

## DESCRIPTION OF THE PROGRAM OF STUDIES

### 1. Description

|  |   |
|--|---|
| 1.1 Number of semesters: 4   | 1.2 Total number of ECTS points necessary to complete studies at a given level: 90  |
| 1.3 Total number of hours:<br>803  | 1.4 Prerequisites (particularly for second-level studies):<br>Completed undergraduate or graduate degree in the field, in which contents of Electrical Engineering related to Circuit Theory and Theory of Electromagnetic Field are contained as well as knowledge gained from at least one of the courses: Electrical Drives, Electrical Devices, Fundamentals of Control Theory, High Voltage Engineering.   |
| 1.5 Upon completion of studies graduate obtains professional degree of:<br>master of science, engineer | 1.6 Graduate profile, employability:<br>A graduate of the second degree studies in the specialization Electrical Power Engineering has advanced and well-established knowledge of the power system operation, automation, protection and control techniques in power engineering. Has ability to use computer tools for designing and modeling. It is capable of creative work and to make decisions and lead work-team labor. He is prepared to continue their education in Doctoral School. |
| 1.7 Possibility of continuing studies:<br>Doctoral School  | 1.8 Indicate connection with University's mission and its development strategy:<br>The knowledge gained during their studies not only lead to success in their future careers of the graduate, but also shapes the human being with a sense of entrepreneurship, creativeness and openness to new challenges.   |

### 2. Detailed description:

#### 2.1 Total number of learning outcomes in the program of study:

W (knowledge) = 21

U (skills) = 21

K (competences) = 7

W + U + K = 49

**2.2 For the main field of study assigned to more than one discipline - the number of learning outcomes assigned to the discipline:**

**D1 (major):** 49

**2.3 For the field of study assigned to more than one discipline - percentage share of the number of ECTS points for each discipline:**

**D1 100 % ECTS points**

**2.4a. For the general academic profile field of study – the number of ECTS points assigned to the classes related to the University's academic activity in the discipline or disciplines to which the faculty is assigned:**

82 ECTS

**2.5. Concise analysis of compliance of the assumed learning outcomes with the needs of the labor market:**

*Learning outcomes refer not only to the broadly understood electrical engineering, i.e. the generation, transmission, distribution, transforming, and utilization of electrical energy, but due to the demands of modern techniques and technologies currently used in electrical power engineering and industry - include electronic and microprocessor technology, computer science, management, and marketing. Obtaining the intended learning outcomes will enable graduates to find attractive and interesting work in all industries, especially in the electrical power engineering sector. The graduate is also prepared to start business in electrical engineering field. Proceedings on the learning outcomes were refereed and discussed at meetings of the Faculty of Electrical Engineering Convent, including representatives of industrial enterprises in the Polish territory, with particular emphasis on the Lower Silesia and the neighboring provinces. During meetings the needs of labor market were explained and discussed..*

**2.6. The total number of ECTS points that a student must obtain in classes requiring direct participation of academic teachers or other persons conducting classes and students (enter the sum of ECTS points for courses / groups of courses marked with the BK1 code)**

63 ECTS

**2.7. Total number of ECTS points, which student has to obtain from basic sciences classes**

|   |   |
|---|---|
| Number of ECTS points for obligatory subjects | 5 |
| Number of ECTS points for optional subjects   | 0 |
| Total number of ECTS points                   | 5 |

**2.8. Total number of ECTS points, which student has to obtain from practical classes, including laboratory classes**

|   |    |
|---|----|
| Number of ECTS points for obligatory subjects | 21 |
| Number of ECTS points for optional subjects   | 28 |
| Total number of ECTS points                   | 49 |

**2.9. Minimum number of ECTS points, which student has to obtain doing education blocks offered as part of university-wide classes or other main field of study**

8 ECTS points

**2.10. Total number of ECTS points, which student may obtain doing optional blocks (min. 30% of total number of ECTS points)**

36 ECTS points

**3. Description of the process leading to learning outcomes acquisition:**

*Teachers delivering the individual courses during the first lecture present the aim and program of the respective course as well as explain the assumed teaching outcomes. Indicate a need of the self-work of student and explain how to use basic and supplementary literature for a given course. Motivate to attend regularly the classes and to use consultations.*



