

University *of Ljubljana*
Faculty *of Computer and Information Science*



**FIRST CYCLE UNIVERSITY STUDY PROGRAMME
COMPUTER AND INFORMATION SCIENCE**

HANDBOOK

for students enrolled for the first time in the first year in the 2023/2024 academic year

Ljubljana, 2023

INFORMATION ABOUT THE STUDY PROGRAMME COMPUTER AND INFORMATION SCIENCE

Main objectives of the programme

Computer and information science is one of the leading breakthrough fields that have been shaping today's economy, education, culture, administration and other areas for several decades now. The striking growth of computer technology dictates the need for highly qualified staff capable of developing, managing and maintaining user and systems technology and the IT systems based on those technologies. This academic study programme appeals to and motivates young professionals, especially those who feel drawn to computer and information science. The programme is comparable with international standards and recommendations, and keeps up with the rapid development of computer science and the latest knowledge. The study programme accordingly provides future engineers with a sufficient professional basis to be able later on, after completing undergraduate studies, to keep abreast of technological changes and successfully continue their career both in Slovenia and on an international level. The study programme allows students to tailor courses according to their desires, preferences and motivation, in keeping with the various possibilities offered by professional specialisations. The initial core courses are followed by elective modules that offer specialisations in various technical fields.

General competences

- developing skills in critical, analytical and synthetic thinking,
- the ability to define, understand and creatively solve technical challenges in computer and information science,
- the ability to transfer knowledge, and professional communication and writing skills,
- the ability to search sources and critically analyse information,
- professional, environmental and social responsibility,
- the ability to apply acquired knowledge in independent work for solving technical and scientific problems in computer and information science,
- the ability to acquire new and enhance acquired technical knowledge,
- skills for group work in the profession, including with experts in other technical fields,
- developing professional responsibility and ethics,
- basic theoretical knowledge acquired in the fields of computer science and information technology and in the natural sciences and mathematics, which provides an excellent basis for continuing studies at the next level, both in computer science and in other technical fields.

Subject-specific competences

- basic skills in computer and information science, which include basic theoretical skills and skills essential for the fields of computer and information science (mathematical treatment of problems, theoretical basis of computer science),
- the ability to understand and apply computer and information science knowledge to other technical and professionally relevant fields (economics, organisational science, etc.),
- practical knowledge and skills in the development of software, hardware and information technologies, which are a necessary part of a successful professional's work in computer and information science (programming, computer architecture, networks),
- the ability to independently perform complex developmental engineering and organisational tasks in own specialised fields, and independently tackle specific, well-defined tasks in computer and information science areas.

Admission requirements

Enrolment in the academic programme is open to students who:

- a) have passed the general school-leaving examination (matura),

- b) have completed a vocational matura exam in any secondary school programme and an exam in one of the matura subjects: computer science, mathematics or physics; the chosen subject must not be the same as the subject the candidate passes for the vocational Matura exam,
- c) have completed any four-year secondary school study programme before 1 June 1995.

Selection criteria for limited enrolment

If a decision is taken to limit enrolment,

- candidates referred to in points 29 a) and c) will be selected depending on:

- overall pass in the general matura or school-leaving exam, 60% of points,
- overall grades in the third and fourth years, 35% of points,
- grades in mathematics in years 3 and 4 of secondary school, 5% of points;

- candidates from point 29 b) will be selected depending on:

- overall grades in the vocational matura, 20% of points,
- overall grades in the third and fourth years, 35% of points,
- grades in mathematics in years 3 and 4 of secondary school, 5% of points
- grade in one matura exam subject, 40% of points.

Criteria for recognising knowledge and skills acquired prior to enrolment

The study programme enables the recognition of relevant knowledge in the field acquired through formal, non-formal or experiential learning. The basis for recognition is the [Rules on the procedure and criteria for recognising non-formally acquired knowledge and skills](#). This type of knowledge can be recognised as part of the completed study requirements, at up to 6 ECTS for one set (the approximate study programme covered in one course) of knowledge acquired outside the Faculty. In the recognition process certificates and other documents are taken into account. Requests for recognition of acquired knowledge will be considered by FRI's Committee for Study Affairs.

Assessment methods

The methods of assessment comply with the [UL Statutes](#) and are set out in the curriculums.

