Cambridge National in IT

What are the aims and intentions of this curriculum?

The aim of our Key Stage 4 Curriculum is to encourage students to: understand and apply the fundamental principles and concepts of IT, including the use of IT in the digital world, Internet of Everything, data manipulation and Augmented Reality. Students will understand, apply and use IT appropriately and effectively for the purpose and audience, develop learning and practical skills that can be applied to real-life contexts and work situations. Students will learn to think creatively, innovatively, analytically, logically and critically. Students will develop independence and confidence in using skills that would be relevant to the IT sector and more widely, plan, design, create, test and evaluate/review IT solutions and products which are fit for purpose. They will understand the importance of meeting user/client requirements and apply design and Human Computer Interface (HCI) considerations appropriate for a defined audience, understand the impacts of digital technologies on the individual, organisation and wider society.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Summer 2	**OCR RO60** **Theme:** **Data manipulation using spreadsheets**	Students will be required to continue the planning of the project. **Sections of the project include** **Planning and designing solutions** • functionality • navigation system • outputs from the system. **Design tools** • use of assets to be used when creating a solution for a client • client requirements for a solution. • how information needs to be presented for the client • alternative methods of presenting information. • the purpose of a main menu	Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users - The characteristics of positive and healthy friendships (in all contexts, including online) including: trust, respect, honesty, kindness, generosity, boundaries, privacy, consent. - Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability Data Manager, Accountants, Banking, Statistician, Market Makers (Stock Brokers).	**Controlled Assessment**

		• navigation to other parts of a client solution • navigation back to the main menu. **Human Computer Interface (HCI) design conventions and principles** • what data needs to be manipulated to meet the client requirements • data provided by the client • the concept that calculations need to be carried out within the solution. • what output is required to meet the client requirements • what information has to be calculated • how will the calculation be carried out – plain English calculations rather than spreadsheet functions • the use of flowcharts to represent calculations to be carried out. • why user aids are included in a spreadsheet solution • the role of data validation • the role of data entry messages. • the variety of outputs that may be required • the use of charts, lists, invoices, reports and worksheets as output in an organisation • chart formatting and labelling • when it is appropriate to use various types of output. • page size • print area on a page • print area • margins • headers/footers		

		• gridlines • orientation • scaling • house style/branding • colour • font size • alignment (vertical and horizontal) • logos/images • cell formatting.		
Autumn 1	**OCR RO60** **Theme:** **Data manipulation using spreadsheets**	**Creating the spreadsheet solution** Students will be required to continue the practical aspects of the project. **Sections of the project include** • explore the manipulation of data using simple formulas • make us of operators (+,-,*,/) and parenthesis introduce the use of cell formatting. • meaningful worksheet names in a workbook • named cells/group of cells • cell references (relative, absolute, named, multi-sheet referencing). • use built in functions SUM, MIN, MAX, AVERAGE, COUNT, IF, COUNTIF, LOOKUP, VLOOKUP, HLOOKUP, AND, OR, DATE, TODAY, SUMIF, SUBTOTAL. • use relational operators including =, <, >, <=, >=, <> • solve formula errors (#DIV/0, #NAME?, #REF! etc). use: • sorting	Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users - The characteristics of positive and healthy friendships (in all contexts, including online) including: trust, respect, honesty, kindness, generosity, boundaries, privacy, consent. - Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability Data Manager, Accountants, Banking, Statistician, Market Makers (Stock Brokers).	**Controlled Assessment**

- filters.

use:
- range check
- text length
- lookup techniques
- limited choice
  - drop down lists
  - radio buttons
- tick list.

consider:
- testing during development
  - technical testing
  - usability testing
- how to record evidence of testing
- documentation to support testing/test plan
- how and when to retest.

use:
- conditional formatting
- importing different file types
- entering different data types
  - Boolean
  - Date
  - Time
  - Text
  - Numeric -
    Integer, Number/Real, Currency, Percentage, Decimal
- further cell formatting such as alignment, border, font, shading, text wrap and currency.

