S4/5 Subject Choices

Design, Engineering & Technology

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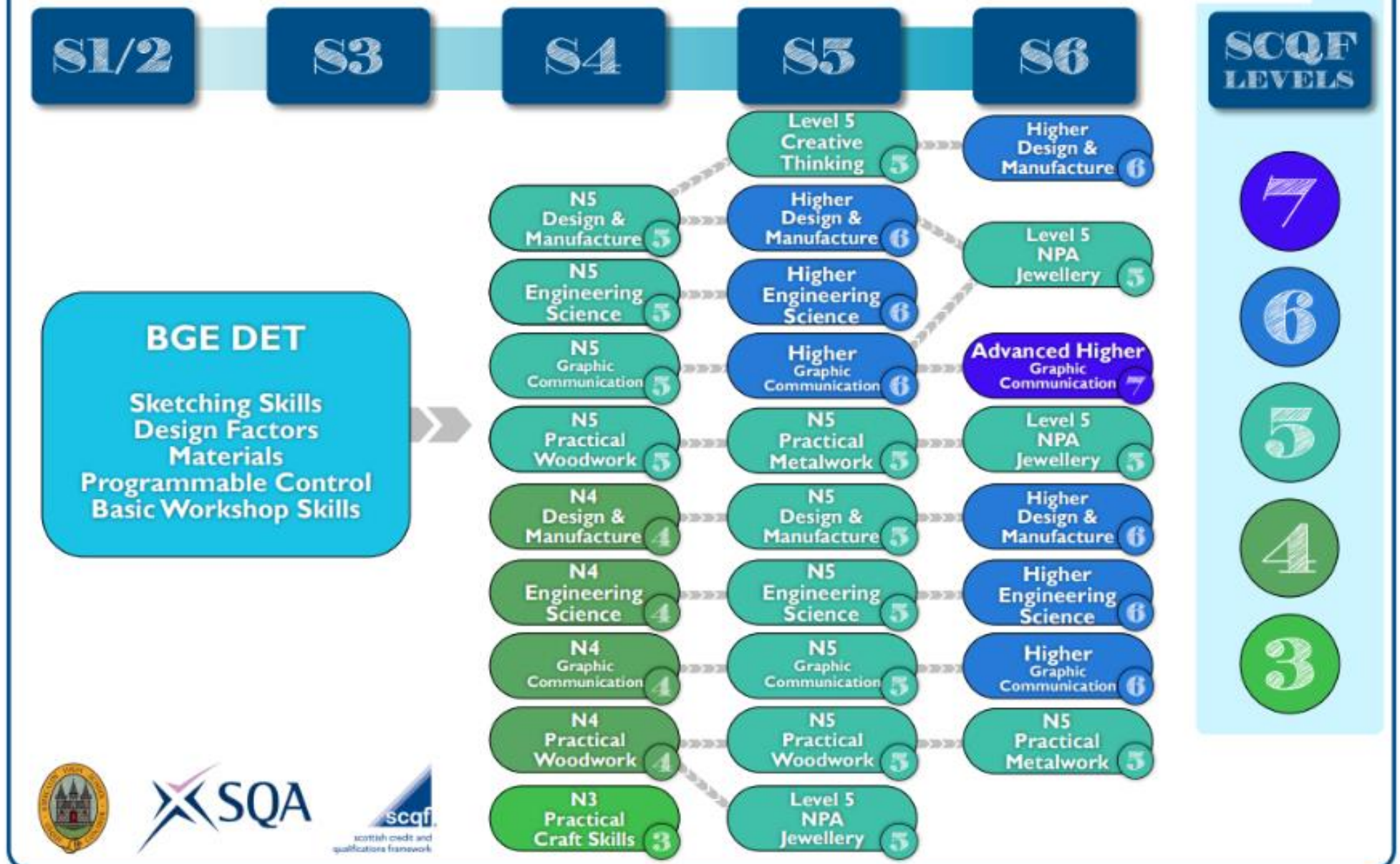

Design & Manufacture Level 6

Entry Requirements – Qualifications, Skills and Knowledge

To study this subject you should: be interested in creativity, problem solving & practical activities. The course is design based with minimal practical.

Course Content

Design: Students explore the design process from initial brief to final design proposals. Key elements include idea generation, specification writing, and developing creative solutions with knowledge of materials and processes.

Manufacture: Focuses on the commercial manufacturing of products, including materials, production processes, and planning for production, while considering sustainability and environmental impacts.

Design & Manufacture Level 6

Course Assessments

Question Paper: 80 marks (2 hours 15 minutes), assessing knowledge in design, materials, manufacturing, and the impact of technologies.
Assignment: 90 marks, requiring candidates to apply design skills to develop a proposal for a set brief, including research, graphic techniques, modelling, and planning for manufacture.

Learning Activities & Homework

Activities include design challenges, research tasks, creating design specifications, exploring ideas, and developing models and manufacturing plans. Homework may involve refining designs, practicing graphic techniques, researching materials and manufacturing methods, or preparing for assessments.

