

9Subject Co-ordinator

- Mr Patrick Noone

1. Teaching Staff

- Mr. Patrick McGarry : Senior Cycle/Junior Cycle
- Mr. Patrick Noone : Senior Cycle/Junior Cycle

2. Department Rooms

- D5

3. Equipment

- General workshop hand tools
- Data Projector
- Desktop Computer
- Lathes x 3
- Milling Machine x 1
- Pillar Stand Drilling Machine x 4
- Gas Forge
- Welder x 1
- Shears and Folding Table

4. Time Allocation

- First Year : 1 double (1/2 Year-taster programme)
- 2nd & 3rd Years : 1 double and 2 singles per week
- 4th & 5th Year : 1 double and 3 singles

5. Mission statement

“The Metalwork and Engineering department aspires to provide a safe, stimulating environment where all students can develop their practical and academic skills to fulfil their goals”

6. Subject Aims

- **To develop the capacity and ability of students in the area of practical activities.**
- **To apply appropriate thinking skills in the realisation of solutions.**
- **To develop observation and evaluation skills in Metalwork/Engineering**
- **To increase awareness of environmental issues.**
- **To develop the cognitive and practical skills associated with Metalwork/Engineering through problem solving and critical thinking.**
- **To develop appropriate technical skills for the construction of practical based project work.**
- **To contribute to the students preparation for life by stimulating the students interest and confidence in working safely with equipment and materials.**
- **To develop an appreciation for a safe working environment.**
 - **To promote the principles of cooperation, quality and balance.**

7. Subject Objectives

On completion of their studies students should be:

- **Familiar with the principles, concepts, terminology and methodologies associated with Metalwork/Engineering.**
- **Creative, resourceful and study both independently and within a group when designing projects.**
- **Able to produce a project folder which follows a standard approach to project design.**

- Able to work with a high degree of confidence and skill on the various workshop machines.
- Able to display an understanding of Metalwork/Engineering materials and their properties by using a variety of materials in practical exercises.
- Able to study and interpret working drawings so as to produce an artefact to a high standard.
- Able to work comfortably and confidently with all hand tools, measurement and marking out equipment.
- Competent and confident in the application of CAD/CAM.
- Able to interpret verbal, written and mathematical information, and to apply that information to the practical environment.

8. Grouping of Pupils (Mixed ability, Streaming)

- Metalwork/Engineering is an optional subject and consequently all groups are of mixed ability. However, early in their 3rd year, students opt for Higher / Ordinary level after discussion with their Parents / Guardian and their teacher. Students are all generally encouraged to take the Higher level paper where possible.
- In 4th year all students follow a common level in Engineering and they also decide on their level by the end of that year in consultation with Subject Teachers.
- Both the Honours and Ordinary groups are taught in the same classroom.

9. Textbooks and Course Materials

- 1st Year : No Textbook
- 2nd&3rd Years : Basic Engineering Technology S O Tuairisg

- **4th&5th Year** :Engineering Technology L Hennessy L Smyth
: Power point notes/hand outs.

10. Planning for students with special needs

The MW/Eng department caters for students with special needs in the following ways:

- The subject lends itself to one-to-one teaching thus assisting students with learning difficulties.
- Teachers liaise regularly with school's learning support co-ordinators Mrs Lyons & Ms Hayes. Relevant information from student profiles is exchanged where appropriate.
- Realistic expectations and suitable homework plans are devised & implemented.
- Teachers also liaise with Tutors, Parents and school management.

11. Cross-curricular planning

This is particularly relevant as there is overlap between Maths, Construction Studies, and DCG. Whenever possible the link is established between subjects to tie the individual subjects together to show the bigger picture of education. As the MW/Eng staff are also practical teachers the links between these subjects is especially highlighted. The link between Maths is also emphasised and discussed both formally and informally with the Maths department to establish common links between the courses.

12. Homework Procedures

Homework is to be given on a regular basis to reinforce subject matter taught in class and to encourage and enhance the students own individual work and abilities.

All students are expected to record their homework in their journals and produce work to an acceptable standard and also within a reasoned allocated time.

Oral questioning is used to evaluate how well this has been undertaken by students.

13. Record Keeping Procedures

Record of results, absenteeism, 'lates', behaviour etc are recorded in the teacher's journal and is also recorded on the schools eportal facility where deemed appropriate.

