**Zał. nr 4 do ZW 25/2019**

**Attachment no. … to Program of Studies**

**PLAN OF STUDIES**

**FACULTY**: **Computer Science nad Management**

**MAIN FIELD OF STUDY: Applied Computer Science**

**EDUCATION LEVEL:** first-level (~~licencjat~~/inżynier) studies / ~~second-level studies / magister uniform studies~~\*

**FORM OF STUDIES**: full-time studies / ~~part-time studies~~\*

**PROFILE:** general academic /~~practical~~ \*

**SPECIALIZATION**: **not applicable**

**LANGUAGE OF STUDY: English**

Resolution no. … of the Senate of Wroclaw University of Science and Technology

In effect since …………………...........................

\*delete as applicable

**Plan of studies structure (optionally)**

1) in point layout; *practical training after VI semester, 5 ECTS + 160 h CNPS added to the balance of semester VI, Mi – modules of optional courses; 1 course to choose*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS |  |
| 27 | 900 30 | 900 30 | 900 30 | 900 30 | 900 30 | 900 30 | 900 30 |  |
| 26 |  |  |  | Sports II30 0 |  |  |  |  |
| 25 |  |  | Sports I30 0 | Presentation Tech.niques 60 2 |  |  |  |
| 24 | General Physics I120 4 (2+2) | General Physics II 180 6 (3+1+2) | English II90 3 | **M8** – Multimedia 120 4 (2+2) |  |  |
| 23 | English I60 2 | **M4** – Mobile Applications120 4 (2+2) |  |  |
| 22 |  |  |
| 21 | Computer System Organization90 3 (2+1) |  |  |
| 20 | Computer Architecture120 4 (2+2) | **M1** – Administration of Computer120 4 (2+2) | **M7** – Programming Tools and Technologies 110 4 (2+2) |  |  |
| 19 | Basics of entrepreneurship 60 2 | **M3** – Database design 120 4 (2+2) |  |  |
| 18 | Structural and Object oriented Programming180 6 (2+2+2) |  |  |
| 17 | Computer Networks 200 7 (4+3) | M10 – Humanistic subject90 3 |  |
| 16 | Data Structures and Algorithms180 6 (2+2+2) | Systems Analysis and Decision Support190 7 (3+2+2) | **M2** – Web Technologies120 4 (2+2) | **M6** – Distributed Systems 120 4 (2+2) |  |
| 15 | **M9** – Current Trends in Computer Science150 5 (2+3) |  |
| 14 |  |
| 13 |  |
| 12 | Logics for IT Specialists 150 5 (3+2) | Effective Programming Techniques150 5 (2+3) | Script Langugages175 6 (3+3) | Cybersecurity150 5 (3+2) | **M5** – Project Management Basics 120 4 (1+2+1) |  |
| 11 | Operating Systems 120 4 (2+2) | Team Project 600 20 (19+1) |  |
| 10 |  |
| 9 | Programming Paradigms 200 7 (3+2+2) |  |
| 8 | Algebra and Analytic Geometry 180 6 (3+3) | Data Bases 175 6 (2+2+2) | Introduction to IoT150 5 (2+3) | Data Warehouses 120 4 (2+3) |  |
| 7 | Discrete Mathematics150 5 (2+3) |  |
| 6 |  |
| 5 |  |
| 4 | Mathematical Analysis I 180 6 (3+3) | Theory of Probabilistic and Statistics 200 7 (4+3) | Basics of Software Engineering120 4 (1+2+1) | Software Engineering 180 6 (3+3) | Artificial Intelligence and Knowledge Engineering150 5 (2+3) |  |
| 3 | Mathematical Analysis II150 5 (3+2) |  |
| 2 | IT Social and Prof. Problems60 2 |  |
| 1 |  |
|  | I | II | III | IV | V | VI | VII | Total |
|  | 24/360 | 24/360 | 25/375 | 26/360 | 25/375 | 24/360 | 17/285 | 165/2475 |

