

|    |                                |                         |
|----|--------------------------------|-------------------------|
| 1. | <b>Field of study</b>          | <b>Informatics</b>      |
| 2. | Academic year of entry         | 2017/2018 (summer term) |
| 3. | Level of qualifications/degree | second degree studies   |
| 4. | Degree profile                 | general academic        |
| 5. | Mode of study                  | full-time               |

## Specialization: Computer Graphics and Visualization

### Field of study courses

| No.                                  | Module                                             | E/C | form of teaching |            |            | Total ECTS | year 1     |            |           |            |           |          | year 2     |           |          |  |  |
|--------------------------------------|----------------------------------------------------|-----|------------------|------------|------------|------------|------------|------------|-----------|------------|-----------|----------|------------|-----------|----------|--|--|
|                                      |                                                    |     | Total            | L          | O          |            | semester 1 |            |           | semester 2 |           |          | semester 3 |           |          |  |  |
|                                      |                                                    |     |                  |            |            |            | L          | O          | E         | L          | O         | E        | L          | O         | E        |  |  |
| 1                                    | Advanced algorithm and data structures             | E   | 60               | 30         | 30         | 5          | 30         | 30         | 5         |            |           |          |            |           |          |  |  |
| 2                                    | Development and configuration of computer networks | Z   | 45               | 15         | 30         | 4          | 15         | 30         | 4         |            |           |          |            |           |          |  |  |
| 3                                    | Monographic lecture                                | Z   | 30               | 30         |            | 4          | 30         |            | 4         |            |           |          |            |           |          |  |  |
| 4                                    | Programming paradigms                              | E   | 60               | 30         | 30         | 5          | 30         | 30         | 5         |            |           |          |            |           |          |  |  |
| 5                                    | Systems modelling and analysis                     | Z   | 45               | 15         | 30         | 4          | 15         | 30         | 4         |            |           |          |            |           |          |  |  |
| 6                                    | Parallel computing                                 | Z   | 30               | 15         | 15         | 4          |            |            |           | 15         | 15        | 4        |            |           |          |  |  |
| 7                                    | Test automation in agile development               | Z   | 30               | 10         | 20         | 4          |            |            |           |            |           |          | 10         | 20        | 4        |  |  |
| <b>TOTAL Field of study courses:</b> |                                                    |     | <b>300</b>       | <b>145</b> | <b>155</b> | <b>30</b>  | <b>120</b> | <b>120</b> | <b>22</b> | <b>15</b>  | <b>15</b> | <b>4</b> | <b>10</b>  | <b>20</b> | <b>4</b> |  |  |

### Speciality subjects

| No.                               | Module                                                 | E/C | form of teaching |            |            | Total ECTS | year 1     |          |          |            |            |           | year 2     |            |           |  |  |
|-----------------------------------|--------------------------------------------------------|-----|------------------|------------|------------|------------|------------|----------|----------|------------|------------|-----------|------------|------------|-----------|--|--|
|                                   |                                                        |     | Total            | L          | O          |            | semester 1 |          |          | semester 2 |            |           | semester 3 |            |           |  |  |
|                                   |                                                        |     |                  |            |            |            | L          | O        | E        | L          | O          | E         | L          | O          | E         |  |  |
| 1                                 | Computational geometry                                 | Z   | 30               | 10         | 20         | 2          |            |          |          | 10         | 20         | 2         |            |            |           |  |  |
| 2                                 | Intelligent computer graphics                          | E   | 45               | 15         | 30         | 3          |            |          |          | 15         | 30         | 3         |            |            |           |  |  |
| 3                                 | Monographic's lecture                                  | Z   | 30               | 30         |            | 2          |            |          |          | 30         |            | 2         |            |            |           |  |  |
| 4                                 | Non-photorealistic graphics                            | Z   | 45               | 15         | 30         | 3          |            |          |          | 15         | 30         | 3         |            |            |           |  |  |
| 5                                 | Specialization project I                               | Z   | 45               |            | 45         | 2          |            |          |          |            | 45         | 2         |            |            |           |  |  |
| 6                                 | Specialized systems of data visualization              | Z   | 30               | 10         | 20         | 2          |            |          |          | 10         | 20         | 2         |            |            |           |  |  |
| 7                                 | Video processing techniques                            | E   | 45               | 15         | 30         | 3          |            |          |          | 15         | 30         | 3         |            |            |           |  |  |
| 8                                 | Development of 3D graphical engines                    | Z   | 30               | 15         | 15         | 2          |            |          |          |            |            |           | 15         | 15         | 2         |  |  |
| 9                                 | General-Purpose computing on Graphics Processing Units | Z   | 45               | 15         | 30         | 3          |            |          |          |            |            |           | 15         | 30         | 3         |  |  |
| 10                                | Graphics in mobile devices                             | Z   | 45               | 15         | 30         | 3          |            |          |          |            |            |           | 15         | 30         | 3         |  |  |
| 11                                | Specialization project II                              | Z   | 30               |            | 30         | 2          |            |          |          |            |            |           |            | 30         | 2         |  |  |
| <b>TOTAL Speciality subjects:</b> |                                                        |     | <b>420</b>       | <b>140</b> | <b>280</b> | <b>27</b>  | <b>0</b>   | <b>0</b> | <b>0</b> | <b>95</b>  | <b>175</b> | <b>17</b> | <b>45</b>  | <b>105</b> | <b>10</b> |  |  |

