



MASTER OF SCIENCE IN MECHANICAL ENGINEERING

Courses & Tracks



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MSc: first year

62 ECTS

Mandatory
Core Courses

- Control and actuating devices for mechanical systems
- Applied metallurgy
- Energy systems
- Advanced manufacturing processes
- Machine design
- Mechanical system dynamics
- Measurements
- Design and management of production systems

MSc: second year

48 ECTS

Track Mandatory &
Elective Courses – SMART
INFRASTRUCTURES
28 - 30 ECTS

Track Elective Courses
18 - 20 ECTS

Tracks:

- ME1: Production Systems
- ME2: Mechatronics and Robotics
- ME3: Virtual Prototyping
- ME4: Int. Comb. Engines and Turbomachinery
- ME5: Advanced Mechanical Design
- ME6: Advanced Materials and Manufacturing
- ME7: Ground Vehicles
- ME8: Machine Tools and Manuf. Systems (BV+PC)
- ME9: Mobility Engineering
- ML5: Engineering Design and Manufacturing (LC)

MSc: Master's thesis

20 ECTS

Master's Thesis –
research project
18 ECTS

Workshops
2 ECTS

- Written dissertation about a chosen Master's thesis research/industrial project
- Horizontal competences acquired by attending four workshops.

ME1: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory Courses
28 ECTS

Track Elective Courses (SMART)
20 ECTS

| COURSE TITLE | SEM | ECTS |
|---|-----|-----------|
| Track Mandatory Courses I | | 18 |
| Manufacturing Systems Engineering (SMART) | 1 | 10 |
| Integrated Manufacturing Systems (SMART) | 1 | 8 |
| Quality Engineering ME (SMART) | 2 | 8 |
| Track Mandatory Courses II | | 10 |
| Industrial Plants (A) | 2 | 10 |
| Logistics Management | 2 | 10 |
| Track Elective Courses (SMART) | | 20 |
| Courses to be chosen from TABLE B | 1-2 | 20 |

ME2: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory Courses
10 ECTS

Track Elective Courses
38 ECTS

| COURSE TITLE | SEM | ECTS |
|--|-----|-----------|
| Mechatronic Systems and Laboratory A (SMART) | 1 | 10 |
| Track Elective Courses I | | 6 |
| Vehicle Dynamics and Control B | 1 | 6 |
| Mechanical Systems Reliability | 1 | 6 |
| Electrical Drives for Industry and Transport Applications | 2 | 6 |
| Functional Mechanical Design | 2 | 6 |
| Track Elective Courses II (2 out of 16 courses available) | | 12 |
| ... | 1-2 | 6 |
| Max. 1 course to be chosen from GROUP OPEN | 1-2 | 6 |
| Track Elective Courses (SMART) | | 20 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 20 |

ME3: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory Courses
10 ECTS

Track Elective Courses
38 ECTS

| COURSE TITLE | SEM | ECTS |
|--|-----|-----------|
| Virtual Prototyping (SMART) | 1 | 10 |
| Track Elective Courses I | | 6 |
| Human Modelling In Engineering | 1 | 6 |
| Methods and Tools for Systematic Innovation B | 1 | 6 |
| Design Methods | 2 | 6 |
| Computer Vision and Reverse Engineering | 2 | 6 |
| Metodi Sperimentali per la Diagnostica Strutturale (IT) | 2 | 6 |
| Track Elective Courses II (2 out of 11 courses available) | | 12 |
| ... | 1-2 | 6 |
| Max. 1 course to be chosen from Group OPEN | 1-2 | 6 |
| Track Elective Courses (SMART) | | 20 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 20 |

ME4: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory Courses
18 ECTS

Track Elective Courses
30 ECTS

| COURSE TITLE | SEM | ECTS |
|---|-----|-----------|
| Track Mandatory Courses | | 18 |
| Internal Combustion Engines | 1 | 10 |
| Turbomachinery A | 1 | 10 |
| Internal Combustion Engines | 1 | 8 |
| Turbomachinery B | 1 | 8 |
| Track Elective Courses (SMART) | | 18 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 18 |
| Track Elective Courses II (2 out of 8 courses available) | | 12 |
| ... | 1-2 | 6 |
| ... | 1-2 | 6 |
| Max. 1 course to be chosen from Group OPEN | 1-2 | 6 |

