Master in

Software Engineering for Information Systems

2023/24

At a glance

Master class: LM-18
ECTS credits: 120
Duration of the course: 2 years
Courses will be taught in English
Places available: 30 + 20 non-EU
Campus: Bozen-Bolzano
Tuition fees: ca. € 1350 per year
Course description

The physical world and the virtual world (cyberspace) are converging into new generations of systems like the Cyber-Physical Systems. Such systems monitor physical environments, communicate and cooperate with each other and with human beings in real-time, and make decentralized intelligent decisions. They are highly dependent on components whose functionality is controlled by software.

With the revolution of Industry 4.0, manufactural production also begins to depend on these systems more and more. At the same time, companies and organizations still need IT to automatize their business processes and release human beings form the burden of repetitive and tedious operations.

Business software provides such support but requires a great knowledge of the operational environment in which it runs as it is developed to meet the needs of a specific business. Thus, designing and building software for such systems is an art that also requires skills in context analysis and customization.

Overall, there is an increasing need for a new generation of systems and software technologies that ensures robust, safe, secure, uninterrupted, and real-time operations - particularly in situations where human life or business is exposed to risk if software fails.

In this Master, you will learn how to conceive, design, implement, customize, and maintain these systems by applying software engineering principles to the industry practice and develop and test your prototypes. Courses are designed to provide you with advanced software engineering knowledge and practice of software and systems development complemented by competences in lean management and entrepreneurship.

The internship program will drive you through a unique experience and can prepare you for your thesis work. The internship can be performed in companies or in collaboration with international research centers associated with the program. The learning experience you get with this Master will give you a solid base for your future as a software and systems-engineer.

Structure of the course

- **Foundations**: these subjects provide the foundational knowledge of software engineering. They aim to homogenize the knowledge of students from different previous educational backgrounds and prepare them for studying advanced and specialization topics.
- **Advanced topics**: these subjects aim to develop the skills of students which complement the foundations, and are useful in the training of the professional figure of software engineers.
- **Specialization topics**: these subjects intend to provide students with knowledge specific to an application type or business domain, and prepare them for their thesis work.
Study Plan

1st Year - 1st Semester
12 CP Programming and Visualization for Data Analytics
   6 CP Module 1 Data Visualization and Exploration
   6 CP Module 2 Programming for Data Analytics
6 CP Contemporary Software Development
6 CP Advanced Software Design Techniques
6 CP Alternatives from Catalogue

1st Year - 2nd Semester
6 CP Verification and Reliability for Dependable Systems
12 CP Systems Design and Implementation
   6 CP Module 1: Embedded Systems Design and Implementation
   6 CP Module 2: Extended Reality: Augmented, Virtual and Mixed Reality
6 CP Software and Systems Security
6 CP Cloud Computing and Distributed Systems

2nd Year - 1st Semester
6 CP Research Methods and Technology Transfer
12 CP Free Choice Courses
6 CP Internship

2nd Year - Semester
6 CP Alternatives from Catalogue
30 CP Thesis

Exchange programmes and internships
Currently we offer exchange programmes with partner universities all over the world and we are part of a large network of collaboration with employers in Italy and abroad where you can undertake an optional internship with a maximum of 300 hours.

Career Opportunities
Typical job profiles are:

- **Software and Information Systems Engineer**: Analysis, design, implementation, customization, overhaul, and maintenance of intelligent solutions with high reliability and performance for information systems, by fully exploiting inventions and software technologies for pragmatic application and rapid commercialization, in real time and on a large scale. Such information systems include: ICT, business, industrial automotive,
automation and control, scientific and data processing, the management of complex infrastructures, cyber-physical systems;

- **Researcher in industrial and public laboratories**: works with roles and functions of conception, analysis, formalization, design and prototype development of new generation software systems and innovative ICT technologies with particular attention to the quality of products, processes and software systems of any level of complexity and size, in strategic sectors of industry and public administration (e.g. University).

On the website of **AlmaLaurea** you can check our outstanding statistical **data about the satisfaction of our graduates**, and their employability.
Master in
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2023/24
Application and Admission

You can find all you need to know in order to apply and gain admission to this study programme by browsing through the information below.

