BTEC Level 3 Engineering – Curriculum Overview

At Space Studio West London, our **BTEC Level 3 Engineering programme** equips students with the skills, knowledge, and creativity needed for future careers in engineering. Over two years, learners explore mathematics, mechanics, electronics, product design, and modern manufacturing while applying theory through hands-on workshops and real-world projects. With a balance of technical study, practical experience, and specialist pathways, students graduate prepared for **university, apprenticeships, or direct entry into the engineering sector**. The programme blends classroom study with hands-on workshops, computer-aided design, electronics, and specialist projects, ensuring that every learner experience both the academic and practical sides of modern engineering.

Year 12 – First Year

Introduction
Year 12 introduces students to the core principles of engineering. They build mathematical fluency, develop safe workshop practices, and begin exploring mechanics, electronics, and design. This year provides the foundation for higher-level study and specialist pathways in Year 13.

Term 1 (September – December)
Students begin by strengthening their mathematical skills in algebra, indices, logarithms, trigonometry, and vector resolution, applying these directly to engineering problems. At the same time, they learn about safe engineering processes, including health and safety, risk assessment, and responsible use of tools in the workshop. By combining theory with practical awareness, learners gain confidence in solving problems and working safely in an engineering environment.

Term 2 (January – March)
The focus shifts towards mechanics and electronics. Students study forces, moments, equilibrium, stress, strain, and material behaviour, linking theoretical study to practical experiments. They also begin electronics with an introduction to semiconductors and diodes, learning how rectifier circuits function in everyday devices. By the end of this term, learners understand how structures and circuits connect within real engineering contexts.

Term 3 (April – May)
In this term, the emphasis is on applied problem solving and assessment preparation. Students revisit key principles of mathematics, mechanics, and electrical theory, applying them in exam-style questions and practical activities. Electronics advances into transistors and biasing techniques, with circuits tested using oscilloscopes and simulations. This strengthens both their technical understanding and their readiness for external assessments.

Term 4 (June – July)
The year ends with a strong focus on design and creativity. Students develop digital design skills through computer-aided design, producing 2D and 3D models, assemblies, and technical drawings. Alongside this, they complete practical workshop projects involving machining, fabrication, and assembly. By the close of Year 12, learners can demonstrate engineering solutions that combine technical accuracy with creative thinking.

Year 13 – Second Year

Introduction
Year 13 allows students to specialise and apply their engineering knowledge to real-world challenges. They study product design and manufacturing, explore commercial and quality principles, and complete advanced projects in areas such as electronics, microcontrollers, mechanics, and digital manufacturing. This final year prepares learners for the transition to higher education or industry.

Term 1 (September – December)
Students study the complete product design and manufacture cycle, analysing existing products, writing specifications, and beginning prototypes. Alongside this, they investigate the business side of engineering by exploring quality assurance, lean processes, and sustainability. This gives learners the tools to think like both engineers and innovators.

Term 2 (January – March)
The second term focuses on specialist pathways. Electronics students design and program microcontroller systems with sensors and actuators, while others study advanced electronics, mechanical behaviour of materials, or further engineering mathematics. This allows learners to deepen their expertise, strengthen coding and analytical skills, and manage specialist projects with increasing independence.

Term 3 (April – May)
This term highlights the commercial and manufacturing aspects of engineering. Students prepare for their external exam on applied commercial and quality principles, developing skills in project management, costing, and business analysis. They are also introduced to modern manufacturing technologies such as computer-aided manufacturing, CNC machining, and additive manufacturing (3D printing). This term connects technical learning with real industry practices.

Term 4 (June – July)
The final term is dedicated to major project work and the completion of specialist units. Students design and manufacture prototypes, test and evaluate their performance, and present professional project reports. Specialist pathways are concluded, allowing learners to demonstrate advanced skills in mechanical, electrical, or digital engineering. The year finishes with a showcase of student projects, leaving learners fully prepared for their next steps in university, apprenticeships, or careers in the engineering sector.