DEPARTMENT OF COMPUTER SCIENCE
CHOICE OF MODULES FOR 2020-21

Contents

1. REGISTRATION AND EXAMINATIONS

1.1 Introduction

This document explains your options for the forthcoming academic year. Please note that it covers only those degree programmes, which come within the terms of reference of the Board of Studies in Computer Science.

Please read the rest of this section on registration and examinations very carefully, as it contains important information. The second section lists the modules available for each programme. You will be able to access detailed information about modules on Liverpool Life when you register.

It is not possible at this stage to give information about the timetable or who will be teaching the modules. Timetable information will be available via Liverpool Life before the start of the next academic year.

Please note that the Student Handbooks for 2020/21 will not be published until the start of the academic year. If you have any questions in the meantime, please contact the Student Experience Team (SET) (csstudy@liverpool.ac.uk).

1.2 Projects

BSc and MEng Year 3 Honours Projects (required for all Computer Science programmes, other than Financial Computing)

Honours students registered for the 30 credit project modules are strongly advised to select their project for 2020-21 in September. Further information will be sent nearer the time by the project coordinator, Dr Stuart Thomason.

GG14 BSc Mathematics and Computer Science – Year 3
GG16 BSc Mathematics and Computer Science with a Year in Industry – Year 4

It is highly recommended that students on these programmes select either COMP391 (semester 1) or COMP392 (semester 2) as part of the optional 15 credit project modules as outlined in the programme structure.

GN34 BSc Financial Computing – Year 3
G3N4 BSc Financial Computing with a Year in Industry – Year 4

Students on Financial Computing will take the mandatory group project, COMP396.

MEng Year 4 and Year 5 Honours Projects

G401 MEng Computer Science – Year 4
G404 MEng Computer Science with a Year in Industry – Year 5

Students in the final year of the G401 MEng Computer Science programme will take a mandatory group project in the first semester, COMP591 and a mandatory individual project in the second semester, COMP592.

G40E MEng Computer Science with Education (with recommendation for Qualified Teacher Status)

Students in the final year of the MEng Computer Science with Education (with recommendation for Qualified Teacher Status) programme will take a mandatory project, COMP593.

Students will be informed of the arrangements for these modules at the start of the next academic year.

1.3 Provisional Registration for 2020-21

You will need to register your modules for the 2020-21 academic year on Liverpool Life before **Thursday, 7th May 2020**. Compulsory/required modules will be pre-registered, but you will need to enter any optional modules to give a total of 120 credits, i.e. for both the first and second semester. Your options are outlined in Section 2.2 below. If you require any advice before choosing your modules, please contact your Academic Advisor (you can find the name of your Academic Advisor on Liverpool Life).

Please note that some optional modules have limited spaces, so you are advised to register early to avoid disappointment.

Your registration remains provisional until you pass your year of study and return to the University for the next Academic Year. To complete the registration process, you will have to confirm via Liverpool Life that you have returned to the University when the new term starts. You must do this using a PC either on campus or in the Halls of Residence.

1.4 Passing a Year of Study and the Classification of Honours Degrees

For information on passing your year of study and the classification of honours degrees, please see Chapter 7 of the University Handbook at
www.liv.ac.uk/student-administration/student-administration-centre/student-handbooks/

Please note that the rules which apply to you depend upon your degree programme, i.e. different rules apply to the MEng programmes, programmes with a Year in Industry and other Undergraduate degree programmes.

In particular, if you are on a programme with a year in industry you must pass your second year modules at first attempt in order to be able to progress to the placement year. If you fail to do so, you will have to change to a programme without a year in industry.

If you fail your year of study, the resit examination period will be between **10th and 21st August 2020**. It is your responsibility to keep yourself informed of the arrangements for your resits and to make yourself available at a date/time and place determined by the Department or University.

The resit timetable will be published on Liverpool Life nearer the time. For further information regarding resit examinations please see
https://www.liverpool.ac.uk/student-administration/exams/results/resits/.

Your registration for the following academic year remains provisional until you have passed all examinations.

1.5 Year 2 students registered on a Year of Industry programme

If you are registered for a programme with a year in industry you must pass your second year modules at first attempt in order to be able to progress to the placement year. If you fail to do so, you will have to change to a programme without a year in industry.

In addition, it is very important that you keep the Programme Director and the Student Experience Team informed about the status of your placement applications.

We also advise students to select their optional modules at the same time as students who are not on Year in Industry programmes. However, as this cannot be completed via Liverpool Life, students must email the Student Experience Team via csstudy@liverpool.ac.uk with their module choices, we will not accept these requests before 10:30am on Monday 27th April 2020.

2. MODULES

2.1 Mandatory/Required Modules

The tables below indicate whether a module is mandatory, required or optional. A required module must be taken on a particular programme. Mandatory modules are not only required but you must also achieve a pass mark on the module in order to continue or graduate with honours on that programme.

The pass mark for modules at level 4, 5 and 6 is 40%; for any level 7 modules which are provided as part of the MEng programmes, the pass mark is 50%.

The University's Code of Practice on Assessment, Appendix B states that:
"The University's progression rules (see paragraph 2.2 above) provide that a student may narrowly fail modules totalling 30 credits in study years 0, 1 and 2 and levels of study 1 and 2 and still progress to the next year of study, provided that all the other modules including all mandatory modules have been passed, that the marks in the failed modules are in the range 35-39% and the overall average mark for the modules taken (totalling 120 credits) is at least 40%."
https://www.liverpool.ac.uk/aqsd/academic-codes-of-practice/code-of-practice-on-assessment/

2.2 Choice of Modules

The modules for each programme are listed below and a full list of available modules, including pre-requisites, is given in section 2.3. All modules are 15 credits unless otherwise indicated.

When choosing modules, you should bear in mind the pre-requisites for modules in subsequent years, e.g. when choosing modules for Year 2 keep in mind the pre-requisites of Honours Year modules. The criteria for choosing your modules should be academic; all your modules should form a sensible, coherent package. Please select from the options indicated and enter your choices on Liverpool Life.

COMP335 Communicating Computer Science
Please note that the registration process for this module is different to that of the other modules:
If you are enthusiastic about Computer Science, you are considering a career in teaching it, or if you just want an option module that is a bit different, then COMP335 might be for you. It's a 15-credit module that runs throughout semesters 1 & 2:

- Semester 1: Introduction to the National Curriculum in Computing, Safeguarding, and Lesson Planning
- Semester 2: Delivery of a lesson to local schools during visits to our labs (pupils will be in Years 9 and 10)

Numbers for this module are strictly limited. If you want to be considered for this module, please send a personal statement by **17:00 on Friday 8th May 2020** to the Module Coordinator, Dr Stuart Thomason (S.Thomason@liverpool.ac.uk).

