
COMPUTER SCIENCE DEPARTMENT BTEC – DIT KEY STAGE 4 CURRICULUM OVERVIEW

The Computer Science department key stage 4 curriculum is designed to implement the Academy’s vision of “Deepening Learning, Raising Aspiration”, in line with the OAT curriculum strategy of “Teach, Develop, Change”. Our curriculum is carefully designed to build resilience, aspiration and independence in our learners. We carefully design the KS4 curriculum to further develop and build upon prior learning at KS3.

A high-quality rounded computer science education equips pupils to use computational thinking, collaborative online tools and creativity to understand and change the world.

The BTec Technical Award - Digital Information Technology has links with mathematics, science, and design and technology, and provides insights into how digital systems are used. The core of the course, in which pupils are taught the principles of research and project management skills, how digital systems work, and how to put this knowledge to use through creating engaging, user friendly interfaces and analysing how data is used.

Fundamentally, we aim to develop the following in our learners at Ormiston Rivers Academy:

- Understanding and applying the fundamental principles and concepts of computer science, including digital design and development, cyber-security and system notation
- Analysing problems, and having repeated practical experience of designing dashboards and interfaces, in order to modify and improve designs in response to user feedback. These are tools that our students will be able to use in other subject areas to better improve their results as well as the ability to self-evaluate.
- Evaluating and applying information technology, including new or unfamiliar technologies, as our students live in what is classed as a rural area so they are heavily reliant on information technology in most aspects of their lives and are likely to be reliant upon using collaborative online tools for either future education and/or employment.
- Responsibility, competence, confidence and creativity as users of information and communication technology to ensure that our students will become viable competitors in the work force.
- Understanding of how diversity helps build toward more viable and innovative digital products, this is explored with the study of interface and how data is used.

Year
10

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Autumn

Importance of User Interface Designs

Diversity

Project Planning Skills

Diversity

Exploring User Interface Design in real world.

Understanding Design Principles

Designing an efficient User Interface

Learning Project Planning Techniques

Spring

Developing & Evaluating

Diversity

Data and Information

Diversity

Analysing user feedback as part of development

Self-evaluation- Design and Planning

Role and impact of Data Collection and Usage

Spreadsheet Skills – Presentation/ Formulae

Summer

Data Manipulation

Diversity

How Data is used

Diversity

Data Processing Methods

How data is used in research/ business

Draw conclusions from Data and review methods

Impact of Presentation- misinterpretations, bias and inaccuracies

Autumn Half Term 1

Block 1 – Weeks 1 to 3

- Recap of user interfaces: hardware features, software features and human facilitation.
- Investigate Basic and Complex user interfaces
- Students will learn how hardware and software affects user interfaces: operating systems/platforms, screen type/size, types of user input, hardware resources available and emerging technologies
- Understand user accessibility needs: visual, hearing, speech, motor and cognitive needs.

Block 2 – Weeks 5 to 6

- Understanding the importance of demographics: age, beliefs/values, culture and past experiences
- Learning about how Design principles play a part in user interface design such as: visual elements, language and amount of information as well as: layout: consistency, placement of items, user expectations, grouping related items, and keeping the user engaged.

Notes/Links/Interleaving

- Hardware features from prior learning in year 7
 - Building on User interfaces Design introduced into year 8
 - Recalling cultural issues discussed in year 8
- Students will be able to discover how they interact with user interfaces

Additional Higher Content

- Research into the psychology behind creating user interfaces

Autumn Half Term 2

Block 3 – Weeks 7 to 9

- Improving the speed of user interfaces: keyboard shortcuts, reversal of actions, informative feedback and distinguishable objects
- Learning Aim A: assessment practice
- Component 1: Learning aim A: formal assessment.

Block 4 = Weeks 10 to 12

- Introduction to Project methodologies: waterfall, iterative and Agile
- Creating Project planning charts, PERT & GANTT charts and critical path diagrams
- Utilising project planning tools: task lists and mood boards
- Planning the project basics: aims and objectives, audience and purpose
- Defining the project requirements with an understanding of Project constraints
- Create an initial design
- Bebras Challenge- Deepen the concept of Computational thinking (Decomposition) for problem solving.

