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| **Computer Science 2024/2025** |
| **Academic Education** |

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| **Start Date** | **9 September 2024** |
| **End Date** | **4 July 2025** |
| **Level of course** | **A Level Computer Science** |
| **Awarding Body** | **AQA** |
| **Specification** | [AQA A-Level Computer Science Specification](https://filestore.aqa.org.uk/resources/computing/specifications/AQA-7516-7517-SP-2015.PDF)  |

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| YOUR SUBJECT TEACHERS |



Course Teacher and co-ordinator: Gurcharan Girn, Teacher of ICT, F26

**Welcome to Computer Science!**

Your teacher(s) this year will be Gurcharan Girn. You can find us in the main staffroom (F26) or the Computer Science base room (G3).

You can contact us at

Email: gurcharan.girn@derby-college.ac.uk

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| CURRICULM MANAGER |

**Welcome to DCG**

Welcome from your Curriculum manager Patrick Ring who is also a Geology A Level teacher:

             

I’m based in G19 by the student services and will be popping into classes from time to time. I’ll be driving your minibus on trips such as visiting universities and many other extracurricular activities. I’m sure you’ll have a great experience at the Joseph Wright Centre but if you have any problems then come see me and I’ll be able to signpost you to rapid assistance.

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| INTRODUCTION & AIMS OF THE COURSE |

**Introduction**

It is impossible to imagine a world without computers or mobile devices. The A-Level Computer Science course will teach you how to use and program computers to make the world work as it does.

You will learn how to program a computer to behave as you want it to, anything from controlling a robot to making life-saving calculations or building your own version of Amazon. You will learn how computers communicate together to form networks like the Internet.

You will also learn an important life skill: how to formulate and solve problems.  This is a great foundation for being able to solve challenges that lie in the future – not only for computer scientists but also for people in a wide variety of professions.

**What subjects combine together and why?**

Computer Science is used everywhere and in every profession. It works with Maths, Physics, Chemistry, Biology, Psychology, Sociology, Criminology, Law, Art, History, Geography, English, Philosophy, Business, Economics etc.

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| COURSE STRUCTURE |

**Subject content**

[10. Fundamentals of programming](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-programming)

[11. Fundamentals of data structures](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-data-structures)

[12. Fundamentals of algorithms](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-algorithms)

[13. Theory of computation](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/theory-of-computation)

[14. Fundamentals of data representation](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-data-representation)

[15. Fundamentals of computer systems](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-computer-systems)

[16. Fundamentals of computer organisation and architecture](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-computer-organisation-and-architecture)

[17. Consequences of uses of computing](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/consequences-of-uses-of-computing)

[18. Fundamentals of communication and networking](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-communication-and-networking)

[19. Fundamentals of databases](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-databases)

[20 Big Data](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/big-data)

[21. Fundamentals of functional programming](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/fundamentals-of-functional-programming)

[22. Systematic approach to problem solving](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/systematic-approach-to-problem-solving)

[23.Non-exam assessment - the computing practical project](https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517/subject-content-a-level/non-exam-assessment-the-computing-practical-project)

**Assessments**







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| KEY COURSE INFORMATION |

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| **Length of Study** | 3 x 1 hour 40 mins classes per week for 36 weeks in the first year.3 x 1 hour 40 mins classes per week for 32 weeks, plus revision sessions in the final half-term, in the second year. |
| **Your classrooms** | G3 |
| **Key skills you will be developing during the course to be successful** | Study skills including notetaking, listening skills, comprehension, writing, reading text, working with source (Skelton) material, revising, time management, research, practical work and evaluation.You will also apply the concepts of computer science, including logic, algorithms and data representation. Analyse problems through practical experience and writing programs to solve them. Thinking creatively, analytically, logically and critically to see relationships between different aspects of computing. Apply mathematical skills such as Boolean algebra, algorithms, number representations and bases. Articulate the individual (moral), social (ethical), legal and cultural opportunities and risks of digital technology. |
| **What will lessons look like?** | Lesson will consist of a range of individual, group activities, practical programming work along with teacher delivery.  |
| **Informal Assessment Methods** | The A level is awarded from the performance in your NEA and two external exams (see above), at the end of the second year. We require you to complete internal formal assessments (mock exams) in both your first and second year.**NB: Progression from year 1 to year 2 is not automatic but based on your performance in these formal assessments and commitment to your studies.**   |
| **Essential Equipment/ Resources** | You will need a ring binder to organise your notes.Stationary - lined paper, pens, pencils, ruler, highlighters.A scientific calculator – bring it to every lesson.Textbook – available online and from the JWC library AQA A level Computer Science by Bob Reeves - ISBN 139781471839511 |
| **Health and Safety** | Adjust your chairs and screen in each lesson. There is NO eating and drinking near computers. You will be expected to follow the college requirements, including the fire regulations, which will be delivered at the start of the academic year, with regular fire drills to test everyone’s understanding and compliance.  |

