ACCREDITATION REPORT
FOR
STUDY PROGRAM:
COMPUTER SCIENCES AND ENGINEERING

Prepared by CSE Accreditation Team

Faculty of Engineering and Natural Sciences
International University of Sarajevo
February 2018
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<thead>
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<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>IUS</td>
<td>International University of Sarajevo</td>
</tr>
<tr>
<td>CSE</td>
<td>Computer Sciences and Engineering</td>
</tr>
<tr>
<td>EHEA</td>
<td>European Higher Education Area</td>
</tr>
<tr>
<td>BHQF</td>
<td>Bosnian-Herzegovina Qualification Framework</td>
</tr>
</tbody>
</table>
CHAPTER 1 : INTRODUCTION

1.1 GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Full name of the institution</th>
<th>International University of Sarajevo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postal address:</td>
<td>Hrasnickacesta 15</td>
</tr>
<tr>
<td></td>
<td>71000 Sarajevo</td>
</tr>
<tr>
<td></td>
<td>Bosnia and Herzegovina</td>
</tr>
<tr>
<td>tel. (switchboard):</td>
<td>++387 33 957 102/110</td>
</tr>
<tr>
<td>fax (general):</td>
<td>++387 33 957 105</td>
</tr>
<tr>
<td>website:</td>
<td><a href="http://www.ius.edu.ba">www.ius.edu.ba</a></td>
</tr>
<tr>
<td>Year of foundation:</td>
<td>2004</td>
</tr>
</tbody>
</table>

The International University of Sarajevo (IUS) is a non-profit independent institution of higher education that autonomously provides funding for its work. It offers educational programs in all three study cycles, as well as specific professional development programs in the registered areas. IUS is accredited with the national Agency for the Development of Higher Education and Quality Assurance and listed in the state register of accredited higher education institutions in Bosnia & Herzegovina\(^1\).

At IUS, education is realized through intertwining scientific and artistic programs, thus enabling the symbiosis of traditional and new disciplines. IUS encourages and promotes academic, cultural and social cooperation with regional and international universities of similar values.

IUS’s aim is to enrich students with aspirations, knowledge and skills which will allow them to succeed in a rapidly changing interconnected world. Our students are taught to "dream no small dream". They are entrusted with the feeling that they are a part of the global society, and understanding what it means to be a good member of local community, the country and the nation.

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\(^1\) \url{http://www.hea.gov.ba/akreditacija_vsu/akreditovani/?id=5378}
The international character of the International University of Sarajevo, with students from all around the world and academic staff with significant international experience, gives IUS a special kind of quality. Such direct interaction with other nationals gives our university students the privilege to meet other cultures. This allows them not only to acquire knowledge, but to develop other competences and experiences immensely important in a globalized world of today.

IUS is an associate member of European University Association (EUA), and a full member of International Association of Universities (IAU) and European Consortium of Political Research (ECPR).

In 2014, IUS was rewarded with a prestigious recognition award “European University and Employer of the Year” by the NGO “European Movement in BiH”.

Figure 1.1 IUS campus
1.2 REALISATION OF THE SELF-DOCUMENTATION

Self-documentation was carried out by the team consisted of representatives of academic staff and administrative staff, and it was composed of the following members:

1. Assist. Prof. Dr. Kanita Karadzujovic-Hadziabdic – Chair
2. Assist. Prof. Dr. Emin Tahirovic
3. Assist. Prof. Dr. Dzejla Medjedovic
4. Assist. Prof. Dr. Emine Yaman
5. Senior Assistant Nesibe Merve Demir

1.3 ABOUT THE UNIVERSITY

1.3.1 IUS HISTORICAL CONTEXT

The International University of Sarajevo (hereinafter IUS) is a higher education institution founded by the Foundation for Development of Education in Sarajevo (hereafter: SEDEF) in 2004. SEDEF is registered with the Ministry of Justice of the Federation of Bosnia and Herzegovina. Its purpose is to support education in Bosnia and Herzegovina by creating the conditions for its development.

From its outset in 2004, IUS has applied the principles of the Bologna Declaration, as follows:

- The European Credit Transfer and Accumulation System (ECTS) is used in all study programs. Students are awarded ECTS Credits and grades upon successful completion of courses.
- IUS implements three cycles of studies. From the beginning of its operation IUS adopted 4+1+3 system. It means that the nominal duration of bachelor, master and doctoral programs are four (240 ECTS), one (60 ECTS) and three (180 ECTS) years, respectively.
- IUS is issuing Diploma Supplement to all of its graduates. It contains information on completed courses and grades achieved, accumulated number of ECTS credits and other information as defined in ECTS Users Guide.
• Learning-outcomes-based curricula are implemented in all study programs which is in line with European QF descriptors.
• Students are represented in IUS decision-making bodies (Senate, Faculty Councils, Boards, Committees, etc.) and have full voting rights.
• As an international institution for education and development, the University cooperates with other universities in the region and other countries, to create a stimulating and pleasant atmosphere for teaching and conducting research for students’ and professors from around the world. IUS’s statute enables and motivates mobility of students, academics and administration. IUS students have the opportunity to accomplish a part of their programs abroad, and also students from other universities are allowed to spend a period of study at IUS. Lecturers are allowed to spend a period abroad and their mobility is supported by IUS.

IUS has experienced a great transformation in the past twelve years of its existence. It proved to be an institution that can meet challenges, overcome problems and improve itself. In the last 12 years, most of the resources, material and human, were directed towards institution-building. Two new faculties, a number of new study programs, new Centers and auxiliary departments and units were established. By the end of 2015, these processes are mostly completed. Today, International University of Sarajevo consists of five faculties and offers twenty-one study programs in all three study cycles of education.

Finally, the new IUS Strategic Plan 2016-2021 (Please refer to: https://www.ius.edu.ba/important-documents/ius-strategy) puts forth an overarching aspiration for the IUS: “To become widely recognized as the best university in Bosnia and Herzegovina and in the region, and a model university for the interweaving of liberal education and fundamental knowledge with practical education and impact on societal and world problems.”

1.3.2 MISSION, VISION AND CORE VALUES

MISSION

The mission of IUS is to produce science, art, and technology and present it to the benefit of humanity; to educate free-thinking, participating, sharing, open-minded
individuals who are open to change and improvement and who have the ability to transform knowledge into values of importance for themselves and the community. International University of Sarajevo (IUS), with its identity as an international institution of education and research is cooperating with universities in the region and in other countries in order to provide a peaceful and comfortable atmosphere of learning for students from a wide geography.

The following seven (7) key dimensions of IUS mission are as follows:

- Continuous improvement of quality culture;
- Internationalized Higher Education;
- Integrity with High Ethical Values to perform in society;
- Interdisciplinary programs;
- Intercultural Competency;
- Civic Engagement;
- Comprehensive Excellence.

VISION

The vision of IUS is to become an internationally recognized institution of higher education and research and a center of excellence and quality through the shared efforts of the founders, academic and administrative staff, students and all stakeholders.

IUS aims at becoming a major hub in Balkans that bridges East and West as a leading international institution of higher education and a research centre with comprehensive excellence and quality whose students are lifelong learners, inter-culturally competent and well-developed leaders in socio-economic development of societies.

1.3.3 IUS ORGANIZATIONAL CONTEXT

The University consists of five faculties, as follows: Faculty of Engineering and Natural Sciences (FENS), Faculty of Business and Administration (FBA), Faculty of Arts and Social Sciences (FASS), Faculty of Law (FLW), and Faculty of Education
(FEDU). The degrees awarded per organizational unit are presented in APPENDIX A – LIST OF FACULTIES AND PROGRAMS OFFERED.

The following centers are indivisible part of the University:
- IUS Library
- International Relations Office
- Project Management Office
- Lifelong Learning Center (IUS Life)
- English Language School (ELS)
- IUS Research and Development Center (RDC)
- IUS Leadership and Entrepreneurship Center (LEC)
- Balkan Studies Center (BSC)
- IUS Student Clubs (24 Clubs)
- IUS Gallery
- GymIUS

Through its centers, sport and cultural activities, formal and informal gatherings, IUS establishes sound relationships with local communities, social partners and industry representatives. These relationships yield mutual benefits for both IUS and external partners, and more and more partners are cooperating with IUS and joining its activities and programs. Aside from measurable indicators, IUS makes other influential cultural, social, intellectual, and research, humanitarian and civic contributions. IUS contributes to local communities through its expertise, its projects, and its scientific and cultural activities, but the greatest contribution of all is made by the quality education provided to its students. Every year IUS offers 1000 (ranging from 5-100%) scholarships to BiH students who demonstrate excellent knowledge at the entrance exam.

1.3.4 STATISTICS AND PROJECTIONS AT GLANCE

The International University of Sarajevo is continuously growing since its establishment in 2004. The number of faculties and study programs increased in the last five years from 12 to 20 programs in the first cycle and from 12 to 19 in the second cycle. Table 1.1 shows the change in number of faculties, and study programs from 2012 to 2017. IUS teaching staff comes from thirteen different countries, which is outlined in the Table 1.2
Table 1.1 Number of Faculties at IUS

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of faculties</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Number of study programs per study cycle:

<table>
<thead>
<tr>
<th>Cycle</th>
<th>I cycle</th>
<th>II cycle</th>
<th>III cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>12</td>
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<td></td>
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<td>19</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>303</td>
<td>75</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 1.2 IUS Teaching staff per country of origin

<table>
<thead>
<tr>
<th>Country of origin</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>2</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>62</td>
</tr>
<tr>
<td>Check Republic</td>
<td>1</td>
</tr>
<tr>
<td>Egypt</td>
<td>3</td>
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<tr>
<td>Ethiopia</td>
<td>1</td>
</tr>
<tr>
<td>Macedonia</td>
<td>2</td>
</tr>
<tr>
<td>Monte Negro</td>
<td>1</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1</td>
</tr>
<tr>
<td>Turkiye</td>
<td>20</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1</td>
</tr>
<tr>
<td>United States of America</td>
<td>4</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>98</strong></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Country of origin</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>1</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>64</td>
</tr>
<tr>
<td>Check Republic</td>
<td>1</td>
</tr>
<tr>
<td>Egypt</td>
<td>2</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 1.3 shows the number of local and foreign students in the period 2017/2018 as well as the number of graduates, where steady increase is also evident, which is in line with the IUS Strategic plan 2016-2021 (refer to https://www.ius.edu.ba/important-documents/ius-strategy). The number of local and international students per their country of origin is outlined in the Table 1.4 for the whole University.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>Macedonia</td>
<td>1</td>
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<tr>
<td>Montenegro</td>
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<tr>
<td>Palestine</td>
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</tr>
<tr>
<td>Poland</td>
<td>2</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1</td>
</tr>
<tr>
<td>Turkiye</td>
<td>23</td>
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<tr>
<td>United Kingdom</td>
<td>1</td>
</tr>
<tr>
<td>United States of America</td>
<td>8</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>107</strong></td>
</tr>
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</table>

Table 1.3 Number of Students at IUS

<table>
<thead>
<tr>
<th>IUS STUDENTS</th>
<th>ACADEMIC YEAR OF 2017/18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign</td>
<td>869</td>
</tr>
<tr>
<td>Bosnian</td>
<td>794</td>
</tr>
<tr>
<td>Total</td>
<td>1663</td>
</tr>
</tbody>
</table>

Total number of full time students on Academic Year/study cycle

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I cycle</td>
<td>1448</td>
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<tr>
<td>II cycle</td>
<td>162</td>
</tr>
<tr>
<td>III cycle</td>
<td>53</td>
</tr>
<tr>
<td>English Language School</td>
<td>134</td>
</tr>
</tbody>
</table>

Graduates: As of academic Year: 2016-2017 (cumulative)

<table>
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<th>Level</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>Bachelor</td>
<td>1623</td>
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<tr>
<td>Master</td>
<td>294</td>
</tr>
<tr>
<td>Doctorate</td>
<td>16</td>
</tr>
</tbody>
</table>
Table 1.4 Number of IUS students per country of origin

<table>
<thead>
<tr>
<th>COUNTRY OF ORIGIN (ALL IUS STUDENTS)</th>
<th>NUMBER OF STUDENTS – UNIVERSITY LEVEL (2017/18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Republic of Yemen</td>
<td>1</td>
</tr>
<tr>
<td>The Hashemite Kingdom of Jordan</td>
<td>2</td>
</tr>
<tr>
<td>The Republic of Ukraine</td>
<td>1</td>
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<td>The Republic of Turkmenistan</td>
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<td>The United Republic of Tanzania</td>
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<td>The Republic of Turkey</td>
<td>760</td>
</tr>
<tr>
<td>The Kingdom of Saudi Arabia</td>
<td>1</td>
</tr>
<tr>
<td>The Syrian Arab Republic</td>
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<tr>
<td>The Republic of Sudan</td>
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<tr>
<td>The Republic of Slovenia</td>
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<tr>
<td>The Republic of Serbia</td>
<td>8</td>
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<td>The Russian Federation</td>
<td>2</td>
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<td>The Republic of Romania</td>
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<td>The Islamic Republic of Pakistan</td>
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<td>The Arab Republic of Egypt</td>
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<td>The Islamic Republic of Iran</td>
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<td>The Republic of Ghana</td>
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<td>The French Republic</td>
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<td>The State of Palestine</td>
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<td>Federal Democratic Republic of Ethiopia</td>
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<tr>
<td>People’s Republic of China</td>
<td>1</td>
</tr>
<tr>
<td>The People’s Democratic Republic of Algeria</td>
<td>1</td>
</tr>
<tr>
<td>The Republic of Chad</td>
<td>1</td>
</tr>
<tr>
<td>The Republic of Bulgaria</td>
<td>1</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>794</td>
</tr>
<tr>
<td>The Kingdom of Bahrein</td>
<td>1</td>
</tr>
<tr>
<td>The Republic of Azerbaijan</td>
<td>1</td>
</tr>
</tbody>
</table>
1.3.5  FENS ORGANIZATIONAL CONTEXT

FENS Faculty Council, Departments and Study Programs are responsible for different administrative and academic responsibilities pursuant to Articles 59-61 and 36-37 of IUS Statute, IUS-SENAT-11-2255/2013, available at http://www.ius.edu.ba/statute. Decentralized organizational structure of IUS offers each faculty, and consequently to departments and study programs, freedom to fulfill its potential in the creative and student-oriented manner. Special emphasis is put on timely flow of information from the University to the Faculty and Departments. FENS Faculty Council consists of representatives of all study programs in FENS, as well as of student representatives (see Figure 1.2 for organizational structure of the faculty).

![Figure 1.2 Structure of FENS faculty](image-url)
1.4 ORGANIZATION OF THE REPORT

The rest of the document is followed by the enclosures and documents to support program documentation.
2.1 ALIGNMENT OF THE STUDY PROGRAM WITH THE OBJECTIVES OF INSTITUTION

**Standard 1.1**—*The study program is aligned with the objectives of the institution and is logically connected with its strategies and goals.*

The Computer Science and Engineering (CSE) study program is designed in the way that it provides comprehensive and interdisciplinary education in computer science and engineering field that shapes graduate that can address the contemporary challenges in the global and local, business and scientific environment. Highly qualified, diverse and devoted academic staff with substantial international academic background is devoted to educating new leaders in industry and academia. Our academic staff has paved the way for the teaching and research excellence, enabling the university to become a prospective regional leader in research and education. Aside from the academic component, the program emphasizes the collaboration with industry and training students to seamlessly integrate in the current business environment. One of the major aims of our program is to become the main University’s hub for the bridge between academia and industry, serving as the main meeting place for entrepreneurs, scientists and engineers. The program, as such, has acquired necessary milestones for becoming a hub between academia and the industry at local and international perspective. Complying with IUS’s vision and mission, the CSE program adds values to the University by fulfilling its strategic goals and objectives.

The variety of topics studied under the CSE include but are not limited to: programming, mathematical foundations of computer science, databases, computer architecture, algorithms, user-interface design, web development, operating systems, computer networks, data mining, etc.
Furthermore, the program offers interdisciplinary approach to the subject of computer science and engineering by offering specific courses from other disciplines. This is implemented with University, Faculty, and Program electives that students are required to take during their study at IUS. University electives cover various topics from economics to humanistic sciences, which enables future computer scientists to broaden their views, and which further equips them to tackle complex and multifaceted challenges of 21st century. Faculty electives can be taken from other engineering programs such as Electrical Engineering, Industrial Engineering, Mechanical Engineering and Bioengineering. Faculty electives enable interdisciplinary approach that requires various competences in other engineering disciplines. Other than offering core foundation courses in CSE, the students are able to select and shape their specific interests within the CSE curriculum by selecting from a variety of courses offered within Program Elective courses such as Artificial Intelligence, Computer Graphics, Computer Vision, Computer and Network Security, Wireless Mobile Networks, Robotics, etc. Namely, computer science has marked an enormous growth and development in various directions, and our program’s mission is ability to educate all different types of computer scientists that the local and global job market needs.

The graduates of CSE program are trained to be able to work both in industry and pursue further specialization in academia. By the end of their studies, students will possess the necessary training to fulfill all responsibilities that come with being project managers, programmers, scientists in industry or professors at a university. Graduates of the CSE program will be able to put their theoretical knowledge into practice and work independently as well as in teams by using a sophisticated problem-solving toolbox they acquired during their study at IUS.

A major goal of the CSE program is to educate future leaders who will be able to adapt to any new technology or a trend, and to do that, the program offers a range of fundamental skills and knowledge that is the backbone and foundation of any modern technology and program, paired with learning the most cutting-edge programming languages and software packages.
The information on duration, number of ECTS and job profiles related to the CSE bachelor degree program are listed in the Table 2.1.

Table 2.1 Basic information about the CSE Bachelor degree program

<table>
<thead>
<tr>
<th>Degree Awarded</th>
<th>Bachelor of Science (B.Sc.) in Computer Sciences and Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of the Study Program</td>
<td>4 years</td>
</tr>
<tr>
<td>Total ECTS</td>
<td>240</td>
</tr>
<tr>
<td>Full time/Part time</td>
<td>Full time</td>
</tr>
<tr>
<td>Language of instruction</td>
<td>English</td>
</tr>
<tr>
<td>Total number of students in 2017/18</td>
<td>126</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job profiles</th>
<th>Graduates of Bachelor program are qualified to work as:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- programmers, engineers, researchers, and consultants in the</td>
</tr>
<tr>
<td></td>
<td>fields of programming, web developer, database</td>
</tr>
<tr>
<td></td>
<td>administrator, database analyst, algorithm design,</td>
</tr>
<tr>
<td></td>
<td>computer network architect, data science, large enterprise</td>
</tr>
<tr>
<td></td>
<td>systems, computer architecture, in both public and private</td>
</tr>
<tr>
<td></td>
<td>sectors as well as to continue further education in academia</td>
</tr>
<tr>
<td></td>
<td>at the second cycle.</td>
</tr>
</tbody>
</table>

2.2 QUALIFICATION OBJECTIVES OF THE STUDY PROGRAM

Standard 1.2–SP *Learning outcomes are clearly defined and meet the technical, scientific and professional requirements and are in accordance with the respective levels of the qualification framework of the EHEA.*

The Educational objectives and learning outcomes of the CSE Bachelor study program are defined according to the qualification framework of the European Higher Education Area (EHEA), as well as Bosnia-Herzegovina Qualification Framework (BHQ).

Our educational objectives and learning outcomes are listed below, followed by correspondence matrices between CSE program learning outcomes and EHEA framework, as well as, CSE program learning outcomes vs. BHQ framework, in Table 2.2, Table 2.3 and Table 2.4 respectively. In addition to this, the relationship
level of the correspondence between the study program educational objectives and learning outcomes are given in Table 2.5.

**Table 2.2 EDUCATIONAL OBJECTIVES of the CSE Bachelor study program**

<table>
<thead>
<tr>
<th>EDUCATIONAL OBJECTIVES of the CSE Bachelor study program are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- To prepare the students for abstract problem solving, logical reasoning and strong mathematical skills, while providing in-depth knowledge in computer programming;</td>
</tr>
<tr>
<td>- To provide the students with the knowledge of practical problem solving and design patterns applied in the industry;</td>
</tr>
<tr>
<td>- To prepare the students for successful careers in the wide range of disciplines with numerous employment opportunities, such as computer science, software engineering, bioengineering, electrical engineering, industrial engineering, etc;</td>
</tr>
<tr>
<td>- To train the students with the soft skills, such as teamwork, written and oral communication, which are crucial for successful employment career;</td>
</tr>
<tr>
<td>- To apply the code of ethics and show professional practice towards the client, employer, colleagues, profession and society;</td>
</tr>
</tbody>
</table>

**LEARNING OUTCOMES of the CSE Bachelor study program**

On successful completion of the study program graduates will be able to:

- Demonstrate a sound knowledge of the basic theoretical aspects of computer science and engineering, with a focus on software development practices, algorithms and computer systems organization, and other various computing areas;
- Apply the necessary strong mathematical skills and logical reasoning to solve engineering and scientific problems;
- Effectively document and analyze requirements and translate them into an implementable design using different design patterns applied in the industry;
- Analyze, design and develop software systems by following recommended concepts, principles and practice of the industry;
- Show an ability to communicate effectively, work in a team and understand social, professional, legal and ethical issues related to computing;

**Table 2.3 Correspondence between SP Learning Outcomes and EHEA (Bachelor)**

<table>
<thead>
<tr>
<th>COMPUTER SCIENCES AND ENGINEERING</th>
<th>EHEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualification that signify completion of the first cycle are awarded to students who (Explanation on Q1-Q5, please see bottom of the table):</td>
<td></td>
</tr>
<tr>
<td>Q1 Q2 Q3 Q4 Q5</td>
<td>Relationship Level</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SP Learning Outcomes</th>
<th>Relationship Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate a sound knowledge of the basic theoretical aspects of computer science and engineering, with a focus on software development practices, algorithms and computer systems</td>
<td>3 3 3 2 3</td>
</tr>
</tbody>
</table>
organization, and other various computing areas;

Apply the necessary strong mathematical skills and logical reasoning to solve engineering and scientific problems; 3 3 3 2 3

Effectively document and analyze requirements and translate them into an implementable design using different design patterns applied in the industry; 3 3 3 3 2

Analyze, design and develop software systems by following recommended concepts, principles and practice of the industry; 3 3 3 3 2

Show an ability to communicate effectively, work in a team and understand social, professional, legal and ethical issues related to computing; 3 3 3 3 3

Level Descriptors according to EHEA

Qualifications that signify completion of the first cycle are awarded to students who:

Q1: have demonstrated knowledge and understanding in a field of study that builds upon and their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study;

Q2: can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study;

Q3: have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues;

Q4: can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences;

Q5: have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.

Relationship Level

-: No contribution (~ very low),
1: Low level contribution,
2: Moderate contribution,
3: High level contribution.

Table 2.4 Correspondence between SP Learning Outcomes and BHQF (Bachelor)

<table>
<thead>
<tr>
<th>SP Learning Outcomes:</th>
<th>Knowledge*</th>
<th>Skills**</th>
<th>Competences***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-Theoretical</td>
<td>-Cognitive</td>
<td>-Autonomy</td>
</tr>
<tr>
<td></td>
<td>-Factual</td>
<td>-Physical</td>
<td>-Responsibility</td>
</tr>
<tr>
<td>Demonstrate a sound knowledge of the basic theoretical aspects of computer science and engineering, with a focus on software development practices, algorithms and computer systems organization, and other various computing areas;</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Apply the necessary strong mathematical skills and logical reasoning to solve engineering and scientific problems;</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Effectively document and analyze requirements and translate them into an implementable design using different design patterns applied in the industry;</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
## Knowledge*

**Theoretical**

- Factual

## Skills**

**Cognitive**

- Physical

## Competences***

**Autonomy**

- Responsibility

### Analyze, design and develop software systems by following recommended concepts, principles and practice of the industry;

<table>
<thead>
<tr>
<th>Knowledge*</th>
<th>Skills**</th>
<th>Competences***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

### Show an ability to communicate effectively, work in a team and understand social, professional, legal and ethical issues related to computing;

<table>
<thead>
<tr>
<th>Knowledge*</th>
<th>Skills**</th>
<th>Competences***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

### Level Descriptors according to BHQF

**Knowledge:** This person demonstrates knowledge and understanding in a field of study that builds upon their secondary education and which is typically at a level, whilst supported by appropriate learning resources (texts, information and communication technologies), which includes some aspects that will be informed by knowledge of the forefront in a given field of study.

**Skills:** This person;

(i) is able to apply acquired knowledge and critical understanding of the principles relating to the given field of study/discipline in a manner to demonstrate professional approach to their work or vocation, and has competences typically demonstrated through devising and sustaining arguments and solving problems within a given field of study;

(ii) is able to apply main methods of acquiring new knowledge and applicative research in a given discipline, and is able to decide on which approach to use in solving a given problem and is aware of the extent to which the selected approach is suitable for solving such a problem;

(iii) is able to communicate in one or several foreign languages and by using communication technologies, information, ideas, problems and solutions to both specialist and non-specialist audiences for given area of study.

**Competences:**

**Professional competence:** This person (i) demonstrates ability to gather and interpret relevant data (usually within the given field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues.

**Personal competence:** This person (i) has developed learning skills to undertake further study, with a high degree of autonomy and academic skills and attributes necessary to undertake research work, comprehend and evaluate new information, concepts and evidence from a range of sources; (ii) possesses a foundation for future self-directed and lifelong learning; (iii) has acquired interpersonal skills, teamwork skills adequate for employment and further study.

### Relationship Level

- No contribution (~ very low),
- Low level contribution,
- Moderate contribution,
- High level contribution.

---

Table 2.5 Correspondence between SP Educational Objectives and Learning Outcomes (Bachelor)
**Contribution level:**
- No contribution
- 1: Low level contribution
- 2: Moderate contribution
- 3: High level contribution

<table>
<thead>
<tr>
<th>SP Learning Outcomes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate a sound knowledge of the basic theoretical aspects of computer science and engineering, with a focus on software development practices, algorithms and computer systems organization, and other various computing areas;</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Apply the necessary strong mathematical skills and logical reasoning to solve engineering and scientific problems;</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Effectively document and analyze requirements and translate them into an implementable design using different design patterns applied in the industry</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Analyze, design and develop software systems by following recommended concepts, principles and practice of the industry;</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Show an ability to communicate effectively, work in a team and understand social, professional, legal and ethical issues related to computing;</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
2.3 CONTENTS, STRUCTURE AND SCOPE OF TEACHING METHODS

**Standard 1.3**—The contents, structure and scope of and teaching methods applied to the curriculum and the modules meet the technical, scientific and professional requirements and are suited to achieve the intended learning outcomes.

2.3.1 BACHELOR DEGREE (I CYCLE)

2.3.1.1 Structure of the study program

The characteristic of CSE bachelor study program is that required and elective courses are grouped as following:

- **University courses (required and elective)** – required and elective courses that include two foreign language elective courses. The objective of university courses are to:
  - provide students with basic knowledge and methods for independent and critical decision-making;
  - offer students a new approach and a deep understanding of the nature of social movements;
  - provide interdisciplinary understanding of the “state” in certain areas that will help further choice of courses in the study;
  - ensure the harmonization of the level of knowledge for all students IUS.

- **Faculty elective courses** – are elective courses defined by the study program which aims to equip the students with interdisciplinary competences.

- **Program courses (required and elective)** – are required and elective courses, which are defined by the study program to achieve the intended program learning outcomes.

- **Free elective courses** – are all undergraduate courses at IUS, excluding the University courses, Faculty courses and Program courses (defined for each program), which aims to give opportunity to students to freely choose a number of courses from other study programs.
The Bachelor degree of the CSE study program is obtained by completing 240 ECTS in the following manner:

<table>
<thead>
<tr>
<th>Course type</th>
<th>Number of courses</th>
<th>Number of ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required</td>
<td>Elective</td>
</tr>
<tr>
<td>University courses</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Faculty courses</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Program courses</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Free elective courses</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Bachelor thesis</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Internship</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>42</strong></td>
<td></td>
</tr>
</tbody>
</table>

The detailed information regarding the program structure and the required and elective courses is given in Table 2.7 and Table 2.8, while the lists of university electives, faculty electives and program elective courses are given in Table 2.11, Table 2.12, and Table 2.13 respectively. The content of each course and syllabi are publically available and can be found on the University web site. The Program is regularly updated each academic year.

It is important to note that all courses at IUS have 3 hours per week throughout 14 weeks period. In addition to this, all faculty and program courses in CSE first cycle curriculum have 2 hours of lab/tutorial per week, which is also indicated in the syllabus of each course.
Table 2.7: Undergraduate Curriculum for CSE Program (Part 1)

Undergraduate Curriculum (Semesters I-IV) - Computer Sciences and Engineering Program (2017 - 2018)

<table>
<thead>
<tr>
<th>Semester I</th>
<th>Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>T</th>
<th>P</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ELIT100</td>
<td>Academic English and Effective Communication</td>
<td></td>
<td>2</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>MATH101</td>
<td>Calculus I</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CS103</td>
<td>Introduction to Programming</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>NS102</td>
<td>Physics</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>xxx</td>
<td>University Elective I</td>
<td>See Table 2.11</td>
<td>3</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>xxx</td>
<td>Foreign Language Elective I</td>
<td></td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Semester Total =</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester II</th>
<th>Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>T</th>
<th>P</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATH102</td>
<td>Calculus II</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CS105</td>
<td>Advanced Programming</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>ENS203</td>
<td>Electrical Circuits I</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>xxx</td>
<td>University Elective II</td>
<td>See Table 2.11</td>
<td>3</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>xxx</td>
<td>Foreign Language Elective II</td>
<td></td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Semester Total =</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester III</th>
<th>Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>T</th>
<th>P</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATH203</td>
<td>Introduction to Probability and Statistics</td>
<td>MATH101</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>MATH204</td>
<td>Discrete Mathematics</td>
<td>MATH101</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CS303</td>
<td>Digital Design</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CS305</td>
<td>Programming Languages</td>
<td>CS105</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>xxx</td>
<td>Faculty Elective I</td>
<td>See Table 2.12</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Semester Total =</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester IV</th>
<th>Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>T</th>
<th>P</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MATH201</td>
<td>Linear Algebra</td>
<td>MATH101</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CS103</td>
<td>Embedded Systems</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>CS105</td>
<td>Database Management</td>
<td></td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>xxx</td>
<td>Faculty Elective II</td>
<td>See Table 2.12</td>
<td>6</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Semester Total =</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2.8: Undergraduate Curriculum for CSE Program (Part 2)

**Undergraduate Curriculum (Semesters V-VIII) - Computer Sciences and Engineering Program (2017 - 2018)**

<table>
<thead>
<tr>
<th>Semester V</th>
<th>Semester VI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>CS302</td>
<td>Algorithms and Data Structures</td>
</tr>
<tr>
<td>ELIT200</td>
<td>Critical Reading and Writing</td>
</tr>
<tr>
<td>CS307</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>MATH202</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>xxx</td>
<td>Faculty Elective III</td>
</tr>
<tr>
<td>Semester Total =</td>
<td>30</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester VII</th>
<th>Semester VIII</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code</strong></td>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>CS412</td>
<td>Web Application Development</td>
</tr>
<tr>
<td>CS313</td>
<td>Theory of Computation</td>
</tr>
<tr>
<td>CS370</td>
<td>Work placement/Internship</td>
</tr>
<tr>
<td>xxx</td>
<td>Program Elective II (Senior standing)</td>
</tr>
<tr>
<td>xxx</td>
<td>Program Elective III (Senior standing)</td>
</tr>
<tr>
<td>Semester Total =</td>
<td>30</td>
</tr>
</tbody>
</table>

**Abbreviations:** T (Theory), P (Practice), ECTS credit

<table>
<thead>
<tr>
<th>No. of Courses</th>
<th>42</th>
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</thead>
<tbody>
<tr>
<td>Total Credits Required for Graduation</td>
<td>240</td>
</tr>
<tr>
<td>Total Credits of Electives</td>
<td>84</td>
</tr>
<tr>
<td>Elective Ratio</td>
<td>35%</td>
</tr>
<tr>
<td>Min.ECTS Credits for Applied/Practical Component of the Curriculum</td>
<td>66</td>
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</tbody>
</table>
In tables below, the division of curriculum courses into University required courses (Table 2.9), Program required courses (Table 2.10), and the electives (university-, faculty-, and program-level, Table 2.11, Table 2.12, and Table 2.13) is shown.

