WMG Academy for Young engineers Solihull

YEAR 10 CURRICULUM BOOKLET

2026 - 2028

Contents

INTRODUCTION

As part of the programme of study at the Academy, students will study a core curriculum of Maths, English Language, English Literature and Triple Science alongside a Level 2 (GCSE equivalent) in Engineering Manufacture. Additional choices will complement the core programme of study by choosing three further option subjects. Currently, in addition Further Mathematics GCSE is offered as extension qualification to our most able Mathematicians.

In addition to the subjects that are laid out in this booklet, we encourage and support community languages. We appreciate that students coming to WMG academy come from a range of backgrounds and cultures, therefore if there is a language that a student is fluent in, are able to read and write in this language and wish to sit a GCSE qualification in please contact solihull.admissions@wmgacademy.org.uk

The WMG Academy for Young Engineers understands the complexity of choosing your Key Stage 4 programme of study and has prepared the following support to assist you.

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ART AND DESIGN - GCSE

Awarding Body: AQA
Course Code: 8202
QAN: 601/8088/2

OVERVIEW OF THE COURSE

Our GCSE ART and DESIGN course will allow students to develop knowledge and understanding through a variety of learning experiences and approaches, including engagement with sources. This will allow students to develop the skills to explore, create and communicate their own ideas. Students will demonstrate these skills through the development, refinement, recording, realisation and presentation of their ideas through a (Component 1) and by responding to an externally set assignment (Component 2).

CONTENT AND ASSESSMENT

Portfolio (Component 1) Coursework module (worth 60% of the final grade).

Each student will create and present a portfolio representative of their course of study. The portfolio will include a sustained project developed in response to a subject, theme, task or brief evidencing the journey from initial engagement with an idea(s) to the realisation of intentions. This will give students the opportunity to demonstrate, through an extended creative response, their ability to draw together different areas of knowledge, skills and/or understanding from across their course of study.

Students will also get an opportunity to create a selection of further work resulting from activities such as trials and experiments; skills-based workshops; mini projects; responses to galleries and museum visits; independent study and evidence of the student's specific role in any group work undertaken.

Students' work is assessed over four assessment points.

Externally set assignment (Component 2) Preparatory period followed by 10 hour exam (worth 40% of the final grade)

Students respond to a starting point provided by the exam boardAQA. This response provides evidence of the student's ability to work independently within specified time constraints, realise intentions that are personal and meaningful and explicitly address the requirements of all four assessment objectives. Students will sit the 10 hour exam over two days.

BUSINESS STUDIES - GCSE

Awarding Body: OCR
Course Code: J204
QAN: 603/0295/1

OVERVIEW OF THE COURSE

GCSE in Business equips students with the skills and confidence to explore how different business situations affect decision-making. They develop their understanding of concepts, objectives and terminology, as well as the impact of contemporary issues on business operations. The qualification is linear, meaning that students will sit all their exams at the end of the two year course.

CONTENT AND ASSESSMENT

Paper 1 – 1 hour 30 minutes exam (out of 80 marks worth 50% of total GCSE)

Business Activity - In this section, students explore how and why businesses start and grow.
Marketing - In this section, students explore the purpose and role of marketing within business and how it influences business activity and the decisions businesses take.
People - In this section, students explore the purpose and role of human resources within business and how it influences business activity and the decisions businesses take.

Paper 2 – 1 hour 30 minutes exam (out of 80 marks worth 50% of total GCSE)

Operations - In this section, students explore what business operations involve, their role within the production of goods and the provision of services and how they influence business activity.
Finance - In this section, students explore the purpose of the finance function, its role in business and how it influences business activity.
Influences on business - In this section, students explore the importance of external influences on business and how businesses change in response to these influences.
The interdependent nature of business - In this section, students will need to use content of the above from both components to make connections between different elements of the subject. They will need to draw together knowledge, skills and understanding from different parts of the GCSE course and apply their knowledge to business decision making within a business context.

Both papers consist of a combination of multiple choice questions as well as a short, medium and extended response style questions. The short, medium and extended response style questions use stimulus material that draw on real business contexts.