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| YEAR PLAN OF STUDY |

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|   | **Year 1**  | **Year 2**  |
| **Teacher**  | **Gurcharan Girn****3 lessons per week**  | **Gurcharan Girn****3 lessons per week**  |
| **Autumn Term Topics**  | **Paper 1*** Python programming fundamentals
* Write/debug/execute simple programs
* Data types, constants and variables
* Programming concepts (sequence, selection and iteration)
* Arithmetic/relational/Boolean operations
* String-handling and lists
* Text and binary files
* Random number generation

**Paper 2*** Number systems and number bases
* Units of information and data conversions
* Unsigned and signed binary arithmetic
* Numbers with a fractional part
* Errors, range and precision
* Graphics, sound, MIDI and other data
* Data compression and encryption
 | **Paper 1:** * Stages of software development
* Data dictionary
* Structured programming
* Object oriented programming
* Recursion
* Data structures (stack, queue, graphs etc.)
* Issue Pre-Release materials for Paper 1 exam

**Paper 2:*** SQL and databases

**NEA:*** Technical skills and coding styles
* Data dictionary and hierarchical charts
* Individual analysis and technical solution
* Test plan and evidence of testing
* Evaluation of individual project
 |
| **Formal Assessment**  | FA1 - 4/11/2024Contents list will be provided through Teams | FA1 7/10/2024FA2 25/11/2024Contents list will be provided through TeamsNEA Final report (See teams for deadlines) |
| **Spring Term Topics**  | **Paper 1*** Functions and procedures
* Structured programming & OOP
* Tracing algorithms
* Exception handling
* Data validation

**Paper 2*** Fundamentals of hardware and software
* Software classifications
* Programming languages and translators
* Relational databases and SQL

**NEA*** Practice spreadsheet and database skills and create small projects using tutorials
* Problem statement and problem investigation
* Data modelling and system objectives
 | **Paper 1:** * Algorithms (searching, sorting, graph traversal, reverse Polish, Dijkstra etc.)
* FSM
* Regular expressions

**Paper 2:*** Internal components of a computer
* Fetch-execute cycle
* Assembly language programming
* Logic gates, truth tables and logical circuits/ expressions
* Input and output device characteristics
* Big data and functional programming
* Consequences of computing
* Computer networks
 |
| **Formal Assessment**  | FA2 – 6/1/2025FA3 – 24/2/2025Contents list will be provided through Teams | FA3 – 27/1/2025 (Mock exam)FA4 -10/3/2025Contents list will be provided through Teams |
| **Summer Term Topics**  | **Paper 1*** Menus and submenus
* GUI and shell-based programming

**Paper 2*** SQL and databases

**NEA*** Analysis
* Technical skills and coding styles
* Individual technical solution
 | **Paper 1:** * Comparing algorithms
* Turing machines
* Practice Skelton program, preliminary materials and EAD
* Prepare for the final exam

**Paper 2:*** Prepare for the final exam
 |
| **Formal Assessment and Year 2 Final Exams**  | FA4 – 21/0/2025Progression exams – 2/6/2025NEA Analysis report (draft) – June 2025Contents list will be provided through Teams | FA5 – 12/05/2025FINAL EXAM – Paper 1 FINAL EXAM – Paper 2 |

Practical work and practical skills are embedded throughout the course.Practical work you complete will count towards your progression.

