

## Y12 Curriculum Overview 2019-21

<b>Subject</b>	<b>Exam Board</b>
<b>BTEC Level 3 National Diploma/Extended Diploma in Engineering</b>	<b>Pearson</b>

### Description:

This level 3 qualification provides the students with a broad introduction to the world of engineering. It is designed to build and add to their knowledge in order to give them a solid understanding of some of the most important engineering principles. At level 3, learners will have the opportunity to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life in the engineering sector.

**BTEC Level 3 National Diploma (120-credits)** is broadly equivalent to two GCE A Levels.

**BTEC Level 3 National Extended Diploma (180-credit)** extends and deepens the specialist work-related focus from the Level 3 Diploma. There is potential for the qualification to prepare learners for appropriate direct employment in the vocational sector and it is suitable for those who have decided that they clearly wish to enter a particular specialist area of work. It is broadly equivalent to three GCE A Levels.

### Units:

Unit (number and title)	Unit size (GLH)	Diploma (720 GLH)	Extended Diploma (1080 GLH)
		E	E
1 Engineering Principles	120	M	M
2 Delivery of Engineering Processes Safely as a Team	60	M	M
3 Engineering Product Design and Manufacture	120	M	M
4 Applied Commercial and Quality Principles in Engineering	60	M	M
5 A Specialist Engineering Project	60	M	M
6 Microcontroller Systems for Engineers	120		M
7 Calculus to Solve Engineering Problems	60		M
9 Work Experience in the Engineering Sector	60	O	O
10 Computer Aided Design in Engineering	60	O	O
12 Pneumatic and Hydraulic Systems	60		O
19 Electronic Devices and Circuits	60	O	O
23 Digital and Analogue Electronic Systems	60		O
24 Maintenance of Mechanical Systems	60	O	O
30 Mechanical Measurement and Inspection Technology	60		O
41 Manufacturing Secondary Machining Processes	60	O	O

### Key

Unit assessed externally	M	Mandatory units
E	O	Optional units
Engineering		

### Method of Assessment:

All units are internally assessed in the BTEC qualifications in this specification.

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All assessment for the BTEC qualifications in this specification is criterion referenced, based on the achievement of specified learning outcomes. Each unit within the qualification has specified assessment and grading criteria which are to be used for grading purposes.

A summative unit grade can be awarded at pass, merit or distinction:

- to achieve a 'pass' a learner must have satisfied all the pass assessment criteria
- to achieve a 'merit' a learner must additionally have satisfied all the merit grading criteria
- to achieve a 'distinction' a learner must additionally have satisfied all the distinction grading criteria.
- Learners who complete the unit but who do not meet all the pass criteria are graded 'unclassified'.

**Link to Specification:**

<https://qualifications.pearson.com/en/qualifications/btec-nationals/engineering-2016.html#tab-2>

## Y12 Curriculum Overview 2019-21

<b>Subject</b>	<b>Exam Board</b>
<b>Mathematics</b>	<b>AQA</b>

### **Description:**

A-level Maths provides students with a thorough grounding in the mathematical tools and techniques often needed in the workplace. The logic and reasoning skills developed by studying A-level Maths make sure the qualification is widely respected even in non-mathematical arenas.

A-level Maths is made up of the following areas:

Mathematical argument, language and proof	Numerical methods
Mathematical problem solving	Vectors
Mathematical modelling	Statistical sampling
Proof	Data presentation and interpretation
Algebra and functions	Probability
Coordinate geometry in the (x,y) plane	Statistical distributions
Sequences and series	Statistical hypothesis testing
Trigonometry	Quantities and units in mechanics
Exponentials and logarithms	Kinematics
Differentiation	Forces and Newton's laws
Integration	Moments

### **Knowledge/skills gained:**

- understanding of the mathematics that underpin many aspects of our lives
- the ability to apply a range of mathematical skills to different situations
- acute logical thinking and problem-solving abilities
- the ability to process, interpret and analyse information.

A-level Maths provides a foundation for further studies in a variety of subjects including Science and Engineering.

### **Method of Assessment:**

All units are of equal weighting and are assessed by an exam of 2 hours.