### Other requirements

| No. | Module                         | E/C | form of teaching |    |    | Total ECTS | year 1     |    |   |            |   |   | year 2     |   |   |  |  |
|-----|--------------------------------|-----|------------------|----|----|------------|------------|----|---|------------|---|---|------------|---|---|--|--|
|     |                                |     | Total            | L  | O  |            | semester 1 |    |   | semester 2 |   |   | semester 3 |   |   |  |  |
|     |                                |     |                  |    |    |            | L          | O  | E | L          | O | E | L          | O | E |  |  |
| 1   | Industrial property protection | Z   | 30               | 10 | 20 | 4          | 10         | 20 | 4 |            |   |   |            |   |   |  |  |

## Other requirements

| No.                              | Module                                              | E/C | form of teaching |            |            | Total ECTS | year 1     |           |          |            |           |            | year 2     |           |           |    |  |
|----------------------------------|-----------------------------------------------------|-----|------------------|------------|------------|------------|------------|-----------|----------|------------|-----------|------------|------------|-----------|-----------|----|--|
|                                  |                                                     |     | Total            | L          | O          |            | semester 1 |           |          | semester 2 |           |            | semester 3 |           |           |    |  |
|                                  |                                                     |     |                  |            |            |            | L          | O         | E        | L          | O         | E          | L          | O         | E         |    |  |
| 2                                | Managing IT projects and teams                      | Z   | 30               | 10         | 20         | 4          | 10         | 20        | 4        |            |           |            |            |           |           |    |  |
| 3                                | Master's workshop I                                 | Z   | 30               |            | 30         | 5          |            |           |          |            | 30        | 5          |            |           |           |    |  |
| 4                                | Master's seminar I                                  | Z   | 15               |            | 15         | 4          |            |           |          | 15         | 4         |            |            |           |           |    |  |
| 5                                | Master's seminar III - preparation of master thesis | Z   | 30               |            | 30         | 10         |            |           |          |            |           |            |            |           | 30        | 10 |  |
| 6                                | Master's workshop II                                | Z   | 45               |            | 45         | 6          |            |           |          |            |           |            |            |           | 45        | 6  |  |
| <b>TOTAL Other requirements:</b> |                                                     |     | <b>180</b>       | <b>20</b>  | <b>160</b> | <b>33</b>  | <b>20</b>  | <b>40</b> | <b>8</b> | <b>0</b>   | <b>45</b> | <b>9</b>   | <b>0</b>   | <b>75</b> | <b>16</b> |    |  |
| <b>TOTAL (A+B+C):</b>            |                                                     |     | <b>900</b>       | <b>305</b> | <b>595</b> | <b>90</b>  | <b>300</b> | <b>30</b> |          | <b>345</b> | <b>30</b> | <b>255</b> | <b>30</b>  |           |           |    |  |
| <b>TOTAL</b>                     |                                                     |     |                  |            |            |            | <b>900</b> |           |          |            |           |            |            |           |           |    |  |

Studia kończą się nadaniem tytułu zawodowego magistra na kierunku Informatics w specjalności Computer Graphics and Visualization.

