

## **PROGRAMME OF EDUCATION**

**FACULTY: ENVIRONMENTAL ENGINEERING**

**MAIN FIELD OF STUDY: ENVIRONMENTAL ENGINEERING**

in area of technical sciences

**EDUCATION LEVEL: 2 nd level, MSc engineer**

**FORM OF STUDIES: full-time**

**PROFILE: general academic**

**SPECIALIZATION: ENVIRONMENTAL QUALITY MANAGEMENT (EQM)**

**LANGUAGE OF STUDY: English**

Content:

1.Assumed educational effects – attachment no. 1

2.Programme of studies – attachment no. 2

Faculty Council Resolution of **25.09.2012**

In effect since **01.10.2012**

## PROGRAMME OF STUDIES

## 1. Description

<i>Number of semesters: 3</i>	<i>Number ECTS points necessary to obtain qualifications: 90</i>
<p><i>Prerequisites (particularly for second-level studies):</i></p> <p>Diploma of the I level studies in: Environmental Engineering, Environmental Protection or related. Each application is assessed individually on its merits. If in doubt, please contact the Admission Officer. English: TOEFL - 550 points or IELTS - 6 points.</p>	<p><i>Upon completion of studies graduate obtains</i></p> <p><i>professional degree of: Master Engineer</i></p> <p><i>2nd level qualifications</i></p> <p>In order to receive the Master's degree, the graduates will be required to write a Master's thesis and pass the examination.</p>
<p><i>Possibility of continuing studies:</i></p> <p>Third-degree in Environmental Engineering and related fields.</p>	<p><i>Graduate profile, employability:</i></p> <p>The EQM graduates will obtain knowledge in environmental engineering and experience in environment protection technology. They will be prepared for solving problems in sustainable development and technology. They will be able to play the role of the leader of the team and to organize and run research debates. They will acquire the experience necessary for professional career at research units, industry and at universities or colleges. They will gain substantial international experience and will be acquainted with the circumstances and the environment of the prestigious laboratories. They will possess well above standard skills in communication.</p> <p>Job prospects: The graduate of EQM is able to design, maintain and operate the systems of air, water, wastewater treatment as well as</p>

<sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)

<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

<sup>6</sup> KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

<sup>7</sup> Optional – enter W, obligatory – enter Ob

	waste management. He may work in the private sector, industry and governmental administration. The profile of the graduate is suitable for work at universities in research and development institutions.
<p><i>Indicate connection with University's mission and its development strategy:</i></p> <p>The mission of our University and our Faculty is to shape the creative and critical personalities of students and define the directions of development in science and technology. The education offered at our institution is strongly linked with scientific research and the needs of economy and is consistent with standards of the European Higher Education Area. The degrees awarded by Wrocław University of Technology and Faculty of Environmental Engineering are a symbol of high quality of education, confirmed by the National Accreditation Committee and the Accreditation Committee of Universities of Technology.</p>	

## 2. Fields of science and scientific disciplines to which educational effects apply:

Fields of science: technical science; scientific disciplines: environmental engineering.

## 3. Concise analysis of consistency between assumed educational effects and labour market needs

Graduates of this programme will have modern knowledge in the field of environmental engineering and experience in environment protection technology. They will be prepared to participate in solving one of the most important problems of global economy– sustainable development. Sustainable development is such a way of satisfying the needs of the current generation that the chances of the future generations to satisfy their needs will not be reduced. This is what maintaining the current level of our civilization development depends on. This is why protection of the natural environment is one of the main issues in the European Union politics. According to the report of the Ministry of Science and Higher Education, the largest difference between the need and the supply of technical studies graduates exists in specialisations related to environment protection. The market need for specialists in environment protection and environmental engineering makes 36% of the need for technical programmes.