The statement should be a simple email covering:

- Why you want to take this module
- Any relevant experience working with young people (it's okay if you don't have any)
- What you hope to gain from the module
- Thoughts on what topic you might like to teach (you can change your mind later)

G40A (G400) BSc (Hons) Computer Science
G401 MEng (Hons) Computer Science
G403 BSc (Hons) Computer Science with a Year in Industry
G404 MEng (Hons) Computer Science with a Year in Industry

All of the programmes offered by the Department require students to take 120 credits in each year of study. This consists of required, optional and mandatory modules.

Every student on the Computer Science programmes takes the following required modules:

• COMP101 or COMP105 • COMP107 • COMP108 • COMP109 • COMP111 • COMP116 • COMP122 • COMP124	• COMP201 • COMP207 • COMP202 • COMP208	• COMP390 (mandatory)

For Year in Industry/MEng students the following modules are also required

Year in Industry	**MEng only**
• COMP299 • COMP221 (mandatory)	• COMP591 (mandatory) • COMP592 (mandatory)

Students can choose to maintain a mixture of modules throughout your degree or follow a specialism pathway in

- **Artificial Intelligence**
- **Algorithms and Optimisation**
- **Data Science**

For the **Artificial Intelligence** specialism pathway <u>in addition</u> to the required modules listed above students must take • COMP219 and take at least 15 credits of the following • COMP218 • COMP222 • COMP229	For the **Algorithms and Optimisation** specialism pathway <u>in addition</u> to the required modules listed above, students should take at least 30 credits from • COMP218 • COMP220 • COMP226 • COMP284 • COMP285	For the **Data Science** specialism pathway <u>in addition</u> to the required modules listed above, students must take • COMP219 • COMP229 • COMP281 • COMP284
And take at least 60 credits from • COMP304 • COMP305 • COMP310 • COMP313 • COMP318 • COMP329 • COMP337 • COMP338	And take at least 60 credits from • COMP305 • COMP309 • COMP323 • COMP324 • COMP326 • COMP331 • COMP336	And take at least 60 credits from • COMP310 • COMP313 • COMP318 • COMP329 • COMP331 • COMP336 • COMP337 • ELEC319 • ELEC320

MEng final year students should take 60 credits from

- COMP521
- COMP522
- COMP523
- COMP528
- COMP529
- COMP524
- COMP525
- COMP526

More detailed information can be found in the Programme Specifications, students are welcome to contact the Student Experience Team for more details about this.

All of the programmes offered by the Department require students to take 120 credits in each year of study.

(•) *indicates a required module and* (+) *indicates a mandatory module*

G40A/G401/G403/G404
1. Computer Science [without a pathway]
2. Pathway A: Computer Science with Artificial Intelligence
3. Pathway B: Computer Science with Algorithms and Optimisation
4. Pathway C: Computer Science with Data Science

YEAR 2 Computer Science [without a pathway)						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisite	Pre-requisite for*
Semester 1						
COMP201	Software Engineering I (•)	15	5	-	COMP122, COMP107	COMP208, COMP220, COMP228 COMP285, COMP319, COMP313
COMP207	Database Development (•)	15	5	-	COMP122, COMP107	COMP208, COMP283, COMP284, COMP315
G403/G404 only						
COMP221	Planning Your Career (+)	7.5	5	-	COMP107	-
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied						
COMP105**	Programming Language Paradigms	15	4	-	-	-
COMP211	Computer Networks	15	5	-	COMP122, COMP124	COMP212, COMP318
COMP218	Decision, Computation and Language	15	5	-	COMP108 COMP109	-
COMP219	Advanced Artificial Intelligence	15	5	-	COMP116, COMP111 or equivalent	COMP305, COMP313, COMP318, COMP329

COMP228	App Development	15	5	-	COMP122, COMP201	-
COMP229	Introduction to Data Science	15	5	-	COMP109, COMP116	-
Semester 2						
COMP202	Complexity of Algorithms (•)	15	5	-	COMP108, COMP116	COMP309, COMP324
COMP208	Group Software Project (•)	15	5	-	COMP108, COMP107, COMP124, COMP122, or equivalents; COMP201; COMP207; or equivalent	COMP390
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied (if on a Year in Industry Programme (G403) then only choose 22.5 credits)						
COMP212	Distributed Systems	15	5	-	COMP122, COMP124, COMP211	COMP318
COMP220*[1]	Software Development Tools	15	5	-	COMP122; COMP201;	-
COMP222	Principles of Computer Game Design and Implementation	15	5	-	COMP122, COMP111	-
COMP226	Computer-Based Trading in Financial Markets	15	5	-	COMP116	-
COMP232	Cyber Security	15	5	-	COMP211	-
COMP281	Principles of C and Memory Management	7.5	5	-	COMP122	COMP282 COMP327
COMP282	Advanced Object Oriented C Languages	7.5	5	-	COMP281	COMP327
COMP283	Applied Database Management	7.5	5	-	COMP107 COMP207	-
COMP284	Scripting Languages	7.5	5	-	COMP122 COMP107 COMP207	-
COMP285*[1]	Computer Aided Software Development	7.5	5	-	COMP122 COMP201	-

***COMP105 cannot be taken again, if already taken in Year 1*
**[1]COMP220 and COMP285 cannot be taken in conjunction.*

G403 & G404 YEAR 3						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

G40A/G401/G404 Year 3 and G403 Year 4 Computer Science [without a pathway)						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP101, COMP102, COMP104, COMP110 or equivalents; COMP106 and COMP108 recommended	-

Semester 1						
Plus options totalling 45 credits from the following modules provided pre-requisites are satisfied						
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP219	-
COMP305	Biocomputation	15	6	-	-	-
COMP309	Efficient Sequential Algorithms	15	6	-	-	-
COMP319	Software Engineering II				COMP201	
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent mathematical module	COMP326
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111 COMP124 COMP219	-
COMP331	Optimisation	15	6	-	-	-
COMP336	Big Data Analytics	15	6	-	-	-
COMP338	Computer Vision	15	6	-	-	-
ELEC319*	Image Processing	7.5	6	-	-	-
Semester 2						
Plus options totalling 45 credits from the following modules provided pre-requisites are satisfied						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	COMP118 or equivalent; COMP201	-
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-
COMP318	Ontologies and Semantic Web	15	6	-	COMP211, COMP212, COMP219	
COMP324	Complex Information Networks	15	6	-	-	-
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP109 COMP323	-
COMP328	High Performance Computing	15	6	-	-	-
COMP337	Data Mining and Visualisation	15	6	-	-	-
ELEC320	Neural Networks	7.5	6	-	-	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

** Should you take ELEC319, you will also be required to take ELEC320 due to a credit imbalance.*

G401/G404 Final Year Computer Science [without a pathway)						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisites**	**Pre-requisites**	**Pre-requisite for**
Semester 1						
COMP591	MEng Group Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following four modules provided pre-requisites are satisfied						