**For more details and to keep up to date on teaching week by week please use Teams where you will find lesson information, resources and assignments/NEA.**

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|  ASSESSMENT AND FEEDBACK |

**Formal Assessment:**

You will have half termly assessments as shown in the above plan. Each assessment will include a variety of topics previously taught that year and include a mix of knowledge recall, practical and application style questions.

The progression exam will be a formal paper covering all topics taught in the year including programming skills and algorithms.

**NEA (Coursework):**

There are six stages to this process that must be completed.  In stages 1 – 5, a completed draft copy of the code/report should be submitted where further amendments are allowed.  The stage 6 is the production of the final report where no further amendments are permitted.

**Year 1**

* Stage 1 – First draft **analysis** report:  **June 2025.**
* Stage 2 – First draft **technical solution** – **Sept 2025.**
* Stage 3 – Improved **technical solutio**n and draft **evidence of testing** – **Oct 2025.**
* Stage 4 – The **evaluation** – **Nov 2025**.
* Stage 5 – Documented **design** – **Nov 2025.**
* Stage 6 – **The final coursework report** – **Dec 2025 (Final).**

**Year 2**

* Stage 1 – First draft **analysis** report:  **June 2024.**
* Stage 2 – First draft **technical solution** – **Sept 2024.**
* Stage 3 – Improved **technical solutio**n and draft **evidence of testing** – **Oct 2024.**
* Stage 4 – The **evaluation** – **Nov 2024**.
* Stage 5 – Documented **design** – **Nov 2024.**
* Stage 6 – **The final coursework report** – **Dec 2024 (Final).**

**Exact dates will be provided by your teacher at the beginning of Summer Term 2025.**

**Referrals Procedures and Resubmissions Procedures**

You will have a clear plan of what to expect, what assessments will take place during the year and when you can expect these assessments to happen. You can expect your work to be marked and quality assured where appropriate and returned within 15 working days of submission.

Once you have submitted your work, it will be marked and potentially be quality assured by the Internal Quality Assurance team. This is particularly key where the learning outcomes have not been met and a resubmission opportunity has been given.

Where a referral has been given, by the teacher or assessor will provide you with an opportunity to resubmit. However, you must read the feedback carefully to ensure you are clear of what you need to do and where a graded qualification and assessment is in place what you can attempt. This will be time bound and you will be given a re-submission date by your trainer/assessor/lecturer, and you must meet this deadline.

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| ACADEMIC MALPRATICE |

DCG is keen to support students and avoid any cases of Academic malpractice. Awarding Organisations take matters of academic malpractice very seriously and require all schools and colleges to have specific policies and procedures in place to both educate staff and students about malpractice, thus deterring them from committing it, whether intentional or not, and report and investigate any suspected malpractice where it may occur.

While we don’t want to see anyone jeopardise their grades or marks, we must ensure the validity of all qualifications and we must investigate any suspected breaches fully. It is your responsibility to ensure you understand the rules and boundaries:

* You must not copy from someone else or give opportunities to another student to copy from you.
* Any wording taken from a published source must be correctly referenced for example:

(Morrison, 2000, p29).

* Where computer-generated content has been used (AI tools such as ChatGPT) you must reference these correctly for example: ChatGPT 3.0 (<https://openai.com/blog/chatgpt/>), 25/01/2024.
* You may also be required to include a bibliography to support referencing.
* You must also avoid working collaboratively with other students beyond what is permitted as this may be deemed to be collusion.

**Academic Malpractice continued:**

Other examples include:

* Falsification or fabrication of results,
* Deliberate destruction of other student’s work
* Any other act that will give you an unfair advantage. This also relates to not following clear guidance in examinations or assessments where examination conditions exist.

You will be required to complete an Authentication Form on submission of any and all assignments/NEA projects. This will confirm that the work is your own, and that it is referenced appropriately, including the use of AI. Where academic malpractice is suspected, this will be reported to your Team Manager who will conduct an investigation and, where relevant, the Awarding Organisation may also be informed and investigate further. Where malpractice is discovered to have occurred, sanctions may be imposed which could include:

* Zero marks for the work or exam.
* Disqualification from the qualification.
* Disqualification from taking any qualification with that Awarding Organisation often over a set period of time.
* Warnings which can last several years.

