

# Diploma Supplement

 Freie Universität Bozen  
Libera Università di Bolzano  
Universit t Liedia de Bulsan

  
UNIVERSITY of OULU  
OULUN YLIOPISTO

  
POLIT CNICA  
"Engineering the future"

  
TECHNISCHE UNIVERSIT T  
KAISERSLAUTERN

## *European Masters Programme in Software Engineering*

An integrated study programme distributed between the Libera Universit  di Bolzano-Freie Universit t Bozen (FUB) (coordinator), the University of Oulu, (OY), the Technische Universit t Kaiserslautern (UNIKL), and the Universidad Polit cnica de Madrid (UPM)

### *Holder of the Qualification*

Family Name

First Name

Date, Place, Country of Birth

Student ID Number or Passport Number

### *Qualification*

Name of Qualification (full, abbreviated; in original language)  
European Master Course in Software Engineering (EMSE)

Main Field(s) of Study  
Software Engineering

Institutions Awarding the Qualification (in original language); Status (Type/Control)  
1.  
2.

Institutions Administering Studies; Status (Type/Control)  
1.  
2.

Language(s) of Instruction/Examination  
English

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#### *Level of Qualification*

##### Level

Graduate joint degree with thesis

##### Official Length of Programme

Two years (120 ECTS)

##### Access Requirements

Bachelor Degree in Computer Science or equivalent; proof of a minimum knowledge of English such as a Toefl (> 550/213) or IELTS (> 6.0) certificate or equivalent.

#### *Content and Results Gained*

##### Mode of Study

Full time; three semester's course work; one semester master's thesis

##### Programme requirements

EMSE is a two-year programme (120 ECTS) completely taught in English. The EMSE programme is built on learning paths defined on annual exchange. Students take EMSE at any two institutions of the consortium (50% of ECTS in each institution).

The EMSE programme is based on core knowledge areas, empirical software engineering research, transversal skills, partner-specific topic in software engineering and an internship. Core areas are topics that cover foundations in SE and are taught in any mobility pattern of the programme: Software Process Management, Verification and Validation, Software Design, and Requirements Engineering. partner-specific topic in software engineering are topics peculiar to a student mobility pattern that reflect the local teaching offer and research. All partners offer a empirical software engineering research to prepare students to thesis work of 30 ECTS. Master thesis is co-supervised by two teachers of the host universities the student has visited. Students that successfully complete the program get a joint degree from the two universities that have visited.

This programme will provide students with skills that allow students to cope with their professional practice that will encompass a wide range of activities, including technical, problem-solving, management, ethical and legal issues, written and oral communication abilities and, very importantly, the capability to keep up to date in a rapidly changing discipline. In sum, students will gain a solid knowledge to be used as managers of different roles in software companies.

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Programme Details

Learning path: FUB- UNIKL

FUB				UNIKL			
ES	Topic	Title	ECTS	Topic	Title	ECTS	
1	SPPM	Software Process Management	8	VV	Safety & Reliability of Embedded systems	4	
	TS	Statistical Methods	4	PST	Performance modelling of distributed systems (A)	4	
	RE	Requirements and Design of Software Systems I	4	I	Internship	8	
	SD	Requirements and Design of Software Systems II	4	TS	Product line Engineering	4	
	PST	IT and Service Management	8	PST	Middleware for Heterogeneous and Distributed Information Systems	8	
				ESE	Software Engineering Seminar	4	
			<b>semester</b>	<b>28</b>			
					<b>semester</b>	<b>32</b>	
2	VV	Software Reliability and Testing	8	T	Thesis	30	
	ESE	Empirical Software Measurement	8				
	SPPM	Software Factory	8				
	PST	Advanced Internet Technologies	8				
			<b>semester</b>	<b>32</b>			
					<b>semester</b>	<b>30</b>	
			<b>year</b>	<b>60</b>			
					<b>year</b>	<b>62</b>	
<b>Total</b>						<b>122</b>	

Of which Subjects at the Associate Partner

### Grading Scheme

ECTS	FX/F	E	D	C	B	A
<b>UNIKL</b>	5,0		4,0; 3,7	3,3; 3,0; 2,7	2,3; 2,0; 1,7	1,3; 1,0
<b>FUB</b>	Fail	18-20	21-25	26-28	29-30	30/30L

Overall Classification (ECTS)

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**European Masters Course in Software  
Engineering**

*Function of the Qualification*

Access to Further Studies

Students who pass the course are qualified to apply for admission to doctoral studies (Ph.D. thesis research in computer science)

Professional Status

Students who pass the course have gained the required capabilities to exercise as professional software engineers

*Additional Information*

Additional Information

Further Information

On the European Masters Course in Software Engineering website:  
<http://emse.inf.unibz.it/>

*Certification*

Date of issuance

Place of issuance

Bolzano, (Italy)

Record No.

