



## *Graphics & Construction Studies*





LEAVING CERTIFICATE APPLIED

VOCATIONAL EDUCATION

**GRAPHICS &  
CONSTRUCTION STUDIES**





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# INTRODUCTION

## RATIONALE

This vocational specialism provides learners with an opportunity to develop a range of practical and generic skills in the area of Graphics and Construction Studies. It facilitates their personal and social development by providing opportunities to engage with the local community. It encourages expression using a range of graphical and other communication skills. The course also seeks to engage the learners in considering and experiencing the aesthetic, environmental, vocational and consumer awareness dimensions of the construction industry.

## NUMBER AND SEQUENCE OF MODULES

Students have to complete four modules. The module in Graphic Communication is a core mandatory module. Any three of Modules 2 to 5 may be selected.

There is no prescribed sequence for the implementation of the modules but it is recommended that Graphic Communication is completed before implementing the module on Construction.

- Module 1: Graphic Communication  
(Core Mandatory Module)
- Module 2: Construction
- Module 3: Building Services
- Module 4: Woodcraft
- Module 5: Design and Manufacture of Educational Toys
- Module 6: Computer Aided Design

## DESCRIPTION OF MODULES

### GRAPHIC COMMUNICATION

This module offers learners an opportunity to explore graphics as a means of communication and presentation in everyday life situations that are relevant to them. It enables them: to integrate and become familiar with various drawing systems; to develop a range of graphical skills; to use a range of materials to enhance presentations; and to develop an awareness of the importance of new technologies in the graphic communication industry. As graphics is an essential part of all modules the learners will have an opportunity to apply the graphic skills developed in this module to the other three modules selected.

### CONSTRUCTION

This module is designed to facilitate the learner in developing practical skills in relation to the construction of buildings. It also presents opportunities to experience the creative, legal, structural,

environmental and vocational aspects of the construction industry. As with all modules in this course it offers great scope for, and is best served by, significant interaction with the local community.

### **BUILDING SERVICES**

This module introduces learners to the practical and environmental aspects of electricity and water supply. The module deals with the generation and distribution of water and electricity and with a range of practical plumbing and electrical engineering skills. In common with all other modules in this course there is an emphasis on safety. The module is relevant to the life experiences of the learner in terms of consumer education, conservation and environmental awareness.

### **WOODCRAFT**

This module offers beginners, and those who have some previous experience of woodcraft, an opportunity to design and make items of furniture for interior and exterior use. Learners are guided through the different stages of production: planning, design, manufacturing and evaluation. Learners practise a range of practical skills in terms of creating a design portfolio, applying graphic communication skills, marking out materials, using a range of tools and processes, joining methods, fittings and finishes. The module also seeks to create an awareness of environmental issues by examining the production and processing of raw materials and the use of preservatives.

### **DESIGN AND MANUFACTURE OF EDUCATIONAL TOYS**

The purpose of this module is to harness the learner's natural enthusiasm for creativity in the production of attractive educational products. It requires the learner to consider the design and finish of educational products from the perspective of people other than themselves and from the perspective of the market. Consequently investigation, research and interaction with the local community are of particular importance in this module. The module contains all the usual characteristics of a design-and-make module. There is a special emphasis on the different mechanisms, and other approaches, used to entertain and stimulate children through toys.

## **COMPUTER AIDED DESIGN**

In this module learners will develop basic skills in Computer Aided Design. They will produce a portfolio of work encompassing the creation of basic shapes, logos and other creative designs and pictures. Learners will also experience some co-ordinate-based drawing and layer based work. This module will help to broaden the learner's understanding of the use of computers and provide them with an introduction to the world of computers and graphics.

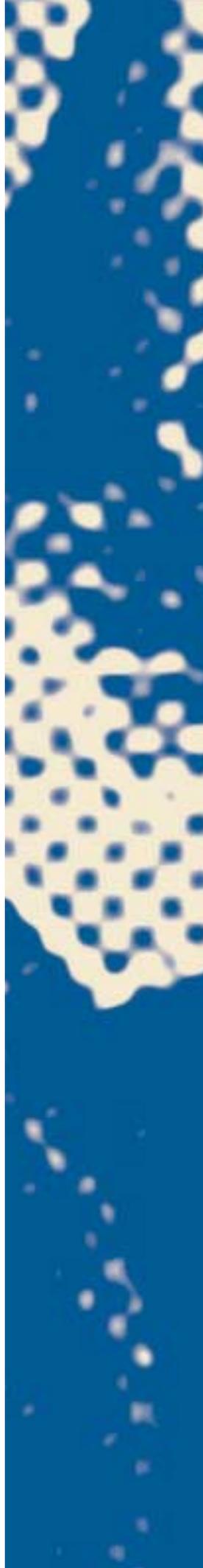
### **GENERAL RECOMMENDATIONS**

The Teacher Guidelines provide suggestions in relation to classroom practice. The guidelines are not prescriptive. There is scope for teachers to exercise their own professional judgement based on the interests, needs and abilities of the group. However, it is essential that the fundamental principles of the Leaving Certificate Applied be upheld. Teachers are therefore required to adopt a methodology that is student centred, activity based and affirming.



MODULE 1

**GRAPHIC COMMUNICATION**



## MODULE 1:

# GRAPHIC COMMUNICATION

### PURPOSE

The importance of being able to communicate by means of drawings and diagrams is widely recognised in all aspects of life but even more so in the area of Construction Studies. This module aims to instil the confidence in every student to produce drawings by freehand sketching, stencils, instruments and the computer. This confidence may be enhanced by displaying the students' work whenever circumstances allow. The appropriate use of colour and shading to add life and depth to drawings is also an important dimension of Graphic Communication. The content should be tailored to suit the students' ability and prior experience of the subject. By the end of the module he/she should feel more comfortable with graphics as a means of communication.

### PREREQUISITES

None.

## AIMS

This Module aims:

- to encourage students to use graphics as a means of communication
- to develop the students' awareness of the importance of graphics in everyday life
- to provide students with an opportunity to develop a range of skills related to graphic communication
- to familiarise students with various drawing systems
- to provide an opportunity for students to experiment with a range of materials to enhance presentation
- to familiarise students with the computer as a means of producing drawings
- to familiarise students with health and safety requirements when working with the computer and materials/equipment used in graphics.

## UNITS

Unit 1: Freehand drawing and colour rendering

Unit 2: Shapes and logos

Unit 3: Drawing systems

Unit 4: Simple developments and packaging

Unit 5: Scale drawing

Unit 6: Computer aided design

Unit 7: Health and Safety

## Unit 1: Freehand drawing and colour rendering

### LEARNING OUTCOMES

The students will be able to:

1. draw/trace and colour optical illusions
2. solve simple graphical puzzles
  
3. create simple puzzles, e.g. mazes, using grid paper
4. draw/trace simple sketches using grid paper
  
5. render sketches with pencils and/or felt markers as a means of enhancing sketches
  
6. produce a portfolio of freehand sketches on a given topic
7. use stencils to create/enhance design solutions.

### TEACHER GUIDELINES

- ▶ Worksheets containing puzzles could be used at the beginning of the unit to simply encourage the students to draw various lines and increase their confidence.
- ▶ Examples of optical illusions, which the students could draw or trace, could be used to show how simple lines and shading can trick the eye and this can be related to design. Students should be encouraged to sketch simple objects with the aid of grid paper. Some students may start by tracing sketches in order to increase their confidence.
- ▶ The students could examine textbooks or magazines to see how rendering can enhance a sketch. The students may experiment with different methods of enhancing drawings and evaluate their results.
- ▶ The students should compile a small portfolio of sketches to illustrate examples of their best work.

