WMG Academy for Young engineers Coventry

CREATING. DOING. DESIGNING.

Year 12 Curriculum Booklet

2022 - 2023

Contents

Key of Qualification Title

Extended Certificate - 1 A' Level Equivalent
Diploma - 2 A' Level Equivalent
Extended Diploma - 3 A' Level Equivalent

INTRODUCTION

We look forward to welcoming you to the WMG Academy for Young Engineers in September 2021. As you begin your Post 16 studies you will be developing new skills, knowledge and exploring the world of engineering through your programmes.

Please read carefully through all of the information about the courses that will be on offer in September, along with the support and guidance programme, to help you make a final decision on your programme of study with us. We will guide you to a programme which takes into consideration your future career, aspirations and interests. Where possible we will accommodate your chosen options however, due to group sizes being either too small or too large, this may be reviewed. We reserve the right not to run courses which are not viable. If this is the case we will talk to you as soon as possible to advise you of this.

Choosing your Post 16 programme of study is an important decision to make. We recommend that you carry out research into your choice of potential careers, talk to your parents/carers and contact universities and companies about apprenticeships to ensure that you are as informed as possible before making your final decisions.

In addition to your programme of study, all Y12 learners are expected to participate fully in the pastoral programme and enrichment. In line with Government regulations, any Post 16 student who has not achieved a grade 4 in Maths or English will be expected to re-sit this during their time at WMG Academy until they have achieved this level.

GUIDANCE ON PROGRAMME OF STUDY

The WMG Academy for Young Engineers understands the complexity of choosing your Post 16 programme of study and has prepared the following support to assist you:

STEP 1: RESEARCH

Please read through all of the course information within this booklet. Think about where you want to be in two, five and ten years' time and find out what you need to do to achieve your aspirations and aims. Contact universities, further education colleges and companies that offer apprenticeships and then think about your strengths and weaknesses. Do they match up?

STEP 2: GUIDANCE MEETING

Once you accept your place in Y12 you will be invited to attend a guidance meeting to discuss your option choices and pathways. This will be with you, your parents and a member of the guidance team from the academy. Please make sure that you bring with you your research from Step 1.

STEP 3: COMPLETION OF THE OPTION FORM

In your guidance meeting, you will need to complete your options form. Where possible we will accommodate your chosen options however, due to group sizes being either too small or too large, this may be reviewed. We reserve the right not to run courses which are not viable. If this is the case we will talk to you as soon as possible to advise you of this.

STEP 4: POST GCSE RESULTS

On the day of your GCSE results, we ask that you come to the academy, bringing a copy of your GCSE results so we can confirm your programme of study. Your programme of study can be adjusted at this stage if you have performed differently to as you expected in your GCSE.

STEP 5: JOINING THE ACADEMY

You will have an induction when you join the academy, to familiarise you with the academy. For us this induction starts as soon as you are offered a place. There are events coming up in the summer term and a secure login is provided for students joining Y10 and Y12 to keep up with all our latest news.

A-LEVEL ART AND DESIGN

Awarding Body: AQA
Course Code: (7241-7246, 7201-7206)
QAN: 601/4456/7

OVERVIEW OF THE COURSE

Students will develop their fine art practice, continuing to explore ideas, convey an experience or respond to a theme or issue. The Art Course is designed to refine skills and practice in many areas of Art and Design. Creativity is a door to many exciting career and degree opportunities, such as architecture, interior design , fashion, photography, film and many more. Extending skills such as problem solving, communication as well as exploring the student's personal visual language. Students will develop a unique portfolio of work ready to apply for an art foundation, graduate degree or work place. The student will develop one extended area of research to show evidence of a committed and sustained idea from intention to realisation.

CONTENT AND ASSESSMENT

Students will develop a portfolio of work experimenting with a wide range of materials and processes. Contextual studies form an important element of study and students will engage with Artists through gallery visits, workshops, documentary and film. Students will work in journals and sketchbooks developing their own personal response. They will explore a variety of scales working from small to large and taking into account the context for their work; i.e gallery installation. All work will be led by the students personal intentions and allow them to use many sources from literature, historical starting points as well as site visits and visual exploration.

