Computer Science (Human Computer Interaction) wIE MEng (Hons) 2020-20

Summary

UCAS code	Award	Title	Duration	Mode
I143	MEng	Computer Science (Human Computer Interaction) wIE MEng (Hons)	5 years	FT + Placement year

Schools	Computer Science
Faculty	Engineering and Physical Sciences
Awarding Institution	Unversity of Manchester
Programme Accreditation	
Relevant QAA benchmark(s)	Computing

Aims and intended learning outcomes

Our programmes aim to:

1) enable graduates to exhibit a high level of practical and theoretical skills over a broad range of Computer Science together with a knowledge of currently available techniques and technologies in Human Computer Interaction.
2) explore the principles that support developments in a rapidly changing subject.
3) provide opportunities for students to understand the wide range of research challenges facing Computer Science and Human Computer Interaction, as well as the breadth and depth of research undertaken in this top-rated school, so they are prepared to embark on research here or elsewhere.
4) develop competent professionals able to play a leading part in many different commercial, industrial and academic activities and adapt rapidly to changing technology.
5) meet industry demand for high calibre graduates who will take a lead in continuing technological change.
6) prepare students for the social, organisational and professional context in which they will be working.
7) In addition, the with Industrial Experience programmes aim to: give extensive practical experience of an industrial or business environment where students are able to apply and develop their skills, both technical and personal.
8) In addition, the MEng programmes aim to: prepare high fliers for professional practice in Computer Science by enhanced depth and breadth of study together with increased emphasis on industrial relevance through industrially related group projects.

Intended learning outcomes (UG)

Knowledge & understanding

A1 (UG) Know and understand the essential mathematics relevant to computer science.

A2 (UG) Understand and apply a wide range of principles and tools available to the software engineer, such as design methodologies, choice of algorithm, language, software libraries and user interface techniques

A3 (UG) Demonstrate a grasp of the principles of computer systems, including architecture, networks and communication

A4 (UG) Recognise and appreciate the professional and ethical responsibilities of the practising computer professional, including understanding the need for quality

A5 (UG) Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, databases and computer graphics

A6 (UG) Apply their knowledge of computing in a commercial or industrial context

A7 (UG) Show a critical understanding of the broad context within which Computer Science resides, including issues such as quality, reliability, enterprise, employment law, accounting and health and safety

A8 (UG) Have a comprehensive knowledge and critical awareness of selected specialist fields at the forefront of computer science, studied at masters level

Intellectual (thinking) skills

B1 (UG) Solve a wide range of problems related to the analysis, design and construction of computer systems.

B2 (UG) Design and implement a software or hardware system of significant size

B3 (UG) Identify a range of solutions and critically evaluate and justify proposed design solutions

B4 (UG) Solve computer science problems with pressing commercial or industrial constraints

B5 (UG) Generate an innovative design to solve a problem containing a range of commercial and industrial constraints

Practical skills

C1 (UG) Plan and undertake a major individual project

C2 (UG) Prepare and deliver coherent and structured verbal and written technical reports

C3 (UG) Give technical presentations suitable for the time, place and audience

C4 (UG) Use the scientific literature effectively and make discriminating use of Web resources

C5 (UG) Design, write and debug computer programs in appropriate languages

C6 (UG) Use appropriate computer-based design support tools

C7 (UG) Apply computer science skills in a commercial or industrial environment

C8 (UG) Demonstrate initiative taking, innovation and self-management in an industrially related group project

C9 (UG) Integrate previously acquired skills and apply them to new, demanding situations

Transferable skills

D1 (UG) Display an integrated approach to the deployment of communication skills

D2 (UG) Use IT skills and display mature computer literacy

D3 (UG) Work effectively with and for others

D4 (UG) Strike the balance between self-reliance and seeking help when necessary in new situations

D5 (UG) Display personal responsibility by working to multiple deadlines in complex activities

D6 (UG) Employ discrete and continuous mathematical skills as appropriate

D7 (UG) Demonstrate significantly enhanced group working abilities

D8 (UG) Further develop career plans and personal objectives

D9 (UG) Communicate effectively with non-specialist as well as computer scientist professionals at a range of levels