Signatures

The Registrar

The Coordinator  
Barbara Russo

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<p><b>INFORMATION ON THE ITALIAN EDUCATION SYSTEM (DM 509/99 and DM 270/2004)</b></p> <p>Since 1999, Italian university studies have been fully reformed so as to meet the objectives of the "Bologna process". The university system is now organised on 3 cycles: the 1st cycle academic degree, that is the Laurea, grants access to the 2nd cycle, and the Laurea Specialistica/Magistrale, the main degree of the 2nd cycle, gives access to 3rd cycle doctorate programmes resulting in the degree called Dottorato di Ricerca. In addition to the mentioned degree sequence after the Bologna pattern, the system offers other degree programmes and related degrees both within the 2nd and 3rd cycle.</p> <p>First cycle. Undergraduate studies consist exclusively in Corsi di Laurea-CL (1st degree courses) aimed at guaranteeing undergraduate students an adequate command of general scientific methods and contents as well as specific professional skills. General access requirement is the Italian school leaving qualification (Diploma di Superamento dell'Esame di Stato conclusivo dei corsi di Istruzione Secondaria Superiore), awarded on passing the relevant state examinations, after completion of 13 years of global schooling; also foreign comparable qualifications may be accepted. Admission to individual degree courses may be subject to specific course requirements. First degree courses last 3 years. The Laurea (L, 1st degree, and bachelor-level of the Bologna process) is awarded to undergraduates who have earned 180 ECTS credits. The L allows transition to the labour market, access to the civil service and/or regulated professions; it also grants access to all degree programmes of the 2nd cycle.</p> <p>Second cycle. Postgraduate studies include A) Corsi di Laurea Specialistica/Corsi di Laurea Magistrale-CLS/CLM; B) Corsi di Master Universitario di 1° livello-CMU1.</p> <p>A) CLS/CLM are aimed at providing postgraduates with an advanced level of education for the exercise of a highly qualified activity in specific areas. Access to CLS/CLM is by the Italian 1st degree (L) or a foreign comparable degree; admission is subject to specific course requirements determined by individual universities; workload: 120 ECTS credits; length: 2 years. The final degree, Laurea Specialistica/Magistrale-LS/LM (master-level of the Bologna process), is awarded to those graduates who, once satisfied all curricular requirements, have also defended an original dissertation in the final degree examination. The change of the degree name from Laurea Specialistica into Laurea Magistrale was agreed upon in 2004.</p> <p>A limited number of 2nd cycle programmes, namely those leading to professions regulated by EU sectoral directives (in dentistry, human medicine, pharmacy, veterinary medicine, architecture), are defined "one long cycle degree programmes" (Corsi di Laurea Specialistica/ Magistrale a ciclo unico-CLSU/CLMU); they differ from the majority of usual CLS/CLM in the following characteristic features: access is by the Italian school leaving diploma or a foreign comparable qualification; admission is always subject to entrance exams; curricula consist of just one long cycle of 5-6 years (at present, only the CLSU/CLMU in human medicine takes 6 years), and a total number of 300-360 ECTS credits.</p> <p>All LS/LM and LSU/LMU allow transition to the labour market, access to the civil service and/or regulated professions; they also grant access to research doctorate programmes as well as to all other degree courses of the 3rd cycle.</p> <p>B) CMU1 consist in advanced scientific courses or higher continuing education studies, open to the holders of a Laurea-L or a foreign comparable degree; admission may be subject to additional conditions. Course length is min. 1 year. The degree Master Universitario di 1° livello-MU1 (1st level university master) is awarded to graduates who have</p>	<p><b>8. INFORMATION ON THE GERMAN HIGHER EDUCATION SYSTEM<sup>1</sup></b></p> <p><b>8.1 Types of Institutions and Institutional Status</b></p> <p>Higher education (HE) studies in Germany are offered at three types of Higher Education Institutions (HEI).<sup>2</sup></p> <ul style="list-style-type: none"> <li>- <i>Universitäten</i> (Universities) including various specialized institutions, offer the whole range of academic disciplines. In the German tradition, universities focus in particular on basic research so that advanced stages of study have mainly theoretical orientation and research-oriented components.</li> <li>- <i>Fachhochschulen</i> (Universities of Applied Sciences) concentrate their study programmes in engineering and other technical disciplines, business-related studies, social work, and design areas. The common mission of applied research and development implies a distinct application-oriented focus and professional character of studies, which include integrated and supervised work assignments in industry, enterprises or other relevant institutions.