ISM UNIVERSITY OF MANAGEMENT AND ECONOMICS

APPROVED BY
THE STUDY COMMISSION
Minutes No. 02-12-2025-14
as of 28th August 2025

TECHNOLOGY AND INNOVATION MANAGEMENT

Course code	*GRAI022*
Compulsory in the programme	*Innovation and Technology Management*
Level of studies	*Graduate*
Number of credits	*6 ECTS (36 contact hours + 2 consultation hours, 124 individual work hours)*
Course coordinator (title and name)	*Dr. Bahman Peyravi*
Prerequisites	*Undergraduate diploma*
Language of instruction	*English*

THE AIM OF THE COURSE:

The primary goal of the course is to expose students to a variety of perspectives on technological innovation, building on an active learning process and preparing for work experiences in the future.

This course approaches the management of technological innovation from a resource/knowledge-based view, which sees technological innovations as a driving force of competitive advantage of organizations through a combination of internal resources and external linkages. Students are introduced to the theories, models, tools and practical cases from industries by understanding what technological innovations are, why they are important, and what are needed to enable and manage technological innovations within and outside of the boundary of organizations. Although most attention will be paid to innovations made by industrial firms, relevant issues of innovations at levels of individual, team, network of organizations, and industry will be addressed as well. The weekly readings consist of a mixture of book chapters, journal articles, and cases.

MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Degree level learning objectives (Number of LO)	Assessment methods	Teaching methods
CLO1. Understanding the phenomena of innovation. Define what innovation is, what different types of innovations are, and explain why innovation is important.	LO1.1	Online lectures, self-study, online group work, case studies.	Active participation in online discussion, small assignments, case analyses assessment, and group project.
CLO2. Pinpoint the role of technology in innovation both in theory and in practice.	LO1.1, LO1.2	Online lectures, self-study, online group work, case studies.	Active participation in online discussion, small assignments, case analyses assessment, and group project.
CLO3. To explain the key concepts of Schumpeterian theory and technology in relation to technological innovation.	LO1.1, LO1.2	Online lectures, self-	Active participation in discussion, case

		study, online group work, case studies.	analyses assessment, and group project.
CLO4. To be able to describe what are the key concepts of resource-based view and its relevance to innovation strategy	LO1.1, LO1.2	Online lectures, self-study, online group work, case studies.	Active participation in online discussion, small assignments, case analyses assessment, and group project.
CLO5. To be able to explain the key concepts of knowledge and learning and its relevance to innovation and the innovation process within an organization.	LO1.1, LO1.2	Online lectures, self-study, online group work, case studies.	Active participation in online discussion, small assignments, case analyses assessment, and group project.
CLO6. To be able to explain the organizational implications, including decision making under uncertainty with regard to innovation and the open innovation perspective and how external resources are possibly expanded into a larger scope thanks to an open approach of innovation.	LO1.2, LO3.1, LO3.2	Online lectures, self-study, online group work, case studies.	Active participation in online discussion, small assignments, case analyses assessment, and group project.
CLO7. To discuss the strengths and weaknesses of the theoretical perspectives form the course curriculum	LO1.2, LO1.3, LO2.1	Online lectures, self-study, online group work, case studies.	Active participation in online discussion, small assignments, case analyses assessment, and group project.

ACADEMIC HONESTY AND INTEGRITY

The course will use a textbook and a collection of published academic articles. All teaching materials will bear proper references to the original sources. This will also apply to students' reports and presentations.