2) in hourly layout

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS | CNPS ECTS |  |
| 27 | 900 30 | 900 30 | 900 30 | 900 30 | 900 30 | 900 30 | 900 30 |  |
| 26 |  |  |  | Sports II (2h) |  |  |  |  |
| 25 |  |  | Sports I (2h) | Presentation Techniques (00002) |  |  |  |
| 24 | General Physics I (21000) | General Physics II (21100 E) | English II (4h) | **M8** - Multimedia (20200 E) |  |  |
| 23 | English I (4h) | **M4** – Mobile applications (20200) |  |  |
| 22 |  |  |
| 21 | Computer System Organization (21000) |  |  |
| 20 | Computer Architecture (20200) | **M1** - Administration of Computer (20200) | **M7** – Programming Tools and Technologies (20200) |  |  |
| 19 | Basics of entre-preneurship (20000) | **M3** - Database design (10020) |  |  |
| 18 | Structural and Object oriented Programming (22200) |  |  |
| 17 | Computer Networks (30200 E) | **M10** - Humanistic subject (2h) |  |
| 16 | Data Structures and Algorithms (21200 E) | Systems Analysis and Decision Support(21100 E) | **M2** – Web Technologies (20200) | **M6** – Distributed Systems (20200) |  |
| 15 | **M9** - Current Trends in Computer Science (20200) |  |
| 14 |  |
| 13 |  |
| 12 | Logics for IT Specialists (22000 E) | Effective Programming Techniques (10200) | Script Languages(20200 E) | Cybersecurity (20200 E) | **M5** - Project Management Basics (10201) |  |
| 11 | Operating Systems (20200) | Team Project(00081) |  |
| 10 |  |
| 9 | Programming Paradigms(21200 E) |  |
| 8 | Algebra and Analytic Geometry (22000 E) | Data Bases (21100 E) | Introduction to IoT (20200 E) | Data Warehouses (20200 E) |  |
| 7 | Discrete Mathematics (22000) |  |
| 6 |  |
| 5 |  |
| 4 | Mathematical Analysis I (22000 E) | Theory of Probabilistic and Statistics (22000 E) | Basics of Software Engineering (12100) | Software Engineering(20020 E) | Artificial Intelligence and Knowledge Engineering(20200 E) |  |
| 3 | Mathematical Analysis II (21000 E) |  |
| 2 | IT Social and Professio-nal Problems (20000) |  |
| 1 |  |
|  | I | II | III | IV | V | VI | VII | Total |
|  | 24/360 | 24/360 | 25/375 | 26/360 | 25/375 | 24/360 | 17/285 | 165/2475 |

**1.** **Set of obligatory and optional courses and groups of courses in semestral arrangement**

**Semester 1**

**Obligatory courses Number of ECTS points 2**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Structural and Object oriented Programming  |  |  | 2 |  |  | K1INF\_W03K1INF\_U01K1INF\_U02 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | PD | Ob. |
|  | Total |  |  | 2 |  |  |  | 30 | 60 | 2 | 1,2 |  |  |  | 2 |  |  |

**Obligatory groups of courses Number of ECTS points 28**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Computer System Organization (GK) | 2 | 1 |  |  |  | K1INF\_W06 | 45 | 90 | 3 | 1,8 | T | Z (w) |  |  | PD | Ob |
|  |  | Structural and Object oriented Programming (GK) | 2 | 2 |  |  |  | K1INF\_W03K1INF\_U01K1INF\_U02 | 60 | 120 | 4 | 2,4 | T | E (w) |  |  | PD | Ob |
|  |  | Logic for IT Specialists (GK) | 2 | 2 |  |  |  | K1INF\_W01 | 60 | 150 | 5 | 3 | T | E (w) |  |  | K | Ob. |
|  |  | General Physics I (GK) | 2 | 1 |  |  |  | K1INF\_W02 | 45 | 120 | 4 | 2,4 | T | Z (w) | O |  | PD | Ob. |
|  |  | Algebra and Analytic Geometry (GK) | 2 | 2 |  |  |  | K1INF\_W01 | 60 | 180 | 6 | 3,6 | T | E (w) | O |  | PD | Ob. |
|  |  | Mathematical Analysis I (GK) | 2 | 2 |  |  |  | K1INF\_W01 | 60 | 180 | 6 | 3,6 | T | E (w) | O |  | PD | Ob. |
|  | Total | 12 | 10 |  |  |  |  | 330 | 840 | 28 | 16,8 |  |  |  |  |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | **12** | **10** | **2** |  |  | **360** | **900** | **30** | **18** |