Table 2.9: University Required Courses for the CSE Program

<table>
<thead>
<tr>
<th>Course group</th>
<th>EC TS</th>
<th>Course name</th>
<th>Course code</th>
<th>Course type</th>
<th>EC TS</th>
<th>Pre-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Required Courses</td>
<td>24</td>
<td>Academic English and Effective Communication</td>
<td>ELIT100</td>
<td>required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calculus I</td>
<td>MATH101</td>
<td>required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physics</td>
<td>NS102</td>
<td>required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Critical Reading and Writing</td>
<td>ELIT200</td>
<td>required</td>
<td>6</td>
<td></td>
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</table>

Table 2.10: Program Required Courses for the CSE Program

<table>
<thead>
<tr>
<th>Course group</th>
<th>EC TS</th>
<th>Course name</th>
<th>Course code</th>
<th>Course type</th>
<th>EC TS</th>
<th>Pre-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program courses</td>
<td>132</td>
<td>Introduction to Programming</td>
<td>CS103</td>
<td>required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calculus II</td>
<td>MATH102</td>
<td>required</td>
<td>6</td>
<td>MATH101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advanced Programming</td>
<td>CS105</td>
<td>required</td>
<td>6</td>
<td>CS103</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrical Circuits</td>
<td>ENS203</td>
<td>required</td>
<td>6</td>
<td>MATH101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduction to Probability and Statistics</td>
<td>MATH203</td>
<td>required</td>
<td>6</td>
<td>MATH101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discrete Mathematics</td>
<td>MATH204</td>
<td>required</td>
<td>6</td>
<td>MATH101</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digital Design</td>
<td>CS303</td>
<td>required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Programming Languages</td>
<td>CS305</td>
<td>required</td>
<td>6</td>
<td>CS105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Linear Algebra</td>
<td>MATH201</td>
<td>required</td>
<td>6</td>
<td>MATH101</td>
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<tr>
<td></td>
<td></td>
<td>Computer Architecture</td>
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<td>required</td>
<td>6</td>
<td>CS103</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Embedded Systems</td>
<td>EE325</td>
<td>required</td>
<td>6</td>
<td>CS103</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Database Management</td>
<td>CS306</td>
<td>required</td>
<td>6</td>
<td>CS105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Algorithms and Data Structures</td>
<td>CS302</td>
<td>required</td>
<td>6</td>
<td>MATH204 and CS105</td>
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<tr>
<td></td>
<td></td>
<td>Operating Systems</td>
<td>CS307</td>
<td>required</td>
<td>6</td>
<td>CS304</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Differential Equations</td>
<td>MATH202</td>
<td>required</td>
<td>6</td>
<td>MATH102</td>
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<tr>
<td></td>
<td></td>
<td>Software Engineering</td>
<td>CS308</td>
<td>required</td>
<td>6</td>
<td>CS105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Numerical Analysis</td>
<td>MATH205</td>
<td>required</td>
<td>6</td>
<td>MATH102</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication Systems and Networks</td>
<td>SE308</td>
<td>required</td>
<td>6</td>
<td>CS105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Web Application Development</td>
<td>CS412</td>
<td>required</td>
<td>6</td>
<td>CS105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Theory of Computation</td>
<td>CS313</td>
<td>required</td>
<td>6</td>
<td>CS105 and MATH204</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Work Placement/Internship</td>
<td>CS370</td>
<td>required</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graduation Project</td>
<td>CS490</td>
<td>required</td>
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</table>
Table 2.11: University Electives for the CSE Program

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>ECTS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Social Sciences Subpool</strong></td>
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<tr>
<td>CULT101</td>
<td>Understanding Cultural Encounters</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>NS111</td>
<td>Understanding Nature and Knowledge</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>NS112</td>
<td>Understanding Science and Technology</td>
<td></td>
<td>3</td>
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<tr>
<td>SPS140</td>
<td>Understanding Religion</td>
<td></td>
<td>3</td>
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<tr>
<td>ECON105</td>
<td>Understanding Politics, Economy and Management</td>
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<tr>
<td>ECON111</td>
<td>Introduction to Microeconomics</td>
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<td>ELIT101</td>
<td>Introduction to Literature</td>
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<td>IBF101</td>
<td>Introduction to Business</td>
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<tr>
<td>IR101</td>
<td>Introduction to International Relations</td>
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<td>6</td>
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<tr>
<td>MAN102</td>
<td>Management</td>
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<td>6</td>
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<td>POLS102</td>
<td>Introduction to Political Science</td>
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<td>6</td>
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<td>PSY103</td>
<td>Introduction to Psychology</td>
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<td>SOC102</td>
<td>Introduction to Sociology</td>
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<td>SPS103</td>
<td>Law and Ethics</td>
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<td>6</td>
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<td>SPS120</td>
<td>Critical Thinking</td>
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<td>SPS150</td>
<td>World History</td>
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<td></td>
<td><strong>Natural Sciences Subpool</strong></td>
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<tr>
<td>CS100</td>
<td>Computer Skills</td>
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<td>ENS105</td>
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<td>Biology</td>
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<td>NS104</td>
<td>General Chemistry</td>
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<td><strong>Arts Subpool</strong></td>
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<td>ARCH107</td>
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<td>VA121</td>
<td>History of Art I</td>
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<td></td>
<td><strong>Language Elective Subpool</strong></td>
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<tr>
<td>xxx</td>
<td>Foreign Language Elective I (&amp;)</td>
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<tr>
<td>xxx</td>
<td>Foreign Language Elective II (&amp;)</td>
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<td>3</td>
</tr>
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</table>

(&) Scholarship students will take either Turkish Language I and II or Bosnian Language I and II.
### Table 2.12: Faculty Electives for the CSE Program

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Pre-requisites</th>
<th>ECTS</th>
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<tbody>
<tr>
<td>BIO301</td>
<td>Molecular Biology</td>
<td>NS103</td>
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<td>BIO415</td>
<td>Genetic Engineering</td>
<td>BIO301</td>
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<tr>
<td>EE201</td>
<td>Analog Electronics I</td>
<td>ENS203</td>
<td>6</td>
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<tr>
<td>EE202</td>
<td>Electrical Circuits II</td>
<td>ENS203</td>
<td>6</td>
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<tr>
<td>EE305</td>
<td>Instrumentation and Measurements</td>
<td>ENS203</td>
<td>6</td>
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<td>EE311</td>
<td>Control System Design</td>
<td>ENS206</td>
<td>6</td>
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<td>EE321</td>
<td>Electrical Machines</td>
<td>EE202</td>
<td>6</td>
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<tr>
<td>EE322</td>
<td>Power Systems</td>
<td>EE202</td>
<td>6</td>
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<td>ENS201</td>
<td>Electromagnetics</td>
<td>MATH102</td>
<td>6</td>
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<tr>
<td>ENS202</td>
<td>Therodynamics</td>
<td>MATH102, NS102</td>
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<td>ENS205</td>
<td>Materials Science</td>
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<td>6</td>
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<td>ENS206</td>
<td>System Modeling</td>
<td>MATH202</td>
<td>6</td>
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<tr>
<td>ENS207</td>
<td>Engineering Graphics</td>
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<td>6</td>
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<tr>
<td>ENS208</td>
<td>Intro. to Manufacturing Systems</td>
<td>MATH101</td>
<td>6</td>
</tr>
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<td>ENS209</td>
<td>Statics</td>
<td>MATH101</td>
<td>6</td>
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<tr>
<td>ENS211</td>
<td>Signals and Systems</td>
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<td>6</td>
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<tr>
<td>ENS221</td>
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<td>ENS302</td>
<td>Engineering Optics</td>
<td>NS102</td>
<td>6</td>
</tr>
<tr>
<td>MATH207</td>
<td>Vector Calculus</td>
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<td>6</td>
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<tr>
<td>MATH209</td>
<td>Discrete Mathematics II</td>
<td>MATH 204</td>
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<tr>
<td>MATH306</td>
<td>Statistical Modeling</td>
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<tr>
<td>ME208</td>
<td>Dynamics and Vibrations</td>
<td>ENS209</td>
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<tr>
<td>ME304</td>
<td>Fluid Mechanics</td>
<td>MATH202</td>
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<tr>
<td>ME306</td>
<td>Heat and Mass Transfer</td>
<td>MATH202</td>
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<td>NS205</td>
<td>Cell Biology</td>
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<td>NS207</td>
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<td>Operations Research I</td>
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<tr>
<td>IE304</td>
<td>Operations Research II</td>
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<tr>
<td>IE307</td>
<td>Quality and Reliability Engineering</td>
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<td>6</td>
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<tr>
<td>IE408</td>
<td>Project Management</td>
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</table>

Faculty Elective may be selected from other FENS programmes with the approval of Program Coordinator.
# Program Electives for the CSE Program

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Prerequisites</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO310</td>
<td>Bioinformatics</td>
<td>NS103 or Program Coord. approval</td>
<td>6</td>
</tr>
<tr>
<td>CS299</td>
<td>Social, Legal, and Ethical Issues in Computing</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>CS309</td>
<td>Advanced Logic Design</td>
<td>CS303</td>
<td>6</td>
</tr>
<tr>
<td>CS310</td>
<td>Human Computer Interaction</td>
<td>CS105</td>
<td>6</td>
</tr>
<tr>
<td>CS402</td>
<td>Introduction to Design of Compilers</td>
<td>CS105, MATH204</td>
<td>6</td>
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<tr>
<td>CS403</td>
<td>Distributed Systems</td>
<td>CS307</td>
<td>6</td>
</tr>
<tr>
<td>CS404</td>
<td>Artificial Intelligence</td>
<td>MATH204</td>
<td>6</td>
</tr>
<tr>
<td>CS405</td>
<td>Computer Graphics</td>
<td>CS302, MATH201</td>
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<tr>
<td>CS413</td>
<td>Developing the Interactive Web</td>
<td>CS105</td>
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<td>CS414</td>
<td>Computer Vision</td>
<td>MATH201, CS103</td>
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<td>Pattern Recognition</td>
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<td>CS416</td>
<td>Cryptography</td>
<td>MATH204, CS302</td>
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<td>CS417</td>
<td>Introduction to Data Mining</td>
<td>CS302</td>
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<td>CS420</td>
<td>Network Programming</td>
<td>CS105, SE308</td>
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<tr>
<td>CS421</td>
<td>Architecture and Implementation of Database Management Systems</td>
<td>CS306</td>
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<td>CS422</td>
<td>Wireless Mobile Networks</td>
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<td>Parallel Computing</td>
<td>CS302, CS307</td>
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<td>CS426</td>
<td>Software Engineering II</td>
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<td>CS427</td>
<td>Computer and Network Security</td>
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<td>CS498</td>
<td>Special Topics in Computer Science I</td>
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<td>Special Topics in Computer Science II</td>
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<td>EE307</td>
<td>Microcomputer Systems</td>
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<td>EE331</td>
<td>Introduction to Communication Systems</td>
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<td>Programmable Logic Controllers</td>
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<td>EE437</td>
<td>Introduction to Robotics</td>
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<td>MAN461</td>
<td>Management Information Systems</td>
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<tr>
<td>SE211</td>
<td>Software Construction</td>
<td>CS103</td>
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<tr>
<td>SE302</td>
<td>Software Testing and Maintenance</td>
<td>SE211 or CS105</td>
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<tr>
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<td>Software Requirements Analysis</td>
<td>SE211 or CS105</td>
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</table>
Program Electives may be selected from other FENS programs (including FENS graduate level courses) with the approval of Program Coordinator.

Table 2.14 lists all electives students need to take during their undergraduate study as a CSE at IUS:

Table 2.14: List of all Elective Courses for the CSE Program

<table>
<thead>
<tr>
<th>Course group</th>
<th>EC TS</th>
<th>Course name</th>
<th>Course code</th>
<th>Course type</th>
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<td>Program Elective V (Sem VIII)</td>
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</table>
2.4 EUROPEAN CREDIT TRANSFER SYSTEM

**Standard 1.4** - The application of ECTS is appropriate and plausible. It meets the recommendations of the European Commission.

As an accredited university that is conducting its activities in the Sarajevo Canton, the International University Sarajevo is bound to be in compliance with the following legal acts pertaining to the use of ECTS model:

1. Framework Law on Higher Education in Bosnia And Herzegovina
2. Law on Higher Education adopted for the Sarajevo Canton

These laws set the higher education model in Bosnia and Herzegovina in three cycles:

- The first cycle leads to the academic title of completed undergraduate studies [the degree of Bachelor] or equivalent, obtained after no less than three years and no more than four years of full time study upon acquiring a secondary school leaving certificate, valued as no less than 180 or 240 ECTS credit points;

- The second cycle leads to the academic title of Master or equivalent, obtained after the completion of undergraduate studies, of duration of one or two years, and valued as 60 to 120 ECTS credit points, in such a way that the total with the first cycle represents 300 ECTS points; and

- The third cycle leads to the academic degree of doctor or equivalent, of duration of three years and valued as 180 ECTS credit points.

One semester of full-time study carries 30 ECTS credit points in each cycle. Law on Higher Education defines ECTS system as “European system of transferring the study points (credits). The study points – credits – are used to define a measure of a student workload and requirements of each course, and are determined on the basis of optimal student workload necessary for achieving competencies in each particular course” (Article 7). The Law further defines one ECTS study credit as 25 hours of the total student workload in all aspects of his/her work on a particular subject (Article 49). Article 31 of the Law stipulates the right of university to establish the manner of implementing European Credit Transfer System principles in its statute.
Implementation of ECTS system at IUS is regulated in Article 121 of our Statute in the following manner:

(1) Study programs apply the European Credit Transfer System (ECTS), i.e. the European system of transfer of study credits, for each course in a study program.

(2) The number of ECTS credits for each course is based upon the total student workload for which the student is engaged in the particular course, as follows:

   a) attending learning activities (theoretical and/or practical teaching activities, tutorials, seminar projects);
   b) independent work (homework, projects, research);
   c) preparing for assessments (tests, final examination); and
   d) other activities in the particular subject.

In addition to establishing credit value of its courses and study programs, IUS is uses ECTS for the following purposes:

1. Evaluation of courses passed at other higher education institution for students who are transferring to IUS
2. Evaluation of foreign qualifications and their recognition for the purpose of continuing education or for getting employment in Bosnia and Herzegovina,
3. Preparing learning agreement for exchange students.

In accordance to abovementioned regulations, I cycle of the CSE study program lasts eight semesters, with 30 ECTS each, which in total adds to 240 ECTS needed for the completion of the program. Most of the courses require 150 hour workload consisting of various activities for the student to successfully finish the course. Required activities and methods of evaluation of students work and achieved learning outcomes are described in syllabus for each course. Students receive syllabus of each course which they register at the beginning of the semester. All syllabi can also be found on IUS web site.

For students who are transferring to the CSE study program from other higher education institution courses which they passed at other institution can be recognized and ECTS credits can be accepted towards Bachelor of Computer Sciences and Engineering at IUS. Process of recognition of those courses is conducted in accordance to the Book of Rules on Recognition of Passed Examinations and their
Equivalence at International University of Sarajevo. This bylaw stipulates that recognition of courses and ECTS credits is granted following the assessment which needs to establishes that the level and type of knowledge, skills and competences, or learning outcomes achieved in the previously passed courses have no significant differences from the level and type of knowledge, skills and competences which are achieved in the subjects for which the recognition was applied for.

Process of evaluation of foreign qualifications and their recognition for the purpose of continuing education or for obtaining employment in Bosnia and Herzegovina is performed in accordance to the Role Book on Recognition of Foreign Qualification. In order for a higher education institution to have the legal power to perform recognition of foreign qualification and to enable usage of that qualification in Bosnia and Herzegovina, bylaw based on which recognition is carried out has to be approved by the Ministry. The Ministry approved IUS Role Book on Recognition of Foreign Qualification on 19th September, 2014 and since that day IUS is performing recognition of foreign qualification.

Other important documents used in the process of recognition of foreign qualification are Recommendations on the Use of Qualifications Frameworks in the Procedure for the Recognition of Foreign Higher Education Qualifications in Bosnia and Herzegovina and Recommendations on Evaluation Criteria for the Recognition of Foreign Higher Education Qualifications issued by Centre for Information and Recognition of Qualifications in Higher Education, Lisbon Recognition Convention, and ECTS Guide.

In order to facilitate students’ mobility, the curriculum is organized through the courses which values are expressed in units of the European Credit Transfer System (ECTS). Students’ workload per semester is determined with 30 ECTS credits so that the total load in one academic year is 60 ECTS.

Given the size of planned content and timing of their implementation, courses at IUS are predominantly assigned to an equal number of study credits i.e. 6 ECTS. One study ECTS point is equivalent to 25 hours of total workload for the average student, and curriculum indicates that this standard is met.
Total student activities, in accordance with the Law on Higher Education in Sarajevo Canton, mainly include the following:

a) Number of hours needed for instructions (lectures, seminars),
b) Time required for student for independent tasks,
c) Time required for preparation of assessment and grading, and
d) Time which academic staff need in assisting the student to acquire the necessary knowledge.

Based on the above legal basis for "assigning" the study points to every single activity in the preparation of curriculum, IUS, as a rule, in all its study programs applies a model of so called standardized workload (2) for each course, ensuring that the total load comprises 150 hours of total student activities per course.

This provides:

a) General harmonization of the scope and subjective “importance” of each course in the curriculum,
b) Standardizing subjective weight for mastering a particular course through a flexible allocation of credits to individual activities,
c) More efficient mobility of students,
d) A simpler implementation and organization of joint courses in the first year of the studies, and
f) An easier transition and recognition of courses with international higher education institutions.

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### 2.5 STUDY PROGRAM VS. QUALIFICATION OBJECTIVES

**Standard 1.5**—The study program is structured consistently with regard to formulated qualification objectives.

In the following tables, the learning outcomes are compared to the University Required and Program Required courses to demonstrate the way in which and to what extent they match the learning outcomes and educational objectives of the program.

#### Table 2.15: Correspondence between the Learning Outcomes and University Required courses

<table>
<thead>
<tr>
<th>COMPUTER SCIENCE AND ENGINEERING</th>
<th>SP Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONTRIBUTION LEVEL</strong></td>
<td><strong>DEMONSTRATE A SOUND KNOWLEDGE OF THE BASIC THEORETICAL ASPECTS OF COMPUTER SCIENCE AND ENGINEERING, WITH A FOCUS ON SOFTWARE DEVELOPMENT PRACTICES, ALGORITHMS AND COMPUTER SYSTEMS ORGANIZATION, AND OTHER VARIOUS COMPUTING AREAS.</strong></td>
</tr>
<tr>
<td>-: No contribution</td>
<td>-</td>
</tr>
<tr>
<td>1: Low level contribution</td>
<td>1</td>
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<tr>
<td>2: Moderate contribution</td>
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<td>3: High level contribution</td>
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<table>
<thead>
<tr>
<th><strong>UNIVERSITY REQUIRED COURSES</strong></th>
<th><strong>SP LEARNING OUTCOMES</strong></th>
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<tr>
<td>Academic English and Effective Communication</td>
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<td>Calculus I</td>
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</tr>
<tr>
<td>Physics</td>
<td>1</td>
</tr>
<tr>
<td>Critical Reading and Writing</td>
<td>-</td>
</tr>
<tr>
<td>COMPUTER SCIENCE AND ENGINEERING</td>
<td>SP Learning Outcomes</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Contribution level:</strong></td>
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</tr>
<tr>
<td></td>
<td>-: No contribution</td>
</tr>
<tr>
<td>1: Low level contribution</td>
<td></td>
</tr>
<tr>
<td>2: Moderate contribution</td>
<td></td>
</tr>
<tr>
<td>3: High level contribution</td>
<td></td>
</tr>
<tr>
<td>Demonstrate a sound knowledge of the basic theoretical aspects of computer science and engineering, with a focus on software development practices, algorithms and computer systems organization, and other various computing areas.</td>
<td>Apply the necessary mathematical skills and logical reasoning to solve engineering and scientific problems.</td>
</tr>
<tr>
<td>Effectively document and translate requirements and translate them into an implementable design using different design patterns applied in the industry.</td>
<td>Analyze, design and develop software systems by following recommended concepts, principles and practice of the industry.</td>
</tr>
<tr>
<td>Show an ability to communicate effectively, work in a team and understand social, professional, legal and ethical issues related to computing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Program Required Courses</th>
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<td>Introduction to Probability and Statistics</td>
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## Table 2.17 Correspondence between the Educational Objectives and the University Required Courses

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<td>2: Moderate contribution</td>
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<td></td>
<td>3: High level contribution</td>
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</table>

- Prepare the students for abstract problem solving, logical reasoning and strong mathematical skills, while providing in-depth knowledge in computer programming.
- Provide the students with the knowledge of practical problem solving and design patterns applied in the industry.
- Prepare the students for successful careers in the wide range of disciplines, with numerous employment opportunities, such as computer science, software engineering, bioengineering, electrical engineering, industrial engineering.
- Train the students with the soft skills, such as teamwork, written and oral communication, which are crucial for successful employment career.
- Apply the code of ethics and show professional practice towards the client, employer, colleagues, profession and society.

<table>
<thead>
<tr>
<th>University Required Courses</th>
<th>Academic English and Effective Communication</th>
<th>Calculus I</th>
<th>Physics</th>
<th>Critical Reading and Writing</th>
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<tbody>
<tr>
<td>Academic English and Effective Communication</td>
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<td>Calculus I</td>
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<td>-</td>
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<td>Physics</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>Critical Reading and Writing</td>
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Table 2.18: Correspondence between the Educational Objectives and the Program Required Courses

<table>
<thead>
<tr>
<th>COMPUTER SCIENCE AND ENGINEERING</th>
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<td>1: Low level contribution</td>
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<tr>
<td>2: Moderate contribution</td>
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<tr>
<td>3: High level contribution</td>
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</tr>
<tr>
<td><strong>Prepare the students for abstract problem solving, logistical reasoning and strong mathematical skills, while providing in-depth knowledge in computer programming.</strong></td>
<td><strong>Provide the students with the knowledge of practical problem solving and design patterns applied in the industry.</strong></td>
</tr>
<tr>
<td><strong>Prepare the students for successful careers in the wide range of disciplines, with numerous employment opportunities, such as computer science, software engineering, bioengineering, electrical engineering, industrial engineering.</strong></td>
<td><strong>Train the students with the soft skills, such as teamwork, written and oral communication, which are crucial for successful employment career.</strong></td>
</tr>
<tr>
<td><strong>Apply the code of ethics and show professional practice towards the client, employer, colleagues, profession and society.</strong></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Program Required Courses</th>
<th>Contribution Level</th>
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<td><strong>Introduction to Programming</strong></td>
<td>3 3 3 2 3</td>
</tr>
<tr>
<td><strong>Calculus II</strong></td>
<td>3 1 3 1 1</td>
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<tr>
<td><strong>Advanced Programming</strong></td>
<td>3 3 3 2 3</td>
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<tr>
<td><strong>Electrical Circuits</strong></td>
<td>2 1 3 1 1</td>
</tr>
<tr>
<td><strong>Introduction to Probability and Statistics</strong></td>
<td>3 1 3 1 2</td>
</tr>
<tr>
<td><strong>Discrete Mathematics</strong></td>
<td>3 1 3 1 2</td>
</tr>
<tr>
<td><strong>Digital Design</strong></td>
<td>2 2 2 1 1</td>
</tr>
<tr>
<td><strong>Programming Languages</strong></td>
<td>2 3 2 2 2</td>
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<tr>
<td><strong>Linear Algebra</strong></td>
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<td><strong>Computer Architecture</strong></td>
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<tr>
<td><strong>Differential Equations</strong></td>
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<tr>
<td><strong>Software Engineering</strong></td>
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<tr>
<td><strong>Numerical Analysis</strong></td>
<td>3 1 3 1 1</td>
</tr>
<tr>
<td><strong>Communication Systems and Networks</strong></td>
<td>2 1 2 2 2</td>
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<tr>
<td><strong>Web Application Development</strong></td>
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</tr>
<tr>
<td><strong>Theory of Computation</strong></td>
<td>3 1 1 1 1</td>
</tr>
<tr>
<td><strong>Work Placement/Internship</strong></td>
<td>3 3 2 3 3</td>
</tr>
<tr>
<td><strong>Graduation Project</strong></td>
<td>3 3 2 3 3</td>
</tr>
</tbody>
</table>
2.6 STUDENTS’ WORKLOAD

**Standard 1.6**—*The students’ workload required for the study program is devised in a way so as to allow them to reach the aspired qualification objectives in the study period specified.*

2.6.1 BACHELOR DEGREE (FIRST CYCLE)

The CSE Bachelor program satisfies legal requirements related to the workload and ECTS credits, with respect to both national and EU contexts.

The first cycle lasts four years, which is equivalent to 240 ECTS credits distributed in eight semesters, each of them enabling students to acquire 30 ECTS.

The standard for student workload and ECTS credit is defined in the Law and equals 25 hours of student engagement. The formula is consistently applied which can be evident from course syllabus forms, where courses that are valued, e.g. 6 ECTS assume that an average student will spend 150 hours of work per semester, including lecture/tutorial attendance, practical work, work on the project and individual learning. In this way, it is estimated that the total work time of an average student will allow him/her to fully obtain the expected knowledge, skills and competences in that course, subsequently assigning the ECTS credits after the successful examination. Student workload per course per semester is equally distributed throughout 14 weeks.

Teaching and Assessment Methods applied at the University vary significantly depending on the faculty and discipline. In general, the courses of CSE program have a tendency towards larger structure and more formal lessons than subjects of humanities and social sciences. An important component of studying at the IUS is independent learning, and special attention is given to individual office hours with students. Academic staff may combine different teaching approaches to achieve specified learning goals and to motivate students to study.

Implementation of teaching can take several forms, but it usually involves a combination of the following:

- Lectures, and class discussion.
- Tutorials, under the supervision of course holder professor, in small groups where individual attention is given to students. Tutorials usually complement lectures, but are more topic-specific. For example, they may include activities such as solving problems or having discussions on particular topics broadly discussed during lectures.

- Practical work, such as weekly sessions in the laboratory where students acquire technical and research skills.

- Internships (min 30 working days) have been designed in a way that offers students opportunities to experience on-the-job training and make well-informed decisions about their future careers. Through the choice of host institutions/sectors for carrying out the Internship, students develop their communication skills and learn how to join interdisciplinary teams.

- Independent learning: Apart from attending lectures and practical classes, students spend a great part of their week days in independent learning that includes reading relevant materials, research, studying in the reading room, doing homework, writing term papers and reports, group or individual projects and presentations.

**Student advisor**

Since its establishment, IUS has always given special attention to the academic advising of students in their studies. Within the study program, the Dean assigns to each student academic advisors, who have obligation to continuously monitor and evaluate student's progress. The task of academic advisors is also based on the expressed wishes of the student for education in the selected area, to advice on the choice of "a coherent set of courses" taking into account the personal preferences of student and the educational requirements of the study program.

2.6.2 ASSESSMENT AND TESTING EXAMINATION METHODS

**Standard 1.7**—The examination methods are suitable to assess whether the defined learning outcomes have been achieved.

Student assessment at the university is regulated by the *Study Rules*. It defines the process of student assessment as well as an appeal process. Students are awarded ECTS credits upon successful completion of each course. Assessment is a continuous
process and it includes, but is not limited to, written exams, oral exams, practical work, seminar papers, tests, quizzes, student presentations, etc. Assessment methods for each course are announced at the beginning of the semester where the evaluation and the weight of each method are clarified for students in the course syllabus. The detailed information on how each type of assessment supports the expected learning outcomes is given in Table 2.19.

Table 2.19 Examination methods vs. Learning Outcomes (Bachelor)

<table>
<thead>
<tr>
<th>SP Learning Outcomes</th>
<th>Type of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate a sound knowledge of the basic theoretical aspects of computer science and engineering, with a focus on software development practices, algorithms and computer systems organization, and other various computing areas;</td>
<td>Papers, written exam questions, problems, class discussions, quizzes, homework assignments</td>
</tr>
<tr>
<td>Apply the necessary strong mathematical skills and logical reasoning to solve engineering and scientific problems;</td>
<td>Papers, written exam questions, problems, class discussions, quizzes, homework assignments</td>
</tr>
<tr>
<td>Effectively document and analyze requirements and translate them into an implementable design using different design patterns applied in the industry</td>
<td>Papers, written exam questions, problems, class discussions, homework assignments, projects</td>
</tr>
<tr>
<td>Analyze, design and develop software systems by following recommended concepts, principles and practice of the industry;</td>
<td>Problem sets, class discussions, labs, projects</td>
</tr>
<tr>
<td>Show an ability to communicate effectively, work in a team and understand social, professional, legal and ethical issues related to computing;</td>
<td>Class discussions, case studies, projects</td>
</tr>
</tbody>
</table>

The grading scale in Bosnia and Herzegovina (B&H) in accordance to the law on Higher Education for each course is defined in Table 2.20 as follows:

The grading scale for each course is in accordance to The Law on Higher Education, Article (55), and is given in the Table 2.20. In addition to the grading scale table, conversion table is used to convert between the grades defined by the Law and international letter grade and grade weight coefficient (see Table 2.21)
### Table 2.20 Grading Scale

<table>
<thead>
<tr>
<th>Letter grade by B&amp;H Law on Higher Education</th>
<th>Points assigned to grades by Law on Higher Education</th>
<th>Percentage Equivalent</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>95-100</td>
<td>exceptional achievement, without errors, or with minimal errors</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>85-94</td>
<td>above average achievement, with a few errors</td>
</tr>
<tr>
<td>C</td>
<td>8</td>
<td>75-84</td>
<td>average achievement, with noticeable errors</td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td>65-74</td>
<td>generally good achievement, with significant imperfections</td>
</tr>
<tr>
<td>E</td>
<td>6</td>
<td>55-64</td>
<td>meets minimal criteria for achievement</td>
</tr>
<tr>
<td>F, FX</td>
<td>5</td>
<td>Less than 55</td>
<td>Does not meet minimal criteria</td>
</tr>
</tbody>
</table>

### Table 2.21. Conversion Table for grading scale

<table>
<thead>
<tr>
<th>Current Aggregated Marks Interval</th>
<th>Current IUS Letter Grade</th>
<th>New Interval</th>
<th>New Letter Grade (*)</th>
<th>IUS GRADE COEFFICIENT</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 54</td>
<td>F</td>
<td>0 - 44</td>
<td>F</td>
<td>0.0</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 - 54</td>
<td>E</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>55 - 64</td>
<td>D</td>
<td>55 - 64</td>
<td>C</td>
<td>2.0</td>
<td>E</td>
</tr>
<tr>
<td>65 - 69</td>
<td>D+</td>
<td>65 - 69</td>
<td>C+</td>
<td>2.3</td>
<td>D</td>
</tr>
<tr>
<td>70 - 74</td>
<td>C-</td>
<td>70 - 74</td>
<td>B-</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>75 - 77</td>
<td>C</td>
<td>75 - 80</td>
<td>B</td>
<td>3.0</td>
<td>C</td>
</tr>
<tr>
<td>78 - 80</td>
<td>C+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>81 - 84</td>
<td>B-</td>
<td>81 - 84</td>
<td>B+</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>85 - 87</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>88 - 90</td>
<td>B+</td>
<td>85 - 94</td>
<td>A-</td>
<td>3.7</td>
<td>B</td>
</tr>
<tr>
<td>91 - 94</td>
<td>A-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.7 DIPLOMA SUPPLEMENT

**Standard 1.8—Issuance of a diploma supplement is guaranteed.**

Issuance of diploma supplement is guaranteed to each student. It is always issued together with the diploma. Package includes:

1. Diploma (in APPENDIX B - DIPLOMA);
2. Diploma supplement - Bosnian and English version available (APPENDIX C – DIPLOMA SUPPLEMENT);
3. Transcript of grades (Bosnian and English version available).

Diploma supplement is designed and prepared according to the instructions provided by the Ministry of Education, Science and Youth of Sarajevo Canton (www.mon.ks.gov.ba).

2.8 ADMISSION REQUIREMENTS FOR THE STUDY PROGRAM
Standard 1.9—Admission requirements for the study program are clearly defined, meet the statutory requirements and contribute to achieving the educational goals of the study program. Recognition rules for external achievements pursuant to the Lisbon Recognition Convention (Applicable to states that have ratified the Lisbon Recognition Convention and where it has come into force) and achievements outside of higher education institutions have been defined.

2.8.1 REQUIREMENTS CONDITION FOR THE FIRST CYCLE

To enroll into the 1st cycle of studies, a candidate needs to have completed four years of secondary education which he/she proves with valid high school diploma.

Being that teaching at the University is carried out in the English language only, in order to be enrolled into the first year, candidates must possess advanced knowledge of the English language. For a student to prove their sufficiency in English they can provide internationally recognized certificates of English language proficiency, such as TOEFL, IELTS, or equivalent certificate, in accordance with the criteria established by University regulations.

If a candidate does not possess any certificate which would waive the requirement for taking English Language Proficiency exam (Proficiency exam), candidates are required to pass Proficiency Exam organized by English Language School (ELS) at the University.

Candidates who meet all requirements for admission, but who do not pass this test, are required to attend intensive program (course) of the English language at the University’s Lifelong Learning Centre, in order to acquire necessary language skills to follow the lectures. While attending the English language course, students are required to submit request for dormant status for the purpose of preparation for the Proficiency exam and acquiring skills to attend lectures.

The general criteria for admission are determined in the public announcement published before each academic year. Ranking of candidates can be made on the basis of the following criteria:

• Success achieved in high school;
• Marks received in the interview organized for the candidates during application process;
• Points earned on the Scholarship test (Aptitude and Math tests) organized by University for those candidates who applied for scholarship, and other criteria stipulated in the announcement.

Further short-listing can be done based on the performance achieved during applicants’ secondary education in the subjects relevant to the area of the undergraduate study.

Applicants from the Republic of Turkey, in addition to the previously mentioned admission criteria, have to pass undergraduate studies entrance exam (LYS – Lisans Yerleştirme SINAV) with the minimal score set by the appropriate government body in charge of higher education in the Republic of Turkey, or they have to achieve at least 1000 points on the SAT (Scholastic Aptitude Test / Scholastic Assessment Test).

Students transferring from other higher education institutions are required to submit application for admission (transfer) along with the official certificate on passed courses (transcript) from previous higher education institution. The request is forwarded to the relevant faculty committee. At the end of transferring process, the faculty Dean decides on application for transfer.

The persons who lose their student status in accordance with the general acts and The Study Rules at the IUS can reclaim their status under the following conditions:

• The University has available infrastructure and human resources to accommodate re-admitted students without any interruption of regular teaching process and everyday operations of the University;
• The student follows the study program curriculum in current use at the time of re-admission;
• The student has no arrears with the University.

