

Course Specification

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Produced By:	Laura Clode
Status:	Validated

Core Information

Awarding Body / Institution:	University of Wolverhampton		
School / Institute:	School of Mathematics and Computer Science		
Course Code(s):	CS025K23UV	Sandwich	4 Years
UCAS Code:	GH77		
Course Title:	BSc (Hons) Artificial Intelligence and Robotics with Sandwich Placement		
Hierarchy of Awards:	Bachelor of Science with Honours Artificial Intelligence and Robotics, having satisfactorily completed a sandwich placement Bachelor of Science with Honours Artificial Intelligence and Robotics Bachelor of Science Artificial Intelligence and Robotics, having satisfactorily completed a sandwich placement Bachelor of Science Artificial Intelligence and Robotics Diploma of Higher Education Artificial Intelligence and Robotics Certificate of Higher Education Artificial Intelligence and Robotics University Statement of Credit University Statement of Credit		
Language of Study:	English		
Date of DAG approval:	23/Mar/2018		
Last Review:	2017/8		
Course Specification valid from:	2017/8		
Course Specification valid to:	2023/4		

Academic Staff

Course Leader:	Ali Safaa Sadiq
Head of Department:	Dr Kevan Buckley

Course Information

Location of Delivery:	University of Wolverhampton
Category of Partnership:	Not delivered in partnership
Teaching Institution:	University of Wolverhampton
Open / Closed Course:	This course is open to all suitably qualified candidates.

Entry Requirements:

Entry requirements are subject to regular review. The entry requirements applicable to a particular academic year will be published on the University website (and externally as appropriate e.g. UCAS)

- A Level minimum of BB or CDD.
- BTEC National Diploma grade MMP, BTEC National Certificate grade DM
- BTEC QCF Extended Diploma grade MMP, BTEC QCF Diploma grade DM
- Access to HE Diploma full award (Pass of 60 credits - of which a minimum of 45 credits must be at level 3 including 18 at Merit or Distinction).
- Applicants will normally be expected to hold GCSE English and Maths at grade C+/4 or equivalent
- If you've got other qualifications or relevant experience, please contact [The Gateway](#) for further advice before applying.
- International entry requirements and application guidance can be found [here](#)
- Successful completion of the [International Foundation Year in Science and Engineering](#) guarantees entry on to this course.
- Students can enter the course after completing the International Foundation year after completing appropriate modules.

Distinctive Features of the Course:

The course is taught by experienced academics, who are deeply involved in research and have experience of collaborating with industry experts. These academics are also able to transfer their knowledge and skills to the students. The course also provides the opportunity for students to work with industry on some modules so that theoretical underpinning is enhanced with real-life experience.

A placement can be undertaken anywhere; local or national for example. During a placement, you will be doing similar work to a normal employee of the organisation giving you a unique insight into your chosen profession or sector, the opportunity to acquire crucial personal skills and also the opportunity to build a network of useful contacts.

The team at [The Workplace](#) constantly search for new placement opportunities but if you find an opportunity that interests you or you have been successful in securing one yourself, contact them for further information and support.

Students choosing to undertake a placement will gain (Sandwich) on their degree classification.

Educational Aims of the Course:

The robotics and artificial intelligence (AI) fuelled by the rise in computer processing power, the profusion of data, and the development of techniques such as 'deep learning' is undergoing a major transformation. AI-enabled Robots are growing beyond being the workhorses of industrial shop floors, and beginning to assume the roles of personal assistants, delivery vehicles, surgical assistants, assist doctors with medical diagnoses, exoskeletons, driverless vehicles, and unmanned aerial vehicles (UAVs), among many others.

Given that Robotics and Artificial Intelligence have an important degree of interdependency, this course brings together these two areas, and offers conceptual grounding in intelligent systems, and the chance to apply

theoretical knowledge in a practical setting.

An artificial intelligence and robotics degree will provide graduates with a fantastic platform from which to enter a wide range of challenging sectors: such as Finance, Engineering, IT & Technology, Manufacturing & Production, Transport & Logistics, Public Sector, Defense, Healthcare, Entertainment and Science.

Intakes:

September

Major Source of Funding:

Office for Students (OFS)

Tuition Fees:

Tuition fees are reviewed on an annual basis. The fees applicable to a particular academic year will be published on the University website.