## 4.1.2. List of basic sciences blocks

### 4.1.2.1. Mathematics block

| No.          | Course code                            | Name of course                   | Weekly number of hours |          |          |          |          | Learning effect symbol | Number of hours |           | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|--------------|--|----------------------------------|------------------------|----------|----------|----------|----------|------------------------|-----------------|-----------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|              |  |                                  | lec                    | cl       | lab      | pr       | sem      |                        | ZZU             | CNPS      | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1            | ELR051372W<br>ELR052172W<br>ELR052572W | Numerical methods in engineering | 1                      |          |          |          |          | K2ETK_W2 K2ETK_K2      | 11              | 30        | 1                     | 0,7        | T              | Z                |                 |           | PD   | OB   |
| 2            | ELR051372P<br>ELR052172P<br>ELR052572P | Numerical methods in engineering |                        |          |          |          | 1        | K2ETK_U2 K2ETK_K2      | 11              | 30        | 1                     | 0,7        | T              | Z                |                 | P         | PD   | OB   |
| <b>Total</b> |  |                                  | <b>1</b>               | <b>0</b> | <b>0</b> | <b>1</b> | <b>0</b> |                        | <b>22</b>       | <b>60</b> | <b>2</b>              | <b>1,4</b> |                |                  |                 |           |      |      |

### 4.1.2.2. Physics block

| No.          | Course code | Name of course                              | Weekly number of hours |          |          |          |          | Learning effect symbol | Number of hours |           | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|--------------|-------------|---|------------------------|----------|----------|----------|----------|------------------------|-----------------|-----------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|              |             |   | lec                    | cl       | lab      | pr       | sem      |                        | ZZU             | CNPS      | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1            | ELR053366W  | Electrical Measurement Nonelectrical Values | 1                      |          |          |          |          | K2ETK_W5 K2ETK_K2      | 11              | 60        | 2                     | 1,4        | T              | Z                |                 |           | PD   | OB   |
| 2            | ELR053366L  | Electrical Measurement Nonelectrical Values |                        |          | 1        |          |          | K2ETK_U4 K2ETK_K2      | 11              | 30        | 1                     | 0,7        | T              | Z                |                 | P         | PD   | OB   |
| <b>Total</b> |             |   | <b>1</b>               | <b>0</b> | <b>1</b> | <b>0</b> | <b>0</b> |                        | <b>22</b>       | <b>90</b> | <b>3</b>              | <b>2,1</b> |                |                  |                 |           |      |      |

### 4.1.2.3. Chemistry block

| No. | Course code | Name of course | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-----|-------------|----------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|     |             |                | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |

### Altogether for basic sciences blocks

| Total number of hours |    |     |    |     | Total number of ZZU hours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points |
|-----------------------|----|-----|----|-----|---------------------------|----------------------------|-----------------------------|-----------------------|
| lec                   | cl | lab | pr | sem |                           |                            |                             |                       |
| 2                     | 0  | 1   | 1  | 0   | 44                        | 150                        | 5                           | 3,5                   |

### 4.1.3. List of main-field-of-study blocks

#### 4.1.3.1. Obligatory main-field-of-study block

| No.   | Course code | Name of course                      | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-------|-------------|-------------------------------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|       |             |                                     | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1     | ELR051371W  | Selected problems of circuit theory | 2                      |    |     |    |     | K2ETK_W1               | 22              | 90   | 3                     | 2,1        | T              | E                |                 |           | K    | OB   |
| 2     | ELR051371C  | Selected problems of circuit theory |                        | 1  |     |    |     | K2ETK_U1 K2ETK_K1      | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | K    | OB   |
| 3     | ELR052271W  | Short-circuits in power systems     | 2                      |    |     |    |     | K2ETK_W3 K2ETK_K3      | 22              | 60   | 2                     | 1,4        | T              | Z                |                 |           | K    | OB   |
| 4     | ELR053262W  | Electromechanical drive systems     | 2                      |    |     |    |     | K2ETK_W4               | 22              | 90   | 3                     | 2,1        | T              | E                |                 |           | K    | OB   |
| 5     | ELR053262L  | Electromechanical drive systems     |                        |    | 1   |    |     | K2ETK_U3 K2ETK_K1      | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | K    | OB   |
| Total |             |                                     | 6                      | 1  | 1   | 0  | 0   |                        | 88              | 300  | 10                    | 7          |                |                  |                 |           |      |      |