Students who want to regain their students status are required to submit a request and explanation to the competent University Authorities. The decision on regaining student’s status is made by the Dean.
2.8.2 RECOGNITION

Bosnia and Herzegovina signed the Convention of the Council of Europe/UNESCO on Recognition of Qualifications in Higher Education in European Region (ETS No. 165, 1997) – The Lisbon Convention („Official Gazette of B&H“, issue 16/03 – International Agreements) in 2003. The Convention entered into force in 2004. This way, Bosnia and Herzegovina took a part in this important instrument for the Bologna Process which aims at creating the “European higher education area” by making academic degree standards and quality assurance standards more comparable and compatible throughout Europe.

In order to improve the implementation of the Convention in our country, the Centre for Information and Recognition of Qualifications in Higher Education (hereinafter CIP/CIR), was established by the Framework Law on Higher Education in Bosnia and Herzegovina (“Official Gazette of B&H”, issue 59/07), as an independent administrative organization. According to the given Law, CIP/CIR is in charge of: information and recognition in higher education, coordination and international exchange of members of academia, students, and programs in higher education and representing Bosnia and Herzegovina in international projects in higher education. Also, through the international network of information centers (ENIC/NARIC network), CIP/CIR provides information to the higher education institutions in Bosnia and Herzegovina on foreign higher education institutions and programs and gives opinion about foreign degrees and diplomas in relation to the continuation of education at higher education institutions in Bosnia and Herzegovina. These instruments are regularly used by IUS, in the way that will be thoroughly explained latter. Also CIP/CIR issued numerous recommendations for the area of Recognition of Qualifications in Higher Education, available here:


Considering that higher education in the Federation of B&H is in also under the authority of Cantons, very important law for the qualification recognition at IUS is the Cantonal Law on Higher Education (“Official Gazette of Sarajevo Canton” issue 42/13 – Consolidated text) available here:

http://www.ius.edu.ba/sites/default/files/the-law-on-higher-education.pdf
Under this Law, institutions of higher education have authority to validate and carry out procedures of recognition of university degrees (qualifications) from abroad through its organizational units by means of nominating a special committee, in compliance with the Law (Article 36). Two types of qualifications recognition is stipulated, academic and professional recognition.

Recognition of foreign higher education qualification is a formal validation of value of foreign higher education qualifications and periods of study, issued by the competent authorities of IUS for the purposes of access to education or employment. Procedure of recognition of higher education qualifications at IUS has been regulated in detail by the Book of Rules on Recognition of Foreign Educational Qualifications which is adopted by the Senate of IUS and approved by the Ministry of Education, Science and Youth of Canton Sarajevo.

The procedure for the recognition of foreign higher education qualifications for the purpose of access to labor market in Bosnia and Herzegovina is being conducted by the Senate of IUS and procedure for academic recognition of foreign higher education qualifications and access to continuation of education is being carried out by the Council of the organizational unit of IUS which issues the same or equivalent higher education qualifications.

In both cases, the Committee is formed of at least three members of the academic staff in the academic title of assistant professor, associate professor or full professor, from a scientific/artistic areas and disciplines which are taught within the study program for which the recognition of foreign higher education qualifications is requested with obligation to submit Report to authorized body of university or faculty, that contains their proposal and explanation on requested recognition of higher qualification based on criteria set by the Book of Rules on Recognition of Foreign Educational Qualifications.

Valuation of foreign higher education qualifications is done exclusively on the basis of acquired knowledge, skills and competences. In the process of recognition of higher education qualification for the purpose of employment, level and type of study, as well as professional, academic or scientific title is being determined without comparing the curricula. Foreign higher education qualification will not be
recognized if substantial differences between the foreign higher education qualification and the corresponding qualification of IUS are found.

Unified Register of all received and processed applications for academic and professional recognition of foreign higher education qualifications is being processed and kept by the Student Affairs Office.

The deadline for adoption of decision on recognition of higher education qualification is 60 days from the filing of a proper application.

2.9 INTERNSHIP

Standard 1.12—Placements (internship) form an educationally relevant part of the curriculum.

Students of CSE program are required to complete minimum 30 full working days of internship during their studies, and this is the condition for graduation. 6 ECTS are allocated for the internship.

The aim of the internship is to provide CSE students with some real-world practical experience, so that they can be better prepared for their future jobs once they complete their studies. Internships will give students more practical experience and implementation of some of the theoretical aspects of the knowledge they have acquired during their studies, and provide them with an advantage over their relative competitors from other local universities. The goals of internship are as follows:

- To develop the ability of students’ reasoning
- To improve their ability to process information and critical thinking
- To increase their ability to apply gained knowledge
- To develop their problem solving strategy in various circumstances etc.

Internships are approved only after authorization from the responsible person in the company where the student plans to complete the internship. The place of internship can be chosen upon a consultation with the program coordinator. After completing
the internship (min. 30 work days), students are required to write an internship report which is signed by the company’s responsible manager. The responsible manager from the company also needs to fill in the trainee evaluation form where the students work and attitude are evaluated. Signed and stamped internship report and trainee evaluation form need to submitted to the program coordinator in the sealed envelope. Only positive reports will be taken into consideration to validate the internship.

The CSE internship opportunities include large companies in Bosnia and Herzegovina, such as BH telecom (telecommunications), Atlant BH, Authority Partners Inc, Mistral, etc. as well as respected companies from Turkey such as ULKER.
CHAPTER 3 : STAFF

3.1 SCIENTIFIC TEACHING AND RESEARCH STAFF

**Standard 2.1**—A sufficient number of scientific or artistic teaching and research staff is available for the study program, who are scientifically qualified, have adequate vocational experience, and are qualified in terms of their teaching methods.

Recruitment of a qualified staff, both for teaching and research, is based on the Law of Higher Education of the Sarajevo Canton. Certain procedures have to be fulfilled. In addition, the Faculty introduced internal procedures when new staff is to be recruited. For prospective academic staff, with no teaching backgrounds like assistant professors, senior assistants and assistants, approaching lecturers are mandatory, at which a recruiting committee, decides whether they fulfill the requirements of the CSE program.

3.1.1 NUMBER OF ACADEMIC STAFF IN THE PROGRAM

Academic staff of CS study program includes 5 full-time professors, 1 part time visiting professor, 4 part time adjunct instructors and 1 scholarship assistant. (See Table 3.2).

3.1.2 QUALIFICATION OF ACADEMIC STAFF

The aim of the IUS is that, among other things, together with contemporary curricula, achieve a greater compatibility and a clear comparability with higher education systems in Europe, and to improve quality of education and its results as a basic requirement for a comparison with European and the world's education systems. Of course, a prerequisite for these objectives is the fulfillment of all Standards and norms for higher education in Canton Sarajevo (hereinafter: Standards), which establishes the requirements for a minimum infrastructure, personnel and other technical conditions necessary for carrying out teaching and research activities of university.
Standards, among others, stipulates the obligation of higher education institutions to provide teachers and associates who will successfully and in accordance with the curriculum implemented established program, where it is necessary that at least 2/3 of the professors, assistants 2/3 and 2/3 of other associates must be employed full-time at the University, and the rest of the academic staff can be engaged from the economic, scientific and similar environments (up to 1/3 of the academic staff, and, if necessary, and more), or from among the visiting professors (1/3 academic staff).

In parallel, IUS carries out continuous analysis of its own scientific teaching capacity i.e. staff members of academic staff who are appointed for the same or related scientific field.

By decisions on appointment into academic title for a specific scientific field, the right to hold all courses contained within established scientific/artistic field is awarded to particular academic member. No matter given the right to hold a certain number of courses contained in the relevant scientific field, teaching load for each semester and each academic member is separately determined by the decision on teaching responsibilities and workload by faculty council. Therefore, the number of courses given by the Decision on the appointment or curriculum always may be limited and coordinated with the decision on teaching responsibilities and workload by faculty council on the semester basis, depending on special teaching needs.

The majority of the appointed members are young professors who have dedicated much of their adult lives to their academic degree earned in the relevant scientific disciplines. In accordance with the decisions on appointments, as a result of public vacancy for appointment into academic tile, they have concluded their employment relationships and they are actively engaged in continuous scientific research and teaching processes, which is resulting with permanent scientific publications and prominent teaching activities.

IUS and faculties as a whole continuously analyze staffing fulfillment and propose measures for improvement in the areas where it was found a lack of a sufficient number of required staff. In general, this analysis is done at the level of the study program and resulting requirements for new staff if found necessary. Furthermore, these requirements are analyzed by the faculty council and forwarded to the IUS
Senate and the Board of Directors for final approval. After approvals, the public vacancies are announced.

3.1.3 ACADEMIC STAFF WORKLOAD

Academic staff members fall into two categories: teachers/lecturers and assistants. There is a universal workload policy, based on the relevant standards and norms and at IUS teachers are supposed to teach nine hours a week and to spend the rest of their working time in other activities, primarily student consultations, research and some administrative duties. Assistants’ workloads are also in line with the existing standards and norms. In order to get academic appointment all the legal and institutional criteria with regard to qualifications and academic/artistic background must be satisfied and the selection process includes introductory lecture which is evaluated by an ad-hoc committee.

3.1.4 ACADEMIC STAFF PROFESSIONAL DEVELOPMENT AND EVALUATION

The professional development policy at IUS is regulated through Program of measures for creation of conditions for promotion of academic staff. This document underlines conditions for promotion of academic staff into higher academic titles and also lists other measures which allow professional development of IUS teaching staff. Hiring process, duties and responsibilities, appointments, promotions, workloads and evaluations of academic staff are regulated by Law, Statute and rulebooks.

There are fair and merit-based procedures for staff recruitment and promotion. Academic staff appointments are publicly announced and open to all the interested candidates. A committee checks the applications and attached files, prepares a shortlist and invites candidates to deliver an introductory lecture for the evaluation purpose. Final decision is brought by Senate voting.

There is a universal workload policy, based on the relevant standards and norms and at IUS teachers are supposed to teach nine hours a week and to spend the rest of their working time in other activities, primarily student consultations, research and some administrative duties. Assistants’ workloads are also in line with the existing standards and norms.
Academic staff members are regularly evaluated by students and institution on a regular yearly basis. Student surveys are performed at the end of each semester and the scores given by students are used in institutional evaluation of academic staff that includes their educational, scientific/artistic and administrative activities. The evaluation is objective with clearly set criteria, identified areas and values for every activity/output. These evaluations are part of the internal QA system and are managed by the Rectorate, as defined in the rulebook.

3.1.5 STUDENT-LECTURER RATIO

Given that the number of undergraduate students in the study program in the period of 2017–2018 is 126 and the number of full time academic staff is CSE study program is 5 (plus one scholarship assistant), without including the number of faculty staff teaching some university required and elective to our students, the student/teacher ratio is 11.5 (see Table 3.1). Although the study process definitely benefits from provision of more individual attention from the teachers and creating space for more productive class work, it nevertheless seems rational to increase the numbers of students being accepted to the study program without negatively impacting the quality of studies.

<table>
<thead>
<tr>
<th>Study cycle</th>
<th>Number of students</th>
<th>Number of academic staff members</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>I cycle</td>
<td>126</td>
<td>6 Professors (including 1 visiting) 4 Adjunct Instructors 1 Scholarship Assistant</td>
<td>11.5</td>
</tr>
</tbody>
</table>

3.2 COMPOSITION OF THE FACULTY

**Standard 2.2**—The composition of the faculty meets the requirements of profound scientific and artistic education and ensures adequate student support.
Learning objectives and learning outcomes of the CSE program require diverse and competent academic staff. Its composition is in line with the teaching and research objectives, as well as students’ needs, wants and demands. Such versatile academic staff profoundly enhances the scholarly and professional development of students. Expertise of the staff, their flexible teaching and research approaches, make students infallible if they decide either industry path career or academia.

Degree, qualifications, and areas of teaching for CSE academic staff is provided in the Table 3.2. Due to the nature of CSE program, being an interdisciplinary, the program benefits from other Faculty program staff, in particular academicians in the fields of Mathematics, Mechanical Engineering and Electrical Engineering are teaching variety of the required and elective courses in CSE curricula.

Table 3.2 Study program academic staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Academic Degree</th>
<th>Position</th>
<th>Qualification/Academic Discipline</th>
<th>Full/Part time</th>
<th>Area of teaching</th>
<th>No of hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanita Karadjuzovic-Hadziabdiv</td>
<td>PhD</td>
<td>Assistant Professor</td>
<td>Computer Science and Engineering</td>
<td>Full Time</td>
<td>Software Engineering, Programming, Computational Photography</td>
<td>9</td>
</tr>
<tr>
<td>Emin Tahirovic</td>
<td>PhD</td>
<td>Assistant Professor</td>
<td>Computer Science and Engineering</td>
<td>Full Time</td>
<td>Probability, Quantitative Research Methods, Biological Data Analysis</td>
<td>9</td>
</tr>
<tr>
<td>Dzejla Medjedovic</td>
<td>PhD</td>
<td>Assistant Professor</td>
<td>Computer Science and Engineering</td>
<td>Full Time</td>
<td>Algorithms, Programming, Computation, Human Computer Interaction</td>
<td>9</td>
</tr>
<tr>
<td>Serzod Rustamovic Turaev</td>
<td>PhD</td>
<td>Associate Professor</td>
<td>Computer Science and Engineering</td>
<td>Full Time</td>
<td>Network and Systems Security, Cyber Security &amp; Privacy</td>
<td>9</td>
</tr>
<tr>
<td>Ali Abd Almisreb</td>
<td>PhD</td>
<td>Assistant Professor</td>
<td>Computer Science and Engineering</td>
<td>Full Time</td>
<td>Pattern Recognition, Acoustic Signal Processing, Machine Learning</td>
<td>9</td>
</tr>
<tr>
<td>Edvin Skaljo</td>
<td>PhD</td>
<td>Visiting Assistant Professor</td>
<td>Computer Science and Engineering</td>
<td>Part Time</td>
<td>Telecommunication, Networking, Fiber Optics</td>
<td>3</td>
</tr>
<tr>
<td>Sadi Matar</td>
<td>PhD</td>
<td>Adjunct Instructor</td>
<td>Computer Science and Engineering</td>
<td>Part Time</td>
<td>Cloud Computing, Communication, Information Society Development Operating systems</td>
<td>3</td>
</tr>
<tr>
<td>Amir Jamak</td>
<td>MSc</td>
<td>Adjunct</td>
<td>Computer</td>
<td>Part</td>
<td>Theory of NP</td>
<td>3</td>
</tr>
<tr>
<td>Name</td>
<td>Academic Degree</td>
<td>Position</td>
<td>Qualification / Academic Discipline</td>
<td>Full/ Part Time</td>
<td>Area of teaching</td>
<td>No of hours per week</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>------------------------------------</td>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Suada Alic Mesanovic</td>
<td>BSc.</td>
<td>Adjunct Instructor</td>
<td>Computer Science and Engineering</td>
<td>Part Time</td>
<td>Modern Customer Analysis, Product development process, Sensitivity Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Rialda Spahic</td>
<td>BSc</td>
<td>Scholarship Assistant</td>
<td>Computer Science and Engineering</td>
<td>Full Time</td>
<td>Programming, Software Engineering, Artificial intelligence</td>
<td>6</td>
</tr>
</tbody>
</table>

**3.3 HUMAN RESOURCE DEVELOPMENT**

**Standard 2.3—Teaching and research staff have access to human resource development and further education measures.**

Through its mission and vision and strategic plan, IUS supports the professional development of its teaching and research staff. Human resource development and further staff education are implemented by some of the following means:

- IUS organizes conferences and seminars where CSE program staff participate as organizers, attendees and/or presenters. (such as the Regional Conference on Soft Computing)
- IUS organizes lectures given by distinguished keynote speakers and experts in the field of CSE.
- IUS provides a financial support for: (1) publishing scientific papers in science citation indexed journals; (2) participation of academic staff in conferences, workshops and seminars (regulated by Book of Rule on Incentives Policy and Financial Support for Book Publishing, Conference
Participation, and Professional Development). The *Book of Rules on Publishing Activities* at the IUS SENAT-11- 974/16 defines all types of publishing activities at IUS, quality control of publications, as well as financing publishing activities.

The list of academic personnel who received financial support stipulated by Book of Rule on Incentives Policy and Financial Support for Book Publishing, Conference Participation and Professional Development is kept in the Office for Financial and Economic Matters.

The list of published scientific papers, books and book chapters by IUS academic staff is publicly available at IUS web-site. The list is regularly updated.

Staff members of CSE Program have a notable record in teaching, research, professional society involvement and experience in practice. They are constantly trying to broaden their research, development and professional activities in all fields of expertise and teaching interests.
CHAPTER 4  : QUALITY ASSURANCE

4.1 INSTITUTION’S QUALITY MANAGEMENT SYSTEM

Standard 3.1–The study program is supported by institution’s quality management system.

IUS formally introduced its internal quality assurance system in 2011. Although this is not the beginning of the quality culture at the University, since 2011 there has been significant progress in terms of institutional approach to the quality assurance.

The following table represents the IUS’s QA framework:
<table>
<thead>
<tr>
<th>Quality culture and QA system backbone</th>
<th>Internal Quality Assurance System at IUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IUS Internal Documents for Quality Assurance</strong></td>
<td><strong>What is it about?</strong></td>
</tr>
<tr>
<td>IUS Statute (incl. mission and vision)</td>
<td>Demonstrated commitment of the IUS senior leadership towards developing internal quality culture.</td>
</tr>
<tr>
<td>IUS Strategic Plan 2011-2016</td>
<td></td>
</tr>
<tr>
<td>IUS Strategic Plan 2016-2020</td>
<td></td>
</tr>
<tr>
<td>Regulation on Quality Assurance at IUS, IUS-SENAT-11-819/11, 21 June, 2011</td>
<td>This document defines internal quality assurance system at IUS, its aims, mission, 63 institutional structure, its responsibilities, its activities and its roles, intention statements, quality culture, students’ role in QA, quality assurance policy, and quality assurance procedures. It also establishes IUS QA bodies as follows:  - Quality Assurance Office (at the University level)  - Faculty Quality Assurance Teams (at the Faculty level)</td>
</tr>
<tr>
<td>Quality Assurance Office Policy, IUS-UO08-32/2011, 22 June, 2011</td>
<td>This decision establishes Quality Assurance Office as an autonomous body of the IUS within the Rector’s Office.</td>
</tr>
<tr>
<td>Internal Quality Assurance Procedures 11-1064/11</td>
<td>Covers procedures related to self-evaluation, external evaluation and contains relevant templates for the processes.</td>
</tr>
<tr>
<td><strong>Curriculum</strong></td>
<td></td>
</tr>
<tr>
<td>Book of Rules on Accepting and Monitoring Study Programs at IUS, revised edition, IUS-SENAT-11-3330/14</td>
<td>This Book of Rules defines the content, methods of proposing, accepting, monitoring and realization of the study programs at International University of Sarajevo, as well as methods of amending or innovating existing study programs. The Book of Rules also regulates the methods to cancel existing study programs or courses within the study programs. It introduces the Curriculum Committee as a body for monitoring the curricula, appointed by the Rector, which task is to consider proposals for introducing new study programs, as well as proposals for amending existing study programs curricula. The Rule Book prescribes the form of the syllabus as well the forms for different types of curricula changes see APPENDIX F- STUDENT SURVEY FORM.</td>
</tr>
<tr>
<td>Book of Rules on the Work of the Curriculum Committee IUS-SENAT-11-3324/14</td>
<td>The methods of work and selection of the Committee members is defined in the Book of Rules on the Work of the Curriculum Committee.</td>
</tr>
<tr>
<td><strong>Academic Staff Evaluation</strong></td>
<td>Book of Rules on Evaluation of the Academic Staff Procedures at the International University of Sarajevo, IUS SENAT – 11 – 3152/13.</td>
</tr>
<tr>
<td>National Institutional Accreditation</td>
<td>IUS Post-accreditation Action Plan on Quality System Improvement, November 2014</td>
</tr>
<tr>
<td>Teaching and Learning</td>
<td>Book of Rules on the Procedure of Effective Teaching Process of the Academic Staff, IUS-SENAT 11 -1044-2/14</td>
</tr>
<tr>
<td>Teaching and Learning</td>
<td>Methods for Monitoring Academic Staff Activities, IUS-SENAT-11-1044-1/14</td>
</tr>
<tr>
<td>Research</td>
<td>Book of Rules of Research and Development Centre, 2016 (under the process of adoption)</td>
</tr>
<tr>
<td>ISO9001:2008</td>
<td>General Secretariat Quality Rule Book Quality policy statement, Rector, 11 February 2015</td>
</tr>
</tbody>
</table>
There are several documents which are not part of QA policy per se but significantly contribute to the IUS overall QA system.

These are:

- Code of Ethics and Decision on the Establishment of Ethical Committee;
- Decision on procedures for Developing, Adopting and Implementation of IUS Strategy;
- Regulation on Student Organization and Student Roles at IUS;

4.1.1 QA BODIES

Specific QA structure at IUS is made of fully functional QA Office at the university level and the QA Teams at faculty level. Student representatives are regularly appointed in Faculty QA Teams.

These bodies, as defined in Article 8 of the Regulation on QA at IUS, are fully operational and functional. The roles, responsibilities, and activities are clearly defined in the aforementioned documents. The QA Office is the main QA executive body. It is an independent unit within the University whose Manager is responsible directly to the Rector. The Faculty QA Teams are constituted within each IUS faculties and responsible to the faculty Deans. A 5-member QA Team at Faculty level is made of the major stakeholders’ representatives, including students.

The QA Office regularly:

- follows development of regulation on quality assurance and propose adequate measures to IUS governance structures.
- actively participates and provides assistance in the process of strategic planning
- provides assistance to academic units in setting intended learning outcomes and educational objectives
- conducts student surveys at the end of each semester and prepares reports,
- provides guidance for analyzing study programs at the end of each academic year, processes reviews and improvements,
- provides support and guidance for the processes of self-evaluation at both study program and IUS level,
- organizes educational activities on QA enhancements
- conducts process of academic staff evaluation
- evaluates staff research activities
- conducts alumni surveys.
- processes all curricula revision requests and prepares documentation for Curricula Committee sessions.
- prepares various templates/forms
- ensures correct application of the entire QMS including ISO 9001:2008.

Activities in which QA Office provides assistance and support include, but are not limited to:

Cooperation with Faculty QA Teams, monitoring and recording of the proper and regular fulfilling of the teaching obligations by academic staff, provides updating study programs curricula changes, syllabi updates, award, monitoring, preparation of forms, updates of rulebooks, definition of scientific areas, establishing needs for academic staff, and participation in events and projects, such as workshops organized by the Council of Europe, EU Twinning Project: Strengthening Institutional Capacity for Quality Assurance and Agency for Higher Education and Quality Assurance, BiH, (HEA). IUS evaluates its QA system formally in the process of self-evaluation, but also as the part of strategy monitoring implementation and regular analyses by Board of Trustees IUS quality system is in full compliance with ENQA standards and guidelines, BH standards and guidelines, laws and Acts of the Agency for Development of Higher Education and Quality Assurance, and competent cantonal laws and by-laws.

4.1.2 STAKEHOLDER PARTICIPATION

Internal and external stakeholders are involved in the QA processes in various ways, but not at the same level. Internal stakeholders, such as students and academic staff, are involved in more systemic manner. Self-evaluations, both at university and SP level are done by appointed committees and student representatives are on all these committees.

All the analyses are discussed at Faculty Council and Senate sessions and, as pointed out earlier, students are also full members in these. Alumni association at IUS is
created at university level and all the accessible alumni are approached in reasonable manner providing valuable input for improvements and innovations in the existing practices and curricula. Representatives of the labor market and professional associations are approached in the process of major changes and enhancement in SPs and/or in very specific and individual cases where their contribution is considered most valued. Faculties maintain good contacts with relevant industries on personal and also professional basis through repeating meetings, workshops and partnerships.

Table 4.1 Involvement of Stakeholders in IUS QA processes

<table>
<thead>
<tr>
<th></th>
<th>Academic staff</th>
<th>Admin. Staff</th>
<th>University Management</th>
<th>Faculty/ Department /Study Programme Management</th>
<th>Students</th>
<th>External stakeholders (employers, experts…)</th>
<th>Alumni</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through participation in IUS governance bodies with voting rights (e.g. Senate, Faculty Councils, Ethical Committee, QA and SER Teams…)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Through formal participation in consultation bodies (Faculty QA Teams, Curriculum Committee, Research Committee, Strategic Planning Committee, etc)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Through formal involvement in self-evaluation activities</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>By informally providing information on the issues at stake</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>By responding to the surveys on regular basis (e.g. at the end of the semester or academic year)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
</tr>
</tbody>
</table>
4.2 STUDY PROGRAM QUALITY ASSURANCE AND ENHANCEMENT

Standard 3.2—The study program is part of a regular quality assurance and enhancement process which takes into account the curriculum, the study conditions and the program institutions, and which involves all relevant groups as well as external experts.

4.2.1 CURRICULUM AND QUALITY ENHANCEMENT

Study programs curricula for all three cycles are adopted by the Senate on the proposal of the Faculty Council and with a positive opinion of the Curricula Committee. The proposal for introduction of a new study program goes through the review process. Before approval of the Faculty Council, the proposal is shared for review with other colleagues, professional associations relevant to the proposed program and other interested parties. To approve the proposal, there should be at least one positive review by an internationally recognized professor in the field concerning the program, and approvals by the Quality Assurance Office and the Curricula Committee. Once the proposal is accepted by the Faculty Council, the proposal is submitted for approval to the Senate.

According to the Book of Rules mentioned above, changes in an existing study program can be classified as minor changes, in which approval of the responsible Faculty Council suffices, and major changes where approval of the Faculty Council and the Senate is needed, assuming the positive opinion of the QA Office and the Curricula Committee.

The quality of the curriculum is assured through continuous monitoring and verification of program objectives, outcomes, teaching/learning methods, workload of students, students’ exam pass rates, and by gathering information from students and lecturers as well as other stakeholders.

Course analysis is performed once a year at the end of each academic year (No. IUS-SENAT 11-132/13). The analysis contains information about the number of registered students for a course, a number of students that have withdrawn from the course, average grade of the course and student’s evaluation of the course, which is measured every semester by the online student survey system.
External stakeholders are usually involved in the self-evaluation process and strategic planning or any kind of major changes whereby opinion of external partners is deemed to be of a significant importance. Academic staff members maintain good contacts with relevant industries on personal and also professional basis through repeating meetings, workshops and partnerships. IUS implements several projects with companies, institutions and government bodies as partners.

External stakeholders are mostly involved in manner of informal forums and personal connection. As a good example of cooperation with external stakeholders is the input on IUS Strategic Plan 2016-2020 where a thorough feedback was obtained from:

- Turkish Chamber of Commerce, and
- BH Agency of Higher Education and Quality Assurance (HEA)

4.2.2 THE USE OF INFORMATION

In this section we will provide an overview on what kind of information is being collected by IUS/Faculties/Study Program, how this information is communicated and how they impact decision making processes. It will also address what kind of information IUS displays publicly.

SIS (UNIPA) software, a centralized student information system, enables IUS and Study Programs to monitor their activities related to students and study programs implementation.

Apart from earlier described UNIPA features (i.e., documents issuance, transcripts, various certificates, diploma, diploma supplements, etc., grading and records maintenance, finance issues control, etc.), it also enables collection of different data related to students, such as:

- Student progression and success rates
- Profile of the student population (e.g. age, gender, nationality, education background)
- Number of students in each study program based on study year
- Number of students graduated each year
- Average grade in each study program
- Average duration of study in each study program
- Drop offs, student transfers, etc.
- Student status
- Percentage of graduates per each generation

All these data are further analyzed at different levels and the measures taken are followed up.

One of the tools is preparation of self-evaluation report, which is done on regular basis in accordance with IUS rules and regulations.

Apart from the information mentioned above, IUS/SP collects different types of information via various surveys, such as:

- Student satisfaction with the courses content and the curricula
- Students evaluation of teachers and teaching methods
- Students’ satisfaction with the resources available to them (Library, Student Affairs Office, etc)
- Alumni/employment satisfaction surveys
- Post-exchange student/teacher survey
- Survey on Strategic Plan.

All these data are further analyzed at different levels and the measures taken are followed up.

4.2.3 PUBLIC INFORMATION

IUS has an open and transparent public policy. On the University level an entire Strategic Plan is publically announced via IUS web page.

Information on the Study Program offered publically includes:

- Information on Qualification granted by the study program
- Intended Learning outcomes and educational objectives
- Curricula for the 1st, 2nd, and 3rd cycle
- Specific information for foreign students
- Information on teaching staff
- Information on the teaching and learning methods and assessment procedures
- Learning opportunities (scholarships, exchange and mobility opportunities)
- Available learning and campus resources (IUS library, laboratories, dorms, canteen, gym, etc)
- Exchange opportunities and mobility
- Project and Research Grant Opportunities

### 4.3 PARTICIPATION OF STUDENTS

**Standard 3.3–The participation of student in reflection on the study program, the study conditions and the program organization has been institutionalized.**

Student surveys are always conducted in the last weeks of the Semester, but before final exams. QA Office processes all the data collected during the survey and prepares usually three types of reports:

- University-wide Report to inform senior university leadership and university governance structures
- Faculty-level Report to inform Faculty/Department /Study Program level
- Individual Report for academic staff per courses they taught.

#### 4.3.1 FEEDBACK LOOP AND COMMUNICATION

The reports mentioned in the previous section are further discussed and analyzed, and serve as the basis for future activities at different levels, from the course, Study Program to at Faculty/Department and university levels. The student surveys are further used in the following manners:

- They are used by the Senior Leadership as an indicator of progress (ANNEX)
- They are taken into consideration in the annual process of assessment of academic staff;
- They are archived in order to inform future assessment of the Study Program;
- They are discussed in the Senate and Faculty Councils and formally adopted by these bodies;
- They are used as input data for self-evaluation processes

This way ensures that any identified deficiency can be properly tackled and resolved by the most competent agents.
Students are informed on the results of student surveys via its representatives in university governance bodies such as Senate, Faculty QA Team and Faculty Council.

**IUS Case Study: Students surveys used as a source of information for revising curricula**

A recent example where the student survey results were taken aboard by the University senior leadership is the revision of the Study Programme Curricula with regard to University courses taught in the first two years of the 1st study cycle.

In the previous curricula (AY 2013-2014) the University courses were awarded with 60 ECTS and they were offered in two categories, as follows: University required and University elective (9 required and 3 elective). In the Student Surveys conducted in the course of the same academic year, students expressed their dissatisfaction with the number of University courses, there “overcrowdness“ as well as with the specific courses they deemed as “least beneficial to their particular area of study.” These comments were analysed on the Faculty/Department and Senate level in the process of self-evaluation. This process resulted in the changes of the curricula for AY 2015-2016 in a manner that the category of “University elective” courses was no longer offered, while at the same time the number of University courses was reduced to the total of 8 required University courses or 36 ECTS award for this category of courses. The above described process consequently was followed by refining and redefining learning outcomes for the 1st study cycle.

The established QA structures, procedures and practices, enable collection of objective data that are used for analyses resulting in feasible measures for improvements. Conclusions from the previous SER are always discussed during next round of self-evaluation.
CHAPTER 5 : FUNDING AND INFRASTRUCTURE

5.1 FUNDING OF THE STUDY PROGRAM

IUS is one of the largest educational projects in the Balkan region. IUS created an open, tolerant and international environment for its students, where young people have the opportunity to acquire new and exchange the existing knowledge and experiences with their fellow students and professors. Therefore the volume of IUS investments is exponentially increasing every academic year, which reinforces the educational and research quality. In Table 5.1, the total volume of IUS investments since academic year 2012-2013 up to 2015-2016 is shown.

Table 5.1 Total Investments of IUS from 2012-2016

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>TOTAL:</td>
<td>979,468.00</td>
<td>1,756,191.00</td>
<td>1,467,751.00</td>
<td>1,485,784.00</td>
</tr>
<tr>
<td>Infrastructure (buildings, parking lots, entrance for disabled persons, labs, classrooms, gyms, libraries, cafeteria)</td>
<td>171,431.00</td>
<td>88,738.00</td>
<td>270,930.00</td>
<td>585,066.00</td>
</tr>
<tr>
<td>Equipment: IT (hardware and software, i.e. library software, electronic data bases, UNIPA, servers, PCs etc.), laboratory equipment, furniture)</td>
<td>326,249.00</td>
<td>533,281.00</td>
<td>454,139.00</td>
<td>169,802.00</td>
</tr>
<tr>
<td>Investment relevant to opening new faculties, study programs</td>
<td>-</td>
<td>10,000.00</td>
<td>20,000.00</td>
<td>35,000.00</td>
</tr>
<tr>
<td>Investment in employees (human resources)</td>
<td>481,788.00</td>
<td>1,124,172.00</td>
<td>722,682.00</td>
<td>695,916.00</td>
</tr>
</tbody>
</table>

IUS finances and income sources are defined by IUS Statute. Income is acquired from: the Founder; tuition fees; scientific research and artistic activities; providing
intellectual i.e. scientific, professional and artistic services; non-cyclical study programs; publishing; provision of the verification and equivalence of public documents; copyrights and patents; donations from legal entities and individuals; donations and bequests; payments collected from students in all study cycles for any academic, administrative or other services in compliance with law, the Statute and other acts of IUS; laboratory activities, centers, institutes, sub-organizational units and other organizational structures of IUS; diagnostic and other professional services; and from other sources in compliance with law and within the registered activities of IUS.

5.2 ROOMS AND FACILITIES

| Standard 4.2 – Adequate rooms and technical facilities required for the study program are available. |

CSE program is executed at the premises of the IUS campus. The students and staff enjoy the comfort of new and modern buildings, excellent infrastructure and state of the art hardware equipment and software. IUS continuously invest in improvement of its physical resources. Below are some of the most important aspects of technical facilities.

