

## Manufacturing Planning and Control (E076221)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 6.0**

**Study time 180 h**

**Course offerings and teaching methods in academic year 2025-2026**

A (semester 1)	English	Gent	seminar	
			lecture	
			independent work	
			practical	
B (semester 1)	Dutch	Gent	practical	0.0h
			seminar	0.0h
			independent work	0.0h

**Lecturers in academic year 2025-2026**

Raa, Birger TW18 lecturer-in-charge

**Offered in the following programmes in 2025-2026**

	crdts	offering
Bridging Programme Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	A
Bridging Programme Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	A
Bridging Programme Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)	6	A
Bridging Programme Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Bridging Programme Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	A
Bridging Programme Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	A
Master of Science in Electrical Engineering (main subject Communication and Information Technology )	6	A
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	B
Master of Science in Electromechanical Engineering(main subject Control Engineering and Automation)	6	A
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	B
Master of Science in Electromechanical Engineering(main subject Electrical Power Engineering)	6	A
Master of Science in Electrical Engineering (main subject Electronic Circuits and Systems)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject Manufacturing and Supply Chain Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	B
Master of Science in Electromechanical Engineering(main subject Maritime Engineering)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	B
Master of Science in Electromechanical Engineering(main subject Mechanical Construction)	6	A
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	B
Master of Science in Electromechanical Engineering(main subject Mechanical Energy Engineering)	6	A
Master of Science in Industrial Engineering and Operations Research(main subject	6	A

Transport and Mobility Engineering)		A
International Master of Science in Advanced Design of Sustainable Ships and Offshore Structures	6	A
Master of Science in Biomedical Engineering	6	B
Master of Science in Biomedical Engineering	6	A
Master of Science in Chemical Engineering	6	A, B
Master of Science in Chemical Engineering	6	A
Master of Science in Civil Engineering	6	A
Master of Science in Computer Science Engineering	6	A
Master of Science in Electromechanical Engineering	6	A
Master of Science in Engineering: Ships and Marine Technology	6	A
Master of Science in Engineering: Ships and Marine Technology	6	A
Master of Science in Industrial Design Engineering Technology	6	A
Master of Science in Industrial Engineering and Operations Research	6	B
Master of Science in Materials Engineering	6	A
Master of Science in Mechanical and Electrical Systems Engineering	6	A
Master of Science in Pharmaceutical Engineering	6	A
Master of Science in Photonics Engineering	6	A
Master of Science in Sustainable Materials Engineering	6	A
Postgraduate Programme in Innovation and Entrepreneurship in Engineering – Advanced	6	A
Postgraduate Programme in Innovation and Entrepreneurship in Engineering – Foundations	6	A

#### Teaching languages

English, Dutch

#### Keywords

operations management, production planning and control

#### Position of the course

Most engineering jobs involve taking some responsibility for a system that produces goods and/or services for customers. Therefore, apart from the technical and technological knowhow of the constituting elements (machines, materials, ICT, etc.), engineers also need to be knowledgeable about the operational management of such systems, in order to optimize effectiveness and efficiency.

This course covers the main techniques for production system planning and control, with special attention to dealing with the inherent uncertainty and variability.

#### Contents

Manufacturing planning:

- 'Master Production Scheduling' and 'Sales and Operations Planning'
- MRP, MRP-II, ERP
- Scheduling
- Inventory management
- Forecasting

Shop floor control:

- Factory Physics
- Push vs. pull production activity control

Operations management:

- Manufacturing strategy
- Theory of Constraints
- Lean Manufacturing and Six Sigma

#### Initial competences

No prerequisites.

#### Final competences

- 1 indicate the strategic importance of production planning and control for a company
- 2 analyse and control complex production systems by using mathematical models
- 3 quantify the impact of variability on the performance of a production system

- 4 distinguish and correctly apply methods and tools for planning production and inventory at strategic, tactical and operational level
- 5 assess the usefulness of the different methods and tools for shop floor control in varying situations

#### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

#### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

#### **Teaching methods**

Seminar, Lecture, Practical, Independent work

#### **Extra information on the teaching methods**

Theory lectures are available online in a series of knowledge clips. On-campus sessions start with a summary + Q&A of the key concepts per chapter, after which students get to work on solving the corresponding exercises.

At the end of the semester, there are guest lectures from industry, and a hands-on simulation game brings some of the main concepts to life.

#### **Study material**

Type: Slides

Name: Lecture slides

Indicative price: Free or paid by faculty

Optional: no

Language : English

Available on Ufora : Yes

Online Available : Yes

Available in the Library : No

Available through Student Association : No

#### **References**

- E.A. Silver, D.F. Pyke, D.J. Thomas (2017), "Inventory and Production Management in Supply Chains (4/e)", CRC Press, ISBN 978-1466558618 - available online via UGent Net.
- F.R. Jacobs, W. Berry, D. Whybark, T. Vollmann (2011), "Manufacturing Planning and Control for Supply Chain Management (6/e)", McGraw-Hill, ISBN 978-0071313933.
- W. Hopp, M. Spearman (2008), "Factory Physics (3/e)", McGraw-Hill, ISBN 978-0071232463.
- J.R.T. Arnold, S.N. Chapman, L.M. Clive (2014), "Introduction to Materials Management (7/e)", Pearson, ISBN: 978-1292021089.
- H. Lödging (2013), "Handbook of Manufacturing Control", Springer, ISBN: 978-3642244575.

#### **Course content-related study coaching**

Teacher and assistants are available upon request.

Course material is available on the electronic learning environment.

#### **Assessment moments**

end-of-term assessment

#### **Examination methods in case of periodic assessment during the first examination period**

Written assessment

#### **Examination methods in case of periodic assessment during the second examination period**

Written assessment

#### **Examination methods in case of permanent assessment**

#### **Possibilities of retake in case of permanent assessment**

not applicable

#### **Extra information on the examination methods**

Written exam with comprehensive questions and exercises

#### **Calculation of the examination mark**

50% of the final mark: comprehensive theory questions

50% of the final mark: exercises

A minimum score of 40% for both theory and exercises must be obtained in order to pass.

Final score F is determined as follows (with T score for theory out of 10, E score voor exercises out of 10):

if  $(T < 4 \text{ or } E < 4)$  then  $F = \min(T + E, 9)$

else  $F = T + E$