



3 <sup>rd</sup> Year Undergraduate study											
5 <sup>th</sup> semester						6 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Organic chemistry	3	2	0	5	7	Thermal process engineering	3	2	1	6	7
Mechanical process engineering	3	2	1	6	8	Chemical reaction engineering	2	0	2	4	6
Catalysis and catalysts	2	2	0	4	6	Measurements and process control	3	2	1	6	7
Energetic	2	0	2	4	5	Optional course II	2	1	0	3	4
Optional course I	2	1	0	3	4	Final thesis	0	6	0	6	6
<b>Total</b>	<b>12</b>	<b>7</b>	<b>3</b>	<b>22</b>		<b>Total</b>	<b>10</b>	<b>11</b>	<b>4</b>	<b>25</b>	
					<b>30</b>						<b>30</b>

#### Optional course I

Industrial ecology

Tensides

Structure determination of organic compounds – University of Zagreb

#### Optional course II

Matlab/Simulink

Petroleum refining processes

New technologies for sustainable construction

Engineering thermodynamics - University of Zagreb

## Chemical Engineering - Graduate study

level of qualification - Graduate university study programme (second cycle degree), with master thesis  
 name of qualification and title conferred (in original language) - magistar inženjer kemijskog inženjerstva; mag.ing.cheming.

Study of Chemical Engineering (CE) is based on a modular principle with three modules in 1<sup>st</sup> and 2<sup>nd</sup> year of graduate study:

MODULE Chemical Process Engineering (CPE)

MODULE Environmental Chemical Engineering (ECE)

MODULE Chemical Technologies and Products (CTP)

MODULE Chemical Process Engineering (CPE)

1 <sup>st</sup> Year Graduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Chemical plant design I	2	2	0	4	5	Chemical plant design II	2	3	0	5	6
Construction materials, corrosion and protection	2	2	0	4	4	Chemical engineering laboratory	0	4	0	4	6
Chemical engineering laboratory	1	3	0	4	6	Mathematical modelling, process dynamics	2	0	2	4	4
Chemical reactors	2	2	0	4	6	Optional course II	2	1	0	3	4
Optional course I	2	1	0	3	4	Process equipment	2	0	1	3	5
Petroleum and petrochemical engineering	2	1	0	3	5	Catalytic reaction engineering	2	1	0	3	5
<b>Total</b>	<b>11</b>	<b>11</b>	<b>0</b>	<b>22</b>		<b>Total</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

2 <sup>nd</sup> Year Graduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Process economy	2	0	1	3	5	Master thesis	0	20	0	20	30
Management	3	0	2	5	7						
Optional course III	2	1	0	3	4						
Optional course IV	2	1	0	3	4						
Formulation engineering	2	0	1	3	5						
Polymer engineering	3	1	1	5	5						
<b>Total</b>	<b>14</b>	<b>3</b>	<b>5</b>	<b>22</b>		<b>Total</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>20</b>	
					<b>30</b>						<b>30</b>

MODULE Environmental Chemical Engineering (ECE)

1 <sup>st</sup> Year Graduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Chemical plant design I	2	2	0	4	5	Chemical plant design II	2	3	0	5	6
Construction materials, corrosion and protection	2	2	0	4	4	Chemical engineering laboratory	0	4	0	4	6
Chemical engineering laboratory	1	3	0	4	6	Mathematical modelling, process dynamics	2	0	2	4	4
Chemical reactors	2	2	0	4	6	Optional course II	2	1	0	3	4
Optional course I	2	1	0	3	4	Air pollution control engineering	2	1	0	3	5
Biochemical engineering	2	1	0	3	5	Environmental engineering	2	0	1	3	5
<b>Total</b>	<b>11</b>	<b>11</b>	<b>0</b>	<b>22</b>		<b>Total</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

2 <sup>nd</sup> Year Graduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Process economy	2	0	1	3	5	Master thesis	0	20	0	20	30
Management	3	0	2	5	7						
Optional course III	2	1	0	3	4						
Optional course IV	2	1	0	3	4						
Industrial waste water treatment	2	2	0	4	5						
Solid and hazardous waste treatment	2	2	0	4	5						
<b>Total</b>	<b>13</b>	<b>6</b>	<b>3</b>	<b>22</b>		<b>Total</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>20</b>	
					<b>30</b>						<b>30</b>

