

Department of Artificial IntelligenceUniversity of EdinburghArtificial Intelligence 2 & 2hAI2(h) Syllabus

The two course is divided into two main sections. Students registered for the half course take the first section only, while students registered for the full course take both sections and do a project.

Section common to both AI2 and AI2h

The first section comprises three parts: Prolog; Planning and Search; Expert Systems.

Programming in Prolog

Paul Brna

Logic programming: terms, clauses, goals, matching and unification; terms as trees.

Flow of control as AND/OR trees; backtracking and recursion; controlling backtracking using the 'cut'.

Operations; lists; difference lists; debugging; input/output; utilities; searching strategies.

Applications of Prolog in Artificial Intelligence techniques.

Planning and Search

Mike Uschold

Representation of problems: state space representation; problem reduction. General search techniques. Game playing.

Basic planning; plan generation; abstraction techniques. Least commitment planning. Reasoning about time.

Expert Systems

Mike Uschold

Discussion of methods of representing knowledge: logic; production rules; structured objects.

Defining features of an expert system.

Consideration of computational mechanisms for implementing expert systems.

Section taken by AI2 students only

The second section, taken by AI2 students only, will focus on the application of AI techniques to the areas of understanding written language and machine vision. It will comprise two taught modules, a project and project presentations where each student will give a short verbal presentation describing his or her project.

Vision

Jim Howe

Discussion of the problems involved in programming a computer to recognise objects, including:

- a. extracting primitive information from scenes
- b. grouping primitive information to yield information about bodies in a scene
- c. interpreting bodies in scenes as real world objects
- d. control processing: top-down control versus bottom-up control

Natural Language Processing

Don Sanella

Techniques involved in computer processing of the structure of natural language - grammar of words and sentences: dictionaries, grammars, parsers, generators.

Techniques for dealing with meaning - representing word meaning, sentence meaning, knowledge of the world; predicate calculus.

Integrated systems and their applications: control structures and interfaces.

Student Projects (AI2 only)

Each AI2 student must complete a project. A project usually consists of a program exploring and/or illustrating some area of the course, together with a written description thereof. Help will be provided by demonstrators and tutors. Computer resources for the project will be provided on a Gould 9000. A handout on projects will be provided during the first term.

Project Presentations (AI2 only)

Each student will give a short presentation (including discussion) describing his or her project.

The schedule of project related events is as follows:

End of week 1, 2nd term: - selection of projects.

End of week 5, 2nd term: - approx. 3 page interim Progress Report due to tutor.

Monday of week 2, 3rd term: - project final reports due by 5pm - no extensions!

Week 3, 3rd term: - project presentations in class begin.

Department of Artificial IntelligenceUniversity of EdinburghArtificial Intelligence 2 & 2hAI2(h) Teaching methodsLectures

There are three class sessions per week, from 9.00 to 9:55 Tuesdays, Thursdays, and Fridays. This time will usually be devoted to lectures, but may also be used for films, demonstrations, and discussions. Lectures will be held in 80 South Bridge, room A10.

Practical Work

Programming exercises will be assigned once a fortnight throughout the year. The exercise set will be based on the current lecture topic. These will be done on the Gould 9000. During practical sessions demonstrators will be available to help you with these exercises. Alternate tutorials will also be devoted to discussing the topic on which the current practical is based.

Tutorials

There are tutorials every week in all three terms. There will be assignments set each week, alternating between practical exercises and set problems relating to the lecture topics. These assignments are compulsory, and will be discussed in the tutorial.

Project (Full course only)

Two copies of your project must be handed in by the Monday of the second week of the third term. This is a requirement for the DP certificate which will enable you to sit the final assessment.

Class Examination (Full course only)

There will be a class examination at the end of second term. This will be of the same form as the final degree examination.

Assessment and DPs

The assessment for the full and half courses and the requirements of the DP certificate, which enables you to sit the examination, are as follows:

Half Course AI2h: Assessment is by one two-hour examination in June carrying 90% of the marks and by assessed practical work which carries 10% of the marks.

The DP certificate for AI2h is conditional upon satisfactory performance in tutorials and practicals.

Full Course AI2: Assessment is by one three-hour examination in June carrying 60% of the marks, by the project which carries 30% of the marks, and by the assessed practical work, carrying 10% of the marks.

The requirements of the DP certificate for AI2 are:

- satisfactory performance in tutorials and practicals
- satisfactory performance in the class examination
- submission of project

Recommended Reading

There is no one set text that covers the course as a whole, however a small number of texts may be recommended by individual lecturers. Additionally, set of lecture notes will be provided for sections of the course at a nominal charge (to cover photocopying). Further reading material in the form of books and articles will be available in the George Square library reading room.