COMPUTER SCIENCE - GCSE

Awarding Body: OCR
Course Code: J277
QAN: 601/8355/X

OVERVIEW OF THE COURSE

Computer Science is engaging and practical, encouraging creativity and problem solving. It encourages students to develop their understanding and application of the core concepts in computer science. Students also analyse problems in computational terms and devise creative solutions by designing, writing, testing and evaluating programs.

CONTENT AND ASSESSMENT

Paper 1 – (worth 50% of the final grade) 1 hour 30 minutes exam.

- Systems architecture
- Memory and storage
- Computer networks, connections and protocols
- Network Security
- Systems Software
- Ethical, legal, cultural and environmental impacts of digital technology

Paper 2 – (worth 50% of the final grade) 1 hour 30 minutes exam.

- Algorithms
- Programming fundamentals
- Producing robust programs
- Boolean logic
- Programming languages and integrated development environments

Practical Programming

All students will be given the opportunity to undertake programming task(s), either to a specification or to solve a problem (or problems) during their course of study.

DESIGN AND TECHNOLOGY (PRODUCT DESIGN) - GCSE

Awarding Body: AQA
Course Code: 8552
QAN: 603/0984/2

OVERVIEW OF THE COURSE

Our GCSE Design and Technology (Product Design) will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise. Our GCSE allows students to study core technical, designing, and making principles, including a broad range of design processes, materials techniques and equipment. They will also have the opportunity to study specialist technical principles in greater depth.

CONTENT AND ASSESSMENT

External Exam: (worth 50% of the final grade) 2 hours

Students will develop their knowledge and understanding of the areas of design technology and product design to include, Core Technical Principles, Specialist Technical principles and designing and making principles. These core skills will be assessed using a mixture of question styles including an extended response that will require the use of the skills learnt to generate ideas.

Coursework and practical assessment (worth 50% of the final grade)

Students will complete a substantial design and make a task from a provided scenario following the design cycle of identifying and investigating design possibilities, producing a design brief and specification, generating design ideas, developing design ideas, realising design ideas and analysing and evaluating their final outcome. Students will respond by investigating and defining the needs and wants of the user using relevant research to produce a design brief and specification. Students will generate design ideas with flair and creativity and develop these to create a final design solution (including modelling). Students will also be required to manufacture a final prototype that is fit for purpose and a final evaluation.

ELECTRONICS - GCSE

Awarding Body: WJEC
Course Code: 4160 (4161, 4162, 4163)
QAN: 603/0776/6

OVERVIEW OF THE COURSE

Studying this GCSE in Electronics enables learners to develop scientific knowledge and conceptual understanding of the behaviour of analogue and digital electrical/electronic circuits including a wide range of electronic components. Develop an understanding of the nature, processes and methods of electronics as an engineering discipline to help them answer questions about practical circuits and be aware of new and emerging technologies. Develop and learn how to apply observational, practical, problem solving and evaluative skills in the identification of needs in the world around them and to propose and test electronic solutions.

CONTENT AND ASSESSMENT

Discovering Electronics: External Exam – 1 hour 30 minutes, 40% of the GCSE.

1. Electronic systems and sub-systems
2. Circuit concepts
3. Resistive components in circuits
4. Switching circuits
5. Applications of diodes
6. Combinational logic systems

Application of Electronics: External Exam – 1 hour 30 minutes, 40% of the GCSE.

1. Operational amplifiers
2. Timing circuits
3. Sequential systems
4. Interfacing digital to analogue circuits
5. Control circuits

Extended system design and realisation task – Coursework (Non-exam assessment, NEA) 20% of the GCSE.

This component requires each learner to produce a single extended system design and realisation task independently. The task builds on the systems developed throughout the specification and the requirement to relate practical circuit design and construction to knowledge and understanding gained from the examinations. This component requires learners to demonstrate their ability to analyse a problem to enable solutions to be developed by developing a design specification to solve the problem, design and build an electronic system, model its performance against the design specification and modify as appropriate.