<b>Paper 1</b>
<p><b>What's assessed</b></p> <p>Any content from:</p> <ul style="list-style-type: none"> <li>• A: Proof</li> <li>• B: Algebra and functions</li> <li>• C: Coordinate geometry</li> <li>• D: Sequences and series</li> <li>• E: Trigonometry</li> <li>• F: Exponentials and logarithms</li> <li>• G: Differentiation</li> <li>• H: Integration</li> <li>• I: Numerical methods</li> </ul>
<p><b>How It's assessed</b></p> <ul style="list-style-type: none"> <li>• Written exam: 2 hours</li> <li>• 100 marks</li> <li>• 33½ % of A-level</li> </ul>
<p><b>Questions</b></p> <p>A mix of question styles, from short, single-mark questions to multi-step problems.</p>

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### Paper 2

#### What's assessed

Any content from Paper 1 and content from:

- J: Vectors
- P: Quantities and units in mechanics
- Q: Kinematics
- R: Forces and Newton's laws
- S: Moments

#### How it's assessed

- Written exam: 2 hours
- 100 marks
- 33⅓ % of A-level

#### Questions

A mix of question styles, from short, single-mark questions to multi-step problems.

### Paper 3

#### What's assessed

Any content from Paper 1 and content from:

- K: Statistical sampling
- L: Data presentation and interpretation
- M: Probability
- N: Statistical distributions
- O: Statistical hypothesis testing

#### How it's assessed

- Written exam: 2 hours
- 100 marks
- 33⅓ % of A-level

#### Questions

A mix of question styles, from short, single-mark questions to multi-step problems.

#### Link to Specification:

<https://www.aqa.org.uk/subjects/mathematics/as-and-a-level/mathematics-7357>

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Subject	Exam Board
<b>Chemistry</b>	<b>AQA</b>
<p><b>Description:</b></p> <p>This course comprises of mixture of physical, organic and inorganic chemistry. In the first year students will start off looking at the structure of the atom then move on to bonding and how elements and compounds interact. In the second year students will be learning thermodynamics, rate equations, and electrode potentials and many more enriching chemistry topics. There is a strong mathematical element to A Level Chemistry you will be learning to calculate moles, rates of reaction, Hess's Law and equilibrium constant <math>K_p</math>. Students will need to complete various practical skills assessment which focus on improving students' lab skills these range from making up a volumetric solution too measuring the EMF of an electrochemical cell.</p> <p>Subject content:</p> <ul style="list-style-type: none"><li>• Physical chemistry</li><li>• Inorganic chemistry</li><li>• Organic chemistry</li></ul>	
<p><b>Method of Assessment:</b></p> <p>This qualification is linear, which means that students will sit all the exams at the end of their A-level course.</p> <p><b>Paper 1 Physical and Inorganic chemistry</b> Written examination (2 hours - 105 marks)</p> <p><b>Paper 2 Physical and Organic chemistry</b> Written examination (2 hours - 105 marks)</p> <p><b>Paper 3 Practical skills</b> Written examination (2 hours - 90 marks)</p>	
<p><b>Link to Specification:</b> <a href="https://www.aqa.org.uk/subjects/science/as-and-a-level/chemistry-7404-7405">https://www.aqa.org.uk/subjects/science/as-and-a-level/chemistry-7404-7405</a></p>	

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Subject	Exam Board
<b>Foundation Technical Award in Cyber Security</b>	<b>AQA</b>
<p><b>Description:</b></p> <p>The UK is now in a situation where very few days will pass without some sort of news article on a breach of IT security somewhere within businesses, the public sector, education, finance or charitable organisations. This often involves data theft, or data loss, as well as intentional acts of sabotage, hacking or other criminal activity. For this reason, the requirement by industry for cyber security staff is on the increase. However, a good cyber security specialist needs to build on a thorough understanding of computers, how they communicate and how networks are put together.</p> <p>Studying this qualification will give you a variety of options. You could choose to use your achievements to contribute towards the larger IT: Cyber Security and Security Administration programme, or you could use the qualification to contribute towards university entry. Even if you opt to go into an unrelated role in the workplace, this qualification will provide the basic underpinning technical learning that will allow you to help with the organisation's network, its configuration and its security. This will mean that you have direct or additional skills to offer an employer. You will study the course as part of a learning programme that could also include other subjects, but will help you to develop the skills and knowledge that are needed in the fast moving IT sector.</p> <p>You will be working on industry focused assignments to help you prepare for work; this will help you to talk confidently about your knowledge and skills in an interview situation.</p> <p>Subject content:</p> <ul style="list-style-type: none"><li>• Unit 1: Fundamental principles of computing</li><li>• Unit 2: Communication technologies</li><li>• Unit 3: Developing and maintaining computer networks</li><li>• Unit 4: Network threats and vulnerabilities</li></ul>	
<p><b>Method of Assessment:</b></p> <ul style="list-style-type: none"><li>• Unit 1: Fundamental principles of computing (2 hour external examination)</li><li>• Unit 2: Communication technologies (2 hour external examination)</li><li>• Unit 3: Developing and maintaining computer networks (internally assessed)</li><li>• Unit 4: Network threats and vulnerabilities (internally assessed)</li></ul> <p>Each unit makes up 25% of the overall qualification.</p>	
<p><b>Link to Specification:</b></p> <p><a href="https://www.aqa.org.uk/subjects/computer-science-and-it/tech-level/it-cyber-security-2016">https://www.aqa.org.uk/subjects/computer-science-and-it/tech-level/it-cyber-security-2016</a></p>	

