



University of Rijeka  
Faculty of Engineering



**CURRICULUM  
GRADUATE UNIVERSITY STUDY OF MECHANICAL ENGINEERING**

Rijeka, March 2015

## 1. CURRICULUM DESCRIPTION

### 1.1. The list of compulsory and elective courses with the number of active classes required for their performance and ECTS credits

1. semester							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Mathematics for Engineers	2	2		1	5	7
	Strength of Materials II	2	2	1		5	7
	Thermodynamics II	3	2			5	7
<b>Subjects from elective group Mechanical Engineering Design and Mechatronics:</b>							
	Machine Elements Design III	2			3	5	5
	Engineering Visualization	1			2	3	4
<b>Subjects from elective group Computational Mechanics and Engineering:</b>							
	Vibrations	2	1	1		4	4
	Modelling in Engineering	2			2	4	5
<b>Subjects from elective group Technology Computational Engineering:</b>							
	Organization of Production	2	2			4	5
	Joining of Materials	2		1		3	4
<b>Subjects from elective group Industrial Engineering and Management:</b>							
	Organization of Production	2	2			4	5
	Engineering Logistics	2	2			4	4
<b>Subjects from elective group Thermal Engineering:</b>							
	Heat Exchangers	2	2			4	4
	Laboratory Practice in Thermal Engineering	1		2		3	5
<b>Subjects from elective group Process and Energy Engineering:</b>							
	Heat Exchangers	2	2			4	4
	Laboratory Practice in Thermal Engineering	1		2		3	5
<b>Subjects from elective group Marine Engineering:</b>							
	Marine Electrical Engineering	2	1			3	4
	Laboratory Practice in Thermal Engineering	1		2		3	5
<b>Subjects from elective group Materials Engineering:</b>							
	Metal Materials	2		1		3	4
	Non-Metal Materials	2		1		3	5
<b>TOTAL</b>						<b>23</b>	<b>30</b>

L - lectures, aT – auditory tutorials, IT – laboratory tutorials, dT – design tutorials.

2. semester							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Project I <sup>1</sup>				2	2	5
	Elective Subject I					4	5
	Free Elective Subject I <sup>2</sup>					4	5
	Professional Practice II						5
<b>Subjects from elective group Mechanical Engineering Design and Mechatronics:</b>							
	Systematic Engineering Design	2			2	4	5
	Power Transmissions	3		1	2	6	5
<b>Subjects from elective group Computational Mechanics and Engineering:</b>							
	Finite Element Analysis of Solids	2		2		4	5
	Fluid Dynamics	2		2		4	5
<b>Subjects from elective group Technology Computational Engineering:</b>							
	Forming Technology	2	1	1		4	5
	Machining Processes	2	1	1		4	5
<b>Subjects from elective group Industrial Engineering and Management:</b>							
	Management and Organizational Development	2	2			4	5
	Project Management	2	2			4	5
<b>Subjects from elective group Thermal Engineering:</b>							
	Energy and Process Devices	3	2			5	5
	Numerical Modelling in Thermodynamics	3		1		4	5
<b>Subjects from elective group Process and Energy Engineering:</b>							
	Energy and Process Devices	3	2			5	5
	Heat Turbines	3	2			5	5
<b>Subjects from elective group Marine Engineering:</b>							
	Ship Systems	2	1	1		4	5
	Heat Turbines	3	2			5	5
<b>Subjects from elective group Materials Engineering:</b>							
	Forming Technology	2	1	1		4	5
	Materials Protection	2	1	1		4	5
<b>TOTAL</b>						<b>20</b>	<b>30</b>

<sup>1</sup> Enroll one subject.

<sup>2</sup> Enroll one subject in the 2<sup>nd</sup> semester from other elective groups or from other graduate studies at the Faculty of Engineering University of Rijeka, worth 5 ECTS or more.