## Specialization: Intelligence Information Systems

### Field of study courses

| No.                                  | Module                                             | E/C | form of teaching |            |            | Total ECTS | year 1     |            |           |            |           |          | year 2     |           |          |  |  |
|--------------------------------------|----------------------------------------------------|-----|------------------|------------|------------|------------|------------|------------|-----------|------------|-----------|----------|------------|-----------|----------|--|--|
|                                      |                                                    |     | Total            | L          | O          |            | semester 1 |            |           | semester 2 |           |          | semester 3 |           |          |  |  |
|                                      |                                                    |     |                  |            |            |            | L          | O          | E         | L          | O         | E        | L          | O         | E        |  |  |
| 1                                    | Advanced algorithm and data structures             | E   | 60               | 30         | 30         | 5          | 30         | 30         | 5         |            |           |          |            |           |          |  |  |
| 2                                    | Development and configuration of computer networks | Z   | 45               | 15         | 30         | 4          | 15         | 30         | 4         |            |           |          |            |           |          |  |  |
| 3                                    | Monographic lecture                                | Z   | 30               | 30         |            | 4          | 30         |            | 4         |            |           |          |            |           |          |  |  |
| 4                                    | Programming paradigms                              | E   | 60               | 30         | 30         | 5          | 30         | 30         | 5         |            |           |          |            |           |          |  |  |
| 5                                    | Systems modelling and analysis                     | Z   | 45               | 15         | 30         | 4          | 15         | 30         | 4         |            |           |          |            |           |          |  |  |
| 6                                    | Parallel computing                                 | Z   | 30               | 15         | 15         | 4          |            |            |           | 15         | 15        | 4        |            |           |          |  |  |
| 7                                    | Test automation in agile development               | Z   | 30               | 10         | 20         | 4          |            |            |           |            |           |          | 10         | 20        | 4        |  |  |
| <b>TOTAL Field of study courses:</b> |                                                    |     | <b>300</b>       | <b>145</b> | <b>155</b> | <b>30</b>  | <b>120</b> | <b>120</b> | <b>22</b> | <b>15</b>  | <b>15</b> | <b>4</b> | <b>10</b>  | <b>20</b> | <b>4</b> |  |  |

### Speciality subjects

| No. | Module                             | E/C | form of teaching |    |    | Total ECTS | year 1     |   |   |            |    |   | year 2     |    |   |  |  |
|-----|------------------------------------|-----|------------------|----|----|------------|------------|---|---|------------|----|---|------------|----|---|--|--|
|     |                                    |     | Total            | L  | O  |            | semester 1 |   |   | semester 2 |    |   | semester 3 |    |   |  |  |
|     |                                    |     |                  |    |    |            | L          | O | E | L          | O  | E | L          | O  | E |  |  |
| 1   | Artificial intelligence algorithms | E   | 30               | 10 | 20 | 2          |            |   |   | 10         | 20 | 2 |            |    |   |  |  |
| 2   | Data base programming              | Z   | 30               | 10 | 20 | 2          |            |   |   | 10         | 20 | 2 |            |    |   |  |  |
| 3   | Data mining                        | Z   | 30               | 10 | 20 | 3          |            |   |   | 10         | 20 | 3 |            |    |   |  |  |
| 4   | Decision support systems           | Z   | 60               | 30 | 30 | 4          |            |   |   | 30         | 30 | 4 |            |    |   |  |  |
| 5   | Programming mobile devices         | E   | 45               | 15 | 30 | 3          |            |   |   | 15         | 30 | 3 |            |    |   |  |  |
| 6   | RAD programming environments       | Z   | 60               | 30 | 30 | 3          |            |   |   | 30         | 30 | 3 |            |    |   |  |  |
| 7   | Data analysis in business          | Z   | 30               | 10 | 20 | 2          |            |   |   |            |    |   | 10         | 20 | 2 |  |  |
| 8   | Data warehouses                    | Z   | 30               | 10 | 20 | 2          |            |   |   |            |    |   | 10         | 20 | 2 |  |  |
| 9   | Development of web-based solutions | Z   | 45               |    | 45 | 2          |            |   |   |            |    |   |            | 45 | 2 |  |  |
| 10  | Security of information systems    | Z   | 30               | 10 | 20 | 2          |            |   |   |            |    |   | 10         | 20 | 2 |  |  |
| 11  | Software testing and verification  | Z   | 30               |    | 30 | 2          |            |   |   |            |    |   |            | 30 | 2 |  |  |

