Course title	Problem Solving Programming with Machine Learning Techniques				
Course code	IS502				
Course type	Compulsory				
Level	Postgraduate				
Year / Semester	1st / 2nd				
ECTS	7.5	**Lectures / week**	1	**Laboratories / week**	1
Course purpose and objectives	C.O.[1]. You will be able to understand the concept of different types of problems. C.O.[2]. You will be able to explain what the appropriate machine learning methods are and how they are applied in relation to the problem being solved. C.O.[3]. You will be able to search efficiently through bibliography and online sources for complex type of problems in the context of programming. C.O.[4]. You will be able to implement algorithmic strategies to diverse problems using programming and machine learning techniques. C.O.[5]. You will be able to understand supervised and unsupervised learning in terms of the types of applications they can implement. C.O.[6]. You will be able to search and utilize Python's programming features for more efficient solving of real -life algorithmic problems. C.O.[7]. You will be able to apply efficient algorithms within the context of artificial intelligence. C.O.[8]. You will be able to document and present findings from programming and machine learning simulations in a structured report. C.O..[9]. You will be able to explain and apply key machine learning evaluation metrics, including confusion matrix, correlation, and accuracy, in the context of machine learning models. C.O.[10]. You will be able to understand programming concepts of object, library, and modules. C.O.[11]. You will be able to identify types of problems, design solutions, and implement them for a wide range of problems.				

	C.O.[12].You will able to define artificial intelligence and describe its core techniques used in machine learning and problem-solving.		
Learning outcomes	O1: Apply advanced tools and skills, exploiting emerging technologies, for designing, developing, managing, and implementing innovative solutions that address complex organizational and social problems. O2: Practice essential skills and knowledge to manage and lead digital innovation and transformation initiatives within organizations. O5: Utilise advanced data analytics and computational methods, including AI, to solve complex business problems. O7: Demonstrate research proficiency by applying advanced research methods to solve real-world information systems and digital innovation challenges.		
Prerequisites	-	**Required**	-
Course content	• Introduction to Programming - Fundamental Programming Structures - Using Python • Functions and Modules - Lists, Dictionaries, Tuples, Sets • File Management - Pandas • Introduction to the SciKit Learn • Library Introduction to NumPy (Sorting, Searching) • Dynamic Programming vs Greedy Algorithm • Supervised Learning using SciKit, Pandas, Matplotlib • Supervised Learning using SciKit, Pandas, Matplotlib • Unsupervised Learning using SciKit, Pandas, Matplotlib • Unsupervised Learning using SciKit, Pandas, Matplotlib • Deep Learning - Neural Networks • Deep Learning - Neural Networks		
Teaching methodology	Mix of interactive lectures, active learning techniques and activities. More precisely: • Interactive face-to-face lectures • Notes and PowerPoint Presentations in digital format through the electronic platform • Basic textbook(s) and additional bibliography • Assignments • Meetings with the instructor • Interactive Activities • Discussions of real word case studies • Web links		

	• Critical reflection on research article • Peer review on group working and discussion in forum • Educational videos on real world case studies and critical discussion in forum
Bibliography	• ***Free ebook: Learning Algorithm:*** ***https://riptutorial.com/ebook/algorithm*** • ***Free e-book: Machine Learning for Humans, 2017:*** ***https://medium.com/machine-learning-for-humans/why-machine-learning-matters-6164faf1df12*** • ***Free e-book: Python for everybody*** ***http://do1.dr-chuck.com/pythonlearn/EN_us/pythonlearn.pdf*** • ***Free e-book: Scikit-Learn (0.21.3), 2019:*** ***https://scikit-learn.org/0.21/_downloads/scikit-learn-docs.pdf***
Assessment	• Interactive activity 1: 5% • Interactive activity 2: 5% • Interactive activity 3: 5% • Interactive activity 4: 5% • Semester assignment: 20% • Final exams: 60%
Language	English