**Subjects from which can be enrolled Project I according to the elective groups:**

**Mechanical Engineering Design and Mechatronics:** Engineering Visualization, Machine Elements Design III, Power Transmissions, Robot Elements Design, Systematic Engineering Design

**Computational Mechanics and Engineering:** Modelling in Engineering, Vibrations

**Technology Computational Engineering:** Forming Technology, Machining Processes

**Industrial Engineering and Management:** Organization of Production, Project Management

**Thermal Engineering:** Compressors, Energy and Process Devices, Heat Turbines, Numerical Modelling in Thermodynamics

**Process and Energy Engineering:** Compressors, Energy and Process Devices, Heat Turbines, Numerical Modelling in Thermodynamics

**Marine Engineering:** Compressors, Numerical Modelling in Thermodynamics, Ship Systems

**Materials Engineering:** Metal Materials, Materials Protection

Elective Subject I							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
<b>Subjects from elective group Mechanical Engineering Design and Mechatronics:</b>							
	Robot Elements Design	2			2	4	5
	Components of Mechatronic Systems	2		2		4	5
<b>Subjects from elective group Computational Mechanics and Engineering:</b>							
	Dynamics of Machines and Robots	2		1	1	4	5
	Thermomechanics	2		2		4	5
	Visualization and Preparation of Computer Simulations	2			2	4	5
	Numerical Modelling in Thermodynamics	3		1		4	5
<b>Subjects from elective group Technology Computational Engineering:</b>							
	Flexible and Intelligent Systems	2		1		3	5
	Industrial Metrology	2		1		3	5
	Maintenance	2	1			3	5
<b>Subjects from elective group Industrial Engineering and Management:</b>							
	Flexible and Intelligent Systems	2		1		3	5
	Industrial Metrology	2		1		3	5
<b>Subjects from elective group Thermal Engineering:</b>							
	Compressors	2	1			3	5
	Heat Turbines	3	2			5	5
<b>Subjects from elective group Process and Energy Engineering:</b>							
	Numerical Modelling in Thermodynamics	3		1		4	5
	Compressors	2	1			3	5
<b>Subjects from elective group Marine Engineering:</b>							
	Numerical Modelling in Thermodynamics	3		1		4	5
	Compressors	2	1			3	5
	Power Transmissions	3	1		2	6	5
<b>Subjects from elective group Materials Engineering:</b>							
	Management and Organizational Development	2	2			4	5
	Finite Element Analysis of Solids	2		2		4	5
	Numerical Modelling in Thermodynamics	3		1		4	5

3. semester							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Project II <sup>3</sup>				2	2	5
	Free Elective Subject II <sup>4</sup>					4	5
<b>Subjects from elective group Mechanical Engineering Design and Mechatronics:</b>							
	Precision Engineering and Microsystems Technologies	3	2			5	6
	Elements of Transport Technic	3			2	5	4
	Elective Subject II					4	5
	Elective Subject III					4	5
<b>Subjects from elective group Computational Mechanics and Engineering:</b>							
	Mechanics of Composites	2		2		4	5
	Optimal Control in Engineering	2			2	4	5
	Elective Subject II					4	5
	Elective Subject III					4	5
<b>Subjects from elective group Technology Computational Engineering:</b>							
	Designing the Production Systems	2	2			4	5
	Advanced Manufacturing Processes	2	1		1	4	5
	Processes Planning	2	1	1		4	5
	Elective Subject II					4	5
<b>Subjects from elective group Industrial Engineering and Management:</b>							
	Designing the Production Systems	2	2			4	5
	Processes Planning	2	1	1		4	5
	Quality Management	2	2			4	5
	Elective Subject II					4	5
<b>Subjects from elective group Thermal Engineering:</b>							
	Thermodynamics of Mixtures	3	2			5	5
	Renewable Energy Sources	3	2			5	5
	Refrigeration	2	2			4	5
	Elective Subject II					4	5
<b>Subjects from elective group Process and Energy Engineering:</b>							
	Thermodynamics of Mixtures	3	2			5	5
	Internal Combustion Engines	3	1	1		5	5
	Thermal Power Plants	3	1			4	5
	Elective Subject II					4	5
<b>Subjects from elective group Marine Engineering:</b>							
	Internal Combustion Engines	3	1	1		5	5
	Marine HVAC&R systems	3	2			5	5
	Marine Energy Devices	2	2			4	5
	Elective Subject II					4	5
<b>Subjects from elective group Materials Engineering:</b>							
	Advanced Manufacturing Processes	2	1		1	4	5
	Quality Management	2	2			4	5
	Thermal Processes of Materials	2	1	1		4	5
	Elective Subject II					4	5
	<b>TOTAL</b>					<b>24</b>	<b>30</b>

<sup>3</sup> Enroll one subject.