COMP521	Knowledge Representation	15	7	-	Completion of first 3 years of MEng	-
COMP522	Privacy and Security	15	7	-		-
COMP523	Advanced Algorithmic Techniques	15	7	-		-
COMP528	Multi-Core and Multi-Processor Programming	15	7	-		-
COMP529	Big Data Analytics	15	7	-		-
Semester 2						
COMP592	MEng Individual Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following five modules provided pre-requisites are satisfied						
COMP524	Safety and Dependability	15	7	-	Completion of first 3 years of MEng	-
COMP525	Reasoning about Action and Change	15	7	-		-
COMP526	Applied Algorithmics	15	7	-		-
COMP527	Data Mining and Visualisation	15	7	-		-
COMP575	Computational Intelligence	15	7	-		-
COMP532	Machine Learning and BioInspired Optimisation	15	7	-	COMP219 COMP310	-

G40A (G400) BSc (Hons) Computer Science with Artificial Intelligence

YEAR 2 Pathway A: Computer Science with Artificial Intelligence						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisite	Pre-requisite for*
Semester 1						
COMP201	Software Engineering I (•)	15	5	-	COMP122, COMP107	COMP208, COMP220, COMP228 COMP285,
COMP207	Database Development (•)	15	5	-	COMP122, COMP107	COMP208, COMP283, COMP284, COMP315
G403/G404 only						
COMP221	Planning Your Career (+)	7.5	5	-	COMP107	-
Semester 2						
COMP202	Complexity of Algorithms (•)	15	5	-	COMP108, COMP116	COMP309, COMP324
COMP208	Group Software Project (•)	15	5	-	COMP108, COMP107, COMP124, COMP122, or equivalents; COMP201; COMP207; or equivalent	COMP390
Plus the following compulsory module provided pre-requisites are satisfied						
Semester 1						

COMP219	Advanced Artificial Intelligence (•)	15	5	-	COMP116, COMP111 or equivalent	COMP305, COMP313, COMP318, COMP329
Plus at least 15 credits from the following three modules provided pre-requisites are satisfied						
Semester 1						
COMP229	Introduction to Data Science	15	5	-	COMP109, COMP116	-
COMP218	Decision, Computation and Language	15	5	-	COMP108 COMP109	-
Semester 2						
COMP222	Principles of Computer Game Design and Implementation	15	5	-	COMP122, COMP111	-
Plus up to 30 credits from the following modules provided pre-requisites are satisfied (if on a Year in Industry Programme (G403) then only choose 22.5 credits)						
Semester 1						
COMP105**	Programming Language Paradigms	15	4	-	-	-
COMP211	Computer Networks	15	5	-	COMP122, COMP124	COMP212, COMP318
COMP228	App Development	15	5	-	COMP122, COMP201	-
Semester 2						
COMP212	Distributed Systems	15	5	-	COMP122, COMP124, COMP211	COMP318
COMP220*[1]	Software Development Tools	15	5	-	COMP122; COMP201;	-
COMP226	Computer-Based Trading in Financial Markets	15	5	-	COMP116	-
COMP232	Cyber Security	15	5	-	COMP211	-
COMP281	Principles of C and Memory Management	7.5	5	-	COMP122	COMP282 COMP327
COMP282	Advanced Object Oriented C Languages	7.5	5	-	COMP281	COMP327
COMP283	Applied Database Management	7.5	5	-	COMP107 COMP207	-
COMP284	Scripting Languages	7.5	5	-	COMP122 COMP107 COMP207	-
COMP285*[1]	Computer Aided Software Development	7.5	5	-	COMP122 COMP201	-

***COMP105 cannot be taken again, if already taken in Year 1*
**COMP220 and COMP285 cannot be taken in conjunction.*

G403 & G404 YEAR 3 Pathway A: Computer Science with Artificial Intelligence						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

G40A/G401/G404 Year 3 and G403 Year 4 Pathway A: Computer Science with Artificial Intelligence						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						

COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP101, COMP102, COMP104, COMP110 or equivalents; COMP106 and COMP108 recommended	-
Semester 1						
Plus options totalling 60 credits from the following modules provided pre-requisites are satisfied						
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP219	-
COMP305	Biocomputation	15	6	-	-	-
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111 COMP124 COMP219	-
COMP338	Computer Vision	15	6	-	-	-
Semester 2						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	COMP118 or equivalent; COMP201	-
COMP318	Ontologies and Semantic Web	15	6	-	COMP211, COMP212, COMP219	
COMP337	Data Mining and Visualisation	15	6	-	-	-
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied[*1]						
Semester 1						
COMP309	Efficient Sequential Algorithms	15	6	-	COMP201	-
COMP319	Software Engineering II	15	6	-	COMP201	-
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent mathematical module	COMP326
COMP331	Optimisation	15	6	-	-	-
COMP336	Big Data Analytics	15	6	-	-	-
ELEC319*	Image Processing	7.5	6	-	-	-
Semester 2						
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-
COMP324	Complex Information Networks	15	6	-	-	-
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP109 COMP323	-
COMP328	High Performance Computing	15	6	-	-	-
ELEC320	Neural Networks	7.5	6	-	-	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

** Should you take ELEC319, you will also be required to take ELEC320 due to a credit imbalance.*

G401/G404 Final Year Pathway A: Computer Science with Artificial Intelligence						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisites**	**Pre-requisites**	**Pre-requisite for**
Semester 1						
COMP591	MEng Group Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following four modules provided pre-requisites are satisfied						
COMP521	Knowledge Representation	15	7	-	Completion of first 3 years of MEng	-
COMP522	Privacy and Security	15	7	-		-
COMP523	Advanced Algorithmic Techniques	15	7	-		-
COMP528	Multi-Core and Multi-Processor Programming	15	7	-		-
COMP529	Big Data Analytics	15	7	-		-
Semester 2						
COMP592	MEng Individual Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following five modules provided pre-requisites are satisfied						
COMP524	Safety and Dependability	15	7	-	Completion of first 3 years of MEng	-
COMP525	Reasoning about Action and Change	15	7	-		-
COMP526	Applied Algorithmics	15	7	-		-
COMP527	Data Mining and Visualisation	15	7	-		-
COMP575	Computational Intelligence	15	7	-		-
COMP532	Machine Learning and BioInspired Optimisation	15	7	-	COMP219, COMP310	-

G40A (G400) BSc (Hons) Computer Science with Algorithms and Optimisation

YEAR 2 Pathway B: Computer Science with Algorithms and Optimisation						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisite	Pre-requisite for*
Semester 1						
COMP201	Software Engineering I (•)	15	5	-	COMP122, COMP107	COMP208, COMP220, COMP228 COMP285,
COMP207	Database Development (•)	15	5	-	COMP122, COMP107	COMP208, COMP283, COMP284, COMP315
G403/G404 only						
COMP221	Planning Your Career (+)	7.5	5	-	COMP107	-
Semester 2						
COMP202	Complexity of Algorithms (•)	15	5	-	COMP108, COMP116	COMP309, COMP324