Deadlines and important dates

**Early Bird Application**
Application: 01/03 - 27/04/2023 (by noon local time)
Language exams: 17/03/2023 and 13 - 14 and 17- 18 - 19/04/2023
Admission procedure and publication of ranking lists: by 16/05/2023
Payment of the 1st instalment of the tuition fees: by 25/05/2023 (by noon local time)
Enrolment: 12/07 - 13/10/2022 (by noon local time)

**Late Application (only for EU citizens)**
Application: 17/05 - 06/07/2023 (by noon local time)
Language exams: 26/06 - 01/07/2023
Admission procedure and publication of ranking lists: by 27/07/2023
Payment of the 1st instalment of the tuition fees: by 03/08/2023 (by noon local time)
Enrolment: 27/07 - 13/10/2023 (by noon local time)

**Preparatory courses and Freshers Days**
Intensive language courses: 04 - 22/09/2023 (Monday to Friday, 6 h/day)
Freshers Days: 02 - 03/10/2023

**1st semester**
Classes: 02/10 - 23/12/2023
Exams (extraordinary session): 14 - 22/12/2023
Holidays: 24/12/2023 - 07/01/2024
Classes: 08/01 - 27/01/2024
Exams: 29/01 - 24/02/2024

**2nd semester**
Classes: 04/03 - 28/03/2024
Holidays: 29/03 - 01/04/2024
Classes: 02/04 - 15/06/2024
Exams (extraordinary session): 15 - 25/05/2024
Exams: 17/06 - 13/07/2024

Autumn session
Exams: 26/08 - 28/09/2024

Available places
EU citizens and citizens given parity of treatment
Early Bird Application: 20
Late Application: 10
Non-EU citizens (living abroad)
Early Bird Application: 20

The programme will only be offered if a minimum of 8 newly enrolled students is reached.

Entry requirements
In order to gain admission to this programme you need one of the following qualifications:

1. a bachelor degree in computer science [L-31 – Scienze e tecnologie informatiche] or in information engineering [L-8 – Ingegneria dell’informazione] obtained in Italy, or equivalent qualification gained abroad or obtained in Italy according to the regulation in force before M.D. 509/99.
2. a bachelor degree in physics [L-30 – Scienze e tecnologie fisiche] or in mathematics [L-35 – Scienze matematiche] or in industrial engineering [L-9 – Ingegneria industriale] obtained in Italy, or equivalent qualification gained abroad or obtained in Italy according to the regulation in force before M.D. 509/99, with appropriate general and disciplinary skills in computer science. To demonstrate the acquisition of such skills at least 6 out of the following topics must have been taken during the bachelor programme:

- Analysis
- Computer Networks
- Databases
- Data Structures and Algorithms
- Logic and Discrete Mathematics
- Operating Systems
- Programming
- Software Project Management
- Software Architecture and Design
- Software Engineering
- Software Requirements
- Software Testing
- Theory of Computing

Qualifications listed under 1 are awarded 3 points; qualifications listed under 2 are awarded 1-2 points.
If you have not yet graduated at the time of application:
You can apply if you have acquired at least 120 credit points (ECTS). In this case you will be admitted conditionally. You will have to submit your diploma by the enrolment deadline.

If you graduate after the enrolment deadline:
You cannot enrol and you will lose your place, which will be offered to the subsequent applicant in the ranking list. In this case you should not pay the tuition fees to secure your admission. You will be able to submit a late enrolment request and, only if there still are available places, you can enrol by 16 December 2022.

To be admitted you must fulfil the language requirements indicated in the section “Language requirements”.

According to national regulations, simultaneous enrolment in a maximum of 2 programmes is possible (however, the two programmes must not belong to the same class, e.g., LM-18/LM-18).

Language requirements
The official teaching language is English. Therefore, the following language requirements apply, otherwise you will be excluded from the admission procedure:

Entry level (to gain admission)
English: B2

The levels of the Common European Framework of Reference apply.

You can demonstrate your language proficiency in the application portal (in the section “upload language certificates” and/or “enrol for language exams”) after you have created an application in the section “create/manage applications”.

- In case your final certificate has been awarded by an Italian public institution, you need to submit a self-declaration.
- In case your final certificate has been awarded by a foreign public institution, you need to upload diploma scanned copy of the original.

You can demonstrate language proficiency through:

1. the main teaching language in your final high school year if English (recognised as C1)
2. a bachelor or master degree in English (recognised as C1). unibz graduates must upload the language certificates obtained and/or declare that they have passed language exams at the unibz Language Centre (B2, B2+ or C1)
3. a recognised language certificate (see the list of recognised certificates) If you cannot upload the certificates, you can send them by e-mail as PDF files or deliver them in person to the Language Centre by the application deadline (see “Deadlines” section).
4. language exams organised by the unibz Language Centre. You can register for these exams online through the application portal (in the section “enrol for language exams”) after you have filled out your application in the section “create/manage applications”. The registration periods are indicated in the “Deadlines” section. If you start your application outside a language exams registration period, you must return to the portal during one of
the periods indicated above in order to register for an exam.

Information regarding the structure of the language proficiency exams, their duration, their administration, and typical processing time for the publication of the results can be found on the following webpage: https://www.unibz.it/en/services/language-centre/language-exams/.