Problems

Any problems which arise should be taken to John Hallam or your lecturer or tutor. Call ahead to be sure of finding us in, but don't think of it as a formal thing - we are here to help.

Lecturers and tutors

The lecturers and tutors on the course are:

- John Hallam	Room C12	Forrest Hill:	667-1011 ex 2557
- Helen Pain	F floor	South Bridge:	225-7774 ex 232
- Paul Brna	F floor	South Bridge:	225-7774 ex 239
- Mike Uschold	F floor	South Bridge:	225-7774 ex 243/248
- Don Sanella	F floor	South Bridge:	225-7774 ex 243/248
- Bob Fisher	Room C11	Forrest Hill:	667-1011 ex 2553
- Sarah Heald	Room C13	Forrest Hill:	667-1011 ex 2556
- Robert Gray	DtoP Suite	Forrest Hill:	667-1011 ex 2517

Department of Artificial IntelligenceUniversity of EdinburghArtificial Intelligence 2 & 2hCourse Description

Artificial Intelligence concerns itself with computer programs which model certain activities of the mind, e.g. visual perception, common-sense and mathematical reasoning, understanding English, playing board games, etc. Typical tasks which computers have been programmed to do are: answering I.Q. tests; describing scenes viewed by a T.V. camera; conducting a conversation in English and learning new concepts from examples and non-examples. How computers can be programmed to do these and related tasks will be discussed in the course.

The scientific and philosophical interest of this new discipline lies in the light it throws on the still quite mysterious character of human cognitive processes. Thus although the focus in AI2 is on the computational techniques involved in tackling the kinds of problems listed above, the larger implications of the course make it of interest to students from psychology, linguistics and philosophy as well as those from computer science, mathematics and engineering.

The aims of the course are to introduce students to the techniques and methodology of AI and to a lesser extent to show how computational modelling offers a non-quantitative, but rigorous, tool for building theories in the cognitive sciences. The focus of the course is on understanding and learning to use the particular techniques which AI has developed for building such models, e.g. designing grammars for parts of English, writing inference rules to capture aspects of common sense, and detailing the steps involved in a robot picking up a spanner.

The course consists of three lectures a week, plus weekly tutorials and practicals. Assessment of the full course is based on a project, a three hour written examination in the third term, and assessed practical work. Assessment of the half course is based on a two hour written examination in the third term and on assessed practical work. More details of AI2 and AI2h can be found in the documents "AI2(h) Syllabus 1986/87" and "AI2(h) Teaching Methods 1986/87".

Department of Artificial IntelligenceUniversity of EdinburghArtificial Intelligence 2 & 2hSummary Timetable for AI2 and AI2h

This timetable summarizes the scheduling of lectures, practical and tutorial exercises, examinations, and other course-related events, for Artificial Intelligence 2 and 2h. The following abbreviations are used:

IN	Introductory lecture	{ John Hallam}
PL	Prolog course lecture	{ Paul Brna}
PS	Problem Solving and Search course lecture	{ Mike Uschold}
ES	Expert Systems course lecture	{ Mike Uschold}
T2, T4	Prolog Tutorial Exercises	
T6, T8	Problem Solving Tutorial Exercises	
PL1, PL2	Prolog Practical Exercises (assessed)	
PS1, PS2	Problem Solving Practical Exercises (assessed)	
ES1	Expert Systems Practical Exercise (assessed)	

First Term Timetable

Week	Date	Lectures			Tutorials		Practicals		Other
		Tu	Th	Fr	Subject	In/Out	In	Out	
1	6 Oct	IN	PL	PL	None*	T2 out	---	PL1	
2	13 Oct	PL	PL	PL	T2	T2 in	---	---	SSC Election
3	20 Oct	PL	PS	PL	PL1	T4 out	PL1	PL2	
4	27 Oct	PL	PS	PL	T4	T4 in	---	---	
5	3 Nov	PL	PS	PS	PL2	T6 out	PL2	PS1	
6	10 Nov	PL	PS	PS	T6	T6 in	---	---	
7	17 Nov	PS	PS	PS	PS1	T8 out	PS1	PS2	
8	24 Nov	PS	PS	PS	T8	T8 in	---	---	Project Handout
9	1 Dec	ES	ES	ES	PS2	---	PS2	ES1	
10	8 Dec	--	--	--	---	---	---	---	

Tutorial And Practical Exercises.

Tutorial exercises will be handed out during tutorials in odd weeks and collected in during even weeks, when the exercises will be discussed. Note that, since there are no tutorials in the first week of term the exercises T2 for the second week tutorial will be handed out by the Prolog Lecturer. Tutorial exercises do not count towards the course assessment, but satisfactory performance of them is required for the DP certificate which enables you to sit the course exam in June.