D10 (UG) Undertake a range of technical roles within a team and be able to display leadership

Intended learning outcomes (PG)

Knowledge and Understanding

A1 (PG) (At all levels) Acquire a knowledge of a range of advanced topics in Computer Science beyond undergraduate level and at the forefront of research

A2 (PG) (At all levels) Understand, apply and develop leading-edge technologies in two of the following themes: Advanced Web Technologies, Computational Biology, Concurrency, Data Management, Health Informatics, Learning from Data, Logic and Automated Reasoning, Management, Mobile Computing, Text Mining, Security, Software Engineering, Visual Computing

A3 (PG) (MSc & PG Diploma) Have a knowledge & understanding of research methodology & practice

Intellectual Skills

B1 (PG) Develop and evaluate original ideas in a research context (MSc and PG Diploma levels only)

B2 (PG) Use methodologies for development of computational systems at an advanced level (All)

B3 (PG) Perform problem-solving in academic and industrial environments (All)

Practical Skills

C1 (PG) Develop applications to satisfy given requirements

C2 (PG) Organise & pursue a scientific or industrial research project (MSc and PG Diploma only)

C3 (PG) Use, manipulate and develop large computational systems

C4 (PG) Perform independent information acquisition and management

Transferable Skills and Personal Qualities

D1 (PG) Work and communicate effectively as a team member

D2 (PG) Prepare and present seminars to a professional standard (MSc level only)

D3 (PG) Understand ethical issues related to professional activities

D4 (PG) Write theses and reports to a professional standard (MSc and PG Diploma)

D5 (PG) Perform independent and efficient time-management

Generic reference to outcome group

G1 (PG) Knowledge and Understanding

G2 (PG) Intellectual Skills

G3 (PG) Practical Skills

G4 (PG) Transferable Skills and Personal Qualities

G5 (PG) Not specified

Teaching, learning and assessment methods

Learning and Teaching on all our programmes aims to combine an understanding of fundamental CS and HCI principles, development of strong practical skills and the group-working, learning and communication skills that are essential for any computing professional.

Course units which involve practical elements all have associated laboratory exercises, usually in timetabled sessions with staff and demonstrator support. Most labs operate a system of face-to-face marking in the lab so that students receive immediate feedback on their work. Units without labs all have regular coursework exercises to support skills development and feedback.

Most units are lecture based, with lab or coursework exercises used to reinforce and enhance knowledge and skills first encountered in lectures. The first year team project deviates significantly from this model and takes an Enquiry Based Learning approach. This unit aims to encourage students to be more actively engaged with, and responsible for, their own learning, to develop skills in problem solving, communication, independent learning, and group work, and to signal the importance we attach to independent learning. This approach is followed up in the second year with the workshop based approach used in the compulsory Software Engineering unit, which also contains a major group working component.

The choice of units offered to students on our programmes is very broad, but they also require depth in study into Human Computer Interaction. The first and second years are reasonably core and include units from Life Sciences, Psychology, and Social Science (specifically Social Statistics). The final years allows more choice. It is intended that by the end of the BSc the students will have been given a deep education in HCI and that if the student chooses to take the MEng year, they will be introduced to a number of specialist domains, or be able to pursue aspects already introduced to a higher level.

All students undertake an individual 3rd year project, supervised by a member of academic task, which usually involves the development of significant software or hardware product. Assessment of this unit involves presentations of plans and results and a major written report

Assessment in almost all units is a combination of lab/coursework and examination.