## MODULE Chemical Technologies and Products (CTP)

1 <sup>st</sup> Year Graduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Chemical plant design I	2	2	0	4	5	Chemical plant design II	2	3	0	5	6
Construction materials, corrosion and protection	2	2	0	4	4	Chemical engineering laboratory	0	4	0	4	6
Chemical engineering laboratory	1	3	0	4	6	Mathematical modelling, process dynamics	2	0	2	4	4
Chemical reactors	2	2	0	4	6	Optional course II	2	1	0	3	4
Optional course I	2	1	0	3	4	Petrochemical technologies	2	1	0	3	5
Technological processes of organic industry	2	1	0	3	5	Inorganic technologies	2	1	0	3	5
<b>Total</b>	<b>11</b>	<b>11</b>	<b>0</b>	<b>22</b>		<b>Total</b>	<b>10</b>	<b>10</b>	<b>2</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

2 <sup>nd</sup> Year Graduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Process economy	2	0	1	3	5	Master thesis	0	20	0	20	30
Management	3	0	2	5	7						
Optional course III	2	1	0	3	4						
Optional course IV	2	1	0	3	4						
Technology of dyes and coatings	3	2	0	5	5						
Electrochemical engineering and products	2	1	0	3	5						
<b>Total</b>	<b>14</b>	<b>5</b>	<b>3</b>	<b>22</b>		<b>Total</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>20</b>	
					<b>30</b>						<b>30</b>

**Optional course I**

Polymer nanocomposites  
Additives for polymer materials and products  
Characterization and identification of materials  
Molecular spectroscopy  
Environmental management systems  
Adhesion and adhesive products  
Degradation and modification of polymers  
Polymeric engineering materials

**Optional course II**

Degradation and modification of polymers  
Cellulose and paper technology  
Introduction to mathematical methods in engineering  
Electrochemistry of biological processes and biomolecules  
Petroleum fuels and lubricants  
Corrosion and environment  
Introduction to nanotechnology  
Particulate systems  
Corrosion and environment - University of Zagreb

**Optional course III and IV**

Polymer nanocomposites  
Additives for polymer materials and products  
Characterization and identification of materials  
Molecular spectroscopy  
Environmental management systems  
Adhesion and adhesive products  
Degradation and modification of polymers  
Polymeric engineering materials  
Polymer science and technology - University of Zagreb  
Nano- and micromechanics of materials

## Materials Science and Engineering – Undergraduate study

level of qualification - Undergraduate university study programme (first cycle degree), with bachelor thesis

name of qualification and title conferred (in original language) - sveučilišni prvostupnik (baccalaureus) inženjer kemijskog inženjerstva; univ.bacc.ing.cheming.

1 <sup>st</sup> Year Undergraduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
General chemistry	2	2	2	6	8	Calculus II	3	0	3	6	8
Calculus I	3	0	3	6	7	Physics II	2	2	2	6	8
Physics I	2	0	2	4	5	Chemical analysis of materials	3	3	0	6	7
Computer programming and application	1	2	0	3	5	Inorganic chemistry	2	2	0	4	6
Mechanics of materials	2	0	1	3	4	English language	2	0	0	2	1
English language	2	0	0	2	1						
<b>Total</b>	<b>12</b>	<b>4</b>	<b>8</b>	<b>24</b>		<b>Total</b>	<b>12</b>	<b>7</b>	<b>5</b>	<b>24</b>	
Physical education	0	2	0	2	0	Physical education	0	2	0	2	0
					30						30

2 <sup>nd</sup> Year Undergraduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Organic chemistry I	3	2	0	5	7	Physical chemistry II	3	2	0	5	7
Physical chemistry I	3	2	0	5	6	Organic chemistry II	3	2	0	5	7
Transport phenomena	2	1	1	4	6	Structure and properties of inorganic materials	2	2	0	4	6
Mass and energy balances	2	0	2	4	5	Measurements and process control	2	2	0	4	5
Statistical and numerical methods	1	0	2	3	5	Electrochemistry	1	1	1	3	4
English language	2	0	0	2	1	English language	2	0	0	2	1
<b>Total</b>	<b>13</b>	<b>5</b>	<b>5</b>	<b>23</b>		<b>Total</b>	<b>13</b>	<b>9</b>	<b>1</b>	<b>23</b>	
Physical education	0	2	0	2	0	Physical education	0	2	0	2	0
					30						30
						Professional internship					