There is 20,508 m² of premises at IUS campus. IUS optimizes and utilizes all the general facilities and space for all the programs. The details of rooms and technical facilities are given below:

<table>
<thead>
<tr>
<th>Rooms and technical facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IT Network and Communication System</strong></td>
</tr>
</tbody>
</table>
Plotter, 2 A3/A4 Colour Printers, 5 Copy/Print machines and over 135 Cisco VoIP Phones.

<table>
<thead>
<tr>
<th>Network and communication applications and services</th>
</tr>
</thead>
<tbody>
<tr>
<td>“ius.edu.ba” domain, E-mail, FTP, Students Information System, Library Management System, Web Site, E-learning System and other applications are hosted within the IUS network system and equipment. IUS has permanent Internet connection available to all its computers and professional wireless system to support wireless Internet access within the campus area. Throughout semester all computer labs, which have permanent Internet connection, are continuously opened to our students in order to support their learning and researching activities. Improving the Internet bandwidth and wireless system are also very important activity continuously coordinated between management and IUS IT Centre.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Microsoft</th>
</tr>
</thead>
<tbody>
<tr>
<td>The University signed Campus Agreement with Microsoft Company which make us the fully licensed for using their products within our educational process (Microsoft Windows XP/Vista/7/8, MS Office 2003/7/10, Windows Server 2008, MS SQL Server and so on). IUS has joined Microsoft Live EDU program and all our students have their LiveID account with web based outlook e-mails system (students.ius.edu.ba) which offer our students 20GB of hard disk space for their documents and files.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four well–equipped and high performance computer labs with 75 desktop computers with installed software which is either fully licensed or open source. Windows LAB #1 (Building A):</td>
</tr>
<tr>
<td>Adobe Creative Suite 5.5 Design Premium:</td>
</tr>
<tr>
<td>- Adobe Photoshop CS 5.5</td>
</tr>
<tr>
<td>- Adobe Illustrator CS 5.5</td>
</tr>
<tr>
<td>- Adobe InDesign CS 5.5</td>
</tr>
<tr>
<td>- Adobe Dreamweaver CS 5.5</td>
</tr>
<tr>
<td>- Adobe Flash Professional CS 5.5</td>
</tr>
<tr>
<td>- Adobe Flash Catalyst CS 5.5</td>
</tr>
<tr>
<td>- Adobe Fireworks CS 5.5</td>
</tr>
<tr>
<td>- Adobe Acrobat X Pro</td>
</tr>
<tr>
<td>- Adobe Bridge CS 5.5</td>
</tr>
<tr>
<td>Android Studio</td>
</tr>
<tr>
<td>ArchiCAD 17</td>
</tr>
<tr>
<td>Autodesk 3DS Max Design 2014</td>
</tr>
<tr>
<td>Autodesk AutoCAD 2014</td>
</tr>
<tr>
<td>Autodesk Inventor Professional 2014</td>
</tr>
<tr>
<td>CD-Adapco STAR-CCM+</td>
</tr>
<tr>
<td>CodeBlocks C, C++ and Fortran IDE</td>
</tr>
<tr>
<td>Eclipse JAVA development</td>
</tr>
<tr>
<td>Eclipse PHP development</td>
</tr>
<tr>
<td>Eclipse C++ development</td>
</tr>
<tr>
<td>Eclipse EE development</td>
</tr>
<tr>
<td>GIIMP 2.8.16</td>
</tr>
<tr>
<td>Inkscape 0.91</td>
</tr>
<tr>
<td>LibreOffice 5</td>
</tr>
<tr>
<td>- Writer(word processor)</td>
</tr>
<tr>
<td>- Calc(spreadsheet app)</td>
</tr>
<tr>
<td>- Impress(presentation app)</td>
</tr>
<tr>
<td>- Draw(drawing/flowcharting)</td>
</tr>
<tr>
<td>- Base(database)</td>
</tr>
</tbody>
</table>
- Math(ed)iting mathematics
  MATLAB R2007a
  MS Office 2007 Professional:
  - MS Word 2007
  - MS Excel 2007
  - MS PowerPoint 2007
  - MS Access 2007
  - MS Outlook 2007
    MS Visual Studio 2010 Express
    MS Visual Studio Community 2015
    NetBeans IDE 8.1
    ProjectLibre
    Rhinoceros 4.0 SR8
    SketchUp 2016 MAKE
    Weka 3.6
    WampServer 2.5:
      - Apache 2.4.9
      - MySQL 5.6.17
      - PHP 5.5.12
      - PHPMyAdmin 4.1.14
      - SqlBuddy 1.3.3
      - XDebug 2.2.5

Windows LAB #2 (Building A):
  - Android Studio
  - ArchiCAD 17 INT
  - Autodesk 3ds Max Design 2014
  - Autodesk AutoCAD 2014
  - SolidWorks 2014
  - Autodesk Inventor Professional 2014
  - CD-AdaPoint STAR-CCM+
  - CodeBlocks C, C++ and Fortran IDE
  - Eclipse JAVA development
  - Eclipse PHP development
  - Eclipse C++ development
  - Eclipse EE development
  - GIMP 2.8.16
  - Inkscape 0.91
  - LibreOffice 5
  - Writer(word processor)
  - Calc/spreadsheet app
  - Impress(presentation app)
  - Draw(drawing/flowcharting)
  - Base(database)
  - Math(ed)iting mathematics
    MATLAB R2007a
    MS Office 2007 Professional:
    - MS Word 2007
    - MS Excel 2007
    - MS PowerPoint 2007
    - MS Access 2007
    - MS Outlook 2007
      MS Visual Studio 2010 Express
      MS Visual Studio Community 2015
      NetBeans IDE 8.1
      ProjectLibre
      SketchUp 2016 MAKE
      Weka 3.6
      My SQL Workbench 6.3
      WampServer 2.5 which include:
      - Apache 2.4.9
      - MySQL 5.6.17
      - PHP 5.5.12
      - PHPMyAdmin 4.1.14
<table>
<thead>
<tr>
<th>Windows LAB #3 (Building B - ECON LAB):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SqlBuddy 1.3.3</td>
<td>XDebug 2.2.5</td>
</tr>
<tr>
<td>Stata 14</td>
<td>IBM SPSS Statistica 21</td>
</tr>
<tr>
<td>MS Office 2007 Professional:</td>
<td>MS Word 2007</td>
</tr>
<tr>
<td>MS Excel 2007</td>
<td>MS PowerPoint 2007</td>
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<tr>
<td>MS Access 2007</td>
<td>MS Outlook 2007</td>
</tr>
<tr>
<td>MATLAB R2007a</td>
<td>CodeBlocks C, C++ and Fortran IDE</td>
</tr>
<tr>
<td>Microsoft Mathematics</td>
<td>Python 2.7</td>
</tr>
<tr>
<td>R Studio</td>
<td>QM for Windows</td>
</tr>
<tr>
<td>QM for Windows</td>
<td>Excel QM v4</td>
</tr>
<tr>
<td>LINUX LAB (Building A)</td>
<td></td>
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<tr>
<td>OpenSuSE</td>
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<td>LibreOffice</td>
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<tr>
<td>Writer(word processor)</td>
<td>Calc(spreadsheet app)</td>
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<tr>
<td>- Calc(spreadsheet app)</td>
<td>Impress(presentation app)</td>
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<tr>
<td>- Impress(presentation app)</td>
<td>Draw(drawing/flowcharting)</td>
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<tr>
<td>- Draw(drawing/flowcharting)</td>
<td>- Base(database)</td>
</tr>
<tr>
<td>- Base(database)</td>
<td>- Math(editing mathematics)</td>
</tr>
<tr>
<td>- Math(editing mathematics)</td>
<td>KDE GNOME Development Tools</td>
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<tr>
<td>- KDE GNOME Development Tools</td>
<td>GNOME Software Development</td>
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<tr>
<td>- GNOME Software Development</td>
<td>KDE Software Development</td>
</tr>
<tr>
<td>- KDE Software Development</td>
<td>X Software Development</td>
</tr>
<tr>
<td>- X Software Development</td>
<td>Legacy Software Development</td>
</tr>
<tr>
<td>- Legacy Software Development</td>
<td>Code::Block C++ development</td>
</tr>
<tr>
<td>- Code::Block C++ development</td>
<td>Eclipse C++ / Java development</td>
</tr>
</tbody>
</table>

**Technical laboratories**

**General purpose laboratory**
- 15 oscilloscopes,
- 15 function generators,
- 15 power supplies,
- 7 PLC units,
- 15 FPGA boards, and many more equipment that are used for practical classes.

**2nd generation GSM laboratory**
- for research and practical course work

**Complex systems lab**
- with a specific workstation and 6 desktop computers, and large number of data acquisition cards and kits for various purposes from National Instruments.

**Smart grid laboratory**
- with 10 protective relays: line and transformer protection

**Basic Physics laboratory**
Access to CNC machine, laser cutter and 3D printer
| **Classrooms** | There are more than 90 various size class rooms with projector and white board in every room. Special multimedia rooms with speakers and sound effects are available as well. Two design studios and one CNC laboratory are available, as well as one video hall. |
| **Amphitheaters** | Five amphitheaters are available for large classes and for public speeches and conferences. One amphitheater is equipped with cabins for simultaneous translation and other multimedia support. The main amphitheater in the building A is equipped with 280 seats, a lectern, a projector, a projection screen, a microphone system and a booth for simultaneous interpretation. This amphitheater is used primarily for conferences and guest lectures. Other two amphitheaters in the A building feature 160 seats each, as well as lecterns, projectors, projection screens and whiteboards, while one of them is also equipped with a surround sound audio system. Two amphitheaters in the B building of IUS campus feature 153 seats each, projectors, projection screens, lecterns and whiteboards. |
| **Library** | The International University of Sarajevo Library is located on the third floor of B building. The library is open from 8:30 till 17:00 to all students. It has a reading room so the students can borrow the books that they need for their classes. The study room has 20 places with classroom style furniture and wireless network. Also, 5 computers with internet connection are on disposal for students to use during the working hours of the library. Library fund is processed and catalogued in a program that was developed by IUS IT Department. Acquisition of the books is in harmonization with the Faculty programs. Each semester list of the textbooks needed by professors for their teaching is submitted to the Library Manager who has the obligation to order books. Library has access to the following databases: EBSCOHOST, JSTOR, World Bank – Global Development Finance, World Bank-World Development Indicators (WDI), ASOS-Academia Social Sciences Index, Dart Europe E-theses, National Databases of Turkey by ULAKBIM |
| **Sport facilities** | One multi-purpose outdoor play ground and one multi-purpose indoor sport hall are available for students use. |
| **Dormitories** | Two large dormitories with canteens are available; one is for male students and one for female students. Students can choose to stay in the dormitories if they wish for a very reasonable fee. |
| **Restaurants** | There is a large restaurant that satisfies all the students and staff needs at IUS. A couple of coffee stands are installed in order to serve the students and staff during the breaks. |
| **Print and copy center** | A copy center is available for students and they can benefit from its services for a reasonable fee, for printing their work and assignment and any other services provided. |
| **Offices** | There is plenty of space for academic staff of a study program and in general they are located in one floor. The policy is that program coordinators and other PhD holders have their own offices, while |
assistants and senior assistants share offices. In special cases PhD holders share offices too.
CHAPTER 6 : RESEARCH AND DEVELOPMENT AND APPRECIATION OF THE ARTS

6.1 OBJECTIVES AND PERSPECTIVES FOR RESEARCH AND DEVELOPMENT OF THE STUDY PROGRAM

**Standard 5.1—The objectives and perspectives for research and development defined for the study program are consistent with the strategic orientation of the institution.**

Objectives of the research and development of CSE program are in the line with main strategic stream of the institution (IUS Strategic Plan for Period 2016-2020). The main objectives for research and development of the program are:

- To attract students from Bosnia and Herzegovina and abroad by offering curriculum that includes basic theoretical aspects of computing combined with the practical problem solving and design skills applied in industry, modern computer laboratories and research possibilities.
- To strengthen and create long term cooperation with industry and work on joint research projects.
- To perform multidisciplinary research with other IUS engineering programs, and other universities and institutions in Bosnia and Herzegovina, and abroad.
- To increase the number of qualified academic staff to support teaching, research, and national/international cooperation.
- To increase the number of students who will add the value to the program in terms of their contribution in the research and development.

CSE academic staff is committed to providing high-quality teaching where most courses involve practical work, such as weekly sessions in computer laboratory where students acquire technical and research skills. The curriculum is regularly optimized in accordance with international standards such as adding multidisciplinary courses as part of the required and elective courses.

As Computer Science is a very fast developing field, it requires great agility from CSE staff. Staff advancement in educational process is organized through staff exchange and demonstrative lectures among staff. Other forms of advancements are left to individuals, and usually involve conference participation. One of the aims of
the CSE program is to increase the number of research and research projects and to recruit staff qualified to carry out such projects.

CSE academic staff was successful in securing funding to implement projects that improve education and community. Some examples are:

1. Partnership for Innovation, Funded by EDC/USAID in the amount of 196,800KM, 30 month project – 2014-2016
2. “Positioning Level V Qualification in BiH”, The total value of the project was 115,777EUR and the project was 80%, co-financed by the European Union Delegation to BiH, 2013-2015
3. GeekFest2013, funded by Ministry of Civil Affairs BiH (7,000 KM),
4. GeekFest2014, funded by USAID and local ICT companies (2000 EUR)
5. GeekFest2015, funded by USAID and local ICT companies (2000 EUR)
6. GeekFest2017, funded by USAID (9000 EUR)
7. BITCamp, (six month intensive education in programming), the pilot project implementation supported by Market Makers (Swiss foreign aid agency) and European Bank for Reconstruction and Development, 2015.

Program staff is especially aware that academia needs to partner with industry and governmental agencies to address human resources market mismatch and work on various joint projects. To this end CSE staff is committed and plans to strengthen cooperation with the industry and governmental agencies. This would at the same time open employment opportunities for students and it would also further develop research and innovation capacities through these partnerships. Some examples of planned collaboration with industry involve strengthening cooperation with BitAlliance (leading software industry association of BiH), Microsoft, Atlant BH, Authority Partners and various other leading IT companies in BiH.
6.2 SCIENTIFIC STAFF RESEARCH ACTIVITIES

**Standard 5.2**–Scientific staff is involved in the institution’s research activities and/or activities regarding the development and appreciation of arts. The interaction between research and teaching is ensured.

Dedicated, competent and experienced academic staff of the CSE program creates a positive research atmosphere. Scientific staff is involved in the research activities to keep up to date on new methodological approaches and on current developments in the engineering. CSE faculty has industrial experience at various domestic and international IT companies. The academic professor's main research areas reflect CSE program main courses subjects. This has a beneficial impact on teaching and learning since it stimulates students’ interests and motivation for particular topic.

The program is equipped with modern laboratories where practical knowledge is enforced. Our program is executed at the great premises of IUS campus. It is our pleasure to be located in a new and modern building, with great infrastructure and equipment. The University signed Campus Agreement with Microsoft Company which make us the fully licensed for using their products within our educational process. Within implemented IUS campus network infrastructure there are four well-equipped and high performance computer labs with 95 desktop computers with installed software which is either fully licensed or open source. These facilities give better environment for researches and incorporation with students. Laboratories or tutorials of each course offered create an interactive and direct communication between teaching staff and students. Such communication with students produces capable and prospective researchers.

The CSE staff is continuously in touch with industry professionals and this could be seen through the “Partnership for Innovation, BITCamp, “Positioning level V in BiH” geekFEST projects. The staff also has cooperation with BitAlliance which is the leading software industry association of BiH. Also, the Study Programs design is being constantly developed according to the similar study programs from the region, Europe and US. Research activities also contribute to updating the curriculum, positively affecting the most of specialized courses.
The table below outlines the short description of research interests and activities of the CSE program staff, whereas the detailed information and list of publications can be found on the University website. The list of the selected publications of the CSE program staff can be found in APPENDIX I – LIST OF SELECTED PUBLICATIONS.

**Assist. Prof. Dr. Kanita Karađuzović-Hadžiabdic**, received her PhD from International University of Sarajevo, BiH in 2016 in the field of High Dynamic Range Imaging. In 2001 she obtained her Master degree at Oxford University. From 2017 Dr. Kanita Karađuzović-Hadžiabdic is working as Assistant Professor and Program coordinator of Computer Sciences and Engineering study program at the International University of Sarajevo. She is the author of a number of indexed scientific articles. Her research interests include areas in computational photography (i.e. high dynamic range imaging) and machine learning. Dr. Kanita also worked as a software engineer in several software engineering companies abroad and in BiH. She speaks fluently English and Bosnian and has a basic knowledge in Dutch and Turkish language.

**Assist. Prof. Dr. Emin Tahirovic**, received his Ph.D. degree in Biostatistics at the University of Pennsylvania, Philadelphia in 2016. He is currently an Assistant Professor in the Department of Computer Science and Engineering and, Software Engineering Program Coordinator at the International University of Sarajevo, Bosnia. 

His research interests include longitudinal and clustered data, sensitivity analysis for non-ignorable missingness, causal inference, machine learning algorithms, financial and organizational incentives for health outcomes, cancer epidemiology, outcomes research. He is currently member of American Statistical Association and International Biometric Society (Eastern North American Region).

**Assist. Prof. Dr. Dzejla Medjedovic** completed her undergraduate degree in Computer Science at Sarajevo School of Science and Technology, Sarajevo in 2008. She received her Ph.D. degree in Computer Science at Stony Brook University, USA in 2014.

Her research interests include algorithms, big data, graph theory, and data structures.

**Assist. Prof. Dr. Serzod Rustamovic Turaev**, have PhD degree in Computer Science from University Rovira i Virgili, Tarragona, Spain (2010) and PhD degree in Mathematics from National University of Uzbekistan (2001). He has more than 15 years of experience working as a lecturer and a (master, doctoral, postdoctoral) researcher at National University of Uzbekistan and University Rovira i Virgili, Otto-Von-Guericke University Magdeburg, University Putra Malaysia, International Islamic University Malaysia. His research interests include algorithms, cryptography, bioinformatics, theory of computation, Discrete Mathematics and machine learning. He has more than 140 published papers in referred journals, book chapters and conference proceedings including Information Fusion, Journal of Control, Open Mathematics, Applied Mathematics and Information Systems, the Computer Journal, Theoretical Computer Science, Acta Cybernetica, Journal of Universal Computer

**Assist. Prof. Dr. Ali Abd Almisreb** completed his undergraduate degree in computer engineering program at the Ittihad Private University, Syria and MSc. degrees at the Universiti Teknologi MARA (UiTM), Malaysia. He received his PhD degree at the Universiti Teknologi MARA (UiTM), Malaysia in Electrical Engineering/Computer Engineering Dep. with-Faculty Excellent Research Award (Anugerah Penyelidik Cemerlang-APC)

His research interests include Iris Recognition/ Ear Recognition/ Lips Recognition/ Speech Recognition, Pattern Recognition, Acoustic Signal Processing, Machine Learning using Deep Neural Networks, Applications based thermal imaging, Robot NAO AI Programming, IBM Watson-Bluemix. Dr. Ali Abd Almisreb speaks Arabic, English, Bahasa Melayu, Mandarin (Basics).

**Visiting Assist. Prof. Dr. Edvin Skaljo** is head of department for Access network and terminal devices, BH Telecom Sarajevo, Directorate Sarajevo and Visiting Professor at International University of Sarajevo. He received PhD degree at the University of Tuzla, Faculty of Electrical Engineering in 2014. Currently he is Senior Member of SPIE, Senior Member of IEEE Photonics Society, and Regular member of OSA.

**Adjunct Instructor Dr. Sadi Matar** completed his undergraduate degree and MSc degree at University of Sarajevo, Sarajevo. He received his Ph.D. degree from Brunel University London, School of Engineering and Design. He is currently advisor to the minister of Bosnia and Herzegovina Ministry of Communications and Transport. He has several published papers in referred journals, book chapters and conference proceedings. He has several certifications from organizations as NATO, NCCIC, UNITAR, Microsoft Certified etc.

**Adjunct Instructor Amir Jamak**, born in Sarajevo 1978, obtained his BSc degree at Istanbul Technical University, Istanbul, Turkey and MSc degree at Tohoku University, Sendai, Japan. He is PhD candidate at International University of Sarajevo, Sarajevo. His research interest is theory of NP completeness, algorithm development, intelligent algorithms, data mining, data anonymization.

**Adjunct Instructor Enes Pivic** obtained his BSc and MSc degrees in Mechanical Engineering at University of Sarajevo, Bosnia and Herzegovina. He is IT Director since 2004 and Expert from Practice at International University of Sarajevo. He has several certificates as CCN4 (WAN Technologies), CCN3 (Switching Basics and Intermediate Routing), CCN2 (Routers and Routing Basics), CCN1 (Networking Basic) and CCNA (Cisco Certified Network Associate)

**Adjunct Instructor Suada Alić – Mešanović** completed her undergraduate degree at Faculty of Science and Mathematics, University of Sarajevo. Between 2003-2004 she worked in Actuarial school, Ministry of Finance in BIH. From 2011 she is a master student at School of Economics and Business, University of Sarajevo. Her research interests include Modern Customer Analysis, Product development process, Sensitivity Analysis.
Scholarship Assistant Rialda Spahic completed her undergraduate degree at Computer Science and Engineering program at International University of Sarajevo in 2017. She is engaged several projects. She is Coordinator of trainers and trainer at the organization of IT Girls (United Nations) since 2016. She also lectured for several organizations as Microsoft - Microsoft Skills Center, Association of Informatics and Embassy of USA - Girl’s SelfeSTEM Project, Level Up Village etc.

6.3 STUDENT INTEGRATION INTO RESEARCH AND STUDENT PROJECTS

**Standard 5.3—To the extent required by the type of study program, students will be integrated into research and student projects.**

CSE study program aims to equip its students with theoretical and practical knowledge in the field of software, hardware and aspects of computing devices, as well as the computer skills of application in engineering, business, science, and other fields. All students, including undergraduate students are also encouraged to participate in research and to publish their work at various conferences and journals.

As part of the undergraduate curriculum students need to submit a graduation project. During the graduation project course students are expected to use most of the skills, competences and information they learned during their study to come out with a research topic upon which they write a report that describes a certain problem and its solution. Students are encouraged to design new applications, and use their skills to develop new tools that will make a difference in their local environment. The graduation project course is a course valued 6 ECTS credits where 10 hours a week student workload is expected to be allocated for the project that include consultation, literature review, experiments in laboratory if needed and writing the final report. Classes that involve presentations of work, communication skills and reports writing are designed to prepare students for graduation project class. Every student is assigned a mentor, and they meet at least once a week where guidance by the mentor is provided and progress by the student is reported. Some of the examples of student projects include: Mobile sensors and their application in mobile devices, IUS Library application, Cinema Ticket Reservation Application, Online Employment Application, Information Management System, Development of an Operating System.
in C++, Application for the Historical Museum of BiH, etc. CSE students also participated in NGO funded projects such as ‘Save the Children’ as well as the projects that involved making an application for the Historical Museum of BiH.
CHAPTER 7 : NATIONAL AND INTERNATIONAL COOPERATION

7.1 NATIONAL AND/OR INTERNATIONAL COOPERATION

Standard 6.1—In line with the study program’s profile, national and/or international cooperation projects with higher education institutions or institutions outside higher education sector have been established.

The CSE program implements national and international cooperation through the University’s International Relation Office (IRO). This office is in charge of promoting the University via an international exchange of academic non-academic/administrative staff and researchers. As one of the institution’s strategic objectives, the strengthening cooperation in teaching and research at national and international level, the CSE program contributes to it by exchanging its staff with universities from almost every continent.

IUS signed more than 80 agreements on cooperation with HEIs in BH and abroad. These agreements assume mobility and there is institutional framework that allows student mobility and recognition of study period spent abroad. IUS also supports and encourages its academic staff to visit and spend time in other higher education or research institutions.

The IRO office is devotedly working on establishment of partnership with other foreign universities through the Erasmus+ program and Mevlana exchange program, for all academics, students and administrative staff.

IUS joined Mevlana Exchange Program in August 2013. The Mevlana program aims at the exchange of students and academic staff between the Turkish higher education institutions and higher education institutions of other countries. Among the previously mentioned number of signed cooperation agreements, more than 30 of them are signed within the Mevlana Exchange Program. A number of IUS students and professors have already used this program for their mobility and in case of
students, documents almost identical to the European ECTS mobility documents are used, obliging sending institution to recognize the specific courses once the student is returned. The courses are to be recognized only if successfully passed. Student mobility can last between one semester and one academic year. Teachers’ mobility is of shorter duration and assumes teaching duties, but also other networking activities.

**ERASMUS+**

International Relations Office (IRO) of the International University of Sarajevo (IUS) is actively involved in the Erasmus+ program from June 2014. IRO activities are mainly focused on: meetings, workshops, promotions (web page, FB page, bulletin, flayers, banners..), email exchanges (to offer the cooperation/Erasmus+ program, advising activities provided to potential exchange of students, academic and non-academic staff, researchers, and the inclusion in international educational projects, with the aim of continuous improvement to provide services to students and academic staff, as well as linking with international partners in the world.

Through its promotional materials and through the website and FB page, IRO regularly informs IUS students and staff, as well as business partners from the region and beyond, on all its activities, with the special focus on Erasmus+ program activities.

The following table (Table 6.1) shows signed agreements between CSE program and international universities as computer engineering field and information and Communication Technologies field.

<table>
<thead>
<tr>
<th>Signed agreements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
<td><strong>University</strong></td>
</tr>
<tr>
<td>Spain</td>
<td>University of Jaen</td>
</tr>
<tr>
<td>Poland</td>
<td>Uni. of Applied Science in Nysa</td>
</tr>
<tr>
<td>Macedonia</td>
<td>International Balkan University</td>
</tr>
<tr>
<td>Romania</td>
<td>Alexandru Ioan Cuza University</td>
</tr>
<tr>
<td></td>
<td>Dimitrie Contemir Christian University</td>
</tr>
<tr>
<td>Latvia</td>
<td>Riga Technical University</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>University of Economics Varna</td>
</tr>
<tr>
<td>Turkey</td>
<td>Yildirim Beyazit University</td>
</tr>
<tr>
<td></td>
<td>YalovaUniversity</td>
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<tr>
<td></td>
<td>Anadolu University</td>
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<tr>
<td></td>
<td>Istanbul Sehir University</td>
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<tr>
<td></td>
<td>CelalBayar University</td>
</tr>
<tr>
<td></td>
<td>TOBB University</td>
</tr>
</tbody>
</table>
At the academic year of 2017/18, 7 students from this programme visited other universities and 2 of the program’s staff visited other universities (Table 6.2). The current exchange program opportunities need to be used more and doing so will add value to the quality of the program.

Table 7.2 Erasmus+ and Mevlana staff and student exchanges for CSE program

<table>
<thead>
<tr>
<th>Erasmus+</th>
<th>Incoming Foreign students</th>
<th>Incoming Foreign staff</th>
<th>Outgoing IUS students</th>
<th>Outgoing IUS staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/2018</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

7.2 CO-OPERATION PROJECTS

**Standard 6.2**—The cooperation projects encourage and support the advancement of the study program and the mobility of students and staff.

Establishing partnerships with other universities, through the Erasmus+ and Mevlana exchange program, is of a great opportunity to CSE program. Besides the teaching opportunities in these partnerships, the CSE program sees this as a great milestone for the international cooperation in research activities as well as implementation of funded projects.

Co-operation projects at IUS are done through the Project Management Office (PMO), which is dedicated to applying consistent project management practices that will help IUS fulfill its mission and strategic goals.

**Mission Statement**

The Project Management Office’s mission is to implement and maintain project management standards and processes, increase the number of institutional projects, announce grant opportunities, and encourage faculty and staff to apply for research opportunities/projects. Moreover, the PMO is responsible for the centralized
management of IUS projects and archives. It is committed to providing an environment that fosters creativity, communication and inclusion of all departments and project partners throughout each implementation phase of the project life cycle.

Vision Statement

- Provide project management best practices, standards and methodology that will consistently deliver successful projects.
- Maintain project alignment to the strategic goals, mission and educational vision of International University of Sarajevo (IUS).
- Build project management maturity at the institutional level.
- Support faculty and staff applying for various grants by providing appropriate tools and information necessary for the facilitation of project management processes
- Organize and carry out trainings on project management.
- Ensure a wide range of projects varying in scope and size.

Projects

IUS projects have been supported by grants from: Turkish government, Ministries of Bosnia and Herzegovina, Türk İşbirliği ve Koordinasyon Ajansı Başkanlığı (TIKA), Swiss Agency for Development and Cooperation (SDC), Federal Department of Foreign Affairs, EU, EU Commission, Delegation of European Union, United Nations Development Programme (UNDP), United States of America International Development Agency (USAID), main international organizations for advanced research (e.g., ICGEB), major companies (e.g., Siemens). CSE program is very successful in securing outside funding to implement projects that improve education and community. Some of IUS previous and current projects related to the CSE program include (total list can be found on [https://pmo.ius.edu.ba/projects](https://pmo.ius.edu.ba/projects)):

- Partnership for Innovation, Funded by EDC/USAID in the amount of 196,800 KM, 30 month project - ends June 2016
- GeekFest2013, co-funded by Ministry of Civil Affairs BiH (8,000 KM), Project completed summer 2013
- GeekFest2014, con-funded by USAID and local ICT companies (2,000 EUR), Project completed summer 2014
-GeekFest2015, con-funded by USAID and local ICT companies (2,000 EUR), Project completed summer 2015

-GeekFest2017, con-funded by USA Embassy, Sarajevo (9,000 EUR), Project completed summer 2017

-Software for “Save the Children” NGO (2,000 EUR)

-“Positioning Level V Qualification in BiH”, The total value of the project is 115,777EUR and the project is 80%, co-financed by the European Union Delegation to BiH

-BITCamp, the pilot project is in implementation stage in IUS premises and the implementation is support by Market Makers (Swiss foreign aid agency) and European Bank for Reconstruction and Development.
## APPENDIX A – LIST OF FACULTIES AND PROGRAMS OFFERED

<table>
<thead>
<tr>
<th>Ordinal number</th>
<th>FACULTY / DEPARTMENT / STUDY PROGRAM</th>
<th>Duration of study in accordance with Bologna system of study</th>
<th>PROFESSIONAL / SCIENTIFIC TITLE AQUIRED</th>
<th>Study duration</th>
<th>Study duration</th>
<th>Study duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>INTERNATIONAL UNIVERSITY OF SARAJEVO</td>
<td>4+1+3 240 ECTS + 60 ECTS + 180 ECTS</td>
<td>Bachelor of Arts (B.A.) in Visual Arts and Visual Communications Design</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

### FACULTY OF ARTS AND SOCIAL SCIENCES

#### Department of Arts

**Visual Arts and Visual Communications Design**
- Bachelor of Arts (B.A.) in Visual Arts and Visual Communications Design
- Master of Arts (M.A.) in Visual Arts and Visual Communications Design
- Doctor of Philosophy (Ph.D.) in Visual Arts and Visual Communications Design

#### Department of Social Sciences

**Psychology**
- Bachelor of Arts (B.A.) in Psychology
- Master of Arts (M.A.) in Clinical Psychology
- Doctor of Philosophy (Ph.D.) in Psychology

**Social and Political Sciences**
- Bachelor of Arts (B.A.) in Political Sciences and Sociology
- Master of Arts (M.A.) in Political Sciences and Sociology
- Doctor of Philosophy (Ph.D.) in Political Sciences and Sociology

#### Department of Cultural Studies

**English Language and Literature**
- Bachelor of Arts (B.A.) in English Language and Literature
- Master of Arts (M.A.) in English Language and Literature
- Doctor of Philosophy (Ph.D.) in English Language and Literature

**Cultural Studies**
- Bachelor of Arts (B.A.) in Cultural Studies
- Master of Arts (M.A.) in Cultural Studies
- Doctor of Philosophy (Ph.D.) in Cultural Studies
<table>
<thead>
<tr>
<th>FACULTY OF BUSINESS AND ADMINISTRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department of Economics and Management</strong></td>
</tr>
<tr>
<td><strong>Economics</strong></td>
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<tr>
<td><strong>Management</strong></td>
</tr>
<tr>
<td><strong>International Business and Finance</strong></td>
</tr>
</tbody>
</table>

| **Department of International Relations and Public Administration** |
| **International Relations** | Bachelor of Arts (B.A.) in International Relations | Master of Arts (M.A.) in International Relations | Doctor of Philosophy (Ph.D.) in International Relations |

<table>
<thead>
<tr>
<th>FACULTY OF ENGINEERING AND NATURAL SCIENCES</th>
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</thead>
<tbody>
<tr>
<td><strong>Department of Natural Sciences</strong></td>
</tr>
<tr>
<td><strong>Genetics and Bioengineering</strong></td>
</tr>
</tbody>
</table>

<p>| <strong>Department of Engineering</strong> |
| <strong>Industrial Engineering</strong> | Bachelor of Science (B.Sc.) in Industrial Engineering | Master of Science (M.Sc.) in Industrial Engineering | Doctor of Philosophy (Ph.D.) in Industrial Engineering |
| <strong>Electrical and Electronics Engineering</strong> | Bachelor of Science (B.Sc.) in Electrical and Electronics Engineering | Master of Science (M.Sc.) in Electrical and Electronics Engineering | Doctor of Philosophy (Ph.D.) in Electrical and Electronics Engineering |</p>
<table>
<thead>
<tr>
<th>Mechanical Engineering</th>
<th>Bachelor of Science (B.Sc.) in Mechanical Engineering</th>
<th>Master of Science (M.Sc.) in Mechanical Engineering</th>
<th>Doctor of Philosophy (Ph.D.) in Mechanical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Bachelor of Science (B.Sc.) in Architecture</td>
<td>Master of Science (M.Sc.) in Architecture</td>
<td>Doctor of Philosophy (Ph.D.) in Architecture</td>
</tr>
<tr>
<td>Computer Sciences and Engineering</td>
<td>Bachelor of Science (B.Sc.) in Computer Sciences and Engineering</td>
<td>Master of Science (M.Sc.) in Computer Sciences and Engineering</td>
<td>Doctor of Philosophy (Ph.D.) in Computer Sciences and Engineering</td>
</tr>
<tr>
<td>Software Engineering</td>
<td>Bachelor of Science (B.Sc.) in Software Engineering</td>
<td>Master of Science (M.Sc.) in Software Engineering</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Bachelor (B.Eng.) in Civil Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FACULTY OF LAW</strong></td>
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<tr>
<td>Law study</td>
<td>Bachelor of Law</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FACULTY OF EDUCATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of languages and literature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish language and literature teaching (TLT)</td>
<td>Bachelor of Education (B.Ed.) in Turkish Language and Literature Teaching</td>
<td>Master of Education (M.Ed.) in Turkish Language and Literature Teaching</td>
<td>Doctor of Philosophy (Ph.D.) in English Language and Applied Linguistics</td>
</tr>
<tr>
<td>English language and literature teaching (ELT)</td>
<td>Bachelor of Education (B.Ed.) in English Language and Literature Teaching</td>
<td>Master of Education (M.Ed.) in English Language and Literature Teaching</td>
<td>Doctor of Philosophy (Ph.D.) in Turkish Language and Literature Teaching</td>
</tr>
<tr>
<td><strong>Department of Education and Information Technologies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Education and instructional technologies (CEIT)</td>
<td>Bachelor of Education (B.Ed.) in Computer Education and Information Technology</td>
<td>Master of Education (M.Ed.) in Computer Education and Information Technology</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B - DIPLOMA
APPENDIX D - CURRICULA FORMS

Changes in the existing Study Program SP-01

Study program: (insert full title in English)
Estimated % of change: (insert your own understanding/estimation of the level of change)
Motivation for change: (explain aims and motivation for change – why do you want change)

Existing practice: (in BiH, EU, other) (insert examples of positive practice contributing to the change and your motivation)

Changed elements: (copy/paste from the existing study program)
Changed elements: (insert new text – your proposal)
Changed elements: (copy/paste from the existing study program)
Changed elements: (insert new text – your proposal)

Effect(s) of change on:
- Study program learning outcomes: (provide information on anticipated or known effects)
- Courses: (provide information on anticipated or known effects)
- Students: (provide information on anticipated or known effects)
- IUS resources: (provide information on anticipated or known effects)

Alignment with:
- EU-level policies and regulations: (insert one of the following: maintained, increased, reduced)
- National regulations: (insert one of the following: maintained, increased, reduced)
- IUS regulations: (insert one of the following: maintained, increased, reduced)
Feasibility:

(Provide information in terms of implementation steps, additional resources, involvement of other departments, etc.)