Learning, Teaching and Assessment of intended learning outcomes

Knowledge and Understanding

Learning and Teaching Processes		Assessment
Lectures (A1, A2, A3, A4, A5, A6, A7)		Unseen written examinations (A1, A2, A3, A4)
Laboratory sessions (A2, A3)		Marked tutorial exercises (A1, A2, A3, A4)
Personal tutorials (A1, A2, A3, A4, A7)		Laboratory reports (A2, A3)
Problem solving classes (A1, A2, A3, A4)		Project reports (individual and group) (A3, A4, A5,A6, A7)
Problem-based learning (A2, A3, A4, A5, A6, A7)		Oral presentations (individual and group) (A3, A4, A5, A6, A7)
Projects (A3, A4, A5, A6, A7)		
Industrial seminars (A4, A5, A6, A7)		

Intellectual Skills

Learning and Teaching Processes		Assessment
Lectures (B1, B2, B4, B5)		Unseen written examinations (B1, B2, B4)
Laboratory sessions (B1, B2)		Marked tutorial exercises (B1, B2)
Personal tutorials (B1, B2, B4)		Laboratory reports (B1, B2)
Problem solving classes (B1, B2, B4)		Project reports (individual and group) (B1, B2, B3,B4, B5)
Problem-based learning (B1, B2, B4)		Oral presentations (individual and group) (B1, B2, B3, B4, B5)
Projects (B1, B2, B3, B4, B5)		

Practical Skills

Learning and Teaching Processes		Assessment
Lectures (C4, C6)		Laboratory reports (C1, C2, C3, C4, C5, C6, C7)
Laboratory sessions (C1, C2, C3, C4, C5, C6, C7)		Project reports (individual and group) (C3, C4, C5,C6)
Projects (C3, C4, C5, C6,C9)		Oral presentations (individual and group) (C6, C8,C9)
Industrial placement (C8,C9)		Industrial placement reports (C8,C9)

Transferable skills

Learning and Teaching Processes		Assessment
Lectures (D3, D4, D5, D7)		Laboratory reports (D1, D3, D5, D6)
Laboratory sessions (D1, D3, D5, D6)		Essays (D2, D3)
Personal tutorials (D1,D2, D3, D4, D7)		Project reports (individual and group) (D1, D2, D3,D4, D5, D6, D7)
Problem solving classes (D4)		Oral presentations (individual and group) (D1, D3, D6, D7, D8)
Problem-based learning (D1, D2, D3, D4, D5, D6)		Industrial placement reports (D8)
Projects (D1, D2, D3, D4, D5, D6, D7)		
Industrial placement (D8)		

Programme structure

 You must take these core units making up a minimum of 120 credits.

Level 1 - compulsory units

All of the units in this pool are mandatory.

Code	Title	Credits
COMP10120	First Year Team Project	20
COMP15111	Fundamentals of Computer Architecture	10
BIOL10832	Excitable Cells	10
COMP13212	Data Science	10
COMP16321	Introduction to Programming 1	20
COMP16412	Introduction to Programming 2	10
PSYC10100	Research Methods	20
PSYC10431	Introduction to Cognition	5
PSYC11222	Brain and Behaviour	10
PSYC11322	Sensation & Perception	5

Level 2 options

You will be automatically enrolled on nine course units which total <u>90 credits</u>.

For the remaining <u>30 credits</u>:

You need to select a minimum of two course units totalling <u>20 credits</u> or a maximum of three course units totalling <u>30 credits</u> from Option Pool 1.

You may select a minimum of zero course units or a maximum of one course unit totalling <u>10 credits</u> from Option Pool 2.

If you take a <u>20 credit</u> whole year course unit you are not permitted to drop this unit when course unit selection reopens at the start of semester 2.

You must ensure your credits are balanced over the academic year (<u>60 credits</u> in each semester).

Level 2 - compulsory units

All of the units in this pool are mandatory.

Code	Title	Credits	Theme
COMP23111	Database Systems	10	Web and Distributed Systems
COMP23311	Software Engineering 1	10	Agile Methods
COMP23412	Software Engineering 2	10	Agile Methods
COMP28112	Distributed Systems	10	Web and Distributed Systems
BIOL22332	Motor Systems for Human Computer Interaction	10	None
BIOL22341	Sensory Systems for Human Computer Interaction	10	None
PSYC21112	Perception & Action	5	None
PSYC21122	Cognitive Neuroscience	10	None
PSYC21181	Cognition	5	None
SOST20022	Essentials of Survey Design & Analysis	20	None

Level 2 - option pool 1

From this option pool choose a maximum of 20 credits
and a minimum of 10 credits.

