**International University of Sarajevo, Faculty of Engineering and Natural Sciences (FENS)**

**Software Engineering Program Curriculum - BACHELOR**

**AY 2024-2025**

***Click on the course code or title to see the syllabus.***

**Semester I**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| ELIT100 | Academic English and Effective Communication | | 2 | 1 | 6 |
| MATH101 | Calculus I | | 3 | 2 | 6 |
| CS103 | Introduction to Programming | | 3 | 2 | 6 |
| ENS101 | Introduction to Engineering | | 2 | 1 | 3 |
| xxx | University Elective I | See Table 1 | | | 6 |
| xxx | Foreign Language Elective I | | 2 | 0 | 3 |
| | | **Semester Total =** | | | **30** |

**Semester II**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| CS105 | Advanced Programming | CS103 | 3 | 2 | 6 |
| SE211 | Software Construction | CS103 | 3 | 2 | 6 |
| MATH201 | Linear Algebra | MATH101 | 3 | 2 | 6 |
| ELIT200 | Critical Reading and Writing | | 2 | 1 | 6 |
| xxx | University Elective II | See Table 1 | | | 3 |
| xxx | Foreign Language Elective II | For. Lang. Ele. 1 | 2 | 0 | 3 |
| | | **Semester Total =** | | | **30** |

**Semester III**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| SE322 | Software Requirements Analysis | SE211 or CS105 | 3 | 2 | 6 |
| MATH204 | Discrete Mathematics | MATH101 | 3 | 2 | 6 |
| MATH203 | Introduction to Probability and Statistics | MATH101 | 3 | 2 | 6 |
| CS305 | Programming Languages | CS105 | 3 | 2 | 6 |
| xxx | Faculty Elective I | See Table 2 | | | 6 |
| | | **Semester Total =** | | | **30** |

**Semester IV**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| CS304 | Computer Architecture | CS105 | 3 | 2 | 6 |
| MATH209 | Discrete Mathematics II | MATH204 | 3 | 2 | 6 |
| CS306 | Database Management | CS105 | 3 | 2 | 6 |
| xxx | Faculty Elective II | See Table 2 | | | 6 |
| xxx | Free Elective I | | | | 6 |
| | | **Semester Total =** | | | **30** |

**Semester V**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| SE302 | Software Testing and Maintenance | SE211 or CS105 and, MATH204 | 3 | 2 | 6 |
| CS302 | Algorithms and Data Structures | CS105 and MATH204 | 3 | 2 | 6 |
| CS307 | Operating Systems | CS304 | 3 | 2 | 6 |
| CS412 | Web Application Development | CS105 | 3 | 2 | 6 |
| IE408 | Project Management | Junior Standing | 2 | 2 | 6 |
| | | **Semester Total =** | | | **30** |

**Semester VI**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| xxx | Faculty Elective III | See Table 2 | | | 6 |
| CS308 | Software Engineering | CS105 | 3 | 2 | 6 |
| SE308 | Communication Systems and Networks | CS105 | 3 | 2 | 6 |
| CS310 | Human Computer Interaction | CS105 | 3 | 2 | 6 |
| ENS309 | Ethics in Engineering and Sciences | | | | 6 |
| | | **Semester Total =** | | | **30** |

**Semester VII**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| SE370 | Work placement/internship | | 0 | 14 | 6 |
| CS420 | Network Programming | SE308 | 3 | 2 | 6 |
| xxx | Program Elective I (Senior standing) | See Table 3 | 3 | | 6 |
| xxx | Program Elective II (Senior standing) | See Table 3 | 3 | | 6 |
| xxx | Program Elective III (Senior standing) | See Table 3 | 3 | | 6 |
| | | **Semester Total =** | | | **30** |

**Semester VIII**

| Code | Title | Prerequisites | T | P | ECTS |
|---|---|---|---|---|---|
| ENS490 | Graduation Project | Last Semester | 0 | 4 | 6 |
| SE407 | Software Quality Management | SE211 or CS105 | 3 | 2 | 6 |
| xxx | Program Elective IV (Senior standing) | See Table 3 | 3 | | 6 |
| xxx | Program Elective V (Senior standing) | See Table 3 | 3 | | 6 |
| xxx | Program Elective VI (Senior standing) | See Table 3 | 3 | | 6 |
| | | **Semester Total =** | | | **30** |

| | | | |
|---|---|---|---|
| **Abbreviations: T (Theory), P (Practice), ECTS credit** | | **No. of Courses** | **42** |
| **Total Credits Required for Graduation** | **240** | **Min.ECTS Credits for Applied/Practical Component of the Curriculum** | **65.8** |
| **Total Credits of Electives** | **84** | **Elective Ratio** | **35%** |

*University Electives and 2 Foreign Language Elective courses are taken from the pool of University Elective courses, see Table 1.*

*3 Faculty Elective courses are taken from the pool of Faculty Elective courses, see Table 2.Faculty Elective may be selected from other FENS programmes with the approval of Program Coordinator.*