Year	Status	Mode	Amount
2020/1	H	Full Time / Sandwich	£9250.00
2020/1	Overseas	Full Time / Sandwich	£12250.00

PSRB:

None

Course Structure:

September (Sandwich)

Year 1

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
4CI018	Academic Skills and Team-based Learning	20	SEM1	Core
4CS001	Introductory Programming And Problem Solving	20	SEM1	Core
4CS015	Fundamentals of Computing	20	SEM1	Core
4CS017	Internet Software Architecture	20	SEM2	Core
4MM013	Computational Mathematics	20	SEM2	Core
4CS016	Embedded Systems Programming	20	SEM2	Core

September (Sandwich)

Year 2

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
5CS036	Robotic Engineering	20	SEM2	Core
5CS037	Concepts and Technologies of AI	20	SEM1	Core
5CI021	Data Mining	20	SEM1	Core
5CS024	Collaborative Development	20	SEM2	Core

For this option group you must choose a minimum of 20 credits and a maximum of 20 credits

5CS020	Human - Computer Interaction	20	SEM2	
5CS022	Distributed and Cloud Systems Programming	20	SEM2	

For this option group you must choose a minimum of 20 credits and a maximum of 20 credits

5CI022	Databases	20	SEM1	
5CS019	Object-Oriented Design and Programming	20	SEM1	
5CS021	Numerical Methods and Concurrency	20	SEM1	

September (Sandwich)

Year 3

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
5MM006	Industrial Placement	40	CRYRA	Core

September (Sandwich)

Year 4

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
6CS012	Artificial Intelligence and Machine Learning	20	SEM2	Core
6CS007	Project and Professionalism	40	YEAR	Core

For this option group you must choose a minimum of 40 credits and a maximum of 40 credits

6CS005	High Performance Computing	20	SEM1
6CS027	Secure Mobile Application Development	20	SEM1
6CS014	Complex Systems	20	SEM1
6CS026	Systems Architecture and Internet of Things	20	SEM1
6CS031	Cyber Threat Intelligence	20	SEM1

For this option group you must choose a minimum of 20 credits and a maximum of 20 credits

6CS030	Big Data	20	SEM2
6CS028	Advanced Web Development	20	SEM2

Please note: Optional modules might not run every year, the course team will decide on an annual basis which options will be running, based on student demand and academic factors, to create the best learning experience.

Learning, Teaching and Assessment

Academic Regulations Exemption:

None

Reference Points:

Quality Code - [Part A: Setting and Maintaining Academic Standards](#). Including :

[Qualifications Frameworks](#)

[Characteristics Statements](#)

[Credit Frameworks](#)

[Subject Benchmark Statements](#)

Quality Code - [Part B: Assuring and Enhancing Academic Quality](#)

[University Policies and Regulations](#)

Equality Act (2010)

QAA Subject Benchmark for Computing

HEA Employability Profiles for Computing

Skills Framework for the Information Age

e-Skills

British Computer Society

Learning Outcomes:

CertHE Course Learning Outcome 1 (CHECLO1)

Demonstrate knowledge of the underlying concepts and principles associated with your area(s) of study, and an ability to evaluate and interpret these within the context of that area of study.

CertHE Course Learning Outcome 2 (CHECLO2)

Demonstrate an ability to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgements in accordance with basic theories and concepts of your subject(s) of study.

CertHE Course Learning Outcome 3 (CHECLO3)

Evaluate the appropriateness of different approaches to solving problems related to your area(s) of study and/or work.

CertHE Course Learning Outcome 4 (CHECLO4)

Communicate the results of your study/work accurately and reliably, and with structured and coherent arguments.

CertHE Course Learning Outcome 5 (CHECLO5)

Demonstrate the qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility.

DipHE Course Learning Outcome 1 (DHECLO1)

Demonstrate knowledge and critical understanding of the well-established principles of your area(s) of study, and of the way in which those principles have developed with an understanding of the limits of your knowledge, and how this influences analyses and interpretations based on that knowledge.

DipHE Course Learning Outcome 3 (DHECLO3)

Demonstrate knowledge of the main methods of enquiry in the subject(s) relevant to the named award, and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study.

DipHE Course Learning Outcome 4 (DHECLO4)

Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis.

DipHE Course Learning Outcome 5 (DHECLO5)

Effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively.

DipHE Course Learning Outcome 6 (DHECLO6)

Demonstrate the qualities and transferable skills necessary for employment, requiring the exercise of personal responsibility and decision-making and undertake further training, developing existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.

Ordinary Course Learning Outcome 1 (ORDCLO1)

Apply a full understanding, knowledge and experience of the principles of AI to design and build robots to perform specific tasks and reflect upon the efficiency and functionality of their performance.

DipHE Course Learning Outcome 2 (DHECLO2)

Demonstrate the ability to apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context.

Ordinary Course Learning Outcome 2 (ORDCLO2)

Demonstrate and apply knowledge of computer hardware and software with particular reference to the application of computing practice to the design and realisation of mobile robots.