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<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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<sup>7</sup> Optional – enter W, obligatory – enter Ob

## 4. List of education modules:

### 4.1. List of obligatory modules:

#### 4.1.1 List of general education modules

##### 4.1.1.1 Liberal-managerial subjects module (min. .2.. ECTS points):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ZMZ001498W	Contemporary Management	1					K2IS_W03,S2EQM_W08,K2IS_K01	15	30	1	0,5	T	Z	O		KO	Ob.
2	FLC024004W	Philosophy of science and technology	1					T2A_W07,T2A_W08,T2A_K01, K2IS_K02	15	30	1	0,5	T	Z	O		KO	Ob.
		Total	2						30	60	2	1						

##### 4.1.1.2 Foreign languages module (min. ...3.. ECTS points):

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1		Polish language A1		1				T1A_K01,T1A_U01,T1A_U02,T1A_U05	15	30	1	0,5	T	Z	O	P	KO	Ob.
2		Polish language A2		3				T1A_U01, T1A_U02, T1A_U05, T1A_K01	45	60	2	1,5	T	Z	O	P	KO	Ob.
		Total		4					60	90	3	2						

### Altogether for general education modules

<sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

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<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes <sup>1</sup>
lec	cl	lab	pr	sem				
2	4				90	150	5	3

## 4.1.2 List of basic sciences modules

### 4.1.2.1 Mathematics module

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ISS005006	Engineering applications of mathematical statistics	1					K2IS_W01	15	60	2	0,5	T	Z			PD	Ob
2	ISS005006	Engineering applications of mathematical statistics		1				K2IS_U01	15	30	1	0,5	T	Z		P	PD	Ob.
Total			1	1					30	90	3	1						

### Altogether for basic sciences modules:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes <sup>1</sup>
lec	cl	lab	pr	sem				
1	1				30	90	3	1

<sup>1</sup>BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

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<sup>3</sup>Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)

<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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## 4.1.3 List of main-field-of-study modules

### 4.1.3.1 Obligatory main-field-of-study modules

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ISS105023	Automation In environmental engineering	1					S2EQM_W07	15	60	2	0,5	T	Z			K	Ob
2	ISS105023	Automation In environmental engineering			1			S1ZWS_U03	15	30	1	0,5	T	Z		P	K	Ob.
3	ISS005007	Environmental management	2					K2IS_W03, K2IS_W09, K2IS_W13 ;K2IS_W03, K2IS_W09, K2IS_W13, K2IS_W03, K2IS_W09, K2IS_W13, K2IS_K01, K2IS_K03,	30	90	3	1	T	Z			K	
4	GPA105723W	Spatial planning	1					K2IS_W02,K2IS_W03,K2IS_K01,K2IS_K03	15	60	2	0,5	T	Z			K	Ob
5	ISS105029	Reliability of eng.syst.	1					S2EQM_W07	15	60	2	0,5	T	Z			K	Ob
6	ISS105036	Organization of construction works	1					S2EQM_W07	15	60	2	0,5	T	Z			K	Ob
7	ISS105037	Buildings regulations	1					K2IS_W02, K2IS_K02	15	60	2	0,5	T	Z			K	Ob
8	ISS105038	Renewable energy systems	1					K2IS_W03,K2IS_W09,S2EQM_W01,S2EQM_W03	15	60	2	0,5	T	Z			K	Ob
Total			8		1				135	480	16	4,5						

### Altogether (for main-field-of-study modules):

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes <sup>1</sup>
lec	cl	lab	pr	sem				
8		1			135	480	16	4,5