## Unit 2: Shapes and logos

### LEARNING OUTCOMES

The students will be able to:

1. identify basic shapes, e.g. triangles, quadrilaterals and polygons
2. draw/trace these shapes using templates or instruments
3. draw/trace tessellations using templates or instruments
4. create patterns based on straight lines and curves
5. draw various logos based on basic shapes
6. create new logograms/pictograms/monograms related to their school, mini-company or work placement.

### TEACHER GUIDELINES

- ▶ Triangles, quadrilaterals and polygons cut from perspex or plywood could be used to investigate their properties. The students may use these as templates to draw shapes and patterns e.g. a hexagon generated from an equilateral triangle. The students could give examples of where geometrical patterns may be found and create their own patterns using templates if necessary.
- ▶ The students collect examples of various logos and categorise them on their basic shape. Some logos could be drawn using instruments or the computer, adding text and colour. The students observe the pictograms used in their own environment and create their own for a specified situation.

### Unit 3: Drawing systems

#### LEARNING OUTCOMES

The students will be able to:

1. draw/trace orthographic views of simple models on grid paper
2. dimension simple orthographic views
3. complete orthographic views from 3D sketches
4. trace/redraw isometric views on grid paper
5. draw/sketch isometric views by interpreting 2D drawings
6. trace a perspective view from a photograph
7. use one point perspective to sketch room interiors adding colour (bearing in mind various colour schemes).

#### TEACHER GUIDELINES

- ▶ Students with little or no experience of graphics may start by working with small models and colouring surfaces seen from various views. Dimensioned orthographic views of these models could be produced.
- ▶ Students could create 2D drawings from 3D data and vice versa. The level of difficulty will depend on the students' ability.
- ▶ Photographs may be used to introduce the concept of perspective drawing. Student may use photographs to locate points etc. One point perspective may be used to create room interiors. Students should discuss the importance of colour and suggest suitable colour schemes for various situations.

## Unit 4: Simple developments and packaging

### LEARNING OUTCOMES

The student will be able to:

1. cite examples of some of their favourite packaging
2. describe the environmental impact of packaging once it has served its purpose
3. cut out and assemble a pre-prepared development using card or cardboard
4. design and make a simple package for a specific purpose
5. use colour stencils or transfers to enhance their packaging
6. describe the importance of sequential diagrams that may accompany products. Produce a sequence of diagrams for a particular situation.

### TEACHER GUIDELINES

- ▶ The students should collect packaging and produce a wall chart with a selection of the group's favourites.
- ▶ This could be used as a focus to discuss the factors to be considered in designing packaging and the need for recycling to avoid the production of large amounts of waste and its problems. The students should follow the design process to produce a folder/container for a specific purpose e.g. holding drawing equipment or computer disks, packaging for mini-company product etc.
- ▶ The students could investigate methods of enhancing their packaging. Students should collect examples of where sequential diagrams are used to aid the assembly of a product or to perform a certain procedure. The students, individually or as a group, could produce their own set of sequential diagrams for a certain situation.

## Unit 5: Scale drawing

### LEARNING OUTCOMES

The student will be able to:

1. give examples of where scale drawings may be used
2. calculate scales and dimensions from given drawings
3. increase/reduce drawings using various methods, e.g. grids, photocopier, overhead projector.

### TEACHER GUIDELINES

- ▶ A group discussion or guest speaker could be used to identify the need for scale drawings and their importance to the construction industry. The students could produce a plan of the graphics room by applying a suitable scale. Using real sets of plans the students could calculate dimensions of rooms etc. and insert objects to given scale.

## Unit 6: Computer Aided Design

### LEARNING OUTCOMES

The students will be able to:

1. produce drawings of simple objects using CAD packages
2. save their work and edit it where necessary
3. identify the hardware necessary to run a CAD package
4. give examples of the career possibilities in CAD
5. describe the impact CAD has had on the area of construction
6. identify career opportunities in the area of computer aided design.

### TEACHER GUIDELINES

- ▶ Adequate access to computers is important for the completion of this unit.
- ▶ Any CAD package that is available in schools would be appropriate.
- ▶ The students could experiment with various commands for this unit and produce simple drawings such as logos.
- ▶ The students would need to become familiar with the hardware required to run a CAD package and appreciate the need to treat the equipment with care.

## Unit 7: Health and Safety

### LEARNING OUTCOMES

The students will be able to:

1. identify the health risks associated with the incorrect use of computers
2. use all materials and equipment in a safe and proper manner
3. list positive ergonomic features in use of computers.

### TEACHER GUIDELINES

- ▶ Health and safety is an integral part of this module. If working with craft knives to produce packages and models extreme care should be taken. Students should be familiar with ergonomic features, such as appropriate worktop height, anti-glare screens, etc.

## RESOURCES

### BOOKS

*Starting Design and Communication*, by Brian Light, Longman,  
ISBN 0-582-00429-2.

*Design Illustration*, by David Beasley, Heinemann Educational Books,  
ISBN 0-435-75063-1

*Graphic Communication 1*, by Stuart Bland, Longman,  
ISBN 0-582-22441-1.

*Graphic Communication 2*, by Stuart Bland, Longman,  
ISBN 0-582-22445-4.

*Design and Communication*, by Tony Lawler, Longman,  
ISBN 0-582-00270-2.

*Graphic Communication (Book 1)*, by A. Yarwood, Nelson  
ISBN 0-17-431263-6.

Junior Certificate Drawing Books may also contain material  
that maybe useful.

The Internet



# KEY ASSIGNMENTS

MODULE 1: GRAPHIC COMMUNICATION

## CHECKLIST

I produced three rendered freehand sketches of various objects and I produced a dimensioned orthographic projection of a simple object

I, as part of a group, produced a logogram/pictogram/monogram for a required situation

I produced a pictorial drawing/model of a room interior with an appropriate colour scheme

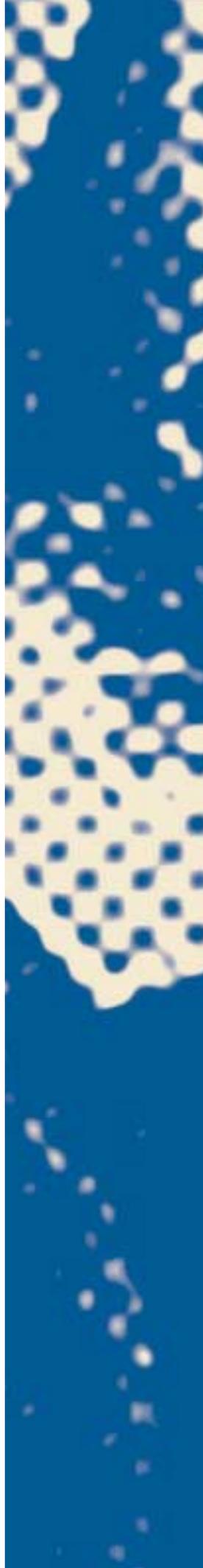
I, as part of a group, invited a guest to speak to us on the importance of graphics in his/her profession

*or*

I, as part of a group, visited a work place where graphics plays an important role.

