IMPERIAL

Module Specification

Basic details

UID		Cohorts covered (Earliest cohort)	
Long title	Deep Learning		
New code	ELEC60009	New short title	
Brief description of module *(approx. 600 chars.)*	Deep learning will focus on deep neural network based learning. This module will introduce you to the background and illustrates how deep learning is impacting our understanding of intelligence and contributing to the practical design of intelligent machines. Deep learning is currently the most active area of research and development and in high demand for experts by hi-tech start-ups, large companies as well as academia. It is the preferred approach for modern AI and machine learning in any domain. Deep learning techniques enable us to automatically extract features from data so as to solve predictive tasks, such as speech recognition, object recognition, machine translation, question-answering, anomaly		
Available as a standalone module/ short course?	No		

Statutory details

	ECTS	CATS	Non-credit	
Credit value	5	10	N	HECOS codes
FHEQ level	6			

Allocation of study hours

	Hours	
Lectures	20	
Group teaching	0	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	0	
Other scheduled	10	*Incl. project supervision, fieldwork, external visits.*
Independent study	95	*Incl. wider reading/ practice, follow-up work, completion of assess*
Placement	0	*Incl. work-based learning and study that occurs overseas.*
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed?	0

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term	2	Other	

Ownership

Primary department	Department of Electrical and Electronic Engineering
Additional teaching departments	
Delivery campus	South Kensington

Collaborative delivery

Collaborative delivery?	
External institution	
External department	
External campus	

Associated staff

Role	CID	Given name	Surname
Module leader		Krystian	Mikolajczyk
Co-lecturer		Abd Al Rahman	Abu-Ebayyeh
Co-lecturer		Chen	Qin

Learning and teaching

Module description

Learning outcomes	Upon successful completion of this module, you will be able to: 1. Formalise a deep learning problem. 2. Choose and fit models to data. 3. Critically appraise the merits and shortcomings of model architectures on specific problems 4. Discriminate between different practical machine learning approaches and apply them to real datasets. 5. Combine modular components to build deep learning systems in a wide range of real-world applications. 6. Choose appropriate performance evaluation metrics. 7. Present and analyse the results as well as draw appropriate conclusions. 8. Implement and evaluate common neural network models for various types of data

Module content	The module includes: Part 1: Introduction to deep learning Part 2: Convolutional Neural Networks (CNN) Part 3: Network Training Part 4: CNN architectures Part 5: Recurrent Neural Networks Part 6: Representation Learning and Autoencoders Part 7: Generative models Part 8: Reinforcement Learning I Part 9: Reinforcement Learning II Part 10: Hyperparameter optimization
Learning and Teaching Approach	This module is delivered through lectures, coursework support workshops and problem classes.
Assessment Strategy	The module is assessed by coursework which consists of Machine Learning experiments in Colab environment with a report submitted in two parts wort 30%, and 50%, as well as through an online quiz with multiple answer questions (20%).
Feedback	You will be provided with written comments on coursework reports and oral feedback during workshops and problem classes.
Reading list	Deep Learning, Ian Goodfellow and Yoshua Bengio and Aaron Courville, MIT Press, http://www.deeplearningbook.org

Quality assurance

Date of first approval	
Date of last revision	May 2025
Date of this approval	June 2025
Module leader	Prof. K. Mikolajczyk
Notes/ comments	updated 17 sept 2026

Office use only

	QA Lead	
Jul-21	Department staff	
	Date of collection	
	Date exported	
	Date imported	

Template version

Assessment details

Grading method	Numerical	Pass mark	40%

Assessments

Assessment type	Assessment description	Weighting	Pass mark	Must pass?
coursework	report interim	30%	40%	N
coursework	report final	50%	40%	N
Coursework	Wiseflow test	20%	40%	N
		100%		