<sup>4</sup> Enroll one subject in the 3<sup>rd</sup> semester from other elective groups or from other graduate studies at the Faculty of Engineering University of Rijeka, worth 5 ECTS or more.

**Subjects from which can be enrolled Project II according to the elective groups:**

**Mechanical Engineering Design and Mechatronics:** CAE in Product Design, Elements of Transport Technic, Modelling of Hydraulics and Pneumatics, Precision Engineering and Microsystems Technologies

**Computational Mechanics and Engineering:** Finite Element Analysis of Solids, Fluid Dynamics, Optimal Control in Engineering

**Technology Computational Engineering:** Designing the Production Systems, Industrial Robotics, Processes Planning

**Industrial Engineering and Management:** Designing the Production Systems, Processes Planning

**Thermal Engineering:** Air Conditioning and Automation Systems, Refrigeration, Renewable Energy Sources, Thermal Power Plants

**Process and Energy Engineering:** Air Conditioning and Automation Systems, Internal Combustion Engines, Refrigeration, Renewable Energy Sources, Thermal Power Plants

**Marine Engineering:** Heat Turbines, Internal Combustion Engines, Marine Energy Devices, Marine HVAC&R systems, Renewable Energy Sources

**Materials Engineering:** Forming Technology, Thermal Processes of Materials

Elective Subjects							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
<b>Subjects from elective group Mechanical Engineering Design and Mechatronics:</b>							
	Modelling of Hydraulics and Pneumatics	2		1	2	5	5
	CAE in Product Design	2			2	4	5
	Control of Mechatronics Systems	2	1			3	5
	Mechanical Behaviour and Selection of Materials	2	1	1		4	5
<b>Subjects from elective group Computational Mechanics and Engineering:</b>							
	Stability of Structures	2		2		4	5
	Optimal Structural Design	2		2		4	5
	Control of Dynamic Systems	2	1		1	4	5
	Application of Parallel Computing	2			2	4	5
	Dynamic Systems	2			2	4	5
	Programming: Scripting Languages	2	2			4	6
<b>Subjects from elective group Technology Computational Engineering:</b>							
	Quality Management	2	2			4	5
	Industrial Robotics	2		2		4	5
	Computer Simulation of Production Processes	2		1		3	5
<b>Subjects from elective group Industrial Engineering and Management:</b>							
	Advanced Manufacturing Processes	2	1		1	4	5
	Computer Simulation of Production Processes	2		1		3	5
	Marketing	2	2			4	5

<b>Subjects from elective group Thermal Engineering:</b>							
	Thermal Power Plants	3	1			4	5
	Air Conditioning and Automation Systems	3	1			4	5
<b>Subjects from elective group Process and Energy Engineering:</b>							
	Air Conditioning and Automation Systems	3	1			4	5
	Renewable Energy Sources	3	2			5	5
	Refrigeration	2	2			4	5
<b>Subjects from elective group Marine Engineering:</b>							
	Renewable Energy Sources	3	2			5	5
	Ocean Mobile & Fixed Structures	2	2			4	5
<b>Subjects from elective group Materials Engineering:</b>							
	Mechanical Behaviour and Selection of Materials	2	1	1		4	5
	Designing the Production Systems	2	2			4	5
	Thermal Power Plants	3	1			4	5
	Ocean Mobile & Fixed Structures	2	2			4	5