Code	Title	Credits	Theme
BIOL21261	Endocrinology	10	None
BIOL21321	Membrane Excitability	10	None
BIOL21451	How to Make a Brain	10	None
COMP24011	Introduction to AI	10	None
COMP26020	Programming Languages & Paradigms	20	None
PSYC21061	Statistics and Data Analysis	10	None
SOST20041	Market Research	10	None

Level 2 - option pool 2

From this option pool choose a maximum of 10 credits
and a minimum of 0 credits.

Code	Title	Credits	Theme
COMP22712	Microcontrollers	10	None

COMP24112	Machine Learning	10	None
COMP24412	Knowledge Based AI	10	Natural Language, Representation and Reasoning
COMP25212	System Architecture	10	Computer Architecture
COMP27112	Introduction to Visual Computing	10	Visual Computing

Level 3 options

You will be automatically enrolled on six course units, including the Third Year Project course unit, totalling <u>100 credits</u>.

For the remaining <u>20 credits</u>:

You may choose a minimum of zero course units or a maximum of one course unit totalling <u>10 credits</u> from Option Pool 1.

You may choose a minimum of zero course units or a maximum of one course unit totalling <u>10 credits</u> from Option Pool 2.

You may choose a minimum of zero course units or a maximum of two course units totalling <u>20 credits</u> from External Option Pool 1 (listed as Option Pool 3 below).

If you take a <u>20 credit</u> whole year course unit you are not permitted to drop this unit when course unit selection reopens at the start of semester 2.

You must ensure your credits are balanced over the academic year (<u>60 credits</u> in each semester).

Level 3 - compulsory units

All of the units in this pool are mandatory.

Code	Title	Credits	Theme
COMP30040	Third Year Project Laboratory	40	None
COMP33511	User Experience	10	Interactive Systems Design
MCEL30031	Enterprise Management for Computer Scientists	10	None
MCEL30032	Managing Finance in Enterprises for Computer Scientists	10	None
SOST30022	Advanced Social Network Analysis	20	None

Level 3 - option pool 1

From this option pool choose a maximum of 30 credits
and a minimum of 10 credits.

Code	Title	Credits	Theme
COMP33712	Agile Software Engineering	10	None
COMP34412	Natural Language Systems	10	Natural Language, Representation and Reasoning
COMP35112	Chip Multiprocessors	10	Computer Architecture
COMP36511	Compilers	10	None
COMP37111	Advanced Computer Graphics	10	Visual Computing
COMP38411	Cryptography and System Security	10	Mobile Computing and Networks
COMP32412	The Internet of Things: Architectures and Applications	10	Web and Distributed Systems
COMP34212	Cognitive Robotics	10	None
COMP38211	Documents and Data on the Web	10	None

Level 3 - option pool 2

From this option pool choose a maximum of 20 credits
and a minimum of 0 credits.

Code	Title	Credits	Theme
BIOL21451	How to Make a Brain	10	None
BIOL31681	Clocks, Sleep & the Rhythms of Life	10	None
BIOL31692	Learning, Memory & Cognition	10	None
PSYC31142	The Psychology of Time	10	None
PSYC31242	Understanding Dementia: Brain & Behaviour	20	None
PSYC37111	Emotion	20	None
SOAN30811	Anthropology of Vision, Memory and the Senses	20	None
SOST30031	Modelling Social Inequality	20	None

You will be automatically enrolled on the Summer Industrial Project and MCEL40042: Business Feasibility Study which totals <u>40 credits</u>.

For the remaining <u>90 credits</u>:

You need to select a minimum of one course unit totalling <u>15 credits</u> or a maximum of two course units totalling <u>30 credits</u> from Option Pool 1.

You need to select one course unit totalling <u>15 credits</u> from Option Pool 2.

You may select a minimum of zero course units and a maximum of one course unit totalling <u>15 credits</u> from Option Pool 3.

You need to select a minimum of one course unit totalling <u>15 credits</u> or a maximum of two course units totalling <u>30 credits</u> from Option Pool 4.

You need to select a minimum of one course unit totalling <u>15 credits</u> or a maximum of two course units totalling <u>30 credits</u> from Option Pool 5.