MODULE 2

**CONSTRUCTION**



## MODULE 2:

# CONSTRUCTION

### PURPOSE

This module is designed to provide students with an insight into a variety of construction processes – thereby developing knowledge and skills that will contribute to the students' overall development, their preparation for further education or training and adult working life.

### PREREQUISITES

Graphic Communication.

## AIMS

This Module aims to:

- develop an understanding of health and safety relating to construction work
- introduce the students to the possibility of a career in the construction industry
- develop basic skills in the use of tools and equipment
- develop an awareness of planning control and its importance to the environment
- enable students to adopt a systematic approach to design.

## UNITS

Unit 1: Planning and Built Environment

Unit 2: Planning a Room

Unit 3: Planning a House

Unit 4: The Building Envelope

Unit 5: The Construction Industry

Unit 6: Health and Safety

## Unit 1: Planning and the Built Environment

### LEARNING OUTCOMES

The student will be able to:

1. explain why planning control is necessary
2. list the various types of planning permission
3. identify the documents required for planning permission
4. complete a planning application form
5. demonstrate awareness of the impact of buildings on the environment.

### TEACHER GUIDELINES

- ▶ The topic and importance of planning control and its relationship with harmony in the built environment can be explored through:
  - a variety of visual material.
  - visits by experts from outside the school.
- ▶ study the necessary documents required for full planning permission.
- ▶ The students should be given hands-on-experience filling out application forms, inserting titles, and labelling drawings.
- ▶ Examples of both new and old buildings should be examined with the intention of getting students to form opinions on the positive and negative impact of these buildings on the environment.

## Unit 2: Designing a Room

### LEARNING OUTCOMES

The students will be able to:

1. draw a plan of a specific room to a given scale
2. create a model of the room
3. design the furniture layout of the room
4. design a colour scheme for the room
5. encompass this room design in a single line floor plan of a dwelling
6. develop an awareness of the different lighting requirements in each room of a house
7. develop an awareness of the ventilation requirements in each room
8. develop an awareness of the need for fire escape.

### TEACHER GUIDELINES

- ▶ The intention of this unit is to develop the students' awareness of functional and aesthetic design by working through the design of a specific room. This may be done by allowing the students to use a room in their own house as an example. They can measure the room and draw it to scale on a hard base. To create a 3D model of the room card walls can be made to scale with doors and windows cut out etc. Scale furniture can be made or bought as a resource to design the layout of the room. Then using paint a colour scheme for the room can be tested. This room can then be included in a single plan layout for a house. During this process attention can focus on light, heat and ventilation requirements as well as on health and safety aspects including "means of escape".

### Unit 3: Building Envelope (External)

#### LEARNING OUTCOMES

The student will be able to:

1. draw or model a typical foundation for a two storey house
2. draw or model a roof truss to scale
3. label and give sizes for a typical head and sill detail in a cavity wall
4. label the parts of an exterior door and state two materials from which it can be made
5. distinguish between different window systems
6. develop an awareness of the differences between solid and timber frame wall construction
7. list three different types of external wall finishes.

#### TEACHER GUIDELINES

- ▶ It is required that at least one of the activities in this unit is a practical exercise where a product is made. The extent of the practical content will depend on the class/students being taught and the time allocated.
- ▶ The depth to which these topics are covered should not be any more than is necessary to create an awareness of the materials used and why they are suitable.
- ▶ A typical example of a practical exercise is to make a roof truss to a small scale by marking it out from a prepared template and outlining the basic idea of triangulation.
- ▶ A practical exercise may be used as the basis for a task, key assignment or an example of practical work. There is also scope for group work in the area of wet trades. In the case of window and door studies, slides or trade catalogues are sufficient to use as resource materials.

## Unit 4: Construction within the House

### LEARNING OUTCOMES

The students will be able to:

1. list two advantages and disadvantages of timber and concrete ground floors and first floors, and draw, make or model one type
2. draw, make or model a typical stud partition to include a door opening and grounds for electrical fittings
3. list three types of internal door
4. list two types of heating
5. demonstrate an awareness of the need for extractor/ventilation units in various rooms
6. show awareness of the need for fire resistance within the house.

### TEACHER GUIDELINES

- ▶ It is required that one practical exercise is undertaken in this unit. This may vary from the making of a scale model to mitring or scribing two pieces of skirting or architrave together.
- ▶ The advantages and disadvantages of floor types may be explained by discussion or a site visit followed by a discussion.
- ▶ The door types may be studied by using brochures or by a visit to a hardware shop.
- ▶ Types of heating should be investigated from the point of view of economy of use in the context of the finite resources of fuels and the advantages of renewable energy resources.
- ▶ The need for ventilation and extraction should be covered to a depth appropriate to the abilities and interests of the class group concerned.
- ▶ An investigation of fire resistance and fire detection (emphasising the use of smoke alarms) is mandatory.

## Unit 5: The Construction Industry

### LEARNING OUTCOMES

The Student will be able to:

1. list the members of a project design team
2. identify the roles of site agent and site foreman
3. describe the work of the various trades and professions associated with the construction industry including:
  - Carpenter
  - Plumber
  - Electrician
  - Plasterer
  - Painter/Decorator
  - Interior Designer.

### TEACHER GUIDELINES

- ▶ It is intended that this unit will enable the students to gain an insight into the work involved in a building project from the point of view of the various professions and trades-people involved in the building industry.
- ▶ It is envisaged that each student will prepare a questionnaire to conduct an interview with an individual involved in one of the areas of work covered in the class. Methods of reporting back or displaying the outcomes include reports, wall charts, models, video or audio production.

## Unit 6: Health and Safety

### LEARNING OUTCOMES

The student will be able to:

1. identify particular potential hazards related to equipment associated with construction processes e.g. portable electric tools
2. name appropriate protective clothing associated with handling construction material
3. use hand, head and eye protectors where appropriate
4. list procedures for summoning assistance in the case of accident
5. outline key regulatory requirements in relation to the workplace
6. demonstrate key lifting and handling techniques.

### TEACHER GUIDELINES

- ▶ The students should be introduced to the publications from the National Industrial Safety Organisations in particular construction summary Sheet No. 8 "Portable Electric Tools and Equipment".
- ▶ The use of hard hats, steel toed shoes, gloves, eye and ear protection should be highlighted.
- ▶ Prior to conducting a site visit it is important to have the appropriate insurance required to cover the students while on site.

## RESOURCES

### BOOKS

*Shaping Spaces, Architecture in Transition Year* Blackrock Education Centre, Dublin

*Building Technology* by Ivor H. Sealy

*Construction Studies* Association of Woodwork Teachers, Dublin Branch

*The Which Book of Do-It-Yourself*, David Holloway editor, Consumers' Association and Hodder and Stoughton

### VIDEO

An Introduction to Concrete Technology

Concrete Practice: Ground Floor Construction

An Introduction to Concrete Practice

Finishes in Concrete

All available from Irish Cement Limited (01 – 2883888)

Our House: Presented by Duncan Stewart, COCO Television.



