

BTEC Engineering – St Joseph's College

Subject vision statement

The BTEC Level 3 Engineering vocational course is designed to provide students with a well-rounded education based on **faith** that combines **respect for self and others**, theoretical knowledge, practical skills, critical thinking abilities and professional attributes to prepare them for successful careers in the engineering **community** or further study in related disciplines. Our vision is to empower students through hands-on **learning** and industry-relevant experience fostering a commitment to continuous improvement, ethical practices and sustainable solutions to our ever-changing world through engineering

Intent statement

What: The primary focus of the curriculum is to equip students with a comprehensive understanding of engineering principles and practical skills relevant to the industry. Students will develop a sound understanding of engineering processes involved including how to use computer aided design systems as used in industry, how to develop sustainable and environmental solutions using workshop practices. This also includes proficiency in areas such as mechanical, electrical, electronic, and civil engineering.

How: In year 12, students will build upon theoretical and practical experiences through DT lessons at both KS3 and 4. Students are therefore introduced to key engineering concepts such as understanding the behaviour of materials and their in-service failures therefore recommending improvements to the performance of material components. Students are also taught how to produce engineering components through use of design systems such as CAD (computer aided design) in the form of solid works, laser cutting mechanisms and 3D printing. Students are assessed both internally through class-based coursework tasks set by Edexcel, external written papers as well external controlled assessment set tasks, again set by the examination board.

Why: The role of engineering as an integral part of the sustainability of the working environment, with more careers being created to support sustainable initiatives, such new industries as the green industry will see engineering playing a key role in the creation of jobs in the future. Through engineering, our students will develop the skills and work-based practices demanded by industry to ensure that they are able to confidently and competently navigate their way into work and continuous education.

Year 12						
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Unit 10 Computer Aided Design and Engineering Unit 2 Delivering safely of Engineering project as a team Unit 1 Engineering Principles Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 6 Microcontrollers (Triple students only) Unit 1 Engineering Principles Unit 6 Exams Unit 1 Engineering Principles Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)		Unit 5 A specialist Engineering project Unit 1 Engineering Principles Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 18 Electrical power generation, transmission, and distribution Unit 3 Product Design Unit 1 Engineering Principles Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 3 Product Design Exams Unit 1 Engineering Principles Unit 13 - Welding technology (Triple students only) Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)
Building on (knowledge, concepts and skills)	For unit 10, students will be expected to demonstrate the ability to interpret and draw engineering components.	Students will be expected to build the knowledge in machine programming and electronics.		Students need to demonstrate their skills in project management based on Engineering projects.	Students will be expected to develop the knowledge on real life context such as how the National grid works.	Students will demonstrate joining skills in fabrication i.e. welding.

	Students will be learning to work in a team within an Engineering environment.	Students will develop their numeracy capabilities within the context of an Engineering environment.			
Building towards (knowledge, concepts and skills)	To explore how processes are undertaken by teams to create an engineering product.	Students learning how programmable devices and electronic component are developed.	The application of project management skills to manufacture a component.	The knowledge towards how electricity is generated transmitted and distributed to customers.	Learning engineering product design and manufacturing processes whilst considering function, material, sustainability etc.
Independent enrichment (wider reading and learning suggestions)	<p>Pearson BTEC National Engineering textbook For specifications from 2016</p> <p>Science and practice of welding, volume 1; Cambridge University press, 1993 Welding processes handbook; Woodhead Publishing, 2012</p>				
SMSC	Students explore the benefits of work experience. They carry out and reflect on a period of work experience, and plan for their personal and professional development.				
Careers	Working AFBE student will have the opportunity to attend careers and networking events in the field of Engineering as well as gaining valuable work experience.				

Year 13						
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Unit 13 - Welding technology Unit 44 fabrication manufacturing process (Triple students only) Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 25 Mechanical behaviour of metallic materials Unit 13 - Welding technology Unit 44 fabrication manufacturing process Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 26 Mechanical behaviour of non-metallic materials Unit 1 Engineering Principles exam Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 4 Applied Commercial and Quality Principles in Engineering Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 4 Applied Commercial and Quality Principles in Engineering Unit 15 - Electrical machines (Triple students only) Unit 7 Calculus to solve Engineering problems Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only)	Unit 15 - Electrical machines (Triple students only) Unit 7 Calculus to solve Engineering problems Unit 8 Further Engineering maths (Triple students only) Unit 3 Product Design Exams Unit 1 Engineering Principles Exams

<p>Building on (knowledge, concepts and skills)</p>	<p>Students will be expected to foster the fabrication of components using cutting, joining, forming and finishing methods.</p>	<p>Students will be expected to foster the knowledge of metallic materials and their mechanical properties.</p>	<p>Students will be expected to foster their knowledge of non-metallic materials and their mechanical properties.</p>	<p>Applying business and commercial knowledge and principles, including legislative and environmental factors likely to impact the Engineering environment.</p> <p>Students will also build upon the principles of electrical machines to understand how electrical machines operate.</p>
<p>Building towards (knowledge, concepts, and skills)</p>	<p>The ability of applying maths to solve electrical electronic and mechanical based engineering problems</p>	<p>The ability to explore failure mode to improve component design</p>	<p>The ability to choose suitable material for the correct application in service</p>	<p>Students should be able to demonstrate a safe operation of electrical machines such as DC motor and their practical applications</p>
<p>Independent enrichment (wider reading)</p>	<p>Pearson BTEC National Engineering textbook For specifications from 2016</p>			

and learning suggestions)	Science and practice of welding, volume 1; Cambridge University press, 1993 Welding processes handbook; Woodhead Publishing, 2012
SMSC	Students having successfully completed the Btec Engineering are now confident in their chosen pathways for their careers in Engineering i.e. University or Apprenticeship
Careers	Civil, Mechanical, Aeronautical, Automotive, Architecture, Biomechanical Engineering