COMP208	Group Software Project (•)	15	5	-	COMP108, COMP107, COMP124, COMP122, or equivalents; COMP201; COMP207; or equivalent	COMP390
Plus at least 30 from the following modules provided pre-requisites are satisfied						
Semester 1						
COMP218	Decision, Computation and Language	15	5	-	COMP108 COMP109	-
Semester 2						
COMP220*[1]	Software Development Tools	15	5	-	COMP122; COMP201;	-
COMP226	Computer-Based Trading in Financial Markets	15	5	-	COMP116	-
COMP284	Scripting Languages	7.5	5	-	COMP122 COMP107 COMP207	-
COMP285*[1]	Computer Aided Software Development	7.5	5	-	COMP122 COMP201	-
Plus up to 30 credits from the following modules provided pre-requisites are satisfied (if on a Year in Industry Programme (G403) then only choose 22.5 credits)						
Semester 1						
COMP105**	Programming Language Paradigms	15	4	-	-	-
COMP211	Computer Networks	15	5	-	COMP122, COMP124	COMP212, COMP318
COMP219	Advanced Artificial Intelligence	15	5	-	COMP116, COMP111 or equivalent	COMP305, COMP313, COMP318, COMP329
COMP228	App Development	15	5	-	COMP122, COMP201	-
COMP229	Introduction to Data Science	15	5	-	COMP109, COMP116	-
Semester 2						
COMP212	Distributed Systems	15	5	-	COMP122, COMP124, COMP211	COMP318
COMP222	Principles of Computer Game Design and Implementation	15	5	-	COMP122, COMP111	-
COMP232	Cyber Security	15	5	-	COMP211	-
COMP281	Principles of C and Memory Management	7.5	5	-	COMP122	COMP282 COMP327
COMP282	Advanced Object Oriented C Languages	7.5	5	-	COMP281	COMP327
COMP283	Applied Database Management	7.5	5	-	COMP107 COMP207	-

***COMP105 cannot be taken again, if already taken in Year 1*

G403 & G404 YEAR 3 Pathway B: Computer Science with Algorithms and Optimisation						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

G40A/G401/G404 Year 3 and G403 Year 4						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP101, COMP102, COMP104, COMP110 or equivalents; COMP106 and COMP108 recommended	-
Semester 1						
Plus at least four modules from the following options, provided pre-requisites are satisfied						
COMP305	Biocomputation	15	6	-	-	-
COMP309	Efficient Sequential Algorithms	15	6	-	COMP201	-
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent mathematical module	COMP326
COMP331	Optimisation	15	6	-	-	-
COMP336	Big Data Analytics	15	6	-	-	-
Semester 2						
COMP324	Complex Information Networks	15	6	-	-	-
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP109 COMP323	-
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied						
Semester 1						
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP219	-
COMP319	Software Engineering II	15	6	-	COMP201	-
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111 COMP124 COMP219	-
COMP338	Computer Vision	15	6	-	-	-
ELEC319*	Image Processing	7.5	6	-	-	-
Semester 2						
Plus options totalling 45 credits from the following modules provided pre-requisites are satisfied						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	COMP118 or equivalent; COMP201	-
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-
COMP318	Ontologies and Semantic Web	15	6	-	COMP211, COMP212, COMP219	
COMP328	High Performance Computing	15	6	-	-	-
COMP337	Data Mining and Visualisation	15	6	-	-	-
ELEC320*	Neural Networks	7.5	6	-	-	-

Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

** Should you take ELEC319, you will also be required to take ELEC320 due to a credit imbalance.*

G401/G404 Final Year Pathway B: Computer Science with Algorithms and Optimisation						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisites**	**Pre-requisites**	**Pre-requisite for**
Semester 1						
COMP591	MEng Group Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following four modules provided pre-requisites are satisfied						
COMP521	Knowledge Representation	15	7	-	Completion of first 3 years of MEng	-
COMP522	Privacy and Security	15	7	-		-
COMP523	Advanced Algorithmic Techniques	15	7	-		-
COMP528	Multi-Core and Multi-Processor Programming	15	7	-		-
COMP529	Big Data Analytics	15	7	-		-
Semester 2						
COMP592	MEng Individual Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following five modules provided pre-requisites are satisfied						
COMP524	Safety and Dependability	15	7	-	Completion of first 3 years of MEng	-
COMP525	Reasoning about Action and Change	15	7	-		-
COMP526	Applied Algorithmics	15	7	-		-
COMP527	Data Mining and Visualisation	15	7	-		-
COMP575	Computational Intelligence	15	7	-		-
COMP532	Machine Learning and BioInspired Optimisation	15	7	-	COMP219 COMP310	-

G40A (G400) BSc (Hons) Computer Science with Data Science

YEAR 2 Pathway C: Computer Science with Data Science						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisite	Pre-requisite for*
Semester 1						
COMP201	Software Engineering I (•)	15	5	-	COMP122, COMP107	COMP208, COMP220, COMP228, COMP285,

COMP207	Database Development (•)	15	5	-	COMP122, COMP107	COMP208, COMP283, COMP284, COMP315
G403/G404 only						
COMP221	Planning Your Career (+)	7.5	5	-	COMP107	-
Semester 2						
COMP202	Complexity of Algorithms (•)	15	5	-	COMP108, COMP116	COMP309, COMP324
COMP208	Group Software Project (•)	15	5	-	COMP108, COMP107, COMP124, COMP122, or equivalents; COMP201; COMP207; or equivalent	COMP390
*For the **Data Sciences** specialism pathway in addition to the above required modules, students must take the below orange modules (45 credits)*						
Semester 1						
COMP219	Advanced Artificial Intelligence	15	5	-	COMP116, COMP111 or equivalent	COMP305, COMP313, COMP318, COMP329
COMP229	Introduction to Data Science	15	5	-	COMP109, COMP116	-
Semester 2						
COMP281	Principles of C and Memory Management	7.5	5	-	COMP122	-
COMP284	Scripting Languages	7.5	5	-	COMP122 COMP107 COMP207	-
Plus 15 credits from the following modules provided pre-requisites are satisfied (if on a Year in Industry Programme (G403) then only choose 7.5 credit)						
Semester 1						
COMP105**	Programming Language Paradigms	15	4	-	-	-
COMP211	Computer Networks	15	5	-	COMP122, COMP124	COMP212, COMP318
COMP218	Decision, Computation and Language	15	5	-	COMP108 COMP109	-
COMP228	App Development	15	5	-	COMP122, COMP201	-
Semester 2						
COMP212	Distributed Systems	15	5	-	COMP122, COMP124, COMP211	COMP318
COMP220*[1]	Software Development Tools	15	5	-	COMP122; COMP201;	-
COMP226	Computer-Based Trading in Financial Markets	15	5	-	COMP116	-
COMP222	Principles of Computer Game Design and Implementation	15	5	-	COMP122, COMP111	-
COMP232	Cyber Security	15	5	-	COMP211	-
COMP281	Principles of C and Memory Management	7.5	5	-	COMP122	COMP282 COMP327
COMP282	Advanced Object Oriented C Languages	7.5	5	-	COMP281	COMP327
COMP283	Applied Database Management	7.5	5	-	COMP107 COMP207	-

