

Engineering Level 3

Welcome to West Suffolk College, we look forward to you joining your BTEC Level 3 Extended Diploma in Advanced Manufacturing Engineering in September. You will be embarking on a career choice that is diverse, challenging and rewarding.

What is an Engineer? If mathematics is the language of the universe and physics is the application of that language to the real world, then fundamentally, an "Engineer" is someone who finds and communicates solutions to real world problems using those principles.



This Level 3 qualification provides you with knowledge and practical skills for the broad engineering sector and is ideal if you're a school leaver with some engineering knowledge and experience or have a passion to advance your career.

It aims to focus on developing your knowledge and practical skills in the engineering world.

During your first year at WSC you will study Math's, Mechanics, Hydraulics/Pneumatics, Electronics and a number of other disciplines that will develop your general engineering knowledge and skills. You will also be expected to start your journey in becoming a skilled communicator of engineering information, processes and solutions.

Effective Communication is a key skill for all employers and a fundamental part of your course. One core module you will complete is "Communications for Engineering". Part of the assessment process will be to deliver a 10-minute presentation to a group of people at the end of year 1.

Your engagement with the summer work is crucial as it sets the foundation for your academic journey and future career in engineering. By actively participating in this preparatory phase, you're not only equipping yourself with essential skills but also fostering a mindset of continuous learning and improvement. Your commitment to completing the summer work not only ensures your readiness for future assessments but also demonstrates your dedication to personal and professional development within the field of engineering.

An effective project over the course of this year would be a fantastic addition to a future CV that showcases your skills for employment.

Completion of the summer project is a mandatory part of the course and your offer of a place on the course may be withdrawn if it is not completed.

Deadline Date: Your induction day	How do I submit my completed work: Please bring this with you on your first day
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This summer work is designed to be a starting point for an assignment you will be issued after starting at WSC. Every assessment on your BTEC course is set within a scenario. Here is the scenario from your first assignment. Your summer work will be a small part of this.

Scenario. You are completing an advanced apprenticeship in a large engineering company and as such you are going through a rotation of departments getting used to the areas of work this multinational company covers. You are currently working with the "Engineering Diversity and Inclusion Office" and you have been asked to produce a presentation that is suitable to be given to the board of directors. The brief for the presentation is below but it centers on the need for the company directors to better understand the role of diversity in engineering.

You must research, write and give a 10-minute presentation on an engineer selected from the below list of the engineers.

Engineer	Main Discipline
Isambard Kingdom Brunel	Civil Engineer
Sarah Guppy,	Civil Engineer
Alan Turing,	Information Technology
Ada Lovelace,	Information Technology
Fazlur Rhaman Khan,	CAD and Structural engineering.
Mae Jemison,	Scientist, Astronaut, Engineer
Frank Whittle,	Aviation
Nikola Tesla,	Electrical/Electronic
Steve Wozniac,	Electronic.
Evelyn Wang	Academic mechanical engineer

Your presentation will include the following.

- i) A biography of your chosen engineer,
- ii) A technical description of their main engineering accomplishment/s,
- iii) How their protected characteristics influenced their careers
- iv) Conclusion / your opinion on how their work has influenced the world.

PLEASE NOTE THAT YOU ARE NOT EXPECTED TO COMPLETE THE ENTIRE ASSIGNMENT OVER THE COURSE OF THE SUMMER. PLEASE GO TO THE NEXT PAGE FOR DETAILED INSTRUCTIONS OF YOUR SUMMER WORK

This summer your objective is to gain and communicate an understanding of the listed engineers. Your research will serve as the foundation for future assessments, where you'll present your chosen engineer and rationale to your lecturer.

The context of your presentation is “THE ROLE OF DIVERSITY IN ENGINEERING”.

Carry out your own research into the listed engineers. They come from a variety of backgrounds where protected characteristics such as race, gender, religion, disability, mental health, sexuality, or other socio-economic factors such as place or time of birth and financial background have impacted their lives and career choices. If you look carefully at the brief biographies below you may find one that you feel you can identify with or whose life interests you. This is where you should start.