Ordinary Course Learning Outcome 3 (ORDCLO3)

Apply appropriate theory, tools and techniques (e.g. theory and practice of programming, object-oriented design and analysis, AI technologies) to the analysis, design and synthesis of solutions to requirements in the domain of Computer Science.

Ordinary Course Learning Outcome 4 (ORDCLO4)

Demonstrate mastery of the essential facts, concepts, principles, theories and practices enabling graduate employment in applications of Computer Science (e.g. Software development, media computing, systems analysis).

Ordinary Course Learning Outcome 5 (ORDCLO5)

Demonstrate a range of social, legal, ethical, professional and project management skills required for continuing professional development in the domain of AI and Robotics within a world-wide context.

Honours Course Learning Outcome 1 (DEGCLO1)

Apply a full understanding, knowledge and experience of the principles of AI to design and build robots to perform specific tasks and reflect upon the efficiency and functionality of their performance.

Honours Course Learning Outcome 2 (DEGCLO2)

Demonstrate and apply knowledge of computer hardware and software with particular reference to the application of computing practice to the design and realisation of mobile robots.

Honours Course Learning Outcome 3 (DEGCLO3)

Apply appropriate theory, tools and techniques (e.g. theory and practice of programming, object-oriented design and analysis, AI technologies) to the analysis, design and synthesis of solutions to requirements in the domain of Computer Science.

Honours Course Learning Outcome 4 (DEGCLO4)

Demonstrate mastery of the essential facts, concepts, principles, theories and practices enabling graduate employment in applications of Computer Science (e.g. Software development, media computing, systems analysis).

Honours Course Learning Outcome 5 (DEGCLO5)

Demonstrate a range of social, legal, ethical, professional and project management skills required for continuing professional development in the domain of AI and Robotics within a world-wide context.

Honours Course Learning Outcome 6 (DEGCLO6)

Demonstrate the ability to gather, evaluate and reflect on information from relevant sources and solutions to problems in the domain of AI and Robotics.

Overview of Assessment:

Module	Title	Course Learning Outcomes
4CI018	Academic Skills and Team-based Learning	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4CS001	Introductory Programming And Problem Solving	CHECLO1, CHECLO2, CHECLO3, CHECLO5
4CS015	Fundamentals of Computing	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4CS016	Embedded Systems Programming	CHECLO1, CHECLO4, CHECLO5
4CS017	Internet Software Architecture	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4MM013	Computational Mathematics	CHECLO1, CHECLO2, CHECLO3, CHECLO4
5CI021	Data Mining	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CI022	Databases	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CS019	Object-Oriented Design and Programming	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO6
5CS020	Human - Computer Interaction	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CS021	Numerical Methods and Concurrency	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CS022	Distributed and Cloud Systems Programming	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CS024	Collaborative Development	DHECLO1, DHECLO2, DHECLO3, DHECLO5, DHECLO6
5CS036	Robotic Engineering	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO6
5CS037	Concepts and Technologies of AI	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO6
5MM006	Industrial Placement	DHECLO5, DHECLO6
6CS005	High Performance Computing	DEGCLO3, DEGCLO4, ORDCLO3, ORDCLO4
6CS007	Project and Professionalism	DEGCLO1, DEGCLO2, DEGCLO3, DEGCLO4, DEGCLO5, DEGCLO6
6CS012	Artificial Intelligence and Machine Learning	DEGCLO1, DEGCLO3, DEGCLO4, ORDCLO1, ORDCLO3, ORDCLO4
6CS014	Complex Systems	DEGCLO1, DEGCLO2, DEGCLO3, DEGCLO4, DEGCLO5, DEGCLO6, ORDCLO1, ORDCLO2, ORDCLO3, ORDCLO4, ORDCLO5
6CS026	Systems Architecture and Internet of Things	DEGCLO3, DEGCLO4, ORDCLO3, ORDCLO4
6CS027	Secure Mobile Application Development	DEGCLO3, DEGCLO4, ORDCLO3, ORDCLO4
6CS028	Advanced Web Development	DEGCLO3, DEGCLO4, ORDCLO3, ORDCLO4
6CS030	Big Data	DEGCLO1, DEGCLO3, DEGCLO4, ORDCLO1, ORDCLO3, ORDCLO4
6CS031	Cyber Threat Intelligence	DEGCLO3, DEGCLO4, ORDCLO3, ORDCLO4

Teaching, Learning and Assessment:

The learning activities on your course will develop distinctive graduate attributes that will make you stand out and enhance your employability. These skills will be embedded into the curriculum throughout your course. Examples include:

Digitally Literacy: All Computer Science graduates will surely be users of advanced technologies. However, on your course you will develop your skills to encompass literacy more fully such as learning how to find

information and how to take best advantage of digital resources and the Internet to make you effective in the Information Age.