14. Reporting Procedures

Depending on what has to be reported dictates to whom the reporting is done.

For disciplinary matters the reporting may be to the Year Head / Principal.

This is primarily done via the school eportal facility but also through face-to-face discussions to get a more personal understanding on any issues.

For matters relating to "child abuse" the reporting must be to the Designated Liaison Person. This report should be written.

Matters relating to a child's academic performance may be reported to parents at a specially arranged meeting and parent teacher meetings.

15. Teacher in-career development

There has been no in-service training for Metalwork/Engineering in recent years.

16. Subject Meetings

Time is allocated to formal subject meetings during the year. Topics include organization of common curriculum, order lists of materials and equipment, organization and maintenance of the Engineering room, paperwork associated with exams, discipline, class sizes, students with learning difficulties, books, new *Literacy and Numeracy* initiatives etc. Both Teachers frequently consult each other regarding matters arising. These subject meetings are very valuable. See Appendix 3 for a copy of department meetings.

See also Appendix 1&2 for Leaving Cert and Junior Cert examinations results which are frequently discussed and evaluated and these Subject Meeting. Strategies to improve results are often debated and recorded. Areas where we perform well against the national figures are also acknowledged.

17. Literacy and Numeracy Policy

Reasons to integration of Numeracy and Literacy in MW/Engineering

- The universal language of *design and Manufacture* helps bridge and overcome many literacy barriers.
- Keywords to describe the skills mastered in Metalwork and Engineering are easily identifiable and can help the student associate with the meaning of that particular term.
- Where pupils struggle with the language to represent their ideas there is huge scope to use other *practical* means to communicate.
- Literacy is encouraged through the use of posters on the wall with new terms explained.

- Numeracy is an integral part of MW/Eng. Links between Mathematics and Technical Graphics are often seen and easily recognised to the students. This is especially focused upon with the Junior and leaving certificate projects.

Strategies for Improving Literacy and Numeracy

- Students free hand sketch various exercises on graph paper which include texting and dimensioning.
- The Engineering student project requires students to research and investigate, develop and explain ideas, produce working drawings. Dictionary and internet are encouraged to help understand difficult terms.
- Topics are explained and demonstrated explicitly to students.
- Class discussions are encouraged using relevant terms/descriptions.
- Students day to day use of measuring equipment.
- Students are encouraged to calculate approximate size of sheet material required.

18. Assessments/Examinations Procedures

Formal assessment of learning occurs at Christmas and Summer for , 2nd and 4th year students in a structured examination setting. 3rd years and 5th years generally have formal examinations in December and Mock examinations in February in a structured examination setting. 1st years are examined on their practical work and sketching. At the end of a section a teacher may give an examination to assess the learning in the particular topic. Assessment for learning continues on throughout the year where teachers monitor student's progress by speaking to students while they work on practical projects. The results of all formal examinations are relayed to parents in the form of a report.

19. Metalwork/Engineering - Activities

First Year

1. Introduction to metalwork room.
2. Health and safety.
3. Introduction to hand tools/pillar stand drill.
4. Free hand sketching of hand tools and production of cardboard folder.
5. Nameplate.
6. Keytag.
7. Mobilephone holder.
8. Decoration for Christmas tree.
9. Egg holder.

Second Year

1. Recap on standard practice within the metalwork room.
2. Health and safety.
3. Aeroplane project.
4. Helicopter project.
5. Vintage car project.
6. Theory.

Third Year

1. Finishing of vintage car project.
2. Preparation of 3hr practical pieces.
3. Junior certificate project work.
4. Theory
5. Mock Examination.
6. 3 hour practical examination
7. Junior certificate theory examination.