#### Altogether for main-field-of-study blocks

| Total number of hours |    |     |    |     | Total number of ZZU hours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points |
|-----------------------|----|-----|----|-----|---------------------------|----------------------------|-----------------------------|-----------------------|
| lec                   | cl | lab | pr | sem |                           |                            |                             |                       |
| 6                     | 1  | 1   | 0  | 0   | 88                        | 300                        | 10                          | 7                     |

#### 4.1.4. List of specialization blocks

##### 4.1.4.1. Obligatory specialization subjects block

| No.          | Course code | Name of course  | Weekly number of hours |          |           |          |          | Learning effect symbol      | Number of hours |             | Number of ECTS points |             | Form of course | Way of crediting | Course          |           |      |      |
|--------------|-------------|---|------------------------|----------|-----------|----------|----------|-----------------------------|-----------------|-------------|-----------------------|-------------|----------------|------------------|-----------------|-----------|------|------|
|              |             |   | lec                    | cl       | lab       | pr       | sem      |                             | ZZU             | CNPS        | total                 | BK classes  |                |                  | university wide | practical | kind | type |
| 1            | ELR051167W  | Lightning and overvoltage protection                                | 1                      |          |           |          |          | S2EEN_W9 K2ETK_K3           | 11              | 60          | 2                     | 1,4         | T              | Z                |                 |           | S    | OB   |
| 2            | ELR051167L  | Lightning and overvoltage protection                                |                        |          | 1         |          |          | S2EEN_U9 K2ETK_K3           | 11              | 30          | 1                     | 0,7         | T              | Z                |                 | P         | S    | OB   |
| 3            | ELR052171W  | Fundamentals of digital power system protection and control         | 1                      |          |           |          |          | S2EEN_W4                    | 11              | 90          | 3                     | 2,1         | T              | E                |                 |           | S    | OB   |
| 4            | ELR052171L  | Fundamentals of digital power system protection and control         |                        |          | 1         |          |          | S2EEN_U4 K2ETK_K2 K2ETK_K6  | 11              | 30          | 1                     | 0,7         | T              | Z                |                 | P         | S    | OB   |
| 5            | ELR052177W  | Digital Modelling in Power Systems                                  | 1                      |          |           |          |          | K2ETK_W3 S2EEN_W5           | 11              | 30          | 1                     | 0,7         | T              | Z                |                 |           | S    | OB   |
| 6            | ELR052177L  | Digital Modelling in Power Systems                                  |                        |          | 1         |          |          | K2ETK_U1 S2EEN_U5 K2ETK_K2  | 11              | 30          | 1                     | 0,7         | T              | Z                |                 | P         | S    | OB   |
| 7            | ELR052272W  | Power System Protection   | 1                      |          |           |          |          | S2EEN_W2 K2ETK_K7           | 11              | 30          | 1                     | 0,7         | T              | Z                |                 |           | S    | OB   |
| 8            | ELR052272L  | Power System Protection   |                        |          | 2         |          |          | S2EEN_U1 S2EEN_U2 K2ETK_K7  | 22              | 90          | 3                     | 2,1         | T              | Z                |                 | P         | S    | OB   |
| 9            | ELR052273L  | MV Network security   |                        |          | 2         |          |          | S2EEN_U10 K2ETK_K2          | 22              | 60          | 2                     | 1,4         | T              | Z                |                 | P         | S    | OB   |
| 10           | ELR052274W  | Fiber optics  | 1                      |          |           |          |          | S2EEN_W7 K2ETK_K6           | 11              | 30          | 1                     | 0,7         | T              | Z                |                 |           | S    | OB   |