# KEY ASSIGNMENTS

MODULE 2: CONSTRUCTION

## CHECKLIST

As part of a group I visited a site and observed excavation in progress

As part of a group I examined the structure of a timber upper floor

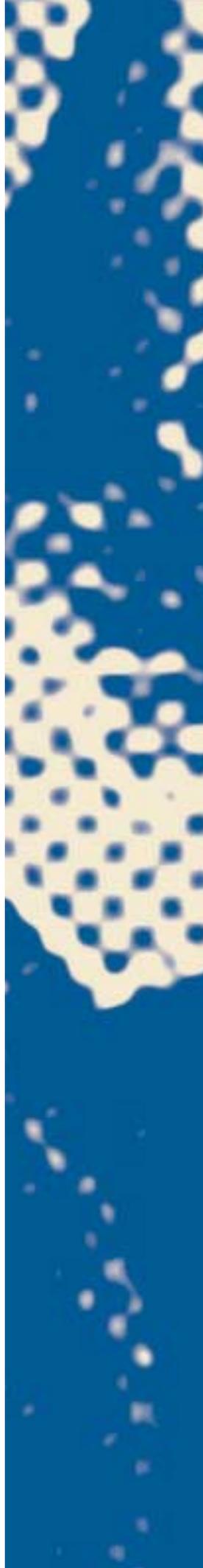
I measured a room and drew its plan to a given scale

I joined two pieces of skirting board using a scribed joint.



MODULE 3

**BUILDING SERVICES**



## MODULE 3:

# BUILDING SERVICES

### PURPOSE

This module is both broad based and specific in its design. First it provides a conceptual basis for the development of increased consumer awareness among students with regard to the supply of water and electricity. Second it sets out the necessary knowledge and understanding of the principles, practices and materials required for both plumbing and electrical provision within the home. It will thus contribute to the overall development of the students in their preparation for further education/training, and adult and working life.

### PREREQUISITES

None.

**Note: the practical work for the electrical part of this module must only be tested using a 9 volt power supply. The Health and Safety of the students must be the prime consideration at all times.**

## AIMS

This Module aims:

- to introduce students to the methods of generating electricity and providing clean water and the environmental implications attached to these
- to familiarise students with the methods of conserving energy in the home
- to provide opportunities for students to demonstrate awareness of health and safety requirements in relation to plumbing and electrical provision within the home.
- to enable the student to become familiar with and to use the appropriate fittings and materials related to water and electricity supply in the home
- to provide opportunities for students to communicate graphically the organisation of engineering services within the home
- to provide opportunities for students to consider the possibility of a career in a related area of work.

## UNITS

- Unit 1: Health and Safety
- Unit 2: Provision of Services – Water
- Unit 3: Plumbing in the Home
- Unit 4: Provision of Services – Electricity
- Unit 5: Electricity in the Home
- Unit 6: Communication Graphics

## Unit 1: Health and Safety

### LEARNING OUTCOMES

The student will be able to:

1. explain the health hazards presented by a polluted water supply, sewer bacteria/gases and the use of insulation material
2. outline the hazards presented by electricity and the appropriate safeguards to be taken
3. explain the standard regulations and correct procedures in relation to the use of equipment and tools.

### TEACHER GUIDELINES

- ▶ This unit draws attention to Health and Safety issues in a general way, in the provision of engineering services.

The work in this unit may be based on investigations such as:

- a visit to an installation outside the school or centre
- a visit by an expert from outside the school or centre to the class
- simple science experiments
- book-based research.

## Unit 2: Provision of Services – Water

### LEARNING OUTCOMES

The student will be able to:

1. describe the sources of water
2. explain the treatment of drinking water, and the way in which it is distributed
3. identify sources of water pollution
4. outline the hazards associated with sewerage and the procedures adapted in making it safe for disposal.

### TEACHER GUIDELINES

- ▶ Following a group discussion on the source of water and how water goes to and from our homes, students produce a schematic diagram to record the various stages.
- ▶ Discuss the importance of clean water. Follow this by categorising the sources of pollution within the community.
- ▶ Research how sewerage is treated locally. This could involve bringing in a guest speaker or a visit to a treatment plant.

## Unit 3: Plumbing in the Home

### LEARNING OUTCOMES

The student will be able to:

1. identify a range of plumbing fittings
2. connect two straight sections of pipe
3. fix a leaking tap
4. name the common methods for heating domestic water and describe the advantages/disadvantages of the various methods
5. explain the operation of a domestic hot/cold water system
6. outline the methods used to reduce heat loss in a domestic dwelling
7. outline the ways in which plumbing in the home can be adapted to take disability into account.

### TEACHER GUIDELINES

- ▶ Various plumbing fittings e.g., stop cock, drain cock, gate valve taps, compression joints, soldered joints, plastic joints, waste pipe fittings, traps and pipe sections are distributed and their uses discussed.
- ▶ Students use the fittings to do a number of plumbing exercises e.g., fixing tapwashers, connecting pipes and fitting undersink traps, replacing washers in taps.
- ▶ Discuss the energy sources used to heat domestic water i.e. gas, oil and solid fuel. Identify the advantages and disadvantages of each. A study of alternative energy sources such as wind or solar heating should be undertaken.
- ▶ The student on their own represents diagrammatically, or working in groups makes a display board of the components of a hot and cold water system. The components dealt with should include: overflow pipe, cylinder, expansion pipe, supply pipes to outlets.
- ▶ Examine samples of insulating materials, and identify where they are used.
- ▶ Brainstorm designing a plumbing system within the home for a person with disability.

## Unit 4: Provision of Services – Electricity

### LEARNING OUTCOMES

The student will be able to:

1. explain the generation and distribution of electricity
2. differentiate between various types of generation stations
3. identify the ways in which electricity may be conserved in the home.

### TEACHER GUIDELINES

- ▶ Discuss/brainstorm the generation of electricity and how it gets from its source to the home.
- ▶ Discuss energy sources used in the generation of electricity i.e. oil, gas, coal, peat, nuclear, hydro and wind.
- ▶ Investigations based on visitor exercises or book-based research may be used for these aspects of the unit.

## Unit 5: Electricity in the Home

### LEARNING OUTCOMES

The student will be able to:

1. wire various domestic outlets i.e. switches and plug tops
2. connect an electric circuit to demonstrate electrical current in both series and parallel
3. calculate the fuse ratings for various domestic appliances
4. calculate the running costs of various domestic appliances
5. explain the need for various types and sizes of cables.

### TEACHER GUIDELINES

- ▶ Use learning centre, display boards and worksheets to support the practical activities in this unit.

## Unit 6: Communication Graphics

### LEARNING OUTCOMES

The student will be able to:

1. sketch freehand the various fittings and components in home plumbing and electricity
2. draw the layout of a hot and cold water system using graphic conventions
3. draw the layout of a two ring circuit.

### TEACHER GUIDELINES

- ▶ Basic freehand sketching and annotated schematic diagrams are the basis of this unit. However, students with artistic flair or ability in Computer Aided Design should be encouraged to use these skills to prepare or enhance their work as and where relevant.

## RESOURCES

*Plumbing and Central Heating*, by A. Jackson and D. May,  
Collins DIY Guide Series, ISBN 0-004-12814-1

*Construction Studies for the Leaving Certificate*,  
Association of Woodwork Teachers, 1991

*Electricity in the Home, Teach yourself series*, by G. Davidson  
and L. Lamb Hodder, ISBN 0-340-49703-0

*Readers Digest, DIY Manual*, The Readers Digest  
Association Limited, London

*The ENFO Pack on Water*, a resource for schools, post-primary resource  
pack researched and developed by Blackrock Teachers Centre, Carysfort  
Avenue, Blackrock, Co. Dublin, 1995

*The Safe Use of Electricity in the Home, E.S.B.*,  
Lower Fitzwilliam Street, Dublin 2, tel. 01-6765831.