</li> <li>- <i>Kunst- und Musikhochschulen</i> (Universities of Art/Music) offer studies for artistic careers in fine arts, performing arts and music; in such fields as directing, production, writing in theatre, film, and other media; and in a variety of design areas, architecture, media and communication.</li> </ul> <p>Higher Education Institutions are either state or state-recognized institutions. In their operations, including the organization of studies and the designation and award of degrees, they are both subject to higher education legislation.</p> <p><b>8.4 Organization and Structure of Studies</b></p> <p>The following programmes apply to all three types of institutions. Bachelor's and Master's study courses may be studied consecutively, at various higher education institutions, at different types of higher education institutions and with phases of professional work between the first and the second qualification. The organization of the study programmes makes use of modular components and of the European Credit Transfer and Accumulation System (ECTS) with 30 credits corresponding to one semester.</p> <p><b>8.4.1 Bachelor</b></p> <p>Bachelor degree study programmes lay the academic foundations, provide methodological skills and lead to qualifications related to the professional field. The Bachelor degree is awarded after 3 to 4 years. The Bachelor degree programme includes a thesis requirement. Study courses leading to the Bachelor degree must be accredited according to the Law establishing a Foundation for the Accreditation of Study Programmes in Germany.<sup>3</sup></p> <p>First degree programmes (Bachelor) lead to Bachelor of Arts (B.A.), Bachelor of Science (B.Sc.), Bachelor of Engineering (B.Eng.), Bachelor of Laws (LL.B.), Bachelor of Fine Arts (B.F.A.) or Bachelor of Music (B.Mus.).</p>
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<p>earned 60 credits at least. The MU1 does not give access to DR programmes nor to other 3rd cycle degree courses.</p> <p>Third cycle. It covers the following typologies of degree courses: A) Corsi di Dottorato di Ricerca-CDR (research doctorate programmes); B) Corsi di Specializzazione-CS (specialisation courses); C) Corsi di Master Universitario di 2° livello-CMU2 (2nd level university master courses).</p> <p>A) CDR aim at training postgraduates for very advanced scientific research or for professional appointments of the highest consequence; they envisage the use of suitable teaching methodologies such as updated technologies, study periods abroad, stages in specialistic research centres. Access is by an Italian 2nd degree (LS/LM) or a foreign comparable degree; admission is subject to the passing of very competitive exams; legal length must be min. 3 years; the drawing up of an original dissertation is necessary for the awarding of the 3rd degree called Dottorato di Ricerca-DR (research doctorate); the corresponding personal title is Dottore di Ricerca.</p> <p>B) CS are devised to provide postgraduates with knowledge and abilities as requested in the practice of highly qualifying professions; the majority concerns medical, clinical and surgical specialities, but CS have been also established for the advanced education and professional training in different contexts. CS may be established exclusively in application of specific Italian laws or EU directives. Access is by an LS/LM or by a foreign comparable degree; admission is subject to the passing of a competitive examination; course length is min. 2 years. The final degree, called "Diploma di Specializzazione"-DS, give th right to the title as "Specialista".</p> <p>C) CMU2 consist in advanced scientific courses or higher continuing education studies, open to the holders of an LS or a foreign comparable degree; admission may be subject to additional conditions. Studies take min. 1 year. The degree (Master Universitario di 2° livello-MU2) is awarded to postgraduates who have earned min. 60 credits.</p> <p>Credits: degree courses are usually structured in credits (crediti formativi universitari - CFU). A university credit generally corresponds to 25 hours of global work per student, time for personal study included. The average workload of a full time student is conventionally fixed at 60 credits/year.</p> <p>Classes of Degree Courses: all CL and CLS/CLM sharing the same educational objectives and the same fundamental types of teaching-learning activities are organised in groups called "classi di appartenenza" (classes of degree courses). The content of individual degree courses is autonomously determined by universities; however, when establishing a CL or a CLS/CLM, individual institutions have to adopt some general requirements fixed at national level. Degrees belonging to the same class have the same legal validity.