COURSE OUTLINE

Topic	In-class hours	Readings

Session 1-2: Technology and Innovation management: an introduction Introduction. Technology and science; The strategic management of technology and innovation; Industry dynamics of technology and innovation - source of innovation & types and patterns of innovation; Open innovation and the need to share and exchange knowledge; Innovation as a management process Discussions: Recent and contemporary studies on technology and innovation management; Innovation and invention; Successful and unsuccessful innovations **Learning objectives:** • Define innovation and different type of innovation • explaining the role of technology in innovation • The sources from which innovation arises, including the roles of individuals, organizations, government institutions, and networks. • The types of innovations and common industry patterns of technological evolution and diffusion. • The factors that determine whether industries experience pressure to select a dominant design, and what drives which technologies to dominate others. • The effects of timing of entry, and how firms can identify (and manage) their entry options.	8	**Session 1-2** Coursebook: Strategic management of technological innovation. Part 1; Chapter 1, Fourth Edition, Melissa A.Schilling Page 13-65
Session 3-4: Make Innovation Happen: National systems of innovation and entrepreneurship The role of the state and national 'systems' of innovation; Why firms depend on the state for so much; How national states can facilitate innovation; National scientific capacity and R&D offshoring; Technological entrepreneurship: a question of context; Science and technology policy. Discussions: The impact of the economic crisis on innovation; Fostering innovation in the United States and Japan; Triple Helix of university–industry–government relationships; technology and Innovation within the 28 European Union states Class exercise: Reverse innovation (group presentation) Learning objectives: • Understand the concept of national Innovation systems (NIS). • Analyse the role of the state in innovation and technology. • Compare international approaches to innovation. • Evaluate national scientific capacity and global R&D Trends. • Explore the contextual nature of technological entrepreneurship. • Apply the Triple Helix Model: Interpret the dynamics and impact of university–industry–government collaborations in driving innovation. • Critically examine the impact of economic crises on innovation and technology: Assess how economic downturns influence innovation investment, policy responses, and the resilience of innovation systems and technology.	8	**Session 3-4** Coursebook:Innovation Management and New Product Development Sixth Edition Paul Trott 48-76 Reading: Articles 1

Session 5-6: Formulating Technological Innovation Strategy Defining the Organization's Strategic Direction; Choosing Innovation Projects; Collaboration Strategies; Protecting Innovation **Learning objectives:** • Assessing the firm's position and defining its strategic direction. • Choosing innovation projects in which to invest, including both quantitative and qualitative valuation techniques. • Deciding whether and how the firm will collaborate on development activities, choosing a collaboration mode, and choosing and monitoring partners. • Crafting a strategy for protecting—or diffusing—a technological innovation through such methods as patents, trademarks, copyrights, and trade secrets. At the end of the session, dedicated time will be allocated for group presentations of the selected case companies. Each group will have a total of 15-20 minutes—comprising 10 minutes for delivering their pitch and 5-10 minutes for receiving feedback from peers.	8	**Session 5-6** Coursebook: Strategic management of technological innovation. Part 2, Fourth Edition, Melissa A.Schilling Page: 103-177
Session 7-8: Implementing Technological Innovation Strategy - R&D Management, Operations, and processes Organizing for Innovation; Managing the New Product Development Process; Managing New Product Development Teams; Crafting a Deployment Strategy **Case Studies and discussions** **Learning objectives:** • Structuring the firm to improve its likelihood of innovating, its effectiveness at new product development, and its speed of new product development. • Managing new product development processes to maximize fit with customer needs, while simultaneously minimizing development cycle time and controlling development costs. • Composing, structuring, and managing new product development teams to maximize new product development effectiveness. • Crafting a strategy for effectively deploying the innovation into the marketplace, including timing, licensing strategies, pricing strategies, distribution, and marketing.	8	**Session 7-8** Course-book: Strategic management of technological innovation. Part 3; Fourth Edition, Melissa A.Schilling Page: 203-277 Articles 2-3
	Total: 32 hours	
CONSULTATIONS	2	
FINAL EXAM	2	

FINAL GRADE COMPOSITION

Type of assignment	**%**
Group Components 50 %	
Group project (presentations)	50
Individual Components 50%	
Final exam	50
Total:	**100**

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT
(Provide short descriptions and grading criteria of each assignment)

Final Exam – 50%

Description:
The final exam will evaluate students' understanding of key theories, frameworks, and real-world applications related to innovation systems, technological entrepreneurship, and science and technology policy. The exam will be held at the **NOV 21** and will consist of two sections:

- **Multiple Choice Questions (MCQs):** Test knowledge of core concepts, terminology, and factual content.
- **Open-Ended Questions:** Assess analytical thinking, the ability to apply theoretical knowledge to real-world situations, and critical reflection on innovation-related topics.

Grading Criteria:

- Multiple Choice Section (25%)
- Open Questions Section (25%)
    - Clarity and depth of argument
    - Application of relevant theories and examples
    - Critical thinking and original insight
    - Structure and coherence of response

Group Presentation – 50%

Description:
Students will work in small groups to research and present a case study on a selected company known for its innovative products, services, or technologies. The presentation should demonstrate how the company applies innovation strategies, engages in entrepreneurship, and interacts with national or global systems of innovation. Each group will deliver a **10 minute pitch**, followed by **5-10 minutes of feedback** and Q&A. Presentations will be scheduled during class sessions.

Grading Criteria:

- Content and Analysis (20%)
- Application of Course Concepts (10%)
- Presentation Delivery (10%)
- Team Collaboration and Q&A (10%)

RETAKE: If final mark of the course, including final exam score, is insufficient, students will be allowed to exercise their right of retake. The retake exam will cover all lectures and case-discussion topics discussed in class during the course. It will replace the 50 % of exam. Groupwork cannot be resubmitted or presented later then assigned date, please inform in advance about possible issues.