ME5: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory
Courses
10 ECTS

Track Elective
Courses
38 ECTS

| COURSE TITLE | SEM | ECTS |
|--|-----|-----------|
| Methods and Tools for Systematic Innovation I. C. (SMART) | 1 | 10 |
| Track Elective Courses I | | 6 |
| Modelling of Mechanical Behaviour and Materials B | 1 | 6 |
| Mechanical Systems Reliability | 1 | 6 |
| Metodi Sperimentali per la Diagnostica Strutturale | 2 | 6 |
| Mechatronic Systems and Laboratory B | 1 | 6 |
| Computer Vision and Reverse Engineering | 2 | 6 |
| Track Elective Courses II (2 out of 19 courses available) | | 12 |
| ... | 1-2 | 6 |
| Max. 1 course to be chosen from Group OPEN | 1-2 | 6 |
| Track Elective Courses (SMART) | | 20 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 20 |

ME6: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory
Courses
12 ECTS

Track Elective
Courses
36 ECTS

| COURSE TITLE | SEM | ECTS |
|--|-----|-----------|
| Innovation in Metallurgical Plants and Process A (SMART) | 1 | 6 |
| Additive Manufacturing B (SMART) | 1 | 6 |
| Track Elective Courses I | | 18 |
| Materials Engineering Recycling and Environmental Impact A | 1 | 8 |
| Design and Analysis of Experiments A | 1 | 8 |
| Advanced Manufacturing Process Lab A | 1 | 8 |
| Materials for Energy | 1 | 8 |
| ... | 1-2 | 6 |
| ... | 1-2 | 6 |
| Track Elective Courses (SMART) | | 18 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 18 |

ME7: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory Courses
12 ECTS

Track Elective Courses
36 ECTS

| COURSE TITLE | SEM | ECTS |
|--|------------|-----------|
| Vehicle Dynamics and Control A | 1 | 6 |
| Ground Vehicle Engineering A | 2 | 6 |
| Track Elective Courses I | | 6 |
| Hybrid and Electric Vehicle | 1 | 6 |
| Mechanical Systems Reliability | 1 | 6 |
| Vehicle Design (Optimal Design) | 2 | 6 |
| Track Elective Courses (SMART) | | 30 |
| 2 out of 14 available Courses | 1-2 | 12 |
| ... | 1-2 | 6 |
| ... | 1-2 | 6 |
| Max. 1 course to be chosen from Group OPEN | 1-2 | 6 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 18 |

ME8: Track Mandatory and Elective Courses

48 ECTS

Track Mandatory
Courses
20 ECTS

Track Elective
Courses
26 ECTS

Project Work I
2 ECTS

| COURSE TITLE | SEM | ECTS |
|--|-----|-----------|
| Machine Tools and Manufacturing Systems LM B | 1 | 8 |
| Automatic Control B (SMART) | 1 | 6 |
| Machine Tools Digital Lab | 2 | 6 |
| Track Elective Courses I | | 8 |
| Mechatronic Systems and Laboratory B (SMART) | 1 | 6 |
| Robotic Systems Design (SMART) | 1 | 6 |
| Advanced Measurements Techniques (SMART) | 1 | 6 |
| Project Work I | 1 | 8 |
| Track Elective Courses (SMART) | | 18 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 18 |

ME9: Track Mandatory and Elective Courses

49 ECTS

Track Mandatory
Courses
14 ECTS

Track Elective
Courses
35 ECTS

| COURSE TITLE | SEM | ECTS |
|--|-----|-----------|
| Electric Systems for Transportation C (SMART) | 1 | 6 |
| Mobility Infrastructures and Services (SMART) | 2 | 8 |
| Track Elective Courses I | | 15 |
| Infrastructure Investment and Project Finance | 1 | 5 |
| Data Science for mobility | 1 | 5 |
| Transport Planning and Economics | 1 | 5 |
| Energy and Emission in Transportation Systems | 1 | 5 |
| Ethics for Transportation | 1 | 5 |
| Max. 1 course to be chosen from Group OPEN_ME1 | 1-2 | 6 |
| Track Elective Courses (SMART) | | 20 |
| Courses to be chosen from TABLE B (SMART) | 1-2 | 20 |

ML5: Track Mandatory and Elective Courses

48 ECTS

Track Elective Courses
42 ECTS

Project Work
6 ECTS

| COURSE TITLE | SEM | ECTS |
|---|-----|-----------|
| Track Elective Courses I | | 16 |
| Measuring Techniques and Sensors for Automation B (SMART) | 1 | 8 |
| Computer-aided Design and Mechanical Prototyping (SMART) | 1 | 8 |
| Robotics and Mechatronics (SMART) | 1 | 8 |
| Track Elective Courses II | | 26 |
| Courses to be chosen from TABLE B (SMART) | 1 | 8 |
| Project Work | 1-2 | 6 |



THANK YOU FOR
YOUR ATTENTION

THE END