Submitted by and date:  (Name, date and signature)

Verified by QA Office Manager:  __________________________
Changes in the existing course syllabus – SP-02

<table>
<thead>
<tr>
<th>Course Code and Title:</th>
<th>(insert course code and full course title in English)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated % of change:</td>
<td>(insert your own understanding/estimation of the level of change)</td>
</tr>
<tr>
<td>Motivation for change:</td>
<td>(explain aims and motivation for change – why do you want change)</td>
</tr>
<tr>
<td>Existing practice:</td>
<td>(insert examples of positive practice contributing to the change and your motivation)</td>
</tr>
<tr>
<td>(in BiH, EU, other)</td>
<td></td>
</tr>
<tr>
<td>Changed elements:</td>
<td>(copy/paste from the existing course syllabus)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Changed elements:</th>
<th>(copy/paste from the existing course syllabus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(insert course syllabus section)</td>
<td>(insert new text)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Changed elements:</th>
<th>(copy/paste from the existing course syllabus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(insert course syllabus section)</td>
<td>(insert new text)</td>
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<table>
<thead>
<tr>
<th>Changed elements:</th>
<th>(copy/paste from the existing course syllabus)</th>
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</thead>
<tbody>
<tr>
<td>(insert course syllabus section)</td>
<td>(insert new text)</td>
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</table>

<table>
<thead>
<tr>
<th>Effect(s) of change on:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course and staff:</td>
<td>(provide information on anticipated or known effects)</td>
</tr>
<tr>
<td>Host study program:</td>
<td>(provide information on anticipated or known effects)</td>
</tr>
<tr>
<td>Students:</td>
<td>(provide information on anticipated or known effects)</td>
</tr>
<tr>
<td>IUS resources:</td>
<td>(provide information on anticipated or known effects)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correlation with:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other courses</td>
<td>(insert one of the following: maintained, increased, reduced)</td>
</tr>
<tr>
<td>Host study program</td>
<td>(insert one of the following: maintained, increased, reduced)</td>
</tr>
<tr>
<td>Feasibility:</td>
<td>(Provide information on in terms of additional resources, involvement of other departments, etc.)</td>
</tr>
</tbody>
</table>

| Submitted by and date: | (Name, date and signature) |
Termination of the existing Course from the Curriculum and Syllabus SP-03

Course Code and Title: (insert course code and full course title in English)
Course status: (Insert course status as UC, FC, required, or elective
(Insert exact statistics)
Short analysis: (for past 4 semesters)
Registered students:
Withdrawals:
Pass rates:
Revision history: (insert date when it was first approved and dates of all subsequent changes)
Motivation: (explain motivation for termination – why)

Is there a replacement proposal: YES □ NO □
Brief description of replacement course: (if YES, insert up to 5 lines of text about the replacing course)

Effect(s) of termination on:
Host study program: (provide information on anticipated or known effects)
Other study programs: (provide information on anticipated or known effects)
Current students: (provide information on anticipated or known effects)
IUS resources: (provide information on anticipated or known effects)

Submitted by and date: (Name, date and signature)

Verified by QA Office Manager: ___________________
New Course proposal SP-04

Course Code and Title:  
Motivation for proposal: 
(explain aims and motivation for new course – why)

Existing practice:  
(in BiH, EU, other) 
Host study program: 
(insert name of the host study program)

Study cycle: 
(insert study cycle – I, II, III)

ECTS points: 
(insert number)

Expected results on: 
Other courses: 
(provide information on anticipated or known effects)

Host study program: 
(provide information on anticipated or known effects)

Students: 
(provide information on anticipated or known effects)

IUS resources: 
(provide information on anticipated or known effects)

Staff: 
(provide information on anticipated or known effects)

Course syllabus is attached: 
(If not, this proposal is incomplete and will not be considered at all)

YES ☒ NO ☐

Feasibility: 
(Provide information on in terms of additional resources, involvement of other departments, etc.)

Submitted by and date: 
(Name, date and signature)

Verified by QA Office Manager: 
___________________
Termination of the Study Program SP-05

Study program: (insert full title in English)
Short analysis: (insert exact statistics)

<table>
<thead>
<tr>
<th>Year</th>
<th>Registered students</th>
<th>Graduated students</th>
<th>(Estimated or exact) Cost analysis</th>
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<tbody>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
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<td>2011</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2012</td>
<td></td>
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</table>

Motivation: (explain motivation for termination – why)

Effect(s) of termination on:
Current students: (provide information on anticipated or known effects)
Other study programs: (provide information on anticipated or known effects)
IUS strategy: (provide information on anticipated or known effects)
IUS resources: (provide information on anticipated or known effects)

Termination steps towards:
Students: (how to deal with enrolled students)
IUS: (how to deal with the existing staff and other resources)
Authorities: (are all legal requirements fulfilled and how)

Notes: (Provide information in terms of resources needed, involvement of other departments, attached documents, etc.)

Submitted by and date: (Name, date and signature)

Verified by QA Office Manager: _________________________
APPENDIX E – ACADEMIC STAFF EVALUATION FORM

ACADEMIC STAFF (SELF) EVALUATION FORM

Overall Weight Distribution:

Research and Scientific Work (30%) A+B+C+D+E
Teaching (20%) F
Service (20%) G
Student Satisfaction Survey (10%)* H
Administrator Evaluation (20%) I

- Only the work of the current year will be calculated
- Co-author coefficients: 0.9 for two author, 0.7 for three authors, 0.6 for four authors, 0.4 for five authors and 0.3 for six or more authors
- Degree of Recognition of an institution or journal will be proposed by relevant faculty council and approved by the Senate
- *Weighted Student Satisfaction Survey: Each student's response multiplied by student's CGPA, normalized and then final score is calculated by the cubic function
- Each different duty collects separate points
- Minimum threshold score should be determined for each subgroup
- Projects must be "externally funded, require a teamwork and bring financial contribution to the IUS"

<table>
<thead>
<tr>
<th>A)</th>
<th>JOURNALS</th>
<th>Points</th>
<th>Limit</th>
<th>Publication date</th>
<th>Link to IUS database</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Full article in journals cited in AHCI, SSCI, SCI-EXP / Equally recognised Art &amp; Architecture Journals</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2)</td>
<td>Short article, analysis, book review, letter to editor, case report etc. in Journals cited in AHCI, SSCI, SCI-EXP / Equally recognised Art &amp; Architecture Journals</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td>Each citation by other authors in journals cited in AHCI, SSCI, SCI-EXP / Highly recognised Art &amp; Architecture Journals</td>
<td>3</td>
<td>Max:5</td>
<td></td>
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<tr>
<td>4)</td>
<td>Full article in journals cited in Registry of Publication</td>
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<td></td>
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<tr>
<td>5)</td>
<td>Short article, analysis, book review, letter to editor, case report etc. in journals cited in Registry of Publication</td>
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<tr>
<td>6)</td>
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<td>2</td>
<td>Max:5</td>
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<tr>
<td>7)</td>
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<td>8</td>
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<tr>
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<td>9)</td>
<td>Articles published in in-house journals</td>
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<td>Max:3</td>
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<td>9)</td>
<td>Articles published in all other journals including national journals</td>
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<td>Each citation by other authors in all other journals including national journals</td>
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<td>Max:5</td>
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<tr>
<td>11)</td>
<td>Conference proceedings in highly respected and recognised international conferences</td>
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<td>Max:2</td>
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<td>12)</td>
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<td>In-house Conference Proceedings</td>
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<tr>
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<td>National Conference Proceedings</td>
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<tr>
<td>15)</td>
<td>Journal Chief Editor/Co-editor/Editorial Board Membership in journals cited AHCI, SSCI, SCI-EXP</td>
<td>30/20/10</td>
<td>Max:1</td>
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<tr>
<td>16)</td>
<td>Journal Chief Editor/Co-editor/Editorial Board Membership in journals cited in Registry of Publication</td>
<td>20/10/5</td>
<td>Max:1</td>
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<tr>
<td>17)</td>
<td>Journal Chief Editor/Co-editor/Editorial Board Membership in other international journals</td>
<td>10/5/2</td>
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<tr>
<td>18)</td>
<td>Journal Chief Editor/Co-editor/Editorial Board Membership in in-house journals</td>
<td>10/5/2</td>
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<tr>
<td>19)</td>
<td>Journal Chief Editor/Co-editor/Editorial Board Membership in national journals</td>
<td>5/2/1</td>
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<td>20)</td>
<td>Refereeing in journals cited AHCI, SSCI, SCI-EXP</td>
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<td>21)</td>
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<td></td>
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<td>22)</td>
<td>Refereeing in other international journals</td>
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<td>Refereeing in in-house journals</td>
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<td>Max:5</td>
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<td>24)</td>
<td>Refereeing in national journals</td>
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<td>Max:5</td>
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</table>

**B) BOOKS**

<table>
<thead>
<tr>
<th></th>
<th>Books published in the person's scientific area by well known and highly respected international publishers or universities</th>
<th>Publication date</th>
<th>Link to IUS database</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Books published in the person's scientific area by well known and highly respected international publishers or universities</td>
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<tr>
<td>2)</td>
<td>Books published in the person's scientific area by other international publishers or universities</td>
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</tr>
<tr>
<td>3)</td>
<td>Books published in the person's scientific area by national publishers or universities</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Chapter in a book published in the person's scientific area by well known and highly respected international publishers or universities</td>
<td>40</td>
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</tr>
<tr>
<td>5)</td>
<td>Chapter in a book published in the person's scientific area by other international publishers or universities</td>
<td>20</td>
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<tr>
<td>6)</td>
<td>Chapter in a book published in the person's scientific area by national publishers or universities</td>
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<tr>
<td>7)</td>
<td>Translated academic books published</td>
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<tr>
<td>8)</td>
<td>Book Editorship in a book published in the person's scientific area by well known and highly respected international publishers or universities</td>
<td>30</td>
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<tr>
<td>9)</td>
<td>Book Editorship in a book published in the person's scientific area by other international publishers or universities</td>
<td>15</td>
<td></td>
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<tr>
<td>10)</td>
<td>Book Editorship in a book published in the person's scientific area by national publishers or universities</td>
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</table>

**C) ARTISTIC AND CREATIVE WORKS, MEDIA COVERAGE**

<table>
<thead>
<tr>
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<th>Works added to the permanent collections of recognised international institutions of art</th>
<th>Date:</th>
<th>Link</th>
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<tbody>
<tr>
<td>1)</td>
<td>Works added to the permanent collections of recognised international institutions of art</td>
<td>150</td>
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<tr>
<td>2)</td>
<td>Works added to the permanent collections of recognised national institutions of art</td>
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<td></td>
</tr>
<tr>
<td>3)</td>
<td>Works added to the permanent collections of other international institutions of art</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>4)</td>
<td>Works added to the permanent collections of other national institutions of art</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>5)</td>
<td>Individual participation in exhibitions/festivals in recognised international venues of art with original work</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>Individual participation in exhibitions/festivals in recognised national venues of art with original work</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>7)</td>
<td>Individual participation in exhibitions/festivals in other international venues of art with original work</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>8)</td>
<td>Individual participation in exhibitions/festivals in other national venues of art with original work</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>9)</td>
<td>Built art/urban planning/architecture design approved for permanent public display</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>10)</td>
<td>Original art work, animation, program, film etc. with IUS affiliation (for artistic or commercial purposes)</td>
<td>20</td>
<td>Max:5</td>
</tr>
<tr>
<td>11)</td>
<td>Architectural Design Studio supervised by a professor and published or exhibited by a publisher or university</td>
<td>15</td>
<td>Max:5</td>
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<tr>
<td>12)</td>
<td>Serving as a judge, jury memebr or curator in international activities</td>
<td>10</td>
<td>Max:5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>13)</td>
<td>Serving as a judge, jury member or curator in national activities</td>
<td>5</td>
<td>Max:5</td>
</tr>
<tr>
<td>14)</td>
<td>Individual international shows/exhibitions for public presentation</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>15)</td>
<td>Individual national shows/exhibitions for public presentation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>16)</td>
<td>Serving in an international committee for art and culture</td>
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<td>Max:5</td>
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<tr>
<td>17)</td>
<td>Serving in a national committee for art and culture</td>
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<td>Max:5</td>
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<tr>
<td>18)</td>
<td>Organizing an international event/exhibition/conference which takes place outside of the country: Main Organizer/Member</td>
<td>30/15</td>
<td>Max:2</td>
</tr>
<tr>
<td>19)</td>
<td>Organizing a national, event/exhibition/conference: Main Organizer/Member</td>
<td>14/7</td>
<td>Max:2</td>
</tr>
<tr>
<td>20)</td>
<td>Organizing a national/international in-house event/exhibition/conference: Main Organizer/Member</td>
<td>20/10</td>
<td>Max:2</td>
</tr>
<tr>
<td>21)</td>
<td>TV/Radio program production with IUS affiliation</td>
<td>20/10</td>
<td>Max:3</td>
</tr>
<tr>
<td>22)</td>
<td>Column writing in recognised press with IUS affiliation (periodically)</td>
<td>25</td>
<td>Max:1</td>
</tr>
<tr>
<td>23)</td>
<td>Reviews, Reports, Analyses etc. published in contemporary magazines and newspapers with IUS affiliation</td>
<td>10</td>
<td>Max:5</td>
</tr>
<tr>
<td>24)</td>
<td>Each TV coverage with IUS affiliation</td>
<td>10</td>
<td>Max:10</td>
</tr>
<tr>
<td>25)</td>
<td>Each press coverage with IUS affiliation</td>
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<td>Max:10</td>
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**D) PROJECTS AND PATENTS**

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<th></th>
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<th>Link to IUS database</th>
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<tr>
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<tr>
<td>2)</td>
<td>National Patent</td>
<td>100</td>
</tr>
<tr>
<td>3)</td>
<td>Team Leader/Member in EU projects</td>
<td>100/50</td>
</tr>
<tr>
<td>4)</td>
<td>Team Leader/Member in other international projects</td>
<td>70/35</td>
</tr>
<tr>
<td>5)</td>
<td>Team Leader/Member in national projects</td>
<td>40/20</td>
</tr>
<tr>
<td>6)</td>
<td>Team Leader/Member in international artistic projects</td>
<td>60/30</td>
</tr>
<tr>
<td>7)</td>
<td>Team Leader/Member in national artistic projects</td>
<td>30/15</td>
</tr>
</tbody>
</table>

**E) AWARDS AND BURSARIES**

<table>
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<th></th>
<th>Date:</th>
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<tbody>
<tr>
<td>1)</td>
<td>Academic/Artistic Award by a widely recognised international institution for service, academic achievement or work</td>
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<tr>
<td>2)</td>
<td>Academic/Artistic Award by other international institutions for service, academic achievement or work</td>
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</tr>
<tr>
<td>3)</td>
<td>Academic/Artistic Award by a widely recognised national institution for service, academic achievement or work</td>
<td>30</td>
</tr>
<tr>
<td>4)</td>
<td>Academic/Artistic Award by other national institutions for service, academic achievement or work</td>
<td>15</td>
</tr>
<tr>
<td>5)</td>
<td>In house award for valuable service or academic contribution</td>
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**F) EDUCATIONAL ACTIVITIES**

<table>
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<tr>
<th></th>
<th>Number of:</th>
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<tbody>
<tr>
<td>1)</td>
<td>Teaching a graduate course, for each semester course</td>
</tr>
<tr>
<td>2)</td>
<td>Teaching an undergraduate course with more than 99 students, for each different semester course</td>
</tr>
<tr>
<td>3)</td>
<td>Teaching an undergraduate course with 50-99 students, for each different semester course</td>
</tr>
<tr>
<td>4)</td>
<td>Teaching an undergraduate course with less than 50 students, for each different semester course</td>
</tr>
<tr>
<td>5)</td>
<td>Teaching an extra section of same undergraduate course with more than 99 students, for each semester course</td>
</tr>
<tr>
<td>6)</td>
<td>Teaching an extra section of same undergraduate course with 50-99 students, for each semester course</td>
</tr>
<tr>
<td>7)</td>
<td>Teaching an extra section of same undergraduate course with less than 50 students, for each semester course</td>
</tr>
</tbody>
</table>
8) Each completed doctoral thesis advised (within current year) as Mentor/Committee Member 50/4

9) Each completed master’s thesis advised (within current year) as Mentor/Committee Member 20/2

10) Each ongoing doctoral thesis advised as Mentor 10

11) Each ongoing master’s thesis advised as Mentor 5

12) Each completed undergraduate thesis advised 3

13) Teaching without the support of an assistant, for each course (for Ph.D. Holders) 2

14) Assisting a professor in Labs/Tutoring hours, for each semester course 7

15) Assisting a professor in grading and course material preparation, for each semester course 3

16) Preparing a syllabus, class notes and other materials for a completely new course in the program 3

G) SERVICE AND ADMINISTRATIVE DUTIES

<table>
<thead>
<tr>
<th>Number of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vice-Rector</td>
</tr>
<tr>
<td>Dean</td>
</tr>
<tr>
<td>Vice Dean</td>
</tr>
<tr>
<td>Program Coordinator</td>
</tr>
<tr>
<td>Coordinator/Director/Manager</td>
</tr>
<tr>
<td>Advisor to the Rector/Deputy Director</td>
</tr>
<tr>
<td>Senate Membership</td>
</tr>
<tr>
<td>Faculty Council Membership</td>
</tr>
<tr>
<td>Chair/Member for permanent committees</td>
</tr>
<tr>
<td>Chair/Member for ad hoc committees</td>
</tr>
<tr>
<td>Serving in promotional activities, each activity</td>
</tr>
<tr>
<td>Each activity completed based on the request by the administration (should have written proof of acknowledgement)</td>
</tr>
<tr>
<td>International Panel/Conference Session Chairmanship</td>
</tr>
<tr>
<td>National Panel/Conference Session Chairmanship</td>
</tr>
<tr>
<td>Student Advisor (Half points for only one semester)</td>
</tr>
<tr>
<td>Manager or Head of a professional association/union with IUS affiliation</td>
</tr>
</tbody>
</table>

H) WEIGHTED STUDENT SATISFACTION SURVEY SCORE

Will be provided by QA Office.

I) DEAN'S SCORE for faculty / RECTOR’S SCORE for Vice-Rectors and Deans

Will be provided by Dean.

Academic honesty statement:

My signature below constitutes my pledge that all of the information is satisfying all the requirements defined in the Book of Rules on Evaluation of the Academic Staff Procedures at IUS (Number: IUS SENAT-11-3152/13, dated December 6, 2013), in this file, and are fully accurate and truthful.

Signature and date: ________________________________
APPENDIX F – STUDENT SURVEY FORM

Student Survey Form

(Student evaluation at the end of a semester)

Evaluation

5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; 1 = Strongly disagree.

<table>
<thead>
<tr>
<th>General:</th>
<th>EVALUATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I find the study program attractive and fulfilling.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. I am absolutely satisfied with IUS Library.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Student Affairs Office staff members were always helpful.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Non-Academic staff members always provided required assistance.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Physical/working conditions and resources available were excellent.</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course-related:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Lectures and class discussions were related to assigned course materials.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. The criteria used in marking had been made clear in advance.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Exam questions were related to study materials, lectures and class discussions.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. Assessment procedures and examinations are fair and transparent.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>10. Teaching material indicated in the course outline was available.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>11. Overall, I am satisfied with the quality of the course.</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teacher/Assistant-related:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12. The lecturer enriches assigned material with useful comments, explanations and examples.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>13. The lecturer encouraged us to actively participate in the learning process.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>14. The lecturer followed course syllabus as given in the course outline.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>15. I have been able to contact the lecturer during specified consultation hours.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>16. The lecturer uses appropriate vocabulary.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>17. The lecturer creates a good study atmosphere in the class.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>18. The lecturer treated me and my opinions with respect.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>19. The lecturer did not discriminate students on gender, ethnic, racial, religious or any other ground.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>20. The lecturer came to lectures regularly and on time.</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking back on the experience, please comment on this course only using the boxes below.</td>
<td></td>
</tr>
<tr>
<td>Please ensure that your comments do not identify you individually.</td>
<td></td>
</tr>
<tr>
<td>21. Comments:</td>
<td></td>
</tr>
<tr>
<td>22. Points for improvement:</td>
<td></td>
</tr>
<tr>
<td>IUS ALUMNI SURVEY</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Nationality (circle)</strong></td>
<td>Turkish</td>
</tr>
<tr>
<td>Gender (shade)</td>
<td>o M</td>
</tr>
<tr>
<td>Year of Graduation (shade)</td>
<td>o 2015</td>
</tr>
<tr>
<td>Graduated from Study Program:</td>
<td></td>
</tr>
<tr>
<td>Degree (circle)</td>
<td>Bachelor</td>
</tr>
<tr>
<td>Did you continue with your further studies? (shade)</td>
<td>o Yes</td>
</tr>
<tr>
<td>Have you been employed since graduation? (shade)</td>
<td>o Yes</td>
</tr>
<tr>
<td>Were you able to find the job related to your studies? (shade)</td>
<td>o Yes</td>
</tr>
<tr>
<td>Please provide the following info:</td>
<td>o Current Job Title: _______________________.</td>
</tr>
<tr>
<td></td>
<td>o Company Type/Sector (e.g. public, private, governmental, non-governmental, education, transport, industry) etc)________________________</td>
</tr>
<tr>
<td>Are you happy you chose this study programme at IUS?</td>
<td>o Yes</td>
</tr>
<tr>
<td>Did your coursework prepare you for this job/further education?</td>
<td>o Yes</td>
</tr>
</tbody>
</table>
# APPENDIX H – LABORATORY EQUIPMENT

## Computer Labs

<table>
<thead>
<tr>
<th>Windows LAB #1 (Building A):</th>
<th>Adobe Creative Suite 5.5 Design Premium:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Adobe Photoshop CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe Illustrator CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe InDesign CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe Dreamweaver CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe Flash Professional CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe Flash Catalyst CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe Fireworks CS 5.5</td>
</tr>
<tr>
<td></td>
<td>- Adobe Acrobat X Pro</td>
</tr>
<tr>
<td></td>
<td>- Adobe Bridge CS 5.5</td>
</tr>
<tr>
<td></td>
<td>Android Studio</td>
</tr>
<tr>
<td></td>
<td>ArchiCAD 17</td>
</tr>
<tr>
<td></td>
<td>Autodesk 3DS Max Design 2014</td>
</tr>
<tr>
<td></td>
<td>Autodesk AutoCAD 2014</td>
</tr>
<tr>
<td></td>
<td>Autodesk Inventor Professional 2014</td>
</tr>
<tr>
<td></td>
<td>CD-Adapco STAR-CCM+</td>
</tr>
<tr>
<td></td>
<td>CodeBlocks C, C++ and Fortran IDE</td>
</tr>
<tr>
<td></td>
<td>Eclipse JAVA development</td>
</tr>
<tr>
<td></td>
<td>Eclipse PHP development</td>
</tr>
<tr>
<td></td>
<td>Eclipse C++ development</td>
</tr>
<tr>
<td></td>
<td>Eclipse EE development</td>
</tr>
<tr>
<td></td>
<td>GIMP 2.8.16</td>
</tr>
<tr>
<td></td>
<td>Inkscape 0.91</td>
</tr>
<tr>
<td></td>
<td>LibreOffice 5</td>
</tr>
<tr>
<td></td>
<td>- Writer(word processor)</td>
</tr>
<tr>
<td></td>
<td>- Calc(spreadsheet app)</td>
</tr>
<tr>
<td></td>
<td>- Impress(presentation app)</td>
</tr>
<tr>
<td></td>
<td>- Draw(drawing/flowcharting)</td>
</tr>
<tr>
<td></td>
<td>- Base(database)</td>
</tr>
<tr>
<td></td>
<td>- Math(editing mathematics)</td>
</tr>
<tr>
<td></td>
<td>MATLAB R2007a</td>
</tr>
<tr>
<td></td>
<td>MS Office 2007 Professional:</td>
</tr>
<tr>
<td></td>
<td>- MS Word 2007</td>
</tr>
<tr>
<td></td>
<td>- MS Excel 2007</td>
</tr>
<tr>
<td></td>
<td>- MS PowerPoint 2007</td>
</tr>
<tr>
<td></td>
<td>- MS Access 2007</td>
</tr>
<tr>
<td></td>
<td>- MS Outlook 2007</td>
</tr>
<tr>
<td></td>
<td>MS Visual Studio 2010 Express</td>
</tr>
<tr>
<td></td>
<td>MS Visual Studio Community 2015</td>
</tr>
<tr>
<td></td>
<td>NetBeans IDE 8.1</td>
</tr>
<tr>
<td></td>
<td>ProjectLibre</td>
</tr>
<tr>
<td></td>
<td>Rhino 3D 4.0 SR8</td>
</tr>
<tr>
<td></td>
<td>SketchUp 2016 MAKE</td>
</tr>
<tr>
<td></td>
<td>Weka 3.6</td>
</tr>
<tr>
<td></td>
<td>WampServer 2.5 :</td>
</tr>
<tr>
<td></td>
<td>- Apache 2.4.9</td>
</tr>
<tr>
<td></td>
<td>- MySQL 5.6.17</td>
</tr>
<tr>
<td></td>
<td>- PHP 5.5.12</td>
</tr>
<tr>
<td></td>
<td>- PHPMyAdmin 4.1.14</td>
</tr>
<tr>
<td></td>
<td>- SqlBuddy 1.3.3</td>
</tr>
<tr>
<td></td>
<td>- XDebug 2.2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Windows LAB #2 (Building A):</th>
<th>Android Studio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ArchiCAD 17 INT</td>
</tr>
<tr>
<td></td>
<td>Autodesk 3ds Max Design 2014</td>
</tr>
<tr>
<td></td>
<td>Autodesk AutoCAD 2014</td>
</tr>
<tr>
<td></td>
<td>SolidWorks 2014</td>
</tr>
<tr>
<td></td>
<td>Autodesk Inventor Professional 2014</td>
</tr>
<tr>
<td></td>
<td>CD-Adapco STAR-CCM+</td>
</tr>
<tr>
<td></td>
<td>CodeBlocks C, C++ and Fortran IDE</td>
</tr>
<tr>
<td></td>
<td>Eclipse JAVA development</td>
</tr>
<tr>
<td></td>
<td>Eclipse PHP development</td>
</tr>
<tr>
<td></td>
<td>Eclipse C++ development</td>
</tr>
<tr>
<td></td>
<td>Eclipse EE development</td>
</tr>
<tr>
<td></td>
<td>GIMP 2.8.16</td>
</tr>
<tr>
<td></td>
<td>Inkscape 0.91</td>
</tr>
<tr>
<td></td>
<td>LibreOffice 5</td>
</tr>
<tr>
<td></td>
<td>- Writer(word processor)</td>
</tr>
<tr>
<td></td>
<td>- Calc(spreadsheet app)</td>
</tr>
</tbody>
</table>
- Impress (presentation app)
- Draw (drawing/flowcharting)
- Base (database)
- Math (editing mathematics)
  - MATLAB R2007a
  - MS Office 2007 Professional:
    - MS Word 2007
    - MS Excel 2007
    - MS PowerPoint 2007
    - MS Access 2007
    - MS Outlook 2007
  - MS Visual Studio 2010 Express
  - MS Visual Studio Community 2015
  - NetBeans IDE 8.1
  - ProjectLibre
  - SketchUp 2016 MAKE
  - Weka 3.6
  - MySQL Workbench 6.3
  - WampServer 2.5 which include:
    - Apache 2.4.9
    - MySQL 5.6.17
    - PHP 5.5.12
    - PHPMyAdmin 4.1.14
    - SqlBuddy 1.3.3
    - XDebug 2.2.5

Windows LAB #3 (Building B - ECON LAB):

- Stata 14
- IBM SPSS Statistica 21
- MS Office 2007 Professional:
  - MS Word 2007
  - MS Excel 2007
  - MS PowerPoint 2007
  - MS Access 2007
  - MS Outlook 2007
- MATLAB R2007a
- Microsoft Mathematics
- CodeBlocks C, C++ and Fortran IDE
- Python 2.7
- R Studio
- QM for Windows
- Excel QM v4

LINUX LAB (Building A):

- OpenSuSE
- LibreOffice
  - Writer (word processor)
  - Calc (spreadsheet app)
  - Impress (presentation app)
  - Draw (drawing/flowcharting)
  - Base (database)
  - Math (editing mathematics)
  - KDE GNOME Development Tools
  - Development Libraries
  - GNOME Software Development
  - KDE Software Development
  - X Software Development
  - Legacy Software Development
  - Code::Block C++ development
  - Eclipse C++ / Java development

General Purpose EE Laboratory

<table>
<thead>
<tr>
<th>No.</th>
<th>DEVICE NAME</th>
<th>BRAND (company name )</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desktop Computer</td>
<td>Apolo MS</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Digital Oscilloscope</td>
<td>RIGOL DS5022M</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Digital Oscilloscope</td>
<td>RIGOL DS1042C</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Analog Oscilloscope</td>
<td>HAMEG HM400</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Function Generator</td>
<td>GWINSTEK</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>DC Power Supply</td>
<td>TT-T-ECHNI-C (MCH-305D-II)</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>DC Power Supply</td>
<td>TT-T-ECHNI-C (MCH-305D)</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>DC Power Supply</td>
<td>Voltcraft VLP-1303 PRO</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>Digital Trainer</td>
<td>CE COKESEN</td>
<td>2</td>
</tr>
<tr>
<td>No.</td>
<td>DEVICE NAME</td>
<td>BRAND (company name )</td>
<td>Quantity</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------</td>
<td>-----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>10</td>
<td>Soldering Units</td>
<td>ERSA</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>PLC Unit</td>
<td>Siemens</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>Multimeter</td>
<td>Volcraft</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td>CCD Color Camera</td>
<td>Unitech</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>FPGA Board</td>
<td>DIGILENT Nexym 3</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>Digital Wattmeter</td>
<td>Lutron</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Analog Wattmeter</td>
<td>Norma</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Insulation Tester</td>
<td>TES 1600</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>Consumables</td>
<td>Resistors, Diodes, Transistors, Capacitors, etc.</td>
<td>Tens of each</td>
</tr>
</tbody>
</table>

Control Systems Laboratory

<table>
<thead>
<tr>
<th>No.</th>
<th>DEVICE NAME</th>
<th>BRAND (company name )</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desktop Computer</td>
<td>HP Pro</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Workstation</td>
<td>DELL</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Analog Oscilloscope</td>
<td>HAMEG HM400</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Function Generator</td>
<td>GWINSTEK</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>DC Power Supply</td>
<td>Voltcraft VLP-1303 PRO</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>PLC Unit</td>
<td>Schneider Zelio</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>PLC Unit</td>
<td>Schneider Twido</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>PCI Expres DAQ</td>
<td>National Instruments</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Noise Rejection Shield</td>
<td>National Instruments</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>Shielded Cable</td>
<td>National Instruments</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>USB NI-Daqmx</td>
<td>National Instruments</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>USB NI-Daqmx Accessories</td>
<td>National Instruments</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>NI myRIO</td>
<td>National Instruments</td>
<td>5</td>
</tr>
<tr>
<td>17</td>
<td>NI myRIO Starter Kit</td>
<td>National Instruments</td>
<td>5</td>
</tr>
<tr>
<td>18</td>
<td>NI myRIO Mechatronics Kit</td>
<td>National Instruments</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>NI myRIO Embedded Kit</td>
<td>National Instruments</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>NI myRIO Mount Kit</td>
<td>National Instruments</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>LabVIEW Premium Suite</td>
<td>National Instruments</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>Quanser Servo Motors</td>
<td>QUBE</td>
<td>2</td>
</tr>
<tr>
<td>23</td>
<td>Quanser Terminal Board</td>
<td>QUBE</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>Rapid Control Prototype Toolkit for LabVIEW</td>
<td>National Instruments</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>Solar Panel</td>
<td>MW GREEN Power</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>Toroid Transformer</td>
<td>Indel</td>
<td>10</td>
</tr>
<tr>
<td>27</td>
<td>Consumables</td>
<td>Many</td>
<td></td>
</tr>
</tbody>
</table>

Smart Grid Laboratory

<table>
<thead>
<tr>
<th>No.</th>
<th>DEVICE NAME</th>
<th>BRAND (company name )</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SIPROTEC 7SJ82 Feeder and overcurrent protection</td>
<td>SIPROTEC (SIEMENS)</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>SIPROTEC 7SL87 Combined line differential and distance protection</td>
<td>SIPROTEC (SIEMENS)</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>SIPROTEC 7UT86 Transformer Differential Protection</td>
<td>SIPROTEC (SIEMENS)</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Siglent Function Generator SDG805 5MHz</td>
<td>Siglent</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Voltcraft Energy Monitor 4000 Pro D LCD</td>
<td>Voltcraft</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Axiomet Digital Multimeter AX-582B</td>
<td>Axiomet</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Autotransformer OIEA1 - 230VAC; Uout:0÷260V; 1A; 1.6kg</td>
<td>Breve TuVassons</td>
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APPENDIX I – LIST OF SELECTED PUBLICATIONS


9. M. A. Bender, M. Goswami, Dz. Medjedovic, P. Montes, "The I/O-Complexity of Sorting with Different-Sized Records", MASSIVE 2013, no proceedings, in submission to a journal


11. K.Karadjuzovic-Hadziabdic, N. M. Demir, "Teaching Neural Networks to Detect the Authors of Texts", 9th International Conference on Knowledge, Economy & Management Proceedings, pp. 1393-1402 (2011)


APPENDIX J – FIRST CYCLE COURSES

IUS University Courses (required)
ELIT100 – Academic English and Effective Communication

Short Content:
This course aims to enhance student’s academic writing skills, research skills and public speaking and presentation skills. The first part of the course deals with scanning, skimming, clustering, prewriting, drafting, and revising techniques. Such techniques will be applied to various forms of writing and research. The second part of the course deals with academic research skills, whereby students will learn how to organize research papers and how to incorporate different types of materials and sources into writings. Public speaking strategies will be explored profoundly by involving student’s in-class presentations. Students will be evaluated on their ability to construct sentences in grammatically correct manner and on their correct use of English vocabulary words.

