# Computer Science and Maths wIE BSc (Hons) options 2023-2024

<strong>You will be automatically enrolled on these six course units which total <u>100 credits</u>.

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

You need to select one course unit from Option Pool 1 totalling <u>10 credits</u> and one course unit from Option Pool 2 totalling <u>10 credits</u>.</strong>

## Level 1 - compulsory units

All of the units in this pool are mandatory.

| Code | Title | Credits |
|------|-------|---------|
| COMP10120 | First Year Team Project | 20 |
| COMP16321 | Introduction to Programming 1 | 20 |
| COMP16412 | Introduction to Programming 2 | 10 |
| MATH11022 | Linear Algebra | 20 |
| MATH11121 | Math Foundations & Analysis | 20 |
| MATH11711 | Probability 1 | 10 |

*You will be automatically enrolled on these six course units which total 100 credits.*

## Level 1 - option pool 1

From this option pool choose 10 credits.

| Code | Title | Credits |
|------|-------|---------|
| COMP11212 | Fundamentals of Computation | 10 |
| COMP13212 | Data Science | 10 |
| COMP15212 | Operating Systems | 10 |

## Level 1 - option pool 2

From this option pool choose 10 credits.

| Code | Title | Credits |
|------|-------|---------|
| MATH11412 | Introduction to ODEs | 10 |
| MATH11712 | Statistics 1 | 10 |

## Level 2 options

<strong>You will be automatically enrolled on MATH21120 Groups and Geometry which totals <u>20 credits</u>.

For the remaining <u>100 credits</u>:

You need to select a minimum of 2 courses totalling <u>40 credits</u> or a maximum of 3 courses totalling <u>60 credits</u> from Option Pool 1. </strong>COMP23311 and COMP23412 must be taken together and therefore count as one unit.

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

You may select a minimum of zero units and a maximum of one course unit totalling <u>10 credits</u> from Option Pool 3.

You need to select one course unit totalling <u>20 credits</u> from Option Pool 4. </strong>The choice of course unit is determined by the choice made in Year 1 from Option Pool 2.

<strong>You need to select one course unit totalling <u>10 credits</u> from Option Pool 5 (Semester 1).

You need to select one course unit totalling <u>10 credits</u> from Option Pool 6 (Semester 2).

</strong>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 |
|---|---|---|---|
| MATH21120 | Groups and Geometry | 20 | None |

*You will be automatically enrolled on MATH21120 Groups and Geometry which totals 20 credits.*

### Level 2 - option pool 1

From this option pool choose a maximum of 60 credits
and a minimum of 40 credits.

| Code | Title | Credits | Theme |
|---|---|---|---|
| COMP23311 | Software Engineering 1 | 10 | Agile Methods |
| COMP23412 | Software Engineering 2 | 10 | Agile Methods |
| COMP26120 | Algorithms and Data Structures | 20 | Computer Languages |
| COMP26020 | Programming Languages & Paradigms | 20 | None |

*COMP23311 and COMP23412 must be taken together and therefore count as one unit.*

### 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 |
|---|---|---|---|
| COMP21111 | Logic and Modelling | 10 | Rigorous Development |
| COMP23111 | Database Systems | 10 | Web and Distributed Systems |
| COMP24011 | Introduction to AI | 10 | None |

### Level 2 - option pool 3

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

| Code | Title | Credits | Theme |
|---|---|---|---|
| COMP24112 | Machine Learning | 10 | None |
| COMP24412 | Knowledge-based AI | 10 | Natural Language, Representation and Reasoning |
| COMP27112 | Introduction to Visual Computing | 10 | Visual Computing |
| COMP28112 | Distributed Systems | 10 | Web and Distributed Systems |

### Level 2 - option pool 4

From this option pool choose 20 credits.

| Code | Title | Credits | Theme |
|---|---|---|---|
| MATH24420 | PDEs and Vector Calculus | 20 | None |
| MATH27720 | Probability and Statistics 2 | 20 | None |

*The choice of course unit is determined by the choice made in Year 1 from Option Pool 2.*

### Level 2 - option pool 5

From this option pool choose 10 credits.

| Code | Title | Credits | Theme |
|---|---|---|---|
| MATH20521 | Principles of Mathematical Modelling | 10 | None |
| MATH21111 | Metric Spaces | 10 | None |
| MATH24411 | Numerical Analysis | 10 | None |
| MATH27711 | Likelihood and Bayesian Inference | 10 | None |

### Level 2 - option pool 6

From this option pool choose 10 credits.

| Code | Title | Credits | Theme |
|---|---|---|---|
| MATH20912 | Introduction to Financial Mathematics | 10 | None |
| MATH21112 | Rings and Fields | 10 | None |
| MATH24412 | Fluid Mechanics | 10 | None |
| MATH27712 | Stochastic Processes | 10 | None |

## Level 3 options

**You will be automatically enrolled on the Third Year Project course unit which totals <u>30 credits</u>.**

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

You need to select a minimum of one course unit totalling <u>10 credits</u> or a maximum of three course units totalling <u>30 credits</u> from Option Pool 1.

