COURSE DESCRIPTION – ACADEMIC YEAR 2020/2021

Course title	**Research Methods and Technology Transfer**
Course code	76062
Scientific sector	INF/01
Degree	Master in Software Engineering for Information Systems (LM-18)
Semester	1
Year	2
Credits	6
Modular	No

Total lecturing hours	40
Total exercise hours	20
Attendance	Not compulsory
Prerequisites	Prior courses in Management Engineering and Mathematical Modeling.
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type caratterizzanti – discipline informatiche – "Software/ Systems Engineering Research". This course is to present the research paradigms such as design science, behavior science or mathematical modeling across Engineering community, Information System community, and Computer Science community. It mainly focuses on the know-how in research, which includes empirical, mathematical, statistical and engineering methodologies. From the scientific perspective, this course will address how to explore the research challenges and how to conduct the research by using suitable research paradigms and methodologies.

Lecturer	Ilenia Fronza
Contact	Piazza Domenicani 3, Room 1.08, Ilenia.Fronza@unibz.it, +39 0471 016247
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	Arrange beforehand by email.
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	• Research paradigms in information and computer science and research methods • Quality assessment of research papers • Literature Review • Dissemination techniques for research results • Research Planning • Models and methods of technology transfer
Teaching format	Frontal lectures, hands-on activity, and discussion.

Learning outcomes	**Knowledge and understanding:** D1.2 To be able to analyze and solve even complex problems in the area of Software Engineering for Information Systems with particular emphasis on the use of studies, methods, techniques and technologies of empirical evaluation. D1.7 To know the different sectors of application of Software Engineering also with reference to the local, national and international economic-social context. D1.8 To be able to read and understand specialist scientific documentation, such as conference proceedings, articles in scientific journals, technical manuals. **Applying knowledge and understanding:** D2.1 To know how to apply the fundamentals of empirical analysis of ICT data to the construction of mathematical models for the evaluation and prediction of characteristics of applications and software systems D2.2 To be able to design and perform experimental analyses of information systems in order to acquire measures related to their behaviour and to evaluate experimental hypotheses in different fields of application, such as business, industrial or research. **Making judgments:** D3.1 To be able to autonomously select documentation from a variety of sources, including technical books, digital libraries, technical scientific journals, web portals or open source software and hardware tools. **Communication skills:** D4.2 To be able to present the contents of a scientific/technical report to an audience, including non-specialists, at a fixed time. D4.5 To be able to prepare and conduct technical presentations in English. **Learning skills:** D5.1 To be able to independently extend the knowledge acquired during the course of study by reading and understanding scientific and technical documentation in English. D5.4 To be able to formulate and validate theories and define new methods through empirical induction and new generation scientific investigation tools.

Assessment	Lab exercises and project work [70% of mark] + final exam (oral) [30% of mark]. The oral exam is needed to assess the students' understanding of the topic's key principles. The laboratory exercises are needed to assess the students' ability to work with examples, applications and real systems. The written project report is needed to assess ability to work in a team, creativity, identification of interesting research questions to investigate in the project, effectiveness in the results and lessons learned presentation. Lab exercises and the final exam are mandatory, and both must be positive in order to pass the exam. In case of a positive mark for the project, the mark will count for the remaining regular exam sessions

	of the academic year. In case of negative evaluation of the project, a new project needs to be submitted for the next session. Students can choose between two modalities to prepare the project work. • Step-by-step, which means completing successfully the lab exercises and project work. • All-in-one, which means preparing the project work and presenting it before the final exam. Projects and lab exercises have to be evaluated BEFORE the final exam, otherwise the exam cannot be registered.
Assessment language	English
Assessment typology	Monocratic
Evaluation criteria and criteria for awarding marks	Relevant for the Theory assessment: correctness of answers, clarity of answers, ability to summarize, deep understanding of experimental designs, methodologies, and data analysis techniques. Relevant for the Practice assessment: creativity, individual contribution, skills in critical thinking, identification of interesting research questions, effectiveness in the results and lessons learned presentation.

Required readings	• 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. • Students will be exposed to current topics of research by reading papers provided during the lectures
Supplementary readings	• Research articles provided during the course • Bhattacherjee A., Social Science Research: Principles, Methods, and Practices, 2012, Open Free Textbook [pdf] • Corbin, J. & Strauss, A. (2008). Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. 3rd ed., Thousand Oaks: Sage UNIBZ library code: MR 2000 C791(3) • Gerring J., Case study Research: Principles and Practices 2007 [UNIBZ Library: MR 2000 G378] • Nardi P., Doing Survey Research: A Guide to Quantitative Methods, 2006 [UNIBZ Library, MR 2400 N223 (2.06)]
Software used	--