REQUIRED READINGS

Course book:

Schilling, A.M. (2013). Strategic Management of Technological Innovation.McGraw-Hill International Edition, Fourth Edition

Trott, P. (2017). Innovation Management and New Product Development. Person, Sixth Edition

ADDITIONAL READINGS

Articles:

1. Asheim, B. T., Isaksen, A., and Trippl, M. (2019). Advanced Introduction to Regional Innovation Systems. Cheltenham: Edward Elgar Pub.
2. Bardel, O., and Krylova, P. (2014). Are we doing enough to support technology transfer to developing countries?. Centre for global development. Available from: https://www.cgdev.org/blog/are-we-doing-enough-support-technology-transfer-developing-countries.
3. Bhatia, A. (2020). Future Tech: Five Patents that Show what Top Tech Companies Are Working on. The Indian express. Available from: https://indianexpress. com/article/technology/tech-news-technology/future-tech-five-patents-that-show-what-top-tech-companies-are-working-on-6197550/
4. Bourke, J., and Roper, S. (2016). AMT adoption and innovation: an investigation of dynamic and complementary effects. Technovation, 55-56,42-55
5. Gartner. (2020). Gartner Top 10 Strategic Technology Trends for 2020. Available from: https://www.gartner.com/smarterwithgartner/gartner-top-10-strategictechnology-trends-for-2020/.
6. Gmeiner, R., and Gmeiner, M. (2021). Encouraging domestic innovation by protecting foreign intellectual property. Int. Rev. Law Econ., 67,1-20. September.
7. Golovko, E., and Valentini, G. (2011). Exploring the complementarity between innovation and export for SMEs' growth. J. Int. Bus. Stud., 42(3), 362-380.
8. Jensen, M. B., Johnson, B., Lorenz, E. and Lundvall, B. Å. (2007). Forms of knowledge and modes of innovation. *Research Policy,* 36(5): 680-693.
9. Vargo, S.L. and Lusch, R.F. (2004). Evolving to a new dominant logic for Marketing. *Journal of Marketing*, 68, 1-17.
10. Bitner, M.J., Ostrom, A.L., and Morgan F. N. (2008). Service Blueprinting: A practical technique for service innovation. *California Management Review*, 50(3): 66-83
11. Newbert, S. L. (2008), Value, rareness, competitive advantage, and performance: a conceptual-level empirical investigation of the resource-based view of the firm. *Strategic Management Journal*, 29, 745–768.
12. Laursen, K. and Salter, A. (2006). Open for Innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms. *Strategic Management Journal*, 27(2), 131-150.
13. Chesbrough, H. W. and Appleyard, M. M. (2007). Open innovation and strategy. *California Management Review*, 50(1): 57-76.
14. Ding, R., Dekker, H.C., and Groot, T. (2013). Risk, partner selection and contractual control in interfirm relationships. *Management Accounting Research*, 24(2), 140-155.
15. Rice et al., (2008). Implementing a learning plan to counter project uncertainty. MIT Sloan Management Review, 49(2), 54-62.
16. Kihlander, I., Magnusson, M., & Karlsson, M. (2024). Critical Factors to Consider When Designing an Innovation Management System. *Research-Technology Management*, 67(3), 34-43.

ANNEX

DEGREE LEVEL LEARNING OBJECTIVES

Learning objectives for the Master of Business Management
Programme:
Innovations and Technology Management

Learning Goals	Learning Objectives
Students will be innovative decision makers	LO1.1. Students will be able to define the business problem and develop **innovative solutions**.
	LO1.2. Students will become **independent learners** and develop their own comprehension of scientific theories, models, and concepts.
	LO1.3. Students will be able to demonstrate critical thinking in problem solving.
Students will be socially responsible leaders	LO2.1. Students will be able to evaluate past and current practices in their discipline from an **ethical perspective**.
Students will be effective communicators	LO3.1. Students will develop and deliver a **coherent oral presentation**.
	LO3.2. Students will develop and deliver a **coherent written research paper**.

Course Timetable

Fridays:		**Saturdays:**	
12.30-15.45	Class (with short breaks)	9.00-12.15	Class (with short breaks)
15.45-16.45	Afternoon coffee break	12.15-13.15	Lunch break
16.45-20.00	Class (with short breaks)	13.15-16.30	Class (with short breaks)