COURSE DESCRIPTION — ACADEMIC YEAR 2020/2021

Course title	**Foundations of Research**
Course code	71048
Scientific sector	
Degree	Ph.D. in Computer Science
Semester	second
Year	2020/2021
Credits	6
Modular	No

Total lecturing hours	36
Total lab hours	0
Attendance	Mandatory
Prerequisites	There are no specific prerequisites for this course.

Specific educational objectives	The course (ING-INF/05 and INF/01) is compulsory for all students enrolled in the PhD program in Computer Science, to fulfill the credit requirements for the 2nd year of study. The course covers the perspectives, terminologies and tools doctoral students need in order to produce high-quality research products. It cover three basic themes. **Science communication** as a theory and a practice, covering • In-reach communication: scholarly presentations and publications in scientific venues; • Out-reach communication: presentations and press articles to non-expert audiences. **Scientific reproducibility** as the formal processes for artifact review to validate the most important claims and contributions of accepted scientific papers. **Ethics** as a transversal theme to research, practice, and scientific production. One main objective of the course is to provide students with operational and analytical skills to critically reflect on ethical issues related to the design and deployment of information technologies. Through case studies and practical examples, this module will cover key topics in digital ethics and provide tools, methods, and processes to reflect on the ethical implications of digital technologies in society. Furthermore, the course looks at the production of scientific knowledge with an emphasis on reproducibility. The acquisition and the implementation of these concepts would allow to produce.

Lecturers	Maria Menendez-Blanco, Ilenia Fronza, Flavio Vella, Antonella De Angeli, Giancarlo Guizzardi
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Fakultät für Informatik
Facoltà di Scienze e Tecnologie informatiche
Faculty of Computer Science

Scientific sector of lecturer	ING-INF/05 and INF/01
Teaching language	English
Office hours	TBD

List of topics	Science Communication • *Epistemology, rhetoric and metaphors in computer science* • *Context, audiences and narratives in science communication* • *Paper writing* • *Fairs, schools, public events and social media* Scientific Reproducibility • Historical overview from Karl Popper to Artifact Evaluation Procedures • Artifact and reproducibility in the computer societies. • Artifact hands-on: how to write an artifact. • Artifact hands-on: how to review an artifact. • Tools for Artifact Evaluation Ethics • Ethical reasoning in practice • Ethics in action for digital design • Ethical procedures at the Free Universities of Bolzano
Teaching format	The course consists of 3 modules, combining frontal lectures small projects and group discussions. Three workshops facilitated by 2 lecturers in co-presence will be run.

Learning outcomes	Knowledge and understanding: • Knowledge of the challenges in research and of the methods and techniques for overcoming these challenges. • Understanding of the skills, tools and techniques required for effective scientific communication. Applying knowledge and understanding: • Writes artefacts and ethical requests • Paper writing Making judgments: • Ability to autonomously select the documentation (in the form of books, web, magazines, etc.) needed to keep up to date in a given sector • Propose countermeasures to address ethical and reproducibility issues in information technologies Communication skills: • Develop the ability to present one's work in a clear and comprehensible way in front of different audiences, including non-specialists • Ability to structure and draft scientific and technical documentation Learning skills: • Ability to autonomously extend the knowledge acquired during the course of study • Ability to reflect on the ethical implications of research and apply the concepts and instruments introduced in the course to their individual projects.

Assessment	Students will work on a set of assignments that will be evaluated and discussed during the course.
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	The exam is pass/fail and no marks are awarded. Relevant for the assessment are the following: - Communication Clarity and Effectiveness - ability to critically reflect on the ethical implications of information systems, - ability to apply the tools, methods, and processes introduced in the course to specific case studies, ability to write and evaluate artifacts of scientific papers from an ethical perspective.

Required readings	The reading material is specified during the course.
Supplementary readings	Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it
Software used	Tools for automatizing software installation and experiments (e.g., scripting, docker images, Collective Knowledge). *cs-tech@inf.unibz.it*