## 4.1.4 List of specialization modules

### 4.1.4.1 Specialization subjects (e.g. whole specialization) modules (min. ..44. ECTS points):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol GK)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ISS105050	Environmental Chemistry	2					S2EQM_W01, S2EQM_W02, K2IS_K02	30	90	3	1	T	E			S	Ob.
2	ISS105050	Environmental Chemistry			2			S2EQM_U02, S2EQM_U04,	30	60	2	1	T	Z		P	S	Ob.
3	ISS105014	Water quality management	2					K2IS_W09,S2EQM_W02	30	90	3	1	T	E			S	Ob.
4	ISS105024	Raw materials management	1					S2EQM_W03, S2EQM_W05, K2IS_K02	15	30	1	0,5	T	Z			S	Ob
5	ISS105024	Raw materials management					1	S2EQM_U01, K2IS_K03,K2IS_K02	15	30	1	0,5	T	Z		P	S	Ob
6	ISS105025	Water treatment technology	2					K2IS_W09,S2ZWS_W02	30	60	2	1	T	E			S	Ob
7	ISS105025	Water treatment technology			1			K2IS_U06,S2ZWS_U02,K2IS_K01	15	60	2	0,5	T	Z		P	S	Ob
8	ISS105026	Sanitary biology	1					K1IS_W03, K2IS_K02	15	60	2	0,5	T	Z			S	Ob
9	ISS105026	Sanitary biology			1			S2EQM_U02, K2IS_U04,K1IS_U02,K1IS_U05,K2IS_U01	15	30	1	0,5	T	Z		P	S	Ob
10	ISS105027	AutoCad			2			S1ZWS_W03,S1ZWS_U05,S1ZWS_U01	30	60	2	1	T	Z		P	S	Ob
11	ISS105028	Water supply systems	1					K2IS_W09,S2EQM_W07, K2IS_K02	15	30	1	0,5	T	Z			S	Ob
12	ISS105028	Water supply systems				1		K2IS_K02,K2IS_U02,K2IS_U05,K2IS_U06,S2EQM_U05	15	30	1	0,5	T	Z		P	S	Ob
13	ISS105015	Biodegradable materials	2					S2EQM_W03,S2EQM_W04	30	60	2	1	T	Z			S	Ob
14	ISS105016	Waste water treatment technology	2					K2IS_W03,K2IS_W09,S2EQM_W02,	30	60	2	1	T	E			S	Ob
15	ISS105016	Waste water treatment technology			1			K2IS_K01,K2IS_U06,S2EQM_U02	15	30	1	0,5	T	Z		P	S	Ob
16	ISS105030	Solid waste management	2					S2EQM_W03,S2EQM_W04, S2EQM_W05, S2EQM_W06	30	60	2	1	T	E			S	Ob
17	ISS105030	Solid waste management			1			S2EQM_U02,S2EQM_W04, S2EQM_W05, K1OS_K03	15	30	1	0,5	T	Z		P	S	Ob
18	ISS105019	Waste gases purification	2					S2EQM_W06	30	60	2	1	T	E			S	Ob
19	ISS105019	Waste gases purification			1			S2EQM_U04	15	30	1	0,5	T	Z		P	S	Ob
20	ISS105031	Toxicology	1					K1IS_W03,K2IS_W01,K2IS_K02	15	30	1	0,5	T	Z			S	Ob
21	ISS105031	Toxicology			1			K2IS_U01,K2IS_U04,K1IS_U02	15	30	1	0,5	T	Z		P	S	Ob
22	ISS105032	Environmental health hazards	2					S2EQM_W05	30	60	2	1	T	Z			S	Ob
23	ISS105033	Sewage systems	1					K2IS_W09, S2EQM_W07, K2IS_K02	15	60	2	0,5	T	Z			S	Ob.
24	ISS105033	Sewage systems				1		K2IS_U06,S2EQM_U03,K2IS_U02,K2IS_U05,S2EQM_U05,K2IS_K02	15	30	1	0,5	T	Z		P	S	Ob.
25	ISS105049	Membrane separation processes in environmental protection	1					K2IS_W03,K2IS_W09,S2EQM_W02	15	60	2	0,5	T	Z			S	Ob.

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<sup>3</sup>Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)

<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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26	ISS105049	Membrane separation processes in environmental protection			1				K2IS_U06,S2EQM_U02,K2IS_K01	15	30	1	0,5	T	Z			S	Ob.
27	ISS105035	Diploma seminar					2		K2IS_U04,S2EQM_U01,S2EQM_U03,S2EQM_U06,S2EQM_U07,K2IS_K01,K2IS_K03	30	60	2	1	T	Z		P	S	Ob
Total			22	1	10	2	3			570	1320	44	19						

#### 4.2.4.2 Diploma project (master thesis) module (min. 20 ECTS points):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol GK)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ISS105034	Diploma project (master thesis)				15		K2IS_U04,S2EQM_U01,S2EQM_U02,S2EQM_U03,S2EQM_U04,S2EQM_U05,S2EQM_U07,K2IS_K01,K2IS_K03	225	600	20	7,5	T	Z		P	S	Ob
Total						15			225	600	20	7,5						

#### Altogether for specialization modules:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes <sup>1</sup>
lec	cl	lab	pr	sem				
22	1	10	17	3	795	1920	64	26,5