Fourth year

1. Six hour practical exercises x2.
2. Theory.
3. Design and make project....Model vehicle, aircraft etc...

Fifth year

1. Six hour practical exercise.
2. Theory.
3. Delivery of Leaving Certificate Project/Design task.
4. Delivery of Leaving Certificate Six hour practical Exercise.
5. Project/Design task.
6. Mock Examination.
7. Leaving Certificate six hour practical Examination.
8. Leaving Certificate Theory Examination.

| First Year | BCS Junior Cert Metalwork Scheme of Work | |
|-------------------|---|--|
| Term | Practical work | Assessment |
| 1-8 weeks | <p>Safety in the Metalwork room.</p> <ul style="list-style-type: none"> • Introduction to Room • Safety • Introduction to hand tools • Name of hand tools • Use of hand tools • Sketching of Hand tools/sketch paper • Making of cardboard folder to contain sketchings <p>Name Plate:</p> <ul style="list-style-type: none"> • Supply of brass material • Use of marking out tools • Introduction to filing procedures. • Introduction to pillar stand drill/safety • Engraving and polishing. <p>Key tag:</p> <ul style="list-style-type: none"> • Supply of aluminium material • Marking out • Drilling • Filing/polishing • Engraving | <p>Review of students work in class</p> <p>Grade pupils folders.</p> <p>Review of students work in class</p> <p>Review of students work in class</p> |

| | | |
|------------------------------------|--|--|
| <p>1-8 weeks</p> | <p>Mobile Phone Holder:</p> <ul style="list-style-type: none"> • Introduction to plastics and their uses • Supply of plastic material • Working with plastic/Acrylic • Thermoplastic, explanation of.... • Marking out/Drilling/countersinking • Introduction to the strip heater • Folding of plastic piece • Supply of aluminium back piece • Folding of back piece • Drilling and assembly <p>Decoration: (Christmas)</p> <ul style="list-style-type: none"> • Brass Star • Aluminium Tree <p>Egg Holder:</p> <ul style="list-style-type: none"> • Plastic egg holder • Chain drilling • Filing/polishing/folding | <p>Review of students work in class</p> <p>Grading of students Projects.</p> <p>Review of students work in class.</p> <p>Grading of students projects.</p> |
| <p>2nd years</p> | <p>Practical work</p> | <p>Assessment</p> |
| <p>Sep-Oct</p> | <p>Aeroplane:</p> <ul style="list-style-type: none"> • Introduction of project work • Emphasis on high standards of work • Accuracy, neatness, finishing • Supply of material for elements 1-5 • Instructions given at each stage on the marking out and manufacture procedure for each element | <p>Review of students work during class.</p> |
| | | |

| | | |
|-----------------------|---|--|
| <p>Nov-Dec</p> | <p>Aeroplane cont.....</p> <ul style="list-style-type: none"> • Supply of material and components for elements 6-10 • Discussion on working drawings and how to read them and apply them to the work piece. • Instructions on marking out, folding/bending • Preparation of metal pieces for paint spraying • Use of emery paper • Spray painting techniques • Safety • Introduction to electronic components and their uses • Soldering and safety • Final assembly • Photographs of projects for classroom and school website | <p>Review of students work in class</p> <p>Grading of students work as they progress through each element of the project.</p> <p>Overall grade of aeroplane.</p> |
| <p>Term</p> | <p>Practical work</p> | |
| <p>Jan-Feb</p> | <p>Helicopter:</p> <ul style="list-style-type: none"> • Supply of material and components for elements 1-5 • Instructions on reading and interpreting the working drawings • Marking out • Manufacture of pieces • Emphasis on cutting, hacksaw work etc... • Polishing/folding • Twisting. | <p>Homework Worksheets</p> <p>Review of students work in class</p> |
| <p>Feb-Mar</p> | <p>Helicopter cont.....</p> <ul style="list-style-type: none"> • Supply of material and components for elements 6-10 • Marking out • Manufacture of pieces • Spray painting • Electronics associated with project • Assembly • Photos for classroom and school website. | <p>Grading of students work as they progress through each element of the project.</p> <p>Overall grade for project.</p> |

Ballyhaunis Metalwork and Engineering Subject Department Plans

| Term | Practical work | Assessment |
|-------------------------------|--|---|
| Apr-May | Vintage car: <ul style="list-style-type: none"> • Supply of materials and components for elements 1-5 • Marking out Measuring • Use of vernier callipers for determining material thickness • Storage of project work | Review of students work in class. |
| 3rd years | Practical work | Assessment |
| Term Sep-Oct | Three hour practical exercises (x2) <ul style="list-style-type: none"> • Supply of material and components for exercises • Discussion on levers, linkages and cams • Emphasis on accuracy of marking out • Accuracy of drilling • Use of height gauge • Use of vernier callipers • Precision of manufacturing • Polishing and presentation of components • Assembly • Focus on operation and movement of finished mechanism | Review of students work in class. Grading of students individual pieces as they progress through each component. |
| Nov-Dec | Junior Certificate Project <ul style="list-style-type: none"> • Project analysis • Materials analysis • Discussion on manufacture methods for each element of the project • Emphasis on project deadline • Supply of materials and components • Commencement of project work • Emphasis on high standards of workmanship | Review of students work in class. |
| Jan-Feb | <ul style="list-style-type: none"> • Continuation of project work • Conclusion of project work | |