| 11           | ELR052274L  | Fiber optics  |                        |          | 1         |          |          | S2EEN_U7 K2ETK_K6           | 11              | 30          | 1                     | 0,7         | T              | Z                |                 | P         | S    | OB   |
| 12           | ELR052371W  | Computer Aided Design (CAD) in Energetic                            | 2                      |          |           |          |          | S2EEN_W8 K2ETK_K1           | 22              | 60          | 2                     | 1,4         | T              | Z                |                 |           | S    | OB   |
| 13           | ELR052371L  | Computer Aided Design (CAD) in Energetic                            |                        |          | 1         |          |          | S2EEN_U8 K2ETK_K1           | 11              | 60          | 2                     | 1,4         | T              | Z                |                 | P         | S    | OB   |
| 14           | ELR052477W  | Modern electrical devices 1   | 1                      |          |           |          |          | S2EEN_W11                   | 11              | 30          | 1                     | 0,7         | T              | Z                |                 |           | S    | OB   |
| 15           | ELR052478L  | Modern electrical devices 2   |                        |          | 1         |          |          | S2EEN_U12 K2ETK_K6          | 11              | 30          | 1                     | 0,7         | T              | Z                |                 | P         | S    | OB   |
| 16           | ELR052573W  | Power Systems Operation and Control 1                               | 2                      |          |           |          |          | S2EEN_W1 K2ETK_K6           | 22              | 90          | 3                     | 2,1         | T              | E                |                 |           | S    | OB   |
| 17           | ELR052574W  | Load management   | 2                      |          |           |          |          | S2EEN_W1 S2EEN_W10 K2ETK_K3 | 22              | 30          | 1                     | 0,7         | T              | Z                |                 |           | S    | OB   |
| 18           | ELR052575L  | Power Systems Operation and Control 2                               |                        |          | 2         |          |          | S2EEN_U6 K2ETK_K6           | 22              | 60          | 2                     | 1,4         | T              | Z                |                 | P         | S    | OB   |
| 19           | ELR052576W  | Modern technologies in electric power transmission and distribution | 2                      |          |           |          |          | S2EEN_W1 S2EEN_W6           | 22              | 90          | 3                     | 2,1         | T              | E                |                 |           | S    | OB   |
| 20           | ELR052577W  | Energy management in energy systems                                 | 2                      |          |           |          |          | S2EEN_W10 K2ETK_K6          | 22              | 60          | 2                     | 1,4         | T              | Z                |                 |           | S    | OB   |
| 21           | ELR052580P  | Control and monitoring systems in the power industry                |                        |          |           | 2        |          | S2EEN_U6 K2ETK_K6           | 22              | 60          | 2                     | 1,4         | T              | Z                |                 | P         | S    | OB   |
| 22           | ELR053167W  | Electromechanical Systems in Renewable Energy                       | 2                      |          |           |          |          | S2EEN_W3                    | 22              | 60          | 2                     | 1,4         | T              | Z                |                 |           | S    | OB   |
| 23           | ELR053167L  | Electromechanical Systems in Renewable Energy                       |                        |          | 1         |          |          | S2EEN_U3 K2ETK_K7           | 11              | 30          | 1                     | 0,7         | T              | Z                |                 | P         | S    | OB   |
| <b>Total</b> |             |   | <b>18</b>              | <b>0</b> | <b>13</b> | <b>2</b> | <b>0</b> |                             | <b>363</b>      | <b>1170</b> | <b>39</b>             | <b>27,3</b> |                |                  |                 |           |      |      |