**Semester 2**

**Obligatory courses Number of ECTS points 12**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Data Structures and Algorithms |  |  | 2 |  |  | K1INF\_W03K1INF\_U01 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  |  | Computer Architecture | 2 |  |  |  |  | K1INF\_W06K1INF\_U04K1INF\_U05 | 30 | 60 | 2 | 1,2 | T | Z |  |  | K | Ob. |
|  |  | Computer Architecture |  |  | 2 |  |  | K1INF\_W06K1INF\_U04K1INF\_U05 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  |  | General Physics II |  |  | 1 |  |  | K1INF\_W02 | 15 | 60 | 2 | 1,2 | T | Z | O | P (2) | PD | Ob. |
|  |  | Operating Systems | 2 |  |  |  |  | K1INF\_W08K1INF\_U06 | 30 | 60 | 2 | 1,2 | T | Z |  |  | K | Ob. |
|  |  | Operating Systems |  |  | 2 |  |  | K1INF\_W08K1INF\_U06 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob |
|  | Total | 4 |  | 7 |  |  |  | 165 | 360 | 12 | 7,2 |  |  |  | 8 |  |  |

**Obligatory groups of courses Number of ECTS points 18**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Data Structures and Algorithms (GK) | 2 | 1 |  |  |  | K1INF\_W03K1INF\_U01 | 45 | 120 | 4 | 2,4 | T | E (w) |  |  | K | Ob |
|  |  | General Physics II (GK) | 2 | 1 |  |  |  | K1INF\_W02 | 45 | 120 | 4 | 2,4 | T | E (w) | O |  | PD | Ob |
|  |  | Discrete Mathematics (GK) | 2 | 2 |  |  |  | K1INF\_W01 | 60 | 150 | 5 | 3 | T | Z (w) |  |  | PD | Ob |
|  |  | Mathematical analysis II (GK) | 2 | 1 |  |  |  | K1INF\_W01 | 45 | 150 | 5 | 3 | T | E (w) | O |  | PD | Ob |
|  | Total | 8 | 5 |  |  |  |  | 195 | 540 | 18 | 10,8 |  |  |  |  |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | **12** | **5** | **7** |  |  | **360** | **900** | **30** | **18** |

**Semester 3**

**Obligatory courses Number of ECTS points 16**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Basics of entrepreneurship | 2 |  |  |  |  | K1INF\_W19 | 30 | 60 | 2 | 1,2 | T | Z |  |  | KO | Ob |
|  |  | Computer Networks | 3 |  |  |  |  | K1INF\_W09K1INF\_U07 | 45 | 110 | 4 | 2,4 | T | E |  |  | K | Ob. |
|  |  | Computer Networks |  |  | 2 |  |  | K1INF\_W09K1INF\_U07 | 30 | 90 | 3 | 1,8 | T | Z |  | P (3) | K | Ob. |
|  |  | Effective Programming Techniques | 1 |  |  |  |  | K1INF\_W03K1INF\_U01 | 15 | 60 | 2 | 1,2 | T | Z |  |  | K | Ob. |
|  |  | Effective Programming Techniques |  |  | 2 |  |  | K1INF\_W03K1INF\_U01 | 30 | 90 | 3 | 1,8 | T | Z |  | P (3) | K | Ob. |
|  |  | Programming paradigms |  |  | 2 |  |  | K1INF\_W04K1INF\_U02 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  | Total | 6 |  | 6 |  |  |  | 180 | 470 | 16 | 9,6 |  |  |  | 8 |  |  |