use:
- what-if and goal seek to predict different outcomes
- pivot tables.
- create outputs which are fit for purpose

		• create and format a variety of charts and graphs
		• creating output documents that follow a house style and page layout properties as given
		• ensuring the information in the rows and columns headings are visible or hidden as needed.
		• buttons
		• macros
		• hyperlinks
		• forms
		• a method to configure the spreadsheet to display the menu at start up.
		could:
		• Explore types of test data – extreme, invalid (erroneous) and valid
		• consider what technical testing involves
		   o navigation features
		   o spreadsheet calculations
		   o content included in the output
		• Carry out testing after development
		• Complete test plan documentation, including details of
		   o test number
		   o test description
		   o test data
		   o expected result
		   o actual result
		   o any remedial action carried out
		   o retesting (if required)
		• Explore the appropriateness of test data to be used within a test plan.		

Autumn 2	**OCR RO60** **Theme:** **Data manipulation using spreadsheets**	**Creating the spreadsheet solution** Students will be required to continue the practical aspects of the project. **Sections of the project include**	Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including	**Controlled Assessment**

			collecting and analysing data and meeting the needs of known users - <mark style="background:lime">The characteristics of positive and healthy friendships (in all contexts, including online) including: trust, respect, honesty, kindness, generosity, boundaries, privacy, consent.</mark> - Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability <mark style="background:aqua">Data Manager, Accountants, Banking, Statistician, Market Makers (Stock Brokers).</mark>	
		Evaluating the spreadsheet solution consider: • how suitable the spreadsheet solution is for the requirements of a client • whether the planned spreadsheet solution has been created • how the navigation system meets the client requirements • the effectiveness of the visual style of the solution • to what extent house style has been followed.		
Spring 1	**OCR RO50** **Theme:** **IT in the digital world**	Students will have a break from practical assignments to concentrate on organising their files to enable them to revise for their OCR RO50 written exam. This lesson looks at the importance of how the design of a HCI is affected by the hardware that it will be used on. You could: • Consider non-standard users Identify the input and • Output devices required for each interaction method • Identify all the ways that humans can interact with a computer system In this lesson you could give students a research task to assess how existing HCIs	Students will be given print subject content books to help them revise. - Explain what processing resources are required for a HCI. - Explain how users interact with computer systems. - Explain the advantages and disadvantages of each interaction method. - Explain how different operating systems enable different interactions. - Explain why the HCIs are different to meet the needs of the platforms' users.	

		operate and look on different Operating Systems.
		• Students compare the HCI used on:
		  o Windows based machines
		  o Android based machines
		  o OS/iOS based machines
		• Students compare the difference between mobile and desktop versions
		• Students look at consistencies / differences between the HCIs.
		These activities could be given as a homework to look at devices at home.
			- Explain how different operating systems enable different interactions.
			- How different devices enable different interface designs and interactions.
			- Explain the levels of processing power required for different HCIs.
			- Explain why the HCIs are different to meet the needs of the platforms' users.
			- Explain the levels of processing power required for different HCIs.
			- Explain the advantages and disadvantages of each form of interaction method.	

Spring 2	**OCR RO50** **Theme:** **IT in the digital world**	In small groups students could research how HCI is used in each of the following areas: • Banking • Embedded systems • Entertainment • Fitness • Home appliances • Retail. For each of the areas a group of students could produce • Visualisation Diagrams of at least 3 examples of a HCI that is used in that area A list of the advantages and disadvantages of using • an HCI in the selected examples. The groups can then share the research that they gathered. The research activities could be given as a homework. • consider non-standard users Identify the input and		Guide to flowchart symbols, from basic to advanced (gliffy.com) 3 Basic Types of Mind Maps (edrawsoft.com) Visualisation Diagrams (lakelandscomputing.com) What Is a Wireframe & How to Design Them: A Beginner's Guide (designshack.net) Compare the 10 best mind mapping software of 2021 (thedigitalprojectmanager.com) Flowchart software (lucidchart.com) 10 best online flowchart software of 2021 (thedigitalprojectmanager.com) 10 tools for creating infographics and visualisations (moz.com)