COMP285*[1]	Computer Aided Software Development	7.5	5	-	COMP122 COMP201	-

***COMP105 cannot be taken again, if already taken in Year 1*
**COMP220 and COMP285 cannot be taken in conjunction.*

G403 & G404 YEAR 3 Pathway C: Computer Science with Data Science						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

G40A/G401/G404 Year 3 and G403 Year 4 Pathway C: Computer Science with Data Science						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP101, COMP102, COMP104, COMP110 or equivalents; COMP106 and COMP108 recommended	-
Semester 1						
Plus at least 60 credits from the following options modules provided pre-requisites are satisfied						
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111 COMP124 COMP219	-
COMP331	Optimisation	15	6	-	-	-
COMP336	Big Data Analytics	15	6	-	-	-
ELEC319*	Image Processing	7.5	6	-	-	-
Semester 2						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	COMP118 or equivalent; COMP201	-
COMP318	Ontologies and Semantic Web	15	6	-	COMP211, COMP212, COMP219	
COMP337	Data Mining and Visualisation	15	6	-	-	-
ELEC320*	Neural Networks	7.5	6	-	-	-
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied[*1]						
Semester 1						
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP219	-
COMP305	Biocomputation	15	6	-	-	-
COMP309	Efficient Sequential Algorithms	15	6	-	COMP201	-
COMP319	Software Engineering II	15	6	-	COMP201	-
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent mathematical module	COMP326

COMP338	Computer Vision	15	6	-	-	-
Semester 2						
Plus options totalling 45 credits from the following modules provided pre-requisites are satisfied						
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-
COMP324	Complex Information Networks	15	6	-	-	-
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP109 COMP323	-
COMP328	High Performance Computing	15	6	-	-	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

** Should you take ELEC319, you will also be required to take ELEC320 due to a credit imbalance.*

G401/G404 Final Year Pathway C: Computer Science with Data Science						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisites**	**Pre-requisites**	**Pre-requisite for**
Semester 1						
COMP591	MEng Group Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following four modules provided pre-requisites are satisfied						
COMP521	Knowledge Representation	15	7	-	Completion of first 3 years of MEng	-
COMP522	Privacy and Security	15	7	-		-
COMP523	Advanced Algorithmic Techniques	15	7	-		-
COMP528	Multi-Core and Multi-Processor Programming	15	7	-		-
COMP529	Big Data Analytics	15	7	-		-
Semester 2						
COMP592	MEng Individual Project (+)	30	7	-	Completion of first 3 years of MEng	-
Plus options totalling 30 credits from the following five modules provided pre-requisites are satisfied						
COMP524	Safety and Dependability	15	7	-	Completion of first 3 years of MEng	-
COMP525	Reasoning about Action and Change	15	7	-		-
COMP526	Applied Algorithmics	15	7	-		-
COMP527	Data Mining and Visualisation	15	7	-		-
COMP575	Computational Intelligence	15	7	-		-
COMP532	Machine Learning and BioInspired Optimisation	15	7	-	COMP219 COMP310	-

G402 BSc (Hons) Computing with a Year in Industry (to be phased out from 2020/21)

This programme is being phased out to accommodate the new structures with specialism pathways drawn up during a review of the Year 1 and 2 programme provisions. If you would like more information regarding this, then please contact the Student Experience Team via csstudy@liverpool.ac.uk.

The programme of study is split into years and semesters as follows.

Module (•) indicates a required module and (+) indicates a mandatory module

G402 YEAR 4 Computing with a Year in Industry (this structure is running for the final time in 2020/21)						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP122, COMP107 or equivalents, COMP208 and COMP108 recommended	-
Semester 1						
COMP319	Software Engineering II	15	6		COMP201	-
Plus options totalling 30 credits from the following four modules provided pre-requisites are satisfied *[1]						
COMP323	Introduction to Computational Game Theory	15	6	-	COMP116 or equivalent mathematical module	COMP326
COMP327	Mobile Computing	15	6	-	COMP122, COMP124, COMP281, COMP282	-
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111, COMP124, COMP219	-
Semester 2						
COMP313	Formal Methods (•)	15	6	-	COMP109, COMP201, COMP219	-
Semester 2						
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied *[1]						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP315	Technologies for E-Commerce	15	6	-	COMP118 or equivalent; COMP201	
COMP318	Ontologies and Semantic Web	15	6	-	-	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

G40E MEng (Hons) Computer Science with Education (with recommendation for Qualified Teacher Status)

This is an opt-in programme after Year 2 and is in collaboration with Liverpool John Moores University. The aim of the programme is to produce graduates who will have a complete and systematic understanding of the domain of computer science while at the same time gaining Qualified Teacher Status. As such, this will enable students who successfully complete the programme to take up a rewarding career as teachers of Computer Science in schools. The programme is also designed equip students with the necessary skills required with respect to careers open to general Computer Science graduates.

Year 1 (Level 4) and Year 2 (Level 5) are all 15 credit modules at University of Liverpool, unless indicated otherwise.

In order to progress to Year 4, students must achieve an average of 55% in Year 3. More information can be found in the Programme Specification, please contact the Student Experience Team (csstudy@liverpool.ac.uk) for further details.

G40E Year 3						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1						
Initial Teaching Training 60 credits Level 6 (Phase 1 & 2 of ITT school based training)						
EDUC621 [6005ITTUG]	Subject Pedagogy in Computer Science	20	6	-	-	EDUC622 [7136SLTA] EDUC703 [7226SPRAC] EDUC623 [7126SREF]
EDUC603 [6003ITTUG]	Inclusion	20	6	-	-	EDUC622 [7136SLTA] EDUC703 [7226SPRAC] EDUC623 [7126SREF]
EDUC602 [6002ITTUG]	Professional Practice	20	6	-	-	EDUC622 [7136SLTA] EDUC703 [7226SPRAC] EDUC623 [7126SREF]
Semester 2						
Plus options totalling 60 credits from the following modules provided pre-requisites are satisfied.						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	-	-
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-
COMP318	Ontologies and Semantic Web	15	6	-	-	-
COMP324	Complex Information Networks	15	6	-	-	-
COMP328	High Performance Computing	15	6	-	-	-
COMP337	Data Mining and Visualisation	15	6	-	-	-

G40E Final Year						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisites**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP593	Computer Science Education Capstone Project	30	7	-	Completion of first 3 years of MEng	-
Semester 1						
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied.						
COMP521	Knowledge Representation	15	7	-	Completion of first 3 years of MEng	-
COMP522	Privacy and Security	15	7	-		-
COMP523	Advanced Algorithmic Techniques	15	7	-		-
COMP528	Multi-Core and Multi-Processor Programming	15	7	-		-
COMP529	Big Data Analytics	15	7	-		-
Semester 2						
Initial Teaching Training 60 credits Level 7 (Phase 3 of ITT school based training)						
EDUC622 [7136SLTA]	Learning and Teaching and Assessment in the 11-16 context	20	7	-	EDUC621 [6005ITTUG] EDUC603 [6003ITTUG] EDUC602 [6002ITTUG]	-
EDUC703 [7226SPRAC]	Pedagogy in Practice	20	7	-	EDUC621 [6005ITTUG] EDUC603 [6003ITTUG] EDUC602 [6002ITTUG]	-
EDUC623 [7126SREF]	Developing Professional Reflective Practice	20	7	-	EDUC621 [6005ITTUG] EDUC603 [6003ITTUG] EDUC602 [6002ITTUG]	-