Requirements for progression through the course

Requirements for progressing to a higher year

Students who have completed course units consisting of 53 credit points may enrol in the second year.

Students who have completed all the requirements of the first year and course units consisting of 53 credits in the second year may enrol in the third year.

Requirements for retaking a year

To retake a year, students must complete the following:

- a) at least half of the requirements from the study programme of that year (30 ECTS),
- b) all exams from the years before.

Students can only retake a year once in their course of study; changing programme is also considered retaking a year, because of the uncompleted requirements of the previous study programme.

Counselling and guidance during study

During the period of study the Career Centre at the Faculty of Computer and Information Science and tutors will be in direct contact with students, guiding their development, exercising concern for their academic success, motivating them towards personal advancement in the profession, and helping and advising them in resolving possible difficulties, problems and crises that can impede students during their course. If they encounter difficulties, students can also turn to the Career Centre of the University of Ljubljana.

Requirements for transferring between programmes

In accordance with the Criteria for Transferring between Programmes, transferring is possible from study programmes which upon completion guarantee similar competences and which enable the recognition of at least half of the obligations based on the European Credit Transfer System (ECTS) from the first

study programme relating to compulsory subjects of the second study programme. Transferring from other programmes is possible after the first year of study.

The requirements for transferring to the first-cycle academic study programme Computer and Information Science from other programmes (academic and professional) are:

- completed requirements for enrolment in the programme,
- at least an equivalent curriculum in Mathematics and Physics in the programme from which students transfer; the recognised courses must have at least as many credits as the aforementioned courses,
- the appropriate faculty authority defines, on the basis of a comparison of the two programmes, the requirements to be recognised and the year in which the candidate can enrol, and consequently issues a decision. Transferring is possible on the basis of the provisions applicable to such programmes.

The requirements for transferring to the academic programme Computer and Information Science from post-secondary programmes are:

- recognised ECTS credits the candidate obtained in the post-secondary programme; due to the variability and the different levels of difficulty in post-secondary programmes, the level of the candidate's knowledge is assessed by a special Admissions Committee, headed by the Vice Dean for Education, and it consequently approves the courses to be recognised for each individual student,
- the appropriate faculty authority defines, on the basis of a comparison of the two programmes, the requirements to be recognised and the year in which the candidate can enrol, and consequently issues a decision.

Requirements for completing the study programme

The requirements for completion of the programme are the passing of all exams and other requirements, including the diploma seminar, in a total of 180 ECTS.

Requirements for completing individual parts of the programme if the programme contains them

The study programme contains no parts that can be completed individually. The programme is integral.

Professional or academic title

- Bachelor of Science

Professional or academic title (abbreviated)

- B. Sc.

STUDY PROGRAMME CURRICULUM COMPUTER AND INFORMATION SCIENCE

Year 1

| | University Course Code | Course title | Lecturers | Contact hours | | | | | Individual student work | Total hours | ECTS | Semesters | Elective |
|-------|------------------------|-------------------------------------|---------------------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| | | | | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | | | | | |
| 1. | 0153574 | Programming 1 | Luka Fürst | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 2. | 0039582 | Calculus | Žiga Virk | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 3. | 0039577 | Discrete Structures | Gašper Fijavž | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 4. | 0039580 | Introduction to Digital Circuits | Nikolaj Zimic | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 5. | 0039578 | Physics | Borut Paul Kerševan | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 6. | 0039584 | Programming 2 | Boštjan Slivnik | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 7. | 0039579 | Linear Algebra | Polona Oblak | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 8. | 0039576 | Computer Systems Architecture | Branko Šter | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 9. | 0039585 | Computer Communications | Zoran Bosnić | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 10. | 0039581 | Introduction to Information Systems | Dejan Lavbič | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| Total | | | | 450 | 0 | 300 | 0 | 0 | 1050 | 1800 | 60 | | |