Level 4 - compulsory units

All of the units in this pool are mandatory.

Code	Title	Credits
COMP40901	Summer Industrial Project	25
MCEL40042	Business Feasibility Study	15

Level 4 - option pool 1

From this option pool choose a maximum of 60 credits
and a minimum of 30 credits.

Code	Title	Credits
COMP60411	Modelling Data on the Web	15
COMP60711	Data Engineering	15
COMP61011	Foundations of Machine Learning	15
COMP61021	Representation Learning	15
COMP62421	Querying Data on the Web	15

Level 4 - option pool 2

From this option pool choose a maximum of 60 credits
and a minimum of 30 credits.

Code	Title	Credits
COMP60332	Automated Reasoning and Verification	15
COMP60532	Principles of Digital Biology	15
COMP60542	Introduction to Health Informatics	15
COMP61332	Text Mining	15
COMP61342	Computer Vision	15
COMP62342	Ontology Engineering for the Semantic Web	15
COMP62532	Component-based Software Development	15

Level 4 - option pool 3

From this option pool choose a maximum of 30 credits
and a minimum of 15 credits.

Code	Title	Credits
BIOL60140	Advanced Methods for Biological Sequence Analysis	15
BIOL60771	Advanced Biotechnology	15
BMAN60422	Data Analytics for Business Decision Making	15
BMAN71652	Information and Knowledge Management	15
MCEL63402	Essential Risk Management for Business	15
SOST70011	Introduction to Statistical Modelling	15

Code	Title	C/O	A1 UG	A2 UG	A3 UG	A4 UG	A5 UG	A6 UG	A7 UG	A8 UG	B1 UG	B2 UG	B3 UG	B4 UG	B5 UG	C1 UG	C2 UG	C3 UG	C4 UG	C5 UG	C6 UG	C7 UG	C8 UG	C9 UG	D1 UG	D2 UG	D3 UG	D4 UG	D5 UG	D6 UG	D7 UG	D8 UG	D9 UG	D10 UG
BIOL10832	Excitable Cells	C																																
BIOL21261	Endocrinology	O																																
BIOL21321	Membrane Excitability	O																																
BIOL21451	How to Make a Brain	O																																
BIOL22332	Motor Systems for Human Computer Interaction	C																																
BIOL22341	Sensory Systems for Human Computer Interaction	C																																
BIOL31681	Clocks, Sleep & the Rhythms of Life	O																																
BIOL31692	Learning, Memory & Cognition	O																																
COMP10120	First Year Team Project	C			DA	D					DA	DA					DA	DA	D	DA				DA		DA	DA	DA	DA		DA		D	DA
COMP13212	Data Science	C																																
COMP15111	Fundamentals of Computer Architecture	C			DA						DA									DA														
COMP16321	Introduction to Programming 1	C																																
COMP16412	Introduction to Programming 2	C																																