*5 Program Electives are taken from the pool of Program Elective courses, see Table 3. 2 Program Electives may be selected from other FENS programmes (including FENS graduate level courses) with the approval of Program Coordinator.*

*3 Free Elective courses are taken from any faculty. It is strongly recommended that the students take MAN303 Entrepreneurship and Small Business Management*

*Junior standing: student has successfully completed at least 108 ECTS. Senior standing: student has successfully completed at least 168 ECTS.*

*This new curriculum is being implemented for the new freshman students who entered the freshman class in the year 2017/2018 or after.*

*For the existing sophomore, junior and senior students, the Faculty Council will make plans for proper adaptation to the new curriculum.*

*In exceptional cases only, Faculty Council may make a decision for a student to bypass a prerequisite for any course.*

*Work placement/Internship is typically practiced in summer for a period of at least 25 work days, totalling at least 150 hours.*

| Table 1: IUS Pool of 6 ECTS University Courses | | | | | |
|---|---|---|---|---|---|
| **Code** | **Title** | **Prerequisites** | **T** | **P** | **ECTS** |
| ECON111 | Introduction to Microeconomics | | 3 | 0 | 6 |
| ECON112 | Introduction to Macroeconomics | | 3 | 0 | 6 |
| ELIT101 | Introduction to Literature | | 2 | 1 | 6 |
| ENS105 | The Brain | | 3 | 0 | 6 |
| IBF205 | Principles of International Business | | 3 | 0 | 6 |
| IR101 | Introduction to International Relations | | 3 | 0 | 6 |
| LAW109 | Law and Ethics | | 3 | 0 | 6 |
| LAW110 | Introduction to Law I | | 3 | 0 | 6 |
| MAN102 | Introduction to Management | | 3 | 0 | 6 |
| NS102 | Physics | | 3 | 2 | 6 |
| NS103 | Biology | | 3 | 0 | 6 |
| NS104 | General Chemistry | | 3 | 2 | 6 |
| POLS102 | Introduction to Political Science | | 3 | 0 | 6 |
| PSY103 | Introduction to Psychology | | 3 | 0 | 6 |
| SOC102 | Introduction to Sociology | | 3 | 0 | 6 |
| SPS120 | Critical Thinking | | 3 | 0 | 6 |
| SPS150 | World History | | 3 | 0 | 6 |
| VA121 | History of Art I | | 3 | 0 | 6 |

| Table 2: IUS Pool of 3 ECTS University Courses | | | | | |
|---|---|---|---|---|---|
| **Code** | **Title** | **Prerequisites** | **T** | **P** | **ECTS** |
| ARCH107 | Understanding Art and Architecture | | 2 | 0 | 3 |
| BIO100 | Introduction to Bioengineering | | 3 | 0 | 3 |
| CS100 | Computer Skills | | 0 | 2 | 3 |
| CULT101 | Understanding Cultural Encounters | | 2 | 0 | 3 |
| ECON105 | Understanding Business | | 2 | 0 | 3 |
| ECON107 | Python | | 1 | 1 | 3 |
| ECON108 | Matlab | | 1 | 1 | 3 |
| HUM100 | Social Responsibility and Sustainable Development | | 2 | 0 | 3 |
| IBF105 | Financial Literacy | | 2 | 0 | 3 |
| IR100 | Understanding the Contemporary World through Curre | | 2 | 0 | 3 |
| MAN105 | Corporate Social Responsibility | | 2 | 0 | 3 |
| NS111 | Understanding Nature and Knowledge | | 2 | 0 | 3 |
| NS112 | Understanding Science and Technology | | 2 | 0 | 3 |
| SPS140 | Understanding Religion | | 2 | 0 | 3 |
| TURK111 | Spoken Turkish I * | | 0 | 2 | 3 |
| BOS111 | Spoken Bosnian I * | | 0 | 2 | 3 |
| TURK112 | Spoken Turkish II ** | TURK111 | 0 | 2 | 3 |
| BOS112 | Spoken Bosnian II ** | BOS111 | 0 | 2 | 3 |
| | ** Scholarship students will take either TURK111 / BOS111* | | | | |
| | *** Scholarship students will take either TURK112 / BOS112* | | | | |