Year 2

| | | | | Contact hours | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|--|--|--|
|--|--|--|--|---------------|--|--|--|--|--|--|--|--|--|

| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
|-------|------------------------|--|--------------------|----------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| 1. | 0039586 | Algorithms and data structures 1 | Tomaž Hočevar | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 2. | 0039591 | Basics of Databases | Marko Bajec | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 3. | 0039593 | Probability and Statistics | Aleksandar Jurišić | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | no |
| 4. | 0039590 | Computer Systems Organisation | Patricio Bulić | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 5. | 0039588 | Computability and Computational Complexity | Borut Robič | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 6. | 0039592 | Theory of Informations and Systems | Uroš Lotrič | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 7. | 0039587 | Algorithms and data structures 2 | Borut Robič | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 8. | 0039589 | Operating Systems | Jurij Mihelič | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | no |
| 9. | 0069529 | General elective course | | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 10. | 0100845 | Specialist elective course | | 45 | | 30 | | | 105 | 180 | 6 | | yes |
| Total | | | | 450 | 10 | 290 | 0 | 0 | 1050 | 1800 | 60 | | |

Year 2, Professional Elective Courses

| | | | | Contact hours | | | | | | | | | |
|----|------------------------|------------------------|-----------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
| 1. | 0039605 | Mathematical Modelling | Žiga Virk | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |

| | | | | | | | | | | | | | |
|-------|---------|-------------------------------------|--------------|-----|---|----|---|---|-----|-----|----|--------------|-----|
| 2. | 0039606 | Principles of Programming Languages | Andrej Bauer | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 3. | 0039607 | Computer Technologies | Rok Žitko | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 135 | 0 | 90 | 0 | 0 | 315 | 540 | 18 | | |

Year 2 and Year 3, General Elective Courses

| | | | | Contact hours | | | | | | | | | |
|----|------------------------|--|--------------------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|----------------------------|----------|
| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
| 1. | 0039594 | English-level A | Nina Bishop Bostič | 30 | | 15 | | | 45 | 90 | 3 | 2nd semester | yes |
| 2. | 0039595 | English-level B | Nina Bishop Bostič | 30 | | 15 | | | 45 | 90 | 3 | 1st semester | yes |
| 3. | 0039596 | English-level C | Nina Bishop Bostič | 30 | | 15 | | | 45 | 90 | 3 | 2nd semester | yes |
| 4. | 0039597 | Topics in Computer and Information Science | | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 5. | 0039601 | Computer Science in Practice I | Slavko Žitnik | 5 | | | | 40 | 45 | 90 | 3 | 1st semester, 2nd semester | yes |
| 6. | 0039602 | Computer Science in Practice II | Slavko Žitnik | 5 | | | | 40 | 45 | 90 | 3 | 1st semester, 2nd semester | yes |
| 7. | 0039603 | Computer Science Skills | Uroš Čibej | 15 | | 45 | | | 30 | 90 | 3 | 1st semester, 2nd semester | yes |
| 8. | 0568792 | Economics and Entrepreneurship | Tomaž Hovelja | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |

| | | | | | | | | | | |
|--|-------|-----|----|-----|---|----|-----|-----|----|--|
| | Total | 205 | 10 | 140 | 0 | 80 | 465 | 900 | 30 | |
|--|-------|-----|----|-----|---|----|-----|-----|----|--|

Year 3

| | | | | Contact hours | | | | | | | | | |
|-----|------------------------|---|--------------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
| 1. | 0039610 | Introduction to Artificial Intelligence | Zoran Bosnić | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | no |
| 2. | 0100850 | Modulski izbirni predmet 1/4 | | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0100851 | Modulski izbirni predmet 2/4 | | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | yes |
| 4. | 0100853 | Modulski izbirni predmet 3/4 | | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 5. | 0100854 | Modulski izbirni predmet 4/4 | | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 6. | 0069536 | Software Engineering | Dejan Lavbič | 45 | 10 | 20 | | | 105 | 180 | 6 | 2nd semester | no |
| 7. | 0100889 | Strokovno izbirni predmet (moduli + seznam) | | 45 | | 30 | | | 105 | 180 | 6 | | yes |
| 8. | 0100890 | Strokovno izbirni predmet (seznam) | | 45 | | 30 | | | 105 | 180 | 6 | | yes |
| 9. | 0100845 | Specialist elective course | | 45 | | 30 | | | 105 | 180 | 6 | | yes |
| 10. | 0039608 | Diploma seminar | Franc Solina | 45 | 10 | 5 | | | 120 | 180 | 6 | 2nd semester | no |
| | | Total | | 450 | 20 | 265 | 0 | 0 | 1065 | 1800 | 60 | | |

