BSc Artificial Intelligence and Cybernetics **UCAS code: GH76**
For students entering Part 1 in 2008/9

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Computing
Faculty:	Science Faculty
Programme length:	3 years
Date of specification:	10/Aug/2010
Programme Director:	Dr Virginie Ruiz
Programme Advisor:	Dr Richard Mitchell Dr Gerard McKee
Board of Studies:	Cybernetics
Accreditation:	British Computer Society

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.

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.

Transferable skills
During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills in line with the University's Strategy for Learning and Teaching. In following this programme, students will have had the opportunity to develop such skills, in particular relating to communication, interpersonal skills, learning skills, numeracy, self-management, use of IT and problem-solving and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.
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 credits for each module is shown after its title.

Part 1 (three terms)
Compulsory modules

Module	*Title*	*Credits*	*Level*
SE1CA5	Cybernetics and its Application	20	4
SE1EB5	Computer and Internet Technologies	20	4
SE1SA5	Programming	20	4
SE1SB5	Software Engineering	20	4

and

SE1CB5	Engineering Mathematics [for students who have A-level Maths]	20	4

or

MA116	Mathematics for Computer Scientists [otherwise]	20	4

Optional modules - choose modules worth a further 20 credits so total is 120

SE1EA5	Electronic Circuits	20	4
SE1SC5	Computer Science Roadmap	20	4

Part 2 (three terms)
Compulsory modules

Module	*Title*	*Credits*	*Level*
CY2G2	Signals	10	5
SE2P6	Engineering Applications	20	5
EE2C2	Digital Circuit Design	10	5
CY2H6	Further Computer Systems	10	5
CS2TD7	Databases	10	5
CY2F7	Medical Engineering and Experimentation	10	5
CS2Q7	Artificial Intelligence	10	5
CS2L7	Human Computer Interaction	10	5
CY2D9	Neural Nets	10	5
CY2K9	Neuroscience	10	5

and if in Part 1 did SE1EA5

CS2T7	Introduction to Algorithms	10	5

else

CY2B9	Electronics for Intelligent Systems	10	5

Part 3 (three terms)
Compulsory modules

Mod Code	*Module Title*	*Credits*	*Level*
CY3G2	Modern Heuristics	10	H
CS3A2	Computer Networking	10	H
CY3B9	Machine Intelligence	10	H
SE3Z10	Social, Legal and Ethical Aspects of Science and Engineering	10	H

either:

CY3P2	Cybernetics Project	30	6
or			
CS3Q2	Computer Science Project	30	6

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

CS3K7	Data Mining	10	6
CS3M6	Evolutionary Computation	10	6
CS3U7	Image Analysis	10	6
CS4V10	Visual Intelligence	10	7
CS3Y7	Robot Systems	10	6

CS3W7	Multi-Agent Systems	10	6
CY3E2	Biological Cybernetics	10	6
CY3F8	Virtual Reality	10	6
CY3J8	Machines in Motion	10	6
CY3K7	Bionics	10	6
CY4I7	Biomechanics	10	7
LAXXX	Institution Wide Language Programme	20	

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. A student whose average is 60% or over may be qualified for the MEng AI/Cyb degree.

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

Part 2 and Part 3 contribute to the final degree assessment in the ratio 1:2

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.

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: 280 points with a Grade C or higher in Mathematics or science subject.
International Baccalaureate: 30 points.
Equivalent qualifications are acceptable.

Admissions Tutor: Dr Faustina Hwang

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, School Senior Tutors, the Students' Union, the Medical Practice and the Student Services Directorate. The Student Services Directorate is housed in the Carrington Building and includes the Careers Advisory Service, the Disability Advisory Service, Accommodation Advisory Team, Student Financial Support, Counselling and Study Advisors. Student Services has a Helpdesk available for enquiries made in person or online (www.risisweb.reading.ac.uk), or by calling the central enquiry number on (0118) 378 5555. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions on everything from accommodation to finance. The Carrington Building is open between 8:30 and 17:30 Monday to Thursday (17:00 Friday and during vacation periods). Further information can be found in the Student website (www.reading.ac.uk/student).

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

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.	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 1, 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. 7. Evaluate commercial risks.	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:*	**Teaching/learning methods and strategies**

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.

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 be expected 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 the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.