ISM UNIVERSITY OF MANAGEMENT AND ECONOMICS

Technology for Economic, Environmental, and Social Impact

Course code	*GRAB008*
Level of studies	*Graduate*
Number of credits	*6 ECTS*; *36 class hours, 72 hours of self-study,*
Course coordinator (title and name)	*Dr. Saman Sarbazvatan (MBA, EDBA)*
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Prerequisites	*Undergraduate diploma*
Language of instruction	*English*

COURSE DESCRIPTION AND OBJECTIVES

Industry 4.0 Technological Enablers drive innovation in solutions and services and restructure the economic and business models and market dynamics. The accelerating pace of Digital Transformation and the upcoming Digital Economy drive and at the same time are driven by the mass integration of Industry 4.0 Enabling Technologies in the backend, core, and front-end of industries, businesses, and markets. Such innovations fundamentally drive the transition to the Digitally Empowered Circular Economy and help us achieve SDGs and Sustainable Competitiveness more efficiently.

This course sheds light on the evolving dynamics of the markets and economies resulting from the transition to the Digital Economy and the urgency to accelerate the transition to the Circular Economy by harvesting the already established digital enablers. The increasing awareness and attention to the imperative of the transition to the Circular Economy coincide with the ongoing transition to the Digital Economy, providing groundbreaking multi-dimensional innovation opportunities in industrial, economic, and business models. By propelling innovation in processes, business models, products, services, industries, markets, and economies, Combinatorial Innovations, and Convergence of Technologies reshape the fabric of the economy and create waves of disruptive and enabling forces across all sectors. They give rise to Emergence, Divergence, and Convergence of technologies, enable Economic, Industrial, and Business Model Innovation. These trends drive and are driven by Digital Transformation and the Digital Economy, and provide groundbreaking solutions to tackle SDGs, promote Sustainable Competitiveness, and enable the transition to the Circular Economy.

This course starts with a brief overview of the exacerbating social, economic, and environmental challenges as the consequences of technologically empowered Industrialization under the Linear Economic Model and our unsustainable sourcing, production, and consumption patterns. Following this introduction, The Circular Economy Alternative is introduced and explored as a prominent means for designing and implementing innovative solutions in response to the threatening aftermath of our unsustainable practices. Following an introduction on the above, this course dives deeper into how technologies integrate into industries and create new technologically empowered industries, such as FinTech, AgriTech, HealthTech, MedTech, InsurTech, EdTech, SpaceTech, and many other xTech industries. These new industries open new markets and enable opportunities for innovation as they operate across sectors and interconnect several industries. Convergence of technologies such as Cloud, Big Data, AI, Analytics, Blockchain, Extended Reality, Digital Twins with Business Model Innovation create technologically empowered business models such as Software as a Service, Platform as a Service, Solution as a Service, Analytics as a Service, Blockchain as a Service, AI as a Service, Light as a Service, Virtualization as a Service, Cybersecurity as a Service, IoT as a Service, and many more XaaS Business Models, a.k.a. Everything as a Service, that is explored in this course. xTech and XaaS are among major digitally empowered industries and business models that promote SDGs, Sustainable Competitiveness, and Circular Economy.

In this course we discuss

1- The drivers of the Dual Transition of the Digital and Circular Economies
2- The significance of technology, digital innovation and transformation, and policy initiatives and strategies in reinforcing Sustainable Competitiveness and promoting United Nations Sustainable Development Goals (SDGs).
3- The role of major digital enablers of Industry 4.0 such as Big Data, Analytics, Artificial Intelligence, Internet of Things, Cloud, Blockchain, Extended Reality, and Digital Twins in driving socially, economically, and environmentally impactful innovations in industrial and business models.