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<sup>3</sup>Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)

<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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<sup>7</sup> Optional – enter W, obligatory – enter Ob



## 4.2 List of optional modules

### 4.2.3 List of main-field-of-study modules

#### 4.2.3.1 Elective subject module (min. .2.. ECTS points):

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1		Elective subject	1					S2EQM_W01	15	30	1	0,5	T	Z				W
2		Elective subject			1			S2EQM_U02	15	30	1	0,5	T	Z		P		W
Total			1		1				30	60	2	1						

#### Altogether for main-field-of-study modules:

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes <sup>1</sup>
lec	cl	lab	pr	sem				
1		1			30	60	2	1

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<sup>3</sup>Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)

<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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#### 4.4 Diploma dissertation module

<b>Type of diploma dissertation</b>	Licencjat / inżynier / magister / magister inżynier	
<b>Number of diploma dissertation semesters</b>	<b>Number of ECTS points</b>	<b>Code</b>
1	20	ISS105034
<b>Character of diploma dissertation</b>		
<p>Master of Engineering Thesis</p> <p>Second degree studies thesis (master thesis) should include computational, investigational or experimental solution of the posted scientific or technical problem using the knowledge acquired during the second degree studies, the thesis should include:</p> <ol style="list-style-type: none"> <li>1) definition of thesis problem,</li> <li>2) an extension of the problem,</li> <li>3) method of particular solutions,</li> <li>4) the use of appropriate analytical tools,</li> <li>5) formulate research proposals on the basis of analysis,</li> </ol> <p>deposition of the research problem in broadly citing literature review.</p>		
<b>Number of BK<sup>1</sup> ECTS points</b>	7,5	

#### 5. Ways of verifying assumed educational effects

<b>Type of classes</b>	<b>Ways of verifying assumed educational effects</b>
lecture	exam, test
class	test, colloquium, participation in the discussion of problems, the activity
laboratory	test, entrance test, lab report
project	project defence
seminar	participation in discussion, presentation of the topic, the essay
training	practice report
diploma dissertation	Thesis preparation

## 6. Range of diploma dissertation

Questions related to water and wastewater treatment.

Questions related to water supply system and canalization.

Questions related to solid waste management.

Questions related to sanitary biology and environmental health hazards.

Questions related to programming, designing, executing and operating air conditioning which create and protect the microclimate in rooms and buildings as well as supplying municipalities and industry with heating.

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<sup>4</sup>University-wide course /group of courses – enter O

<sup>5</sup>Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

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<sup>7</sup> Optional – enter W, obligatory – enter Ob

### 7. Requirements concerning deadlines for crediting courses/groups of courses for all courses in particular modules

No.	Course code	Name of course	Crediting by deadline of... (number of semester)
1	ZMZ001498W	Contemporary Management	1
2	FLC024004W	Philosophy of science and technology	1
3	ISS005006	Engineering applications of mathematical statistics	1
4	ISS105023	Automation In environmental engineering	1
5	ISS005007	Environmental management	2
6	GPA105723W	Spatial planning	2
7	ISS105029	Reliability of eng.syst.	2
8	ISS105036	Organization of construction works	3
9	ISS105037	Buildings regulations	3
10	ISS105038	Renewable energy systems	3
11	ISS105050	Environmental Chemistry	1
12	ISS105014	Water quality management	1
13	ISS105024	Raw materials management	1
13	ISS105025	Water treatment technology	1
14	ISS105026	Sanitary biology	1
15	ISS105027	AutoCad	1
16	ISS105028	Water supply systems	1
17	ISS105015	Biodegradable materials	2
18	ISS105016	Waste water treatment technology	1
19	ISS105030	Solid waste management	2
20	ISS105019	Waste gases purification	2
21	ISS105031	Toxicology	2
22	ISS105032	Environmental health hazards	2
23	ISS105033	Sewage systems	2
24	ISS105049	Membrane separation processes in environmental protection	2
25	ISS105035	Diploma seminar	3
26	ISS105034	Diploma project (master thesis)	3

**8. Plan of studies (attachment no. ....)**

Approved by faculty student government legislative body:

.....  
Date, name and surname, signature of student representative

.....  
Date, Dean's signature