<b>4. semester</b>							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
	Free Elective Subject III <sup>5</sup> Graduate Work					4	5 10
<b>Subjects from elective group Mechanical Engineering Design and Mechatronics:</b>							
	Numerical Methods in Design	2	2			4	5
	Elective Subject IV					4	5
	Elective Subject V					4	5
<b>Subjects from elective group Computational Mechanics and Engineering:</b>							
	Computational Fluid Dynamics	2			2	4	5
	Experimental Testing in Mechanics of Structures and Machines	2		2		4	5
	Elective Subject IV					4	5
<b>Subjects from elective group Technology Computational Engineering:</b>							
	CNC/NC Machine Tools	2		1		3	5
	CAD/CAPP/CAM	2		1		3	5
	Elective Subject III					4	5
<b>Subjects from elective group Industrial Engineering and Management:</b>							
	Computer Integrated Manufacturing	2		1		3	5
	Production Management	2			1	3	5
	Elective Subject III					4	5
<b>Subjects from elective group Thermal Engineering:</b>							
	Gas Engineering	3	1			4	5
	Thermal Measurements	2		2		4	5
	Elective Subject III					4	5

Subjects from elective group Process and Energy Engineering:							
	Environmental Engineering	2	2			4	5
	Process Plants Equipment	2	2			4	5
	Elective Subject III					4	5
Subjects from elective group Marine Engineering:							
	Ship Propulsion Devices	2	1		1	4	5
	Marine Deck Machinery	2			2	4	5
	Elective Subject III					4	5
Subjects from elective group Materials Engineering:							
	CNC/NC Machine Tools	2		1		3	5
	Materials Testing and Fracture Analysis	2		1		3	5
	Elective Subject III					4	5
<b>TOTAL</b>						<b>16</b>	<b>30</b>

<sup>5</sup> Enroll one subject in the 4<sup>th</sup> semester from other elective groups or from other graduate studies at the Faculty of Engineering University of Rijeka, worth 5 ECTS or more.

Elective Subjects							
	Subject title	Hours / week					ECTS
		L	aT	IT	dT	L+T	
Subjects from elective group Mechanical Engineering Design and Mechatronics:							
	Transport Systems	2			2	4	5
	Laboratory Exercises A	1		2		3	5
	Micro and Nano Electromechanical Systems	2	1			3	5
	Laboratory Exercises B	1		2		3	5
Subjects from elective group Computational Mechanics and Engineering:							
	Durability of Machines and Structures	2		1	1	4	5
	Dynamics of Offshore Structures	2	2			4	5
	Numerical Modelling of Hydraulic Machines	2			2	4	5
	Programming of Engineering Applications	2			2	4	5
Subjects from elective group Technology Computational Engineering:							
	Application of Artificial Intelligence	2		1		3	5
	Production Management	2			1	3	5
	Computer Integrated Manufacturing	2		1		3	5
	Materials Testing and Fracture Analysis	2		1		3	5
Subjects from elective group Industrial Engineering and Management:							
	CAD/CAPP/CAM	2		1		3	5
	Materials Testing and Fracture Analysis	2		1		3	5
Subjects from elective group Thermal Engineering:							
	Fuels, Lubricants and Water	2	2			4	5
	Environmental Engineering	2	2			4	5



<b>Subjects from elective group Process and Energy Engineering:</b>							
	Fuels, Lubricants and Water	2	2			4	5
	Gas Engineering	3	1			4	5
	Thermal Measurements	2		2		4	5
	Process Engineering	2	2			4	5
<b>Subjects from elective group Marine Engineering:</b>							
	Fuels, Lubricants and Water	2	2			4	5
	Gas Engineering	3	1			4	5
	Basics of Ship Production	2			1	3	5
	Environmental Engineering	2	2			4	5
	Ship Outfitting and Repair	3			1	4	5
<b>Subjects from elective group Materials Engineering:</b>							
	Ship Propulsion Engines	2	1			3	5
	Basics of Ship Production	2			1	3	5
	Production Management	2			1	3	5

<b>GRADUATE UNIVERSITY STUDY OF MECHANICAL ENGINEERING TOTAL</b>	<b>Hours 83</b>	<b>ECTS 120</b>
--	---------------------	---------------------