G500 (G50A)/G502 BSc (Hons) Computer Information Systems/with a Year in Industry **(only available to continuing students)**

G500 (G50A)/G502 Final Year Computer Information Systems / with a Year in Industry						
Module Code	Module Title	Credit Value	Level	Co-requisites	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP122, COMP107 or equivalents; COMP215 and COMP108 recommended	-
Semester 1						
Plus options totalling 45 credits from the following three modules provided pre-requisites are satisfied						
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP109 COMP111	-
COMP305	Biocomputation	15	6	-	COMP116 COMP219	
COMP319	Software Engineering II (•)	15	6	-	COMP201	-
COMP323	Introduction to Computational Game Theory (•)	15	6	-	COMP116 or equivalent mathematical module	COMP326
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111, COMP124, COMP219	-
Semester 2						
Plus options totalling 45 credits from the following three modules provided pre-requisites are satisfied						
COMP310	Multi-Agent Systems	15	6	-	COMP111	-
COMP313	Formal Methods	15	6	-	COMP109, COMP201, COMP219	
COMP315	Technologies for E-Commerce (•)	15	6	-	COMP207	-
COMP318	Ontologies and Semantic Web (•)	15	6	-	COMP211, COMP212	-
COMP324	Complex Information Networks	15	6	-	-	-
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP116 COMP323	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

G610 BSc (Hons) Software Development (to be phased out after 2020/21 and only available to continuing students)
G611 BSc (Hons) Software Development with a Year in Industry (to be phased out after 2020/21 and only available to continuing students)
GX10 BSc (Hons) Software Development with a Year in China

G610 FINAL YEAR this structure is running for the final time in 2020/21 and only available to continuing students)						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisites**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP101, COMP102, COMP104, COMP110 or equivalents; COMP106 and COMP108 recommended	-
Semester 1						
COMP319	Software Engineering II (•)	15	6	-	COMP201	-
Plus options totaling 30 credits from the following four modules provided pre-requisites are satisfied.						
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent mathematical module	-
COMP327	Mobile Computing	15	6	-	COMP106 COMP281 COMP292	-
COMP329	Autonomous Mobile Robotics	15	6	-	None	-
Semester 2						
Plus options totaling 45 credits from the following four modules provided pre-requisites are satisfied.						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	COMP118 or equivalent; COMP201	-
COMP318	Ontologies and Semantic Web	15	6	-	-	-
COMP324	Complex Information Networks	15	6	-	-	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

GZ10 BSc (Hons) Computer Science with Software Development
G61Z BSc (Hons) Computer Science with Software Development with a Year in Industry
GZ1X BSc (Hons) Computer Science with Software Development with a Year in China

Every student on the Computer Science with Software Development programme takes the following required modules:

• COMP101 or COMP105 • COMP107 • COMP108 • COMP109 • COMP111 • COMP116 • COMP122 • COMP124	• COMP201 • COMP207 • COMP220 • COMP208	• COMP390 (mandatory)

For Year in Industry students the following modules are also required:

- COMP221
- COMP299

In addition to the required modules listed above students should take

in Year 2 at least 30 credits from:	and in Year 3 (or Year 4 for the Year in Industry programme) take at least 60 credits from:
• COMP211 • COMP212 • COMP218 • COMP219 • COMP226 • COMP228 • COMP229 • COMP232 • COMP281 • COMP282 • COMP283 • COMP284	• COMP310 • COMP313 • COMP315 • COMP318 • COMP319 • COMP323 • COMP324 • COMP326 • COMP328 • COMP329 • COMP331 • COMP336 • COMP337 • COMP338 • ELEC319 • ELEC320

GZ10 G61Z & GZ1X Year 2 Computer Science with Software Development / with a Year in Industry / Year in China						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisite	Pre-requisite for*
Semester 1						
COMP201	Software Engineering I (•)	15	5	-	COMP122, COMP107	COMP208, COMP220, COMP228 COMP285, COMP319, COMP313
COMP207	Database Development (•)	15	5	-	COMP122, COMP107	COMP208, COMP283, COMP284, COMP315
GZ10 only						
COMP221	Planning Your Career (+)	7.5	5	-	COMP107	-
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied						
COMP105**	Programming Language Paradigms	15	4	-	-	-
COMP211	Computer Networks	15	5	-	COMP122, COMP124	COMP212, COMP318
COMP218	Decision, Computation and Language	15	5	-	COMP108 COMP109	-
COMP219	Advanced Artificial Intelligence	15	5	-	COMP116, COMP111 or equivalent	COMP305, COMP313, COMP318, COMP329
COMP228	App Development	15	5	-	COMP122, COMP201	-
COMP229	Introduction to Data Science	15	5	-	COMP109, COMP116	-
Semester 2						
COMP220	Software Development Tools	15	5	-	COMP122; COMP201;	-
COMP208	Group Software Project (•)	15	5	-	COMP108, COMP107, COMP124, COMP122, or equivalents; COMP201; COMP207; or equivalent	COMP390
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied (if on a Year in Industry Programme then only choose 22.5 credits)						
COMP202	Complexity of Algorithms (•)	15	5	-	COMP108, COMP116	COMP309, COMP324
COMP212	Distributed Systems	15	5	-	COMP122, COMP124, COMP211	COMP318
COMP222	Principles of Computer Game Design and Implementation	15	5	-	COMP122, COMP111	-
COMP226	Computer-Based Trading in Financial Markets	15	5	-	COMP116	-
COMP232	Cyber Security	15	5	-	COMP211	-
COMP281	Principles of C and Memory Management	7.5	5	-	COMP122	COMP282 COMP327
COMP282	Advanced Object Oriented C Languages	7.5	5	-	COMP281	COMP327

COMP283	Applied Database Management	7.5	5	-	COMP107 COMP207	-
COMP284	Scripting Languages	7.5	5	-	COMP122 COMP107 COMP207	-

***COMP105 cannot be taken again, if already taken in Year 1*

G61Z YEAR 3 Computer Science with Software Development with a Year in Industry						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