		• output devices required for each interaction method
		This lesson looks at how humans interact with different devices.
		• Identify all the ways that humans can interact with a computer system
		In this lesson you could give students a research task to assess how existing HCIs operate and look on different Operating Systems.
		• Students compare the HCI used on:
		   ○ Windows based machines
		   ○ Android based machines
		   ○ OS/iOS based machines
		• Students compare the difference between mobile and desktop versions
		• Students look at consistencies / differences between the HCIs.
		These activities could be given as a homework to look at devices at home.
		
		Students can continue with their research looking at existing HCI for different digital platforms.
		• Identify the consistencies / differences between the HCI for
		   ○ Database
		   ○ Mobile Apps
		   ○ Spreadsheet
		   ○ Website.
		Explore how data is converted into information.
		• Identify the differences between data and information
		• Identify how data is converted into information
		• Identify the different types of data that exist
		• Knowledge organisers of the different types of data and the characteristics
				Transform the way you design software (mockflow.com)
				
				Life's too short for bad software!
				
				Flow charts
				Create Presentations, Infographics, Design & Video (visme.co)
				
				Wireframes
				The go to free online wireframing tool (wireframe.cc)
				The differences in wireframe fidelity: from low to high fidelity wireframes (blog.hubspot.com)
				
				The Alan Turing Institute human computer interaction theory (turing.ac.uk)
				
				Adobe human computer interaction information (xd.adobe.com) Adobe human computer interaction information)
				
				BBC Bitesize Human computer interfaces (HCI) (bbc.co.uk)
				
				A guide to human computer interface (softwaretesttips.com)

| Summer 1 | OCR RO70

Theme:
Using Augmented Reality to present information | This unit is similar to the RO60 controlled assessment. The advantage of this unit are students are expecting to combine their knowledge of project planning and what they have learned from submitting their Data Manipulation project. The coursework format will be familiar to the students as well as the AR software.

Planning and design considerations

- what augmented reality is and how it is different to virtual reality.
- Get the students to research the different uses of AR in the different sectors and how AR is used.
- the different types of AR

Purpose
User Requirements
Target Audience
Content

Assets

- Assets
- Charts and graphs
- Hyperlinks / weblinks

Text

- Assets
- Audio
- Video
- Photographs / images

Layers / User Interaction

- Triggers
- Object recognition / marker-based | Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users

- Explain how different operating systems enable different interactions.
- The legal rights and responsibilities regarding equality (particularly with reference to the protected characteristics as defined in the Equality Act 2010) and that everyone is unique and equal.
- About online risks, including that any material someone provides to another has the potential to be shared online and the difficulty of removing potentially compromising material placed online.
- Not to provide material to others that they would not want shared further and not to share personal material which is sent to them.
- The characteristics of positive and healthy friendships (in all contexts, including online) including: trust, respect, honesty, kindness, generosity, boundaries, privacy, consent

Programmer
Software Engineer
Robotics Engineer | The RO70 mandatory controlled assessment is refreshed every June. The new release is planned to coincide with the students starting the project with the view of completing the coursework by December to meet the January submission.

Controlled Assessment |

		- Location (GPS) based / Markerless - Superimposition - Layers/user interaction - Action flow - Static interactive - the purpose of layers and how users can interact with augmented reality and navigate through the layers - explain the importance of the action flow to navigate the layers - explain the difference between a static an interactive layer. - the types of triggers that could be used and for what purpose - the type of user interaction for navigating then layers and initiating the triggers - how they have considered the action flow of the AR app design - whether they are using static, interactive or both forms of user interaction and layers. - Components - Flow charts - Mind maps - Mood boards - introduce the final three different types of design tools and their components - explain the advantages and disadvantages of each type of design tool - summarise the software that can be used to create the different design tools		