3 <sup>rd</sup> Year Undergraduate study											
5 <sup>th</sup> semester						6 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Polymers and polymerization processes	2	2	0	4	5	Characterization of materials	2	3	0	5	6
Unit operations	2	2	1	5	6	Inorganic nonmetal materials	2	1	0	3	4
Structure and properties of polymer materials	2	1	1	4	6	Metal materials, corrosion and protection	2	1	0	3	4
Thermodynamics and kinetics of materials	2	1	1	4	6	Optional course	2	1	0	3	4
Chemical reaction engineering and catalysis	2	1	1	4	6	Final thesis	0	9	0	9	13
<b>Total</b>	<b>10</b>	<b>8</b>	<b>4</b>	<b>22</b>		<b>Total</b>	<b>8</b>	<b>14</b>	<b>0</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

#### Optional courses

Construction materials

Molecular spectroscopy

Matlab/Simulink

New technologies for sustainable construction

Introduction to nanotechnology

Polymeric biomaterials



## Materials Science and Engineering – Graduate study

level of qualification - Graduate university study programme (second cycle degree), with master thesis  
 name of qualification and title conferred (in original language) - magistar inženjer kemijskog  
 inženjerstva; mag.ing.cheming.

1 <sup>st</sup> Year Graduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Surface engineering	2	1	2	5	7	Ceramic engineering	3	3	0	6	7
Petroleum and petrochemical products	3	2	0	5	7	Composite materials (composites)	2	2	0	4	6
Physical chemistry of polymers	3	2	0	5	6	Polymer processing	2	1	1	4	6
Inorganic binders engineering	3	2	0	5	7	Silicate chemistry	2	2	0	4	6
Optional course	2	1	0	3	4	Optional course	2	1	0	3	4
<b>Total</b>	<b>13</b>	<b>8</b>	<b>2</b>	<b>23</b>		<b>Total</b>	<b>11</b>	<b>9</b>	<b>1</b>	<b>21</b>	
					31						29

2 <sup>nd</sup> Year Graduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Material engineering laboratory	0	4	0	4	8	Master thesis	0	22	0	22	30
Quality management	2	2	1	5	6						
Introduction to management	2	0	2	4	4						
Optional course	2	1	0	3	4						
Optional course	2	1	0	3	4						
Optional course	2	1	0	3	4						
<b>Total</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>22</b>		<b>Total</b>	<b>0</b>	<b>22</b>	<b>0</b>	<b>22</b>	
					30						30

### **Optional courses in the 1<sup>st</sup> semester**

Polymer nanocomposites

Additives for polymer materials

Polymer packaging materials

Polymer blends

Non-destructive methods of chemical analysis in arts and archaeology

Nano- and micromechanics of materials

### **Optional courses in the 2<sup>nd</sup> semester**

Introduction to mathematical methods in engineering

Conducting polymers - synthetic metals

Elastomers

Adhesion and adhesive products

Supplements for cement composites

X-ray diffraction in materials engineering

Introduction to nanotechnology

### **Optional courses in the 3<sup>rd</sup> semester**

Polymer nanocomposites

Additives for polymer materials

Elastomers

Supplements for cement composites

X-ray diffraction in materials engineering

Polymer packaging materials

Polymer blends

Polymer science and technology - University of Zagreb

## Environmental Engineering – Undergraduate study

level of qualification - Undergraduate university study programme (first cycle degree), with bachelor thesis

name of qualification and title conferred (in original language) - sveučilišna prvostupnica (baccalaurea) inženjerka ekoinženjerstva;

univ. bacc. ing. oecoing.