**Obligatory groups of courses Number of ECTS points 12**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Programming paradigms (GK) | 2 | 1 |  |  |  | K1INF\_W04K1INF\_U02 | 45 | 140 | 5 | 3 | T | E (w) |  |  | K | Ob. |
|  |  | Theory of Probabilistic and Statistics (GK) | 2 | 2 |  |  |  | K1INF\_W01 | 60 | 200 | 7 | 4,2 | T | E (w) |  |  | PD | Ob. |
|  | Total | 4 | 3 |  |  |  |  | 105 | 340 | 12 | 7,2 |  |  |  |  |  |  |

**Optional courses (minimum 60 hours in semester, 2 ECTS points)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
| 1. |  | Foreign Language I |  | 4 |  |  |  | K1INF\_U19 | 30 | 60 | 2 | 1,2 | T | Z | O |  | KO | W |
| 2. |  | Sports I |  | 2 |  |  |  |  | 30 | 30 | 0 | 0 | T | Z | O |  | KO | W |
|  | Total |  | 6 |  |  |  |  | 60 | 90 | 2 | 1,2 |  |  |  |  |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | **10** | **7** | **6** |  |  | **375** | **900** | **30** | **18** |

**Semester 4**

**Obligatory courses Number of ECTS points 11**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Data Bases |  |  | 1 |  |  | K1INF\_W13K1INF\_U03K1INF\_U04 | 15 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  |  | Systems Analysis and Decision Support Methods |  |  | 1 |  |  | K1INF\_W12K1INF\_U07 | 15 | 50 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  |  | Script Languages | 2 |  |  |  |  | K1INF\_W03K1INF\_U01 | 30 | 85 | 3 | 1,8 | T | E |  |  |  | Ob. |
|  |  | Script Languages |  |  | 2 |  |  | K1INF\_W03K1INF\_U01 | 30 | 90 | 3 | 1,8 | T | Z |  | P (3) | K | Ob. |
|  |  | Basics of Software Engineering |  |  | 1 |  |  | K1INF\_W06K1INF\_U03 | 15 | 30 | 1 | 0,6 | T | Z |  | P (1) | K | Ob. |
|  | Total | 2 |  | 5 |  |  |  | 105 | 315 | 11 | 6,6 |  |  |  | 8 |  |  |

**Obligatory groups of courses Number of ECTS points 12**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Data Bases (GK) | 2 | 1 |  |  |  | K1INF\_W13K1INF\_U03K1INF\_U04 | 45 | 115 | 4 | 2,4 | T | E(w) |  |  | K | Ob. |
|  |  | Systems Analysis and Decision Support Methods (GK) | 2 | 1 |  |  |  | K1INF\_W12K1INF\_U07 | 45 | 140 | 5 | 3 | T | E(w) |  |  | K | Ob. |
|  |  | Basics of Software Engineering (GK) | 1 | 2 |  |  |  | K1INF\_W06K1INF\_U03 | 45 | 90 | 3 | 1,8 | T | Z(w) |  |  | K | Ob. |
|  | Total | 5 | 4 |  |  |  |  | 135 | 345 | 12 | 7,2 |  |  |  |  |  |  |

**Optional courses (minimum 90 hours in semester, 3 ECTS points)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Foreign Language II |  | 4 |  |  |  | K1INF\_U17 | 60 | 90 | 3 | 1,8 | T | Z | O |  | KO | W |
| 2. |  | Sports II |  | 2 |  |  |  |  | 30 | 30 | 0 | 0 | T | Z | O |  | KO | W |
|  | Total |  | 6 |  |  |  |  | 90 | 120 | 3 | 1,8 |  |  |  |  |  |  |

**Group of optional courses M1 – Administration of Computer Systems (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Linux Server Administration (GK) | 2 |  | 2 |  |  | K1INF\_W08K1IN\_U14 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  |  | Microsoft Systems Administration (GK) | 2 |  | 2 |  |  | K1INF\_W08K1IN\_U14 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  |  | Routing and Switching in Computer Networks (GK) | 2 |  | 2 |  |  | K1INF\_W08K1IN\_U14 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2)  | K | W |
|  | Total | 2 |  | 2 |  |  |  | 60 | 120 | 4 | 2,4 |  |  |  | 2 |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | **9** | **10** | **7** |  |  | **390** | **900** | **30** | **18** |