Global Citizenship: On each level of your course you will learn about social, legal and ethical aspects of Computing, which will broaden your understanding of the way the world works and how communication and collaboration are evolving.

Knowledgeable and Enterprising: Throughout your course you will build up your professional and employability skills and learn to apply the knowledge you have acquired in an enterprising way. You will constantly nurture your own intellectual curiosity. The tools, methodologies and techniques that you will learn have been carefully selected to prepare you with the skills that employers demand and the opportunities for work based learning and placements will allow you to gain the vital experience that they often expect.

Assessment Methods:

At the University of Wolverhampton, a variety of modes of assessment will be used to support and test your learning and progress and to help you develop capabilities that are valued beyond your University studies and into your working life. Your course may include a variety of assessment activities:

Written examinations (including online examinations, open and closed book examinations and quizzes)
Coursework (for example, essays, reports, portfolios, project proposals and briefs, CVs, poster presentation)
Practical (for example, oral and video presentations, laboratory work, performances, practical skills assessment)

In the final year of your undergraduate degree, and at the end of your postgraduate degree, you are likely to be expected to write an extended piece of work or research, such as a dissertation or a practice-based piece of research.

Student Support:

General University support:

[University Learning Centres](#) are the key source of academic information for students. Learning Centres provide physical library resources (books, journal, DVDs etc.) and offer a range of study areas to allow students to study in the environment that suit them best: Social areas, quiet and silent areas. Learning Centres also provide access to wide range of online information sources, including eBooks, e-Journals and subject databases.

Learning Centres also provide students with academic skills support via the [Skills for Learning programme](#). Students on campus can attend workshops or ask for one-to-one help on a range of skills such as academic writing and referencing. Students can access a range of online skills material at: www.wlv.ac.uk/lib/skills

The [University Student Support website](#) offers advice on a variety of matters (careers, counselling, student union advice, etc.) Students can also access these services by booking appointment with the SU, careers, counselling services, etc.

Course Specific Support

At the start of each year of your course you will be assigned a Personal Tutor who will guide you through the induction process and provide support and academic counselling throughout the year on an appointment basis. They should be able to offer you advice and guidance to help you liaise with other staff and support facilities in the School and University. You should meet your Personal Tutor at least 3 times a year, which must include meetings that you are invited at critical points in your course.

The Faculty Students Services Office (FSSO) provides academic support (along with tutors) and will be accessible throughout the week on an appointment basis to discuss timetables, requests for extensions, requests for extenuating circumstances, general concerns about study and student life and general programme planning. The FSSO will act as a first point of contact in relation to leave of absence (including returning after leave), withdrawal, transferring to another course (internal and external) and changes to mode

of attendance. Your Course Leader will also be available thereafter for meetings by appointment (through SAMS) to discuss leave of absence, withdrawal, transferring to another course (internal and external), changes to mode of attendance, returning after leave of absence and direct entrants.

Subject support:

Tutorials, workshops, seminars and meetings - provide the primary opportunities for students to interact with staff on topics relating to modules. All modules provide at least one of these forms of face-to-face support.

Formative feedback - tutors provide personalised written feedback on most summative assessments. The mechanism for feedback from purely formative tasks varies between assessments, but will always be provided in some form. Online formative tasks often provide feedback straight away. On occasions tutors may provide generalised verbal feedback to the whole class on points relating to an assessment

Assessment and subject-based surgeries provide additional student support for subjects that students often need extra help with. They are often concentrated around the times when assessments take place. Revision sessions are provided for many modules that have exam-like tests and enable you to interact with tutors to review parts of the course. Mock exams and tests may provide opportunities to experience an examination environment before the final summative test and give you feedback on your understanding.

Employability in the Curriculum:

As AI and Robotics technologies develop, they are going to create a demand for new skills. The graduates will develop a portfolio during their course which will give them suitable experience in order to present to employers of practical skills required from industry. Students will also be encouraged to pursue a project with an industry partner, giving them 'industry experience'. The students will also be encouraged to take part in national and international competitions which will further how involvement with external stakeholders.

The transferrable skills such as problem identification, analysis, modelling, solution developing and evaluation gained in this course will prepare the students for a range of careers. The modules related to this award will be conscious of conformance to the University Employability + enterprise award, to ensure that relevant support and guidance is embedded in the curriculum.

The most common fields where employment can be found will be in industries developing robotic solutions for manufacturing, healthcare, transport, energy, defence, research, etc. Graduates roles could include,

- Robotics Design specialist
- Software engineer/developer
- Embedded Systems developer
- Intelligent Systems architect
- Intelligence analyst in a range of sectors such as Finance

Further study (Computer Science Masters courses, PhDs researching)



THE UNIVERSITY OF OPPORTUNITY