Engineering Manufacture

YEAR 11

EXAM – FINAL EXAM

Core content and specialist knowledge: Revise and use practice exam papers in preparation for exam.

Principles of lean manufacturing: Investigate how industry design for efficient production and sustainability.

Modern technologies: Investigate how industry assesses quality using modern technology.

NEA R112 – Quality Control of engineered products

Quality Control: Use QC techniques to assess and compare manual and CNC manufacturing.

CNC manufacturing: Report on rapid prototyping, additive manufacturing & robotics.

CAD/CAM manufacture: Use CNC manufacturing to produce aluminium thumb screw.

Planning: Plan & simulate CAD/CAM production of thumb screw.

NEA R111 – COMPUTER AIDED MANUFACTURE

Manufacturing: Plan & make a thumb screw from aluminum using machine techniques.

Scale of production: Modify production plans.

NEA R110 – PLANNING FOR MANUFACTURE

Communication: Understanding and interpreting orthographic drawings & convention.

Materials: Properties, characteristics & applications.

Preparation: Accurate marking out of work pieces.

BUSH INSERT – SKILLS DEVELOPMENT

Machining skills: Centre lathe & milling machine skill acquisition.

CLIP-IT – SKILLS DEVELOPMENT

Bench skills: Developing cutting, shaping, threading & riveting skills, etc.

Fabrication: Investigating methods of assembly.

DOOR HOOK – SKILLS DEVELOPMENT

YEAR 10

MOVE – ELECTRONICS & MECH

Robotics: Using microcontrollers to control and design robotics.

Teams: Work as a design team, to merge ideas and work to briefs

SKILLS STICK – RESISTANT MATERIALS

Modelling: Develop your design through iterative modelling.

Creativity: Using techniques such as biomimicry to create design.

LIT – TECHNIQUES & PROCESS

Craft Skills: Addition processes & wood joints. Using skills to develop high quality craftsmanship products.

Design: Mastering Isometric and rendering skills, iterating designs.

Learning about foundation principles in Engineering.

Experience of multiple manufacturing techniques, associated skills and theory.

Metalwork: Understanding material properties, and honing fine motor skills.

Testing: Using modelling techniques to test and trial ahead of manufacture

Motions, movements & levers: How things move, and mechanical advantage.

Electronics: Applying programming knowledge to design.

Materials: Working properties, and joining materials.

Manufacturing: Concrete casting, materials theory, routers, jigs and many more!

CAD: Assembling parts together, creating orthographic drawings and 3D printing.

MOOD LIGHTING – METALWORK & DESIGN

MECHANISMS – ENGINEERING DESIGN

DESIGN DAY

YEAR 9

WHEELIES – GRAPHICS & CAD DESIGN

Evaluate: At each stage, how can you improve your product's performance?

CAD: Develop independence in CAD using 3D design software to make complex design ideas.

Industry: Gain experience of working in industry for the day to a real world brief

Electronics: Understanding capacitance, and astable circuitry

Users (UCD): User centered design, and creativity techniques.

DYNAMIC DESIGNS – GRAPHICS & PHOTOSHOP

MEDIA PLAYER – 3D CAD & USER DESIGN

KEEP OUT! – ELECTRONICS & PLASTICS

Photoshop: Applying graphics theory, Using computers to convey Product design

Make: Thermo - Forming Shaping manufactured boards Basic circuitry and soldering

Evaluate: Does your product work? How can you fix problems?

Materials: Working with metals, casting, cutting and finishing techniques.

Structures: Experimenting with tension and compression, and understanding material properties.

Processes: Designing formers, vacuum forming and vinyl cutting

Teams: Work as a design team, to merge ideas and work to briefs

Broadening knowledge of materials and mechanisms. Working in more depth on projects, honing your practical skills, improving your resilience & problem solving whilst developing independence in the workshop.

ILLUMINATIONS – CAD & ELECTRONICS

ZIP IT – METALWORK & MATERIAL

ARCHITECTURE – MATERIALS & MODELS

YEAR 8

Materials: Polymers Classification. What is a polymer? What is a circuit?

Model: Using card to model complex structures, and present ideas

Computer Aided Design: Begin to master 2D CAD, and experiment with 3D.

Electronics: Circuits, what components do and, resistance theory.

WHAT'S IT HOLDING – WOODWORK & JOINTS

DESIGN SKILLS – GRAPHICS & MODELS

Design: Designing for users, CAD design development, creativity and range extension.

Product Analysis: What makes a product suitable, or desirable? How can we learn from others?

Make: Measuring, wood joints, use of hand and machine tools

Materials: Wood classification. Where does timber come from?

Graphics: Drawing for purpose and for explanation (isometric)

Baseline Assessment: What do you already know about D&T?

Introduction to the workshops: Health and Safety

Welcome! Settling in, equipment and group identity

YEAR 7

Learning about foundation principles in the design and manufacture of products for specific users.

Experience of multiple material areas with associated skills and theory.

THE FERNWOOD SCHOOL