| | | |
|-----------------------------|---|---|
| Feb-Mar | <ul style="list-style-type: none"> • Emphasis on quality of finish and operation • Spraying and polishing of pieces • Associated electronics • Final assembly/exam number • Storage of projects • Project deadline (march 26th approx) | <p>Monitoring of students progress throughout the project. Encouraging students at all times to maintain high standards and achieve their goal.</p> |
| Apr-May | <ul style="list-style-type: none"> • Preparation of three hour practical pieces • Focus on accuracy/precision and finishing • Drilling correct sized holes for tapping • Completion of pieces • Storage of pieces • Discussion on three hour practical test • Working against the clock • Three hour practical examination (May) | <p>Monitoring of students class/practical work on an ongoing basis.</p> |
| 4th years | Practical work | Assessment |
| Terms | | |
| Sep-Oct | Past six hour practical examination (x2) | |
| Nov-Dec | <ul style="list-style-type: none"> • Supply of materials and components for both exams • Discussion on mechanisms, levers and linkages and their uses in the wider areas of engineering and technology • Studying and interpretation of the working drawings supplied • Emphasis on accurate marking out and associated procedures • Use of the vernier height gauge • Use of the vernier callipers • Precision drilling and sizing of holes for tapping procedures • Edge finishing of materials, plastics and metals • Emery paper and polishing mops • Assembly of components • Testing | <p>Review of students work in class.</p> <p>Evaluation of each component and overall grading of two practical exercises.</p> |
| | | |

| | | |
|-----------------------|--|--|
| <p>Jan-May</p> | <p>Design and Make project</p> <ul style="list-style-type: none"> • It is envisaged that the project in Engineering at senior cycle will help with the development of many skills within the subject area • Use of different teaching methodologies during the project will help to stimulate learning throughout its period • Discovery learning.....displaying a greater sense of self achievement when they produce an artifact/project that they designed or part designed themselves • Stimulus variation..... varying the teaching techniques and good quality demonstrations will promote higher levels of interest and attention spans • Group work/learning.....a project by its very nature promotes group work which has many benefits such as improving problem solving skills <ul style="list-style-type: none"> • Introduction to the concept of design in the context of project work • Design and make a model vehicle..... • Introduction to project work • How to approach it • Emphasis on the design process • Research and investigation of ideas and possible solutions • Working drawings • Choice of material • Manufacture • Assembly and finish | <p>Monitoring of students work during class period.</p> <p>Grading of students projects on completion.</p> |
|-----------------------|--|--|

| 5 th years | Practical work | Assessment |
|-----------------------|---|---|
| Term | | |
| Sept-Oct | <p>Past six hour practical examination</p> <ul style="list-style-type: none"> • Supply of materials and components for exercise • Emphasis on precision • High standards of workmanship to the completion of the exercise • Edge finishing and surface finishing • Assembly and testing | Review of students work in class |
| Nov-Dec | <p>Leaving Certificate Engineering Project and six hour practical</p> <ul style="list-style-type: none"> • Hand out working drawings for six hour practical • Revisit the reading and interpretation of working drawings • Supply students with material • Start work on numbered items • Gather work when complete and store in individual containers | |
| Jan-Mar | <ul style="list-style-type: none"> • Reintroduce the topic of project work as per 4th year scheme • Design and choice of materials • Start making project • Continue with production and design of project | Review of students work in class |
| Apr-may | <ul style="list-style-type: none"> • Emphasis on the project folder and the production of same • All areas of the design process are to be covered • High quality drawings, sketches etc... • Conclusion of project and folder • Final presentation of project • Examination number • Storage of project (mid-march approx) <p>Leaving Certificate Six Hour Practical</p> <ul style="list-style-type: none"> • Day examination will take place in mid-may • Hand out completed preparatory work | Observation of students work at all times. Encourage high standards at all times. Praise work done and stress the importance of project deadline. |