</p> <p>Academic Titles: the latest university legislation has defined the academic titles corresponding to the degrees of the Bologna sequence. The L entitles to be called "Dottore", the holders of an LS/LM have a right to the title as "Dottore Magistrale, the DR attributes the title as "Dottore di Ricerca".</p> <p>Joint Degrees: Italian universities are allowed to establish all the degree programmes in cooperation with foreign partner universities, both European and non-European; they may therefore design integrated curricula on completion of which joint or double/multiple degrees are awarded.</p>	<p><b>6.4.2 Master</b></p> <p>Master is the second degree after another 1 to 2 years. Master study programmes must be differentiated by the profile types "more practice-oriented" and "more research-oriented". Higher Education Institutions define the profile of each Master study programme.</p> <p>The Master degree study programme includes a thesis requirement. Study programmes leading to the Master degree must be accredited according to the Law establishing a Foundation for the Accreditation of Study Programmes in Germany.<sup>1)</sup></p> <p>Second degree programmes (Master) lead to Master of Arts (M.A.), Master of Science (M.Sc.), Master of Engineering (M.Eng.), Master of Laws (S.L.M.), Master of Fine Arts (M.F.A.) or Master of Music (M.Mus.). Master study programmes, which are designed for continuing education or which do not build on the preceding Bachelor study programmes in terms of their content, may carry other designations (e.g. MBA).</p> <p><b>6.4.3 Integrated "Long" Programmes (One-Tier): Diplom-degrees, Magister Artium, Staatsprüfung</b></p> <p>An integrated study programme is either mono-disciplinary (Diplom degrees, most programmes completed by a Staatsprüfung) or comprises a combination of either two major or one major and two minor fields (Magister Artium). The first stage (1.5 to 2 years) focuses on broad orientations and foundations of the field(s) of study. An immediate Examination (Diplom-Vorprüfung for Diplom degrees; Zwischenprüfung or credit requirements for the Magister Artium) is prerequisite to enter the second stage of advanced studies and specializations. Degree requirements include submission of a thesis (up to 6 months duration) and comprehensive final written and oral examinations. Similar regulations apply to studies leading to a Staatsprüfung. The level of qualification is equivalent to the Master level.</p> <p>- Integrated studies at Universitäten (U) last 4 to 5 years (Diplom-degree, Magister Artium) or 3 to 3.5 years (Staatsprüfung). The Diplom degree is awarded in engineering disciplines, the natural sciences as well as economics and business. In the humanities, the corresponding degree is usually the Magister Artium (M.A.). In the social sciences, the precise varies as a matter of institutional traditions. Studies preparing for the legal, medical, pharmaceutical and teaching professions are completed by a Staatsprüfung.</p> <p>The three qualifications (Diplom, Magister Artium and Staatsprüfung) are academically equivalent. They qualify to apply for admission to doctoral studies. Further prerequisites for admission may be defined by the Higher Education Institution, cf. Sec. 6.5.</p> <p>- Integrated studies at Fachhochschulen (FH)/Universities of Applied Sciences (UAS) last 4 years and lead to a Diplom (FH) degree. While the FH/UAS are non-doctorate granting institutions, qualified graduates may apply for admission to doctoral studies at doctorate-granting institutions, cf. Sec. 6.5.</p> <p>- Studies at Kunst- and Musik-Hochschulen (Universities of Art/Music etc.) are more diverse in their organization, depending on the field and individual objectives. In addition to Diplom/Magister degrees, the integrated study programme awards include Certificates and certified examinations for specialized areas and professional purposes.</p> <p><b>6.5 Doctorate</b></p> <p>Universities as well as specialized institutions of university standing and some Universities of Art/Music are doctorate-granting institutions. Formal prerequisite for admission to doctoral work is a qualified Master (UAS and U), a Magister degree, a Diplom, a Staatsprüfung, or a foreign equivalent. Particularly qualified holders of a Bachelor or a Diplom (FH) degree may also be admitted to doctoral studies without acquisition of a further degree by means of a procedure to determine their aptitude. The universities respectively the doctorate-granting institutions regulate entry to a doctorate as well as the structure of the procedure to determine aptitude. Admission further requires the acceptance of the Dissertation research project by a professor as a supervisor.</p>
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**8.6 Grading Scheme**