The course is assessed through two projects over the two years of study.

Component 1) students will respond to a project brief and explore areas of Art and Design in response to this theme. They will realise their intentions by informed research and development and refinement of ideas. A written essay will support the practical work teasing out one specific area of study that students will research and develop. This component is worth 50% of the course.

Component 2) (externally set assignment) Separate question papers will be provided for each title. A choice of 8 questions will be used as starting points. A supervised outcome will be completed in a 15 hour controlled assessment. This component is worth 50% of the course.

Assessment objectives.
- AO1: Develop ideas through investigations demonstrating critical understanding of sources.
- A02: Refine work by exploring ideas, selecting and experimenting with appropriate materials, techniques and processes.
- A03: Record ideas, observations and insights relevant to intentions as work progresses,
- A04: Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language.

CONTENT AND ASSESSMENT

GCSE Art or Design at Grade 6 or Level 2 Merit.

A-LEVEL BIOLOGY

Awarding Body: AQA
Course Code: 7402
QAN: 601/4625/4

OVERVIEW OF THE COURSE

Biology A-level will give you the skills to make connections and associations with all living things around you. Biology literally means the study of life and if that's not important, what is? Being such a broad topic, you're bound to find a specific area of interest, plus it opens the door to a fantastic range of interesting careers. This qualification is linear. Linear means that students will sit all their exams at the end of the course.

CONTENT AND ASSESSMENT

Paper 1 – 2 hour exam worth 35% of the final grade.

- Biological molecules.
- Cells.
- Organisms exchange substances with their environment.
- Genetic information, variation and relationships between organisms.

Paper 2 – 2 hour exam worth 35% of the final grade.

- Energy transfers in and between organisms
- Organisms respond to changes in their internal and external environments
- Genetics, populations, evolution and ecosystems
- The control of gene expression

Paper 3 – 2 hour exam worth 30% of the final grade.

Any content from the 2-year course can be assessed from any unit and any practical.

There is no coursework on this A-Level. However, your performance during practicals will be assessed. At least 15% of the marks for A-Level Biology are based on what you learned in your practicals.

ENTRY REQUIREMENTS

GCSE Biology at grade 6 or GCSE Combined Science at grade 6 (with grade 6 in the Biology unit exams) is required.

A-LEVEL CHEMISTRY

Awarding Body: AQA
Course Code: 7405
QAN: 601/5731/8

OVERVIEW OF THE COURSE

A-Level Chemistry attempts to answer the big question 'what is the world made of' and it is the search for this answer that makes this subject so fascinating. From investigating how one substance can be changed drastically into another, to researching a new wonder drug to save millions of lives, the opportunities that chemistry provides are endless.

CONTENT AND ASSESSMENT

Paper 1 – 2 hour exam worth 35% of the final grade.

Physical Chemistry: Atomic structure, amount of substance, bonding, energetics, chemical equilibria, Le Chatelier's principle and Kc, Oxidation, reduction and redox equations, Thermodynamics, Equilibrium constant Kp for homogenous systems, Electrode potentials and electrochemical cells, acids and bases.

Inorganic Chemistry: Periodicity, group 2, group 7, properties of period 3 elements and their oxides, transition metals, reactions of ions in aqueous solution.

Paper 2 – 2 hour exam worth 35% of the final grade.

Physical Chemistry: Amount of substance, bonding, energetics, kinetics, chemical equilibria, Le Chatelier's principle and Kc, rate equations.

Organic Chemistry: Introduction to organic chemistry, alkanes, halogenoalkanes, alkenes, alcohols, organic analysis, optical isomerism, aldehydes and ketones, carboxylic acids and derivatives, aromatic chemistry, amines, polymers, amino acids, proteins and DNA, organic synthesis, NMR, chromatography.