| | | |
|----------------------------|--|---|
| | <ul style="list-style-type: none"> Do six hour exam | |
| 2nd year | Theory | Assessment |
| Term | | |
| Sep-Oct | Workshop tools/equipment <ul style="list-style-type: none"> Workshop tools Health & safety Drilling machine Drill bits Materials Plastics Metals | Homework Exercises. Review of students work in class. |
| Nov-Dec | Furnaces <ul style="list-style-type: none"> Blast, Basic oxygen process, Electric arc Types of steel.....dead, mild, medium carbon, stainless and their uses Non-Ferrous metals.....aluminium, copper, lead and their uses Non-Ferrous alloys.....brass, bronze, soft solder Christmas exam | Topic Test Homework Exercises. Christmas exam. |
| Jan-Feb | Structures and Mechanisms <ul style="list-style-type: none"> Types of forces.....compression, torsion, tension, bending, shear Shape of structure members.....T shape, channel, box, corrugated Triangulation in structures Levers....mechanical advantage---Load/Effort velocity ratio.... Examples of levers in everyday life Pulleys and belts....u, toothed, flat Chains and sprockets | Homework Exercises. Topic Test |
| Feb-Mar | Gears <ul style="list-style-type: none"> Spur, idler, bevel, worm and wheel, rack and pinion, gear trains Calculation of gear ratio Calculation of rotational speed of driven gear Cams....different profiles, followers, their uses in industry and mechanisms Ratchets Crank and slider mechanism Cam shafts | Homework Exercises. |

| | | |
|----------------|--|--|
| | | |
| Apr-May | Graphics and Design <ul style="list-style-type: none"> • Projection, systems... orthographic, isometric, oblique, working drawings • Freehand sketching • Design process • Research and developments of ideas • Material selection • Production of drawings • Evaluation • Inventors and discoveries • Summer exam | <p>Homework Exercises.</p> <p>Summer Exam.</p> |

| | | |
|-----------------|---|---|
| | | |
| 3rd Year | Metalwork Theory | |
| | Topic | Assessment |
| Term | | |
| Sept-Oct | Electronics <ul style="list-style-type: none"> • Introduction to electronics and its uses in industry • Electronic symbolspositive, negative, ac/dc, cell, battery. Bell, buzzer, transistors, meters Recap on Furnaces <ul style="list-style-type: none"> • Three types...blast, basic oxygen process, electric arc • Production of iron and steels Engines <ul style="list-style-type: none"> • Four stroke, two stroke • Parts of the engine...valves, piston, cylinder, intake, exhaust, crankshaft, gudgeon pin, cam shaft, sparkplug, piston rings | <p>Review of students work in class</p> <p>Review of students work in class</p> <p>Homework Exercises</p> <p>Topic test</p> |

| | | |
|--------------------------|---|--|
| | | |
| Nov-Dec | <p>Junior cert metalwork project</p> <ul style="list-style-type: none"> • Study of junior cert project • Reading and interpretation of working drawings • Examination of manufacturing steps and associated procedures of each component • Discussion on materials to be used • Study of three hour practical examination pieces to be prepared in advance of examination | Review of students work in class |
| Nov- Dec Cont.... | <p>Machining</p> <ul style="list-style-type: none"> • Lathe work • Parts of the lathe...head stock, tail stock, carriage, cross slide, top slide, feed shaft, lead screw • Chucks....three jaw self centring , four jaw independent • Tool posts.....holders, types of bits • Types of turning...facing, parallel, taper • Lathe tool angles....clearance, rake • Centre drill • Knurling • Calculation of spindle speeds and cutting speeds $N = \frac{S \times 1000}{\pi \times D}$ | <p>Homework Exercises</p> <p>Homework Exercises</p> <p>Christmas Test</p> |
| Term | | |
| Jan-Feb | <p>CNC Machining/Lathe</p> <ul style="list-style-type: none"> • Identification of cnc lathe • Jog keys • Explanation of lathe terms...test run, G-codes, M-codes, tool offsets, tool park position • X and Z axes on lathe • Explanation of co-ordinates • + and - • Advantages of cnc machining • Safety procedures involved • CAD/CAM • Identification of computer devices...input and | Homework Exercise |