##### Altogether for specialization blocks

| Total number of hours |    |     |    |     | Total number of ZZU hours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points |
|-----------------------|----|-----|----|-----|---------------------------|----------------------------|-----------------------------|-----------------------|
| lec                   | cl | lab | pr | sem |                           |                            |                             |                       |
| 18                    | 0  | 13  | 2  | 0   | 363                       | 1170                       | 39                          | 27,3                  |

## 4.2. List of optional blocks

### 4.2.1. List of general education blocks

#### 4.2.1.1. Liberal-managerial subjects block

| No.   | Course code | Name of course                      | Weekly number of hours |    |     |    |     | Learning effect symbol     | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-------|-------------|-------------------------------------|------------------------|----|-----|----|-----|----------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|       |             |                                     | lec                    | cl | lab | pr | sem |                            | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1     | FLH551622S  | Ethics in bussiness                 |                        |    |     |    | 1   | K2ETK_U7 K2ETK_K6          | 11              | 50   | 2                     | 1,4        | T              | Z                | O               | P         | KO   | W    |
| 2     | PKH550422S  | Social communication                |                        |    |     |    | 1   | K2ETK_U7 K2ETK_K6          | 11              | 50   | 2                     | 1,4        | T              | Z                | O               | P         | KO   | W    |
| 3     | PKH555522S  | The art of public speaking          |                        |    |     |    | 1   | K2ETK_U7 K2ETK_K6          | 11              | 50   | 2                     | 1,4        | T              | Z                | O               | P         | KO   | W    |
| 4     | PRR051271W  | Standardization and engineering law | 1                      |    |     |    |     | K2ETK_W7 K2ETK_K3 K2ETK_K5 | 11              | 25   | 1                     | 0,7        | T              | Z                | O               |           | KO   | W    |
| 5     | PRR051272W  | Engineering law                     | 1                      |    |     |    |     | K2ETK_W7 K2ETK_K3 K2ETK_K5 | 11              | 25   | 1                     | 0,7        | T              | Z                | O               |           | KO   | W    |
| 6     | PRR051273W  | Technical standardization           | 1                      |    |     |    |     | K2ETK_W7 K2ETK_K3 K2ETK_K5 | 11              | 25   | 1                     | 0,7        | T              | Z                | O               |           | KO   | W    |
| 7     | ZMR052571W  | Management of a Company             | 1                      |    |     |    |     | K2ETK_W6 K2ETK_K3 K2ETK_K6 | 11              | 50   | 2                     | 1,4        | T              | Z                | O               |           | KO   | W    |
| 8     | ZMR052579W  | Management in the power industry    | 1                      |    |     |    |     | K2ETK_W6 K2ETK_K3 K2ETK_K6 | 11              | 50   | 2                     | 1,4        | T              | Z                | O               |           | KO   | W    |
| Total |             |                                     | 2                      | 0  | 0   | 0  | 1   |                            | 33              | 125  | 5                     | 3,5        |                |                  |                 |           |      |      |

#### 4.2.1.2. Foreign languages block

| No.   | Course code  | Name of course              | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-------|--------------|-----------------------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|       |              |                             | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1     | JZL030001BKC | Foreign language A1 or A2   |                        | 3  |     |    |     | K2ETK_U6 K2ETK_K1      | 33              | 60   | 2                     | 1,4        | T              | Z                | O               | P         | KO   | W    |
| 2     | JZL030002BKC | Foreign language B2+ or C1+ |                        | 1  |     |    |     | K2ETK_U5 K2ETK_K1      | 11              | 30   | 1                     | 0,7        | T              | Z                | O               | P         | KO   | W    |
| Total |              |                             | 0                      | 4  | 0   | 0  | 0   |                        | 44              | 90   | 3                     | 2,1        |                |                  |                 |           |      |      |

#### 4.2.1.3. Sporting classes block

| No. | Course code | Name of course | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-----|-------------|----------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|     |             |                | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |



#### 4.2.1.4. Information technologies block

| No. | Course code | Name of course | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-----|-------------|----------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|     |             |                | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |

#### Altogether for general education blocks

| Total number of hours |    |     |    |     | Total number of ZZU hours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points |
|-----------------------|----|-----|----|-----|---------------------------|----------------------------|-----------------------------|-----------------------|
| lec                   | cl | lab | pr | sem |                           |                            |                             |                       |
| 2                     | 4  | 0   | 0  | 1   | 77                        | 215                        | 8                           | 5,6                   |

#### 4.2.2. List of basic sciences blocks

##### 4.2.2.1. Mathematics block

| No. | Course code | Name of course | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-----|-------------|----------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|     |             |                | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |

##### 4.2.2.2. Physics block

| No. | Course code | Name of course | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-----|-------------|----------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|     |             |                | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |



## 4.2.4. List of specialization blocks

### 4.2.4.1. Specialization subjects block

| No.   | Course code | Name of course  | Weekly number of hours |    |     |    |     | Learning effect symbol               | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-------|-------------|---|------------------------|----|-----|----|-----|--------------------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|       |             |   | lec                    | cl | lab | pr | sem |                                      | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1     | ELR051168W  | High voltage measurement and diagnostics of insulation                    | 2                      |    |     |    |     | S2EEN_W14 K2ETK_K3 K2ETK_K6          | 22              | 60   | 2                     | 1,4        | T              | Z                |                 |           | S    | W    |
| 2     | ELR052174W  | Peripheral devices of Programmable Logic Controllers                      | 1                      |    |     |    |     | S2EEN_W13                            | 11              | 30   | 1                     | 0,7        | T              | Z                |                 |           | S    | W    |
| 3     | ELR052174L  | Peripheral devices of Programmable Logic Controllers                      |                        |    | 1   |    |     | S2EEN_U12 K2ETK_K2 K2ETK_K7          | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| 4     | ELR052175W  | Logic design  | 2                      |    |     |    |     | S2EEN_W12                            | 22              | 60   | 2                     | 1,4        | T              | E                |                 |           | S    | W    |
| 5     | ELR052175L  | Logic design  |                        |    | 1   |    |     | S2EEN_U11 K2ETK_K2 K2ETK_K6 K2ETK_K7 | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| 6     | ELR052176W  | Artificial intelligence methods in power system protection and control    | 2                      |    |     |    |     | S2EEN_W12                            | 22              | 60   | 2                     | 1,4        | T              | E                |                 |           | S    | W    |
| 7     | ELR052176L  | Artificial intelligence methods in power system protection and control    |                        |    | 1   |    |     | S2EEN_U11 K2ETK_K2 K2ETK_K6          | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| 8     | ELR052275W  | PLC and Wireless Communication for Monitoring and Metering                | 2                      |    |     |    |     | S2EEN_W12 K2ETK_K6                   | 22              | 60   | 2                     | 1,4        | T              | E                |                 |           | S    | W    |
| 9     | ELR052275S  | PLC and Wireless Communication for Monitoring and Metering                |                        |    |     |    | 1   | S2EEN_U11 K2ETK_K6                   | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| 10    | ELR052374W  | Intelligent electrical installations – computer planning and applications | 1                      |    |     |    |     | S2EEN_W13                            | 11              | 30   | 1                     | 0,7        | T              | Z                |                 |           | S    | W    |
| 11    | ELR052374P  | Intelligent electrical installations – computer planning and applications |                        |    |     | 1  |     | S2EEN_U12 K2ETK_K6                   | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| 12    | ELR052471W  | Electric shock protection systems in high-voltage installations           | 2                      |    |     |    |     | S2EEN_W14 K2ETK_K1                   | 22              | 60   | 2                     | 1,4        | T              | Z                |                 |           | S    | W    |
| 13    | ELR052473W  | Environmental aspects of the development of the electric power system     | 2                      |    |     |    |     | S2EEN_W14 K2ETK_K3                   | 22              | 60   | 2                     | 1,4        | T              | Z                |                 |           | S    | W    |
| 14    | ELR052474W  | Operation and maintenance of electrical equipments                        | 2                      |    |     |    |     | S2EEN_W14 K2ETK_K6                   | 22              | 60   | 2                     | 1,4        | T              | Z                |                 |           | S    | W    |
| 15    | ELR052578W  | Automation of electric power systems                                      | 2                      |    |     |    |     | S2EEN_W12                            | 22              | 60   | 2                     | 1,4        | T              | E                |                 |           | S    | W    |
| 16    | ELR052578L  | Automation of electric power systems                                      |                        |    | 1   |    |     | S2EEN_U11 K2ETK_K6                   | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| 17    | ELR053274W  | Power electronics converters in energetics                                | 2                      |    |     |    |     | S2EEN_W12                            | 22              | 60   | 2                     | 1,4        | T              | E                |                 |           | S    | W    |
| 18    | ELR053274L  | Power electronics converters in energetics                                |                        |    | 1   |    |     | S2EEN_U11 K2ETK_K7                   | 11              | 30   | 1                     | 0,7        | T              | Z                |                 | P         | S    | W    |
| Total |             |   | 5                      | 0  | 2   | 0  | 0   |                                      | 77              | 210  | 7                     | 4,9        |                |                  |                 |           |      |      |