GZ10 Year 3, G61Z and GZ1X Year 4 Computer Science with Software Development / with a Year in Industry / with a Year in China						
Module Code	**Module Title**	**Credit Value**	**Level**	**Co-requisite**	**Pre-requisites**	**Pre-requisite for**
Semester 1 and 2						
COMP390	Honours Year Computer Science Project (+)	30	6	-	COMP101, COMP102, COMP104, COMP110 or equivalents; COMP106 and COMP108 recommended	-
Semester 1						
Plus options totalling 45 credits from the following modules provided pre-requisites are satisfied[1]*						
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP219	-
COMP305	Biocomputation	15	6	-	-	-
COMP309	Efficient Sequential Algorithms	15	6	-	COMP201	-
COMP319	Software Engineering II	15	6	-	COMP201	-
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent mathematical module	COMP326
COMP329	Autonomous Mobile Robotics	15	6	-	COMP111 COMP124 COMP219	-
COMP331	Optimisation	15	6	-	-	-
COMP336	Big Data Analytics	15	6	-	-	-
COMP338	Computer Vision	15	6	-	-	-
ELEC319*	Image Processing	7.5	6	-	-	-
Semester 2						
Plus options totalling 45 credits from the following modules provided pre-requisites are satisfied						
COMP310	Multi-Agent Systems	15	6	-	-	-
COMP313	Formal Methods	15	6	-	COMP118 or equivalent; COMP201	-
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-

COMP318	Ontologies and Semantic Web	15	6	-	COMP211, COMP212, COMP219	
COMP324	Complex Information Networks	15	6	-	-	-
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP109 COMP323	-
COMP328	High Performance Computing	15	6	-	-	-
COMP337	Data Mining and Visualisation	15	6	-	-	-
ELEC320*	Neural Networks	7.5	6	-	-	-
Semester 1 and 2						
COMP335***	Communicating Computer Science	15	6	-	-	-

****Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

** Should you take ELEC319, you will also be required to take ELEC320 due to a credit imbalance.*

2.3 Joint Honours

GG14 (GG1A) / GG16 BSc (Hons) Mathematics with Computer Science / with a Year in Industry

This programme combines the theory and practice of mathematics and computer science. The programme provides theoretical knowledge in mathematics that is fundamental to the computer science discipline and introduces concrete applications in computer science. Students will develop initiative by tackling problems in a rational analytic manner and forming balanced judgements.

GG14/GG16 YEAR 2							
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for	Parent Dept
Semester 1							
Choose options totalling 30 credits from the following four modules provided pre-requisites are satisfied							
COMP111	Introduction to Artificial Intelligence	15	4	-	-	Number of second and third year modules	CS
COMP201	Software Engineering I	15	5	-	COMP122 COMP107		CS
COMP207	Database Development	15	5	-	COMP122 COMP107	COMP315	CS
COMP218	Decision, Computation and Language	15	5	-	COMP108 COMP109	-	CS
Plus options from Maths totalling 30 credits from the following eight modules provided pre-requisites are satisfied							
MATH201	Ordinary Differential Equations	15	5	-	MATH101 MATH102 MATH103	Number of third year modules	Maths
MATH225	Vector Calculus with Applications in Fluid Mechanics	15	5	-	MATH102	-	Maths
MATH227	Math Models: Micro-economics & Population Dynamics	15	5	-	MATH101 MATH102 MATH103	-	Maths
MATH241	Metric Spaces and Calculus	15	5	-	MATH101 MATH102 MATH103	-	Maths
MATH243	Complex Functions	15	5	-	MATH101 MATH102 MATH103	-	Maths
MATH244	Linear Algebra and Geometry	15	5	-	MATH101 MATH102 MATH103	-	Maths
MATH261	Introduction to Methods of Operational Research	15	5	-	MATH101 MATH102 MATH103	-	Maths
Semester 2							
COMP202	Complexity of Algorithms (•)	15	5	-	COMP108	Number of third year options	CS
Choose options totalling 15 credits from the following three modules provided pre-requisites are satisfied							

COMP124	Computer Systems	15	4	-	-	-	CS
COMP208	Group Software Project	15	5	-	COMP101 COMP201 COMP207		CS
COMP232	Cyber Security	15	5	-	-	-	CS
Plus options from Maths totalling 30 credits from the following nine modules provided pre-requisites are satisfied							
MATH224	Introduction to the Methods of Applied Mathematics	15	5	-	MATH101 MATH102 MATH103	Number of third year modules	Maths
MATH228	Classical Mechanics	15	5	-	MATH101 MATH102 MATH103 MATH122	Number of third year modules	Maths
MATH247	Commutative Algebra	15	5	-	MATH101 MATH102 MATH103	-	Maths
MATH260	Financial Mathematics II	15	5	-	MATH101 MATH103 MATH162	-	Maths
MATH263	Statistical Theory and Methods I	15	5	-	MATH101 MATH102 MATH103 MATH162	Number of third year modules	Maths
MATH264	Statistical Theory and Methods II	15	5	-	MATH101 MATH103 MATH162	Number of third year modules	Maths
MATH266[1]	Numerical Methods	15	5	-	MATH101 MATH102 MATH103	-	Maths
MATH268	Operational Research: Probabilistic Models	15	5	-	MATH101 MATH102 MATH103 MATH162	-	Maths

[1] *MATH266 is highly recommended*

GG16 YEAR 3 Mathematics with Computer Science with a Year in Industry						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

GG1A Year 3 and GG16 Year 4 Mathematics with Computer Science / with a Year in Industry							
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre- requisite for	Parent Dept
Semester 1							
Choose options totalling 30 credits from the following four modules provided pre-requisites are satisfied							
COMP219	Advanced Artificial Intelligence	15	5	-	COMP116 COMP111 or equivalent	Number of third year modules	CS
COMP304	Knowledge Representation and Reasoning	15	6	-	COMP109 COMP111	-	CS

COMP305	Biocomputation	15	6	-	-	-	CS
COMP309	Efficient Sequential Algorithms	15	6	-	COMP202	-	CS
COMP319	Software Engineering II	15	6	-	COMP201	-	CS
COMP323	Introduction to Computational Game Theory	15	6	-	COMP109 or equivalent Maths module	-	CS
COMP331	Optimisation	15	6	-	COMP109 or equivalent Maths module	-	CS
COMP391[1]	Final Year First Semester 15 Credit Project	15	6	-	-	-	CS
Plus options totalling 30 credits from the following ten modules provided pre-requisites are satisfied							
MATH322	Chaos and Dynamical Systems	15	6	-	MATH101 MATH103 MATH201	-	Maths
MATH323	Further Methods of Applied Mathematics	15	6	-	MATH101 MATH102 MATH103 MATH224	-	Maths
MATH324	Cartesian Tensors and Mathematical Models of Solids and Viscous Fluids	15	6	-	MATH101 MATH102 MATH103	-	Maths
MATH325	Quantum Mechanics	15	6	-	MATH101, MATH102, MATH103, MATH122; MATH201 or MATH224	-	Maths
MATH326	Relativity	15	6	-	MATH101 MATH102 MATH103 MATH122 MATH228	-	Maths
MATH343	Group Theory	15	6	-	MATH101, MATH103, MATH142 or MATH224 or MATH247 helpful	-	Maths
MATH344	Combinatorics	15	6	-	MATH101, MATH102 MATH103	-	Maths
MATH362	Applied Probability	15	6	-	MATH264	-	Maths
MATH363	Linear Statistical Models	15	6	-	MATH263	-	Maths
MATH367	Networks in Theory and Practice	15	6	-	2nd Year Maths	-	Maths
Semester 2							
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied							
COMP310	Multi-Agent Systems	15	6	-	COMP111	-	CS
COMP313	Formal Methods	15	6	-	COMP109, COMP201, COMP219	-	CS
COMP315	Technologies for E-Commerce	15	6	-	COMP207	-	CS
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP323 COMP109 Or equivalent mathematical	-	CS

