

MSc in Machine Learning and Artificial Intelligence

Programme Code

14371 – 887 (180)

Programme Description

This one-year structured postgraduate programme is aimed at students with a strong mathematical and computational background. It will equip you with a foundation of machine learning and artificial intelligence fundamentals, as well as a suite of sophisticated techniques and concepts at the research forefront of these fields.

Specific Admission Requirements

In order to register for the programme, one of the following qualifications is required:

- An honours degree in Applied Mathematics, Computer Science, Mathematics, or Mathematical Statistics;
- A four-year Bachelor's degree in Electrical Engineering;
- A qualification deemed equivalent to the above, in a field closely linked to machine learning.

You will also be expected to have existing and demonstrable proficiency in Python or an equivalent programming language, be comfortable with numerical linear algebra and multivariable calculus, and possess basic knowledge of probability theory and statistics.

The departmental academic committee, in collaboration with the programme coordinator, gives final approval for admission, also taking into account the infrastructure and capacity of the Department.

Closing Date for Applications

Apply online at <http://www0.sun.ac.za/pgstudies/> by 31 October of the previous year.

Duration of Programme

The programme will run over one academic year full-time, or two academic years part-time, beginning in January and ending in December.

Programme Structure

The programme consists of three separate blocks: compulsory core modules, elective modules, and a research project. Every block makes up 60 credits, for a programme total of 180 credits. Modules in a particular block may not all run in parallel over the entire block and will be scheduled based on inter-module content development and the availability of lecturers.

Programme Content

The programme will equip you with specialist knowledge and skills to the level where you will be able to critically evaluate the suitability of existing theories and techniques for a specific application. The modules (with their associated assignments) and the research project will also develop your abilities to design, select and apply technically advanced methods, techniques and theories to complex practical and theoretical machine learning and artificial intelligence problems.

Compulsory Modules

Subject Number	Module Code	Credits	Module Name	Semester
14398	814	15	Applied Machine Learning at Scale	1 or 2
14396	813	15	Foundations of Deep Learning	1 or 2
14394	811	15	Mathematics for Machine Learning	1 or 2
14395	812	15	Probabilistic Modelling and Reasoning	1 or 2
14399	885	60	Research Project (Machine Learning)	1 or 2

plus

Elective Modules

Choose six modules to the value of 60 credits. Not all of these modules will necessarily be offered every year.

Subject Number	Module Code	Credits	Module Name	Semester
14404	820	10	Advanced Probabilistic Modelling	1 or 2
14409	825	10	Advanced Topics in Artificial Intelligence	1 or 2
14408	824	10	Advanced Topics in Machine Learning	1 or 2
14407	823	10	Artificial Intelligence and the Brain	1 or 2
62847	842	10	Computer Vision	1 or 2
14406	822	10	Monte Carlo Methods	1 or 2
14401	817	10	Natural Language Processing	1 or 2
14405	821	10	Optimisation for Machine Learning	1 or 2
14402	818	10	Reinforcement Learning and Planning	1 or 2
14403	819	10	Sequence Modelling	1 or 2

Assessment and Examination

- All the modules (except for the research project) will be assessed by means of flexible assessment. This entails a combination of practical assignments and summative assessments.
- All summative assessments will be moderated internally and at least 40% of the final mark will be moderated externally.
- The 60-credit research project will be examined by the supervisor and an independent examiner. A moderator will review the recommendations by the examiner and the supervisor and, if necessary, will also examine the project. Either the examiner or the moderator must be external and must be appointed by the Science Faculty Board.
- You must obtain a minimum of 50% for the research project, and a minimum of 50% for each module, to pass the programme.