Design & Manufacture Level 6

<u>Wider Skills Development</u>

Thinking Skills: Creative problem-solving, analytical evaluation, and planning.
Employability Skills: Collaboration, communication, and understanding manufacturing processes.
Sustainability Awareness: Evaluating environmental impacts of design and production.

<u>Progression & Career Opportunities</u>

Progression to higher education in design, engineering, manufacturing, or related fields. Career opportunities in industrial design, product development, engineering, marketing, and manufacturing industries.

Engineering Science Level 5 & 6

Entry Requirements – Qualifications, Skills and Knowledge

To study this subject you should: be interested in the key role Engineers play in meeting the needs of society in fields that include: climate, medicine, IT & transport. You should also have achieved Mathematics at National 5 level.

Course Content

Engineering Contexts and Challenges: Exploration of real-world engineering problems, emerging technologies, and sustainability.
Electronics and Control: Study of electronic and programmable systems, including analogue, digital, and microcontroller-based control.
Mechanisms and Structures: Analysis of mechanical systems, structural designs, forces, and material properties.

Engineering Science Level 5 & 6

Course Assessments

Question Paper: 110 marks (2 hours 30 minutes), covering a range of engineering topics including control systems, drive systems, structures, and materials.
Assignment: 50 marks, involving analysis, design, construction, testing, and evaluation of engineering solutions to a set problem.

Learning Activities & Homework

Hands-on problem-solving tasks, including circuit design, modelling mechanical systems, and programming control systems. Investigative tasks into real-world engineering solutions, with a focus on sustainability and emerging technologies. Homework may include research, calculations, and practicing question paper techniques.

Engineering Science Level 5 & 6

Wider Skills Development

Numeracy: Application of formulas, data handling, and calculations related to energy, efficiency, forces, and material properties.
ICT Skills: Use of simulation software, microcontroller programming, and digital evidence management.
Thinking Skills: Problem-solving, critical evaluation, and applying theoretical knowledge to practical challenges.

Progression & Career Opportunities

Progression to further study in engineering or related disciplines at higher education levels. Careers in mechanical, electronic, structural, or systems engineering, as well as in sectors such as renewable energy, aerospace, and transportation.

Graphic Communication Level 5 & 6

Entry Requirements – Qualifications, Skills and Knowledge

To study this subject you should want the opportunity to: develop skills in graphic techniques, including the use of equipment, materials and software. To develop an understanding of the impact of graphic communication technologies on our environment and society.

Course Content

2D Graphic Communication: Students create, interpret, and evaluate 2D graphics using techniques such as orthographic drawing, digital design tools, and manual sketching.

3D and Pictorial Graphic Communication: Focus on creating and interpreting 3D models, rendering, and presentations, using CAD and other tools to produce impactful visual designs.

Graphic Communication Level 5 & 6

Course Assessments

Question Paper: 90 marks (2 hours 30 minutes), testing knowledge in CAD, graphic interpretation, drawing conventions, and desktop publishing (DTP).
Assignment: 50 marks, requiring the production of preliminary, production, and promotional graphics to respond to a design brief.

Learning Activities & Homework

Activities include manual and CAD-based tasks such as creating orthographic sketches, building 3D models, designing promotional materials, and applying graphic design principles. Homework may involve refining skills in DTP, CAD, and sketching, researching design principles, or analysing real-world graphic solutions.

Graphic Communication Level 5 & 6

Wider Skills Development

Numeracy: Measurement, dimensioning, and tolerance.
ICT Skills: Mastery of graphic software, CAD tools, and digital publishing techniques.
Thinking Skills: Applying design knowledge, analszing graphic designs, and creating innovative solutions.

Progression & Career Opportunities

Progression to further studies in design, engineering, architecture, or graphic arts. Careers in graphic design, advertising, marketing, CAD drafting, and related creative and technical industries.

Practical Metalworking Level 5

Entry Requirements – Qualifications, Skills and Knowledge

To study this subject you should have a keen interest in the practical manufacture of high quality products and an interest in workshop based practical manufacturing using metal.

Course Content

Bench Skills: Development of skills using hand tools for bench-fitting, sheet-metal work, and marking out complex features.
Machine Processes: Use of machines and equipment for metalworking, including turning, drilling, and shaping.
Fabrication and Thermal Joining: Skills in joining metal components through welding, brazing, soldering, riveting, and other thermal joining techniques.

Practical Metalworking Level 5

Course Assessments

Question Paper: 60 marks (1 hour), assessing knowledge in tools, materials, techniques, health and safety, and sustainability.
Practical Activity: 70 marks, involving the manufacture of a metal product to a set standard, with a completed log book documenting the process.

Learning Activities & Homework

Practical tasks like marking out, cutting, joining, and shaping metal products. Activities include interpreting working drawings, using power tools, applying finishing techniques, and practicing safe workshop procedures. Homework may involve research on materials, practicing drawing interpretations, or preparing for the assessments.