1 <sup>st</sup> Year Undergraduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Introduction to environmental engineering	2	0	0	2	4	Calculus II	3	0	3	6	7
Calculus I	3	0	3	6	7	Analytical chemistry	2	1	1	4	6
General and inorganic chemistry	2	2	2	6	7	Physics II	2	0	2	4	6
Physics I	2	0	2	4	6	Microbiology	2	2	0	4	6
Applied computer sciences	2	2	0	4	5	Optional course	2	2	0	4	4
English language	2	0	0	2	1	English language	2	0	0	2	1
<b>Total</b>	<b>13</b>	<b>4</b>	<b>7</b>	<b>24</b>		<b>Total</b>	<b>13</b>	<b>5</b>	<b>6</b>	<b>24</b>	
Physical education	0	2	0	2	0	Physical education	0	2	0	2	0
					<b>30</b>						<b>30</b>

2 <sup>nd</sup> Year Undergraduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Basics of environmental statistics and numerical methods	2	0	2	4	6	Environmental protection	2	1	1	4	5
Organic chemistry	2	2	0	4	5	Chemistry of environment	3	3	0	6	7
Physical chemistry	3	2	1	6	7	Mass and energy balances	2	0	3	5	6
Transport phenomena	2	1	1	4	6	Fluid mechanics	3	1	1	5	6
Ecology	2	0	1	3	5	Modern analytical methods in analysis of environment	2	1	0	3	5
English language	2	0	0	2	1	English language	2	0	0	2	1
<b>Total</b>	<b>13</b>	<b>5</b>	<b>5</b>	<b>23</b>		<b>Total</b>	<b>14</b>	<b>6</b>	<b>5</b>	<b>24</b>	
Physical education	0	2	0			Physical education	0	2	0	0	0
					<b>30</b>						<b>30</b>

3 <sup>rd</sup> Year Undergraduate study											
5 <sup>th</sup> semester						6 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Unit operations in environmental engineering	3	1	1	5	7	Analysis and modeling of environmental processes	3	0	3	6	7
Engineering thermodynamics	2	0	2	4	4	Process equipment in environmental engineering	2	1	1	4	5
Environmental management systems	2	0	1	3	4	Environmental impact assessment	2	0	2	4	5
Air, water and soil management	2	1	1	4	4	Energy management	2	0	1	3	4
Waste management	2	0	2	4	4	Optional course	2	0	2	4	4
Reactors and bioreactors	3	0	2	5	7	Final thesis	0	4	0	4	5
<b>Total</b>	<b>14</b>	<b>2</b>	<b>9</b>	<b>25</b>		<b>Total</b>	<b>11</b>	<b>5</b>	<b>10</b>	<b>25</b>	
					30						30

#### Optional courses in the 2<sup>nd</sup> semester

Basics of mechanical engineering  
 Basics of electrical engineering  
 Biology

#### Optional courses in the 6<sup>th</sup> semester

Biology  
 Inorganic chemistry I  
 Renewable energy sources  
 Basics of mechanical engineering  
 Basics of electrical engineering  
 Matlab/Simulink  
 Measurement and automatic process control  
 New technologies for sustainable construction  
 Biochemistry

## Environmental Engineering – Graduate study

level of qualification - Graduate university study programme (second cycle degree), with master thesis  
 name of qualification and title conferred (in original language) - magistra inženjerka ekoinženjerstva;  
 mag. ing. oecoing.

1 <sup>st</sup> Year Graduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Environmental engineering laboratory	1	5	0	6	10	Environmental engineering laboratory	1	5	0	6	10
Module 1 – Optional course I	2	1	1	4	5	Module 1 – Optional course II	2	1	1	4	5
Module 2 – Optional course I	2	1	1	4	5	Module 2 – Optional course II	2	1	1	4	5
Module 3 - Optional course I	2	1	1	4	5	Module 3 - Optional course II	2	1	1	4	5
Optional course II	2	1	1	4	5	Optional course III	2	1	1	4	5
<b>Total</b>	<b>9</b>	<b>9</b>	<b>4</b>	<b>22</b>		<b>Total</b>	<b>9</b>	<b>9</b>	<b>4</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

2 <sup>nd</sup> Year Graduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Environmental engineering project	1	5	0	6	10	Master thesis	0	22	0	22	30
Optional course IV	2	1	1	4	5						
Optional course V	2	1	1	4	5						
Optional course VI	2	1	1	4	5						
Optional course VII	2	1	1	4	5						
<b>Total</b>	<b>9</b>	<b>9</b>	<b>4</b>	<b>22</b>		<b>Total</b>	<b>0</b>	<b>22</b>	<b>0</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