Paper 3 – 2 hour exam worth 30% of the final grade.

Any content from the 2-year course can be assessed from any unit and any practical.

There is no coursework on this A-Level. However, your performance during practicals will be assessed. At least 15% of the marks for A-Level Chemistry are based on what you learned in your practicals.

ENTRY REQUIREMENTS

GCSE Chemistry at grade 6 or GCSE Combined Science at grade 6 (with grade 6 in the Chemistry unit exams) is required.

A-LEVEL COMPUTER SCIENCE

Awarding Body: OCR
Course Code: H446
QAN: 601/4811/5

OVERVIEW OF THE COURSE

This course helps students understand the core academic principles of computer science. Classroom learning is transferred into creating real-world systems through the creation of an independent programming project. This A-Level will develop the student's technical understanding and their ability to analyse and solve problems using computational thinking.

CONTENT AND ASSESSMENT

Paper 1 – Systems [40% of A-Level]

The internal workings of the (CPU), data exchange, software development, data types and legal and ethical issues.

Assessment: Written exam, 2 hours and 30 minutes.

Paper 2 – Algorithms and programming [40% of A-Level]

This builds on component 01 to include computational thinking and problem solving. Using computational thinking to solve problems.

Assessment: Written exam, 2 hours and 30 minutes.

Paper 3 – Programming project [20% of A-Level]

Students are expected to apply the principles of computational thinking to a practical programming project. They will analyse, design, develop, test, evaluate and document a program written in a suitable programming language. The project is designed to be independently chosen by the student and provides them with the flexibility to investigate projects within the diverse field of computer science.

Assessment: Written exam, 2 hours and 30 minutes.

ENTRY REQUIREMENTS

Grade 6 or above in GCSE Computer Science or relevant ICT course.

A-LEVEL ECONOMICS

Awarding Body: Pearson A
Course Code: 9EC0
QAN: 601/4105/0

OVERVIEW OF THE COURSE

Economics is a social science that studies how individuals, businesses, governments and nations make choices around the allocation of resources to satisfy needs and wants. It is an interesting study into the wider picture of global economies, and the narrower picture of the individual consumer. The course will look at topics such as Supply and Demand, Government failure, Macroeconomic objectives and the features of developing countries. It will prove to be a fascinating look into how the world works and be a tool for explaining topical issues such as the recent global recession and financial crisis.

CONTENT AND ASSESSMENT

There are 4 key themes within A-Level Economics, within which students will develop an understanding of various topics:

Theme 1: Introduction to markets and market failure – The nature of economics, how markets work, market failure and government intervention.

Theme 2: The UK economy – performance and policies – Measures of economic performance, aggregate demand, aggregate supply, national income, economic growth, macroeconomic objectives and policy.

Theme 3: Business behaviour and the labour market – Business growth, business objectives, revenues, costs and profits, market structures, labour markets and government intervention.

Theme 4: A global perspective – International economics, poverty and inequality, emerging and developing economies, the financial sector and the role of the state in the macroeconomy.

Assessment:

Paper 1 is a 2 hour paper assessing Theme 1 and 3, worth 35% of the final grade.

Paper 2 is a 2 hour paper assessing Theme 2 and 4, worth 35% of the final grade.

Paper 3 is a 2 hour paper assessing Themes 1-4, worth 30% of the final grade.

ENTRY REQUIREMENTS

Grade 5 or above in GCSE English and Mathematics.

A-LEVEL ELECTRONICS

Awarding Body: WJEC
Course Code: A490QS
QAN: 603/0777/8

OVERVIEW OF THE COURSE

The WJEC Electronics A level specification provides a sound foundation for the study of electronics or a related area and is a natural progression from GCSE electronics. Successful study will require strong applied maths skills. Studying electronics at A level and beyond provides great job opportunities for Electrical/Electronic Engineers in the UK, including transport networks, renewable energy sources, manufacturing and construction, systems design, programming, robotics and medical engineering. Universities and employers widely recognise the status and value of this A level. Electronics expertise sits alongside CAD and programming skills as one of the most desirable strengths in many companies attracting preferential and higher salaries than other engineering disciplines.