The grading scheme in Germany usually comprises five levels (with numerical equivalents; intermediate grades may be given): "Sehr Gut" (1) = Very Good; "Gut" (2) = Good; "Befriedigend" (3) = Satisfactory; "Ausreichend" (4) = Sufficient; "Nicht ausreichend" (5) = Non-Sufficient/Fail. The minimum passing grade is "Ausreichend" (4). Verbal designations of grades may vary in some cases and for doctoral degrees.

In addition institutions may already use the ECTS grading scheme, which operates with the levels A (best 10 %), B (next 25 %), C (next 30 %), D (next 25 %), and E (next 10 %).

**8.7 Access to Higher Education**

The General Higher Education Entrance Qualification (*Allgemeine Hochschulreife, Abitur*) after 12 to 13 years of schooling allows for admission to all higher educational studies. Specialized variants (*Fachgebundene Hochschulreife*) allow for admission to particular disciplines. Access to *Fachhochschulen* (UAS) is also possible with a *Fachhochschulreife*, which can usually be acquired after 12 years of schooling. Admission to Universities of Art/Music may be based on other or require additional evidence demonstrating individual aptitude.

Higher Education Institutions may in certain cases apply additional admission procedures.

**8.8 National Sources of Information**

- Kultusministerkonferenz (KMK) [Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany]; Lennstrasse 6, D-53113 Bonn; Fax: +49[0]228/501-229; Phone: +49[0]228/501-0
- Central Office for Foreign Education (ZaB) as German NARIC; [www.kmk.org](http://www.kmk.org); E-Mail: [zab@kmk.org](mailto:zab@kmk.org)
- "Documentation and Educational Information Service" as German EURYDICE-Unit, providing the national dossier on the education system ([www.kmk.org/doku/bildungswesen.htm](http://www.kmk.org/doku/bildungswesen.htm)); E-Mail: [eurydice@kmk.org](mailto:eurydice@kmk.org)
- Hochschulrektorenkonferenz (HRK) [German Rectors' Conference]; Ahrstrasse 39, D-53175 Bonn; Fax: +49[0]228/887-110; Phone: +49[0]228/887-0; [www.hrk.de](http://www.hrk.de); E-Mail: [sekri@hrk.de](mailto:sekri@hrk.de)
- "Higher Education Compass" of the German Rectors' Conference features comprehensive information on institutions, programmes of study, etc. ([www.higher-education-compass.de](http://www.higher-education-compass.de))

<sup>1</sup> The information covers only aspects directly relevant to purposes of the Diploma Supplement. All information as of 1 July 2005.

<sup>2</sup> *Berufakademien* are not considered as Higher Education Institutions, they only exist in some of the Länder. They offer educational programmes in close cooperation with private companies. Students receive a formal degree and carry out an apprenticeship at the company. Some *Berufakademien* offer Bachelor courses which are recognized as an academic degree if they are accredited by a German accreditation agency.

<sup>3</sup> Common structural guidelines of the Länder as set out in Article 9 Clause 2 of the Framework Act for Higher Education (HRG) for the accreditation of Bachelor's and Master's study courses (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany of 10.10.2003, as amended on 21.4.2005).

<sup>4</sup> "Law establishing a Foundation 'Foundation for the Accreditation of Study Programmes in Germany'", entered into force as from 26.2.2005, GV. NRW. 2005, nr. 5, p. 45 in connection with the Declaration of the Länder to the Foundation 'Foundation for the Accreditation of Study Programmes in Germany' (Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany of 16.12.2004).

<sup>5</sup> See note No. 4.

<sup>6</sup> See note No. 4.