For further details and to fully familiarise yourself with JCQ guidance please see the Joint Councils for Qualifications (JCQ) website:

[Information for candidates documents - JCQ Joint Council for Qualifications](https://www.jcq.org.uk/exams-office/information-for-candidates-documents)

Further information can be found on the DCG website:

[**Examination Information - DCG (derby-college.ac.uk)**](https://www.derby-college.ac.uk/student-support/examination-information/)

**Appeals Procedures**

Each Awarding Organisation will have slightly different processes for appealing decisions. Appeals can be made where:

* You believe that the awarding body policies and procedures have not been followed correctly in respect of external quality assurance/standards verification (policies and procedures can be found on the relevant awarding body website).
* You believe that the awarding body policies and procedures have not been followed correctly in respect of qualification decisions (policies and procedures can be found on the relevant awarding body website).
* You disagree with the outcome of your internal appeals procedure (for example, a decision in relation to reasonable adjustments or assessment outcomes).

However, should you, as a student wish to appeal, firstly:

* Contact your teacher and discuss your concerns.

If you are still not satisfied with the outcome, the College would usually make an appeals application on your behalf. This would require your consent. It is possible to apply directly to the Awarding Organisation but only once the College’s internal processes have been followed. At this point you would be informed of the next stages and Awarding Organisation communication link. This is time bound and this will also be communicated to you once the internal appeals process has taken place.

Note: you must be aware that through this process the initial grade can go up, stay the same, or go down.

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| ENRICHMENT AND VISITS |

Trip to University of Lincoln – to be confirmed

Trip to University of Derby – to be confirmed

Introduction to accessibility – to be confirmed in September

Computer Science Webinars – to be confirmed in October

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| SUCCESSFUL LEARNER HABITS |

The 5Ps and College code of conduct.

To be successful at Derby College you will be expected to be:

* Positive
* Polite
* Punctual
* Prepared, and
* Professional in your approach.

Please pay attention to the code of conduct, you will be asked to sign a copy to promise you will abide by the College guidelines: [Code of Conduct (sharepoint.com)](https://studentderbycollegeac.sharepoint.com/sites/StudentHandbook/SitePages/Code-of-Conduct.aspx)

**Derby College has a zero tolerance approach to all forms of bullying, harassment and abuse both online and face-to-face.** [Statement on Sexual Harassment, Bullying and Online Abuse (sharepoint.com)](https://studentderbycollegeac.sharepoint.com/sites/StudentHandbook/SitePages/Statement-on-Bullying.aspx)

If you or anyone else is being bullied, harassed or abused – or if you become aware of discriminatory behaviour or actions taking place – you are encouraged to report this by contacting either your course tutor or <https://studentderbycollegeac.sharepoint.com/sites/Welfare/SitePages/Chat-to-a-Welfare-Officer.aspx> or call our confidential **BULLYING HELPLINE** on **01332 387499.**

What all students can expect from Derby College Group:

* We will listen to you and take your concern seriously and deal with it in a sensitive manner.
* We will give you support and involve you in any decision that affects you.
* We will take disciplinary action against any student who has harmed you and/or breached the college Code of Conduct.

To do well you will need to practice, practice and practice Python programming skills.

At the end of each lesson, read the relevant pages in the textbook and add to your class notes – this does not mean copy it! Read and condense the information. Create a set of flash cards/memory aid of your choice. Rewrite programming solutions to practice programming and problem-solving skills.

**Successful students are ORGANISED!**

Successful students come to class with their correct materials needed for lesson and their folder is organised. For computer science, you will need a separate folder and notebook and always bring pens, pencils and highlighters with you.  Disorganised students tend to struggle with revision and preparing for assessments, make sure you are organised, know where everything is and come to lessons prepared.

**Successful students participate in lessons!**

Raise your hand, volunteer, and do not be afraid to ask questions or challenge statements! Students who participate retain more information and will eventually have a much better understanding of the content, and therefore do better in formative assessments, NEA and exams! Ultimately, these same students will develop a more positive outlook towards education by actively taking part in the learning process. Show up, engage and leave the lesson feeling like you have made a positive contribution!