| | | |
|------------------------|---|---|
| | <p>output</p> <ul style="list-style-type: none"> • Revise for junior cert mocks | Mock test |
| Mid Feb - Mar | <p>Hot and cold forming of materials</p> <ul style="list-style-type: none"> • Straight edge bending • Folders, formers • Sheet metalworking tools • Techniques involved.....hollowing, planishing, bending, twisting, scrolling • Hot metal forming <p>Fitting and assembly</p> <ul style="list-style-type: none"> • Rivets • Screws, threads, nuts • Stocks and dies | <p>Review of students work in class</p> <p>Homework Exercises</p> |
| Term | | |
| Feb-Mar cont... | <p>Pillar Stand drill</p> <ul style="list-style-type: none"> • Parts • Gearbox • Speeds • Speed calculation $N = \frac{S \times 1000}{\pi \times D}$ | <p>Homework Exercise</p> <p>Review of students work in class</p> <p>Topic test</p> |
| Apr-May | <p>Heat Treatment</p> <ul style="list-style-type: none"> • Annealing • Normalising • Hardening & Tempering • Case hardening • Water and oil and brine • Revision and preparation for Junior Certificate Exam | Past papers |

| 4 th year | | |
|----------------------|--|---|
| Engineering Theory | | |
| Term | Topic | Assessment |
| Sept-Oct | <p>Material Testing</p> <ul style="list-style-type: none"> • Destructive testing....hardness, toughness, impact, izod, charpy, • Non-destructive testing....dye, x-ray, ultra sound, eddy current • Stress, strain graphs • Load extension graphs • Youngs modulus of elasticity | <p>Homework Exercises.</p> <p>Topic Test</p> |
| Nov-Dec | <p>Metallurgy</p> <ul style="list-style-type: none"> • Mining <ul style="list-style-type: none"> ➤ Open cast ➤ Under ground • Ore processing <ul style="list-style-type: none"> ➤ Flotation ➤ Solution <p>Thermal joining of materials</p> <ul style="list-style-type: none"> • Permanent <ul style="list-style-type: none"> ➤ Gas welding ➤ Electric arc ➤ Submerged ➤ Mig & Tig • Non permanent <ul style="list-style-type: none"> ➤ Soldering ➤ Brazing • Transformer • Transformer rectifier circuit • Safety | <p>Homework Exercises</p> <p>Topic Test</p> <p>Christmas test</p> |
| Term | <p>Plastics</p> <ul style="list-style-type: none"> • Basics • Polymers • Extrusion • Injection moulding • Uses in industry and home • Plasticisers • Stabilisers • Glass and carbon fibre • Lamination | <p>Homework Exercises</p> <p>Topic Test</p> |

| | | |
|---------------------------------------|--|--|
| <p>Mar-May</p> | <p>Robotics and CNC machining</p> <ul style="list-style-type: none"> • Uses in industry • Terms associated • Operation of • Advantages and disadvantages • Safety features • Simulation <p>Electronics</p> <ul style="list-style-type: none"> • Uses in industry and home • Terms associated • Components and their uses • Circuit diagrams • Power sources <p>Revision</p> | <p>Homework Exercises</p> <p>Summer Test.</p> |
| <p>5th year</p> | <p>Engineering theory</p> | <p>Assessment</p> |
| <p>Term Sep-Oct</p> | <p>Engineering Materials & Properties</p> <ul style="list-style-type: none"> • Metals • Non metals <ul style="list-style-type: none"> ➤ Polymers ➤ Ceramics ➤ Traditional • Ductility, malleability, hardness, toughness, elasticity, brittleness, conductivity, tensile strength • Alloy diagrams • Bonding <ul style="list-style-type: none"> ➤ Covalent ➤ Ionic ➤ Metallic • Structures <ul style="list-style-type: none"> ➤ Body Centred Cubic ➤ Face Centred Cubic ➤ Close Packed Hexagonal • Defects <ul style="list-style-type: none"> ➤ Line ➤ Crystal ➤ Vacancy | <p>Homework Exercises</p> <p>Review of students work in class</p> <p>Topic Test</p> |
| | | |