### Speciality subjects

| No.                               | Module | E/C | form of teaching |   |   | Total ECTS | year 1     |            |           |            |          |          | year 2     |            |           |           |            |           |
|-----------------------------------|--------|-----|------------------|---|---|------------|------------|------------|-----------|------------|----------|----------|------------|------------|-----------|-----------|------------|-----------|
|                                   |        |     | Total            | L | O |            | semester 1 |            |           | semester 2 |          |          | semester 3 |            |           |           |            |           |
|                                   |        |     |                  |   |   |            | L          | O          | E         | L          | O        | E        | L          | O          | E         |           |            |           |
| <b>TOTAL Speciality subjects:</b> |        |     |                  |   |   | <b>420</b> | <b>135</b> | <b>285</b> | <b>27</b> | <b>0</b>   | <b>0</b> | <b>0</b> | <b>105</b> | <b>150</b> | <b>17</b> | <b>30</b> | <b>135</b> | <b>10</b> |

### Other requirements

| No.                              | Module                                              | E/C | form of teaching |    |    | Total ECTS | year 1     |            |           |            |           |            | year 2     |            |           |            |           |           |
|----------------------------------|-----------------------------------------------------|-----|------------------|----|----|------------|------------|------------|-----------|------------|-----------|------------|------------|------------|-----------|------------|-----------|-----------|
|                                  |                                                     |     | Total            | L  | O  |            | semester 1 |            |           | semester 2 |           |            | semester 3 |            |           |            |           |           |
|                                  |                                                     |     |                  |    |    |            | L          | O          | E         | L          | O         | E          | L          | O          | E         |            |           |           |
| 1                                | Industrial property protection                      | Z   | 30               | 10 | 20 | 4          | 10         | 20         | 4         |            |           |            |            |            |           |            |           |           |
| 2                                | Managing IT projects and teams                      | Z   | 30               | 10 | 20 | 4          | 10         | 20         | 4         |            |           |            |            |            |           |            |           |           |
| 3                                | Master's workshop I                                 | Z   | 30               |    | 30 | 5          |            |            |           |            | 30        | 5          |            |            |           |            |           |           |
| 4                                | Master's seminar I                                  | Z   | 15               |    | 15 | 4          |            |            |           |            | 15        | 4          |            |            |           |            |           |           |
| 5                                | Master's seminar III - preparation of master thesis | Z   | 30               |    | 30 | 10         |            |            |           |            |           |            |            |            | 30        | 10         |           |           |
| 6                                | Master's workshop II                                | Z   | 45               |    | 45 | 6          |            |            |           |            |           |            |            |            | 45        | 6          |           |           |
| <b>TOTAL Other requirements:</b> |                                                     |     |                  |    |    | <b>180</b> | <b>20</b>  | <b>160</b> | <b>33</b> | <b>20</b>  | <b>40</b> | <b>8</b>   | <b>0</b>   | <b>45</b>  | <b>9</b>  | <b>0</b>   | <b>75</b> | <b>16</b> |
| <b>TOTAL (A+B+C):</b>            |                                                     |     |                  |    |    | <b>900</b> | <b>300</b> | <b>600</b> | <b>90</b> | <b>300</b> | <b>30</b> | <b>330</b> | <b>30</b>  | <b>270</b> | <b>30</b> | <b>900</b> |           |           |
| <b>TOTAL</b>                     |                                                     |     |                  |    |    | <b>900</b> |            |            |           |            |           |            |            |            |           |            |           |           |

Studia kończą się nadaniem tytułu zawodowego magistra na kierunku Informatics w specjalności Intelligence Information Systems.

