St Nathy's College

Subject Department Plan

for

Technical Graphics

2009-2010

Subject Aims.

- To stimulate the students creative imagination through developing their visual and spatial abilities.
- To encourage the development of the cognitive and practical manipulative skills associated with graphicacy.
- To provide the students with a body of knowledge appropriate to interpreting and communicating spatial information and ideas.
- To sharpen the students visual perception of their environment and its elements and encourage the exercising of aesthetic value judgements.
- To develop basic competency in computer graphics in the context of graphic problem solving and computer aided design.
- To encourage the development of logical and progressive reasoning an d enquiry/investigative skills, and the ability to spatialise and visualise two and three dimensional configurations and their elements in the solution of graphical problems.
- To help the students understand the importance of communicating information graphically.

Subject Objectives.

The students will be able to:-

- Use graphics in the development of ideas and in the communication of information.
- Interpret drawings and diagrams including freehand sketches, plans, numerical data (expressed graphically), flow charts and formal working drawings.

- Solve two and three dimensional space problems graphically using appropriate geometrics and their underlying principles and theorems.
- Demonstrate dexterity in the use of drawing instruments, templates etc as reflected in neatness and accuracy.
- Display an understanding of projection systems associated with descriptive geometry.
- Select appropriate methods of graphic representation in expressing spatial ideas and concepts.
- Show a basic understanding of input, processing and output systems associated with computers.
- Produce computer generated drawings and graphical solutions using appropriate computer graphics and computer aided design software.
- Produce neat and accurate drawings according to recognised standards, conventions and illustration techniques.
- Co-operate in the assimilation of data necessary for scaled representation.
- Produce freehand drawings in two and three dimensions as graphical communication and as an aid to spatial reasoning and refinement.
- Recognise the importance of graphics in the process of designing and produce graphical solutions to appropriate design problems.
- Use shade and colour with discretion and model appropriate solutions in card or other materials.
- Apply ergonomic and other appropriate data in the consideration and solution of design problems.

Subject Co-Ordinator.

J Keville.

Subject Teachers.

J. Keville

O Lennon

G. Gildea

J Howley

T Colleran

Time Allocation.

1st Year:- 3 Class periods per week

2nd Year:- 4 Class periods per week

3rd Year:- 4 Class periods per week

Timetabling

1st Year:- Double and a single is ideal.

2nd Year:- Double and 2 singles is ideal

3rd Year:- Double and 2 singles is ideal

Grouping of Pupils (Mixed ability, Streaming)

Students are allocated to option subjects according to their preference and are done so on a mixed ability basis. At exam level both higher and ordinary levels are catered for in the one class.

Student Access to Subject / Level.

As is stated above due to the mixed ability nature of the class and the absence of any streaming both levels are catered for in the one class and each student have the option of selecting a level suited to their abilities, in their examination year.

Students at both levels are encouraged and appropriate time is given to both groups. There should be minimal differentiation between levels as much as is possible and the students should be challenged to explore all areas of the course in as much detail as possible.

Class Organisation

Each student is assigned a seat and is provided with a drawing board, a T – square and paper.

Equipment List and Course Materials.

Year Group	Equipment Necessary	Textbooks.
Technical Graphics		
1st Year	A4 Display Folder 2H pencils 45 & 30/60 Set Squares Protractor Compass	Technical Graphics Book and Workbook *By O'Callaghan*

	Eraser Pencil Sharpener Set of colouring pencils.	
2nd & 3rd Year	A4 Display Folder 2H pencils 45 & 30/60 Set Squares Protractor Bow Compass Eraser Pencil Sharpener Set of colouring pencils	Technical Graphics Book and Workbook *By O'Callaghan*

Planning for Students with Special Needs.

In order to best help students with special needs some of the following strategies can be used:-

- Limit the materials you ask special needs students to manage at a given time.
- Consider each special needs students preferred learning style when you create assignments and where possible modify the assignment to better suit their needs.
- Where possible limit the amount of written work given to special needs students.
- Structure your classroom routine so that the students can predict what they are expected to do.
- Be generous with your praise when the students do well.

Cross Curricular Planning.

