



ENGINEERING

EXAMINATION STAGE

YEAR 10	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
CONTENT	Unit R113: Electronic Principles Unit R114: Simulate, construct and test electronic circuits	Unit R113: Understand basic electronic principles Unit R114: Be able to use Computer Aided Design (CAD) for circuit simulation and design	Unit R113: Understand the operating principles of electronic components Unit R114: Be able to construct circuits	Unit R113: Know test methods for electronic circuits Unit R114: Be able to test electronic circuits	Unit R113: Understand commercial circuit construction methods	Unit R115: engineering applications of computers Understand how computers are used in engineering design, manufacture and process control
SKILLS	Course outline with general breakdown of course induction, skills to be learnt with the mini projects: 1. Understand basic electronic principles 2. Understand the operating principles of electronic components 3. Know test methods for electronic circuits 4. Understand commercial circuit construction methods 1a. Be able to use Computer Aided Design (CAD) for circuit simulation and design 2a. Be able to construct circuits 3a. Be able to test electronic circuits	In this topic learners will investigate electronic sensing, processing and output subsystems and design and test systems made up of a range of components in each sub-system including: 1 Components and Circuits 2 Principles, Units and Measurement 3 Ohms Law and power law 4 Series and Parallel Resistors and Potential Divider 5 Power Sources and Regulators 1a. Circuit schematics and CAD 2a. Circuit simulation and test using CAD 3a. PCB design using CAD	This topic develops the use of circuit symbols to communicate electronic circuits, by both drawing and analysing them. Learners will investigate circuits by measuring voltage, current and resistance and carry out calculations to predict or check these readings. 1 Cables, Resistors and Capacitors 2 RC Applications 3 Switches 4 Protection 5 Systems Approach 6 Input Devices 7 Output Devices 8 Process Devices 9 DC Motors 10 Smart materials 1a. Practical safe PCB manufacture	This topic provides an opportunity for learners to explore the resistance of series and parallel resistors through calculation and by carrying out tests to measure resistance of simple resistor networks. Learners will investigate the use of voltage dividers in sensing circuits for a range of input components, by carrying out calculations and taking measurements. 1 Electrical Hazards 2 Fault Finding and Test Equipment 1a. Visual inspection of PCBs 2. Using test equipment 3a. Fault finding techniques for electronic circuits	Electronic Skills This topic involves the learners investigating commercial manufacturing through calculation, modelling and by comparing their action. Mathematical Skills There are a number of opportunities for the development of mathematical skills in this topic. These include: 1 Component Types and Surface Mount Technology 2 Circuit Manufacture 3 Quality Assurance for Printed Circuit Boards	1 Computers in the design of new products 2 Computers in manufacturing 3 Computer monitoring of production and managing process control 4 Features of computer controlled automation



Curriculum & Assessment Map

			2a. PCB construction techniques and safe use of tools 3a. Practical safe PCB construction			
ASSESSMENT	Peer and self-assessment Verbal and written feedback Teachers use both formative and summative assessment in accordance with the school's assessment policy.	Peer and self-assessment Verbal and written feedback Teachers use both formative and summative assessment in accordance with the school's assessment policy.	Peer and self-assessment Verbal and written feedback Teachers use both formative and summative assessment in accordance with the school's assessment policy.	Peer and self-assessment Verbal and written feedback Teachers use both formative and summative assessment in accordance with the school's assessment policy.	Peer and self-assessment Verbal and written feedback Teachers use both formative and summative assessment in accordance with the school's assessment policy.	Peer and self-assessment Verbal and written feedback Teachers use both formative and summative assessment in accordance with the school's assessment policy.
USEFUL RESOURCES / GUIDANCE: Seneca - https://www.senecalarning.com/ BBC Bitesize - http://www.bbc.co.uk/schools/gcsebitesize/design/ Blood Hound SSC - http://www.bloodhoundssc.com/ CREST Awards - http://www.britishtscienceassociation.org/crest-awards Design and technology Association - https://www.data.org.uk/ Design Technology Department - http://www.design-technology.org/ Design Technology on the Web - http://www.design-technology.info/home.htm F1 in Schools - http://www.f1inschools.co.uk/ IET Faraday - http://faraday.theiet.org/ Innovators in Mathematics Education - http://www.mei.org.uk/ Institution of Civil Engineers - http://www.ice.org.uk/ Institution of Engineering and Technology - http://www.theiet.org/ Institution of Mechanical Engineers - http://www.imeche.org/ Institution of Structural Engineers - http://www.istructe.org/ James Dyson Foundation - http://www.jamesdysonfoundation.co.uk/ Lego Education - http://education.lego.com/en-gb National STEM Centre - http://www.nationalstemcentre.org.uk/ Royal Academy of Engineering - http://www.raeng.org.uk/education/ Technology Student - http://www.technologystudent.com Sketch Up Online - https://www.sketchup.com/products/sketchup-for-web 2D Design - P:\examination\art_and_technology\Design & Technology\2d_design_student_v2_inc_license Circuit Wizard - P:\Circuit Wizard Student Edition						



Curriculum & Assessment Map

YEAR 11	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
CONTENT	Extended system design and realisation task. Non-exam assessment (NEA) 20% of qualification 40 marks	UNIT R116 - Process Control Systems Understand the application and operation of microcontrollers and microprocessors in engineered products	Creating a circuit & coursework - 20% of total GCSE grade.	Creating a circuit & coursework - 20% of total GCSE grade.	Creating a circuit & coursework - 20% of total GCSE grade.	
SKILLS	Review, modify and refine ideas and responses. Create a meaningful and personal response for the chosen Electronics Project.	System layouts 1 Lesson Element: System layouts 2 Applications of microprocessors and microcontrollers 3 Basic function of component parts of a control system 4 Operation of a control system	Analyse the problem and derive a design specification. Develop and test a range of sub-systems;	Develop, realise and test a final physical system Evaluate the final system against the design specification and suggest improvements.	Develop, realise and test a final physical system; Evaluate the final system against the design specification and suggest improvements.	
ASSESSMENT	Biweekly progress tracking. Guidance/assessment given in line with exam board guidance.	Understand the application and operation of microcontrollers and microprocessors in engineered products	Biweekly progress tracking. Guidance/assessment given in line with exam board guidance.	Biweekly progress tracking. Guidance/assessment given in line with exam board guidance.	All exam work is internally marked and externally modified. Official exam grade. (20% of total GCSE grade)	
USEFUL RESOURCES / GUIDANCE: Seneca - https://www.senecalearning.com/ BBC Bitesize - http://www.bbc.co.uk/schools/gcsebitesize/design/ Blood Hound SSC - http://www.bloodhoundssc.com/ CREST Awards - http://www.britishscienceassociation.org/crest-awards Design and technology Association - https://www.data.org.uk/ Design Technology Department - http://www.design-technology.org/ Design Technology on the Web - http://www.design-technology.info/home.htm F1 in Schools - http://www.f1inschools.co.uk/ IET Faraday - http://faraday.theiet.org/ Innovators in Mathematics Education - http://www.mei.org.uk/ Institution of Civil Engineers - http://www.ice.org.uk/ Institution of Engineering and Technology - http://www.theiet.org/ Institution of Mechanical Engineers - http://www.imeche.org/ Institution of Structural Engineers - http://www.istructe.org/ James Dyson Foundation - http://www.jamesdysonfoundation.co.uk/ Lego Education - http://education.lego.com/en-gb National STEM Centre - http://www.nationalstemcentre.org.uk/ Royal Academy of Engineering - http://www.raeng.org.uk/education/						



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