ENGINEERING DESIGN - CAMBRIDGE NATIONAL

Awarding Body: OCR
Course Code J822
QAN: 603/7086/5

OVERVIEW OF THE COURSE

Our Cambridge National in Engineering Design will develop knowledge, understanding and practical skills that would be used in the engineering design and development sector. This will help you to develop independence and confidence in using skills that would be relevant to the engineering design and development sector. The qualification will also help you to develop learning and skills that can be used in other life and work situations, such as:

- Completing research to inform engineering design ideas
- Solving problems by exploring different engineering design options
- Finding imaginative solutions through creative thinking.

This qualification will complement other learning that you're completing for GCSEs or vocational qualifications at Key Stage 4 and help to prepare you for further study.

CONTENT AND ASSESSMENT

External Exam: (worth 40% of the final grade)

R038: Principles of engineering design In this unit you will learn about the different design strategies and where they are used, as well as the stages that are involved in iterative design, which is currently one of the most widely used design strategies. You will learn about the type of information needed to develop a design brief and specification, and the manufacturing and other considerations that can influence a design. You will develop knowledge of the types of drawing used in engineering to communicate designs, as well as the techniques used to evaluate design ideas and outcomes, including modelling methods.

Coursework: worth 60% of the final grade consisting of 2 pieces of coursework

R039: Communicating designs In this unit you will learn how to develop your techniques in sketching, and gain industrial skills in engineering drawing using standard conventions that include dimensioning, line types, abbreviations, and representation of mechanical features. You will enhance your confidence and capabilities by using computer aided design (CAD), 2D and 3D software, to produce accurate and detailed drawings and models that visually communicate your designs.

R040: Design, evaluation and modelling In this unit you will learn how designers can quickly create and test models to develop a working prototype of a design. You will develop your virtual modelling skills using computer aided design (CAD) 3D software, to produce a high-quality model that will be able to simulate your design prototype. You will also develop your physical modelling skills using modelling materials or rapid-prototyping processes to produce a physical prototype.

ENGINEERING MANUFACTURE - CAMBRIDGE NATIONAL

Awarding Body: OCR
Course Code: J823
QAN: 603/7087/7

OVERVIEW OF THE COURSE

Our Cambridge National in Engineering Manufacture will develop knowledge, understanding and practical skills that would be used in the engineering, manufacturing, process and control sector. This will help you to develop independence and confidence in using skills that would be relevant to the engineering manufacturing and development sector. The qualification will also help you to develop learning and skills that can be used in other life and work situations, such as:

- Solving problems by exploring different engineering manufacturing processes, tools and equipment.
- Planning a sequence of processes. This will involve managing your time and identifying the resources you will need, as well as reviewing your plans if necessary.

This qualification will complement other learning that you're completing for GCSEs or vocational qualifications at Key Stage 4 and help to prepare you for further study.

CONTENT AND ASSESSMENT

External Exam: (worth 40% of the final grade)

R014: Principles of engineering manufacture in this unit you will learn about the different types of manufacturing processes, the materials that can be used to manufacture products using these processes, and the factors to be considered when determining the manufacturing requirements of an engineered product. You will consider the different types of manufacturing process that are typically used in engineering, using specific examples of each process type. The engineering materials include ferrous and non-ferrous metals, polymers, ceramics, composites, and smart materials. You will understand how the properties of these materials relate to their manufacturing characteristics. In addition, you will also develop an understanding of some of the current developments in engineering manufacture.

Coursework: worth 60% of the final grade consisting of 2 pieces of coursework

R015: Manufacturing a one-off product in this unit you will learn to identify the information required to make a product, plan the production of a product and carry out risk assessments for the processes, tools and equipment needed to produce a product in small quantities. You will also learn how to select and safely use the equipment, processes and tools required to mark out, measure and manufacture a product in small quantities, using a range of handheld equipment and conventional (non-Computer Numerical Control (CNC) machining methods.

R016: Manufacturing in quantity in this unit you will learn how to manufacture and use simple jigs and templates to support manufacturing in volume. By using CAD software, you will learn about the information needed to facilitate manufacture, and apply this in order to program Computer Numerical Control (CNC) equipment. In addition, you will learn how to set up and operate the CNC equipment and monitor the quality of the manufactured products.