Objectives:
• To teach students to use prewriting methods that help generate and focus ideas before drafting a paragraph or an essay.
• To enable students to recognize and demonstrate elements of an essay: Introduction, thesis, body/support paragraphs and conclusion.
• To introduce students with basic research skills by locating and selecting pertinent materials in the library, including online library databases.
• To involve students in the social sphere of the writing class and enable them for open discussion and peer feedback by respectfully and clearly expressing questions and suggestions.
• To improve students’ essential English language skills, including reading, writing, listening and speaking.

Learning Outcomes:
• To use prewriting methods effectively and state fundamental principles of academic essay writing.
• To analyze transitions and apply them in their writings.
• To recognize elements of an essay and use that knowledge in writing well structured and organized essays.
• To use basic research skills and develop research papers and essays based on those skills.
• To apply various dynamic presentation skills.
• To write clear and correct sentences in English, and be able to compose paragraphs.

MATH101 - Calculus I

Short Content:

Objectives:
• Explain the concept of limit and its applications.
• Explain the concept of derivative, tangent line and instantaneous rate of change
• Introduce the Riemann integral and the Fundamental theorem of calculus.

Learning Outcomes:
• Explain the concept of limits and calculate limits for various single variable functions.
• Use all rules for computing derivatives well and to be familiar with the definition of derivative and slope of tangent.
• Apply first and second derivatives in finding maxima/minima of functions.
• Apply first and second derivatives to find intervals of monotonicity/concavity.
• Graph polynomial, rational and basic trigonometric functions.

NS102 – Physics

Short Content:
A calculus-based study of the basic concepts of physics. Topics include vector algebra, kinematics, dynamics of single particle system, energy, momentum, conservation laws, circular and rigid body motion, fluid mechanics, thermal equilibrium, temperature, and the laws of thermodynamics with applications to ideal gases and thermodynamic processes.

Objectives:
• give students an understanding of the fundamental principles of physics and their application to everyday life and technology
• develop an appreciation of physics as a human endeavor, thereby enriching the students' experience of life
• provide a reasonably broad perspective of physics, thus developing an understanding of the physical environment and of how human beings interact with it
• provide a general education in physics for all students, whether or not they proceed to further studies in physics
• develop the ability to observe, to think logically, and to communicate effectively to develop an understanding of the scientific method
• develop an understanding of the beauty, simplicity and symmetry in nature.

Learning Outcomes:
• analyze and interpret 1D and 2D kinematics problems that include free fall, projectile motion, relative motion and uniform circular motion by using motion diagrams, vector representation of motion, explicit problem-solving strategy for kinematic problems
• solve dynamics problems in 1D and 2D by applying Newton’s Laws and conservation laws (energy and momentum)
• define Newton’s Laws, work, energy, momentum and impulse, and explain their relationship to motion
• perform basic analysis of oscillating systems
• define basic properties of solids, liquids and gases
• use ideal gas law
• solve problems that involves energy transfers by heat and work by using First Law of Thermodynamics
• define First and Second Law of Thermodynamics
• define electric properties of matter, electric current, voltage, electric field, Coulomb’s law, Ohm’s law
• calculate basic problems from electricity and magnetism

LIT200 – Critical Reading and Writing

Short Content:
The course builds up and expands students’ communicative, critical reading and writing skills. A great emphasis is placed on the need to effectively and efficiently approach and analyze lengthy academic texts and develop critical reading skills. Students will become aware of the importance of thinking critically about diverse issues, analyzing and synthesizing different processes and concepts. The course will improve students’ academic writing skills, whereby the specific steps in the writing process will be analyzed and practiced. Successful completion of this course rounds out the language skills students will need for sustained academic achievement in their undergraduate studies.

Objectives:
• Expands students’ communicative, critical reading and writing skills.
• Effectively and efficiently approach and analyze lengthy academic texts and develop critical reading skills.
• Enable students to analyze and synthesize different processes and concepts.
• Improve students’ academic writing skills.

Learning Outcomes:
• Apply fundamental principles of rhetorical reading.
• Comprehend, interpret and summarize lengthy academic texts.
• Analyze a variety of texts in terms of content, author's aim, style, subtext etc.
• Produce quality academic essays with good structure and in clear and correct English.
• Make sustained, logical arguments and express them effectively
• Combine the knowledge or information gathered from several sources for the purpose of an accurate interpretation of a text in English.

IUS University Courses (elective)
CULT101 – Understanding Cultural Encounters

Short Content:
This course aims to present an overview of the cultural - historical relationships emerged in Near Eastern Islamic countries and their neighbors between 11th and 17th centuries C.E. By comparative analysis of observational narratives from remarkable Muslim travelers such as Ibn Battuta (Moroccan-Berberi), and Evliya Celebi (Turkish-Ottoman), this course is going to give a clear, understandable frame of cultural - intellectual relations for the Islamic world in the classical ages. Thus, the course aims to present the historical picture with the help of travel accounts, including daily life practices, legends, and colorful stories which will make the students enjoy intellectual history of that era.

Objectives:
• To present an overview of the cultural - historical relationships emerged in Near Eastern Islamic countries.
• To give a clear, understandable frame of cultural - intellectual relations for the Islamic world in the classical ages.
• To present the historical picture with the help of travel accounts, including daily life practices, legends, and colorful stories.

Learning Outcomes:
• Explain the frame of cultural - intellectual relations for the Islamic world in the classical ages.
• Identify the medieval ages as golden ages for Muslims, then argue about it with opponent views.
• Identify some key historical places and events in the modern maps in accordance with old maps.
• Present an overall discussion of cultural relations, and global connections in the Islamic world of classical ages, by the eyes of Muslim travelers.

NS111–Understanding Nature and Knowledge

Short Content:
The focus of this course is to introduce students to the history and philosophy of science, particularly in the Islamic and the Western worlds.

Objectives:
• Assemble the born of science in assumptions about the nature of reality.
• Discuss connections between early philosophy and science.
• Define the perception of the world and interaction in science.
• Discuss the impact of recent scientific breakthroughs on modern life.

Learning Outcomes:
• To assemble the born of science in assumptions about the nature of reality.
• To discuss connections between early philosophy and science.
• To define the perception of the world and interaction in science.
• To discuss the impact of recent scientific breakthroughs on modern life.
NS112 – Understanding Science and Technology

Short Content:
The aim of the course is to expose students to various issues and opinions on the development, the current state and the role of the science and technology in the development of human societies. The goal is not to give definitive answers but rather to provoke discussion and initiate further learning.

Objectives:
- To expose students to various issues and opinions on the development, the current state and the role of the science and technology.
- To teach students to be comfortable with non-definitive answers, and to initiate discussion from which all involved would build up their knowledge about the world and technology.

Learning Outcomes:
- Demonstrate critical thinking of the current state and the role of the science and technology in the development of human societies.
- Analyze the issues related to the science and technology impact on the sustainable development.

SPS140 – Understanding Religion

Short Content:
The main objective of this course is to establish a cross-cultural understanding of worlds’ religions. A special attention will be paid to religions within the diverse and global changing world. The students will be taught to: understand the importance of religion in relation to their society, culture and history; globalization and religion; gender and religion; science and religion; interfaith dialogue; and sociology and psychology of religion.

Objectives:
- To establish a cross-cultural understanding of worlds' religions.
- Understand the importance of religion in relation to their society, culture and history.
- Understand globalization and religion; gender and religion; science and religion; interfaith dialogue.
- To understand psychology of religion.

Learning Outcomes:
- Demonstrate understanding of major world religions.
- Use cross-cultural religious themes as to promote religious understanding and dialogue.
- Differentiate an academic and scholarly versus missionary study and interpretation of religion.
- Recognize the significance of religions as inevitable for shaping our society, culture and institutions.
- Define methods and approaches to the study of religions.

SPS103 – Law and Ethics

Short Content:
To understand how international business has changed since World Word War II. To develop an ability to analyze cultural social, economical, political and other forces in the countries analyzed.

Objectives:
- understand how international business has changed since World Word War II.
- Develop an ability to analyze country specific cultural social, economical, political and other forces

Learning Outcomes:
- Understand the role institutions related to international trade
- Understand dynamics of international business, government relationship, as well as strategies used to enter
- Understand the theories of trade and foreign investment, the world financial environment.
ECON111 – Introduction to Microeconomics

Short Content:
ECON 111 is an introduction course in microeconomics. This course develops students' theoretical and practical knowledge of the students in the topics of market system, consumer choices, theory of firm and market failure. The course aims to provide basic understanding of how people and firms make their decisions in the markets.

Objectives:
- Develop students' theoretical and practical knowledge in the areas of market system, consumer choices, theory of firm and market failure;
- Provide basic understanding of how people and firms make their decisions in the markets;

Learning Outcomes:
- Be able to identify business problem;
- Be able to understand and explain market mechanism;
- Be able to understand how consumer makes their optimal purchasing decisions;
- Be able to understand how firms make their optimal production decisions.
- Be able to understand the impact of government intervention in the market.
- Be able to understand how markets can fail and the remedies for market failure.

ELIT101 – Introduction to Literature

Short Content:
This course aims to introduce the students to the basic terms and concepts related to literature. These terms and concepts (figures of speech, elements of plot structure, genres and subgenres etc.) are essential to students' ability to understand and interpret literary works. The terms and concepts will be defined and explained to the students and exemplified through works of literature.

Objectives:
- Introduce the students to the basic terms and concepts related to literature.
- The terms and concepts: figures of speech, elements of plot structure, genres and subgenres etc will be defined and explained;

Learning Outcomes:
- Recognize a work of literature and understand how it is different from other forms of artistic expression.
- Show understanding and recognition of basic literary terms and interpret previously unseen literary works
- Explicate a particular work of literature and form a critical interpretation of it
- Use appropriate critical terminology when discussing literature.
- Be able to understand the impact of government intervention in the market.
- Be able to understand how markets can fail and the remedies for market failure.

IBF101 – Introduction to Business

Short Content:
The purpose of this course is to provide an in depth familiarization with the challenges of operating in an international environment. The course is taught primarily from the perspective of a firm that seeks or is conducting business abroad. As such the business and its managers must have an understanding of environment in which they will or do operate, including the economic, legal, political, social, and cultural standards of the host country.

Objectives:
- Provide an in depth familiarization with the challenges of operating in an international environment.
- Gaining the understanding of environment in which a firm conducting business abroad will or does operate, including the economic, legal, political, social, and cultural standards of the host country;
Learning Outcomes:
• Understand how businesses are planned, developed, and organized.
• Examine how businesses operate in our modern, political, social, and economic environment.
• Examine the functional areas of business.
• Expand and enrich your business vocabulary and research skills.
• Create an awareness of the various career opportunities in business.

IR101 – Introduction to International Relations

Short Content:
The purpose of this course is to provide an in depth familiarization with the challenges of operating in an international environment.

Objectives:
• To provide foundational knowledge in areas relate to international relations.
• To offer an basic overview of the most important theories, issues as well as recent development in the field;

Learning Outcomes:
• Discuss the various analytical and theoretical positions in international relations.
• Distinguish between the three levels of analysis of the international system.
• Interpret the most important problems of international relations.
• Identify major international institutions and describe their roles.

MAN102 – Management

Short Content:
To introduce students to management concepts; To provide tools in analysing and solving management problems students will face in industry (this will include using business cases and doing qualitative or quantitative analysis).

Objectives:
• To introduce students to management concepts.
• To provide tools in analysing and solving management problems students will face in industry;

Learning Outcomes:
• Develop knowledge of fundamental management concepts and skills..
• Apply lessons learned from real managers.
• Identify the internal and external factors and forces of the organization that managers must confront in their daily work.
• Differentiate and examine the functions of management: such as planning, organizing, staffing, leading, and controlling.
• Identify the key competencies needed to be an effective manager.
• Gain a brief understanding of the historical development of management theories.
• Demonstrate critical thinking when presented with managerial problems.
• Understand the importance of social responsibility and managerial ethics in management operations.

POLS102 – Introduction to Political Sciences

Short Content:
This course opens with the recent history of political sciences. We further enable students to compare major political science theories and to be able to apply these in order to explain events and developments in the world.

Objectives:
• To give students an understanding of the recent history of political sciences..
• To enable students to compare and contrast the major Political sciences theories and to be able to apply them to explain events and developments.
• To help students understand how these seemingly abstract debates actually deal with experiences in our everyday lives.
• To give students and understanding of major institutions and issues in political sciences.
• To cultivate students’ ability to think critically.

Learning Outcomes:
• To analyze basic concepts and approaches to the study of political science.
• To apply them towards the analysis of current political issues, disputes and trends.
• To comprehend functioning of institutions, the state and government and its branches, political parties and party systems.
• Compare and contrast different branches within political sciences.
• Demonstrate some familiarity with the specific recent developments within the political sciences.
• Use a range of published materials in engaging with the conceptual challenges of cross-cultural study of politics and apply an understanding of politics to other social sciences.

PSY103 – Introduction to Psychology

Short Content:
This course is conceived as a broad, conceptual introduction to modern psychology. It delineates major principles, issues, and approaches to psychological phenomena and processes and to behavior from a variety of perspectives, offering insights into specificities of scientific reasoning and discovery in psychology as it relates to other scientific disciplines. Psychology is portrayed as a live and dynamic subject, which can be easily related to students' experiences.

Objectives:
• To give students broad, conceptual introduction to modern psychology.
• To delineate major principles, issues, and approaches to psychological phenomena and processes;
• To offer insights into specificities of scientific reasoning and discovery in psychology as it relates to other scientific disciplines.
• To portray psychology as a live and dynamic subject.

Learning Outcomes:
• To have sufficient knowledge about the key issues and approaches in psychology.
• To understand how psychology developed in relation to other branches of science.
• To understand the dynamic nature of scientific discovery and reasoning with regard to matters of psychology.
• To have a clear idea about the scope of psychology and its main subdisciplines.
• To relate selected principles of psychology to their everyday life.

PSY103 – Introduction to Psychology

Short Content:
The course will offer a broad introductory survey to Sociology.

Objectives:
• The course will offer a broad introductory survey to Sociology.
• The course will engage with core concepts, foundational scholars, and emerging theories in sociology.
• This course will provide introductory students the necessary tool for critically evaluating social reality today.

Learning Outcomes:
• To define and explain what the sociological method is.
• To understand the social construction of many different aspects of reality.
• To engage with scientific and empirical methods for data collection and analysis in sociology.
• To competently evaluate the foundations of different cultures.


SPS103 – Law and Ethics

Short Content:
The course will offer a broad introductory survey to Law and Ethics.

Objectives:
- To help students understand the complexities and “pros and cons” of moral, ethical and legal decision making, and to coherently present both sides of the argument.
- To emphasize students’ ability to critically assess information, including perspectives contrary to their own ones.
- To assist students to think beyond their geographic, social and religious borders.
- To ensure that students know the historical and geographic context of morals, ethics and law as well as the search for moral and ethical universality.
- To increase students’ ability to apply ethical theory to practical personal and professional decision-making.
- To increase students’ awareness and recognition that ethics is not just a matter of opinion.

Learning Outcomes:
- To examine and use basic ethical terms and concepts.
- To relate ethical concepts to different courses.
- To understand the interplay between law, ethics, and public policy.
- To demonstrate historical, analytical and comparative skills.

SPS120 – Critical Thinking

Short Content:
The main objective of this course is to establish a well-articulated understanding of critical thinking skills. These skills play a crucial role in every day life reasoning and scientific methodology, not to mention their significance in constructing philosophical arguments.

Objectives:
- To establish a well-articulated understanding of critical thinking
- To emphasize students’ ability to critically assess information, including perspectives contrary to their own ones.

Learning Outcomes:
- To analyze arguments into premises and conclusions of critical analysing.
- To evaluate deductive arguments for validity and soundness in life.
- To evaluate inductive arguments for strength of brain and critical thinking.

SPS150 – World History

Short Content:
The aim of this course is to teach the historical significance of global interconnections between the world’s civilizations and peoples from 1000 C.E. to the present. It provides a chronological cross-cultural overview of world history from ancient to modern times. The course has the objective of exploring crucial themes of human activity from a global perspective. The diversity of human civilizations will be traced in terms of their historical, cultural, political, and economic formation with a focus on their interactions, similarities and differences. Examining the broad patterns of change and continuity, as well as the turning points in world history, students will develop a greater understanding of today’s global environment.

Objectives:
- To teach the historical significance of global interconnections between the world’s civilizations and peoples from 1000 C.E. to the present.
- To provide a chronological cross-cultural overview of world history from ancient to modern times.
- To explore crucial themes of human activity from a global perspective.
- To examine the broad patterns of change and continuity, as well as the turning points in world history.
Learning Outcomes:
- To reason historical events chronologically.
- To compare/contrast and contextualize historical events.
- To evaluate inductive arguments for strength of brain and critical thinking.
- To comparatively analyze, synthesize, and evaluate historical content, contexts, and perspectives.

ENS105 – The Brain

Short Content:
To introduce structural and functional knowledge about human brain during health and disease.

Objectives:
- To introduce structural and functional knowledge about human brain during health and disease.

Learning Outcomes:
- To explain the "human nature" as a function of human brain which is encoded by human genome.
- To explain neuroanatomical features of human brain and their functions such as, cortex, limbic system.
- To summarize the basic features emotional and cognitive behaviors as brain mechanisms during health.
- To explain the subject of consciousness as an issue of scientific research.

NS103 – Biology

Short Content:
The purpose of this course is to provide students with the introductory level principles, mechanisms, and methodology of biological sciences with special emphasis on molecular and cellular aspects of living systems.

Objectives:
- To provide students with the introductory level principles, mechanisms, and methodology of biological sciences.
- To emphasize molecular and cellular aspects of living systems

Learning Outcomes:
- To explain the principles of scientific methodology.
- To define biological terms and explain associated mechanisms using these terms.
- To communicate biological concepts clearly and accurately.
- To explain biology as a creative activity in a variety of research and application fields.

NS104 – General Chemistry

Short Content:
Introduction to chemistry, atoms and atomic theories, Chemical compounds and their chemical reactions. Aqueous solutions, principles of gases, liquids and solutions, energy and work, covalent vs. Ionic binding, Carbohydrates and Life essential molecules.

Objectives:
- To build a basic knowledge of the structure of chemistry
- To analyze scientific concepts and think critically
- To review the importance and relevance of chemistry in our everyday lives
- To be able to utilize the methods of science as a logical means of problem solving in regards to chemistry

Learning Outcomes:
- Define the basic concepts of chemistry (the structure of atoms, electronic configuration, chemical bonds, properties of elements etc...).
- Classify matter by its state and binding behavior using the Periodic table as a reference.
- Understand and explain basic equilibrium chemistry and the principle behind four main classes of reaction, e.g., acid-base, oxidation-reduction, complex metric and precipitation reactions.
- Recognize in real live organic compounds and understand their functions and structures.
• Compare and contrast the chemical behavior and physical properties of common substances.
• Understand the importance of metabolic reactions
• Define the molecules of life

**ARCH107 – Understanding Art and Architecture**

**Short Content:**
This course will introduce students to the basic concepts of art and architectural practice, through an analysis of the production of art and architecture drawn from a range of historical periods and contexts.

**Objectives:**
• To introduce students to the basic concepts of art and architectural practice

**Learning Outcomes:**
• Identify key art and architectural styles and movements.
• Understand the contexts in which art and architectural practices have been undertaken.
• Identify and understand the common themes and links between art and architecture.
• Understand the meaning of art and architecture through acquiring the analytic tools allowing them to read and analyze the production of art and architecture.

**VA120 – History of Art I**

**Short Content:**
This first, broad survey course aims to familiarize students with the history of the arts in Western and some non-Western cultures. It aims to develop student skills in observation, analysis and interpretation of historical forms and cultural layers.

**Objectives:**
• To familiarize students with the history of the arts in Western and some non-Western cultures.
• To develop student skills in observation, analysis and interpretation of historical forms and cultural layers.

**Learning Outcomes:**
• Identify authors and artworks.
• Recognize styles of periods from Antiquity through the Middle Ages.
• Identify and understand the common themes and links between art and architecture.
• Analyze and discuss major works of art from Antiquity through the Middle Ages.

**BOS112 – Spoken Bosnian II**

**Short Content:**
Spoken Bosnian II (the first level - intermediate course of the Bosnian language) is a continuation of the basic elementary course and is intended to improve overall communicative competence of the Bosnian language as a foreign language. First, through the repetition of the basic characteristics of the initial rate, review the main points of the Bosnian grammar and basic vocabulary to be made. With frequent repetition and new knowledge (in accordance with the initial program of the intermediate course), students will build and nurture acquired vocabulary, grammar and spelling, and further develop listening, reading, speaking and compositional skills as well as more detailed introduction to Bosnian culture. Specifically, students will improve their ability to understand and share ideas with native speakers. Students will also express original ideas, report on different types of events, etc. The course includes a range of activities, including regular dialogues and reading texts, language games, the cultivation of grammar and phonetic exercises, dictations, translations, discussion topics, etc.

**Objectives:**
• Introduce students to basic features of the Bosnian language as a foreign language at the level of initial intermediate course that represents a basic knowledge of the characteristics of the Bosnian spoken and written language;
• Teach students how to follow intermediate course within the initial focus on the active use of the four basic skills of mastering a foreign language: listening, reading, writing and speaking;
• Instruct students how to self-educate using appropriate literature as well as an active process of speaking with native speakers;
• Actively use the Bosnian language as a foreign language in the understanding of and fostering intercultural differences and similarities between Turkish and Bosnian culture

Learning Outcomes:
• Usage Bosnian provided the initial framework middle course;
• Understand the basic features of the Bosnian language in the process of listening, reading, writing and speaking;
• Write clear and correct sentences in Bosnian language;
• Participate in the processes of their own self through the use of appropriate literature, and the active voice with native speakers;
• Nurture intercultural differences and similarities, and speak and feel as the Bosnian link Turkish and Bosnian culture.

TURK111 – Spoken Turkish I
Short Content:
In the beginning of this course students will learn about Ural-Altaic Language group to which Turkish Language belongs too. They will also learn some differences between Ural-Altaic Language group and Indo-European Language group. After phonetics, phonetics rules and sentence writing, students will complete their basic knowledge of Turkish phrases and expressions. In the second part of the semester students will be focused on Present Continuous Tense. This will enable students to understand tenses in Turkish language. At the end of the semester students will be focused on the topics of daily life, and will meet one big metropolis such as Istanbul.

Objectives:
• To teach students about the most important fundamentals in the Turkish language
• To enable students to introduce their self, their family and the environment in which they live and study.
• To form class environment in order to develop reading, writing, listening and speaking skills
• To involve students in dialogues and enable them to have conversation in Turkish language.

Learning Outcomes:
• Introduce their self, their daily activities, their family, and environment in which they live and study.
• Fill in job applications, scholarship applications and registration applications at the university.
• Have a conversation about daily life topics.
• Use Turkish language in day-to-day conversation

TURK112 – Spoken Turkish II
Short Content:
During this semester students learn Possessive suffixes (pronouns), Genitival Possessive Construction, Shortened Genitival Possessive Construction, Past Tense, Future Tense, Telling time in Turkish language. Each of these components will be practiced by corresponding text and audio – video materials.

Objectives:
• Introduce themselves to their friends;
• Compare life in town and village;
• Speak about holiday from the past, or events from past;
• Have conversation about past or future events.

Learning Outcomes:
• To teach students grammar rulers which are important for daily communication;
• To enable students to compare life in town and village;
• To be enable student to speak about events from past and future;
• To develop student’s speaking, reading, listening and understanding skills;
• To evolve students in dialogues and conversations.

FENS Faculty Courses

BIO301 – Molecular Biology

Short Content:
The course is designed to provide students with a firm grounding in molecular biology, on which they can integrate more complex concepts addressed in upper level course offerings.

Objectives:
• to explain the main concepts and fundamental processes of molecular biology.
• develop skills for basic techniques used in molecular biology provide general education at the molecular level and prepare students for following related courses in GBE program
• to develop understanding of general principles of Central dogma

Learning Outcomes:
• Explain basic concepts of semiconductor materials
• Explain explanation of the flow of genetic information within a biological system
• discuss and elaborate on basic molecular biology mechanisms
• understand basic intracellular molecular events in Central Dogma axis
• work collaboratively with their peers on scientific article assignments.

BIO415 – Genetic Engineering

Short Content:
The course is an introduction to genetics and gene technology from an evolutionary perspective, and about the methods that are used in the area.

Objectives:
• The goal of this course is to introduce students principles, tools and methodology of genetic engineering

Learning Outcomes:
• Define relevant terms and concepts of genetic engineering
• Explain the methodologies of gene isolation and manipulation
• Identify the elements of cloning procedure and discuss their implementation for various conditions
• Describe the methods of screening and analysis of recombinant DNA and its product
• Design cloning strategies for recombinant DNA and implement associated bioinformatic tools.

EE201 – Analog Electronics I

Short Content:
Material classification based on the energy diagrams: n-type and p-type extrinsic materials, diode biasing, diode characteristics, operation of the diode, operation of special purpose diodes, analysis of different diode circuit configurations, analysis and design of basic bipolar junction transistors and their circuits, analysis and design of basic field effect transistors and their circuits.

Objectives:
• Introduce students to concept of semiconductor
• Provide students with the basic knowledge of diodes and their applications
• Provide students with the basic knowledge of transistors and their applications

Learning Outcomes:
• Explain basic concepts of semiconductor materials
• Explain basic concepts of diodes and transistors
• Explain and discuss the operation of the BJT
• Explain and discuss the operation of the FET
• Use the theory and applications of semiconductors and semiconductor circuits in creating meaningful circuit design.

**EE202 – Electrical Circuits II**

**Short Content:**
The course deals with: AC circuits analysis techniques; power in AC circuits, poly-phase circuits, Laplace transform and its application in electrical circuits, Frequency dependant circuits, mathematical models and differential equations of AC circuits and various software tools for analysis of AC circuits.

**Objectives:**
- To introduce to students AC electric circuits and systems with AC power concepts
- To explain the concepts of impedance, phasor and frequency response
- To study passive and active analogue filters
- To introduce the Laplace transform and its application in electrical circuits
- To analyse polyphase circuits and two port networks

**Learning Outcomes:**
- Use circuit analysis methods to solve electrical circuits problems that involve AC power sources and AC power
- Use different software tools for the analysis of single and polyphase AC circuits
- Explain frequency response of circuit elements and solve problems involving active and passive filters
- Explain and use Laplace transform for AC circuit analysis
- Perform Laboratory tests and measurements that involve AC circuits.

**EE305 – Instrumentation and Measurements**

**Short Content:**
Basic measurement concepts, basic electronic measurement, signal generators and analyzers, sensors, digital instruments, acquisition systems and optical measurements.

**Objectives:**
- Introduce students to the principles of measurement
- Provide students with hands-on laboratory experiences with a variety of transducers and instruments (including ‘virtual instruments’)
- Provide students with the opportunities to write substantial, professional, computer-generated technical reports.

**Learning Outcomes:**
- Explain different standards and units of measurement, the conversion between standards and the importance of the measurement process and its various stages.
- Understand the different characteristics of measurement instruments and their effect on the performed measurements
- Perform measurements of different physical variables using measurement instruments
- Explain how various values of pressure and temperature are measured and to the basic principles of the instruments used in their measurement
- Explain the process of transmitter calibration, its importance and how it’s done as well as the usage of these transmitters in the measurement process.

**EE321 – Electrical Machines**

**Short Content:**
The course provides a deep look to electrical machines and the major physical principles that govern them. The course reviews basic principles of phasor analysis, three phase circuits, Ideal and practical transformers. The course studies AC machinery fundamentals and DC machinery fundamentals. Detailed look to synchronous machines and induction motors is presented. Finally, and introduction to power electronics and machine drive is provided.
Objectives:

- The physical and mathematical principals that govern electromechanical motion
- The analysis of broad range of electrical machines.
- Using software to study different electrical machines
- The concept of power electronics and machine drives.

Learning Outcomes:

- Explain the theory of electromechanical energy conversion
- Explain the construction and principles of operation of various AC and DC electrical motors and generators
- Explain the construction and operation of ideal and practical transformers
- Solve simple problems related to operation of DC and AC electrical machines as well as various electrical transformer types
- Use software tools to analyze and solve problems related to various types of electrical machines.

EE322 – Power Systems

Short Content:

Objectives:

- To introduce the students with the concepts of power systems
- To provide students with basic knowledge of power network and power flow calculation
- To introduce the students with symmetrical components and short circuit calculation

Learning Outcomes:

- Understand power system operations
- Calculate power flow in power system networks
- Calculate three phase faults in power networks
- Use MATLAB for power system steady state analysis.

EE311 – Control System Design

Short Content:

Objectives:

- To give students an understanding of the fundamental principles of time domain state space description of dynamic systems, and their applications to everyday life and technology
- To provide a reasonably broad perspective of control systems thus developing an understanding of the models of the physical environment and of how human beings interact with it
- To provide a complete idea of control systems transient and steady state behavior, for the use of them in other engineering courses, as well as further graduate studies in engineering
- To develop an understanding of the power of control theory through various techniques and be able to analyze control systems applications in engineering and science
- To develop an appreciation of control theory and design and have an ability of modeling and controlling physical systems using control theory

Learning Outcomes:

- Analyze problems from engineering, economics, mechanics, and everyday life through control theory
- Apply various techniques to work with models in practical systems environment and solve problems of engineering and science
- understand the role and properties of time and frequency domain in control systems design to address real natural phenomena
- to work with basic methods in control systems design
- perform transient and stationary analysis of control systems.

**ENS201 – Electromagnetics**

**Short Content:**
Review of vector analysis, electrostatics, electric potential, electric fields in matter, magnetostatics, magnetic fields in matter, electrodynamics, Maxwell’s Equations.

**Objectives:**
- To introduce students to the foundations in electromagnetism for any future academic and professional work in this area
- To develop skills for practical solutions to various electromagnetic problems
- To achieve a better understanding of vector algebra, differential calculus, and their applications in the field of electromagnetic
- To understand electromagnetic properties of different materials
- To become comfortable in the terminology used in electromagnetic

**Learning Outcomes:**
- Describe the concepts of electric and magnetic fields
- Analyze potentials due to static fields
- Demonstrate understanding of how materials affect electric and magnetic fields
- Demonstrate understanding of the relation between the fields under time varying situations
- Become familiar with Maxwell’s equations.