#### 4.2.4.2. Training block

| No. | Course code | Name of course | Weekly number of hours |    |     |    |     | Learning effect symbol | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-----|-------------|----------------|------------------------|----|-----|----|-----|------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|     |             |                | lec                    | cl | lab | pr | sem |                        | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |

#### 4.2.4.3. Diploma dissertation block

| No.   | Course code                            | Name of course  | Weekly number of hours |    |     |    |     | Learning effect symbol      | Number of hours |      | Number of ECTS points |            | Form of course | Way of crediting | Course          |           |      |      |
|-------|--|-----------------|------------------------|----|-----|----|-----|-----------------------------|-----------------|------|-----------------------|------------|----------------|------------------|-----------------|-----------|------|------|
|       |  |                 | lec                    | cl | lab | pr | sem |                             | ZZU             | CNPS | total                 | BK classes |                |                  | university wide | practical | kind | type |
| 1     | ELR051199D<br>ELR052199D<br>ELR053199D | Master's thesis |                        |    |     | 12 |     | S2EEN_U14 K2ETK_K4 K2ETK_K6 | 132             | 540  | 18                    | 12,6       | T              | Z                |                 | P         | S    | W    |
| 2     | ELR052198S                             | Diploma seminar |                        |    |     | 2  |     | S2EEN_U13 K2ETK_K6          | 22              | 90   | 3                     | 2,1        | T              | Z                |                 | P         | S    | W    |
| Total |  |                 | 0                      | 0  | 0   | 12 | 2   |                             | 154             | 630  | 21                    | 14,7       |                |                  |                 |           |      |      |

#### Altogether for specialization blocks

| Total number of hours |    |     |    |     | Total number of ZZU hours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points |
|-----------------------|----|-----|----|-----|---------------------------|----------------------------|-----------------------------|-----------------------|
| lec                   | cl | lab | pr | sem |                           |                            |                             |                       |
| 5                     | 0  | 2   | 12 | 2   | 231                       | 840                        | 28                          | 19,6                  |

#### 4.3 Training module (Faculty Council resolution on principles of crediting training – attachment ... )

|                       |                                      |                         |      |
|-----------------------|--------------------------------------|-------------------------|------|
| Name of training:     |                                      |                         |      |
| Number of ECTS points | Number of ECTS points for BK classes | Training crediting mode | Code |
|                       |                                      | report from training    |      |
| Training duration     | Training objective                   |                         |      |
|                       |                                      |                         |      |

#### 4.4. Diploma dissertation module

|  |                       |  |
|--|-----------------------|--|
| Type of diploma dissertation:  | magister              |  |
| Number of diploma dissertation semesters   | Number of ECTS points | Code   |
| 1  | 21                    | ELR052198S<br>ELR051199D<br>ELR052199D<br>ELR053199D |
| <b>Character of diploma dissertation</b>   |                       |  |
| Master Thesis can be classified as computational, theoretical, or may contain a description and analysis of performed experimental studies. In each case contains a section in which the author alone interpret and draw conclusions from own research. Intellectual contributions of student should be clearly visible. |                       |  |
| Number of BK ECTS points:  | 14,7                  |  |

#### 5. Ways of verifying assumed learning outcomes

| Type of classes      | Ways of verifying assumed learning outcomes            |
|----------------------|--|
| lecture              | examination, progress/final test                       |
| class                | progress/final test                                    |
| laboratory           | pretest, report from laboratory                        |
| project              | project defence  |
| seminar              | participation in discussion, topic presentation, essay |
| diploma dissertation | prepared diploma dissertation                          |

#### 6. Range of diploma dissertation

The diploma examination problems are available on the Faculty website.

**7. Requirements concerning deadlines for crediting courses/groups of courses for all courses in particular blocks**

| No. | Course code | Name of course | Crediting by deadline of... (number of semester) |
|-----|-------------|----------------|--|
| 1   |             |                |  |
| 2   |             |                |  |
| 3   |             |                |  |
| 4   |             |                |  |

**8. Plan of studies (Attachment no.1 to Description of the Programme of Studies)**

Approved by faculty student government legislative body:

.....  
Date

.....  
Name and surname, signature of student representative

.....  
Date

.....  
Dean's signature