ENGLISH LANGUAGE - GCSE

Awarding Body: AQA
Course Code: 8700
QAN: 601/4292/3

OVERVIEW OF THE COURSE

English Language is a linear course where students sit all of their exam papers at the end of Year 11. Students are introduced to fiction and non-fiction extracts that they will be asked to explore. One of the non-fiction extracts will be from the 19th century. This qualification will enable students to develop their analytical and creative skills whilst incorporating a variety of genres, audiences, viewpoints and perspectives. This course of study is at the heart of their learning journey and will equip them with a range of reading and writing skills that are valued by employers and colleges alike.

CONTENT AND ASSESSMENT

Paper 1 – Explorations in Creative Reading and Writing.
Written exam: (worth 50% of the GCSE) 1 hour 45 minutes.

Section A: Reading - One literature fiction text
Section B: Writing - Descriptive or narrative writing

Paper 2 – Writers' Viewpoints and Perspectives.
Written exam: (worth 50% of the GCSE) 1 hour 45 minutes.

Section A: Reading - One non-fiction text and one literary non-fiction text
Section B: Writing - Writing to present a viewpoint

Non Examination Assessment – Spoken Language.
(Students will receive a certificate of pass, merit or distinction).

Each student must complete an individual presentation on a subject of their choice in front of an audience.
AQA requires these presentations to be filmed for moderation purposes.
Students also have to respond to questions and feedback.
Marked by teacher. All marks submitted and externally moderated and verified by AQA.
The spoken language aspect of the course does not contribute to the final GCSE grade but it is an essential requirement of the course that all students complete it.

All students receive a Pass, Merit or Distinction for this part of the course.

ENGLISH LITERATURE - GCSE

Awarding Body: AQA
Course Code: 8702
QAN: 601/4447/6

OVERVIEW OF THE COURSE

English Literature is a linear course where students sit all of their exams in the summer term of Year 11. Students will be introduced to a range of genres over time. It is an academic course of study, which will take students on a journey through the Elizabethan period to modern day poetry. This qualification will enable students to develop their critical thinking , analytical skills and a deeper understanding of the written word. It equips them with a range of reading and writing skills that are valued by employers and colleges alike.

CONTENT AND ASSESSMENT

Paper 1 – Shakespeare and the 19th Century Novel

Written exam: (worth 40% of GCSE) 1 hour 45 minutes.

Macbeth (Shakespeare)
A Christmas Carol (Charles Dickens)

Section A: Shakespeare – Students will answer one question on the play. They will be required to write in detail about an extract from the play and then to link these ideas to the play as a whole. This essay is also marked for spelling, punctuation and grammar.
Section B: The 19th-century novel – Students will answer one question on their novel. They will be required to write in detail about an extract from the novel and then to write about the novel as a whole.

Paper 2 – Modern Texts and Poetry

Written exam: (worth 60% of GCSE) 2 hour 15 minutes.

An Inspector Calls (J.B Priestley)
Poetry Anthology (Power and Conflict) 15 poems linked by the theme of Power & Conflict
Unseen Poetry

Section A: Modern texts – Students will answer one essay question from a choice of two on their studied drama text. This essay is also marked for spelling, punctuation and grammar.
Section B: Poetry – Students will answer one comparative question on one named poem (printed) on the paper and one other poem from their anthology cluster (not printed).
Section C: Unseen poetry – Students will answer one question on one unseen poem and one question comparing this poem with a second unseen poem.

FURTHER MATHS (ENRICHMENT) - GCSE

Awarding Body: AQA
Course Code: 8365
QAN: 603/3104/5

OVERVIEW OF THE COURSE

AQA Level 2 Further Maths GCSE is a unique qualification designed to stretch and challenge high achieving mathematicians who are expected to achieve the top grades in GCSE Mathematics and are likely to progress to study A-level Mathematics and Further Mathematics. It is only offered as an extra-curricular qualification and is studied by invitation only.

High-achieving students are introduced to AS topics that will help them develop skills in algebra, geometry, calculus, matrices, trigonometry, functions and graphs. The course includes topics which will be familiar through their previous studies in mathematics, but also introduces more abstract and unfamiliar topics such as matrices.