CONTENT AND ASSESSMENT

The subject is taught in modules and examined at the end of Year 13. The exam is based around students demonstrating core concepts across three component assessments.

C1 Principles of electronics - 40% written examination (Knowledge and understanding) - 2hr 45m

1. Semiconductor components
2. Logic Systems
3. Operational Amplifiers
4. Signal Conversion
5. AC circuits and passive filters
6. Wireless transmission
7. Instrumentation systems

C2 Application of electronics - 40% written examination (Applying knowledge and skills) - 2hr 45m

1. Timing Circuits
2. Sequential Logic systems
3. Microcontrollers
4. Digital Communications
5. Optical communication
6. Mains power systems
7. High power switching systems
8. Audio systems

C3 Extended System Design - 20% NEA coursework (Design, analysis and evaluation)

The NEA is an integral part of the A level and is 20% of the total examination. It requires each learner to complete two tasks independently. These build on the concepts studied throughout the specification. The tasks are both academic and practical in nature and reflect learning from components 1 and 2.

ENTRY REQUIREMENTS

Grade 6 in GCSE Electronics or GCSE Mathematics.

A-LEVEL FURTHER MATHEMATICS

Awarding Body: Pearson
Course Code: 9FM0
QAN: 603/1499/0

OVERVIEW OF THE COURSE

In this course you will complete more units from the GCE (A-Level) in Mathematics, leading to an additional A-Level qualification in Further Maths. The course is designed to be taught alongside A-Level Mathematics and consists of two compulsory Core Pure Maths units (CP1 & CP2) and two more optional units. There is a degree of flexibility with the optional units to be studied, and this is to be decided in conjunction with teachers. This year we are teaching the FS1 (Further Statistics) and FM1 (Further Mechanics) units.

Many students who take a qualification in Further Maths go on to read Mathematics at university and perhaps then become professional mathematicians. Most, however, are taking Mathematics as a support subject for a wide variety of fields including financial services and medicine.

CONTENT AND ASSESSMENT

The Advanced GCE in Further Mathematics consists of distinct pure and applied topics:

- Pure (CP1 and CP2) – Proof, Complex numbers, Matrices, Algebra and functions, Calculus, Vectors, Polar coordinates, Hyperbolic functions & Differential equations.
- Statistics (FS1) – Probability distributions and functions, Statistical distributions, Hypothesis testing, Statistical testing.
- Mechanics (FM1) – Momentum and impulse, Work, energy and power, Elastic collisions in one and two dimensions.

Assessment is in the form of externally assessed written examinations, which are taken at the end of the two year programme.

- Four written papers: each contributes 25% of the final grade.
- Each paper lasts 1 hour 30 minutes.
- 75 marks on each paper.

ENTRY REQUIREMENTS

Grade 8 or above in GCSE Mathematics.

A-LEVEL MATHEMATICS

Awarding Body: Pearson
Course Code: 9MA0
QAN: 603/1333/X

OVERVIEW OF THE COURSE

In this course you will build on the knowledge, skills and understanding learnt during your GCSE Maths studies, as well as develop confidence in applications of mathematics, such as statistics and mechanics, which will help consolidate learning in other subjects, especially the sciences and engineering. A-Level Maths encourages students to develop confidence in, and a positive attitude towards, mathematics and to recognise the importance of mathematics in their own lives and to society. This qualification prepares students to make informed decisions about the use of technology, further learning opportunities and career choices.

CONTENT AND ASSESSMENT

This A-Level consists of distinct pure and applied topics:

- Pure – Proof, Algebra and functions, Coordinate geometry in the (x, y) plane, Sequences and series, Trigonometry, Exponentials and logarithms, Differentiation, Integration, Numerical methods, and Vectors.
- Statistics – Statistical sampling, Data presentation and interpretation, Probability, Statistical distributions, Statistical hypothesis testing.
- Mechanics – QANtities and units in mechanics, Kinematics, Forces and Newton's laws, Moments.

