MASUDEM
MASTER STUDIES IN SUSTAINABLE DEVELOPMENT AND MANAGEMENT

COURSE OUTLINE

Name of course	**TECHNOLOGY AND INNOVATION MANAGEMENT FOR SUSTAINABILITY (TIMS)**		
Lecturer		e-mail:	
Seminar Instructor		e-mail:	
Week 1	Technology and innovation management	Lecture, hours	Seminar, hours
	i. Circular economy and fundamental of technology and innovation management	3	-
Week 2	ii. Business operations and the value chain	3	-
Week 3	iii. Introduction to digital technologies iv. Human vs. Technology	3	-
Week 4	Technology and sustainability performances	Lecture, hours	Seminar, hours
	i. Sustainability performance metrics ii. Impacts of technology on sustainability	3	-
Week 5	iii. Sustainable technology innovation and technology need assessment	3	-
	Emerging technologies for improving sustainability performances	Lecture, hours	Seminar, hours
Week 6	i. Sustainable products and services design and development	3	-
Week 7	ii. Big data analytics iii. Artificial intelligence (AI)	3	-
Week 8	iv. Robotics and Internet of Things (IoT)	3	-
Week 9	v. Blockchain technology vi. Digital twins technology	3	-

RECOMMENDED SOURCES

Compulsory literature:

- Study text

Suggested reading:

- White, M. and Bruton, D. (2011). *The management of technology and innovation, a strategic approach*, 2nd edition, South Western, Cengage Learning, USA
- Turban, E., L. Volonino, and G.R. Wood. (2015). *Information Technology for Management: Digital Strategies for Insight, Action, and Sustainable Performance*. 10th Edition. Danvers, MA: John Wileyand Sons. (TVW)
- Carroll, L.S.L. (2017). A comprehensive definition of technology from an ethological perspective. *Social Sciences*, Vol. 6 No. 126, pp. 1-20. (CL)
- Phaal, R., Farrukh, C.J.P. and Probert, D.R. (2001). Technology management process assessment: a case study. *International Journal of Operations and Production Management*, Vol. 21 No. 8, pp. 1116-1132. (PFP)
- Cetindamar, D., Phaal, R. and Probert, D. (2009). Understanding technology management as a dynamic capability: a framework for technology management activities. *Technovation*, Vol. 29, pp. 237-246. (CPP)
- Ahmed, P. K., & Shepherd, C. D. (2010). *Innovation management: Context, strategies, systems and Processes*. Pearson Education Limited.

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- Alberto, O. O. Z. C. (2012). *Logistics Management and optimization through Hybrid Artificial Intelligence Systems*. Hershey, PA: Information Science Reference.
- Brown, S. (2020). *The innovation ultimatum: How six strategic technologies will reshape every business in the 2020s*. John Wiley & Sons, Inc.
- Buyya, R., Calheiros, R. N., & Dastjerdi, A. V. (2016). *Big data: Principles and paradigms*. Elsevier/Morgan Kaufmann.
- Kersten, W., Blecker, T., & Ringle, C. M. (2022). *Artificial Intelligence and digital transformation in Supply Chain Management: Innovative Approaches for Supply Chains*. Berlin: epubli GmbH.
- Tim A. Herberge, J. J. D. (2021). Digitalization, Digital Transformation and Sustainability in the Global Economy: Risks and Opportunities. In. Springer.
- Elangovan, U. (2019). Smart Automation to Smart Manufacturing. Momentum Press.
- Gacovski, Z. (2020). Mechatronics and Robotics. Arcler Press.
- Radziwill, N. M., & Knovel. (2020). Connected, intelligent, automated : the definitive guide to digital transformation and quality 4.0 (First edition. ed.). Quality Press.
- Balusamy, B., R, N. A., Kadry, S., Gandomi, A. H., & Wiley, I. (2021). Big data : concepts, technology and architecture (First edition. ed.). John Wiley and Sons, Inc.
- Marr, B. (2022). Data strategy : how to profit from a world of big data, analytics and artificial intelligence (Second edition. ed.). Kogan Page Limited.
- Bashir, I. (2018). Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained. Packt Publishing.
- Fuller, A., Fan, Z., Day, C., & Barlow, C. (2020). Digital Twin: Enabling Technologies, Challenges and Open Research. IEEE Access, 8, 108952-108971. https://doi.org/10.1109/ACCESS.2020.2998358

Selected internet sources:

- UN (2016) Technology Needs Assessment Handbook *https://www.undp.org/publications/technology-needs-assessment-handbook*

TEACHING METHOD	
Lecture: Delivers information to the students in a structured manner.	50%
Case: Encourages critical thinking, decision-making, and the application of theoretical knowledge to practical situations.	30%
Workshop: Involves interactive sessions where participants engage in hands-on learning, often through practical exercises, discussions, and group activities.	15%
Class Activity: Engages students with activities in the classroom, encouraging participation and interaction, and promoting active learning.	5%
ASSESSMENT CRITERIA	
Capstone project	50%
Assignment and Case discussion	30%
Quizzes	10%
Participate	10%

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