**ENS202 – Thermodynamics**

**Short Content:**
This course is an introduction to the concept of energy. It provides the basic tools necessary for the analysis of any engineering system in which energy transfer or energy transformations occur; thus, thermodynamics is an important part of the training of almost all engineering disciplines.

**Objectives:**
- Analyze energy transfer and transformation in systems by using fundamental concepts of properties of materials, work, heat, internal energy, entropy, equilibrium
- To study and analyze relations derived from the First and Second Laws of Thermodynamics.

**Learning Outcomes:**
- State and explain the 1st and 2nd Law of Thermodynamics.
- Apply the 1st and 2nd Law of Thermodynamics to calculate heat, work and energy for both closed and open systems.
- Calculate the boundary work for a variety of processes for closed systems
- Plot processes on both P-v and T-s diagrams.

**ENS205 – Material Science**

**Short Content:**
Discuss what is Materials Science and its basic concepts such as atomic structure of materials, atomic arrangements, crystal structure defects, atomic diffusion, mechanical and thermal behavior. Use phase diagrams to understand the microstructure-sensitive properties. Learn about failure due to plastic deformation beyond elastic limit under the loading and prevention of the system. Discuss application of Materials Science in production life in order to understand the environmental degradation and prevent it via selecting the suitable materials for the applied forces.

**Objectives:**
- Improve student's skills to analyze used materials
- Improve student's understanding of mechanical, thermal, and electrical factors on materials
- Use knowledge of materials in design and selection of work-parts

**Learning Outcomes:**
- Compare the Coulomb forces forming strong and weak bonds and keeping atoms and ions together
- Categorize the general arrangement type of atoms according to crystalline or amorphous structure
- Calculate the amount of diffusion according to whether the time is constant or not during diffusion process
- Analyze on phase diagram and properties, interpreting the microstructure variation gained from this phase diagram
- Relate each corrosion and protection methods
- Select suitable materials for the used area

**ENS206 – System Modelling and Control**

**Short Content:**

**Objectives:**
- Familiarize students with the concept of modeling, analysis, and control of electrical, mechanical, and electromechanical systems with realistic steady-state and transient specifications
- Introduce students to system description using transfer functions and learn about the main components of a closed loop control system including PID regulator
- Introduce students how to determine the system stability using mathematical and graphical tools.

**Learning Outcomes:**
- Derive models of simple systems and present them on common mathematical form, including block diagram form
- Model and analyze a linear system in the frequency domain by reducing a complex multi-block control system to a standard form using block diagram algebra; deriving the input-to-output transfer function; and computing the impulse response, output response and steady-state error for a given test input signal
- Model and analyze a linear system computing the characteristic roots and assessing the stability of the system from the location of these roots in the complex domain using the Routh-Hurwitz (R-H) stability criterion
- Model electrical, mechanical, and electromechanical systems using state-space variables in the time domain and to solve the state equations for standard inputs (step response or impulse response)
- Design and tune a three-term (PID) controller for a physical system to achieve desired steady-state and transient specifications.

**ENS207 – Engineering Graphics**

**Short Content:**
The course provides a background in descriptive geometry, orthographic projection, engineering drawing techniques, and computer-aided engineering graphics for undergraduate students. Point line and plane relationships in projection; multi-view engineering drawings; auxiliary and section views; basic dimensioning; engineering applications.

**Objectives:**
- Comprehend general projection theory, with emphasis on orthographic projection to represent three-dimensional objects in two-dimensional views (principal, auxiliary, sections).
- Introduce dimensioning and annotate two-dimensional engineering drawings.
- Introduce application of industry standards and best practices applied in engineering graphics.
- Emphasize freehand sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Introduce CAD software for the creation of 3D models and 2D engineering drawings.
Learning Outcomes:
- Describe and utilize both the scientific and empirical foundations for engineering design.
- Recognize basic geometrical relationships; parallelism, perpendicularity, angularity, collinearity and concentricity.
- Use standard units of length used in industry, inches and millimeters, and the expression of fractional and decimal values.
- Use industry-standard Computer Aided Design (CAD) software to model solid objects proceeding from basic sketching techniques to the creation of solid features through the use of extrusions, cuts, rotations, patterns and sweeps.
- Communicate clearly and completely a multi-component, conceptual design by creating drawings that follow good engineering conventions and practices.

ENS208 – Introduction to Manufacturing Systems
Short Content:
Introduction to Manufacturing Systems course focuses on analyses of work and its environmental circumstances in all engineering discipline. During the course basic concepts of Introduction to Manufacturing Systems such as casting, forming, machining, and joining processes for metals and non-metals will be discussed. Based on this knowledge, one of the main goals of this course is to understand machining fundamentals, processes and machines. Joining Processes such as Welding, Assembly with mechanical fasteners, will be discussed and surface finishing will also be considered.

Objectives:
- Introduce most used manufacturing processes to students
- Develop skills and give practical training for use of laser cutter and milling machine
- Provide basic knowledge of manufacturing

Learning Outcomes:
- Present basic manufacturing processes to colleagues
- Compare the basic manufacturing processes and gain the ability to classify the engineering materials and their behavior under various manufacturing processes.
- Calculate production rates, required powers and exposed forces and select suitable machines and presses.
- Evaluate manufacturing process plans
- Analyze the relation between manufacturing tolerances, surface quality and cost of those.
- Discuss how to plan manufacturing resources as material, machine, and tool.

ENS209 – Statics
Short Content:
Force vectors, equilibrium of particle, equilibrium of rigid body, structural analysis and internal forces, friction, center of gravity and centroid, moments of inertia, virtual work.

Objectives:
- To provide students with a basic understanding of forces and force systems acting and equilibrium conditions for particle or rigid body
- To give students the ability to perform analysis of forces developed in structural members
- To perform structural analysis similar to those they will encounter in industry.

Learning Outcomes:
- Construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.
- Analyze distributed loads.
- Demonstrate understanding of the internal forces and moments in members.
- Conduct force analysis on structures.
- Calculate centroids and moments of inertia.
- Solve static equilibrium problems involving friction.

ENS211 – Signals and Systems
Short Content:

Objectives:
- To develop the skills of the students in the area of communication systems
- To provide an understanding of the fundamentals that govern the behavior of signals and systems
- To provide the student with a sophisticated set of tools for analyzing systems

Learning Outcomes:
- Describe the most important properties of communication system
- Demonstrate understand of mathematical descriptions and representations of continuous and discrete signals and systems
- Familiarize with the idea of representing continuous time signals in the frequency domain
- Improve the knowledge of mathematics and thus be more prepared for learning and mastering many other courses.

ENS221 – Introduction to Engineering
Short Content:
The course explores the different disciplines of engineering and providing participants with a broad background in different areas of engineering.
Objectives:
- introduces students to the range of engineering disciplines and the engineering method of problem-solving.
- Motivates the students toward the future engineering careers.
- Develop skills on improving core engineering communication skills.

Learning Outcomes:
- Demonstrate the basic principles of the engineering method.
- Recognise the need for lifelong learning and for continuous professional development
- Write and speak in a style appropriate to academic and professional contexts
- Apply the key concepts of design, ethics, safety and sustainability.
- Explain the nature of the role of engineers in a global society
- Describe the non disciplinary-specific aspects and open-ended nature of engineering problems.

ENS302 – Engineering Optics
Short Content:
This course concerns the basic of optical methods in engineering and system design, with an emphasis on diffraction, statistical optics, holography, and imaging.
Objectives:
The objectives of this course are to teach the student about basic optical mechanisms and components withinsensing, diagnostics and instrumentation with emphasis on bio-medical applications..

Learning Outcomes:
- Name different light sources and explain their principle of operation, and explain the principle of lazeraction
- Describe basic light-matter and light-tissue interactions and calculate energy exchange in those interactions
- Apply and describe spectroscopic techniques like fluorescence, Raman spectrometry, microscopy
- Explain how light is used in different fields of science and engineering.

MATH207 – Vector Calculus
Short Content:
Vectors and geometry of the space: three dimensional coordinate system, vectors, the dot product, the cross product, lines and planes in space, cylinders and quadric surfaces; Vector-valued functions and motion in space: curves in space and their tangents, integral of vector functions, arc length in space,
curvature, components of acceleration, velocity and acceleration in polar coordinates; Partial derivatives; Multiple integrals; Integration in vector fields.

Objectives:
- give students an understanding of the fundamental principles of vector calculus and their applications to everyday life and technology
- provide a reasonably broad perspective of functions with two variables, and vector functions thus developing an understanding of the physical environment and of how human beings interact with it
- provide a complete idea of differentiation and integration of multivariable and vector functions for students, for the use of them in other engineering courses, as well as further graduate studies in engineering
- develop the ability to observe, to think logically, and to communicate effectively
- develop an understanding of the power of mathematical modeling

Learning Outcomes:
- solve multidimensional optimization problems from economics, mechanics, and everyday life
- apply differentiation and integration of multivariable functions to solving problems
- demonstrate understanding of role of vector calculus in fluid mechanics
- compute flux, and work for vector fields
- Justify Green, Gauss, and Stokes theorems for vector fields.

MATH306 – Statistical Modeling
Short Content:
The emphasis will be upon the understanding and use of statistical methodology, and the written communication of the results of data analysis.

Objectives:
The aims of this course are to study common statistical techniques. Students should gain practical experience in elementary data management and analysistechniques.

Learning Outcomes:
- Demonstrate ability to decide on appropriateness and the type of descriptive statistical techniques, toolsand statistiscsoftware
- Estimate the important characteristics (parameters) of populations using data from properly selected
- Write a report about findings that will clearly/visually explain the results, attach all relevant output, and guide decision maker.
- Apply regression and correlation analysis techniques correctly using popular software.

ME208 – Dynamics and Vibrations
Short Content:
This course in vector dynamics is designed to teach solution techniques for rigid body kinematics. Conservation of momentum and energy are employed to analyze two and three dimensional problems. The use of vectors and free body diagrams for the analysis of dynamic mechanical systems is stressed. Kinematics of particle: force and acceleration, work and energy, impulse and momentum. Kinematics of rigid body: force and acceleration, work and energy, impulse and momentum. Vibrations.

Objectives:
- To provide students with basics of three-dimensional motion of particles and two-dimensional motion of rigid bodies
- To provide students with basic principles of work-energy applications in dynamic problems
- To give students ability to analyze various forms of vibration

Learning Outcomes:
- Derive equations for the kinematics and kinetics of particles in three-dimensional motion
- Derive and use equations for the kinematics of rigid bodies in two-dimensional motion
- Set up and solve equations of motion for rigid bodies in two-dimensional motion
- Apply work-energy principles in the solution of rigid-body dynamics problems in two dimensions
- Analyze damped and undamped vibration as well as forced damped vibration.
ME304 – Fluid Mechanics
Short Content:
The course covers the topics of fluid mechanics, fluid dynamics and their applications in various engineering areas.

Objectives:
The course aims to give students fundamental knowledge in fluid mechanics, to teach them basic problem solving skills in hydrostatics and fluid dynamics, and make them aware of role of fluid mechanics in various engineering applications and design.

Learning Outcomes:
- apply integral relations for a control volume to compute various fluid mechanics problems.
- define the physical properties of a fluid and to explain the consequence of such properties on fluid flow.
- apply the conservation principles of mass, linear momentum, and energy to fluid flow systems.
- compute various problems of fluid flow in ducts.
- compute the lift, drag, and moments acting on simple aerodynamic profiles and shapes in inviscid, steady fluid flows.
- apply CFD software to compute fluid dynamics problem with moderate level of complexity.

ME306 – Heat and Mass Transfer
Short Content:
The course provides an introduction to heat and mass transfer and introduces practical application in industry. Basic tools to design process operations involving heat transfer and mass transfer are covered.

Objectives:
The course aims to introduce basic concepts and principles of heat transfer encountered in mechanical engineering practice. It covers analytical, empirical and numerical techniques for the solution of heat transfer problems. At the end of course diffusion mass transfer will be introduced.

Learning Outcomes:
- Identify the mechanisms of heat transfer that occur simultaneously in practice.
- Solve one-dimensional heat conduction problems and obtain the temperature distributions within a medium.
- Solve steady conduction problems that involve multilayer rectangular, cylindrical, or spherical geometries.
- Analyze transient heat transfer problems and solve it when lumped system approach is applicable.
- Understand the limitations of analytical solutions of conduction problems, and the need for computation-intensive numerical methods.
- Calculate various characteristics of internal and external convection heat transfer problems.

NS205 – Dynamics of the Cell
Short Content:
This course describes different principles, observations, and phenomena in cell biology, such as the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles. Biological terminology and concepts in relation to molecules and cells, membranes and their functions, including membrane transport, the processes which regulate and integrate cell function, how energy is used and generated in cells, cell cycle and cell division, the mechanisms and characteristics of reproduction and inheritance, the retrieval, collection and interpretation of biological information.

Objectives:
- To introduce the basic principles and concepts of cell biology to explore the nature of life's molecular building blocks and systems
- To enable students to discover some of the principles behind how cells work and explore ideas about how biological complexity and life itself may have originated
To get idea about ability to combat disease, to harness solar energy to feed the world, to sustainably power human industry and to recycle the waste efficiently using microbial system.

To explain how organisms can pass on their traits which convey selective advantages for survival.

Learning Outcomes:
- List the main components of cells and summarize their structure and functions
- Demonstrate understanding of how these cellular components are used to generate and utilize energy in cells
- Identify cell organelles and the main cytoskeletal components
- Outline how cell ultra structure is related to cell function
- Apply their knowledge of cell biology to selected examples of changes or losses in cell function; these can include responses to environmental or physiological changes, or alterations of cell function brought about by mutations.
- Apply critical thinking and analytical skills to solve problems.

**NS207 – Organic Chemistry**

Short Content:
Introduction to organic chemistry, atoms and atomic theories, Chemical compounds and their chemical reactions. How to write a Formula for an Ionic Compounds and how to name a Covalent Molecule. Alkanes, unsaturated organic compounds, Organic Compounds that Contain Oxygen, Halogen, or Sulfur, aldehydes, ketones, chemistry of lipids. Carbohydrates, proteins and nucleic acids.

Objectives:
- To build a basic knowledge of the structure of organic compounds
- To understand the function of organic molecules in the cell.
- Use of organic compounds in daily life
- To analyze scientific concepts and think critically
- To review the importance and relevance of chemistry in our everyday lives
- To be able to utilize the methods of science as a logical means of problem solving

Learning Outcomes:
- Understand the fundamental concepts of organic and biological chemistry and illustrate and explain natural and synthetic organic compounds and how these compounds affect our daily life
- Differentiate essential hydrocarbons and present their major usage in the industry and in every day live
- Know how to name basic organic molecules with the basic functional groups, understand their essence and name and explain the usage of their main representatives Understand the metabolism of Lipids, Oils and fatty acids and explain the essence and to draw the structure of DNA/RNA molecules
- Explain the role of carbohydrates and their major representative and the importance of Proteins, Enzymes and nucleic acids.

**NS209 – Genetics I**

Short Content:
The purpose of this course is to provide an in-depth, background in all areas of classic Mendelian genetics, population and evolutionary genetics, and Quantitative genetics.

Objectives:
This course aims to introduce the basic concepts in genetics, and explains the principles and mechanisms of heredity. It also provides information about genetic mapping, chromosomal changes, population genetics and quantitative genetics.

Learning Outcomes:
- Understand basic genetic concepts and Mendelian Genetics
- Comprehend the importance of cell cycle and divisions
- Understand and discuss extensions of genetic analysis and chromosomal changes
- Comprehend genetic mapping, Population and Quantitative Genetics
IE303 – Operations Research I
Short Content:
This course covers how to formulate, analyze, and solve mathematical models that represent real-world problems and how to use EXCEL and other software packages for solving optimization problems.
Objectives:
Operations research (OR) have many applications in science, engineering, economics, and industry and thus the ability to solve OR problems are crucial for both researchers and practitioners. Being able to solve the real life problems and obtaining the right solution requires understanding and modeling the problem correctly and applying appropriate optimization tools and skills to solve the mathematical model. The goal of this course is to teach you to formulate, analyze, and solve mathematical models that represent real-world problems. We will also discuss how to use EXCEL and other software packages for solving optimization problems.
Learning Outcomes:
- Formulate a real-world problem as a mathematical programming model
- Understand the theoretical workings of the simple method for linear programming and perform iterations of it by hand
- Perform sensitivity analysis to determine the direction and magnitude of change of a model's optimal solutions as the data change
- Understand the applications of basic methods for, and challenges in integer programming
- Learn optimality conditions for single- and multiple-variable unconstrained and constrained non-linear

IE301 – Production Planning I
Short Content:
This course will introduce students to materials management by learning the planning production process, master scheduling, material requirement and forecasting material demands and inventory levels.
Objectives:
This course equips students with knowledge of fundamental issues in production and inventory planning and control in manufacturing firms, at the same time, developing the students' modeling and analytical skills. The course is targeted toward engineering students planning careers in technical consulting, business analysis in operations, logistics and supply-chain, positions in general management and future entrepreneurs. The students will be able to apply the techniques using MS EXCEL.
Learning Outcomes:
- Apply forecasting methods
- Understand the concept of dependent and independent demand
- Apply aggregate planning and Master Production Scheduling approaches
- Apply the capacity planning methodologies
- Understand the logic and applications of order release mechanisms such as MRP and JIT – based systems

IE304 – Operations Research II
Short Content:
This course covers how to formulate, analyze, and solve mathematical models that represent real-world problems and analyze problems that are uncertain in nature.
Objectives:
This is an undergraduate course, mostly on nondeterministic models in Operations Research. The primary objective is to present and study OR methods that can be applied to analyze and solve problems that are stochastic or uncertain in nature.
Learning Outcomes:
- Analyze and interpret solution results, and report in plain language.
- Construct models of such problems, and solve manually or using computer software
- Develop the ability to recognize the nature of many uncertain or nonlinear real-world processes.
- Abstract from such real-world situations appropriate operations research models.
IE307 – Quality and Reliability Engineering
Short Content:
This course covers quality concepts and basic knowledge of quality and reliability in engineering.
Objectives:
• Introduce analyses of quality concepts
• Develop skills to analyse quality culture in companies
• Provide basic knowledge of quality and reliability in engineering
Learning Outcomes:
• apply continuous improvement techniques and basic quality concepts in analysis
• analyse a manufacturing process using appropriate control charts
• Develop use software for SPC analysis

IE408 – Project Management
Short Content:
Project selecting, structuring, scheduling, budgeting, resource management, and project control are the main topics.
Objectives:
This course introduces project management issues and techniques, which the students are required to apply to real-world projects.
Learning Outcomes:
• Explain the fundamentals of projects and the project management process.
• Demonstrate the use of project planning tools such as Gantt Charts, Critical Path Method, ProjectLibre, etc.
• Critically review a project plan with particular emphasis on identifying project risk.
• To learn how to use a computer software to manage the projects.

REQUIRED Courses for CSE

CS105 – Advanced Programming
Short Content:
The course teaches the students main object-oriented concepts such as classes, objects, instance methods, fields, mutator and accessor methods, encapsulation, polymorphism, inheritance, etc. It also introduces the fundamental data structures used in computer science such as strings, lists, stacks, queues, etc. During the course, students solve moderately complex real-world problems using object oriented programming language. Students are also able to verify the correctness of their solutions and effectively debug the written software.

Objectives:
• teach students main object-oriented concepts and practices,
• introduce students to one object-oriented programming language,
• teach students some of the fundamental data structures and algorithms.

Learning Outcomes:
• Solve moderately complex real-world problems using object oriented programming language
• Verify the performance and correctness of your solutions, and effectively debug the software you have written
• Define, explain, and use the various data structures discussed in class
• Identify which abstract data structure could be useful in representing or solving a problem and why

CS103 – Introduction to Programming
Short Content:
Designed for students with little or no prior experience in programming. The course introduces the basic concepts of procedural programming.
Objectives:
The main goal is for students to develop confidence in programming and the ability to apply programming skills to problems arising in a variety of fields. Topics include: high-programming
languages, language syntax, control statements, loops, functions, arrays and pointers, simple searching and sorting, file streams, introduction to classes and objects.

Learning Outcomes:
- Design programs to solve basic problems
- Apply the concept of variables and control structures to real-life computational problems
- Design and implement functions, parameters, and return values.
- Solve problems requiring the use of arrays and pointers.

Perform file input and output

ENS203 – Electrical Circuits I
Short Content:
This course covers: Electrical circuit components like; batteries, resistors, inductors and capacitors. Series and parallel combinations of DC circuits with and without storage elements. Ohm’s law, Voltage and current dividers, Nodal analysis, Mesh Analysis, Thévenin’s and Norton circuit equivalents. And the transient response of storage elements. An introduction to AC signals and circuits. Lab experiments for connecting and troubleshooting DC circuits using bread boards, and using software packages to simulate and analyze DC circuits behavior.

Objectives:
- Introduce the students to the principles of electric circuits
- Introduce the students to various DC circuits’ solution methods and software simulation
- Provide the students with hands-on skills in the laboratory
- Introduce the students to the basic AC circuits and mathematical representation of AC Signals
- Provide the students opportunities to write substantial, professional, technical reports and conclusions

Learning Outcomes:
- Explain the basic electrical elements like, resistors, inductors and capacitors and their interaction within DC electrical circuits
- Calculate voltage and current in various DC electrical circuit combinations
- Measure voltage and current in various DC electrical circuit combinations
- Explain the basic principles of AC signals and the need for AC circuits
- Solve network theorems of DC circuits by hand and using software packages.

MATH201 – Linear Algebra
Short Content:
This course covers the following main areas: linear systems, their representation and their solution. Vector spaces, subspaces and linear transformations, the various concepts encountered in a classical linear algebra class, like independence, orthogonality, null space, solution space, kernel, dimensions... etc. Toward the end of the course, all the learned concepts are applied in different engineering fields: biology, statics, and electrical circuits.

Objectives:
- Explain the concepts of linear equations and matrices,
- Introduce various methods of solving linear equations
- To provide students with good understanding of vector space, inner product spaces and linear transformation.
- Explain the various use of determinants, independence, orthogonality and other concepts in linear systems and their solutions.
- To connect linear algebra to other fields both within and without mathematics.

Learning Outcomes:
- Identify and represent linear systems in matrix form
- Solve linear systems of equations using various techniques
- Explain vector spaces and inner product spaces
- Identify linear transformation and extract transformation matrix for them
- Solve various linear algebra problems in abstract form and within applications in other fields like biology, mechanical engineering, electrical engineering and others.
MATH202 – Differential Equations
Short Content:
First-order differential equations and solution methods. Modeling with Linear Equations. Second and higher order linear differential equations, undetermined coefficients, variation of parameters, Applications of Second Order Equations. series solutions, series solution around an ordinary point, series solution around a regular singular point, Euler equations and Bessel’s equations, Laplace transformation, models with second order equations, linear systems, numerical methods, nonlinear systems, boundary value problems, partial differential equations, separation of variables; heat conduction problem the wave equation; vibration of elastic strings and membranes, Laplace equation: steady state heat conduction further remarks on separation of variables; series of orthogonal functions Bessel and Legendre expansions.

Objectives:
- The goal of the course is to explain the main concepts and fundamental processes of differential equations, their solution techniques, and modeling engineering problems using differential equations.
- The course also provides also and modeling engineering problems using partial differential equations. Wave equation; vibration of elastic strings and membranes, diffusion equation, and Laplace equation are used in modeling.

Learning Outcomes:
- Solve first, second, and higher order differential equations
- Model engineering problems using first and second order ordinary differential equations
- Solve engineering problems formulated by the use of second order linear using partial differential equations.

MATH203 – Introduction to Probability and Statistics
Short Content:
This course covers the following topics: Axioms of probability, discrete and continuous probability distributions, conditional probability and Bayes theorem, discrete and continuous random variables, expectation, variance and standard deviation, binomial distribution, normal distribution, exponential, uniform and Poisson-distribution, Central limit theorem, sampling, confidence intervals, hypotheses testing (time permitting), Chebishev inequality (time permitting).

Objectives:
- To give students a deep understanding of the fundamental principles of probability
- To provide students with counting skills necessary for computing discrete probabilities
- To illustrate a number of applications of probability and statistics in many sciences
- To give a good overview of common types of random variables: uniform, binomial, exponential, normal
- To give a basic understanding of sampling, confidence intervals and applications of the Central Limit Theorem.

Learning Outcomes:
- To understand the basic axioms of probability, conditional probability, independence of events and Bayes theorem and perform basic counting techniques (combinations, permutations).
- To compute probabilities, probability distributions, expectation and variance.
- To have a good understand of common types of random variables: uniform, exponential, normal, etc.
- To understand the Central limit theorem and its applications
- To find confidence intervals for means with known standard deviation.

MATH204 – Discrete Mathematics
Short Content:
Set theory, Relations and functions, Combinatorics, Induction, Recursion, Graph Theory.

Objectives:
To extend student’s mathematical maturity and ability to deal with abstraction.
To introduce most of the basic terminologies used in computer science courses.
To train students how to apply ideas to solve practical problems.
To provide students with the basic language and problem solving tools of discrete mathematics so they can use these in further study.

Learning Outcomes:
- Translate statements and arguments into symbolic form and construct truth tables to evaluate these statements and arguments.
- Apply basic logic to the analysis of digital logic circuits.
- Construct direct proofs, proofs by contradiction, and proofs by mathematical induction.
- Classify types of graphs, find paths, circuits.
- Use combinations and permutations to find probabilities.

MATH205 – Numerical Analysis
Short Content:
Topics include the standard algorithms for numerical computation: root finding for nonlinear equations, interpolation and approximation of functions by simpler computational building blocks, numerical differentiation and divided difference, numerical quadrature and integration, numerical solutions of ordinary differential equations and boundary value problems, symmetric matrix eigenvalue problems, introduction to optimization.

Objectives:
- To develop numerical algorithms to provide solutions to common problems formulated in science and engineering
- To develop the basic understanding of the construction of numerical algorithms, and perhaps more importantly, the applicability and limits of their appropriate use
- To understand the guaranteed accuracy that various methods provide, the efficiency and scalability for large scale systems and issues of stability.

Learning Outcomes:
- Solve systems of linear and non-linear algebraic equations by using a range of methods.
- Apply numerical interpolation, approximation, integration and differentiation techniques in solving different kind of engineering problems.
- Use techniques for solving ordinary differential equations.
- Use MATLAB packages for solving problems by numerical methods.

CS302 – Algorithms and Data Structures
Short Content:
Designed to teach students the algorithmic toolbox for problem-solving. The main goal of the course is for students to learn the algorithmic paradigms and data structures that enable them to solve computational problems in any field. At the end of the course, a student should be able to take a computational problem from any field and know what data structure and/or algorithm is applicable in that problem. The course develops data structures and relevant algorithms in parallel. Topics include: stacks, queues, arrays, sorting and searching, binary search trees, hashing, heaps, graphs and graph algorithms.

Objectives:
- The course presents to students how to design, implement and analyses data structures and algorithms for computer programs.
- Demonstrates and discusses computational complexity of algorithms and their comparative analysis.

Learning Outcomes:
- Define basic types of data structures like stackcs, queues, sets, arrays, etc.
- Define, explain and use various algorithmic paradigms for problem-solving
- Modify existing and develop new efficient algorithms.
- Analyze complexity of algorithms
- Be able to recognize the appropriate algorithmic method to solve a newly given problem.

**CS303 – Digital Design**

**Short Content:**
Digital Design is concerned with the design of modern digital systems such as microprocessors, microcontrollers, I/O device controllers and Digital Signal Processors. In this introductory course on the subject, the students will learn topics such as Boolean algebra, Laws of Commutation, Association, Duality, De Morgan, Logic Gates, Truth tables, Fan-in, Fan-out, Number Systems and Representation, Flip-flops, State machines, encoder/decoder, multiplexer/demultiplexer, adder and register files. A focal point of the course will be the practical aspects of designing modern digital systems; the students will learn how to solve practical problems using a Hardware Description Language. In particular, VHDL: Very High Speed Integrated Circuit (VHSIS) Hardware Description Language will be used.

**Objectives:**
To introduce the main building blocks of digital circuits and develop the skills of the students in the area of logic design and digital systems.

**Learning Outcomes:**
- Express, convert and calculate with real numbers having different bases
- Analyse and optimize digital system with respect to number and type of logical gates,
- Design, assemble and test digital circuits, configured into functional systems as combinational and sequential circuits on bread board, in programmable devices using hardware definition language, or a simulation program,
- Understand architecture and timing diagrams of digital circuits that include memory blocks (RAM),
- Write a report that clearly and concisely explains the results obtained in laboratory exercises

**CS304 – Computer Architecture**

**Short Content:**
During this course the students will learn the fundamentals of Computer Architecture. We will start with the review of basics, starting from electrical signal and production of digital circuits to data and program presentation. Then three major computer building blocks will be examined: processor, memory and input/output. The processor part will include the following topics: processor types and computation engines, instruction sets, operand addressing and instruction representation, CPUs and assembly language programming. The memory section will cover the following topics: physical memory and physical addressing, virtual memory technologies and virtual addressing, caches and caching. Finally, the input/output section will cover: concepts and terminology, busses and bus architecture, programmed and interrupt-driven I/O and programmer’s view of devices, I/O and buffering.

**Objectives:**
- to understand how programs and data are presented at the machine level
- to have a high level understanding of how computer is built from the low level electric signal to application software (processor, memory, I/O)
- to understand issues of performance and to be able to debug a sizable system when something breaks

**Learning Outcomes:**
- Master of the basic concepts underlying all computer systems
- Apply the knowledge of computer architecture to debug a program
- Design efficient, secure, cache-efficient and reliable programs
- Write programs in an assembly language.

**CS305 – Programming Languages**

**Short Content:**
Describes the fundamental concepts of programming languages by discussing the design issues of the various language constructs, examining the design choices for these constructs in some of the most common languages, and critically comparing design alternatives.

Objectives:
- Understand the principal goals and to introduce the main constructs of contemporary programming languages
- provide students with the tools necessary for the critical evaluation of existing and future programming languages
- prepare the student for the study of compiler design

Learning Outcomes:
- Be Identify the similarities and differences of various programming languages
- Implement different programming language for the same code solution
- Understand design PL methodology.
- Evaluate existing programming languages on their core concepts
- Identify various programming language design and construction

CS306 – Database Management
Short Content:
The course introduces students to the topics in the field of database management and provides an opportunity to gain theoretical and practical understanding of the relational algebra and the concepts behind the relational model. Different data modeling concepts are discussed and students are able to demonstrate their knowledge in the task of database creation using complex SQL queries of relational databases.

Objectives:
- to introduce the field of database management.
- to introduce the concepts behind the relational model
- to introduce the relational algebra
- be familiar with data modelling concepts (E-R and Class diagrams) used in database development
- be able to create databases and complex SQL queries of relational databases.
- be familiar with a broad range of data management issues including data integrity and security.

Learning Outcomes:
- Draw ER Diagrams for databases and implement databases
- Develop commands to create database schemas, insert and manipulate data records and extract information from stored data.
- Apply the theoretical foundations of query languages to real life problems
- Use SQL database language in MySQL
- Critically analyze and evaluate database designs in real-life contexts

CS307 Operating Systems
Short Content:
Designed to teach students the concepts of modern operating system design. The focus is on understanding the major functions of the operating system, emphasizing system programming tasks, dealing with programs and processes, threads, synchronization, input/output, file systems, dynamic memory and inter-process communication. Upon completion of this course, the students will be able to more fully understand the concepts employed in operating systems, explore the use of operating systems such as UNIX, examine issues in distributed operating systems, and practice programming with threads, remote procedure calls and client/server processes.

Objectives:
- The course aims to show the students basic operating system concepts
- Present high-level understanding of the processes relevant to the operating system
- Demonstrate how to write system programs that use operating system services.

Learning Outcomes:
Describe process management, storage management, I/O and File systems
Describe and apply basic algorithms associated with distributed process management
Apply regression and correlation analysis techniques correctly using popular software
Analyze a concurrent programming application and apply appropriate techniques to avoid control problems: mutual exclusion, deadlock, and starvation
Describe and apply virtual memory concepts, concept of a process and list the various process state transitions and scheduling on process and file management.

CS308 – Software Engineering
Short Content:
The aims of this course are to show the key elements of software development process as practiced in the industry. It discusses the key ideas in program design, development, debugging, testing and maintenance. Process of planning and writing documentation relevant to the development of software applications are also covered. Topics include software engineering process, UML basics, introduction of design patterns, good coding practices and professional software engineering skills.

Objectives:
- Show the key elements of software development process as practiced in the industry
- Present the tools used in the making of quality software.
- Demonstrate the process of planning and writing documentation relevant to the development of software applications.

Learning Outcomes:
- Present key elements of software development processes as practiced in industry.
- Plan and implement an effective software engineering process, based on the acquired knowledge of used development lifecycle models.
- Effectively document and analyze requirements and translate them into an implementable design using a structured process model.
- Use Unified Modeling Language (UML), a widely-used industry standard for describing the design of software design using a structured process model.
- Effectively work in teams that involve skills such as organization, planning, time management and within group organization.

CS313 Theory of Computation
Short Content:
The course introduces students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability. The students will develop ability to understand and conduct mathematical proofs for computation and algorithms. This theory provides a simple yet elegant way to understand the complex machine known as a computer. The theory is mature, 70 years old, stable and “forever” in contrast with ever-changing technological world and computer systems in particular. Many parts of this theory may have direct impact on practical problems faced by students such as (minimization of ) Automata on circuit design, compiler design, and search algorithms; Formal Languages and Grammars on compiler design but also for analysis of natural languages; and Complexity on cryptography and optimization problems in manufacturing, business, and management.

Objectives:
- Understand basic theory of computation concepts
- Be able to write programs for DFA, parsing.
- functions on languages, and decision procedures for regular and context-free languages.

