**Economics of innovation**

## Prof. Fabio Montobbio; Prof. Bruce Tether

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course studies the economics of innovation and technological change from three perspectives: macro, micro and industry level. The first part of the course (macro) examines the relationship between technological change and economic transformation (e.g. productivity growth, unemployment, structural change). Particular attention is paid to measurement of innovation activities and the relationship between innovation and places and why some places prosper while others stagnate. Secondly the course studies at the micro level the different sources of innovation and the main appropriablity strategies. It studies the dichotomy big state vs. free markets and asks which works best, for whom and when. It addresses the issue of skills and innovation and how the rewards form innovation activities are distributed. At the industry level the course analyzes the forces that drive the diffusion of new processes and products, industry and market lifecycles, the role of design(s), network effects and standards and how to address the technological lock-in and lock-out. In addition, two themes are central in the analysis of technological innovation. Intellectual property (patents, copyrights and trademarks) and scientific progress. The course examines the economic justification for intellectual property and how different possible institutional design can stimulate or hinder innovation. It addresses the efficiency of the international regulation of intellectual property with a specific regard to developing countries (diffusion of knowledge, access to medicines etc. etc.). It studies how intellectual property can be used for technology transfer between university and industry. Secondly, the course analyzes the economics of science, the determinants of scientific progress and its economic impact. Some sectoral or firm-level case studies are proposed in some particularly relevant industries as the so called ‘industry 4,0’ or biotechnology, software and telecommunication.

Upon successful completion of the requirements for this course, students will be able to:

1. understand the relationships between innovation and the most important economic processes like growth, unemployment and structural change.

2. evaluate different competitive strategies in different the different innovative and emerging industries in the economy.

3. master the microeconomic principles driving innovation.

4. understand the different sources of innovation for the firm and the various appropriability strategies.

5. evaluate critically the use and impact of intellectual property.

6. think critically about the opportunities and challenges in the relationship between scientific progress and innovation.

***COURSE CONTENT***

1. Introduction to the course: stylized facts - basic concepts and definitions

2. Sources of innovation

3. Research and Development, and its management

4. The external organization of innovation: “Open Innovation”

5. Services and Innovation

6. Platforms and Business Model Innovation

7. Innovation and Growth: Artificial Intelligence and General Purpose Technologies

8. Measurement of innovation: Indicators and data

9. Diffusion of Innovation

10. Intellectual property rights and Profiting from Innovation

11. Economics of Science

12. Environmental Innovations: Drivers and Effects.

13. Technology and employment.

***READING LIST***

The course is based on various reading material and slides provided at the beginning of the course and available on the Blackboard Platform.

*Course Materials*

Posted on BlackBoard.Unicatt: case studies, exercises, and library links to readings.

*Library resources*

The Università Cattolica del Sacro Cuore’s Library provides a range of learning resources including texts, journals, periodicals, magazines, and access to online databases and information services. It also offers a virtual library which is accessible via the University’s website.

*Online learning*

Icatt is the Università Cattolica del Sacro Cuore's online learning environment. It is used to support traditional face-to-face lectures, tutorials and workshops at the University. Icatt provides access to various features including announcements, course materials, discussion boards and assessments for each online course of study.

***TEACHING METHOD***

The course uses a mixture of readings, exercises, cases and guest speakers. Traditional lectures will be associated to a group assignment (the economic analysis of sources and impact of an existing innovation) and to discussion of case studies. Examples of the most relevant dynamics and controversies in high tech sectors are discussed through case studies, with a specific attention to the sources of innovation, firms’ strategy, intellectual property and knowledge transfer policies.

***ASSESSMENT METHOD AND CRITERIA***

For attending students grades are based on

• Group assignment (40%).

• Two written exams (1 h): the mid-term exam and the final exam on the second and third parts of the course to be held at the end of the course (2 out of 3 questions on various course topics, 60%). Only in the first exam session it will be possible to take the final exam only on the second and third part of the course.

Non-attending students:

Written exam (1h 30) to be held at the end of the course (3 questions on various course topics. The program is a set of compulsory readings posted on Blackboard).

The group assignment is the analysis of a specific innovation developed in the last few years. The students will have to form a group of four/five people using the e-learning platform BLACKBOARD. Each group will deliver 3 intermediate assignments of two pages each. The nature of the assigment will be specified in class. The final project will contain the three assignments plus the additional considerations each group is free to put forward (e.g. prospects, competitors, welfare and policy implications, health and environmental issues).

In the event that the health situation relating to the Covid-19 pandemic does not allow face-to-face teaching, distance learning will be guaranteed in ways that will be communicated to students in due course.