Year 3, Module Informatics

| | | | | | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|--|--|--|
| | | | | Contact hours | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|--|--|--|

| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
|-------|------------------------|-------------------------------------|--------------|----------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| 1. | 0039614 | Electronic Business | Denis Trček | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | yes |
| 2. | 0039622 | Data Management Technologies | Matjaž Kukar | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0100860 | Information Systems Development | Marko Bajec | 45 | 20 | 10 | | | 105 | 180 | 6 | 2nd semester | yes |
| 4. | 0039620 | Informatics Planning and Management | Rok Rupnik | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 180 | 30 | 90 | 0 | 0 | 420 | 720 | 24 | | |

Year 3, Module Software

| | | | | Contact hours | | | | | | | | | |
|-------|------------------------|--|----------------------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
| 1. | 0039629 | Software Development Processes | Branko Matjaž Jurič | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 2. | 0039613 | System Software | Tomaž Dobravec | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0100872 | Analysis of Algorithms and Heuristic Problem Solving | Marko Robnik Šikonja | 45 | 10 | 20 | | | 105 | 180 | 6 | 2nd semester | yes |
| 4. | 0039611 | Compilers | Boštjan Slivnik | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 180 | 30 | 90 | 0 | 0 | 420 | 720 | 24 | | |

Year 3, Module Computer Systems and Networks

| | | | | Contact hours | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | |

| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
|-------|------------------------|------------------------------|----------------|----------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| 1. | 0039625 | Computer Networks Modeling | Miha Mraz | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 2. | 0039627 | Distributed Systems Computer | Uroš Lotrič | 45 | | 30 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0100867 | Communication Protocols | Mojca Ciglarič | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 4. | 0039623 | Mobile and Wireless Networks | Nikolaj Zimic | 45 | 10 | 20 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 180 | 20 | 100 | 0 | 0 | 420 | 720 | 24 | | |

Year 3, Module Artificial Intelligence

| | | | | Contact hours | | | | | | | | | |
|-------|------------------------|------------------------------------|----------------------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
| 1. | 0039643 | Intelligent Systems | Marko Robnik Šikonja | 45 | 6 | 24 | | | 105 | 180 | 6 | 1st semester | yes |
| 2. | 0039645 | Machine Perception | Matej Kristan | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0039644 | Development of Intelligent Systems | Danijel Skočaj | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 4. | 0100896 | Introduction to Data Mining | Blaž Zupan | 45 | 20 | 10 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 180 | 36 | 84 | 0 | 0 | 420 | 720 | 24 | | |

Year 3, Module Media Technologies

| | | | | Contact hours | | | | | | | | | |
|--|--|--|--|---------------|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | |

| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
|-------|------------------------|---------------------------------------|-------------------|----------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| 1. | 0039619 | Computer Graphics and Game Technology | Matija Marolt | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 2. | 0039617 | Multimedia Systems | Luka Čehovin Zajc | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0039618 | Introduction to Graphics Design | Narvika Bovcon | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| 4. | 0069537 | Platform Based Development | Veljko Pejović | 45 | | 30 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 180 | 20 | 100 | 0 | 0 | 420 | 720 | 24 | | |

Year 3, Professional Elective Courses

| | | | | Contact hours | | | | | | | | | |
|-------|------------------------|--|--------------------------|---------------|---------|-----------|--------------------|----------------------|-------------------------|-------------|------|--------------|----------|
| | University Course Code | Course title | Lecturers | Lectures | Seminar | Tutorials | Clinical tutorials | Other forms of study | Individual student work | Total hours | ECTS | Semesters | Elective |
| 1. | 0039630 | Web Programming | Dejan Lavbič | 45 | 20 | 10 | | | 105 | 180 | 6 | 1st semester | yes |
| 2. | 0070351 | Digital Design | Nejc Ilc, Patricio Bulić | 45 | 10 | 20 | | | 105 | 180 | 6 | 1st semester | yes |
| 3. | 0171404 | Organisation and Management | Tomaž Hovelja | 45 | 10 | 20 | | | 105 | 180 | 6 | 2nd semester | yes |
| 4. | 0039628 | Computer Systems Reliability and Performance | Miha Mraz | 45 | 20 | 10 | | | 105 | 180 | 6 | 2nd semester | yes |
| Total | | | | 180 | 60 | 60 | 0 | 0 | 420 | 720 | 24 | | |