					module		
COMP392[1]	Final Year Second Semester 15 Credit Project	15	6	-	-	-	CS
Plus options totalling 30 credits from the following modules provided pre-requisites are satisfied							
MATH331	Mathematical Economics	15	6	-	MATH101 MATH102 MATH103; MATH227 preferred	-	Maths
MATH332	Mathematical Biology	15	6	-	MATH101 MATH102 MATH103 MATH201	-	Maths
MATH342	Number Theory	15	6	-	MATH101 MATH103 MATH142	-	Maths
MATH349	Differential Geometry	15	6	-	MATH101 MATH102 MATH103; MATH248 recommended	-	Maths
MATH361	Theory of Statistical Inference	15	6	-	MATH263 MATH264	-	Maths
MATH364	Medical Statistics	15	6	-	-	-	Maths
MATH366	Mathematical Risk Theory	15	6	-	MATH264	-	Maths
MATH399[2]	Projects in Mathematics	15	6	MATH334 MATH302 MATH391	-	-	Maths
Semester 1 and 2							
COMP335*	Communicating Computer Science	15	6	-	-	-	CS

COMP391/2 is highly recommended, but only one of COMP391/2 can be taken.
**Students who wish to choose this module will undergo an interview with the Module Co-ordinator before being selected. If COMP335 is taken, an imbalance of 15 credits between the two semesters is allowed.*

GN34/G3N4 BSc (Hons) Financial Computing/with a Year in Industry

Financial Computing is the provision of financial services and markets using electronic communication and computation. This programme is designed to address the demand for graduates who have both the necessary computer skills and the knowledge of financial products to build finance applications. This programme is based in the Department of Computer Science and is taught in conjunction with the Management School.

GN34/G3N4 YEAR 2							
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for	Parent Dept
Semester 1							
ACFI201	Financial Reporting I (•)	15	5	-	ACFI101	ACFI202 ACFI302 ACFI309	ULMS
ACFI213	Corporate Financial Management for non-specialist students (•)	15	5	-	ACFI102 ACFI103	ACFI314 ACFI341	ULMS
COMP201	Software Engineering I (•)	15	5	-	COMP122, COMP107	COMP215	CS
COMP207	Database Development (•)	15	5	-	COMP122, COMP107	None	CS
Semester 2							
COMP215	eCommerce Group Project (•)	15	5	-	-	COMP396	CS
COMP226	Computer-Based Trading in Financial Markets (•)	15	5	-	-	COMP396	CS
ECON241	Securities Markets (•)	15	5	-	ACFI103 ECON121	-	ULMS
Plus options totalling 15 credits from the following five modules provided pre-requisites are satisfied							
ACFI202	Accounting Theory	15	5	-	ACFI201	-	ULMS
COMP283	Applied Database Management	7.5	5	-	COMP107 COMP207	None	CS
COMP284	Scripting Languages	7.5	5	-	COMP122 COMP107	None	CS
COMP285	Computer Aided Software Development	7.5	5	-	COMP122 COMP201	None	CS
MKIB225	International Business	15	5	-	-	MKIB351	ULMS

G3N4 YEAR 3 Financial Computing with a Year in Industry						
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for
Semester 1 and 2						
COMP299	Industrial Placement Year 3 (+)	120	5	-	-	-

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GN34/G3N4 Final Year							
Module Code	Module Title	Credit Value	Level	Co-requisite	Pre-requisites	Pre-requisite for	Parent Dept
Semester 1 and 2							
COMP396	Honours Year Automated Trading Project (+)	30	6	-	COMP226	-	CS
Semester 1							
ACFI314	Quantitive Business Finance (•)	15	6	-	ACFI213	ACFI341	ULMS
COMP323	Introduction to Computational Game Theory (•)	15	6		COMP109 or COMP116 or equivalent mathematical module	COMP326	CS
Plus options totalling 15 credits from the following five modules provided pre-requisites are satisfied							
ACFI309	Financial Reporting 2	15	6	-	ACFI101 ACFI201	ACFI302	ULMS
COMP319	Software Engineering II	15	6	-	COMP201	-	CS
COMP331	Optimisation	15	6	-	COMP109 or COMP116 or equivalent mathematical module	-	CS
EBUS301	E-Business Models and Strategy	15	6	-	-	-	ULMS
MKIB351	Global Strategic Management	15	6	-	MKIB225	-	ULMS
Semester 2							
ACFI341	Finance and Markets (•)	15	6	-	ACFI314	-	ULMS
COMP315	Technologies for E-Commerce (•)	15	6	-	COMP207	-	CS
Plus options totalling 15 credits from the following three modules provided pre-requisites are satisfied							
ACFI302	Corporate Reporting and Analysis	15	6	-	ACFI101 ACFI201 ACFI309	-	ULMS
COMP310	Multi-Agent Systems	15	6	-	-	-	CS
COMP326	Computational Game Theory and Mechanism Design	15	6	-	COMP323, COMP109 or COMP116 or equivalent mathematical module	-	CS

3. STUDENT COMPLAINTS AND OTHER WORRIES

The University has a code of practice for student complaints. If you are concerned about any aspect of your programme, or have health or family problems, then the first point of contact remains your Academic Advisor or the Student Experience Team.

If you have a complaint about an individual member of staff then in the first instance put your complaint in writing and give or send it to that member of staff; if this fails to resolve the issue, or if you feel unable to deal directly with the member of staff, then you should state your complaint in writing and give or send it to the Head of Department, Professor Boris Konev. You should state your complaint clearly and also what you would like done about it. The Head of Department will deal with the matter as soon as possible.

Full details of the complaints procedure are on the University's website, at http://www.liv.ac.uk/student-administration/student-administration-centre/policies-procedures/complaints/

Appeals against the mark received on a particular assessment or module, against the non-award of a degree, diploma, or certificate, against the classification or other mark of differentiation of a degree, diploma or certificate which has been awarded, or against a decision to make a different award from that which a student was attempting to qualify are governed by a different part of the University's regulations which can be found at http://www.liv.ac.uk/student-administration/student-administration-centre/policies-procedures/appeals/

A complaint of a more general nature could also be addressed via the Staff Student Liaison Committee. The Secretary is Dr Louise Dennis, room G22 in the Ashton building, or you can contact one of the Student Representatives. For contact details, see http://intranet.csc.liv.ac.uk/student/sslc/membersUG.php

If you have a complaint about any of the University's services, then in the first instance please contact the Student Experience Team or speak to any member of staff and they will advise you.