

MANAGEMENT INFORMATION SYSTEMS (EMaCS-01-02)				
DEGREE PROGRAM:		Master in Computer Science for the Human-Centric and Sustainable Industry		
SEMESTER: First	TYPE: Basic	CREDITS: 6 ECTS	WORKLOAD: 150 hours	MENTORING: 4 hours/week
LANGUAGE: English				

OBJECTIVES	
General	<p>This course provides an overview of Management Information Systems (MIS) and explores the role of information systems in organizations. Students will learn how information systems support decision-making, enhance business processes, and enable strategic planning. The course covers topics such as information systems concepts, database management, integrated enterprise systems, business intelligence, and the impact of technology on organizational performance. Throughout the course, students will engage in practical exercises, case studies, and hands-on projects to reinforce their theoretical knowledge and develop practical skills in using tools, such as databases, data analysis software, and enterprise systems. The course aims to equip students with a well-rounded understanding of the role of information systems in modern organizations and prepare them for the dynamic and ever-evolving field of management information systems.</p>
Specific	<ul style="list-style-type: none"> • Understand the fundamental concepts and principles of Management Information Systems. • Explore the role of information systems in organizations and their impact on decision-making and business processes. • Understand the ethical, legal, and societal implications of information systems. • Learn about database management systems and their importance in managing organizational data. • Gain knowledge of enterprise systems and their integration across functional areas of an organization. • Explore business intelligence and analytics for effective data-driven decision-making. • Develop critical thinking and problem-solving skills in the context of information systems.
SUSTAINABILITY	
<p>The course "Management Information Systems" significantly contributes to sustainability by addressing specific competencies and objectives that incorporate ethical, legal, and social considerations, as well as the efficient management of information and the application of emerging technologies. The focus on the ethics and social implications of information systems emphasizes the importance of considering the long-term impact of these technologies on society. The section on Current Trends in Information Systems addresses topics such as cloud computing, big data analytics, and artificial intelligence, providing students with knowledge of advanced technologies that can contribute to sustainable solutions. Additionally, attention to information security and privacy reinforces the importance of sustainability in the design and management of information systems.</p>	
RESILIENCE AND HUMAN-CENTRIC DEVELOPMENT	
<p>The course promotes resilience and human-centred development by addressing competencies that foster adaptability, problem-solving, and collaboration. The exploration of integrated information systems highlights how these systems can improve organizational efficiency and support business processes, reflecting a user-centred approach. The ability to reflect on ethical outcomes and consider the social implications of emerging technologies emphasizes the importance of building systems that are not only technically robust but also ethical and socially responsible. Willingness to engage in collaborative and project-centred activities underscores the importance of teamwork and effective communication,</p>	

fundamental aspects for human-centred development and resilience in dynamic professional environments.

SUBJECT MATTER

Block I: INTRODUCTION TO MANAGEMENT INFORMATION SYSTEMS

In this introductory block, students will gain a comprehensive understanding of the fundamental concepts and components of information systems. Topics covered will include:

- Definition and scope of Management Information Systems
- Role and importance of management information systems in organizations
- Types of information systems and their functions
- Management information Systems and Organizational Strategy
- Information Systems Security
- Ethical and legal considerations in management information systems

Block II: DATA MANAGEMENT

This block focuses on the effective management of data as a critical organizational asset. Key topics covered include:

- Data and Database Fundamentals
- Database Management Systems (DBMS) and their Types
- Data Modeling and Entity-Relationship Diagrams
- Database Design and Normalization
- Structured Query Language (SQL) for Database Operations
- Data Integrity, Security, and Privacy
- Big Data Concepts and Technologies

Block III: INTEGRATED INFORMATION SYSTEMS

In this block, students delve into the world of integrated information systems that streamline business processes and enhance efficiency. Topics include:

- Information Systems and Business Processes
- Business Process Model and Notation (BPMN)
- Enterprise Resource Planning (ERP) Systems and their Functions
- CRM (Customer Relationship Management) Systems
- SCM (Supply Chain Management) Systems
- HRIS (Human Resource Information Systems)
- Benefits and Challenges of Implementing Management Integrated Systems
- Business Process Reengineering and Change Management

Block IV: CURRENT TRENDS IN INFORMATION SYSTEMS

The final block explores emerging trends and advancements shaping the landscape of information systems. Topics covered include:

- Cloud Computing and its Implications
- Mobile and Wireless Technologies in Information Systems
- Big Data Analytics and Predictive Modeling
- Artificial Intelligence and Machine Learning
- Blockchain Technology and its Applications
- Internet of Things (IoT) and Sensor Networks
- Ethical and Social Implications of Technological Advancements