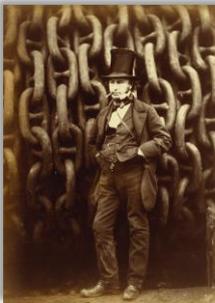
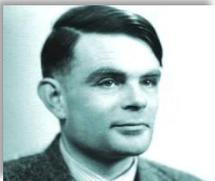
Tasks

Here's what you should produce and present to your tutor before the start of the academic year. There is no formal structure for how this information should be presented. You should use your own initiative and present it in the way that you think best communicates your own ideas.

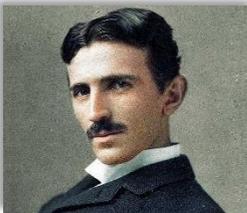
- 1) Research notes. List approximately 5 sources of information that you have used to gain an understanding of the lives of the engineer or engineers that interest you and why you think these are reliable sources.
- 2) Write Approximately 400 words on the engineer that you think you would like to do you presentation on. You should say which engineer interested you the most, what interests you about their work or their lives and which of their protected characteristics you think affected them and crucially ...how or why it did!
- 3) A mind map of the things you think you would like to cover in a 10-minute presentation on this engineer.
- 4) How might this engineer or any of the engineers on the list relate to your future career plans?. Write around 100 Words on what you hope to achieve after your BTEC and how the lives of these engineers might relate to your goals.

Note. Your choice of engineer doesn't have to be a final decision. You will have the time and opportunity to change your mind on your chosen engineer later.

The Engineers

Engineer		Brief Biography
 <p>Isambard Kingdom Brunel Civil Engineer</p>	<p>Isambard Kingdom Brunel (1806–1859), born into a family of engineers, navigated the challenges of his modest upbringing to become a pioneering British engineer. Despite financial constraints, Brunel's upbringing instilled in him a passion for innovation and problem-solving. His iconic projects, like the Thames Tunnel and the Great Western Railway, reflect both his engineering prowess and his determination to overcome obstacles. Isambard Kingdom Brunel's legacy endures as a testament to ingenuity, resilience, and the transformative power of vision.</p>	
 <p>Sarah Guppy, Civil Engineer</p>	<p>Sarah Guppy (1770–1852) was a pioneering British engineer and inventor, notably recognised for her contributions to civil engineering and household innovations. She patented numerous inventions, including a bridge construction method and a safer design for ship's bridges. Guppy's inventive spirit and determination challenged gender norms of her time, paving the way for future generations of female engineers. Her legacy as a trailblazer in engineering continues to inspire innovation and diversity in the field.</p>	
 <p>Alan Turing, Information Technology</p>	<p>Alan Turing (1912–1954) rose from modest roots to become a pioneering British mathematician and computer scientist. Despite facing financial constraints and societal prejudices, Turing's brilliance was undeniable. His groundbreaking contributions to artificial intelligence and codebreaking during World War II, notably at Bletchley Park, were instrumental in Allied victory. Tragically, Turing's post-war life was marred by persecution for his homosexuality, leading to his unjust conviction and chemical castration. His untimely death remains a somber reminder of the injustices faced by LGBTQ+ individuals. Turing's enduring legacy underscores the vital intersection of intellect, integrity, and social progress.</p>	