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<b>Computer Science</b>	<b>AQA</b>
<p><b>Description:</b></p> <p>Computer Science A-Level is for all students excited about learning how to code and how computers work.</p> <p>This course has a two unit structure that is delivered over two years. Students learn an exciting range of practical skills ready for their online Paper 1 exam in the second year of the course. Paper 1 has a heavy emphasis on coding skills using C#, as well as theoretical knowledge of programming, data structures, algorithms and computation. Paper 2 focusses on data representation, computer systems, architecture, databases, big data, problem solving, how a computer works and communication and networking. This is a paper-based exam also taken at the end of the second year of the course. Finally students complete a non-examined assessment similar to past coursework projects where students solve a problem, usually with a coding-based solution and produce a written project write up. This is completed at the end of the first year of the course.</p> <p>Subject content:</p> <ul style="list-style-type: none"><li>• Fundamentals of programming</li><li>• Fundamentals of data structures</li><li>• Fundamentals of algorithms</li><li>• Theory of computation</li><li>• Fundamentals of data representation</li><li>• Fundamentals of computer systems</li><li>• Fundamentals of computer organisation and architecture</li><li>• Consequences of uses of computing</li><li>• Fundamentals of communication and networking</li><li>• Fundamentals of databases</li><li>• Big Data</li><li>• Fundamentals of functional programming</li><li>• Systematic approach to problem solving</li><li>• Computing practical project</li></ul>	
<p><b>Method of Assessment:</b></p> <p>This qualification is linear, which means that students will sit all the exams at the end of their A-level course.</p> <p><b>Paper 1</b> On-screen examination (2 hours 30 mins – 40% of A Level)</p> <p><b>Paper 2</b> Written examination (2 hours 30 mins - 40% of A Level)</p>	

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### Practical project

Non-examined assessment (20% of A Level)

### Link to Specification:

<https://www.aqa.org.uk/subjects/computer-science-and-it/as-and-a-level/computer-science-7516-7517>

Subject	Exam Board
<b>BTEC Level 3 National Extended Certificate/Diploma in Information Technology</b>	<b>Pearson</b>
<p><b>Description:</b></p> <p>BTEC qualifications in this specification have been developed in the IT sector to:</p> <ul style="list-style-type: none"><li>• give education and training for IT employees</li><li>• give IT employees opportunities to achieve a nationally recognised level 3 vocationally-specific qualification</li><li>• give full-time learners the opportunity to enter employment in the IT sector or to progress to vocational qualifications such as the Pearson BTEC Higher Nationals in Computing and Systems Development</li><li>• give learners the opportunity to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life.</li></ul> <p>The BTEC courses actively encourage students to work independently and teachers are there to guide and facilitate learning. Some lessons are still delivered in a more traditional way due to their content, however great emphasis is out on independent guided tasks.</p> <p><b>BTEC Level 3 National Extended Certificate in Information Technology</b> is equivalent to one GCE A Level.</p> <p><b>BTEC Level 3 National Diploma in Information Technology</b> is equivalent to two GCE A Levels.</p> <p><b>Units:</b></p> <ul style="list-style-type: none"><li>• <b>Unit 1</b> Communication and Employability Skills for IT</li><li>• <b>Unit 2</b> Computer Systems</li><li>• <b>Unit 16</b> Procedural Programming</li><li>• <b>Unit 17</b> Project Planning with IT</li><li>• <b>Unit 34</b> Business Resources</li><li>• <b>Unit 42</b> Spreadsheet Modelling</li></ul> <p><b>Method of Assessment:</b></p> <p>All units are internally assessed in the BTEC qualifications in this specification. All assessment for the BTEC qualifications in this specification is criterion referenced, based on the achievement of specified learning outcomes. Each unit within the qualification has specified assessment and grading criteria which are to be used for grading purposes.</p>	



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**Link to Specification:**

<https://qualifications.pearson.com/en/qualifications/btec-nationals/information-technology-2016.html#tab-ExtendedCertificate>