COMPETENCES

C2. BROWSING, SEARCHING AND FILTERING DATA, INFORMATION AND DIGITAL CONTENT

C3. MANAGING AND EVALUATING DATA, INFORMATION AND DIGITAL CONTENT

C4. INTEGRATING AND RE-ELABORATING INFORMATION and DIGITAL CONTENT

C5. PROGRAMMING

C9. REFLECTING ON ETHICAL OUTCOMES

C10. EXPLORATORY AND CRITICAL THINKING

C11. PROBLEM FRAMING

C12. IDENTIFYING NEEDS AND TECHNOLOGICAL RESPONSES

C13. CREATIVELY USING DIGITAL TECHNOLOGIES

C15. MANAGING SYSTEMS and/or PROJECTS

C16. WORKING WITH OTHERS

C17. COMMUNICATING EFFECTIVELY			
LEARNING OUTCOMES			
Knowledge	<ul style="list-style-type: none"> • Know how to integrate technological prowess with managerial insights by applying tools such as BPMN and Odoo to solve real business problems. • Know how to evaluate the ethical implications and security concerns of managing information systems. • Know how to articulate intricate technical concepts precisely, bridging the communication divide between technical experts and non-technical stakeholders in organizational settings. 		
Skills	<ul style="list-style-type: none"> • Be able to design and analyse business processes using Business Process Model and Notation (BPMN), to visually represent complex workflows, identify bottlenecks, and propose streamlined solutions within the context of management information systems. • Be able to use Power Query to extract, clean, and integrate diverse data sources, achieving seamless data transformation. • Develop proficiency in programming VBA to automate tasks, enhance data analysis, and create custom functions. • Be able to configure and adapt business processes using an Enterprise Resource Planning (ERP) system such as Odoo, to streamline operations, manage resources, and optimize workflows. 		
Attitudes/values	<ul style="list-style-type: none"> • Be willing to integrate technological prowess with managerial insights to solve authentic business challenges, using a cross-disciplinary approach that enhances organizational efficiency. • Develop advanced problem-solving skills by designing sophisticated information systems to assess different options, predict issues, and craft solutions aligned with strategic goals. • Be willing to participate in collaborative, project-centred activities that demand the application of advanced technological tools to excel in teamwork and communication within dynamic professional environments. • Nurture an ethos of perpetual learning and adaptability to stay up-to-date with emerging trends and technologies, ensuring continued competence in the student's career. 		
TEACHING METHODS			
Method	Class Workload	Individual Workload	Total
Theoretical Sessions	24	24	48
Laboratory Sessions	24	42	66
Research and writing of an applied project	4	30	34
Written Examinations	2	0	2
TOTAL	54 hours	96 hours	150 hours
EVALUATION			
To pass the course, it is necessary to obtain a minimum mark of 4 out of 10 in each of the three evaluation procedures and a minimum of 5 out of 10 in their weighted average.			
PRECONDITIONS			
<ul style="list-style-type: none"> • Basic programming skills. • Familiarity with Microsoft Excel. • Knowledge of calculus and mathematics at a level of a graduate student (e.g. matrix and vector calculus). 			
DEPARTMENT	Department of Management Engineering		
LECTURERS	Luis R. Izquierdo		
LITERATURE	<ul style="list-style-type: none"> • Alexander, M. (2022). Excel Power Pivot & Power Query. ISBN-13: 978-1119844488. 		

	<ul style="list-style-type: none"> • Deckler, G. (2022). Learn Power BI: A comprehensive, step-by-step guide for beginners to learn real-world business intelligence, 2nd Edition. Packt Publishing. ISBN-13: 978-1801811958. • Easley, D. & Kleinberg, J. (2010). Networks, crowds, and markets: Reasoning about a highly connected world. Cambridge University Press, 2010. https://www.cs.cornell.edu/home/kleinber/networks-book/ • Hammergren, T. & Simon, Alan (2009) Data warehousing. 2nd ed., Hoboken, N.J. : Wiley Pub. ISBN-13: 978-0470407479. • Kusleika, D. (2022). Excel VBA programming. John Wiley & Sons Inc. ISBN-13: 978-1119843078. • Laudon, K. & Laudon, J.P. (2021) Management Information Systems: Managing the Digital Firm, Global Edition, (17th Edition), Prentice Hall. ISBN-13: 978-1-292-40328-1. • Porter, M. (2001) Strategy and the Internet. Harvard Business Review. https://hbr.org/2001/03/strategy-and-the-internet • Pierson, L. (2017). Data science for dummies. Second edition, Hoboken, New Jersey: John Wiley & Sons, Inc. ISBN-13: 978-1118841556. • Tapscott, D. (2014) The digital economy. 2nd edition. McGraw Hill. ISBN-13: 978-0071835558. • Scheps, S. (2008) Business intelligence for dummies. 1st edition, Wiley. ISBN-13: 978-0470127230
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