Quality of Education: *Curriculum is planned and sequenced so that new **knowledge** and **skills** build on what has been taught before and towards its clearly defined end points.*

Ormiston Victory Academy

SUBJECT: DT - Engineering CURRICULUM PROGRESSION PATHWAYS CL: Mr D Grimes				2023/24
KS3 (Level 1) D&T	KS4 (Level 2) WJEC Vocational Award in Engineering	KS5 (Level 3) BTEC National	Further Education / training	Careers
9-11 Week Projects **Y7 DT Product Design – Skatepark Design** **Knowledge:** woodworking materials, tools and techniques, designing for a brief, workshop health & safety, skateboarding culture, Electrical components, Computer Aided Design **Skills:** Quality control measures, cutting and shaping wood using hand tools, introduction to pillar drill and belt sander, annotating engineering drawings, production planning. **Y8 DT Engineering Manufacture - Aluminium Lamp** **Knowledge:** Engineering materials, tools and equipment, CAD/CAM, hand tool and machine recognition, machine health and safety (lathe and pillar drill), **Skills:** Cutting internal and external screw threads, component assembly, 2D Design, laser cutting, metal working techniques, annotating engineering drawings, cutting lists, production planning. **6 Week Rotations** **Y9 DT Product Design - 3D Printed Lamp** **Knowledge:** Iterative design, designing for a brief, 3D printing materials, 3D CAD modelling, machine health and safety, temporary fasteners. **Skills:** 3D CAD modelling using fusion 360, Meeting a design brief, following working drawings, cutting and drill manufactured	**Year 10 WJEC Level ½ Vocational Award in Engineering** **Unit 1 - Manufacturing Engineering Products** **Knowledge:** Planning for manufacture, interpreting engineering drawings, selection of tools, materials and equipment for engineering products, manufacturing to agreed tolerances of metal components, risks associated with typical manufacturing processes in the workshop. **Skills:** Using metalworking tools, equipment and machinery safely and independently, creating production plans to follow based on a design brief and engineering drawings, identifying correct order or operations based on materials and design features, creating risk assessments of common workshop manufacturing processes. **Year 11 WJEC Level ½ Vocational Award in Engineering** **Unit 1 - Manufacturing Engineering Products** **Autumn Year 11 Certification** **20 Hour Internal Assessment** **Year 11 WJEC Level ½ Vocational Award in Engineering** **Unit 2 - Designing Engineering Products** **January Year 11** **10 Hour Internal Assessment** **Knowledge:** Iterative design process to develop products in a structured and appropriate manner for the given engineering product, redesigning engineering products, interpreting design brief, understanding engineering drawings, research methods for existing products, justification and methods for determining suitable design ideas, selection of drawing methods. **Skills:** Identifying design problems based on a design brief, writing design specifications, presenting design ideas, technical drawing methods, creating accurate engineering drawings that enable third party manufacture, using 2D and 3D CAD design solutions, researching existing	**Year 12 BTEC National Level 3 Extended Certificate in Engineering** **Unit 2:** Delivery of Engineering processes safely as a team. **Knowledge:** Manufacturing systems and processes. Material properties. **Skills:** Manufacture of a reading lamp using a range of tools and machines accurately and safely. **Unit 1 Exam:** Engineering Principles **Knowledge:** Materials and Engineering Science. Applied Maths. **Skills:** Application of knowledge (exam) Jan - June **Year 13 BTEC National Level 3 Extended Certificate in Engineering** **Unit 10:** Computer aided design for manufacture **Knowledge:** 2D / 3D CAD Commands. Drawing conventions. **Skills:** 2D, 3D Solid and 3D Shell drawing techniques. **Unit 3 Exam:** Product Design and Manufacture	**Engineering Undergraduate & Postgraduate Degree** **Apprenticeships in:** Aerospace automotive Broadcast civil engineering communication construction electrical energy hydraulics marine mechanic mining process engineering renewables systems engineering telecommunications transport. **Levels** intermediate advanced higher degree Post Graduates	**Engineering Sectors** Aerospace Agricultural Architecture Automotive Biomedical Chemical Civil A.I. /Robotics Drafting and Design Structural Systems Electrical Energy Renewables Technology

Material knowledge Use of tools and equipment accurately Iterative Design process Graphic Communication Access for All
Engineering Careers

boards using basic hand tools, production planning, evaluation **Y9 DT Engineering Manufacture - Toolbox** **Knowledge:** Metalworking tools and equipment selection, Production planning, interpreting engineering drawings, metalworking health and safety, permanent and non-permanent fasteners. **Skills:** Using tools and equipment safely in the workshop, operating a centre lathe to create basic turned components, creating internal and external threads in metals, folding metals accurately, deburring metals, using templates and jigs to streamline manufacture.	products, justifying design changes to solve engineering problems **Unit 3 - Solving Engineering Problems** **June Year 11** **1 Hr 30 External Exam** **Knowledge:** common engineering tools, materials and equipment, machining methods, additive and subtractive manufacturing processes, scales of production, forming methods, material properties and characteristics, structural design, mechanical design, electronic design, how engineering affects everyday life, environmental impact of materials, technologies that influence engineering, risk assessments, solving engineering problems using physics and mathematics, basic formulae, understand details in engineering drawings, common fixing methods used in the workshop. **Skills:** Understand and interpret command words used in exam questions, produce and interpret a range of engineering drawings, structuring extended writing tasks to produce a concise and detailed response, time management during exams, effective revision and recall techniques.	**Knowledge:** Research and design **Skills:** Iterative design, application of material knowledge.		