| Table 3: Faculty Electives | | | |
|---|---|---|---|
| **Code** | **Title** | **Prerequisites** | **ECTS** |
| BIO301 | Molecular Biology | | 6 |
| BIO415 | Genetic Engineering | Senior Standing | 6 |
| EE201 | Analog Electronics I | ENS203 | 6 |
| EE202 | Electrical Circuits II | ENS203 | 6 |
| EE305 | Instrumentation and Measurements | ENS203 | 6 |
| EE311 | Control System Design | ENS206 | 6 |
| EE321 | Electrical Machines | EE202 | 6 |
| EE322 | Power Systems | EE202 | 6 |
| ENS201 | Electromagnetics | MATH102 | 6 |
| ENS202 | Thermodynamics | MATH102 and NS102 | 6 |
| ENS203 | Electrical Circuits I | MATH101 | 6 |
| ENS205-6 | Materials Science | | 6 |
| ENS206 | System Modeling | MATH202 | 6 |
| ENS207-6 | Engineering Graphics | | 6 |
| ENS208-6 | Intro. to Manufacturing Systems | MATH101 | 6 |
| ENS209-6 | Statics | MATH101 | 6 |
| ENS211 | Signals and Systems | MATH102 | 6 |
| ENS221 | Introduction to Engineering | | 6 |
| ENS302 | Engineering Optics | NS102 | 6 |
| MATH102 | Calculus II | MATH101 | 6 |
| MATH202 | Differential Equations | MATH101 | 6 |
| MATH205 | Numerical Analysis | MATH101 | 6 |
| MATH207 | Vector Calculus | MATH101 | 6 |
| MATH306 | Statistical Modeling | MATH203 | 6 |
| ME208-6 | Dynamics and Vibrations | MATH202 | 6 |
| ME304 | Fluid Mechanics | MATH202 | 6 |
| ME306 | Heat and Mass Transfer | MATH202 | 6 |
| NS102 | Physics | | 6 |
| NS122 | Physics II | NS102 | 6 |
| NS205 | Cell Biology | NS103 | 6 |
| NS207 | Organic Chemistry | | 6 |
| NS209 | Genetics I | | 6 |
| IE301 | Production Planning I | MATH203 | 6 |
| IE303 | Operations Research I | MATH201 | 6 |
| IE304 | Operations Research II | IE303 | 6 |
| IE307 | Quality and Reliability Engineering | Junior Standing | 6 |
| *NB. Faculty Elective may be selected from other FENS programmes with the approval of Program Coordinator.* | | | |

| Table 4: Program Electives | | | |
|---|---|---|---|
| **Code** | **Title** | **Prerequisites** | **ECTS** |
| AID201 | Programming for Data Science | CS103 | 6 |
| AID403 | IoT Fundamentals | CS103 | 6 |
| AID404 | Business Intelligence | | 6 |
| BIO310 | Bioinformatics | NS103 or Program Coordinator Approval | 6 |
| BIO405 | Biological Data Analysis with Python | ENS213 / CS103 | 6 |
| CS299 | Social, Legal, and Ethical Issues in Computing | | 6 |
| CS303 | Digital Design | | 6 |
| CS309 | Advanced Logic Design | CS303 | 6 |
| CS313 | Theory of Computation | CS105 and MATH204 | 6 |
| CS402 | Introduction to Design of Compilers | CS105 and MATH204 | 6 |
| CS403 | Distributed Systems | CS307 | 6 |
| CS404 | Artificial Intelligence | MATH204 | 6 |
| CS405 | Computer Graphics | CS302 and MATH201 | 6 |
| CS413 | Developing the Interactive Web | CS105 | 6 |
| CS414 | Computer Vision | MATH201 and CS103 | 6 |
| CS415 | Pattern Recognition | MATH201 | 6 |
| CS416 | Cryptography | MATH204 and CS302 | 6 |
| CS417 | Introduction to Data Mining | CS302 | 6 |
| CS421 | Management Systems | CS306 | 6 |
| CS422 | Wireless Mobile Networks | SE308 | 6 |
| CS423 | Parallel Computing | CS302 and CS307 | 6 |
| CS426 | Software Engineering II | CS308 | 6 |
| CS427 | Computer and Network Security | CS307 and SE308 | 6 |
| CS429 | Cybersecurity Essentials | | 6 |
| CS498 | Special Topics in Computer Science I | | 6 |
| CS499 | Special Topics in Computer Science II | | 6 |
| EE307 | Microcomputer Systems | | 6 |
| EE310 | Introduction to E-mobility | EE201 | 6 |
| EE325 | Embedded Systems | CS103 | 6 |
| EE331 | Introduction to Communication Systems | MATH102 | 6 |
| EE405 | Software Engineering Project | EE325 | 6 |
| EE406 | Hardware Engineering Project | | 6 |
| EE418 | Introduction to Machine Learning | | 6 |
| EE434 | Digital Communications | EE331 | 6 |
| EE435 | Microprocessors-I | | 6 |
| EE436 | Programmable Logic Controllers | CS303 | 6 |
| EE437 | Introduction to Robotics | Senior Standing | 6 |
| MAN461 | Management Information Systems | MAN102 | 6 |
| SE304 | Tools and Methods of CASE Technologies | CS105 | 6 |
| SE401 | SCADA Systems | MATH101 and CS105 or SE211 | 6 |
| SE402 | Programming of CNC Machines | CS105 | 6 |
| SE403 | Development of Science and Technology | CS105 | 6 |
| SE404 | Psycho Cibernetics | CS105 | 6 |
| SE421 | CAD Systems | CS105 | 6 |
| SE423 | Automatics and Robotics | CS105 | |

***2 Programe Electives may be selected from other FENS programmes (including FENS graduate level courses) with the approval of Program Coordinator.***

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