

Module Template for New and Revised Modules¹

Module Code	CSP7001
Module Name	Introduction to Machine Learning
ECTS Weighting²	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Giovanni Di Liberto
<u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> and how they are developed in discipline	<p>On successful completion of this module, students should be able to:</p> <p>MLO1 Configure a programming environment suitable for exploring ML techniques</p> <p>MLO2 Prepare datasets for ML processing, visualise the data, and understand the consequences of decisions made in cleaning data</p> <p>MLO3 Assess the performance of a ML pipeline</p> <p>MLO4 Critically evaluate the outputs of a ML pipeline</p> <p>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.</p> <p>MLO6 Assess the cost/benefit of distinct ML methodologies and explain what makes one approach more suitable than another one for a given task</p> <p>MLO7. Understand challenges involving data sharing, storage, and privacy</p> <p>Graduate Attributes: levels of attainment</p> <p>To act responsibly - Introduced</p> <p>To think independently - Enhanced</p> <p>To develop continuously - Enhanced</p> <p>To communicate effectively - Attained</p>
Module Content	<p>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.</p>

¹ [An Introduction to Module Design](#) from AISHE provides a great deal of information on designing and re-designing modules.

² [TEP Glossary](#)

Teaching and Learning Methods	Lectures, tutorials, group project, guest lecture/seminar, classroom discussion				
Assessment Details³ Please include the following: <ul style="list-style-type: none"> • Assessment Component • Assessment description • Learning Outcome(s) addressed • % of total • Assessment due date 	Assessment Component	Assessment Description	LO Addressed	% of total	Week due
	Engagement and Communication	Group project presentation	LO2-6	10	Second last week
	Technical (coding & ML) skills	Individual laboratory assignments	LO1-4	25	Weeks 3, 6, 9
	Communication, presentation, group work	Group assignment (written report)	LO2-7	25	Final week
	Written Test	2h written test	LO2-7	40	Final week
Reassessment Requirements	100% written examination				
Contact Hours and Indicative Student Workload³	Contact hours: 28h in total: 14h lectures + 4h tutorials discussion + 3h laboratory Q&A + 3h group project discussion + 2 group project presentations + 2 written test				
	Independent Study (preparation for course and review of materials, this includes flipped classroom tutorials): 40h				
	Independent Study (preparation for assessment, incl. completion of assessment): 49h				
Recommended Reading List	<ul style="list-style-type: none"> - (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) 				

³ [TEP Guidelines on Workload and Assessment](#)

	- (optional) “Fundamentals of machine learning for predictive data analytics”, By John D. Kelleher, Brian Mac Namee, and Aoife D`arcy
Module Pre-requisite	None
Module Co-requisite	
Module Website	Blackboard
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	
Module Approval Date	
Approved by	
Academic Start Year	September 2022
Academic Year of Date	2025-26