BSc Applied Artificial Intelligence and Cybernetics UCAS code: HG76

For students entering Part 1 in 2003

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Relevant QAA subject benchmarking group(s): Computing
Faculty of Science Programme length: 4 years
Date of profile: 28/02/05
Programme Director: DrV.F.Ruiz
Programme Advisers: Dr R.J.Mitchell (Cybernetics) and Dr G.T.McKee (Computer Science)
Board of Studies: Computer Science and Cybernetics

Summary of programme aims

The programme aims to give an understanding of intelligence and intelligent systems, whether these are biological or artificial; to appreciate the use of intelligence for machine learning; and to be well informed but critical about current developments. (For a full statement of the programme aims and learning outcomes see below)

Transferable skills

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills which all students are expected to have developed by the end of their degree programme. In following this programme, students will have had the opportunity to enhance their skills relating to career management, communication (both written and oral), information handling, numeracy, problem-solving, team working and use of information technology.

As part of this programme students are expected to have gained experience and show competence in the following transferable skills: IT (word-processing, using standard and mathematical software, scientific programming), scientific writing, oral presentation, team-working, problem-solving, use of library resources, time-management, career planning and management, and business awareness.

Programme content

The profile which follows states which modules must be taken (the compulsory part), together with one or more lists of modules from which the student must make a selection (the "selected" modules). Students must choose such additional modules as they wish, in consultation with their programme adviser, to make 120 credits in each Part. The number of modules credit for each module is shown after its title.

Part 1 (three terms)		*Credits*	*Level*
Compulsory modules			
CY1A2	*Cybernetics and Its Application*	20	C
SE1A2	*Introduction to Computer Systems*	10	C
CS1G2	*Introduction to Algorithms*	10	C
MA113	*Logic and Discrete Maths*	20	C
and either both			
SE1B2	*Systems and Circuits*	20	C
EG1C2	*Engineering Mathematics*	20	C
or CY1B2	*Analysis of Cybernetic Systems*	20	C
and either both			
CS1A2	*Programming 1*	10	C
CS1B2	*Programming 2*	10	C
or both			
CS1C2	*Introductory Programming 1*	10	C
CS1D2	*Introductory Programming 2*	10	C
Optional modules – if necessary choose modules worth a further 20 credits so total is 120			

	CS1H2	*Functional Programming*	20	C
	EE1A2	*Electronic Devices and Telecoms*	20	C
		Institution Wide Language Programme	20	C

Part 2 (three terms)			*Credits*	*Level*
Compulsory modules				
	CS2E2	*Software Engineering*	10	I
	CS2D2	*Databases*	10	I
	CS2G2	*Algorithmic Techniques*	20	I
	CS2Q2	*AI Concepts*	10	I
	CY2D2	*Neurocomputation*	20	I
	CY2F2	*Medical Engineering*	10	I
	CY2G2	*Signals*	10	I
	SE2B2	*Further Computer Systems*	20	I
	SE2R2	*Transferable Skills*	10	I

Industrial year (three terms)			*Credits*	*Level*
Compulsory modules				
	CS3S2	*Industrial year*	120	I

Part 3 (three terms)			*Credits*	*Level*
Compulsory modules				
	CY3B2	*Machine Intelligence*	10	H
	CY3G2	*Modern Heuristics*	10	H
	CS3A2	*Computer Networking*	10	H
	SE3Z5	*Social, Legal and Ethical Aspects of Science and Engineering*	20	H
&	CS3Q2	*Computer Science Project*	30	H
or	CY3P2	*Cybernetics Project*	30	H
Optional modules must be chosen to give a total of 120 credits:				
	CS3M2	*Evolutionary Computation*	10	H
	CS3F2	*XML Technologies & Applications*	10	H
	CS3U2	*Linear Algebra for Computer Vision and Robotics*	10	H
	CS3G2	*Computer Vision*	10	H
	CS3Y2	*Robot Architectures*	10	H
	CY3F2	*Virtual Reality*	10	H
	CY3E2	*Biological Cybernetics*	10	H
	CY4I2	*Biomedical Engineering*	10	M
	CY4E2	*Bionics*	10	M
	CY4B2	*Mind as Motion*	10	M

Progression requirements

In order to progress from Part 1 to Part 2 students must:

- Achieve an overall average of 40% in 120 credits taken in Part 1; and
- Achieve not less than 30% in modules taken in Part 1, but note * below.

In order to progress from Part 2 to Part 3 students must:

- Achieve an overall average of 40% in 120 credits taken in Part 2; and
- Achieve not less than 30% in modules taken in Part 2, but note * below.

* except that marks of less than 30% in a total of 20 credits may be condoned provided that the candidate has pursued the course for the module with reasonable diligence and has not been absent from the examination without reasonable cause.

Summary of teaching and assessment
Teaching is organised in modules that typically involve lectures and tutorial or laboratory practicals. Most modules are assessed by a mixture of coursework and formal examination. Some modules, for instance the Part 3 project, are assessed only as coursework.