Assessment is in the form of externally assessed written examinations, which are taken at the end of the two year programme.

- Three written papers: each contributing 33.3% of the final grade.
- Each paper lasts 2 hours.
- 100 marks on each paper.

ENTRY REQUIREMENTS

Grade 7 or above in GCSE Mathematics.

A-LEVEL PHYSICS

Awarding Body: AQA
Course Code: 7408
QAN: 601/4747/7

OVERVIEW OF THE COURSE

Studying Physics gives students the opportunity to expand upon their understanding from GCSE science and is a common prerequisite for further study of engineering or sciences. This qualification is linear meaning that students will sit all their exams and submit all their non-exam assessment at the end of the course.

CONTENT AND ASSESSMENT

1. Measurements and their errors
2. Particles and radiation
3. Waves
4. Mechanics and materials
5. Electricity
6. Further mechanics and thermal physics
7. Fields and their consequences
8. Nuclear physics
9. Astrophysics

Assessment:

Paper 1 – 2 hour written exam based on sections 1-5 and 6.1 worth 34% of the final grade.

Paper 2 – 2 hour written exam based on Sections 6.2, 7 and 8 with assumed knowledge from previous sections worth 34% of the final grade.

Paper 3 – 2 hour written exam based on practical skills and astrophysics worth 32% of the final grade.

ENTRY REQUIREMENTS

GCSE Physics at grade 6 or GCSE Combined Science at grade 6 (with grade 6 in the Physics unit exams) is required.

Students wishing to study A-Level Physics must also study A-Level Mathematics, due to the significant overlap in content.

A-LEVEL PRODUCT DESIGN

Awarding Body: AQA
Course Code: 7552
QAN: 603/1133/2

OVERVIEW OF THE COURSE

This creative and thought-provoking qualification gives students the practical skills, theoretical knowledge and confidence to succeed in a number of careers. Especially those in the creative industries. They will investigate historical, social, cultural, environmental and economic influences on design and technology, whilst enjoying opportunities to put their learning in to practice by producing products of their choice. Students will gain a real understanding of what it means to be a designer, alongside the knowledge and skills sought by higher education and employers.

CONTENT AND ASSESSMENT

Paper 1: Technical principles – Written exam: 2 hours and 30 minutes worth 30% of the A-Level.

Students are expected to be able to name specific materials for a wide range of applications. They must also be able to provide detailed and justified explanations of why specific materials and combinations of materials are suitable for given applications, with reference to: physical and mechanical properties (working characteristics), product function, aesthetics, cost, manufacture and disposal.

Paper 2: Designing and making principles – Written exam: 1 hour and 30 minutes worth 20% of the A-Level.

Students should be aware of, and able to explain, different approaches to user centred design. That in approaching a design challenge there is not a single process, but that good design always addresses many issues, including: designing to meet needs, wants or values, investigations to inform the use of primary and secondary data, the development of a design proposal, the planning and manufacture of a prototype solution and the evaluation of a prototype solution to inform further development.

Non-exam assessment (NEA) – Practical application of technical principles, designing and making principles (50% of the A-level)

A substantial design and make project worth 50% of the A-Level. Evidence can be written or digital design portfolio and photographic evidence of final prototype.

ENTRY REQUIREMENTS

Grade 6 or above in GCSE Product Design or an equivalent design subject and GCSE Maths at Grade 5 is recommended.

LEVEL 3 CAMBRIDGE TECHNICAL IN BUSINESS (EXTENDED CERTIFICATE – 1 A' LEVEL)

Awarding Body: OCR
Course Code: 05835
QAN: 601/7699/4

OVERVIEW OF THE COURSE

This qualification will provide learners with the skills, knowledge and understanding to progress into Higher Education on a business-related programme. The mandatory unit will give learners an understanding of the wider external contexts in which businesses operate and of internal business functions and their interdependencies, and allow learners to appreciate how legal, financial, ethical and resource constraints can affect business behaviour and the influence that different stakeholders can have and how businesses must respond. The optional units cover a wide range of topics to give learners the opportunity to take a unit that is relevant to a specific aspect of business.