## **VIDEOS**

Videos available on loan from ENFO,  
17 St. Andrew Street, Dublin 2. Tel.: 01-6793144

No. 59      Natural Gas - Clean Energy (16 mins)

No. 62      While fishes watch the water (30 mins)

No. 64      Fair City - Smog (30 mins)

No. 71      Energy (25 mins)

No. 89      Choices for the planet (28 mins)

(AVP)      Energy

An Action Video Pack (AVP) is an integrated resource pack containing linked video clips and student assignment sheets.

No. 93      Water (20 mins)

No. 131     Water (54 mins)

No. 141     Working Water - The Lee Hydro - Electric Scheme (18 mins)

‘Plumb it yourself’ said the Little Red Hen, Red Hen International,  
Fairfax House, Fullwood Place, Grays Inn, London WC IV6 UB,  
United Kingdom

‘Wire it yourself’ said the Little Red Hen, Red Hen International,  
Fairfax House, Fullwood Place, Grays Inn, London WC IV6 UB,  
United Kingdom.



# KEY ASSIGNMENTS

MODULE 3: BUILDING SERVICES

## CHECKLIST

As part of a group I traced the path of a waste discharge system from its source to the public drainage junction.

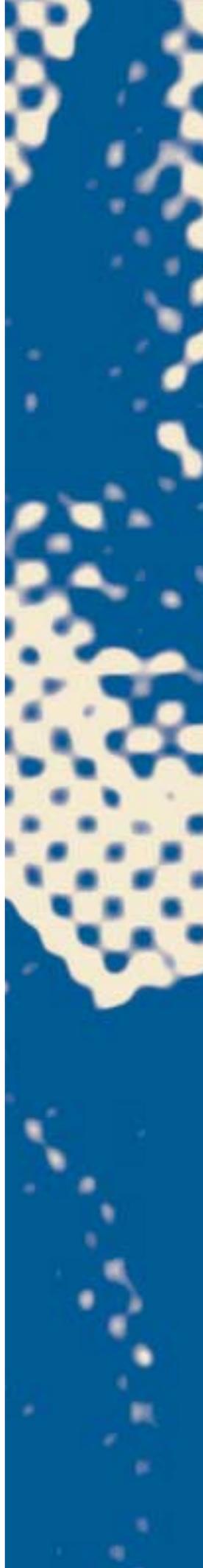
I joined two straight sections of pipe and tested its effectiveness, and I replaced a washer in a tap.

As part of a group I produced a report on how energy loss could be reduced in the home or school.

I wired a plug and inserted fuses appropriate to different appliances.

MODULE 4

**WOODCRAFT**



## MODULE 4:

# WOODCRAFT

### PURPOSE

This module has been designed for students with no previous technological experience and for those who wish to renew and upgrade their skills in this area.

The main emphasis is on learning by doing, with the teacher setting design tasks suitable to the ability of the student. It is envisaged that the student would gain a basic appreciation of what "good design" means in relation to their domestic surroundings.

While the module is intended to be generally educational it will also advance the students' preparation for further training/education, adult and working life.

### PREREQUISITES

None.

## AIMS

This Module aims:

- to develop an appreciation of what good design means in everyday life
- to promote an understanding of the benefit of the forest as a place of beauty and as a source of raw material for outdoor products
- develop the student's skills in using a variety of hand tools
- to introduce students to the different design and materials used for interior and exterior items of furniture
- to familiarise students with the different types of preservatives and their method of application
- to develop an appreciation of the importance of graphic communication when designing and manufacturing any item
- to develop an understanding of the importance of safe working practices in relation to tools, materials and processes.

## UNITS

Unit 1: Outdoor Domestic Products

Unit 2: Indoor Domestic Products

Unit 3: Hand Tools and Materials

Unit 4: Design Graphics

Unit 5: Selection and Installation of Hardware

Unit 6: Health and Safety

## Unit 1: Outdoor Domestic Products

### LEARNING OUTCOMES

The student will be able to:

1. discuss the design process
2. evaluate some existing designs of outdoor furniture
3. design a product in this area
4. produce an artefact in this area
5. collect information on forestry products
6. examine the possible business potential of one of these products
7. list 3 main types of wood preservative and outline the method of application and use for each
8. be aware of any safety hazards when using preservatives and finishes
9. select suitable timbers for external use
  
10. identify two adhesives suitable for exterior use
  
11. produce a simple design portfolio to accompany their work.

### TEACHER GUIDELINES

- ▶ The teacher can use a wide range of materials, slides, magazines to get the students to discuss the quality of design for various outdoor/garden products. It is envisaged that students will design a product for external domestic use e.g. window box, bird table, ornamental well, etc., then as part of a group, select the best design (or perhaps best 2 or 3 designs) for manufacture.
- ▶ Students should be encouraged to make further modifications to the design to suit their individual taste. This could involve something as simple as using stencilling or pyrography to make projects more interesting or colourful. Perhaps fretwork could be used to cut out designs and place them onto projects e.g. flower cutouts placed onto window boxes.
- ▶ It is essential that students evaluate their work when they have designed and manufactured a product. The teacher should design a questionnaire with six or seven questions which should give important feedback to the student and make them think about the various processes involved and what he/she has learned.
- ▶ A simple design portfolio should accompany any practical work. This should include sketches, notes and an evaluation.

## Unit 2: Indoor Domestic Products

### LEARNING OUTCOMES

The student will be able to:

1. evaluate the ergonomics of 4 items of domestic furniture/household artefacts
2. design a project in this area
3. use a range of suitable jointing techniques during the course of producing at least one artefact in this area
4. identify two different adhesives suitable for interior use
5. prepare material surfaces to a high standard showing an understanding of the procedures involved
6. to produce a simple design portfolio for all the artefacts she/he produced.

### TEACHER GUIDELINES

- ▶ This unit is intended to encourage students to look at existing indoor products in a critical way while learning the basic jointing techniques to manufacture their own artefacts.
- ▶ The selection of products is left to the student and teacher with an emphasis on 'design' and 'learning by doing'.
- ▶ It is important that students learn the correct procedure when marking out, cutting , paring and shaping timber.
- ▶ Other methods of jointing solid timber and manufactured boards should be discussed and areas such as cramping, squaring frames and hinging doors should be demonstrated.
- ▶ The importance of surface preparation and finish should be emphasised and carried out systematically. It is important that students can explain procedures used during the construction of these items.

## Unit 3: Hand Tools and Materials

### LEARNING OUTCOMES

The student will be able to:

1. identify and use a range of hand- tools for measuring, marking out, holding, cutting and shaping material
2. select the most suitable materials for use on interior and exterior domestic artefacts
3. use the correct procedure of acquiring and carrying tools in the workshop
4. identify a range of hardwoods and softwoods
5. identify a range of manufactured boards.

### TEACHER GUIDELINES

- ▶ The students should be able to name the tools they use in the workshop. They should also sketch them and name the main parts of each one.

## Unit 4: Design Graphics

### LEARNING OUTCOMES

The student will be able to:

1. make an orthographic drawing and/or a 3D drawing/sketch for each project undertaken
2. work from an orthographic drawing of at least one project in order to mark out and make the project
3. display their graphic work with their manufactured project work
4. sketch each tool used
5. produce a simple portfolio for each product manufactured.