Practical Metalworking Level 5

Wider Skills Development

Numeracy: Measurement, dimensioning, and tolerances. Teamwork: Sharing tools and workspace with peers. Problem-Solving: Developing practical solutions to design and manufacturing challenges. Sustainability Awareness: Understanding recycling practices and material selection.

Progression & Career Opportunities

Progression to further studies in practical technologies or related fields. Career pathways in metal fabrication, engineering, construction, and manufacturing industries.

Practical Woodworking Level 5

Entry Requirements – Qualifications, Skills and Knowledge

To study this subject you should have a keen interest in the practical manufacture of high quality products and an interest in workshop based practical manufacturing using wood.

Course Content

Flat-frame Construction: Skills in making woodworking joints and assemblies commonly used in flat-frame joinery.
Carcase Construction: Skills in creating carcase assemblies, using working drawings in both familiar and unfamiliar contexts.
Machining and Finishing: Skills in using power tools and machinery, as well as surface preparation and finishing techniques.

Practical Woodworking Level 5

Course Assessments

Question Paper: 60 marks (1 hour), assessing knowledge of tools, materials, woodworking techniques, health and safety, and sustainability.

Practical Activity: 70 marks, requiring candidates to manufacture a finished product to a given specification, including maintaining a logbook documenting the process.

Learning Activities & Homework

Practical tasks like constructing woodworking joints, assemblies, and finished products. Activities include interpreting working drawings, safe tool usage, and applying surface finishes. Homework may involve reviewing health and safety practices, practicing marking out, or preparing for assessment.

Practical Woodworking Level 5

Wider Skills Development

Numeracy: Measuring, marking out, and calculating dimensions.
Employability and Citizenship: Collaboration, tool-sharing, and teamwork in workshop settings.
Thinking Skills: Applying knowledge to solve problems and creating woodworking products from specifications.

Progression & Career Opportunities

Progression to higher-level qualifications in practical technologies or related areas. Career paths in woodworking, carpentry, joinery, construction, and related industries.

Jewellery Basic Techniques Level 5

Entry Requirements – Qualifications, Skills and Knowledge

To study this subject you should have a keen interest in the practical manufacture of high quality jewellery and an interest in workshop based practical manufacturing using fine metals.

Course Content

Jewellery: Manufacturing Techniques – An Introduction
Marking Out
Piercing
Soldering
Working with Wire
Polishing

Jewellery Basic Techniques Level 5

Course Assessments

Assessments include practical exercises, design briefs, reports, and presentations. Each NPA requires candidates to complete specific Units, with integrated assessment opportunities where appropriate. Exercises may use base metals (e.g., copper, brass) and projects may involve precious metals and synthetic gemstones.

Learning Activities & Homework

Activities include marking out, piercing, soldering, polishing, and repairs. Practical, hands-on learning in a workshop setting, supported by demonstrations, projects, and research tasks. Design projects encourage candidates to develop and present creative ideas.

Jewellery Basic Techniques Level 5

Wider Skills Development

Core Skills: Communication, Numeracy, ICT, Problem Solving, and Working with Others.
Employability Skills: Workshop safety, precision, and craftsmanship.
Creative Thinking: Design development and application of aesthetic and technical jewellery-making skills.
Sustainability Awareness: Recycling and material selection.

Progression & Career Opportunities

Progression to HNC/HND in Jewellery or higher-level qualifications.
Career pathways include: Self-employed jeweller/designer
Employed jeweller/designer in retail
Bench jeweller in manufacturing or repair/service environments
Specialist roles in CAD, casting, setting, and other technical areas.

Creative Thinking Level 5

Entry Requirements – Qualifications, Skills and Knowledge

Suitable for learners interested in developing critical and creative thinking skills. No specific prior qualifications required; open to all learners motivated to explore creative problem-solving.

Course Content

Core Components: Research, Conceptualisation, Iteration (Fail & Fix), Communication, and Evaluation.
Outcomes:
Conduct primary and secondary research.
Develop and conceptualize imaginative ideas.
Test and refine solutions.
Clearly communicate and critically evaluate work.

Creative Thinking Level 5

Course Assessments

Formative and summative assessments based on the five learning outcomes. Evidence collected through sketchbooks, project outputs, and critical reflection. Grading based on the best two projects out of three challenges completed.

Learning Activities & Homework

Creative projects, hands-on exercises, and problem-solving activities. Activities include research, brainstorming, prototyping, and storytelling. Learners maintain sketchbooks to document their creative journey and provide evidence of their process.

Creative Thinking Level 5

Wider Skills Development

Development of meta-skills like critical thinking, problem-solving, communication, and adaptability. Fosters teamwork, innovation, and environmental and social awareness. Encourages self-reflection and iterative improvement in creative processes.

Progression & Career Opportunities

Articulation to Level 6 qualifications, HNC/D courses, or higher education programs in creative fields. Recognized by universities and creative industries for entry into degree programs and careers. Careers include roles such as designer, creative director, UX designer, strategist, planner, and more.