CONTENT AND ASSESSMENT

Unit 1: The business environment – In this unit you will develop an understanding of how and why businesses operate in the way they do. You will look at a range of different types of business and business structures, and explore how the ownership of a business and its objectives are interrelated.

Unit 2: Working in business – This unit will cover the skills and understanding needed to work effectively within a business environment. This includes arranging meetings, working with business documents, making payments, prioritising business activities and communicating with stakeholders.

Unit 4: Customers and communication – In this unit you will learn the purpose, methods and importance of communication in business and the appropriateness of different forms of communication for different situations. You will develop the skills that will help you create a rapport with customers and have the opportunity to practise and develop your communication skills.

Unit 5: Marketing and market research – This unit has particular emphasis on the role of market research and how it contributes to marketing decision-making, and the actions a business may take.

Unit 8: Introduction to human resources – In this unit you will gain an overview of the HR function and learn about factors affecting human resources planning.

Assessment: Units 1 and 2 are external examinations that take place in Year 12 and 13. Units 4, 5 and 8 are internally assessed pieces of coursework.

ENTRY REQUIREMENTS

GCSE English and Maths at grade 4 or above and a grade 5 or above in Business GCSE if studied.

LEVEL 3 CAMBRIDGE TECHNICALS IN INFORMATION TECHNOLOGY
(EXTENDED CERTIFICATE – 1 A' LEVEL)

Awarding Body: OCR
Course Code: 05839
QAN: 601/7098/0

OVERVIEW OF THE COURSE

Cambridge Technicals in IT allows students to gain an insight into IT and cybersecurity. Through practical and project-based work, students will develop knowledge and skills in areas such as infrastructure, cyber security, information and project management.

CONTENT AND ASSESSMENT

Unit 1: Fundamentals of IT – A sound understanding of IT technologies and practices is essential for IT professionals. Information learnt in this unit will provide a solid foundation in the fundamentals of hardware, networks, software, the ethical use of computers and how business uses IT.

Unit 2: Global Information – The purpose of this unit is to demonstrate the uses of information in the public domain, globally, in the cloud and across the internet, by individuals and organisations. You will discover that good management of both data and information is essential, and that it can give any organisation a competitive edge.

Unit 3: Cyber Security– We rely on computerised systems in all walks of life. However, some people have found ways to exploit them and this poses a threat to our safety and security. To deal with this problem the cyber security industry is expanding at a rapid rate. This unit has been designed to enable you to gain knowledge and understanding of the range of threats, vulnerabilities and risks that impact on both individuals and organisations.

Unit 8: Project Management – This unit will provide you with the opportunity to understand and use various project planning skills and techniques, thereby enabling you to become more effective in the workplace. Project management skills are essential transferrable skills that can be used for all IT related projects whether it's traditional methodologies or more recently adapted agile approaches within the IT development environment.

Unit 17: Internet of Everything – This unit is about the use of the internet and how it is impacting people and society. You will learn about the Internet of Everything (IoE) and how it is used.

ENTRY REQUIREMENTS

GCSE English and Maths at grade 5 or above and a grade 5 or above in IT GCSE if studied.

LEVEL 3 CAMBRIDGE TECHNICAL ENGINEERING (EXTENDED CERTIFICATE – 1 A' LEVEL)

Awarding Body: OCR
Course Code: 05823
QAN: 601/4594/8

OVERVIEW OF THE COURSE

This qualification is designed for students aged 16-19 wishing to gain an understanding of the engineering sector and who wish to study Engineering alongside other A-Levels or vocational qualifications. This qualification could provide entry to employment through an apprenticeship in engineering (e.g. Advanced or Higher Apprenticeships) or could also lead directly to employment in areas of engineering such as mechanical engineering and design, electrical and electronic engineering, manufacturing, automation and systems and control.