### TEACHER GUIDELINES

- ▶ This unit should be used to reinforce the skills developed in the module on Graphic Communication.
- ▶ The level of graphics involved in each project will depend on the ability and experience of each student.
- ▶ It is important that each individual is challenged and can appreciate the importance of graphics in the production of any item. Where it is possible students' work (both graphic and practical) should be displayed, even for a short period of time. This can have a very positive effect on the student.
- ▶ The portfolio should include sketches, notes and a self-evaluation sheet of their work. Photographs can enhance the students work greatly.

## Unit 5: Selection and installation of Hardware

### LEARNING OUTCOMES

The student will be able to:

1. identify a range of fittings associated with interior and exterior furniture
2. use at least one type of hinge, lock and handle as part of his/her project work
3. sketch basic items of hardware.

### TEACHER GUIDELINES

- ▶ There is a very wide range of fittings available relating to interior and exterior furniture. It is important that students are familiar with the basic hardware e.g. Butt, Blumb, piano and flush hinges etc., types of screws e.g. philips, posidrive, slot, brass, steel etc. and types of locks and handles available. A class display board is a simple way of doing this and can also help students when trying to select hardware for their own project work.

## Unit 6: Health and safety

### LEARNING OUTCOMES

The student will be able to:

1. identify a range of safety hazards associated with the home
2. discuss how poor design in the home can lead to accidents
3. outline procedures for summoning assistance in the case of an accident
4. understand the need for good ventilation in the workshop when working with glues and finishes
5. use eye and ear protection where appropriate
6. identify six safety hazards which occur frequently in industrial situations, and list six precautions that can be taken to prevent them.

### TEACHER GUIDELINES

- ▶ Health and safety is an integral part of each of the other units of this Module. Along with hands-on-awareness and appreciation of good working practice in the workshop, students should be encouraged to look critically at safety in their own home and beyond to public places and industrial environments.

## RESOURCES

### BOOKS

*Traditional Garden Woodwork*, by Peter Holland, Wardlock, 1995

*Garden Furniture A Practical Handbook for Woodworkers*,  
by George Buchanan, Castle, London 1996

*176 Woodworking Projects* - the staff of Workbends Magazine,  
Sterling Publishing Co., ISBN 0-8096-6528-2

*Making Furniture*, by David Thomas, Orbis Publishing, London

Junior Certificate Material Technology (wood) Books  
may also contain material that may be useful

### VIDEO

Wood Finishing With Frank Klausz, The Taunton Press Inc.



# KEY ASSIGNMENTS

MODULE 4: WOODCRAFT

## CHECKLIST

I evaluated one household item in terms of good/bad design

I used three different methods of joining wood and a variety of glues during the manufacture and assembly of artefacts

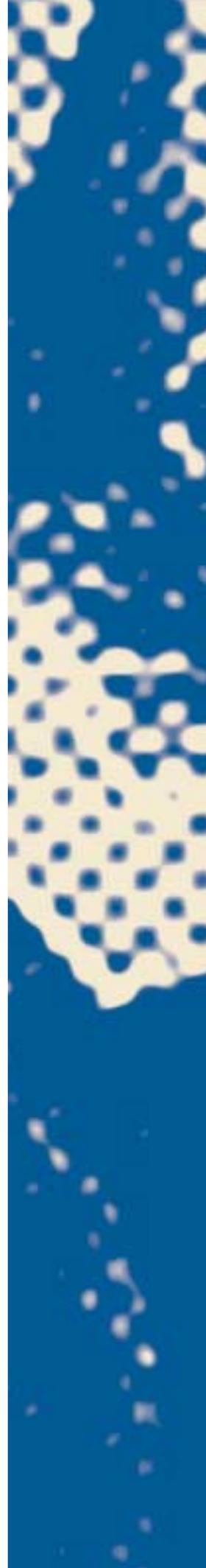
As part of a group I took part in an investigation of a local furniture or garden furniture workshop

I made out a materials/cutting list for each of my projects.



MODULE 5

**DESIGN AND MANUFACTURE  
OF EDUCATIONAL TOYS**



## MODULE 5:

# DESIGN AND MANUFACTURE OF EDUCATIONAL TOYS

### PURPOSE

This module is designed on the presumption that all toys have an educational use. This module is designed to harness students' natural enthusiasm for creativity and is directed towards the production of useful, attractive and educational products. Through this module they should develop knowledge and skills that will contribute to their overall development and their preparation for further education/training, adult and working life.

### PREREQUISITES

None.

## AIMS

This Module aims:

- to develop the students' awareness of the educational benefit of toys for children of all ages
- to develop the students' understanding of good/bad design in relation to toy manufacture
- to acquire a wide range of skills in the use of tools and equipment
- to appreciate the various finishes that are appropriate for toy manufacture
- to familiarise students with the various forms of mechanisms and their application
- to explore the business possibilities of products in this area
- to develop an understanding of health and safety relating to tools, material and processes.

## UNITS

Unit 1: Evaluating Existing Designs

Unit 2: Mobile and Secondary Movement Toys

Unit 3: Educational Toys

Unit 4: Puzzles and Games

Unit 5: Design Graphics

Unit 6: Health and Safety



**Unit 1: Evaluating existing designs (Continued)**

**LEARNING OUTCOMES**

4. use a square grid as a means of scaling up and down, paper-folding to achieve symmetry, stencils as a means of embellishment
5. investigate materials, mechanisms and methods of assembly
6. model designs in card OR wood and analyse finishes used
  
7. be aware that finishes should be lead free and non-toxic
  
8. identify potential safety hazards in relation to toy design.

**TEACHER GUIDELINES**

- ▶ The techniques of transferring design shapes to wood, the use of paper templates and an ability to model their ideas in card or wood are important basic skills. The teacher can also introduce students to the many programmes that can assist their design that are available on the computer e.g. Powerpoint and Gallery. It is also important that they are made aware of the quality and suitability of material for various toys.
- ▶ Students must be reminded that where toys are being designed for young children, special care has to be taken to protect them from injury from sharp edges, and moving parts.
- ▶ The dangers from swallowing loose parts and the importance of using lead-free non-toxic paints and varnishes must be realised.

## Unit 2: Mobile and Secondary Movement Toys

### LEARNING OUTCOMES

The student will be able to:

1. investigate power sources and use them in projects
2. investigate and become familiar with various mechanisms, gears, cams
3. design and produce a simple push/pull along toy with a secondary movement and investigate the range of materials, designs, finishes available from hobby/craft suppliers
4. work with a wide range of materials and fittings
5. consider safety protection for moving parts
6. enhance products with colour and evaluate his/her own work.

### TEACHER GUIDELINES

- ▶ The use of wind, electricity, water, elastic, gravity and human power should be investigated and used where appropriate.
- ▶ A study of the following (by experimentation or in existing designs) as a means of producing secondary motion is essential: cams, pull-cords, cranks, eccentric wheels, off-centre pivot points, wind, springs, rotation.
- ▶ The students should be encouraged to come up with their own idea for a project in this area. This could mean finding a suitable picture of e.g. an animal and transferring it onto timber or developing their own idea independently. This depends on the ability and experience of the student. Alternatively students, through discussion, could produce group designs or select the most popular individual designs for all students to manufacture. The actual movements may be similar or different, again, depending on the ability of particular students.

### Unit 3: Educational Toys

#### LEARNING OUTCOMES

The student will be able to:

1. investigate the educational benefit of toys
2. apply this knowledge to the design of educational toys for children of specific ages
3. be aware of the safety standards required in toy making
4. develop an understanding of the properties of materials used in toy-making
5. acquire skill in the use of tools and equipment in toy production
6. produce an artefact in this category
7. examine the role of movement, texture and soft materials in toy making
8. evaluate his/her own work.