## Specialization: Internet Engineering

### Field of study courses

| No.                                  | Module                                             | E/C | form of teaching |    |    | Total ECTS | year 1     |            |           |            |            |           | year 2     |           |          |           |           |          |
|--------------------------------------|----------------------------------------------------|-----|------------------|----|----|------------|------------|------------|-----------|------------|------------|-----------|------------|-----------|----------|-----------|-----------|----------|
|                                      |                                                    |     | Total            | L  | O  |            | semester 1 |            |           | semester 2 |            |           | semester 3 |           |          |           |           |          |
|                                      |                                                    |     |                  |    |    |            | L          | O          | E         | L          | O          | E         | L          | O         | E        |           |           |          |
| 1                                    | Advanced algorithm and data structures             | E   | 60               | 30 | 30 | 5          | 30         | 30         | 5         |            |            |           |            |           |          |           |           |          |
| 2                                    | Development and configuration of computer networks | Z   | 45               | 15 | 30 | 4          | 15         | 30         | 4         |            |            |           |            |           |          |           |           |          |
| 3                                    | Monographic lecture                                | Z   | 30               | 30 |    | 4          | 30         |            | 4         |            |            |           |            |           |          |           |           |          |
| 4                                    | Programming paradigms                              | E   | 60               | 30 | 30 | 5          | 30         | 30         | 5         |            |            |           |            |           |          |           |           |          |
| 5                                    | Systems modelling and analysis                     | Z   | 45               | 15 | 30 | 4          | 15         | 30         | 4         |            |            |           |            |           |          |           |           |          |
| 6                                    | Parallel computing                                 | Z   | 30               | 15 | 15 | 4          |            |            |           | 15         | 15         | 4         |            |           |          |           |           |          |
| 7                                    | Test automation in agile development               | Z   | 30               | 10 | 20 | 4          |            |            |           |            |            |           |            | 10        | 20       | 4         |           |          |
| <b>TOTAL Field of study courses:</b> |                                                    |     |                  |    |    | <b>300</b> | <b>145</b> | <b>155</b> | <b>30</b> | <b>120</b> | <b>120</b> | <b>22</b> | <b>15</b>  | <b>15</b> | <b>4</b> | <b>10</b> | <b>20</b> | <b>4</b> |

### Speciality subjects

| No. | Module                                       | E/C | form of teaching |    |    | Total ECTS | year 1     |   |   |            |    |   | year 2     |   |   |  |  |  |
|-----|----------------------------------------------|-----|------------------|----|----|------------|------------|---|---|------------|----|---|------------|---|---|--|--|--|
|     |                                              |     | Total            | L  | O  |            | semester 1 |   |   | semester 2 |    |   | semester 3 |   |   |  |  |  |
|     |                                              |     |                  |    |    |            | L          | O | E | L          | O  | E | L          | O | E |  |  |  |
| 1   | Front-end and back-end applications security | E   | 45               | 15 | 30 | 3          |            |   |   | 15         | 30 | 3 |            |   |   |  |  |  |
| 2   | Internet protocols                           | Z   | 45               | 15 | 30 | 2          |            |   |   | 15         | 30 | 2 |            |   |   |  |  |  |
| 3   | Microcomputers and network couplers          | Z   | 45               | 15 | 30 | 3          |            |   |   | 15         | 30 | 3 |            |   |   |  |  |  |
| 4   | Modern mobile technologies                   | E   | 45               | 15 | 30 | 3          |            |   |   | 15         | 30 | 3 |            |   |   |  |  |  |

