MEng Artificial Intelligence and Cybernetics   UCAS code: GH7P
For students entering Part 1 in 2006

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 specification: 24/03/09
Programme Director: Dr. V.F.Ruiz
Programme Adviser: Dr R.J.Mitchell (Cybernetics), Dr G.T.McKee (Computer Science)
Board of Studies: Computer Science and Cybernetics
Accreditation: British Computer Society

Summary of programme aims and learning outcomes
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				
	SE1CA5	*Cybernetics and Its Application*	20	C
	SE1SA5	*Programming*	20	C
	SE1SB5	*Software Engineering*	20	C
	SE1EB5	*Computer and Internet Technologies*	20	C
and	SE1CB5	*Engineering Mathematics* [if have A level Maths]	20	C
or	MA116	*Mathematics for Computer Scientists* [otherwise]	20	C
Optional modules –choose modules worth a further 20 credits so total is 120				
	SE1EA5	*Electronic Circuits*	20	C
	SE1SC5	*Computer Science Roadmap*	20	C

Part 2 (three terms)   *Credits*   *Level*

Compulsory modules

	CS2TD7	*Databases*	10	I
	CS2L7	*Human Computer Interaction*	10	I
	CS2Q7	*Artificial Intelligence*	10	I
	CY2D7	*Neurocomputation*	20	I
	CY2F7	*Medical Engineering and Experimentation*	10	I
	CY2G2	*Signals*	10	I
	EE2C2	*Digital Circuit Design*	10	I
	CY2H6	*Further Computer Systems*	10	I
	SE2P6	*Engineering Applications*	20	I
&	CY2B7	*Electronics for Intelligent Systems [If taken SE1SC5]*	10	I
or	CS2T7	*Introduction to Algorithms [If not taken SE1SC5]*	10	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:

	CS3M6	*Evolutionary Computation*	10	H
	CS3K7	*Data Mining*	10	H
	CS3U7	*Image Analysis*	10	H
	CS3V7	*Visual Intelligence*	10	H
	CS3Y7	*Robot Systems*	10	H
	CS3W7	*Multi-Agent Systems*	10	H
	CY3E2	*Biological Cybernetics*	10	H
	CY3F8	*Virtual Reality*	10	H
	CY3J8	*Machines in Motion*	10	H
	CY3K7	*Bionics*	10	H
	LA3XX	*Language from IWLP*	20	H

Part 4 (three terms)   *Credits*   *Level*

Compulsory modules

	SE4P6	*MEng Research Project*	40	M
	CY4B2	*Mind as Motion*	10	M
	SE4R9	*Research Studies*	10	M
	SE4S9	*Law and Management*	10	M

Optional modules must be chosen to give a total of 120 credits.

	MMM038	*Practice of Entrepreneurship*	20	M
	CS4B2	*Parallel Algorithms*	10	M
	CS4E7	*Computational Robotics*	10	M
	CS4Z4	*Computer Security*	10	M
	CY4I7	*Biomechanics*	10	M
	CY4F8	*Swarm Intelligence and Artificial Life*	10	M
	CY4K7	*Learning Classifier Systems*	10	M
	CY4M8	*Medical Image and Signal Processing*	10	M

Progression requirements

To gain a threshold performance at Part 1 and qualify for the CertHE a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 1, where all the credits are at C level or above, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 1 to Part 2, a student shall normally be required to achieve a threshold performance at Part 1, and to have no module mark below 30%.

To gain a threshold performance at Part 2 and qualify for the DipHE a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 2, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 2 to Part 3, a student shall normally be required to achieve a threshold performance at Part 2 and achieve an overall average of 60% in the 120 credits taken in Part 2. A student whose average is below 60% may be qualified for the BSc AI/Cyb degree.

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 example the Part 3 project, are assessed only as coursework. Details are given in the relevant module description.

A student must obtain at least 40% in both their projects (CY3P2/CS3Q2 and SE4P6) to be eligible for honours.

The relative contributions to the final assessment of Parts 2, 3 and 4 are 1:2:2.

Admission requirements

Entrants to this programme are normally required to have obtained:
Grade B or better in Combined Science and grade B or better in Mathematics at GCSE;
and achieved
UCAS Tariff: 300 points with grade B or better in Mathematics or Science
International Baccalaureat: 32 points or
Irish Leaving Certificate: BBBBB, including B or better in Maths or Science
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 are 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 School additional support is given though practical laboratory classes. The development of problem-solving skills is assisted by appropriate assignment and project work. There is a Programme Adviser 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 produces a Handbook for Students, which provides general information about the staff and facilities within the school.

Career prospects

Career prospects are 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 School or at other Universities.

Opportunities for study abroad or for placements
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.

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:	Teaching/learning methods and strategies
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. *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:	Teaching/learning methods and strategies
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.	*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.

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.
6. conduct research in intelligent systems.

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, 5 and 6.
Assessment
1 is tested in coursework and in examinations.2, 5 and 6 are tested by assignments and projects. 3 is assessed by practicals and sometimes in projects. 4 is assessed through project work. 6 is also assessed in many Part 4 modules.

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.