**Semester 5**

**Obligatory courses Number of ECTS points 18**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Presentation Techniques  |  |  |  |  | 2 | K1INF\_U18 | 30 | 60 | 2 | 1,2 | T | Z |  |  | KO | Ob. |
|  |  | Cybersecurity | 2 |  |  |  |  | K1INF\_W10K1INF\_U08 | 30 | 90 | 3 | 1,8 | T | E |  |  | K | Ob. |
|  |  | Cybersecurity |  |  | 2 |  |  | K1INF\_W10K1INF\_U08 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  |  | Introduction to IoT | 2 |  |  |  |  | K1INF\_W09K1INF\_U04K1INF\_U07 | 30 | 60 | 2 | 1,2 | T | E |  |  | K | Ob. |
|  |  | Introduction to IoT |  |  | 2 |  |  | K1INF\_W09K1INF\_U04K1INF\_U07 | 30 | 90 | 3 | 1,8 | T | Z |  | P (3) | K | Ob. |
|  |  | Software Engineering | 2 |  |  |  |  | K1INF\_W14K1INF\_U03K1INF\_U04K1INF\_U21 | 30 | 90 | 3 | 1,8 | T | E |  |  | K | Ob. |
|  |  | Software Engineering |  |  |  | 2 |  | K1INF\_W14K1INF\_U03K1INF\_U04K1INF\_U21 | 30 | 90 | 3 | 1,8 | T | Z |  | P (3)  | K | Ob. |
|  | Total | 6 |  | 4 | 2 | 2 |  | 210 | 540 | 18 | 10,8 |  |  |  | 8 |  |  |

**Group of optional courses M2 – Web Technologies (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Web Systems Programming (GK) | 2 |  | 2 |  |  | K1INF\_W07K1INF\_U11 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  |  | Developing Web Applications with .NET (GK) | 2 |  | 2 |  |  | K1INF\_W07K1INF\_U11 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  | Total | 2 |  | 2 |  |  |  | 60 | 120 | 4 | 2,4 |  |  |  | 2 |  |  |

**Group of optional courses M3 – Database Design (minimum 45 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Database Systems Engineering (GK) | 1 |  |  | 2 |  | K1INF\_W14K1INF\_U03K1INF\_U04 | 45 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  |  | Oracle Database – Programming (GK) | 1 |  |  | 2 |  | K1INF\_W14K1INF\_U03K1INF\_U04 | 45 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  |  | Database Design (GK) | 1 |  |  | 2 |  | K1INF\_W14K1INF\_U03K1INF\_U04 | 45 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  | Total | 1 |  |  | 2 |  |  | 45 | 120 | 4 | 2,4 |  |  |  | 2 |  |  |

**Group of optional courses M4 – Mobile applications (minimum 60 hours in semester, 4 ECTS points, 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Mobile Applications for Android (GK) | 2 |  | 2 |  |  | K1INF\_W07K1INF\_U11 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  |  | Mobile Applications for IOS (GK) | 2 |  | 2 |  |  | K1INF\_W07K1INF\_U11 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | W |
|  | Total | 2 |  | 2 |  |  |  | 60 | 120 | 4 | 2,4 |  |  |  |  |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | 11 |  | 8 | 4 | 2 | 375 | 900 | 30 | 18 |

**Semester 6**

**Obligatory courses Number of ECTS points 9**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Artificial intelligence and knowledge engineering | 2 |  |  |  |  | K1INF\_W13K1INF\_U06 | 30 | 60 | 2 | 1,2 | T | E |  |  | K | Ob. |
|  |  | Artificial intelligence and knowledge engineering |  |  | 2 |  |  | K1INF\_W13K1INF\_U06 | 30 | 90 | 3 | 1,8 | T | Z |  | P (3) | K | Ob. |
|  |  | Data Warehouses | 2 |  |  |  |  | K1INF\_W12K1INF\_U06 | 30 | 60 | 2 | 1,2 | T | E |  |  | K | Ob. |
|  |  | Data Warehouses |  |  | 2 |  |  | K1INF\_W12K1INF\_U06 | 30 | 60 | 2 | 1,2 | T | Z |  | P (2) | K | Ob. |
|  | Total | 4 |  | 4 |  |  |  | 120 | 270 | 9 | 5,4 |  |  |  | 5 |  |  |