| | | |
|-----------------------|---|---|
| <p>Nov-Dec</p> | <ul style="list-style-type: none"> • Distribution of Leaving Cert Project • Discussion on brief <ul style="list-style-type: none"> ➤ Analysis and definition of ➤ Folder creation ➤ Design process ➤ Investigation, research, ideas, possible solutions, final solution ➤ Making models ➤ Lessons on the production of working drawings...sketching, solidworks • Copper production <ul style="list-style-type: none"> ➤ Oxygen converter ➤ Electrolysis • Heat treatments • Special topic | <p>Homework Exercises.</p> <p>Topic Test</p> |
| | | |
| <p>Jan-Feb</p> | <p>Preparation for Mock Examination</p> <ul style="list-style-type: none"> • Revision of topics from 4th year and recent theory from Sep-Dec • Work from past papers • Mock Examination | <p>Homework Exercises</p> <p>Mock Exam</p> |
| | | |
| | | |
| | | |

| Term | Topic | Assessment |
|----------|---|----------------------------------|
| Feb-Mar | Machining <ul style="list-style-type: none"> • Lathe • Grinding • Milling • Drilling • CAD/CAM | Review of students work in class |
| | Pneumatics <ul style="list-style-type: none"> • Terms associated with and its uses in industry • Advantages and disadvantages • Programming | |
| Apr- May | Health and Safety <ul style="list-style-type: none"> • In the workshop • With industrial waste • With adhesives • With corrosive substances • Signage and notices | Homework Exercises |
| | Project Folder <ul style="list-style-type: none"> • Completion and presentation of project folder for leaving certificate project | |
| | Thermal Equilibrium Diagrams <ul style="list-style-type: none"> • Understanding how a diagram is made up • Drawing diagrams • Solid solutions • Composition of the phases • Liquidus line and solidus line • Calculating the ratio of the phases using lever law • Eutectic and eutectoid | |
| | Iron Carbon Diagrams <ul style="list-style-type: none"> • Allotropy of iron • Iron carbon diagrams | Past Papers |

| | | |
|----------------------------------|---|--|
| | <ul style="list-style-type: none"> Structures of ferrite, pearlite. Cementite, austenite <p>Revision and preparation for leaving certificate examination</p> | Leaving Certificate |
| Term 2 Oct- Dec | <p>C.A.D</p> <ul style="list-style-type: none"> Terminology and theoretical aspects-no computers. Identification and application of computer software and hardware. Familiarisation of various tools in CAD software package. (Very limited availability of computers) <p>Short Questions</p> <ul style="list-style-type: none"> Introduction through Ordinary and Higher level past papers <p>Perspective</p> <ul style="list-style-type: none"> 1 and 2 point perspective and exercises on same | <p>Homework Worksheets</p> <p>Review of students work in class</p> <p>Topic Test</p> <p>Homework Worksheets</p> |
| Term 3 Jan-Feb | Revision of Topics for Mocks | |
| Feb - June | Exam Papers –Revision where appropriate | |

20. Engineering Course Content

1. Core Areas of Study

- **Health & Safety**
- **Materials Science**
- **Computer Aided Processes (CAD/CAM)**
- **Electronics**
- **Pneumatics**
- **Manufacturing Techniques and Technology**
- **Drawing and Design**
- **Power and Energy**
- **Mechanisms**

2. Optional Areas of Study Students must study any two of five

- **Computer Aided Processes**
- **Decorative Metal Craft**
- **Power, Energy and Control**
- **Manufacturing Techniques & Technology**
- **Materials Science**

Course assessment

The syllabus will be assessed in relation to the syllabus objectives and the specified student learning outcomes. All material specified within the areas of study is examinable.

There are three assessment components at Junior cert and Leaving cert Higher levels and two at Junior cert Ordinary level

- **Junior Cert Higher Level**
 - **Project 35%**
 - **Three Hour Practical 35%**
 - **Theory 25%**
- **Junior Cert Ordinary Level**
 - **Project 75%**
 - **Theory 25%**

- **Leaving Cert Higher Level**
 - **Project 25%**
 - **Six Hour Practical 25%**
 - **Theory 75%**
- **Leaving Cert Ordinary Level**
 - **Project 30%**
 - **Six Hour Practical 30%**
 - **Theory 40%**

- **Students are encouraged to use the I.T. resources available on subject related websites such as T4 and E.T.T.A.**