Artificial Intelligence MSc – Welcome

Iain Murray
School of Informatics
Blackboard

Recording now for those that can’t make it live.

Raise your hand to ask a question

Or write in the chat box
About Me

Iain Murray
Programme Director for AI MSc
Professor in Machine Learning and Inference
Also an Amazon Scholar
Freddy

“Freddy was one of the earliest robots to integrate vision, manipulation and intelligent systems as well as having versatility in the system and ease in retraining and reprogramming for new tasks.”

Freddy II (1973–1976)  
University of Edinburgh
Freddy I (1969–1971)

Identifying a cup

The six parameters of P.A.T.

Beautiful 1958 BBC documentary

https://blog.nms.ac.uk/2018/05/17/talking-technology-how-machines-learned-to-speak/
Goal for Today

- Hello! An introduction and first meet
- A little more on programme and course selection
- Questions

Lots of information this week and next. Slides will be online
MSc Handbook

https://tinyurl.com/infmsc21
Taught MSc Handbook 2020/21

The MSc Handbook for the 2020/21 academic year.

**Welcome to Edinburgh**
Welcome week information for MSc taught students.

**Assessment**
Information on examination & progression to dissertation.

**Degree programmes and courses**
Course requirements and advice on selecting optional courses, by degree programme.

**Course times and structure**
When and where your lectures will be, credit values, and what to expect from courses.

**Resources**
A list of useful resources for MSc students.

**Meet your programme welcome events**
Come along and meet students on your programme.

**Project Topics**
A list of students' project topics and supervisors.

**Course registration and change**
Information on course registration for Taught MSc students.

**Design Informatics**
Welcome week information for Design Informatics students.

**Supporting your studies**
Student reps, SSLC meetings, feedback, facilities and Tier 4
Artificial Intelligence MSc

An overview of the degree and advice on selecting your courses.

Overview of the degree

Edinburgh hosts the UK's longest established centre for artificial intelligence, which remains one of the best in the world. Courses on this degree span a wide range of areas in artificial intelligence and also draw on research in related fields such as neuroscience, cognitive science, linguistics, and mathematics. We aim to give you the fundamental knowledge and practical skills needed to design, build, and apply AI systems in your chosen area of specialisation.

Full-time students on this degree must be registered for exactly 180 credit points at all times. Part-time students have the same course requirements, but spread out over two or three years.

Compulsory courses

The following courses are compulsory:

- Informatics Research Review (IRR) — 10 credits of coursework in Semester 1.
- Informatics Project Proposal (IPP) — 10 credits of coursework in Semester 2.
- MSc Dissertation — 60 credits in the Summer.

Information about IRR, IPP, and Dissertation

Optional courses

In addition, you must register for another 100 credits of optional taught courses, usually split evenly across two semesters, with at least 60 credits chosen from AI and Cognitive Science courses, and the remainder from other Informatics and outside courses.

This degree offers considerable flexibility in your taught course choices. Specific course options and requirements are listed in your Degree Programme...
## Programme Structure

180 credit points in total. You must register for 100 credits of taught courses, usually split across both semesters, with at least 60 credits chosen from AI and Cognitive Science courses.

### Semester 1
- Informatics Research Review **IPR** (10 credits)
- + 50 credits taught

### Semester 2
- Informatics Project Proposal **IPP** (10 credits)
- + 50 credits taught

### Summer (June - Aug)
- **Dissertation/Project** (60 credits)
Artificial Intelligence (MSc) (Full-time)

Before making your course choices, make sure you have discussed them with your Personal Tutor.

Compulsory courses (80 Credits)

There are 3 compulsory courses:

- **Semester 1**
  - Informatics Research Review
    - 10 Credits • Level 3 • NV

- **Semester 2**
  - Informatics Project Proposal
    - 10 Credits • Level 3 • NV
  - MSc Dissertation (Informatics)
    - 60 Credits • Level 5 • NV

Add to my courses

https://path.is.ed.ac.uk/degrees/PTMSCAINTL1F
Machine Learning Courses

Many of you will do some machine learning, so I’ll focus on that choice.

However, don’t only focus on Machine Learning courses. Learn other things too.

You won't do everything in your MSc. Pick courses where you think you will learn a lot and that you will enjoy. You will continue to learn things afterwards in your future career.
Introductory Applied Machine Learning (IAML)

Semester 1, 20 credits - Do not take with MLPR

Introduction to Machine Learning but with more focus on practical application of existing methods, than the mathematical construction and principles of the methods. The course covers both supervised and unsupervised learning. The primary aim is to provide the student with a set of practical tools that can be applied to solve real-world problems in machine learning, coupled with an appropriate, principled approach to formulating a solution.
Machine Learning and Pattern Recognition (MLPR)

Semester 1, 20 credits - Do not take with IAML

This course covers some of the core principles of machine learning. It is introductory in the sense that it does not assume any prior machine learning experience. However, there are enough materials to stretch most of those with some machine learning background. It is accessible to those with non-CS backgrounds as long as you have done some programming before. Those from physics, engineering, or maths backgrounds are usually fine. Assumes you are comfortable using linear algebra, calculus, and probability theory, which will all be used in combination. If you do not have the mathematical background for MLPR, please attend IAML instead where mathematical proficiency is less critical.