Notes/Links/Interleaving

- Building upon Design Principle knowledge
- Research skills, the ability to reference work and to produce a piece of work that engages the audience. Spellings

Additional Higher Content

- Students can investigate real world scenarios where project planning exists
- Bebras challenge will enable students that do well to take part in the Oxford University TCS OCC competition

This will complete Component 1 Learning Aim A

Spring Half Term 1

• Block 1 – Weeks 1 to 4

- Learning aim B: assessment practice
- Developing a functional user interface: showing the outputs, inputs and the navigational methods
- Showing the key aspects of a user interface: awareness of intended device, how the requirements have been met, the overall look/feel and the ease of use
- Refining the user interface: presenting the interface to potential users, gaining feedback, refining the interface, documenting changes
- Reviewing the user interface and what areas could be developed further
- Reviewing the project planning techniques and lessons learned.

Block 2 – Weeks 5 to 6

- Learning aim C: assessment practice
- Component 1: Learning aim B and C: formal assessment

Notes/Links/Interleaving

- Importance of feedback
- The ability to modify work
- Self-evaluation this has strong ties to any type of project work

This will complete Component 1 Learning Aim B and C

Additional Higher Content

- Research into how/ if interfaces have determined whether a digital product has succeeded or not.

Spring Half Term 2

Block 3 – Weeks 7 to 9

- Understand the difference between data and information:
- Collecting data: data collection methods, data collection features and big data
- Why quality is important: source, accuracy, age, completeness, amount of detail, format/presentation and volume
- Who uses data modelling: types of sectors and data modelling in decision making

Block 4 - Weeks 10 to 12

- Learn how to present information: text, numbers, tables, graphs/charts and infographics
- Making data suitable for processing: validation: range, type, look up, presence and length checks and verification: proofreading and double entry
- Threats: privacy, fraud, targeting vulnerable groups and inaccurate data
- Learning aim A: assessment practice
- Component 2: Learning aim A: formal assessment

Notes/Links/Interleaving

- Building on basic Spreadsheet skills obtained in Year 7
- This component will show students the importance of how data is collected and used, making them more aware of hoe their data is used in real world.
- Spreadsheet skills- links to business and statistics
- Data collection- links to business (Marketing)

This will Complete Component 2 Learning Aim A

Additional Higher Content

- Practice higher level formulae such as conditional formulae and scenarios where this may be useful

Summer Half Term 1**Block 1 – Weeks 1 to 4**

- Learn and use Data manipulation methods such as logical operations/sorting and filtering
- Understand and use processing methods such as absolute and relative cell referencing
- Understand processing methods: macros, multiple and linking worksheets and alternative views
- Understand how showing information summaries such as totals, counts and percentages are important

Block 2 – Weeks 5 to 6

- Create a dashboard in Excel
- Breaking information down in order to present in diagrams
- Learn and include presentation methods: form controls, graphs/charts, pivot tables, conditional formatting and select data/range
- Include professional presentation features: font size/style/colour, cell borders/shading, graphics, axis label and titles

Notes/Links/Interleaving

- Building on knowledge acquired in year 7
- Spreadsheet skills- links to business and statistics
- Data collection- links to business (Marketing)

Additional Higher Content

- Practice and create Macros <https://www.guru99.com/introduction-to-macros-in-excel.html#5>

Summer Half Term 2**Block 3 – Weeks 7 to 9**

- Learning aim B: assessment practice
- Learn how to draw conclusions: e.g. trends, patterns, anomalies and possible errors
- Making recommendations: e.g. who to target advertisements at, where to deploy staff and how to adapt transport schedules.

Block 4 - Weeks 10 to 12

- The impact of presentation: information being misinterpreted, information being bias and inaccurate conclusions being made
- Learning aim C: assessment practice
- Component 2: Learning aim B and C: formal assessment

Notes/Links/Interleaving

- Spreadsheet skills- links to business and statistics
- Data collection- links to business (Marketing) and how to improve business models

Additional Higher Content

- Research how misrepresentation of data can be detrimental and what effects that can have.