CONTENT AND ASSESSMENT

Unit 1: Mathematics for engineering (External assessment) – This unit will develop your knowledge and understanding of the mathematical techniques commonly used to solve a range of engineering problems.

Unit 2: Science for engineering (External assessment) – This unit will develop your knowledge and understanding of principles of engineering science and consider how these can be applied to a range of engineering situations.

Unit 3: Principles of mechanical engineering (External assessment) – All machines and structures are constructed using the principles of mechanical engineering. Machines are made up of components and mechanisms working in combination. Engineers need to understand the principles that govern the behaviour of these components and mechanisms.

Unit 4: Principles of electrical and electronic engineering (External assessment) – This unit will develop your knowledge and understanding of the fundamental principles that underpin electrical and electronic engineering.

Unit 9: Mechanical design (Internal assessment) – The aim of this unit is for you to develop the knowledge, understanding and skills to be successful in their design of mechanical engineering components and products.

Unit 10: Computer-aided Design (Internal assessment) – The aim of this unit is for you to develop the ability to be able to create 3D models using CAD, and to go on to create 3D assemblies of components within a CAD system.

ENTRY REQUIREMENTS

Grade 5 or above in GCSE Mathematics.

LEVEL 3 BTEC ENGINEERING
(DIPLOMA – 2 A' LEVELS/EXTENDED DIPLOMA – 3 A' LEVELS)

Awarding Body: Pearson
Course Code:
QAN: 601/7580/1, 601/7588/6

OVERVIEW OF THE COURSE

The BTEC Level 3 in Engineering has been designed to give new entrants to the engineering sector the underpinning knowledge and specific skills needed to meet the needs of modern mechanical engineering industries. This qualification gives both the designed both for those students who wish to enter employment, apprenticeships or those who plan to progress into Higher Education, for example to BTEC Higher Nationals and undergraduate engineering degree qualifications.

CONTENT AND ASSESSMENT

Students completing the Diploma (2 A-Level equivalent) will complete 10 units. Those on the full Extended Diploma (3 A-Level equivalent) will complete all 15 units.
*Units 1-5 are compulsory for the Diploma.
** Units 1-7 are compulsory for the Extended Diploma.

Unit	Unit Name	Internal / External
Unit 1	Engineering principles*	External
Unit 2	Delivery of engineering processes safely as a team*	Internal
Unit 3	Engineering product design and manufacture*	External
Unit 4	Applied commercial and quality principles in engineering*	Internal
Unit 5	A specialist engineering project*	Internal
Unit 6	Microcontroller systems for engineers**	External
Unit 7	Calculus to solve engineering problems**	Internal
Unit 10	Computer aided design in engineering	Internal
Unit 8	Further Mathematics	Internal
Unit 22	Electronic printed circuit board design and manufacture	Internal
Unit 24	Maintenance of mechanical systems	Internal
Unit 25	Mechanical behaviour of metallic materials	Internal
Unit 44	Fabrication manufacturing processes	Internal
Unit 45	Additive manufacturing processes	Internal
Unit 19	Electronic devices and circuits	Internal

ENTRY REQUIREMENTS

Grade 5 or above in GCSE Mathematics.

LEVEL 3 BTEC APPLIED SCIENCE (EXTENDED CERTIFICATE – 1 A' LEVEL/DIPLOMA – 2 A' LEVELS/EXTENDED DIPLOMA – 3 A' LEVELS)

Awarding Body: Pearson
Course Code:
QAN: 601/7436/5, 601/7435/3, 601/7437/7

OVERVIEW OF THE COURSE

This BTEC Science course aims to give students a solid foundation in all three sciences, extending their knowledge from GCSE and providing them with the practical skills needed to progress in a career in science or engineering, both in employment and in Higher Education. This course is designed for students who want to continue with science, but for whom A-Levels are not the chosen pathway. This course is made up of 4, 8 or 13 modules, depending on whether students are entering for the single, double or triple A-Level equivalent. Around 25% of the course is exam assessed, while the remaining units are coursework assessed.