The class website has a self-test and more information on the class.
https://mlpr.inf.ed.ac.uk/
Machine Learning Practical (MLP)

Semesters 1 & 2, 20 credits

Most students specialising in machine learning should take this course. This is not a stand-alone introduction to machine learning, and also assumes familiarity with the maths commonly used in machine learning as well as prior programming experience. **If you don't have prior machine learning experience or have little programming background it will move very quickly and be very time-consuming.** You might do better to plan on taking an alternative applications course that includes considerable material on neural networks.
Semester 2 Machine Learning Courses

**Probabilistic Modelling and Reasoning** (PMR) (20 credits)

PMR looks at graphical models and fundamentals of learning from data. Similar maths requirements to MLPR, but MLPR is not a prerequisite.

**Machine Learning Theory** (MLT) (10 credits)

Mathematically characterize ML (accuracy, fairness, robustness, ...)

**Reinforcement Learning** (RL) (10 credits)

Learning from rewards. This is an area of machine learning that has become increasingly active over the past few years.
Prerequisites

Make sure you satisfy the requirements for a course e.g. the necessary mathematical and programming prerequisites.
Many more courses!

Causality

Text processing

Accelerated Natural Language Processing (20 credits, S1)
Natural Language Understanding, Generation, and Machine Translation (20 credits, S2)
Text Technologies for Data Science (20 credits, full year)

Speech processing

Speech Processing (10 credits, S1)
Automatic Speech Recognition (10 credits, S2)
Speech Synthesis (10 credits, S2)

Cognitive Science and Ethics

Computational Cognitive Neurosciences (10 credits, S2)
Ethics of Artificial Intelligence (20 credits, S2)
Student Course Feedback

This page presents feedback from students about their experience on Informatics courses from previous years. It is a useful resource to help you with your course choices.

There are also responses from the lecturers.

Easiest way to find it:

Link at top of sortable course list:  https://course.inf.ed.ac.uk

http://web.inf.ed.ac.uk/infweb/student-services/ito/admin/course-survey-reports
What Do Employers Want?

“You can decide what approach in data science is best to get the job done, whether that is a cutting-edge deep learning or probabilistic models, or a simple regression.”
What Do Employers Want?

- Python + cloud stuff + Framework such as PyTorch or TensorFlow
- Data experience: Analysis of datasets with Python libraries such as numpy, scikit-learn, pandas, ...
- Environment: Linux, Bash scripting
- Training and evaluating machine learning models
- Proficiency querying data with SQL
- A strong understanding of probability
- Confidence communicating with both technical and non-technical audiences
- Self-motivation in the face of challenges
- Ability to learn new things quickly
Tips From previous MSc Students

We asked some former students what advice they would give themselves starting out on the programme.
Student A

- **Networking** is extremely useful, and kind of made my whole experience of this year. Just finding a small group of people where you talk about what you're stuck on is invaluable. Remember to reach out to others and eventually bonds will form over the course of months.

- **Group chats** are key here. I would suggest to seek out and try to get added to the group chats of every course (usually there's a whatsapp group for every course with 20-60 people depending on the course).

- Also, people shouldn't be afraid to make their own smaller group chats - it's easier to ask questions in a smaller group. **Don't be afraid to ask dumb questions**, as you're giving another person a chance to express themselves via an answer, and making it less scary for other people to ask questions. I would suggest doing this (looking for/making group chats) as early as possible as the course starts, since after the course begins groups might be already formed and it becomes a bit more awkward.

- There should also be the gigantic AI groups chat with all AI students - still, quite a few people don't look for it and don't get added, and they miss out on a lot.
First, **make friends**! Most of us will come from various backgrounds. It will be extremely helpful to support each other in challenging courses by having regular study group and explaining hard concepts to each other.

Second, **start early**! For courses that have a large group project in the second Semester (e.g. MLP, TTDS), it is beneficial to brainstorm early about the topic that you want to do.

Lastly, prepare for a busy year ahead, but you will be rewarded with lots of new knowledge. All the best!
Student C

- I had a maths degree with little computing experience and found all of the computing requirements very doable once I got to know a few people to help me out occasionally. Those with little maths background appeared to have to put in a lot more work but no one struggled that much in the long run.
- It is definitely important to find a group of friends with varied abilities so you can benchmark yourself a little bit against those who share your background/share the struggle, and know where to turn for questions outside of your area.
- Try to team up with students with complementary skill sets in your project groups.
- In the beginning I decided to stick to a routine of 9am-7pm with a 2hr exercise/lunch break in the middle, regardless of the lecture timetable/assignments.
- The programme is pretty relentless throughout so if you don't get into a habit of taking breaks you will rarely get a chance to.
- The past student module review things are very helpful for picking classes and seemed mostly true.
- You can audit as many classes as you want at the start of a term so I wish I had taken more in the beginning to refine my choices.
Most Important Tip for Success This Year?

Work together!
More events, and in-person events

If there is interest, I will try to organise a question and answer session with some MSc students from last year. Probably when more of you are in Edinburgh.

Events are best when driven by you! E.g., Ed Intelligence.

But I’m keen to help, and so are student support. We can help you, e.g. to book rooms. I’d be happy to discuss ideas.
Class Representatives

As MSc coordinator I’m electing MSc class reps:  i.murray@ed.ac.uk

But any of you can reach out to me directly.
Summary

- Welcome!
- Get to know one another and look out for each other
- Be prepared to work hard, but also to learn a lot
- Feedback is welcome
- Read you email
Questions?

Remember to sign up to Discord look out for emails this week

i.murray@ed.ac.uk

Raise your hand to ask a question

Or write in the chat box