

CSP7001 — Introduction to Machine Learning

Module Information	
Module Code	CSP7001
Module Title	Introduction to Machine Learning
Department	Political Science
Year Group	Master's
Module Personnel	Giovanni Di Liberto
Academic Year	2026-27
Credit Weighting	5 credits
Semester	Semester 2
Contact Hours	28h (1 lecture per week, 1 lab hour per week)

Module Content	
Module Description	Introduction to Machine Learning is designed to offer an introduction to the basics of ML, specifically with a hands-on curriculum aimed at developing knowledge and skills in establishing ML pipelines with state of the art languages and toolkits. This module is designed for students with limited prior experience of programming. It will introduce the fundamentals of programming, with a focus on setting up an effective pipeline for processing datasets to execute common ML techniques such as Support Vector Machines and Linear Regression. Students will be assessed both on the acquired technical skills and on their ability to understand the ML pipeline and results and communicate effectively with experts and non-experts.
Module Learning Aims	<i>The broad aims of the module (optional)</i>
Learning Outcomes	MLO1 Configure a programming environment suitable for exploring ML techniques MLO2 Prepare datasets for ML processing, visualise the data, and understand the consequences of decisions made in cleaning data

Module Content

	MLO3 Utilise standard machine learning techniques to perform classification, regression, or clustering tasks MLO4 Critically evaluate the outputs of a ML pipeline MLO5 Communicate with ML experts and non-experts: Explain goals and requirements of a project, interpret the outcomes of typical ML analyses, present results to non-experts. MLO6 Assess the cost/benefit of distinct ML methodologies and explain what makes one approach more suitable than another one for a given task MLO7 Understand challenges involving data sharing, storage, and privacy MLO8 Collaborate in a multidisciplinary group setting
Indicative Reading / Resources	- (recommended reading before the start of the module) Python Crash Course: A Hands-On, Project-Based Introduction to Programming, Eric Matthes (eBook available in the TCD library) - (recommended) Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, Aurélien Géron, 2nd Edition, O'Reilly Media (first half of the book) - (optional) “Fundamentals of machine learning for predictive data analytics”, By John D. Kelleher, Brian Mac Namee, and Aoife D`arcy

Assessment

Assessment Components	25% individual homework (CWN), 25% group project (GROUP), 10% group presentation (CWN), 40% written in-class test (CWN)				
Assessment Details	Engagement and Communication	Group project presentation	LO2-5	10	Second last week
	Technical (coding & ML) skills	Individual laboratory assignments	LO1-3	25	Weeks 3, 6, 9



Assessment

	Communication, presentation, group work	Group assignment (written report)	LO2-6	25	Final week
	Written Test	2h written test	LO2-6	40	Final week

Additional Information

Prerequisites	<i>None</i>
Co-requisites	<i>None</i>
Any other information	<i>Anything else that should appear on the website (optional)</i>