Online application

Your application must be submitted online through the Application Portal. The deadlines are indicated in the “Deadlines” section.

- You need to create an account and upload a valid ID card or passport (front/back). Please note: if your document is invalid, incomplete or unreadable, you will be excluded from the admission procedure;
- Fill in the online form and upload the attachments listed under “Admission procedure”;
- If you gained your qualification abroad, you must also upload the diploma of your qualification: if you are not yet in possession of the diploma, you’ll need to upload it upon enrolment;
- Complete and submit the online application by the deadline. Once the application has been sent, it cannot be modified. Filled-in forms which have not been sent correctly will not be taken into consideration.

Please note: Mendacious declarations will be criminally prosecuted and will result in the automatic exclusion from the ranking list.

EU-Citizens and equivalent

You might apply for more than one study programme. If you are excluded in the first session, you might apply again in the second one.

Considered as equivalent are:

1. Citizens from Norway, Iceland, Liechtenstein, Switzerland, San Marino and the Vatican City State;
2. Non-EU citizens with a valid permit to stay in Italy [see article 39, paragraph 5 of decree no. 286 of 25.07.1998: "permesso di soggiorno" (residence permit) for work, family reasons, political or humanitarian asylum, religious reasons]. In this case, you apply directly to the University as described above and must submit a copy of your valid permit to stay. A permit to stay for study reasons or a visa for tourism is not. If the permit has expired, you must attach a renewal request. Please note that if you do not upload the permit in the application portal, you will be automatically considered a non-EU citizen living abroad and therefore subject to the admission procedure through the Italian authorities in your country of origin.

Non-EU-Citizens (living outside of Italy)

Only one application period is offered. After the deadline it is not possible to apply anymore. Application fee: € 30.

Once the ranking list has been published, if you have gained admission, secure it by paying the first instalment and then start your visa application on the Universitaly portal. The application
on Universitaly is mandatory, otherwise you will not be allowed to enrol. On Universitaly you can apply for one study programme only.

Admission procedure

The admission procedure is based on the evaluation of the following criteria:

1. **Curriculum**: The study curriculum and curriculum vitae together are scored up to 10 points;

2. **Type of Bachelor degree**: Qualifications listed under point 1 of the "Entry Requirements" are awarded 3 points; qualifications listed under point 2 are awarded 1-2 points.

3. **Bachelor final grade**: The score awarded to the final grade of the bachelor in CGPA (eventually converted to) is weighted on the basis of the most recent "Webometrics Ranking of World Universities" (http://www.webometrics.info/en), as follows:
   - 3 points for universities in position from 1 to 1000 in the ranking;
   - 2 points for universities in position from 1001 to 2000;
   - 1 point for universities in position from 2001 to 3000 in the ranking;
   - 0,5 points for universities in position from 3001 to 4000 in the ranking;
   - 0 points for universities in position from 4001 onwards;

4. **Working Experience**: The working experience is only considered if it is in computer science, from 0 to 3 points with 0 less than one year of experience and 3 with three or more years.

**English proficiency**: The certificate of English language proficiency (B2) does not give a score but is an admission prerequisite.

The final score is computed as weighted average of the above criteria with Curriculum weight = 1, BSc type weight = 0.3, BSc final mark weight = 0.6, Experience weight = 0.1. Minimum final score to pass is 6.

In the application portal, you shall upload:

1. **Curriculum Vitae** (European format)

2. **Documents about the bachelor degree**:
   - if graduated in Italy: diploma supplement or self-declaration (following the Italian D.P.R. no. 445/2000) of the degree awarded with the exams passed (if graduated) or with the exams passed (if not graduated yet);
   - if graduated abroad: diploma supplement or final degree certificate with exams passed (if graduated) or transcript of records (if not graduated yet).

The above must contain the following information: final grade, exams passed with grade and date of passing, credit points, scientific fields (the latter only for Italian titles).

For qualifications obtained abroad also: scale of grades awarded by the university of provenance (with a minimum final grade to obtain the qualification and a maximum final grade achievable).

The Faculty reserves the right to request a description of the contents of the single courses and/or teaching hours where necessary.
3. **Excel file**: Please use the excel file available in the application portal, fill it in and upload it in the portal.

**Please note**: mendacious declarations will be sanctioned by criminal law and will result in your automatic exclusion.

**Ranking lists**
The Admission Committee will only evaluate the documents uploaded in the portal by the application deadline. The ranking lists will be published here and are only valid for the respective academic year.

**Secure your study place and enrolment**
If you have been admitted to more than one study programme, you can secure your admission for a maximum of 2 programmes by paying the designated rate twice. By confirming your place, you renounce admission to the other programmes.