**Group of optional courses M5 – Project Management Basics (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Introduction to IT Project Management (GK) | 1 |  | 2 |  | 1 | K1INF\_W17K1INF\_U09K1INF\_U16K1INF\_U18 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob. |
|  |  | Support for IT Project Management (GK) | 1 |  | 2 |  | 1 | K1INF\_W17K1INF\_U09K1INF\_U16K1INF\_U18 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob |
|  |  | IT Project Process Management (GK) | 1 |  | 2 |  | 1 | K1INF\_W17K1INF\_U09K1INF\_U16K1INF\_U18 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob. |
|  | Total | 1 |  | 2 |  |  |  | 60 | 120 | 4 | 2,4 |  |  |  |  |  |  |

**Group of optional courses M6 – Distributed Systems (minimum 60 hours in semester, 4 ECTS points, 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Distributed Information Systems (GK) | 2 |  | 2 |  |  | K1INF\_W07K1INF\_U11K1INF\_U16 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob. |
|  |  | Programming on Microsoft Azure (GK) | 2 |  | 2 |  |  | K1INF\_W07K1INF\_U11K1INF\_U16 | 60 | 120 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob |
|  | Total | 2 |  | 2 |  |  |  | 60 | 120 | 4 | 2,4 |  |  |  |  |  |  |

**Group of optional courses M7 – Programming Tools and Technologies (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Software Development in .NET Environment (GK) | 2 |  | 2 |  |  | K1INF\_W16K1INF\_U13 | 60 | 110 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob. |
|  |  | Games Programming (GK) | 2 |  | 2 |  |  | K1INF\_W16K1INF\_U13 | 60 | 110 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob |
|  |  | Advanced Web Technologies (GK) | 2 |  | 2 |  |  | K1INF\_W16K1INF\_U13 | 60 | 110 | 4 | 2,4 | T | Z (w) |  | P (2) | K | Ob. |
|  | Total | 1 |  | 2 |  |  |  | 60 | 110 | 4 | 2,4 |  |  |  |  |  |  |

**Group of optional courses M8 – Multimedia (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Computer Graphics GK) | 2 |  | 2 |  |  | K1INF\_W15K1INF\_U12 | 60 | 120 | 4 | 2,4 | T | E (w) |  | P (2) | K | Ob. |
|  |  | Programming Multimedia Applications (GK) | 2 |  | 2 |  |  | K1INF\_W15K1INF\_U12 | 60 | 120 | 4 | 2,4 | T | E (w) |  | P (2) | K | Ob |
|  |  | Digital Media Processing Techniques (GK) | 2 |  | 2 |  |  | K1INF\_W15K1INF\_U12 | 60 | 120 | 4 | 2,4 | T | E (w) |  | P (2) | K | Ob. |
|  | Total | 2 |  | 2 |  |  |  | 60 | 120 | 4 | 2,4 |  |  |  |  |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | **11** |  | **12** |  | **1** | **360** | **900** (160 hours of practical training included) | **30** (5 ECTS of practical training included) | **18** (3 ECTS of practical training included) |

**Semester 7**

**Obligatory courses Number of ECTS points 2**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | IT Social and Professional Problems | 2 |  |  |  |  | K1INF\_W20K1INF\_W22 | 30 | 60 | 2 | 1,2 | T | Z |  |  | KO | Ob. |
|  | Total | 2 |  |  |  |  |  | 30 | 60 | 2 | 1,2 |  |  |  |  |  |  |

**Optional courses (minimum 135 hours in semester, 20 ECTS points)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Team Project (GK) |  |  |  | 8 | 1 | K1INF\_U10K1INF\_U17K1INF\_U20K1INF\_U21K1INF\_U22K1INF\_K01K1INF\_K02K1INF\_K03K1INF\_K04 | 135 | 600 | 20 | 12 | T | Z |  | P (19) | K | W |
|  | Total |  |  |  | 8 | 1 |  | 135 | 600 | 20 | 12 |  |  |  |  |  |  |