COMP22712	Microcontrollers	O		D	D							D	D							D	D						D	D					
COMP23111	Database Systems	C				D	DA		D		DA		DA				DA							DA		DA		DA					
COMP23311	Software Engineering 1	C		DA		DA		DA				D	DA	DA	DA					DA	D			DA			DA						
COMP23412	Software Engineering 2	C	D	D	D		DA	D			D	DA	D	D	DA	DA			DA	D	D			DA	DA	DA	D		D		DA			D
COMP24011	Introduction to AI	O																															
COMP24112	Machine Learning	O																															
COMP24412	Knowledge Based AI	O	DA				DA													DA					DA			DA					
COMP25212	System Architecture	O			DA						DA	DA	DA								DA												
COMP26020	Programming Languages & Paradigms	O																															
COMP27112	Introduction to Visual Computing	O	DA																									DA					
COMP28112	Distributed Systems	C																															
COMP30040	Third Year Project Laboratory	C									D	D	D			D	D	D						D	D	D	D	D	D				D	
COMP32412	The Internet of Things: Architectures and Applications	O	D	DA	D		D		D		D		DA		DA	DA								DA									
COMP33511	User Experience	C	DA	D	D		D				DA		D						D										DA				
COMP33712	Agile Software Engineering	O																															
COMP34212	Cognitive Robotics	O					DA			DA		D					D		D	D						D							
COMP34412	Natural Language Systems	O		DA			DA				DA		DA						DA									DA					
COMP35112	Chip Multiprocessors	O		DA	DA		DA				DA		DA				DA			DA													
COMP36511	Compilers	O																															
COMP37111	Advanced Computer Graphics	O	DA	DA			DA				DA																						
COMP38211	Documents and Data on the Web	O																															
COMP38411	Cryptography and System Security	O	D		D	D	D				D		D						D														
MCEL30031	Enterprise Management for Computer Scientists	C																															
MCEL30032	Managing Finance in Enterprises for Computer Scientists	C																															
PSYC10100	Research Methods	C																															
PSYC10431	Introduction to Cognition	C																															
PSYC11222	Brain and Behaviour	C																															
PSYC11322	Sensation & Perception	C																															
PSYC21061	Statistics and Data Analysis	O																															
PSYC21112	Perception & Action	C																															
PSYC21122	Cognitive Neuroscience	C																															
PSYC21181	Cognition	C																															
PSYC31142	The Psychology of Time	O																															
PSYC31242	Understanding Dementia: Brain & Behaviour	O																															
PSYC37111	Emotion	O																															
SOAN30811	Anthropology of Vision, Memory and the Senses	O																															
SOST20022	Essentials of Survey Design & Analysis	C																															
SOST20041	Market Research	O																															
SOST30022	Advanced Social Network Analysis	C																															
SOST30031	Modelling Social Inequality	O																															

Code	Title	C/O	A1 PG	A2 PG	A3 PG	B1 PG	B2 PG	B3 PG	C1 PG	C2 PG	C3 PG	C4 PG	D1 PG	D2 PG	D3 PG	D4 PG	D5 PG	G1 PG	G2 PG	G3 PG	G4 PG	G5 PG
BIOL60140	Advanced Methods for Biological Sequence Analysis	O																				
BIOL60771	Advanced Biotechnology	O																				
BMAN60422	Data Analytics for Business Decision Making	O																				
BMAN71652	Information and Knowledge Management	O																				
COMP40901	Summer Industrial Project	C																				DA
COMP60332	Automated Reasoning and Verification	O	DA	DA			DA	DA			DA											
COMP60411	Modelling Data on the Web	O	DA	DA					DA		DA	DA					DA					
COMP60532	Principles of Digital Biology	O																				DA
COMP60542	Introduction to Health Informatics	O																D	D	D	D	
COMP60711	Data Engineering	O	D	DA		DA		D				D			DA	DA						
COMP61011	Foundations of Machine Learning	O																DA		D	D	
COMP61021	Representation Learning	O	D	D	D	DA		DA	DA			DA		DA				D	D	DA	DA	
COMP61332	Text Mining	O	D	D		D	D	DA	D		D	D									D	
COMP61342	Computer Vision	O																D	DA	DA	D	
COMP62342	Ontology Engineering for the Semantic Web	O	D	DA		D	DA	DA	D			D					D					
COMP62421	Querying Data on the Web	O	DA	DA	DA	DA																
COMP62532	Component-based Software Development	O	D	D			D				D											
MCEL40042	Business Feasibility Study	C																DA	DA	DA	DA	
MCEL63402	Essential Risk Management for Business	O																				
SOST70011	Introduction to Statistical Modelling	O																				

Mechanisms for programme revision

Course units are reviewed annually by the Undergraduate Committee, as part of the Annual Review process, taking into account the results and comments from Course Unit Evaluation Questionnaires. Input is also received from the Teaching Assessment Panel, which has a responsibility for monitoring teaching quality in the School; similar processes are followed in the other participating Schools.

Programmes have been reviewed regularly by groups created specifically for this purpose; the last major review resulted in a new programme portfolio design which started in the first year in 2008-9. The responsibility for leadership of programme review is now the in the hands of the Director of Teaching Strategy (currently Dr Steve Pettifer) who chairs a School Teaching Strategy Committee. On the commencement of each new review, input will be sought from all participating Schools.