	<p>Ada Lovelace, Information Technology</p>	<p>Ada Lovelace (1815–1852) navigated a challenging upbringing marked by her parents' separation and her own fragile health. Despite these adversities, she emerged as a visionary mathematician and writer, defying societal norms of her time. As the daughter of poet Lord Byron, Lovelace inherited a keen intellect and pursued her passion for mathematics. Collaborating with Charles Babbage on the Analytical Engine, she overcame personal struggles to produce groundbreaking work, conceiving the first algorithm for the machine. Lovelace's enduring legacy as the world's first computer programmer transcends her obstacles, inspiring generations of women in STEM fields worldwide.</p>
	<p>Fazlur Rhaman Khan, CAD and Structural engineering.</p>	<p>Fazlur Rahman Khan (1929–1982) was a visionary Bangladeshi-American structural engineer and architect, renowned for his revolutionary contributions to skyscraper design. Born in Dhaka, Khan's innovative structural systems, such as the tube structure, transformed urban landscapes globally. His iconic designs include the Sears Tower (now Willis Tower) in Chicago, a testament to his engineering prowess and commitment to efficiency and safety. Khan's legacy extends beyond his pioneering designs; he advocated for sustainable urban development and social responsibility in architecture. Through his brilliance and humanitarian ethos, Fazlur Khan remains an enduring figure in the world of architecture and engineering.</p>
	<p>Mae Jemison, Scientist, Astronaut, Biomedical Engineering</p>	<p>Born in, Alabama, in 1956, Mae Jemison rose as a pioneer in science, space exploration, and entrepreneurship. Gaining a bachelor's in chemical engineering from Stanford and a Doctor of Medicine from Cornell, she shattered barriers by becoming the first African-American woman in space aboard the Space Shuttle Endeavour in 1992. Post-mission, Jemison founded The Jemison Group in 1993, a tech research firm propelling advancements in healthcare, energy, and education. Through her company, she championed diversity in STEM and mentored aspiring innovators.</p>

	<p>Frank Whittle, Aviation</p>	<p>Sir Frank Whittle (1907–1996) was a pioneering British engineer and inventor, celebrated for his groundbreaking work in aviation. Born in Coventry, he envisioned and developed the turbojet engine, a concept that revolutionized air travel. His tireless dedication led to the first operational jet engine in 1937. Despite initial skepticism from military and government officials, Whittle's perseverance ultimately transformed aviation, shaping the course of history. Knighted in 1948 for his contributions, his legacy endures as an icon of innovation in aerospace engineering. Sir Frank Whittle's visionary spirit continues to inspire generations of engineers and aviators worldwide.</p>
	<p>Nikola Tesla, Electrical Electronic</p>	<p>Nikola Tesla (1856–1943) persevered through personal challenges, including his neurodivergence and obsessive-compulsive behaviors. Despite facing family tragedy and financial struggles, Tesla's brilliance as an inventor and electrical engineer shone through. His groundbreaking work in alternating current (AC) power systems transformed the world, yet he grappled with setbacks and financial difficulties. Despite these obstacles, Tesla's relentless pursuit of innovation left an indelible mark on modern technology, solidifying his legacy as one of history's most remarkable inventors.</p>
	<p>Steve Wozniac, Electronic.</p>	<p>Steve Wozniak (born 1950) overcame early challenges, including dyslexia, to become a pioneering figure in technology. Co-founder of Apple Inc., Wozniak's engineering genius led to the development of the Apple I and II, revolutionizing personal computing. Despite financial struggles and initial skepticism, his innovations reshaped the tech industry. Wozniak's commitment to accessibility and education, along with his philanthropic efforts, further solidify his legacy as a visionary and humanitarian in the world of technology.</p>



**Evelyn
Wang**

**Academic
mechanical
engineer**

Evelyn Wang, a leading figure in engineering and academia, has excelled despite facing early gender barriers. Born in 1972, she overcame societal stereotypes to become a renowned professor at MIT. Specializing in nanotechnology and energy systems, Wang's pioneering research has earned her international recognition. Despite the challenges of navigating male-dominated fields, she continues to inspire future generations of women in STEM. Wang's dedication to innovation and education cements her status as a trailblazer in the world of engineering and science.

Wang is a currently serving Professor of Mechanical Engineering at MIT. A specialist in solar power and nanostructures who, unlike many on this list, has not yet completed her career. Academic engineers lead the way on solving real world problems. Aspiring to enter engineering at university level would expose you to engineers of this capability. The best universities in the world such as MIT are so attractive to academics because of your ability to work alongside and learn from well-established engineers.

Staff Contact Information -

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If you have any concerns about completing this summer work including access to the internet for research, then please contact your course director.