Finally, successful students make sure they complete the recommended **independent study** guided hours every week! See a list of resources in the next section in this guide for independent learning.

**Checklist:**

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| **Content Activities** |
| * Make sure your class notes are complete and logically organised
* Read through your class notes
* Use resources on Moodle
* Read your course textbook
* Create mind maps or diagrams
* Re-make or re-order your class notes
* Highlight or colour code important content in your class notes
* Create Flashcards
* Create a revision wall to display your learning
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| **Skills Activities**   |
| * Write exam answers under timed conditions
* Read model answers
* Plan answers to past exam questions
* Practice programming skills
* Practice algorithms
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| **Feedback Activities**   |
| * Use a mark scheme to mark your own answers
* Study mark schemes or examiners reports
* Work with other student(s) to test your knowledge
* Compare your own work with a model answer & identify how you can improve your answer
* Write your own exam style questions
* Hand in extra work to your teacher for marking and feedback
* Discuss your progress with your teacher
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| YOUR NEXT STEPS OPPORTUNITIES |

Make an appointment with Careers Team to discuss your next steps opportunities to successfully achieve your chosen study program / course.

**Most common career pathways to study post A Level Computer Science are:**

* Cyber security specialist
* Software engineer
* Programmer
* System analyst
* IT/Computer Science support specialist
* Robotics engineer
* Computer Science Teacher/Lecturer
* Web developer/designer
* Computer networking specialist
* Computer scientist/researcher
* Computer specialist in manufacturing

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| SUBJECT RESOURCES FOR STUDENTS |

**Get the help you need!** Come into the Library or use the resources online and ask any one of the friendly team members for help.  All the Libraries for Learning Team are skilled researchers willing to help you find the information you need and guide you to resources you might not have considered to help you finish those assignments.  On the rare occasions that the library does not have exactly what you want, they will do their best to borrow it through another library.  They can also give you advice on study skills and digital skills via the Skills Hubs too (see Study Skills and Digital Skills on the [Libraries for Learning Pod Page](https://pod.derby-college.ac.uk/course/view.php?id=36)).

Specific resources and recommended reading lists to support your learning can be found below:

* Runestone Academy -  [How to Think like a Computer Scientist: Interactive Edition](https://runestone.academy/ns/books/published/CompSci1B1/index.html)
* Video Tutorials: [A level: AQA Specification Order](https://youtube.com/playlist?list=PLCiOXwirraUDUYF_qDYcZV8Hce8dsE_Ho)
* POD - [Computer Science Year 1 - Paper 1](https://pod.derby-college.ac.uk/course/view.php?id=89)
* POD - [Computer Science Year 2 - Paper 1](https://pod.derby-college.ac.uk/course/view.php?id=95)
* Online textbook: [Textbook](https://ebookcentral.proquest.com/lib/derby-college/reader.action?ppg=1&docID=2131082&tm=1508234526134) - A Level Computer Science
* Wiki Book: <https://en.wikibooks.org/wiki/A-level_Computing/AQA>
* Physics and maths Tutor:
[AQA A-level Computer Science Revision - PMT (physicsandmathstutor.com)](https://www.physicsandmathstutor.com/computer-science-revision/a-level-aqa/)
* Isaac Computer Science - [A level topics — Isaac Computer Science](https://isaaccomputerscience.org/topics/a_level?examBoard=all&stage=all#aqa)
* Video Tutorials: [A level: AQA Specification Order](https://youtube.com/playlist?list=PLCiOXwirraUDUYF_qDYcZV8Hce8dsE_Ho)
* Quizzes: [Paper 1 A Level Computer Science | Quizlet](https://quizlet.com/class/18877495/)
* Quizzes: [Paper 2 A Level Computer Science | Quizlet](https://quizlet.com/class/2267107/)
* SQL practice:  [SELECT basics - SQLZoo](https://sqlzoo.net/wiki/SELECT_basics)

Search for more resources using the library catalogue: [Library Catalogue](https://broomx.cirqahosting.com/cirqa-web-app/)



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| NOTES |