1. **Choose the study programme and pay the fees (to secure your admission) in the application portal**.

The deadlines are indicated in the “Deadlines” section.

If you do not meet this deadline, you will automatically be excluded and the next applicant in the ranking list will be admitted.

For EU citizens and citizens given parity of treatment only: any remaining places of the early bird application, will be offered in the late application.

**Please note** that you do not gain full student status by only paying the tuition fees. This status will only be acquired upon enrolment. If you have secured your admission, there will be no refund of the tuition fees unless you do not pass your secondary school final exam or, in the event of non-EU applicants living abroad, you do not receive the documents necessary for enrolment from the Italian authorities in your country.

2. **Enrol online in the application portal**.

The deadlines are indicated in the “Deadlines” section.

Enrolment is recommended as early as possible, so you have the possibility to upload incomplete documents before the deadline.

If you do not meet the enrolment deadline, you will be excluded and the next applicant in the ranking list will be admitted.

**Admission with reservation**:

If you do not have the required academic qualification, you will be given a conditional offer for a study place and you must submit your qualification upon enrolment. If you achieve your qualification after the enrolment deadline, you cannot enrol, and you will lose your place which will be offered to the subsequent applicant in the ranking list. **Advice**: If you achieve your qualification after the enrolment deadline, you should not pay the tuition fees to confirm the study place. You will be able to submit a late enrolment request and, only if there are study places still available, you can enrol by 15 December 2023.
If you have gained your qualification abroad, you must certify that at the universities in the country where you gained your qualification, you can access to a study programme similar to that chosen at unibz. Therefore you must upload (if not uploaded upon application):

- diploma of your qualification
- official translation of your diploma into Italian (translation is not necessary if it has been issued in German or English)

and one of the following:

- the Diploma supplement, where it must be indicated: that you have achieved at least 180 credit points (ECTS) and that the study title gives access to a Master course. In case of doubt, unibz reserves the right to request the Statement of comparability
- Statement of comparability of your qualification, issued by the Italian Information Centre on Academic Mobility and Equivalence (CIMEA), in the case the Diploma supplement is missing

**Please note** that if you do not possess a valid admission qualification, you could be excluded with Rector’s decree even after enrolment.

**If you are a non-EU citizen living abroad:**

If you are eligible for admission (check the ranking lists) and have also applied on Universitaly, the Italian Authorities in your own country will issue you the entry visa for studies/university. This will allow you to arrive in Italy to enrol for the study programme that you have applied for, after passing the admission procedure.

According to Italian law, within 8 working days of your arrival in Italy, you must have applied for the residence permit: as soon as you arrive, get in touch with the Advisory Service and you will be given the necessary information for starting the procedure.

Once you will obtain your residence permit (permesso di soggiorno), you have to hand it in at the Student Secretariat personally or via e-mail.

**Students intending to transfer from another Italian University to unibz** must submit to the Student Secretariat - at the beginning of the academic year - a copy of the transfer application presented at the university of provenance.

**Tuition fees**

Fees amount to € 1351.50

- **1st instalment** (€ 751.50)*: includes the provincial tax for the right to study of € 151.50 and a revenue stamp of € 16.
- **2nd instalment** (€ 600): must be paid by 31 March 2023.

Delayed payment of the second instalment will result in a fine being levied. If you have not paid the tuition fees, you will be unable to take exams and will not be able to transfer to other universities or other study programmes.

If you drop out of a programme, interrupt your studies or are excluded from studies, you are
not entitled to reimbursement of the fees.

Exemption from the tuition fees (and the provincial tax) is granted to:

- Students with a disability recognized under article 3, paragraph 1, of Law No 104/1992, or with a disability up to or exceeding 66%: the disability certificate, issued by the health authorities, must be handed in at the beginning of the academic year.
- Foreign students who have been granted a scholarship from the Italian government.

Students who benefit from a scholarship granted by the Autonomous Province of Bozen-Bolzano are entitled to receive a refund of the tuition fees.

**Recognition of credit points from previous studies**

Credit points from previous university studies can only be recognised after enrolment if the exams taken at the university of provenance are equivalent in content to those offered at unibz. You can fill out the application after enrolment.

The Advisory Service provides support regarding your choice of study. In many cases a simple call or a short request is enough to get the relevant information (Tel. +39 0471 012100).
Advisory Service
Universitätsplatz 1 - piazza Università, 1
Italy - 39100, Bozen-Bolzano
Tel +39 0471 012100
Fax +39 0471 012109
apply@unibz.it

Opening Hours
Tuesdays: 10:00-12:00
Thursdays: 14:00-16:00

Alternatively, you may call us throughout the week or book an online appointment

Subject to change.
Latest update: 04.11.2022