## **MODULE 1**

Bioreaction engineering  
Renewable energy sources  
Ecotoxicology

## **MODULE 2**

Environmental engineering and management  
Environmental risk assessment  
Introduction to mathematical methods in engineering

## **MODULE 3**

Environmental protection in petroleum refining  
Recycling and disposal of waste  
Bioremediation  
Environmental protection in petrochemical production  
Industrial biotransformations  
Polymer waste management  
Membrane technologies in water treatment  
Air pollution control engineering  
Corrosion and environment

### **Optional courses**

Bioreaction engineering  
Environmental protection in petrochemical production  
Organic dyes in environment  
Advanced oxidation technologies  
Recycling and disposal of waste  
Polymer science and technology - University of Zagreb  
Management

## Applied Chemistry – Undergraduate study

level of qualification - Undergraduate university study programme (first cycle degree), with bachelor thesis

name of qualification and title conferred (in original language) - sveučilišna prvostupnica (baccalaurea) primijenjene kemije; univ. bacc. appl. chem.

1 <sup>st</sup> Year Undergraduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
General chemistry	2	2	2	6	8	Analytical chemistry I	2	2	1	5	6
Physics I	2	0	2	4	5	Inorganic chemistry	2	2	0	4	6
Calculus I	3	0	3	6	7	Physics II	2	0	2	4	5
Computer programming and application	2	2	0	4	5	Calculus II	3	0	3	6	6
Basics of mechanical engineering	1	0	1	2	3	Basics of electrical engineering	1	1	0	2	3
						Optional course	2	0	0	2	4
English language	2	0	0	2	1	English language	2	0	0	2	1
<b>Total</b>	<b>12</b>	<b>4</b>	<b>8</b>	<b>24</b>		<b>Total</b>	<b>14</b>	<b>5</b>	<b>6</b>	<b>25</b>	
Physical education	0	2	0	2	0	Physical education	0	2	0		
					29						31

2 <sup>nd</sup> Year Undergraduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Organic chemistry I	3	2	0	5	7	Physical chemistry II	3	2	0	5	6
Physical chemistry I	3	2	0	5	6	Organic chemistry II	3	2	0	5	6
Analytical chemistry II	2	1	1	4	5	Fundamentals of chemical and biochemical engineering	3	0	2	5	5
Statistical and numerical methods	1	0	2	3	4	Transfer and separation processes	2	1	1	4	5
English language	2	0	0	2	1	Thermodynamics of real systems	2	0	1	3	5
Optional course	2	0	0	2	3	English language	2	0	0	2	1
Optional course	2	0	0	2	3	Optional course	2	0	0	2	3
<b>Total</b>	<b>15</b>	<b>5</b>	<b>3</b>	<b>23</b>		<b>Total</b>	<b>17</b>	<b>5</b>	<b>4</b>	<b>26</b>	
Physical education	0	2	0	0	0	Physical education	0	2	0	2	0
					29						31
						Professional internship					

3 <sup>rd</sup> Year Undergraduate study											
5 <sup>th</sup> semester						6 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Electrochemistry	2	2	2	6	7	Chemical technology laboratory	0	5	0	5	5
Chemistry of macromolecules	3	3	0	6	7	Electrochemical and corrosion engineering	2	2	0	4	5
Instrumental analytical chemistry	2	1	0	3	6	Optional course from A or B or C	2	1	0	3	5
Molecular spectroscopy	2	0	1	3	6	Optional course from A or B or C	2	1	0	3	5
Biochemistry	2	0	1	3	4	Final thesis	0	7	0	7	10
<b>Total</b>	<b>11</b>	<b>6</b>	<b>4</b>	<b>21</b>		<b>Total</b>	<b>6</b>	<b>16</b>	<b>0</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

#### Optional course 2<sup>nd</sup> semester

Biology  
Stoichiometry I  
Stoichiometry II

#### Optional course 3<sup>rd</sup> semester

Ecotoxicology  
Tensides  
Stoichiometry I  
Stoichiometry II

#### Optional course 4<sup>th</sup> semester

Ecotoxicology  
Biology  
Matlab/Simulink  
New technologies for sustainable construction

#### Popis izbornih predmeta po modulima

##### MODULE A – Environmental Chemistry and Green Technologies

Introduction to environmental chemistry  
Chemistry in the environmental protection

##### MODULE B – Advance Materials and Technologies

Introduction to nanotechnology  
Structure and properties of materials

##### MODULE C – Applied Organic Chemistry

Planning of organic synthesis  
Chemistry of heterocycles  
Petrochemistry



## Applied Chemistry – Graduate study

level of qualification - Graduate university study programme (second cycle degree), with master thesis  
 name of qualification and title conferred (in original language) - magistar primijenjene kemije;  
 mag.appl.chem.