CONTENT AND ASSESSMENT

Assessment
The course is assessed through two exams, both of which are 1 hour and 45 minutes.
Paper 1 is non-calculator, paper 2 requires a calculator
Any content from the course can appear on either paper

Content

1. Number
- Combinatorics
- Surds

2. Algebra
- Polynomial Algebra
- Functions
- Simultaneous Equations
- Laws of Indices
- Sequences

3. Coordinate Geometry
- Equation of a straight line
- Equation of a circle

4. Calculus
- Differentiation of polynomials
- Finding gradients of tangents and normal
- Finding higher derivatives
- Finding minima and maxima

5. Geometry
- Geometric Proof
- Trigonometry
- Pythagoras's theorem
- Trigonometric graphs

6 Matrices
- Arithmetic with matrices
- Transformations of the plane

MATHEMATICS - GCSE

Awarding Body: AQA
Course Code:
QAN: 601/4700/3

OVERVIEW OF THE COURSE

In this course students will develop their knowledge and understanding of a range of mathematical concepts, and apply these to everyday, real-life situations. Alongside the comprehensive set of mathematical procedures that students will master, students will develop more general mathematical skills. These include problem-solving, strategic thinking, mathematical reasoning, inference, and communicating mathematics. From encryption to architecture, mathematics underpins many elements of modern life and we aim to bring maths to life by leveraging these specific and practical applications throughout the curriculum.

CONTENT AND ASSESSMENT

The course is split into six key subject areas:

- Number
- Algebra
- Ratio, Proportion and Rates of Change
- Geometry and Measures
- Probability
- Statistics

Students are assessed at the end of year 11 with three external exam papers

- Each paper is equally weighted
- Paper 1 is non-calculator, paper 2 and 3 are both calculator
- Each paper lasts 1 hour 30 minutes, with 80 marks on each paper

Mathematics is one of the few subjects that still has a tiered exam:

- Students sitting the higher paper can achieve grades 4 – 9
- Students sitting the foundation paper can achieve grades 1 - 5

Further Maths - GCSE

We also offer GCSE Further Maths to our most passionate and capable mathematicians (AQA Level 2 Certificate in Further Maths). This qualification builds on the content found in GCSE maths, and introduces some key concepts that students will encounter at A-level. Opportunities to experience this content are also built into our maths curriculum; if a student is passionate about maths, WMG Academy is an excellent place for them to be.

SCIENCES TRIPLE - GCSE

Awarding Body: AQA
Course Codes: Biology 8461 , Chemistry 8462 and Physics 8463
QAN:601/8752/9 , 601/8757/8, 601/8751/7

OVERVIEW OF THE COURSES

Students taking Triple Science will achieve three full GCSE grades in Biology, Chemistry and Physics over their two years of study. They will gain further understanding and depth of knowledge compared to students choosing to take Combined Science, and will be at an advantage for further study. These qualifications are linear. Linear means that students will sit all their exams at the end of Year 11.

CONTENT AND ASSESSMENT

BIOLOGY	CHEMISTRY	PHYSICS
1. Cell Biology	1. Atomic Structure and periodic table	1. Energy
2. Organisation	2. Bonding, structure and the properties of matter	2. Electricity
3. Infection and response	3. Quantitative chemistry	4. Particle model of matter
4. Bioenergetics	4. Chemical Changes	5. Atomic Structure
5. Homeostasis and response	5. Energy Changes	6. Forces
6. Inheritance, variation and evolution	6. The rate and extent of chemical changes	7. Waves
7. Ecology	7. Organic chemistry	8. Magnetism and electromagnetism
8. Key Ideas	8. Chemical analysis	9. Space Physics
	10. Chemistry of the atmosphere 11. Using resources	12. Key Ideas

There are six examination papers: two Biology, two Chemistry and two Physics. For each of the separate Science GCSEs, students will sit two 1 hour 45-minute papers. Each of the papers will assess knowledge and understanding from distinct topic areas. There is no coursework in science at GCSE. However, for each of the subjects, students are expected to be familiar with eight required practicals. Questions will be asked about the practicals studied in lessons as part of the examinations.