This will Complete Component 2 Learning Aim B and C

Year 11	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Modern Technologies Diversity						Cyber Security					
	Networks and Cloud Computing			Collaborative Technologies			Threats to Data			Prevention and Policies		
Spring	Wider Implications of Digital Systems Diversity			Planning and Communication			Revision					
	Legal and Ethical			Forms of Notation			Revision of topics - personalised revision guides					

Autumn Half Term 1

Block 1 – Weeks 1-3

- Recap: ad-hoc networks, open networks, performance issues and network availability
- Understand Cloud storage: access rights, synchronisation, availability and scalability
- Know Cloud computing: applications, consistency of versions between users, single shared instances and collaboration tools/features
- Discuss the Selection of platforms and services:
- Using cloud and traditional systems together: device synchronisation, online/offline working.
- Choosing cloud technologies: disaster recovery policies and security of data, maintenance, set up and performance considerations

Block 2 – Weeks 4-6

- Collaborative technologies: world teams, multicultural, inclusion, 24/7/365 and flexibility
- Using modern technology when managing teams: communication and collaboration tools
- Communication with stakeholders: communication platforms and selection of appropriate communication channels
- How modern technologies impact on the organisation: infrastructure, demand, availability, 24/7 access and security of distributed/distributed data
- How technology impacts individuals: flexibility, working styles and impact on mental wellbeing
- A: assessment practice/revision

Notes/Links/Interleaving

- Building on prior learning in year 9
- Links to business and how online technologies influence them.
- Discussion of mental wellbeing in the workplace
- Practicing answering long questions- justifying their answers

Additional Higher Content

- Access GCSE Computer science networking content- IP address- data flow
- Practice using online collaboration tools

Autumn Half Term 2

Block 3 – Weeks 7-9

- Understanding why systems are attacked
- Knowing what the external threats to digital systems and data are.
- Realising the internal threats to digital systems and data security
- Understanding what user access restriction is such as: locks, passwords, levels of permitted access, biometrics and two-factor authentication

Block 4 – Weeks 10-12

- Explain how to protect data: firewalls, anti-virus software, device hardening and encryption
- Finding weaknesses and improving system security
- Understanding security policies: who takes responsibility and how to plan for disaster recovery
- Defining security parameters: passwords and policies
- B: assessment practice/revision

Notes/Links/Interleaving

- Building on knowledge acquired in Year 7
- Deepening understanding of how their personal digital devices are protected and also vulnerable to attacks.

Additional Higher Content

- Compete in online Cyber Security Challenges
- Discuss why the NCSC is so important.

Spring Half Term 1

Block 1 – Weeks

- Understand the benefits, drawbacks and responsible use of sharing data
- Consider the impact of technology on the environment and different cultures.
- Explain net neutrality and how this impacts organisations
- Understand the importance of acceptable use policies
- Know the data protection principles, the importance of intellectual property and the criminal use of computer systems:
- C: assessment practice/revision

Block 2 – Weeks

- Introduction to forms of notation
- Learn how to interpret/create data flow diagram and flowcharts
- Learn how to interpret system diagrams, tables and written information
- D: assessment practice

Notes/Links/Interleaving

- Building on topics learnt in year 8 and 9
- As these topics should be a lot of recapping there will be time to revise for the first **practice** externally assessed exam that is in the first week of February
- Focus on command words- State, Justify, Explain, Discuss

Additional Higher Content

- Interpreting and creating flow charts for textual programs
- Researching examples of notation

Spring Half Term 2

Block 3 – Weeks

- Revision of the above topics from the beginning of year 11
- Personalised revision lists based on assessment results for each topic A,B,C and D

Block 4 - Weeks

- Revision of the above topics from the beginning of year 11
- Personalised revision lists based on assessment results for each topic A,B,C and D

Notes/Links/Interleaving

- Practice exam results come out early April enabling more focused revision for students.

Additional Higher Content

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