MODULE Environmental Chemistry and Green Technologies (MODULE A)

MODULE Advance Materials and Technologies (MODULE B)

MODUL Applied Organic Chemistry (MODULE C)

1 <sup>st</sup> Year Graduate study											
1 <sup>st</sup> semester						2 <sup>nd</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Chemometrics	2	2	0	4	6	Integrated chemical systems I	2	0	2	4	6
Quantum chemistry	2	0	2	4	6	Optional course from A or B or C	2	2	0	4	6
Chemical and physical surface properties and nanostructures	2	4	0	6	8	Optional course from A or B or C	2	2	0	4	6
Molecular separations	2	2	0	4	6	Optional course from A or B or C	2	2	0	4	6
Optional course	2	2	0	4	5	Optional course	2	0	0	2	6
<b>Total</b>	<b>10</b>	<b>10</b>	<b>2</b>	<b>22</b>		<b>Total</b>	<b>10</b>	<b>6</b>	<b>2</b>	<b>18</b>	
					<b>30</b>						<b>30</b>

2 <sup>nd</sup> Year Graduate study											
3 <sup>rd</sup> semester						4 <sup>th</sup> semester					
Course name	P	V	S	P+V+S	ECTS	Course name	P	V	S	P+V+S	ECTS
Quality management	2	0	1	3	4	Master thesis	2	20	0	22	30
Technology management and innovations	1	0	1	2	4						
Optional course	2	2	0	4	4						
Optional course from A or B or C	2	2	0	4	6						
Optional course from A or B or C	2	2	0	4	6						
Optional course from A or B or C	2	2	0	4	6						
<b>Total</b>	<b>11</b>	<b>8</b>	<b>2</b>	<b>21</b>		<b>Total</b>	<b>2</b>	<b>20</b>	<b>0</b>	<b>22</b>	
					<b>30</b>						<b>30</b>

### Optional course 1<sup>st</sup> semester

Corrosion and environment

Polymeric engineering materials

Bioreaction engineering

Non-destructive methods of chemical analysis in arts and archaeology

Environmental management system

Degradation and modification of polymers

## List of optional courses

### MODULE A - 2<sup>nd</sup> semester

Introduction to environmental chemistry  
Chemistry in the environmental protection  
Chemical processes in soil and sediments  
Water chemistry  
Applied ecotoxicology

### MODULE B - 2<sup>nd</sup> semester

Introduction to nanotechnology  
Structure and properties of materials  
Functional ceramics  
Alternative energy sources  
Fuel cells  
Chemical energy sources  
Natural alumino-silica materials  
Polymeric biomaterials

### MODULE C - 2<sup>nd</sup> semester

Petrochemistry  
Structure determination of organic compounds  
Organic chemistry in drug development  
Chemistry of natural compounds  
Organic electrochemical synthesis

### Optional courses in the 2<sup>nd</sup> semester

Advanced strategies in organic chemistry  
Chemistry of heterocycles  
Membrane technologies in water treatment  
Introduction to mathematical methods in engineering  
Electrochemistry of biological processes and biomolecules  
Polymer nanocomposites  
X-ray diffraction in materials engineering  
Degradation and modification of polymers

### MODULE A - 3<sup>rd</sup> semester

Advanced separation technologies in environmental chemistry  
Non-destructive methods of chemical analysis in arts and archaeology

### MODULE B - 3<sup>rd</sup> semester

Conducting polymers - synthetic metals  
Corrosion stability of materials  
Hydrogen energy and economy

### MODULE C - 3<sup>rd</sup> semester

Heterocyclic antitumor drugs  
Microwave enhanced organic synthesis  
Antiviral and cytostatics

### Optional courses in the 3<sup>rd</sup> semester

Polymeric engineering materials  
Bioreaction engineering  
Polymer science and technology - University of Zagreb