## Speciality subjects

| No.                               | Module                                              | E/C | form of teaching |            |            | Total ECTS | year 1     |          |          |            |            |           | year 2     |            |           |   |  |
|-----------------------------------|-----------------------------------------------------|-----|------------------|------------|------------|------------|------------|----------|----------|------------|------------|-----------|------------|------------|-----------|---|--|
|                                   |                                                     |     | Total            | L          | O          |            | semester 1 |          |          | semester 2 |            |           | semester 3 |            |           |   |  |
|                                   |                                                     |     |                  |            |            |            | L          | O        | E        | L          | O          | E         | L          | O          | E         |   |  |
| 5                                 | Parallel computing engineering                      | Z   | 40               | 10         | 30         | 2          |            |          |          | 10         | 30         | 2         |            |            |           |   |  |
| 6                                 | Selected methods of data mining                     | Z   | 40               | 10         | 30         | 2          |            |          |          | 10         | 30         | 2         |            |            |           |   |  |
| 7                                 | Services servers administration                     | Z   | 30               | 10         | 20         | 2          |            |          |          | 10         | 20         | 2         |            |            |           |   |  |
| 8                                 | Activation of application on computing cluster      | Z   | 30               |            | 30         | 2          |            |          |          |            |            |           |            |            | 30        | 2 |  |
| 9                                 | Configuration and administration of hybrid networks | Z   | 30               |            | 30         | 3          |            |          |          |            |            |           |            |            | 30        | 3 |  |
| 10                                | Web applications                                    | Z   | 30               | 10         | 20         | 3          |            |          |          |            |            |           |            | 10         | 20        | 3 |  |
| 11                                | Wireless sensor networks                            | Z   | 40               | 10         | 30         | 2          |            |          |          |            |            |           |            | 10         | 30        | 2 |  |
| <b>TOTAL Speciality subjects:</b> |                                                     |     | <b>420</b>       | <b>110</b> | <b>310</b> | <b>27</b>  | <b>0</b>   | <b>0</b> | <b>0</b> | <b>90</b>  | <b>200</b> | <b>17</b> | <b>20</b>  | <b>110</b> | <b>10</b> |   |  |

## Other requirements

| No.                              | Module                                              | E/C | form of teaching |            |            | Total ECTS | year 1     |           |            |            |            |           | year 2     |           |           |    |  |
|----------------------------------|-----------------------------------------------------|-----|------------------|------------|------------|------------|------------|-----------|------------|------------|------------|-----------|------------|-----------|-----------|----|--|
|                                  |                                                     |     | Total            | L          | O          |            | semester 1 |           |            | semester 2 |            |           | semester 3 |           |           |    |  |
|                                  |                                                     |     |                  |            |            |            | L          | O         | E          | L          | O          | E         | L          | O         | E         |    |  |
| 1                                | Industrial property protection                      | Z   | 30               | 10         | 20         | 4          | 10         | 20        | 4          |            |            |           |            |           |           |    |  |
| 2                                | Managing IT projects and teams                      | Z   | 30               | 10         | 20         | 4          | 10         | 20        | 4          |            |            |           |            |           |           |    |  |
| 3                                | Master's workshop I                                 | Z   | 30               |            | 30         | 5          |            |           |            |            | 30         | 5         |            |           |           |    |  |
| 4                                | Master's seminar I                                  | Z   | 15               |            | 15         | 4          |            |           |            |            | 15         | 4         |            |           |           |    |  |
| 5                                | Master's seminar III - preparation of master thesis | Z   | 30               |            | 30         | 10         |            |           |            |            |            |           |            |           | 30        | 10 |  |
| 6                                | Master's workshop II                                | Z   | 45               |            | 45         | 6          |            |           |            |            |            |           |            |           | 45        | 6  |  |
| <b>TOTAL Other requirements:</b> |                                                     |     | <b>180</b>       | <b>20</b>  | <b>160</b> | <b>33</b>  | <b>20</b>  | <b>40</b> | <b>8</b>   | <b>0</b>   | <b>45</b>  | <b>9</b>  | <b>0</b>   | <b>75</b> | <b>16</b> |    |  |
| <b>TOTAL (A+B+C):</b>            |                                                     |     | <b>900</b>       | <b>275</b> | <b>625</b> | <b>90</b>  | <b>300</b> | <b>30</b> | <b>365</b> | <b>30</b>  | <b>235</b> | <b>30</b> |            |           |           |    |  |
| <b>TOTAL</b>                     |                                                     |     |                  |            |            |            |            |           |            | <b>900</b> |            |           |            |           |           |    |  |

Studia kończą się nadaniem tytułu zawodowego magistra na kierunku Informatics w specjalności Internet Engineering.