You need to select a minimum of one course unit totalling <u>10 credits</u> or a maximum of three course units totalling <u>30 credits</u> from Option Pool 2.

You need to select a minimum of two course units totalling <u>20 credits</u> and a maximum of four course units totalling <u>40 credits</u> from CM Option Pool 3.

You need to select a minimum of two course units totalling <u>20 credits</u> and a maximum of four course units totalling <u>40 credits</u> from CM Option Pool 4.

Please note that some combinations of course units may not be possible due to timetable clashes.

If you wish to enrol on optional units (COMP or MATH) that are not listed below you must have permission from the Programme Tutor - Dr Andrea Schalk.</strong>

At least <u>40 credits</u> of MATH units in Year 3 must be at level 3.

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

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.</strong>

### Level 3 - compulsory units

All of the units in this pool are mandatory.

| Code | Title | Credits | Theme |
|------|-------|---------|-------|
| COMP30030 | 3rd Year Project (Joint Hons 30 Credits) | 30 | None |

*You will be automatically enrolled on the Third Year Project course unit which totals 30 credits.*

### 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 |
|------|-------|---------|-------|
| COMP31311 | Giving meaning to programs | 10 | None |
| COMP33511 | User Experience | 10 | Interactive Systems Design |
| COMP34111 | AI & Games | 10 | None |
| COMP34711 | Natural Language Processing | 10 | None |
| COMP36111 | Algorithms and Complexity | 10 | Programming and Algorithms |
| COMP37111 | Graphics and Virtual Environments | 10 | Visual Computing |
| COMP38311 | Advanced Distributed Systems | 10 | None |

### Level 3 - option pool 2

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

| Code | Title | Credits | Theme |
|------|-------|---------|-------|
| COMP33312 | Agile Software Pipelines | 10 | None |
| COMP34812 | Natural Language Understanding | 10 | None |
| COMP36212 | Mathematical Systems and Computation | 10 | Programming and Algorithms |
| COMP37212 | Computer Vision | 10 | Visual Computing |
| COMP39112 | Quantum Computing | 10 | None |
| COMP34212 | Cognitive Robotics | 10 | None |
| COMP34312 | Mathematical Topics in Machine Learning | 10 | None |
| COMP34612 | Computational Game Theory | 10 | None |

### Level 3 - option pool 3

From this option pool choose a maximum of 40 credits
and a minimum of 20 credits.

| Code | Title | Credits | Theme |
|------|-------|---------|-------|
| MATH31051 | Topology | 10 | None |

| | | | |
|---|---|---|---|
| MATH32001 | Group Theory | 10 | None |
| MATH32031 | Coding Theory | 10 | None |
| MATH32091 | Combinatorics and Graph Theory | 10 | None |
| MATH33021 | Mathematical Logic | 20 | None |
| MATH34011 | Complex Analysis and Applications | 20 | None |
| MATH35031 | Mathematical Biology | 10 | None |
| MATH36001 | Matrix Analysis | 10 | None |
| MATH36031 | Problem Solving by Computer | 10 | None |

## Level 3 - option pool 4

From this option pool choose a maximum of 40 credits
and a minimum of 20 credits.

| Code | Title | Credits | Theme |
|---|---|---|---|
| MATH30002 | Mathematics Education | 10 | None |
| MATH31042 | Fractal Geometry | 10 | None |
| MATH32012 | Commutative Algebra | 10 | None |
| MATH32052 | Hyperbolic Geometry | 10 | None |
| MATH32062 | Introduction to Algebraic Geometry | 10 | None |
| MATH32072 | Introduction to Number Theory | 10 | None |
| MATH35002 | Viscous Fluid Flow | 10 | None |
| MATH35012 | Wave Motion | 10 | None |
| MATH35062 | Mathematics of a Finite Planet | 10 | None |
| MATH35082 | Symmetry in Nature | 10 | None |
| MATH36022 | Numerical Analysis II | 10 | None |
| MATH36062 | Convex Optimization | 10 | None |
| MATH39032 | Mathematical Modelling in Finance | 10 | None |