

COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

Course title	Research Methods and Technology Transfer
Course code	76062
Scientific sector	INF/01
Degree	Master in Software Engineering (LM-18)
Semester	1
Year	2
Credits	6
Modular	No
Total lecturing hours	40
Total exercise hours	20
Attendance	Not compulsory, but strongly recommended for the exercise hours. Non-attending students must contact the lecturer at the start of the course to agree on the modalities of the independent study.
Prerequisites	--
Course page	https://ole.unibz.it/
Specific educational objectives	<p>The course belongs to the type "caratterizzanti – discipline informatiche".</p> <p>This course explores the research challenges and how to conduct the research by using suitable research methodologies.</p>
Lecturer	Ilenia Fronza
Contact LA	Via Cassa di Risparmio 21, Room 1.06, Ilenia.Fronza@unibz.it
Scientific sector of lecturer	ING-INF/05
Teaching language	English
Office hours	During the lecture time span, Thursday 14:00 - 15:00, arrange beforehand by email
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	<ul style="list-style-type: none"> • Quantitative, qualitative, and mixed-method research • Systematic literature review, Systematic mapping study • Survey research • Experimental research • Case study • Technology transfer and dissemination
Teaching format	Frontal lectures, hands-on activity, and discussion.
Learning outcomes	<p>Knowledge and understanding</p> <ul style="list-style-type: none"> • D1.2 be able to analyse and solve even complex problems in the area of Software Engineering for Information Systems with particular emphasis on the use of empirical evaluation studies, methods, techniques and technologies; • D1.7 know the various fields of application of Software Engineering also with reference to the local, national and international economic-social context;

	<ul style="list-style-type: none"> • D1.8 To be able to read and understand specialist scientific documentation, such as conference proceedings, articles in scientific journals, technical manuals. <p>Applying knowledge and understanding</p> <ul style="list-style-type: none"> • D2.2 know how to design and carry out experimental analyses of software systems in order to acquire measurements of their behaviour and evaluate experimental hypotheses in different application fields, such as business, industry or research; <p>Making judgments</p> <ul style="list-style-type: none"> • D3.1 ability to independently select documentation from various sources, including technical books, digital libraries, technical scientific journals, web portals or open source software and hardware tools; <p>Communication skills</p> <ul style="list-style-type: none"> • D4.2 To be able to present the contents of a scientific/technical report to an audience, including non-specialists, at a fixed time. <p>Learning skills:</p> <ul style="list-style-type: none"> • D5.1 ability to independently extend the knowledge acquired during the course of study by reading and understanding scientific and technical documentation in English;
<p>Assessment</p>	<p>Project work [70% of mark] + final exam (oral) [30% of mark].</p> <p>The oral exam is needed to assess the students' understanding of the topic's key principles. Project work is needed to assess the students' ability to work with examples, applications and real systems. The written project report is needed to assess creativity, identification of interesting research questions to investigate in the project, effectiveness in the results and lessons learned presentation.</p> <p>Project work and final exam are mandatory, and both must be positive to pass the exam. In case of a positive mark for the project work, the mark will count for the remaining regular exam sessions. In case of negative evaluation of the project work, a new project needs to be submitted for the next session.</p> <p>Students can choose between two modalities to prepare the project work:</p> <ul style="list-style-type: none"> • Step-by-step (for attending students), which means successfully completing the project work in an iterative way <u>during the course semester</u>. • All-in-one (for non-attending students), which means preparing the project work autonomously and presenting it before the final exam. Non-attending students have to contact the lecturer <u>at the start of the course</u> to agree on the modalities of preparation of the project work. <p>Project work must be evaluated BEFORE the final exam, otherwise the exam cannot be registered.</p>
<p>Assessment language</p>	<p>English</p>

Assessment typology	Monocratic
Evaluation criteria and criteria for awarding marks	<p>Relevant for the final exam assessment: correctness of answers, clarity of answers, ability to summarize, and deep understanding of the course topics.</p> <p>Relevant for the project work assessment: skills in critical thinking, identification of interesting research questions, correct application of the research method, effectiveness in the results, and quality of the final report.</p>
Required readings	<ul style="list-style-type: none"> • Experimentation in Software Engineering. C. Wohlin, P. Runeson, M. Höst, M.C. Ohlsson, B.Regnell, A. Wesslén. Springer, 2012 • Software Metrics – A Rigorous & Practical Approach. N. Fenton, S. Pfleeger. • Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. Sage. • Richards, L. (2014). Handling qualitative data: A practical guide. Sage. • Easterbrook S., Singer J., Storey MA., Damian D. (2008) Selecting Empirical Methods for Software Engineering Research. In: Shull F., Singer J., Sjøberg D.I.K. (eds) Guide to Advanced Empirical Software Engineering. Springer, London. https://doi.org/10.1007/978-1-84800-044-5_11 • Fowler, F. J. (2009). Applied Social Research Methods: Survey research methods (4th ed.). Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781452230184 • Runeson, P., Host, M., Rainer, A., & Regnell, B. (2012). Case study research in software engineering: Guidelines and examples. John Wiley & Sons. https://onlinelibrary.wiley.com/doi/book/10.1002/9781118181034 <p>Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it</p>
Supplementary readings	Additional books and papers will be suggested during the course.
Software used	--