LEARNING OUTCOMES

Course learning outcomes (CLO)	Study methods	Assessment methods
CLO1. To understand and apply Digital Transformation and the concept of the forthcoming Digital Economy	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO2. To evaluate how Convergence of Technologies and Combinatorial Innovations restructure the fabric of economy and restructure industries and markets	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO3. To understand and analyse the negative social, economic, and environmental impacts of Industrial Revolutions and the Repercussions of the Linear Economic Model	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO4. To be able to assess and integrate knowledge about Sustainable Competitiveness, ESG, SDGs, and Circular Economy	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO5. To analyse the role of Technology in Impact-Driven Business Model Innovation: Everything as a Service (XaaS)	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO6. To be able to apply Technology in Impact-Driven Industrial Innovation (xTech)	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO7. To evaluate the impact of Digital Enablers of I4.0 in promoting Sustainable Competitiveness, SDGs, and Circular Economy	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO8. To be able to integrate Symbiotic Sustainability Models, Industrial Symbiosis, and NGO-Corporate Alliances	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects
CLO9. To analyze and apply cases and industry examples in explaining the role of strategic technology management for social, economic, and environmental prosperity	Lectures, readings, case studies, self-study, groupwork, in class discussions & presentation	Participation in discussions and the quality team projects

ACADEMIC HONESTY AND INTEGRITY

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism are fully applicable and will be strictly enforced in the course. Academic dishonesty, and cheating will lead to a report to the ISM Committee of Ethics.

QUALITY ASSURANCE MEASURES

The lecturer will apply multiple teaching methods to keep the students engaged in the topic. Continuous student feedback will be invited and accommodated to improve class experience. Students are encouraged to e-mail the lecturer between the respective classes for any assistance or clarification needed.

COURSE OUTLINE

Session	Topic	In-class hours	Reading assignments[1]
1	Digital Transformation, Industrial Revolutions, and the forthcoming Digital Economy	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
2	Convergence of Technologies and Combinatorial Innovations	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
3	The Repercussions of the Linear Economic Model	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
4	Sustainable Competitiveness, ESG, SDGs, and Circular Economy	4	Resources provided in the e-learning platform and additional research on use cases and industry examples

[1] Because the course deals with rather dynamic knowledge domain, certain proportion of the lecture and discussion material for the course may be updated and/or delivered just-in-time (uploaded to e-learning or indicated for downloading from the Internet). Students should be committed to follow e-learning system and observe uploaded course material on daily basis.

5	Technology for Impact-Driven Business Model Innovation: Everything as a Service (XaaS)	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
6	Technology for Impact-Driven Industrial Innovation (xTech)	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
7	Digital Enablers of I4.0 for Sustainable Competitiveness, SDGs, and Circular Economy	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
8	The role of Digital Enablers in creating Circular Economy Ecosystems	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
9	Symbiotic Sustainability Models, Industrial Symbiosis, and NGO-Corporate Alliances	4	Resources provided in the e-learning platform and additional research on use cases and industry examples
		Total: 36 hrs.	

FINAL GRADE COMPOSITION

Type of assignment	**Self-study hours**	**% of the total grade**
Preparation and Participation	36	50
Team Projects and Presentations	36	50
Total:	**72**	**100**

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT

Assessment 1. Preparation and Participation (50%)
Each session includes discussions, debates, and oral questions. Students will be graded based on their preparation for each session, finding relevant examples, and actively participating in debates and answering questions.

Assessment 2. Team Projects and Presentations (50%)
In each session students will present their groupwork and the projects will be graded based on the depth of the analysis and incorporating the requirements for each type of project.

DYSFUNCTIONAL TEAM MEMBERSHIP
At the end of the course, the lecturer will collect peer feedback on team project members' relative performance. In extreme cases where it is determined that a team member did very little, the lecturer reserves the right to lower the grade, or to assign negative grades on the project to that person.

RETAKE
In case of unsatisfactory performance, or in case of missed sessions, students will be asked to write a report for the corresponding class activity (further information will be provided during the class).

REQUIRED READINGS
There is no single textbook for this course, rather a diverse set of textbook chapters, articles and cases will be provided to the students through the e-learning platform, and a significant part of the preparation for delivery of the groupworks would require research on companies, industry trends, markets, and particular use cases and scenarios.