#### TEACHER GUIDELINES

- ▶ Students should investigate the use of toys in a variety of educational settings, from assembling counting/stacking blocks to alphabet blocks, to more complicated construction/engineering type toys.
- ▶ This unit presents students with an opportunity for mutually beneficial contact with people in the local community. Some students could research a local crèche/play-group or get a crèche/play-group leader to visit the class as a means of doing research. Students may design and make toys to this person's specification. Toys for this exercise should be sturdy and have a lot of 'play-ability'.
- ▶ It is important that students are aware of the developmental age of the child they are making the toy for and ensure that it is designed correctly in terms of complexity and stimulation.

## Unit 4: Puzzles and Games

### LEARNING OUTCOMES

The student will be able to:

1. evaluate existing games and puzzles
2. make a puzzle or a game
3. develop skills in the use of precision tools and equipment
4. strive to achieve a high degree of accuracy and workmanship
5. gain experience in the use of jigs and templates
6. make out accurate cutting/material lists
7. cost and produce (as part of a team) an artefact with a view to sale (this can be associated with any other appropriate unit)
8. evaluate his/her own work.

### TEACHER GUIDELINES

- ▶ Students must be facilitated in relation to forming ideas for games and puzzles by visiting toy shops, researching books and catalogues and by brain-storming. In the production stage emphasis must be on the making of accurate templates in paper, card or board, the use of colour, and a high standard of finish.

## Unit 5: Design Graphics

### LEARNING OUTCOMES

The student will be able to:

1. make an orthographic drawing and/or a 3D drawing/sketch for each project undertaken
2. display their graphic work with their project work
3. produce a simple portfolio for each project undertaken.

### TEACHER GUIDELINES

- ▶ Graphics are an important part of any design and manufacturing endeavour. The level of complexity of graphics will be dictated by the ability and experience of the student. The portfolio is intended to be a tangible and meaningful method of communication and self-evaluation for the student.

## Unit 6: Health and Safety

### LEARNING OUTCOMES

The student will be able to:

1. identify particular potential hazards from portable electric tools and equipment associated with the production of toys
2. use eye and ear protectors where appropriate
3. outline procedures for summoning assistance in the case of an accident
4. outline the key regulatory requirements in relation to the workshop
5. understand the need for good ventilation when working with finishing materials
6. identify six safety hazards which occur frequently in industrial situations, and list six precautions that can be taken to prevent them.

### TEACHER GUIDELINES

- ▶ It is envisaged that this unit permeates all other units, and becomes an integral part of each. Students should be familiar with basic safety regulations pertaining to hand tools and power tools. They should use power tools under the supervision of the teacher. They should use eye/ear protectors and dust masks where appropriate. When working with solvent based finishing materials, they should work in well ventilated situations.
- ▶ A general knowledge of industrial safety is an important part of the students education and development, as responsible members of society.

## RESOURCES

### BOOKS

*CDT An Introduction to Craft Design and Technology*,  
by Stewart Dunn, Bell & Hyman, London 1987

*Blizzards Wonderful Wooden Toys*, by Richard Blizzard  
BBC Books, London 1987

*Blizzards Wooden Toys (More Of)*, by Richard Blizzard,  
BBC Books, London 1987

*Designing & Making Wood Toys*, by Terry Kelly, G.N.C.  
Publications, East Sussex 1994

*How to Make Animated Toys*, by David Wakefield, Sterling,  
New York 1998

Child Development & Play (Module From), Community Care,  
Leaving Certificate Applied, NCCA/Department of Education

Junior Certificate Materials Technology (Wood) Books,  
may also contain information that may be useful.



# KEY ASSIGNMENTS

MODULE 5: DESIGN AND MANUFACTURE OF EDUCATIONAL TOYS

## CHECKLIST

I designed and made a toy which had secondary movement

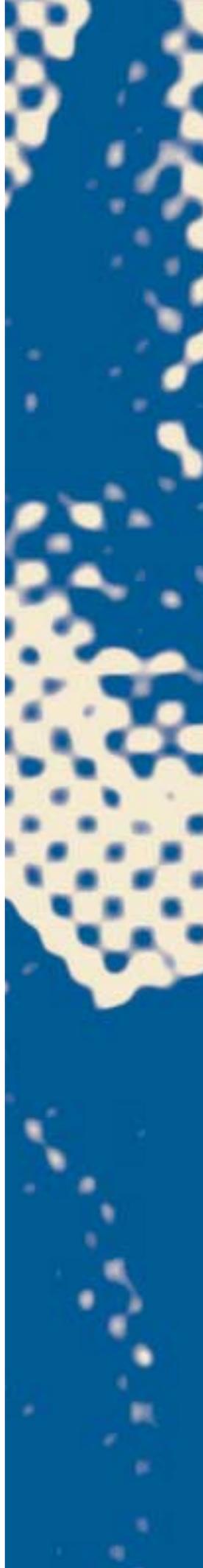
As part of a group I explored the range of toys in use in crèches/playgroups in my locality

I investigated and tabulated the key safety features of a toy, a game and a puzzle

I used two different finishes suitable for toys.

MODULE 6

**COMPUTER AIDED DESIGN**



## MODULE 6:

# COMPUTER AIDED DESIGN

### PURPOSE

This module will introduce students to a number of basic Computer Aided Design skills that will help them develop and produce their own computer drawings. From this they will proceed to more complex work and investigate further possibilities for Computer Aided Design. On completion of this module, students will have acquired an understanding of the changing world of Computer Aided Design and developed skills that will contribute to their overall development.

### PREREQUISITES

None.

## AIMS

This module aims:

- to develop the student's understanding of basic functions relating to a CAD package
- to enable the student to use the computer efficiently when carrying out various draughting tasks
- to enable the student to become more familiar with computer terminology
- to enable the student to carry out basic draughting operations using CAD commands
- to give the student an understanding of the health and safety issues related to computer usage
- to enable the student to explore some CAD related career opportunities.

## UNITS

The units of this module should be arranged and sequenced to suit the requirements of the learners.

Unit 1: Introduction to Computer Aided Design

Unit 2: Basic Drawing Commands

Unit 3: Editing Commands

Unit 4: Drawing Structure

Unit 5: Time Saving Devices

Unit 6: Dimensioning and Hatching

Unit 7: Printing and Plotting

## Unit 1: Introduction to CAD

### LEARNING OUTCOMES

The learner will be able to:

1. identify parts of the computer relevant to the work of the module; distinguish between input and output devices, between programme and file, between hard disk and other storage devices
2. select, run and exit the CAD programme
3. show an awareness of the importance of saving work regularly and of keeping backup copies of drawing files
4. name the parts on the drawing screen and activate commands
5. identify safety hazards related to computer use (eye-strain, posture, etc) and the measures that should be taken to counter these hazards
6. collect samples of work produced by professionals in industry
7. identify career opportunities associated with Computer Aided Design and research opportunities for further training in this area.

