

## Solent University Unit Descriptor

**Unit Code:** COM624      **Unit title:** Machine Learning

### **Why is this unit important?**

Technology and its applications today are advancing rapidly, and some skills and knowledge required to enable this are changing too. Nowadays, learning is not restricted to human, but machines too. They are also learning from experience to change their behaviours and ways of solving new problems. Machine learning algorithms use rules to learn from data, rather than having pre-programmed equations.

Machine learning techniques enable us to automatically extract features from data to solve predictive tasks, such as speech recognition, object recognition, machine translation, question-answering, anomaly detection, medical diagnosis and prognosis, automatic algorithm configuration, personalisation, robot control, time series forecasting, and much more. Learning systems adapt so that they can solve new tasks, related to previously encountered tasks, more efficiently.

This unit aims to provide machine learning concepts and principles for solving complex real-life scenarios. Learning from experience is now something that machines can do, not just humans. The unit focuses on the exciting field of machine learning and introduces elements of deep learning toward the end.

### **What you will learn on the unit**

Aspects of learning principles and algorithms will be covered in this unit. Key concepts such as supervised and unsupervised learning, loss functions and generalisation, probabilistic theory, kernel methods for non-linear data, Bayesian methods and Ensemble learning. Also, in the later part, concepts of deep learning and their applications will be introduced.

### **How you will learn**

The unit delivery involves a diverse learning approach including group activities, blended and applied learning. You will be given industry-based problems with surgery sessions for further tutorials. Group-based tasks and individual learning will be encouraged to prepare students for real world industry requirements.

### **How much time the unit requires**

This unit is a 20-credit unit and you are expected to study for 200 hours (which equates to 10 hours per credit) The total learning time is made up of contact time, directed learning tasks, independent learning and assessment activity. Your tutor will offer you guidance on how best to manage your study-time on this unit

### **How you will be assessed**

#### **Tasks which help you to learn and prepares you for summative tasks (Formative):**

You will be assessed through a problem-based task for which an artefact will be created with a report explicating the development process of the project. You will be provided feedback (formatively assessed) at intervals, on aspects of the summative assessment and work progress, as individual, group and in plenary prior to the summative assessment deadline.

### Tasks which count towards your degree (Summative):

Summative assessment will be a combination of the aspects of the formative assessment e.g., a real-life problem, which is solved using machine learning concepts. Intensive research is expected to be conducted based on taught concepts to develop an artefact solution (a software) plus a report to evidence the process of research, evaluation and sophistication in thought.

### When assessment does not go to plan

Re-assessment tasks must demonstrate achievement of the learning outcomes covered by the original assessment. Therefore, you are permitted to retake or have a re-assessment that is similar to the original assessment, although the university policy on referral and late submissions is considered at the stage of re-assessment.

### What you will be able to do after the unit

1. Critically evaluate existing research about data and develop machine-learning artefacts to a given set of problems.
2. Contrast and compare the mathematical approaches necessary for constructing novel machine learning solutions.
3. Critically evaluate machine learning techniques/approach to be able to implement models for language, vision, speech and novel decision making.
4. Computationally work with various data types to learn and develop new patterns or concepts.
5. Assess machine learning conflicts with respect to legal, ethical and societal issues.

Overall, upon completion of the module, student will be able to provide solutions to real-world machine learning problems.

### How this relates to the dimensions of Solent's Real-world curriculum framework

Dimensions	How students learn	How students are assessed
Students are challenged to think in critical, creative and applied ways	Different theories of machine learning will be examined. The application of these theories is expected to challenge students' cognitive ability to creatively provide solutions to problems	Real-world problem-based assessment is provided as summative assessment.
Students are inspired to do research through inquiry, curiosity and problem-solving	Group and independent tasks will be given, and in-depth research is expected to be conducted in arriving at a solution.	Student will work independently and in groups at intervals, particularly, in the formative assessment sessions to provide adequate solution to given problems.
Students experience an intellectually stimulating curriculum which inspires them to learn for life	The application of theories and machine learning algorithms and their application in providing solution to real	Students will present artefact and report to demonstrate skills and sophistication in thoughts of solving real-life problems. This

	life problems stimulate students intellectually	serves as major assessment for this unit.
Students learn from authentic, engaging and programmatic assessment	The assessment is a real-world based problem which knowledge and skills of providing solution is transferable to real-life problem.	Problem-based assessment involves report on how given problems has been resolved following taught concepts.

### Summative assessment details

AE1	Weighting:	100%
	Assessment type:	Report and Software Artefacts
	Aggregation:	N/A
	Length/duration:	3000 words plus software problem-based task
	Online submission:	Yes
	Grade marking:	Yes
	Anonymous marking:	No

**Unit Author:** Dr Olufemi Isiaq

Unit Title: Machine Learning			
Credit Points:	20	Unit Code:	
FHEQ Level:	6	School/Service	SMAT
Unit Delivery Model:	CD	Max/Min student numbers	N/A
Unit Leader:	Dr Olufemi Isiaq		
HECOS code	100359		

### Unit change history:

Unit Approved/Year Implemented/Code	May 2019	2020/21	COM624
Unit modified/Year Implemented/Code			