CONTENT AND ASSESSMENT

The following units are mandatory units:

1. Principles and Applications of Science - Externally assessed exam.

2. Practical Scientific Procedures and Techniques.

3. Science Investigation Skills - Controlled assessment.

4. Laboratory Techniques and their Application (Diploma/Extended Diploma).

5. Principles and Applications of Science II (Diploma/Extended Diploma) - Externally assessed exam.

6. Investigative Project (Diploma/Extended Diploma).

7. Contemporary Issues in Science (Extended Diploma) - Externally assessed exam.

In addition to those above, optional units will also be completed in order to bring up the total number of units to those needed for the chosen qualification.

ENTRY REQUIREMENTS

Students should be aiming to achieve a grade 55 in combined science.

EXTENDED PROJECT QUALIFICATION

Awarding Body: OCR
Course Code: H857
QAN: 603/2304/8

OVERVIEW OF THE COURSE

The Extended Project is a stand-alone task and the topic is chosen by the learner. It can relate to any aspect of engineering or manufacturing and will be assessed via an internal assessment which can be in the form of a dissertation, report, design portfolio, design-and-make or manufactured artefact. Learners will develop and extend research; identifying, designing, planning and completing an individual project as well as applying a range of organisational skills. They will need to select information from a range of sources, analyse data, and solve problems to complete their final project outcome. Learners will be allocated a supervisor to oversee and guide them through the project.

CONTENT AND ASSESSMENT

Learners must complete:

A project log which details how they have planned, researched and evaluated their project.

A Project which can be presented as:

- an artefact, model or construction
- a CD/video/DVD of performances or activities
- an audiotape/multimedia presentation
- a journal of activities or events
- a slide or PowerPoint presentation
- a photographic record of the project

Project products must include a written report of between 1000 and 5000 words and a presentation on the process followed and the outcomes produced.

ENTRY REQUIREMENTS

There are no specific entry criteria for this subject.

LEVEL 3 MATHEMATICAL STUDIES (CORE MATHS)

Awarding Body: AQA
Course Code: 1350
QAN: 601/4945/0

OVERVIEW OF THE COURSE

Level 3 Mathematical Studies (Core Maths) is a new qualification designed for students who have achieved a grade 5 or above at GCSE.

It helps to develop students' mathematical skills and thinking and supports courses such as A-level Psychology, Sciences and Geography as well as technical and vocational qualifications.

CONTENT AND ASSESSMENT

The course consists of two papers, both of which are 1 hour 30 minutes long.

Paper 1 assesses:

- 3.1 Analysis of data
- 3.2 Maths for personal finance
- 3.3 Estimation

Paper 2 assesses:

- 3.4 Critical analysis of given data and models
- 3.8 Critical path and risk analysis
- 3.9 Expectation
- 3.10 Cost benefit analysis

ENTRY REQUIREMENTS

5 or above in GCSE maths.

GCSE ENGLISH LANGUAGE & MATHEMATICS (RETAKE)

Awarding Body: AQA
Course Code: 8700 (English Language) & 8300 (Mathematics)
QAN: 601/4292/3 (English Language) & 601/4608/4 (Mathematics)

OVERVIEW OF THE COURSE

Students who have not achieved a grade 4 in their English or Mathematics GCSEs are required to continue studying the course as part of their Sixth Form programme until they achieve that grade.

CONTENT AND ASSESSMENT

Students retaking either English or Maths GCSE will have the opportunity to retake their exams in November. If they are not successful at achieving a grade 4 or above, they will then continue studying the subject and sit the summer examinations.

ENTRY REQUIREMENTS

This option is only for students who have not achieved a grade 4 in their English or Mathematics GCSE. Students can only be offered a place in the Sixth Form where one retake subject is required. Students needing to retake both English and Mathematics will unfortunately not be able to attend the WMG Academy Sixth Form.