### TEACHER GUIDELINES

- ▶ Learners should use a notebook to write down information and keep notes of commands used frequently in the CAD programme. This unit links directly with the course in Information Technology which is taken by all learners.
- ▶ Learners should be encouraged to cultivate these positive working practices by practising them regularly throughout the module.
- ▶ After entering the program the learners should be encouraged to use drop down menus, toolbar, command line and screen menu.
- ▶ These exercises provide an opportunity for learners to carry out investigations and draw up reports either individually or in groups. It may be possible to conduct these investigations while on work experience.
- ▶ They also provide opportunities for visits to relevant out-of-school locations or for relevant visitors to the class.

## Unit 2: Basic Drawing Commands

### LEARNING OUTCOMES

The learners will be able to:

1. draw simple objects using the following commands:  
 Line  
 Circle  
 Point  
 Ellipse  
 Polygon  
 Rectangle  
 Polyline  
 Donut
2. select and use different colours
3. select and use different line types
4. combine the basic shapes to create new drawings
5. create simple orthographic drawings using basic shapes
6. describe the difference between lines and polylines and when each should be used
7. complete simple tasks based on tangents and tangential circles
8. enter text into a drawing using different styles and different positions
9. describe and explain the various basic drawing commands either orally or in writing.

### TEACHER GUIDELINES

- ▶ By way of practice learners should draw these shapes to different sizes. Ideas for drawings may stem from a variety of sources and may include items such as simple floor plans or flow diagrams. Material from the module on "Graphic Communication" should be considered here. Future or current editing of these drawings provides further opportunities to practise the skills related to simple objects but also to selecting the colour and line-types used.
- ▶ Learner should investigate the difference by creating a drawing using lines and a second identical drawing using a polyline.
- ▶ This work can be of simple objects based on circles, and constructed using the line and circle commands.
- ▶ Learners should become familiar with simple text entries, using varieties of style and colour and entering text on drawings. They may want to use some of those referred to earlier in this unit.

## Unit 3: Editing Commands

### LEARNING OUTCOMES

The learners will be able to:

1. edit existing drawings by using a selection of the following commands:
  - Erase
  - Extend
  - Trim
  - Change
  - Scale
  - Chamfer
  - Fillet
  - Offset
2. edit and further amend drawings by using a selection of the following commands:
  - Copy
  - Move
  - Rotate
  - Mirror
  - Array
3. modify the linetype and colour of existing work
4. describe and explain a range of editing commands either orally or in writing.

### TEACHER GUIDELINES

- ▶ Previously stored drawings or new drawings may be used for these exercises. New and more advanced drawings such as line diagrams, logos, crests, trade marks, flags, simple floor layouts and other examples of design drawings such as those from the module on "Graphic Communication" may be used. It is important to give learners a sense of broadening the range of work added to their files and portfolios.

*This unit provides an opportunity to link with the courses in Visual Art and Information Technology (Graphics).*

## Unit 4: Drawing Structure

### LEARNING OUTCOMES

The learner will be able to :

1. set up the following drawing aids:
  - Snap
  - Grid
  - Orthogonal modes and limits
2. use the Zoom facility as required
3. set the correct limits for specific drawings
4. set a suitable grid and snap for a range of drawings
5. input co-ordinates using one of the following types of co-ordinate entry:
  - Absolute, relative or polar
6. create and use a prototype drawing
7. describe the purpose of a prototype drawing and how it is used.

### TEACHER GUIDELINES

- ▶ Once initial skills have been acquired learners can use the commands to create and edit drawings of different sizes and use the zoom command as appropriate.

## Unit 5: Time Saving Devices

### LEARNING OUTCOMES

The learners will be able to:

1. describe the function of layers in the management of drawings
2. create and use layers with various linetypes and colours assigned to each layer
3. turn a layer on and off. Freeze and thaw a layer, lock and unlock a layer
4. describe the advantages of using layers in a drawing.

### TEACHER GUIDELINES

- ▶ This is a very useful facility for learners. Learners should start by opening completed drawing with layers and investigate the notion of layers in terms of layer names and controls. They should be given the opportunity to edit the drawing.

They should then create a simple drawing using two or three layers.

## Unit 6: Dimensioning and Hatching

### LEARNING OUTCOMES

The learners will be able to:

1. dimension a drawing using a selection of the following dimension commands: Linear (vertical and horizontal), angular, aligned, leader, diameter and radii
2. apply hatch patterns to areas of drawings.

### TEACHER GUIDELINES

## Unit 7: Printing and Plotting

### LEARNING OUTCOMES

The learners will be able to:

1. prepare the plotter/printer for use (load it with paper; install ink cartridges)
2. print or plot drawings
3. compare and contrast the use of plotters and printers in producing CAD drawings.

### TEACHER GUIDELINES

## TEACHING APPROACH

Specific learning programmes are not prescribed in this module descriptor. Schools/centres are free to design their own courses and to use any suitable CAD programme based on the desired learning outcomes. Teachers are encouraged to develop and draw on a wide variety of available resources and outside experts. In addition to the exercises described in this module descriptor, the teacher/trainer should select materials and exercises that are beneficial to and suitable for the learner. Candidates who are expected to do exceptionally well should be encouraged to select their own activities.

A learner-centred, activity-based teaching approach should be adopted throughout. This implies the involvement of the learner in activities such as planning, investigating, designing, researching, problem solving, getting things done, acquiring knowledge, organising, reflecting, drawing conclusions. These activities are best organised by use of the following techniques: brainstorming, pro forma worksheets, individual and/or group research, structured group work, case studies, careers-teacher input, use of library, activities in real or simulated situations, visitor exercise, visits outside the school or centre.

The module should be regarded as a means of enabling learners to improve their literacy skills. This can be achieved by enabling them to develop word banks related to the module.

Theoretical and practical work should be combined throughout this module. Long theory sessions should be avoided. Every opportunity should be taken to encourage the learners to utilise their existing skills, and to reflect on the extent to which they are developing new practical skills as well as skills in communication, and interpersonal relationships. It is necessary that the teacher/trainer provide guidance on and suggestions as to the exercises the learners undertake and that the teacher/trainer actively help learners to interpret their findings.

## RESOURCES

*AutoSketch for Windows, 'Getting Started Manual'*

(comes with the software).

*AutoCAD Tutorial Guide* (Included with Manuals).

*A Student's AutoCAD* by A.Yarwood, Longman Scientific  
& Technical ISBN 0-582-23087-X

*Practical AutoCAD* by P.McMullan. Blackwell Scientific Publications  
ISBN 0-632-02486-0

*AutoCAD Assignments* by Paul Whelan, Stanley Thornes,  
ISBN 0748717846

*AutoCAD L.T in easy steps* by Paul Whelan, Computer Step,  
ISBN 1840780053

*AutoSketch for Windows Release 2* by A Yarwood,  
Longman Higher Education. ISBN 0582285771

*Beginning AutoCAD* by Bob McFarlane, Arnold Paperback,  
ISBN 0340585714.

*Assignments in AutoCAD* by Bob McFarlane, Arnold Paperback,  
ISBN 0340691816



# KEY ASSIGNMENTS

MODULE 6: COMPUTER AIDED DESIGN

## CHECKLIST

As part of a group I designed a new crest for my favourite club, or my school or for my family name. This crest included an attractive hatch pattern.

I drew a well known logo that included dimensioning and different colours.

*or*

Using Computer Aided Design I created a drawing relevant to another module in Graphics and Construction Studies.

I used a plotter/printer to produce hard copy of my work.

I compiled a portfolio containing:

- (a) drawings and exercises that I produced during the module
- (b) samples of computer aided design work that I collected from professionals who use computer aided design programmes.



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