit [ask.mq.edu.au](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

**Academic Integrity**

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

**Student Support**

Macquarie University provides a range of support services for students. For details, visit [http://students.mq.edu.au/support/](http://students.mq.edu.au/support/)

**The Writing Centre**

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.
Student Services and Support

Macquarie University offers a range of Student Support Services including:

- **IT Support**
- **Accessibility and disability support** with study
- **Mental health support**
- **Safety support** to respond to bullying, harassment, sexual harassment and sexual assault
- **Social support** including information about finances, tenancy and legal issues
- **Student Advocacy**, provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University’s IT, you must adhere to the [Acceptable Use of IT Resources Policy](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

Changing Assessment Activities, including assessment types and weights.

**Engineers Australia Competency Mapping**

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<tr>
<th>EA Competency Standard</th>
<th>Unit Learning Outcomes</th>
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[https://unitguides.mq.edu.au/unit_offerings/167337/unit_guide/print](https://unitguides.mq.edu.au/unit_offerings/167337/unit_guide/print)
<table>
<thead>
<tr>
<th>Knowledge and Skill Base</th>
<th>1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline.</th>
<th>ULO1 &amp; ULO2 &amp; ULO3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.</td>
<td>ULO1 &amp; ULO2 &amp; ULO3</td>
</tr>
<tr>
<td></td>
<td>1.3 In-depth understanding of specialist bodies of knowledge</td>
<td>ULO3 &amp; ULO4</td>
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<tr>
<td></td>
<td>1.4 Discernment of knowledge development and research directions</td>
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<td></td>
<td>1.5 Knowledge of engineering design practice</td>
<td>ULO4</td>
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<tr>
<td></td>
<td>1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.</td>
<td></td>
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<tr>
<td>Engineering Application Ability</td>
<td>2.1 Application of established engineering methods to complex problem solving</td>
<td>ULO2 &amp; ULO3</td>
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<tr>
<td></td>
<td>2.2 Fluent application of engineering techniques, tools and resources.</td>
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<td></td>
<td>2.3 Application of systematic engineering synthesis and design processes.</td>
<td>ULO3 &amp; ULO4</td>
</tr>
<tr>
<td></td>
<td>2.4 Application of systematic approaches to the conduct and management of engineering projects.</td>
<td>ULO1</td>
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<tr>
<td>Professional and Personal Attributes</td>
<td>3.1 Ethical conduct and professional accountability.</td>
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<td></td>
<td>3.2 Effective oral and written communication in professional and lay domains.</td>
<td>ULO3 &amp; ULO4</td>
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<td></td>
<td>3.3 Creative, innovative and pro-active demeanour.</td>
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<td></td>
<td>3.4 Professional use and management of information.</td>
<td>ULO1 &amp; ULO2 &amp; ULO3 &amp; ULO4</td>
</tr>
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<td></td>
<td>3.5 Orderly management of self, and professional conduct.</td>
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<td></td>
<td>3.6 Effective team membership and team leadership</td>
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