## Specialization: Software Quality Engineering

### Field of study courses

| No. | Module                                             | E/C | form of teaching |    |    | Total ECTS | year 1     |    |   |            |    |   | year 2     |   |   |  |  |
|-----|----------------------------------------------------|-----|------------------|----|----|------------|------------|----|---|------------|----|---|------------|---|---|--|--|
|     |                                                    |     | Total            | L  | O  |            | semester 1 |    |   | semester 2 |    |   | semester 3 |   |   |  |  |
|     |                                                    |     |                  |    |    |            | L          | O  | E | L          | O  | E | L          | O | E |  |  |
| 1   | Advanced algorithm and data structures             | E   | 60               | 30 | 30 | 5          | 30         | 30 | 5 |            |    |   |            |   |   |  |  |
| 2   | Development and configuration of computer networks | Z   | 45               | 15 | 30 | 4          | 15         | 30 | 4 |            |    |   |            |   |   |  |  |
| 3   | Monographic lecture                                | Z   | 30               | 30 |    | 4          | 30         |    | 4 |            |    |   |            |   |   |  |  |
| 4   | Programming paradigms                              | E   | 60               | 30 | 30 | 5          | 30         | 30 | 5 |            |    |   |            |   |   |  |  |
| 5   | Systems modelling and analysis                     | Z   | 45               | 15 | 30 | 4          | 15         | 30 | 4 |            |    |   |            |   |   |  |  |
| 6   | Parallel computing                                 | Z   | 30               | 15 | 15 | 4          |            |    |   | 15         | 15 | 4 |            |   |   |  |  |

|                                      |                                      |   |            |            |            |           |            |            |           |           |           |          |           |           |          |    |   |
|--------------------------------------|--------------------------------------|---|------------|------------|------------|-----------|------------|------------|-----------|-----------|-----------|----------|-----------|-----------|----------|----|---|
| 7                                    | Test automation in agile development | Z | 30         | 10         | 20         | 4         |            |            |           |           |           |          |           |           | 10       | 20 | 4 |
| <b>TOTAL Field of study courses:</b> |                                      |   | <b>300</b> | <b>145</b> | <b>155</b> | <b>30</b> | <b>120</b> | <b>120</b> | <b>22</b> | <b>15</b> | <b>15</b> | <b>4</b> | <b>10</b> | <b>20</b> | <b>4</b> |    |   |

### Speciality subjects

| No.                               | Module                                            | E/C | Total      | L          | O          | Total ECTS | form of teaching |          |          |            |            |           | year 1     |            |           | year 2 |  |  |
|-----------------------------------|---------------------------------------------------|-----|------------|------------|------------|------------|------------------|----------|----------|------------|------------|-----------|------------|------------|-----------|--------|--|--|
|                                   |                                                   |     |            |            |            |            | semester 1       |          |          | semester 2 |            |           | semester 3 |            |           |        |  |  |
|                                   |                                                   |     |            |            |            |            | L                | O        | E        | L          | O          | E         | L          | O          | E         |        |  |  |
| 1                                 | Advanced object disigning                         | Z   | 30         |            | 30         | 2          |                  |          |          |            | 30         | 2         |            |            |           |        |  |  |
| 2                                 | Automation in the process of software development | Z   | 45         | 15         | 30         | 3          |                  |          |          | 15         | 30         | 3         |            |            |           |        |  |  |
| 3                                 | Concurrent programming                            | E   | 45         | 15         | 30         | 3          |                  |          |          | 15         | 30         | 3         |            |            |           |        |  |  |
| 4                                 | Machine learning algorithms                       | E   | 45         | 15         | 30         | 3          |                  |          |          | 15         | 30         | 3         |            |            |           |        |  |  |
| 5                                 | Methods of computational intelligence             | E   | 45         | 15         | 30         | 3          |                  |          |          | 15         | 30         | 3         |            |            |           |        |  |  |
| 6                                 | Optimization techniques                           | E   | 45         | 15         | 30         | 3          |                  |          |          | 15         | 30         | 3         |            |            |           |        |  |  |
| 7                                 | Advanced object programming                       | Z   | 45         | 15         | 30         | 2          |                  |          |          |            |            |           | 15         | 30         | 2         |        |  |  |
| 8                                 | Declarative languages                             | Z   | 30         | 15         | 15         | 2          |                  |          |          |            |            |           | 15         | 15         | 2         |        |  |  |
| 9                                 | Programming with use of agile methodologies       | Z   | 30         |            | 30         | 2          |                  |          |          |            |            |           |            |            | 30        | 2      |  |  |
| 10                                | Security of information systems                   | Z   | 30         |            | 30         | 2          |                  |          |          |            |            |           |            |            | 30        | 2      |  |  |
| 11                                | Team project                                      | Z   | 30         |            | 30         | 2          |                  |          |          |            |            |           |            |            | 30        | 2      |  |  |
| <b>TOTAL Speciality subjects:</b> |                                                   |     | <b>420</b> | <b>105</b> | <b>315</b> | <b>27</b>  | <b>0</b>         | <b>0</b> | <b>0</b> | <b>75</b>  | <b>180</b> | <b>17</b> | <b>30</b>  | <b>135</b> | <b>10</b> |        |  |  |