**Group of optional courses M9 – Current trends in Computer Science (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Data Science (GK) | 2 |  | 2 |  |  | K1INF\_W18K1INF\_U10 | 60 | 150 | 5 | 3 | T | Z (w) |  | P (3) | K | W |
|  |  | Neural Networks (GK) | 2 |  | 2 |  |  | K1INF\_W18K1INF\_U10 | 60 | 150 | 5 | 3 | T | Z (w) |  | P (3) | K | W |
|  |  | Metaheuristics in Problems Solving (GK) | 2 |  | 2 |  |  | K1INF\_W18K1INF\_U10 | 60 | 150 | 5 | 3 | T | Z (w) |  | P (3) | K | W |
|  |  | User – Computer Interaction (GK) | 2 |  | 2 |  |  | K1INF\_W18K1INF\_U10 | 60 | 150 | 5 | 3 | T | Z (w) |  | P (3) | K | W |
|  | Total | 2 |  | 2 |  |  |  | 60 | 150 | 5 | 3 |  |  |  |  |  |  |

**Group of optional courses M10 – Przedmiot humanistyczny (minimum 60 hours in semester, 4 ECTS points; 1 course to choose)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Course/group of courses code | Name of course/group of courses (denote group of courses with symbol **GK**) | Weekly number of hours | Learning effect symbol | Number of hours | Number of ECTS points | Form2 of course/group of courses | Way3 of crediting | Course/group of courses |
| lec | cl | lab | pr | sem | ZZU | CNPS | total | BK classes1 | university-wide4 | practical5 | kind6 | type7 |
|  |  | Przedmiot humanistyczny 1 | 2 |  |  |  |  | K1INF\_W22 | 30 | 90 | 3 | 1,8 | T | Z | O |  | KO | W |
|  |  | Przedmiot humanistyczny 2 | 2 |  |  |  |  | K1INF\_W22 | 30 | 90 | 3 | 1,8 | T | Z | O |  | KO | W |
|  | Total | 2 |  |  |  |  |  | 30 | 90 | 3 | 1,8 |  |  |  |  |  |  |

**Altogether in semester**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Total number of hours | Total number ofZZUhours | Total number of CNPS hours | Total number of ECTS points | Number of ECTS points for BK classes1 |
| lec | cl | lab | pr | sem |  |  |  |  |
|  |  |  | **6** |  | **2** | **8** | **1** | **255** | **900** | **30** | **18** |

**2.** **Set of examinations in semestral arrangement**

|  |  |  |
| --- | --- | --- |
| Course / group of courses code | Names of courses / groups of courses ending with examination | Semester |
|  | 1. Logika dla informatyków
2. Algebra z geometrią analityczną
3. Analiza matematyczna
 | 1 |
|  | 1. Algorytmy i struktury danych
2. Analiza matematyczna II
3. Fizyka II
 | 2 |
|  | 1. Sieci komputerowe
2. Paradygmaty programowania
3. Rachunek prawdopodobieństwa i statystyka
 | 3 |
|  | 1. Metody systemowe i decyzyjne
2. Bazy danych
3. Języki skryptowe
 | 4 |
|  | 1. Cyberbezpieczeństwo
2. Podstawy Internetu Rzeczy
3. Projektowanie oprogramowania
 | 5 |
|  | 1. Sztuczna inteligencja i inżynieria wiedzy
2. Hurtownie danych
3. Multimedia
 | 6 |

**3.** **Numbers of allowable deficit of ECTS points after particular semesters**

|  |  |
| --- | --- |
| Semester | Allowable deficitof ECTS pointsafter semester |
| 1 | 8 |
| 2 | 8 |
| 3 | 8 |
| 4 | 8 |
| 5 | 8 |
| 6 | 0 |
| 7 | 0 |

Opinion of student government legislative body

................... ................................................................................

Date Name and surname, signature of student representative

................... ................................................................................

Date Dean’s signature