Practicals will be handed out by the lecturer on the Tuesday of the handing-out week noted above (except for the Prolog practical PL1, which will be handed out on Thursday of week one). They are due back during the Tuesday lecture of the handing-in week given above. Practicals handed in late will not contribute to those assessed for the course -- you will lose all the marks for a practical by being late!

A detailed timetable will be supplied when students have been assigned to practical sessions and tutorials. The timetable for second term will be available shortly.

Department of Artificial IntelligenceUniversity of EdinburghArtificial Intelligence 2 & 2h

Tutorials - Who, Where, When

Wednesday 10-11am

Tutor: JOHN HALLAM FH Sem. Room

Robert Fletcher
Duncan Kemp
Paul Lucas
Campbell McKellar
Ulrich Nehmzow
Julian Palmer
Fritz Seytter

Thursday 11-12am

Tutor: ROBERT GRAY FH Sem. Room

Andrew Bissell
Conrad Chin
Colin Davidson
Konrad Flamm
Stephen Loughran
Neil Stevenson
Christopher Thornborrow

Thursday 2-3pm (A)

Tutor: HELEN PAIN F5 SB

David Adger
Jonathan Broadbent
Paul Cairns
Rhona Forshaw
Bruce Mason
John McIntock
Annette Ringrose
Ivan Vemlianin

Thursday 2-3pm (B)

Tutor: MIKE USCHOLD C7 SB

Max Carcas
Christopher Deanes
Edward Driver
Robert Moffat
James Murdoch
James Pease
Ronald Smith

Thursday 4-5pm (A)

Tutor: BOB FISHER FH Sem. Room

Lesley Daniel
Sameer Ensaif
Gregor Erbach
William Harley
John Leask
Kevin Maguire
Paul Martin
Gregory Milne

Thursday 4-5pm (B)

Tutor: DON SANNELLA C7 SE

David Greenfield
Craig Morrison
Ross Petrie
Paul Roberts
Mary Ruddy
Matthew White
Graeme Wood
Peter Wright

Friday 2-3pm

Tutor: SARAH HEALD FH Sem. Room

Aaron Constable
Jason Kristiansen
Colin Reid
Duncan Russel
Alan Snell

Friday 3-4pm

Tutor: GARY ROBERTS C5 SB

Alexander Harley
Andrew Irvine
Graeme Lunn
Alan McBride
Christopher Sutherland
David Walker

Department of Artificial Intelligence
University of Edinburgh
Artificial Intelligence 2 & 2h

Practical Session & Demonstrators

Tuesday 10-11am

Demonstrator: Alison Cawsey

Andrew Bissell
 Christopher Deanes
 Robert Fletcher
 Duncan Kemp
 Paul Lucas
 Criag Morrison
 Graeme Wood

Thursday 3-4pm

Demonstrators: Geraint Wiggins &
 Alison Cawsey

David Adger
 Jonathan Broadbent
 Paul Cairns
 Max Carcas
 Edward Driver
 Rhona Forshaw
 David Greenfield
 Bruce Mason
 John McLintock
 Robert Moffat
 James Murdoch
 Ulrich Nehmzow
 James Pease
 Annette Ringrose
 Ronald Smith
 Ivan Vemlianin

Friday 2-3pm

Demonstrators: Roberto Desimone &
 Andrew Stevens

Conrad Chin
 Lesley Daniel
 Alexander Harley
 Andrew Irvine
 Stephen Loughran
 Graeme Lunn
 Kevin Maguire
 Paul Martin
 Alan McBride
 Gregory Milne
 Ross Petrie
 Paul Roberts
 Neil Stevenson
 Christopher Sutherland
 Christopher Thornborrow
 David Walker
 Peter Wright

Friday 3-4pm

Demonstrators: Roberto Desimone &
 Andrew Stevens

Aaron Constable
 Colin Davidson
 Sameer Ensaff
 Gregor Erbach
 Konrad Flamm
 William Harley
 Jason Kristiansen
 John Leask
 Campbell Mckellar
 Julian Palmer
 Colin Reid
 Mary Ruddy
 Duncan Russell
 Fritz Seytter
 Alan Snell
 Matthew White

Practical exercises will be set once a fortnight. They will be handed out the week before. You are expected to tackle these during the practical sessions and in your own time. Demonstrators will be provided to help you in the practical sessions. Commented programs should be handed in at the Tuesday lecture noted in your timetable. They will be marked and count for 10% of your course marks. Practicals handed in late will not be counted.