To be eligible for honours the student must obtain an overall average mark of at least 40% and at least 40% in the Part 3 project. In addition the student must submit a satisfactory report on the industrial year, otherwise the student may be eligible for the non-applied variant of the degree. Part 2 contributes one third of the final degree assessment and Part 3 contributes two thirds.

Admission requirements
Entrants to the programme are normally required to have obtained:

A minimum of GCSE: Mathematics Grade B or higher and Combined Science Grade B or higher.
UCAS Tariff: 300 points with a Grade B or higher in Mathematics or science subject.
International Baccalaureate: 32 points; or
Irish Leaving Certificate: BBBBB, with a Grade B or higher in Mathematics or science subject.
Equivalent qualifications are acceptable.

Admissions Tutor: Dr Will Browne

Support for students and their learning
University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Student Access to Independent Learning (S@IL) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

Within the providing Department additional support is given through practical laboratory classes. The development of problem-solving skills is assisted by appropriate assignment and project work. There is a Course Advisor to offer advice on the choice of modules within the programme. Course handbooks are provided for each Part of the course: these give more details about the modules which make up the degree. In addition, the School of Systems Engineering produces a Handbook for Students, which provides general information about the staff and facilities within the School.

Career prospects
Career prospects tend to be good as the course is very relevant to today's high technology society and, because the course is not dependent upon any one industry, graduates are employed in a variety of areas. Some graduates join large companies, often IT based companies; others join smaller companies and consultancies; and some choose to further their research interests either in the Department or at other Universities.

Opportunities for study abroad
N/A

Educational aims of the programme
The programme aims to combine an understanding of systems in general, both technological and biological, with a knowledge of relevant modern technologies, theories and techniques; to produce good practically oriented graduates whose systems grounding allows them to work in an academic, research or industrial environment, as individuals or as part of a team. This programme is distinctive in that it gives an overview of the computational and the human aspects of intelligence.

Many students find that the experience and knowledge gained during the Industrial Year allows them to make better use of their final year of University study, and provides useful background knowledge for more permanent career choices.

Programme Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

A. Knowledge and understanding of: 1. Appropriate mathematical techniques. 2. Information technology. 3. Design of systems. 4. Aspects of computer and human intelligence. 5. Business context. 6. Engineering practice.	*Teaching/learning methods and strategies* The knowledge required for the basic topics is obtained via lectures, tutorials, laboratory practicals, assignments and project work. Appropriate IT packages are taught. Laboratory demonstrators and project supervisors advise students, and feedback is provided on all continually assessed work. As the course progresses students are expected to show greater initiative. The year spent in industry gives students a first hand knowledge of the business context. *Assessment* Most knowledge is tested through a combination of practicals, assignments and formal examinations. Students write reports on many assignments after Part I, and may also make oral presentations of their work.

Skills and other attributes

B. Intellectual skills – able to: 1. Select and apply appropriate scientific principles, mathematics and computer based methods for analysing systems. 2. Organise tasks into a structured form. 3. Understand the evolving state of knowledge in a rapidly developing area. 4. Transfer appropriate knowledge and methods from one topic within the subject to another. 5. Plan, conduct and write a report on a project or assignment. 6. Prepare and give an oral presentation. 7. Evaluate commercial risks.	*Teaching/learning methods and strategies* Appropriate mathematical, scientific and IT skills and tools are taught in lectures and problems to be solved are given as projects or assignments. Written and oral presentations are required for various assignments and projects. *Assessment* 1-4 (see left box) are assessed partly by examination and partly by project or assignment work. 5 and 6 are assessed as part of project work. 7 is assessed by examination.

C. Practical skills – able to:

1. Use appropriate mathematical methods or IT tools;
2. Program a computer to solve problems;
3. Use relevant laboratory equipment; and analyse the results critically;
4. Manage a project;
5. Present work.

Teaching/learning methods and strategies

Mathematics and IT tools are introduced in lectures and their use is assessed by examinations and assignments. Programming assignments are set and students may write programs as part of other projects. Laboratory practicals and projects are used for 3 and projects are used for 4 and 5.

Assessment

1 is tested in coursework and in examinations.2 and 5 are tested by assignments and projects. 3 is assessed by practicals and sometimes in projects. 4 is assessed through project work.

D. Transferable skills – able to:

1. Use IT tools
2. Acquire, manipulate and process data;
3. Use creativity and innovation;
4. Solve problems;
5. Communicate scientific ideas;
6. Give oral presentations;
7. Work as part of a team;
8. Use information resources;
9. Manage time.

Teaching/learning methods and strategies

IT methods are taught partly in lectures, but mainly through laboratory sessions and assignments.

Data skills are acquired in the laboratory and through project work. Creativity, innovation, problem solving, team working, time management and presentations are learnt in projects. Use of information resources such as the library and IT is learnt through projects and assignments.

Assessment

Some skills such as the ability to use IT tools and the ability to communicate orally and in written form are directly assessed in assignments or projects. Other skills such as time management are not directly assessed but their effective use will enhance a student's overall performance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably expect to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in module and programme handbooks.