### Other requirements

| No.                              | Module                                              | E/C | Total      | L          | O          | Total ECTS | form of teaching |           |            |            |            |            | year 1     |           |           | year 2 |  |  |
|----------------------------------|-----------------------------------------------------|-----|------------|------------|------------|------------|------------------|-----------|------------|------------|------------|------------|------------|-----------|-----------|--------|--|--|
|                                  |                                                     |     |            |            |            |            | semester 1       |           |            | semester 2 |            |            | semester 3 |           |           |        |  |  |
|                                  |                                                     |     |            |            |            |            | L                | O         | E          | L          | O          | E          | L          | O         | E         |        |  |  |
| 1                                | Industrial property protection                      | Z   | 30         | 10         | 20         | 4          | 10               | 20        | 4          |            |            |            |            |           |           |        |  |  |
| 2                                | Managing IT projects and teams                      | Z   | 30         | 10         | 20         | 4          | 10               | 20        | 4          |            |            |            |            |           |           |        |  |  |
| 3                                | Master's workshop I                                 | Z   | 30         |            | 30         | 5          |                  |           |            |            | 30         | 5          |            |           |           |        |  |  |
| 4                                | Master's seminar I                                  | Z   | 15         |            | 15         | 4          |                  |           |            |            | 15         | 4          |            |           |           |        |  |  |
| 5                                | Master's seminar III - preparation of master thesis | Z   | 30         |            | 30         | 10         |                  |           |            |            |            |            |            |           | 30        | 10     |  |  |
| 6                                | Master's workshop II                                | Z   | 45         |            | 45         | 6          |                  |           |            |            |            |            |            |           | 45        | 6      |  |  |
| <b>TOTAL Other requirements:</b> |                                                     |     | <b>180</b> | <b>20</b>  | <b>160</b> | <b>33</b>  | <b>20</b>        | <b>40</b> | <b>8</b>   | <b>0</b>   | <b>45</b>  | <b>9</b>   | <b>0</b>   | <b>75</b> | <b>16</b> |        |  |  |
| <b>TOTAL (A+B+C):</b>            |                                                     |     | <b>900</b> | <b>270</b> | <b>630</b> | <b>90</b>  | <b>300</b>       | <b>30</b> | <b>330</b> | <b>30</b>  | <b>270</b> | <b>30</b>  | <b>270</b> | <b>30</b> |           |        |  |  |
| <b>TOTAL</b>                     |                                                     |     |            |            |            |            |                  |           |            |            |            | <b>900</b> |            |           |           |        |  |  |

Studia kończą się nadaniem tytułu zawodowego magistra na kierunku Informatics w specjalności Software Quality Engineering.

#### Legend

Each semester consists of 15 weeks

E/C - examination/course work

E - ECTS

L - lecture, O - all forms of teaching excluding lecture (practical classes, laboratory classes, discussion classes, seminar, proseminar, language classes, field practice, workshop, internship, tutoring)

Plan studiów zatwierdzony przez Radę Wydziału w dniu 22.06.2017 r.

#### Otrzymują:

1. Dział Kształcenia
2. Wydział Informatyki i Nauki o Materiałach
3. Dziekanat

.....  
(pieczęć i podpis Dyrektora Instytutu)

.....  
(pieczęć i podpis Dziekana)