Learning Outcomes:
to categorize abstract finite state machines and to construct machines appropriate to specific problems.

- to demonstrate a deeper and broader understanding of classes of complexity and of the ability to deduce the complexity of specific algorithms.
- to display an extended ability to determine the complexity of software by the application of analytical techniques
- to demonstrate practical competence in the range of issues associated with the class.

**CS412 – Web Application Development**

**Short Content:**
The course introduces the student to the dynamic web programming with the focus on server side web programming. Topics include: PHP syntax, PHP and MySQL integration, implementation of authentication, web application security issues, session control and other advanced concepts and issues about server-side design strategies. Through labs and programming projects, students will learn how to use current scripting and mark-up languages to build nontrivial applications.

**Objectives:**
- teach students to build nontrivial, dynamic web applications
- teach students server-side web programming with PHP and MySQL technologies
- expose students to basic security mechanisms for server-side web application development

**Learning Outcomes:**
- develop dynamic websites
- Apply HTML, CSS and JavaScript for website design. Usage of a web application framework (e.g. Bootstrap).
- Understand and apply the a scripting language and database system to design dynamic website (e.g. PHP and MYSQL).
- Build basic security mechanisms for protection of dynamic websites.

**EE325 – Embedded Systems**

**Short Content:**
The fundamentals of embedded system hardware and firmware design will be explored. Issues such as embedded processor selection, hardware/firmware partitioning, glue logic, circuit design, circuit layout, circuit debugging, development tools, firmware architecture, firmware design, and firmware debugging will be discussed.

**Objectives:**
- Introduce Embedded Systems from Software and Hardware points of view
- Provide real world coding experience and hands on skill through programming in open source platform
- Explain various types of peripherals and communication protocols

**Learning Outcomes:**
- Explain basic architecture and code for certain microcontroller platform
- Explain serial and parallel interfacing as well as different types of interrupts and handleing routines
- Write C and assembly language code for embedded systems
- Evaluate various hardware and software trade-offs related to projects as well as suitable protocols needed.

**SE308 Communication Systems and Networks**

**Short Content:**
This course provides knowledge and identifies principles behind advanced high-speed computer networks and Internet; to enable to understand issues and implementation considerations relevant to providing services in advanced communication networks and Internet. Students will learn how to describe the layered organization and structuring of computer networks, identify and analyze the key design parameters and their effect to provide consistent services in computer networks, analyze the key problems involved at the layers of the TCP/IP protocol stack and apply the techniques and algorithms that have been devised to address these problems, maintain small network, to design small and medium network and to be a part of team to maintain a large network.
Objectives:
- The course aims to provide knowledge and identify principles behind advanced high-speed computer networks and Internet.
- To enable students to understand issues and implementation considerations relevant to providing services in advanced communication networks and Internet.

Learning Outcomes:
- Be able to apply the understanding of layered design and network structure in designing real-life systems.
- Demonstrate an in-depth understanding and design issues of advanced networking.
- Analyze the key design parameters and their effect to provide consistent services in computer networks.
- Analyze the key problems involved at the layers of the TCP/IP protocol stack and apply the techniques and algorithms that have been devised to address these problems.
- Maintain a small network, to design small and medium networks and to be a part of a team to maintain a large network.

AREA ELECTIVE / PROGRAM Courses

CS299 – Social, Legal and Ethical Issues in Computing
Short Content:
The course explains and discusses social, legal and ethical aspects of computing in areas such as intellectual property rights, computer and network security, etc. It identifies the effects of technological change, particularly that due to the introduction of computer and software systems. It provides an understanding of legal areas which are relevant to discipline of computing. It discusses and analyzes real life examples in consideration of ethical matters and solving problems.

Objectives:
- To explain and discuss social, legal and ethical aspects of computing in areas such as intellectual property rights, computer and network security, etc.
- Provides an understanding of legal areas which are relevant to discipline of computing.
- Give and analyze real life examples in consideration of ethical matters and solving problems.

Learning Outcomes:
- Identify and understand ethical problems found in computing.
- Discuss and solve ethical issues that are raised in computer science.
- Discuss and analyze the possibilities and limitations from a legal and social perspective.
- Identify and analyze the effect of technological change, particularly that due to the introduction of computer and software systems.

CS310 – Human Computer Interaction
Short Content:
Human factors issues in the development of software, the use of database systems, and the design of interactive systems. Science base (theories, models, usability studies, and controlled experimentation), and software engineering with user interface development environments. Issues include: programming and command languages; menus, forms, and direct manipulation; graphical user interfaces, computer-supported cooperative work, information search and visualization; input/output devices; and display design.

Objectives:
- Understand the core theories, models and methodologies from the field of human computer interaction (HCI).
- Describe and discuss current research in the field of HCI.
- Implement simple graphical user interfaces using the Java Swing toolkit.

Learning Outcomes:
- Understand and describe HCI design principle.
- To have and updated current research in the field of HCI.
- Be able to implement simple graphical user interfaces using the Java Swing toolkit.
• Be able to design user interfaces easy in use.

CS402 – Introduction to Design of Compilers
Short Content:
The course is intended to teach the students the basic techniques that underlie the practice of Compiler Construction. The course will introduce the theory and tools that can be standardly employed in order to perform syntax-directed translation of a high-level programming language into an executable code. This includes parsing, semantic processing and optimization. Students will study compiler and translator writing techniques and scope rules, block structure and symbol tables, runtime stack management, parameter passing mechanisms, heap storage management, code generation, macros. A compiler project for a substantial programming language using a compiler generating system is assigned to every student. Student will understand better advanced semantics aspects of programming languages, such as recursion, dynamic memory allocation, types and their inferences, object orientation, concurrency and multi-threading.
Objectives:
This course introduces students to design and implementation of compilers. It covers both the theoretical underpinning as well as practical considerations when designing a compiler. The course material is divided according to compiler design phases, as follows: lexical analysis, finite state automata, syntax analysis, context-free grammars, parsing, syntax-directed translation, intermediate-code generation, type checking, memory management, garbage collection, code generation and code optimizations. One of the key objectives of the course is to teach students to become even more proficient programmers. This is done through a series of practical coding assignments that lead to a simple, yet complete compiler at the end of the course.
Learning Outcomes:
• Design and implement a simple compiler
• Demonstrate an in-depth understanding of different compilers phases and steps
• Become a more proficient programmer
• Employ the knowledge of compilers in design of real-world systems

CS403 – Distributed Systems
Short Content:
The course introduces the main principles underlying distributed systems: processes, communication, naming, synchronization, consistency, fault tolerance, and security. Students will be familiar with some of the main paradigms in distributed systems: object-based systems, file systems, web-based and coordination-based systems. On the completion of the unit, students will understand the fundamentals of distributed computing and be able to design and develop distributed systems and applications. Students will be able to explain what a distributed system is, and what the desired properties of such systems are.
Objectives:
• introduces the main principles underlying distributed systems: processes, communication, naming, synchronization, consistency, fault tolerance, and security.
• show the fundamentals of distributed computing and teach students how to design and develop distributed systems and applications.
• enable students to design, implement and analyze the simple distributed system
Learning Outcomes:
• understand principles underlying distributed systems: processes, communication, naming, synchronization, consistency, fault tolerance, and security.
• explain what a distributed system is, and what the desired properties of such systems are.
• design, implement and analyze the simple distributed system
• assess the quality of the existing system and propose how to upgrade it.
• understand and use different tools and frameworks to manage distributed systems.

CS404 – Artificial Intelligence
Short Content:
Provides students with an opportunity to gain advanced theoretical understanding of history and philosophy of the Artificial Intelligence (AI). Students will learn classical AI approaches like search problems, machine learning, constraint satisfaction, graphical models, logic etc. They will also deal with how to model a complex real-world problem by the classical AI approach
Objectives:
The aims of this course are to present an overview of artificial intelligence (AI) principles and approaches. Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning. Students will implement a small AI system in a team environment.

Learning Outcomes:
- comprehend challenges and provide solutions to various problems
- write code using mathematical notation language (e.g. lisp variant, scheme)
- design and implement a real world application using AI module
- understand and apply sub-AI topics such as neural computing, uncertainty and bayesian networks, concept of learning (supervised / unsupervised) etc in solving real world problems.

CS405 – Computer Graphics

Short Content:
During this course the students will learn the fundamentals of Computer Graphics. The knowledge of linear algebra and data structures will be assumed. First topic that will be discussed is graphics systems and models. The next topic will be graphics programming. After that we will teach how to represent 3D objects geometrically and how to perform transformations on them. The concept and viewing 3D scenes as well practical implementation of it will be taught as the next topic. After the students have learned how to create a 3D mode, and successfully move objects and camera through it we will teach lighting and shading of CG scenes. For the remainder of the class the students will be taught a selection of the following topics: Implementation strategies, Discrete techniques, Modelling and hierarchy, Procedural methods, Curves and Surfaces and Advanced rendering.

Objectives:
- to teach students basic computer graphics algorithms for 3D computer graphics systems
- to teach students on the different goals of computer graphics (such as real-time graphics and high-fidelity graphics) and issues connected to them
- to teach students how to program a computer graphics systems

Learning Outcomes:
- to understand basic concepts and algorithms relevant to computer graphics
- to identify, define and solve graphics problems through hands-on programming.
- to critically evaluate graphics algorithms and software
- to communicate information through visual means using computers.

CS413 – Computer Graphics

Short Content:
This course offers an in-depth exploration of fundamental concepts in 2D and 3D computer graphics and also provides introduction to computer graphics algorithms, software and hardware.

Objectives:
- Understand challenges and complexities involved in designing and implementing modern business web applications.
- Gain experience designing and implementing a project during the course of the semester.
- Understand inn’s, out’s and pitfalls of using graphics, color and fonts on web page.

Learning Outcomes:
- Develop dynamic websites
- Integrate the PHP scripting language and the MySQL database system

CS414 – Computer Vision

Short Content:
Image acquisition, image representation, image processing, image segmentation, colour image processing, morphological operations, object recognition, feature extraction, representation and description, pattern recognition and training.

Objectives:
To provide a broad introduction to Computer Vision, its applications and image representation
To introduce the current approaches to image formation and image processing
To introduce the basic concepts and algorithmic tools of Computer Vision
To develop the students’ skills in the practical design and implementation of computer vision system

Learning Outcomes:
To have an understanding of the theoretical and practical capabilities of Computer Vision
To have a knowledge of common Computer Vision and Image Interpretation techniques and algorithms
Apply techniques to extract useful features from an image
Apply techniques to recognize patterns and objects
Be able to formulate solutions to problems in Computer Vision.

CS415 – Pattern Recognition
Short Content:
Examples of pattern recognition systems, feature selection, measurement techniques, basic structure of pattern recognition systems, supervised and unsupervised learning, basics of multivariate probability and statistics, class conditional density function, Bayesian decision theory, Bayes classifier, Parametric (model-based) and nonparametric techniques (Parzen windows, k-nearest neighbors) for supervised learning, Validation of pattern recognition systems, cross-validation, Algorithms for unsupervised classification. K-means clustering.

Objectives:
To introduce students to fundamental topics in the field of pattern recognition.
To equip student with the knowledge of hardware and software implementation of some important pattern recognition algorithms.
To explain to students methods such as Bayesian spam filtering, nonlinear dimensionality reduction on human facial expressions, and intrusion detection using pattern recognition
To provide the student with both a fair sampling and an in-depth, useful know-how of the big field of pattern recognition.

Learning Outcomes:
Explain basic structure of pattern recognition systems and the statistical bases of the classification theory (the Bayes classifier).
Distinguish supervised learning methods from the unsupervised one
Apply supervised learning methods (model-based maximum likelihood, k-nearest neighbors, k-means clustering).

CS416 – Pattern Recognition
Short Content:
Designed to teach students theoretical foundations and practical applications of cryptography. The goal of the course is to have students understand how cryptographic algorithms, keys and protocols, and an appropriate hardware and software can solve security problems such as confidentiality, integrity and authenticity. Topics include: threats, attacks, and countermeasures, including cryptosystems and cryptographic protocols, secure systems/networks, history of cryptography, encryption (conventional, public key), digital signatures, hash functions, message authentication codes, identification, authentication, applications.

Objectives:
teach students theoretical foundations and practical applications of cryptography
have students understand how cryptographic algorithms, keys and protocols
introduce the appropriate, state of art, hardware and software that can solve security problems in real life situations

Learning Outcomes:
to understand theoretical foundations and practical applications of cryptography.
understand how cryptographic algorithms, keys and protocols
effectively solve security problems such as confidentiality, integrity and authenticity
analyse and assess the quality of an existing cryptographic system
Understand and use different tools and frameworks for Cryptography

**CS417 – Introduction to Data Mining**

**Short Content:**
Previous data mining techniques, type of data, similarity measures, data/research visualization. Predicate models (e.g. decision trees, SVM, Bayes, K-nearest neighbors, packing and strengthening). Modeling techniques of evaluations, clustering, (hierarchical, partitional, on the basis of density), discovering anomalies. Case studies such as scientific environment, web, network attacks, and genomics.

**Objectives:**
- Teach students about basic tools and techniques for data mining
- Enable students to become familiar with active research challenges in data mining
- Gain hands-on experience on data mining applications

**Learning Outcomes:**
- Deal with data issues that will be need for successful application of data mining
- Apply knowledge in database technologies which is necessary in data mining apps
- Apply pre-processing methods for given data
- Apply clustering and classification algorithms
- Understand statistical logic of data mining algorithms that is outlined.

**CS420 – Network Programming**

**Short Content:**
This course covers principles and practice of network programming, application layer protocol and how applications use the transport layer, the client-server model, concurrent processing, introduction to sockets and related functions client and server software design with examples, principles, issues and challenges in e-mail and web application protocols, security protocols and network life system concepts.

**Objectives:**
- Cover principles and practice of network programming, application layer protocol,
- Show how applications use the transport layer, the client-server model, concurrent processing,
- Introduce sockets and related functions client and server software design with examples, principles, issues and challenges in e-mail and web application protocols, security protocols and network life system concepts.

**Learning Outcomes:**
- Write client and server programs using UDP and TCP protocols.
- Implement protocols for TCP based connection oriented application layers
- Write distributed network applications using common protocol standards such as XML-RPC and RMI.
- Create, install, maintain, and analyze SSL security certificates for various network services on Linux systems.

**CS421 – Architecture and Implementation of Database Management Systems**

**Short Content:**
This course introduces the main techniques for database analysis and design and how they can be applied in a practical way. Additionally, it covers a methodology for database design and considers the main technologies associated with data ownership, data security and how to deal with big data like data warehouses.

**Objectives:**
This course introduces the main techniques for database analysis and design and how they can be applied in a practical way. Additionally, it covers a methodology for database design and considers the main technologies associated with data ownership, data security and how to deal with big data like data warehouses

**Learning Outcomes:**
Analyze the database system development lifecycle.
Identify database design methodology and three phases of database design.
Evaluate and discuss the scope of database security and examine the types of computer systems threat
Identify basic concepts of the DDBMS and make distinction between DDBMSs, distributed processing, and parallel DBMSs.
Evaluate and discuss the DBMS requirements for proper enterprise data warehouse implementation.

**CS423 – Parallel Computing**

**Short Content:**
Designed to teach students the main tenets of parallel computing. The goal of the course is to have students learn about parallel and high-performance computers and algorithmic design paradigms that surround such architectures. Topics include: parallel architectures design, embedding’s, routing, parallel performance metrics, parallel sorting, parallel matrix operations, graph problems, dynamic load balancing, types of parallelisms, parallel programming paradigms, message passing programming in MPI.

**Objectives:**
The course aims to show the students the understanding of relevant algorithms and their complexity, teach students parallel architectures and high-performance computers.

**Learning Outcomes:**
- Apply algorithms in parallel computing problems
- Design a small scale parallel architectures
- Implement various parallel algorithms

**CS426 – Software Engineering II**

**Short Content:**
During the course the students learn how to develop a strong sense of design quality, understand the process of design through examples, discussion and introspection. Students also develop advanced skills for specification, design, implementation and testing of software. Topics include software testing, software maturity models, cost specification models, distinction between critical and non-critical systems, bug estimation, software reliability models, software complexity, quality control, etc. During the course, students are expected to work on a hands-on, real life project that includes the full life cycle of software development.

**Objectives:**
- present a process of design through examples, discussion and introspection
- to present the full software life cycle (i.e. specification, design, implementation, testing and evolution) .
- Develop the skill in team work through a real world software project.

**Learning Outcomes:**
- demonstrate knowledge of the distinction between critical and non-critical systems
- author a software requirements document process model and translate them into implementable design using a structured process model
- identify specific components of a software design that can be targeted for reuse
- manage a software testing plan
- work in a team do develop a real world software project.

**CS427 – Computer and Network Security**

**Short Content:**
Concepts of computer, network, and information security. Risk analysis, authentication, access control, security evaluation, audit trails, cryptography, network/database/application security, viruses, and firewalls.

**Objectives:**
- To teach students theoretical concepts of computer and network security
- To teach student practical concepts of computer and network security
• To teach students basic mathematical algorithms that are used to implement computer and network security

**Learning Outcomes:**

• use a computer system in a secure manner
• recognize common vulnerabilities in protocols, designs, and programs
• eliminate or minimize the impact of these vulnerabilities
• apply the principal security standards in use today to design and build secure applications
• Apply principles, concepts, and tools from security to your own research.

**CS422 – Wireless and Mobile Networks**

**Short Content:**
The course will cover basic aspects of signal propagation like path loss of signals, multi-path propagation, interference, multiplexing, spread spectrum, media access control, wireless system design, wireless link characteristic, avoiding collision, various types of wireless technologies (Bluetooth, IrDA, Wi-Fi, WiMax), reactive and proactive routing, cognitive networks, ad hoc networks and other topics.

**Objectives:**

• To introduce the students to the principles of RFID, NFC, Bluetooth, ZigBee, Wifi technologies
• To give the students hands-on laboratory experiences
• To provide the students with opportunities to write substantial, professional, technical reports and conclusions.

**Learning Outcomes:**

• Recognize effects of radio propagation
• Explain various types of wireless technologies
• Get familiar with IEEE 802.xx family of standards
• Perform basic operations with wireless devices

**CS498 – Special Topics in Computer Science I**

**Short Content:**

**Objectives:**
The aims of this course are to teach students about recent advances and topical issues in selected topics in computer science and engineering

**Learning Outcomes:**

• understand the whole concept of going from idea to a software product
• implement a software based on initial applicative idea
• learn to program mobile applications

**CS499 – Special Topics in Computer Science II**

**Short Content:**

**Objectives:**
The aims of this course are to teach students about recent advances and topical issues in selected topics in computer science and engineering

**Learning Outcomes:**

• understand the whole concept of going from idea to a software product
• implement a software based on initial applicative idea
• learn to program mobile applications

**MAN461 – Management Information Systems**

**Short Content:**
The aim of the course is to introduce students with importance of IT in today business environment
Objectives:
- introduce students with different types of information systems that are highly used by different types of business in order to help them recognize opportunities
- make decision and eventually gain competitive advantage
- provide information which help students to recognize when it is necessary for the business to adopt new information system and which developmental approach to use.

Learning Outcomes:
- Elaborate the importance of IT in business environment.
- Understand the differences of applying different information systems
- Match business strategies and application of different information systems.
- To make differences between the approaches of developing information systems for particular needs of business.

BIO310 – Bioinformatics
Short Content:
This course introduces fundamental concepts and methods for structural bioinformatics and the advanced applications.

Objectives:
The goal of this course is to introduce students to the application of biological databases and software to address and analyze biological phenomena.

Learning Outcomes:
- Use online databases to study various aspects of biology
- Analyze and compare gene and protein sequences,
- Model and analyze protein’s secondary and tertiary structure
- Identify and predict protein interactions and docking sites using bioinformatics software.

EE331 – Introduction to Communication Systems
Short Content:

Objectives:
- introduce students to the basic concept knowledge from signals and systems;
- familiarize students with the concept of communication systems;
- introduce students to the fundamentals of analog and digital communications;
- get comfortable with the concept of noise and random process.

Learning Outcomes:
- link the fundamental concepts and theory of analog and digital communication systems with practice
- apply methods of mathematical analysis for signal processing and modulation processes
- Become well versed in analog and digital modulation methods.

EE418 – Introduction to Machine Learning
Short Content:
Models of learning. Supervised algorithms such as perceptrons, logistic regression and large margin problems (Support vector machines). Hypothesis evaluation. Learning theory. Unsupervised algorithms (clustering, dimensionality reduction, kernel methods); applications of machine learning, such as to robotic control, data mining, autonomous navigation, bioinformatics, speech recognition, and text and web data processing.

Objectives:
- To provide conceptual, theoretical and experimental training in machine learning.
- To introduce students with fundamental concepts in machine learning.
- To acquire hands-on experiences with implementation of machine learning algorithms.
- To develop understanding how to formulate and solve application questions with appropriate machine learning methods.
- To discuss recent applications of machine learning.
Learning Outcomes:
- Identify problems where machine learning techniques can be useful
- Frame the problem and the solution in terms of machine learning,
- Choose appropriate algorithms, implement the solution, and evaluate the results.

EE434 – Digital Communications
Short Content:
This course covers next topics: mathematics of digital communications, linear codes, graph based codes, multichannel and multicarrier systems, and spread spectrum signals.

Objectives:
- To layout foundations in digital communications and communications theory, coding and broadband signals
- To develop skills for practical solutions digital communication problems
- To understand the fundamentals of digital communications

Learning Outcomes:
- list concepts of digital communications,
- identify potentials of application of basic concepts
- use mathematical knowledge for solving problems in a field of block codes, digital modulation schemes, spread spectrum for digital and fading channels
- categorize channels, modulation schemes, multichannel and multicarrier systems

EE435 – Microprocessors I
Short Content:
The course introduces the architecture and instruction set of typical 8-bit microprocessor. It also deals with Assembly Language Programming using a macro-assembler. Input-output techniques and important programmable support chips used in microprocessor-based systems are discussed in detail.

Objectives:
- To introduce microprocessor systems;
- To learn the Operation and Control of 8-bit microprocessor
- To present Instruction set of assembly language programming as well as Programmable Peripheral Interface
- To introduce I/O Techniques, Interfacing of I/O Devices; Interrupts; Peripheral Devices
- To introduce programmable Interval timer as well as programmable Interrupt Controller

Learning Outcomes:
- Explain the structure and functions of Microcomputer System. With emphasis on 8-bit microprocessors (Intel 8085)
- Explain various memory types MROM, ROM, EPROM, EEPROM, DRAM,
- Write assembly code for operation and control of microprocessor and Interface the microprocessor with memory chips and various I/O devices
- Explain and use various interrupts of a microprocessor
- Programming peripheral interface and programming interval timers.

EE436 – Programmable Logic Controllers
Short Content:
The course gives an introduction to Programmable logic controllers; their structure, their connection, and their various types of input and output devices and signals. The course gives an introduction different programming approaches and different programming platforms, with more emphasis on ladder diagram programming using logix pro as well as zelio soft. Topics include counters, timers, comparators, Control Instructions, data manipulation as well as input and output devices.

Objectives:
- Introduce the main concepts of programmable logic controllers, and the benefits of using PLCs in industrial applications
Explain the way PLCs are used and implemented in various industrial applications.
Introduce PLC programming using ladder logic diagram and other programming methods

Learning Outcomes:
- Explain what a PLC and how does it work
- Explain what are input and output devices to PLC and their modules
- Demonstrate understanding of various programming principles of a PLC.
- Write and test ladder diagram programs for PLC to be implemented in the controlling of various applications

EE437 – Introduction to Robotics
Short Content:
Position and orientation in 3-D space; manipulator forward and inverse kinematics; velocities and forces - Jacobian's relations; manipulator dynamics; stiffness and compliance control; trajectory control; mobile robots - selected topics.

Objectives:
- To provide students with a solid foundation for the multidisciplinary field of robotics
- To introduce the basic concepts and algorithmic tools in robotics
- To develop the students’ skills in the practical design and implementation of robotic systems

Learning Outcomes:
- Classify main types of industrial and non-industrial robots,
- Use various mathematical tools for the single chain robot kinematic and dynamic analysis, and the fundamental control methodologies for robot tracking and force control,
- Generate smooth trajectories,
- Choose appropriate actuation and reduction mechanisms for robotic designs,
- Simulate the dynamics of robotic manipulators under independent joint and multivariable control strategies.

SE211 – Software Construction
Short Content:
Software Construction presents the basic principles and techniques of software development. Special attention is paid how to write the software code that is bug-free, easy to maintain, understandable, extensible and reusable. During the course students will tackle the set of problems and a final project. The particular attention is paid to the topics such as specifications and invariants; testing; abstract data types, simple and complex; design patterns for object-oriented programming; notions of concurrent programming and concurrency.

Objectives:
- study and present the basic principles and techniques of software development
- present the way to write the software code that is bug-free, easy to maintain, understandable, extensible and reusable
- introduce specifications and invariants; testing; abstract data types, simple and complex; design patterns for object-oriented programming; notions of concurrent programming and concurrency.

Learning Outcomes:
- to use basic principles and techniques of software development
- to write the software code that is bug-free, easy to maintain, understandable, extensible and reusable
- Effectively use the good practices of Software Developments
- Use specifications and invariants; preform testing
- Understand and use design patterns for object-oriented programming; notions of concurrent programming and concurrency.

SE302 – Software Testing and Maintenance
Short Content:
Software Construction presents the basic principles and techniques of software development. Special attention is paid how to write the software code that is bug-free, easy to maintain, understandable, extensible and reusable. During the course students will tackle the set of problems and a final project. The particular attention is paid to the topics such as specifications and invariants; testing; abstract data
types, simple and complex; design patterns for object-oriented programming; notions of concurrent programming and concurrency.

**Objectives:**
- study of software testing and maintenance methodologies to develop object-oriented, component-based software using the Test Driven Development approach
- present the main theoretical and practical topics for different types of coverage analysis, automatic test case generation, and regression testing and impact analysis
- introduce program-based software testing and maintenance approaches

**Learning Outcomes:**
- test and maintain object-oriented software
- Use and master main theoretical and practical topics for different types of coverage analysis
- Effectively use and create automatic test case generation, and regression testing and impact analysis
- Use efficiently Unit Tests for object oriented programming environment.
- Understand and use different tools and frameworks for software testing

**SE322 – Software Requirements Analysis**

**Short Content:**
Students will learn and train how to use requirements engineering techniques to capture software requirements for all types of real world problems. Particular attention will be paid on how to work with clients and non-specialists in Computer Science, how to negotiate and work with final users of the system. The course covers elicitation, specification, and management of software system requirements. The course will present the iterative techniques to develop full requirement analysis. The course assumes students have the basic familiarity with the subject of gathering requirements and basics of software development or other engineering projects.

**Objectives:**
- study of software requirements engineering
- present the good practices of Software Requirements Engineering in real life situations
- introduce different tools and frameworks for Software Requirements Engineering

**Learning Outcomes:**
- to use requirements engineering techniques to capture requirements for all types of real world problems
- to work with clients and non-specialists in Computer Science, negotiate and work with final users
- Effectively use the good practices of Software Requirements Engineering in real life situations
- Use iterative techniques to develop full requirement analysis
- Understand and use different tools and frameworks for Software Requirements Engineering

**SE401 – SCADA Systems**

**Short Content:**
Design to teach students the theoretical and practical foundations of software design for Supervisory Control and Data Acquisition (SCADA) systems. Topics include: the SCADA scan cycle, fundamentals of SCADA communication, sensors, actuators and rewiring, operator interface and the HMI, SCADA integration. **Objectives:**
- describe the typical architecture of a SCADA system
- understand the basic technology of each of SCADA’s major building blocks and understand the limitations of SCADA
- Understand when SCADA system would be beneficial to your operation and select appropriate SCADA technology

**Learning Outcomes:**
- to use requirements engineering techniques to capture requirements for all types of real world problems
- to work with clients and non-specialists in Computer Science, negotiate and work with final users
- Effectively use the good practices of Software Requirements Engineering in real life situations
• Use iterative techniques to develop full requirement analysis
• Understand and use different tools and frameworks for Software Requirements Engineering

SE402 – Programming of CNC Machines
Short Content:
During the course the students learn the basics of CNC machines as well as the fundamentals of CNC programming. Topics include: CNC production, coordinate systems, cutting speeds for milling and drilling, drawing basic shapes using geometric methods, write simple programs to operate computer-numerically controlled milling machines, CAD-CAM software tools etc.
Objectives:
• The aims of this course are to teach students the basics of CNC machines and fundamentals of CNC programming.
Learning Outcomes:
• perform basic maintenance of CNC machines
• write G-code
• perform 3D modelling of a part
• operate 3 Axes CNC milling machines, Co2 lasers
• design and fabricate a part

SE403 – Distributed Systems
Short Content:
During the course the students learn the basics of CNC machines as well as the fundamentals of CNC programming. Topics include: CNC production, coordinate systems, cutting speeds for milling and drilling, drawing basic shapes using geometric methods, write simple programs to operate computer-numerically controlled milling machines, CAD-CAM software tools etc.
Objectives:
• introduces the main principles underlying distributed systems: processes, communication, naming, synchronization, consistency, fault tolerance, and security.
• show the fundamentals of distributed computing and teach students how to design and develop distributed systems and applications.
• enable students to design, implement and analyze the simple distributed system
Learning Outcomes:
• understand principles underlying distributed systems: processes, communication, naming, synchronization, consistency, fault tolerance, and security.
• explain what a distributed system is, and what the desired properties of such systems are.
• design, implement and analyze the simple distributed system
• assess the quality of the existing system and propose how to upgrade it
• understand and use different tools and frameworks to manage distributed systems

SE404 – Psycho-Cybernetics
Short Content:
Designed to help students lead more successful and fulfilling lives by learning and applying the foundations of psycho-cybernetics. The course revolves around introducing the idea of self-image in psychology and the idea of personal creativity as desirable tools for a successful software engineer. By the end of this course, the students should have increased their self-awareness, and by understanding their unconscious blueprint of themselves, they improve their chances for self-growth, self-improvement and become more ready to recognize and embrace new opportunities for creativity and innovation.
Objectives:
This course is designed to help one create a new system of thinking and behaving, and as such is a useful tool for self-development. The course is based on the book that was originally written by a plastic surgeon turned self-help author, Dr. Maxwell Maltz. The course introduces basic ideal that empower individuals and help them create a happier, more successful life. Topics of the course are: self-image and how it affects everything we do, improving our lives by changing habits and thoughts, and how to turn setbacks and failures into progress and success.
Learning Outcomes:
• Understand its self-imposed internal limits and how to overcome them,
Analyze our own self-image and make improvements to it,
Train our mind to be more awake and alert,
Learn to be in the present,
Be aware of one's body and learn how to relax.

SE406 – Software Engineering Management
Short Content:
Software engineering management is introduced to the students as the application of management activities—planning, coordinating, measuring, monitoring, controlling, and reporting—and all this to ensure that software products and software engineering services are delivered efficiently, effectively, and to the benefit of stakeholders. While it would be possible to manage a software engineering project in the same way as other complex projects there is many aspects very particular to software projects and software life cycle processes. Students will study how to work with clients and developers at the same time and continuously, particularly regarding the impact of changing requirements. The impact, and how to deal, of the high degree of novelty and complexity in the requirements and underlying technology is studied extensively.

Objectives:
- introduce students to the activity of software product management as well as to recognize the importance of careful planning and preparation of the software project and the importance of evaluation and analysis.
- manage a software engineering project in the same way as other complex projects there is many aspects very particular to software projects and software life cycle processes

Learning Outcomes:
- Apply the principles and best practices of managing software engineering teams and projects,
- Apply and adjust software engineering models and processes to specific software projects in specific engineering environments,
- Acquaint with planning activities, implementation of software project, coordination, measurement, monitoring, control and reporting, with special emphasis on the specific nature of human resources management in the conditions of software production.

SE407 – Software Quality Management
Short Content:
The course will develop the advanced set of skills to ensure the required level of quality in a industrial software product. Beside the software engineering techniques, the course present and define the quality standards and procedures that follow. The term of „quality culture“ will discuss all along the course. Particular attention is paid to quality assurance, quality planning and quality control and what are the keys for effective quality management. The place of Software Quality Management and process is studied and defined in the typical software engineering project. Students will work on several real world case studies and will have to submit the final project.

Objectives:
- to familiarize students with software quality management, or how it applies to all segments of software processes, products and resources.
- define the process itself, the process owner, and requirements for these processes, and also the process and output measurements, as well as the feedback channel.

Learning Outcomes:
- become familiar with the planning of the SQM (Software Quality Management) processes themselves, which are determined to evaluate the planned quality characteristics according to the realistic implementation of these plans.
- analyze SQM processes process data and how the software product meets customer requirements and requirements of other stakeholders, or how it provides a new value and provides the required software quality in accordance with software requirements.

SE423 – Automatics and Robotics
Short Content:
This course introduces the basic principles of automated systems and describes the tasks that technicians perform on the job. The main topics include the history, development, and current
applications of robots and automated systems including their development, configuration, operation, components, and controls. Upon completion, students should be able to understand the basic concepts of automation and robotic systems.

**Objectives:**
- study the basic principles of automated systems and describes the tasks that technicians perform on the job
- present the way to use automotive assembly of a product by a manipulator
- analyse and use parallel-driven robots and mechatronics systems for reducing dynamic errors

**Learning Outcomes:**
- explain and use basic principles of automated systems.
- describe the tasks that technicians perform on the job
- present the way to use automotive assembly of a product by a manipulator
- analyse and use parallel-driven robots and mechatronics systems for reducing dynamic errors
- Understand and use tools and frameworks to control and build modern robots.