Space Studio West London
an Aspirations Academy

National Engineering Diploma (Double) - Curriculum Plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12 (RQF) curriculum overview	**Unit 1 Engineering Principles (LA A & B)** Mathematical Methods and Mechanical Principles. **Unit 3 Engineering Product Design & Manufacture (LA A)** Product design requirements and specifications.	**Unit 1 Engineering Principles (LA C & D)** Electrical and Fluid Principles. **Unit 3 (LA B & C)** Design communication and manufacturing processes.	**Unit 3 (LA D)** Product evaluation and optimisation. **Unit 2 Delivery of Engineering Processes Safely as a Team (LA A)** Safe working practices and legislation.	**Unit 2 (LA B & C)** Team working and carrying out engineering processes. **Unit 5 Specialist Engineering Project (LA A)** Research and project planning.	**Unit 5 Specialist Engineering Project (LA B & C)** Design development, prototype manufacture, testing and evaluation.	**Unit 7 Calculus to Solve Engineering Problems (LA A, B & C)** Functions, differentiation and integration.
Key knowledge outcomes (students should know)	> SI units and engineering notation >Algebraic manipulation >Trigonometry >Forces and equilibrium >Moments, stress and strain >Product lifecycle >Design briefs and specifications >Sustainability and material selection	> Current, voltage and resistance > Ohm's Law and power calculations > Fluid properties and pressure systems > Engineering drawing standards > Orthographic and CAD drawings > Manufacturing processes > Quality assurance and quality control	> Product testing and evaluation methods > Product optimisation techniques > Health and Safety at Work Act > COSHH and PPE requirements > Risk assessments > Safe systems of work	> Team roles and responsibilities > Communication methods in engineering > Engineering documentation > Project planning techniques > Research methods > Project specifications > Gantt charts and resource planning	> Design development techniques > CAD modelling principles > Material and component selection > Manufacturing planning > Prototype development > Testing and evaluation methods > Engineering	> Functions and graphs > Limits and continuity > Differentiation techniques > Rates of change > Integration methods > Area under curves > Engineering applications of calculus

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Key skills (students should be able to)	→Apply mathematical methods to engineering problems → Perform force and stress calculations → Rearrange engineering formulae → Produce engineering specifications → Analyse design requirements	→Analyse electrical circuits →Calculate electrical and fluid parameters →Produce engineering drawings →Use CAD software →Select manufacturing processes →Apply quality control techniques	→Evaluate engineering products → Recommend product improvements → Conduct risk assessments → Identify workplace hazards →Apply safe working practices	→Work effectively within engineering teams →Produce engineering documentation → Plan engineering activities → Conduct technical research → Develop project proposals and specifications	→Create and develop engineering designs →Produce CAD models →Manufacture prototypes → Conduct testing and collect data → Evaluate engineering solutions → Present project findings	→Apply differentiation and integration to engineering problems → Analyse graphical engineering data → Solve advanced engineering calculations → Interpret mathematical models → Apply calculus techniques in engineering contexts
Year 13 curriculum overview	**Unit 7 Calculus to Solve Engineering Problems (LA A & B)** Functions, differentiation and engineering mathematics.	**Unit 19 Electronic Devices and Circuits** Electronic principles, components, circuits and testing.	**Unit 60 Autonomous Mobile Robotics** Robotics systems, sensors, control systems and autonomous operation.	**Unit 29 Principles and Applications of Fluid Mechanics** Fluid properties, pressure systems and fluid applications.	**Unit 4 Applied Commercial and Quality Principles in Engineering** Commercial engineering, quality systems and continuous improvement.	Assignment Completion, Resubmissions, Synoptic Engineering Activities, Progression Preparation
Key knowledge outcomes (students should know)	> Functions and graphs > Limits and continuity > Differentiation	> Electronic components and symbols > Resistors, capacitors, inductors	> Robotics terminology > Autonomous systems > Sensors and	> Properties of fluids > Density, viscosity and pressure > Fluid statics and dynamics	> Commercial engineering principles > Quality assurance and quality control	> Synoptic links across engineering disciplines > Project evaluation

	techniques > Rates of change > Optimisation methods > Engineering mathematics applications	and diodes > Transistors and switching circuits > Logic gates > Circuit behaviour and testing procedures > Electronic fault diagnosis	actuators > Control systems > Navigation methods > Robot programming principles > Industrial applications of robotics	> Pascal's Law > Bernoulli's Principle > Continuity Equation > Engineering fluid systems	> Lean manufacturing > Six Sigma > Continuous improvement > Costing and budgeting > Engineering legislation and standards	techniques > Engineering career pathways > Apprenticeship requirements > University progression routes > Professional engineering expectations
Key skills (students should be able to)	→Apply differentiation to engineering problems → Apply integration techniques → Solve engineering calculations →Interpret graphical engineering data → Analyse engineering systems mathematically	→Construct electronic circuits → Interpret circuit diagrams → Use multimeters and oscilloscopes → Test and troubleshoot circuits → Analyse electronic system performance	→Design robotic systems → Program autonomous functions → Integrate sensors and actuators → Evaluate robot performance → Produce technical reports and evidence	→Calculate pressure and flow rates →Conduct fluid mechanics investigations →Analyse fluid systems →• Record and interpret experimental data → Produce engineering evaluations	→Apply quality management techniques → Analyse business performance → Evaluate engineering processes →Recommend improvements →Produce professional engineering documentation	→Complete assignment portfolios → Present engineering solutions professionally →Reflect on learning and performance.