The Junior and Senior Cycle Graphics subjects have links and ties in with subjects such as Maths, Metalwork and Engineering, Materials Technology Wood and Construction Studies.

It also ties in with the LCA Graphics and Construction programme.

Subject Planning for a Culturally Diverse Society.

Due to multicultural nature of our society which is reflected in the classroom, there are now a number of challenges that need to be overcome to create an effective learning environment for every student. These include aspects such as:

- Communication: it is important that language is not a barrier to learning, and not to make assumptions about a student's knowledge level because they cannot speak English clearly.
- Learning preferences: the manner in which students understand and retain information differs and their perspective also differs depending on background experience. Some students are visual learners and some are tactile learners. Bringing cultural diversity into the classroom enhances the learning opportunity of the entire class. The visual learner can benefit from maps, discussions of videos and pictures.
- Social values: values differ from culture to culture and it is important that no one person's values are disregarded.

One way to overcome these challenges is to implement peer tutoring into the classroom situation. An example of projects that can be done is to invite the students to do research on their families' culture. One assignment might involve students finding pictures that represent how cultures live in their native country.

The teacher also must realize that some students have not been exposed to people who are from different backgrounds and cultures. They may not be sure how to respond to someone who speaks differently. It also provides material for class discussions on the dangers of stereotyping people, the role of the media as it relates to culture and understanding people on an individual basis. Teachers may initiate projects connecting students with schools in other countries.

Effective Teaching Methodologies.

- 3D Graphics models made from solid wood and plastic.
- Use of the overhead projector, blackboard, whiteboard and data projector.
- Teacher demonstration.
- Pairing of students of varying abilities.
- Working on the computer with graphics packages such as *Solid Works*.

Range & Variety of Resources

- Paper
- Overhead Projector
- Blackboard / Whiteboard
- Models
- Data Projector.

Availability/ Use of ICT Facilities.

The main drawing room is now fully equipped with 24 PC's for the students use and a laptop and data projector for the teachers use.

The PC's have access to the internet via broadband.

Provision for Health and Safety Requirements.

- General guide – the schools Health and Safety statement is available.
- Students are made aware of the danger of sharp objects such as compasses.
- Drawing boards / desks have an angled work surface so as to reduce on back strain while drawing.
- Computer monitors have a cover so as to reduce on any glare for students using them on an ongoing basis.
- There is a fire Exit plan and route highlighted in each classroom and a drill is carried out during each school year.

Breakdown of Coursework to be covered for individual Year Groups.

Outline of approach to 1st Year Technical Graphics.

The students will carry out their work on A4 sheets and their work is kept in an A4 display folder with clear plastic pockets. This format is preferable to cardboard folders as it keeps the sheets neat, it is easily carried by the students and it is easy to browse through for revision purposes.

There is also a strong emphasis in 1st year in making the subject interesting and relevant to the students, so they are encouraged to use colour and shading to enhance their drawings. Familiar shapes and logos are also drawn that incorporate the construction of all the basic shapes.

The main emphasis in 1st year is teaching the students how to manipulate the instruments and developing the skills of neatness, accuracy and draughtsmanship.

In relation to course content it is felt that the students should get a good foundation in the basics such as : -

- Basic constructions – bisecting / dividing lines etc.
- Construction of all basics shapes – circles, quadrilaterals, triangles and polygons.
- An introduction to Orthographic Projection.

In conjunction with the sheet work carried in class the workbook can be used for homework and as a revision tool, to reinforce the work carried out in class.

1St Year.

Outline of topics to be covered from

September - December

Topics to be covered	No of Sheets
Printing Text	**1**
Measuring and redrawing lines.	**1**
Heavy lines / Light lines	**1**
Lines at 45o & 30/60	**3**
Shapes using horizontal, vertical and angles lines	**5**
(Ref Page 11 of book)	**4**
Angles	**7**
(Ref Page 15 & 16 of book)	**5**
Constructions	**3**
(Ref Page 17, 18 & 19 of book)	**2**
Circles	
(Ref Page 21 & 22 of book)	
Triangles	
(Ref Page 21 & 22 of book)	
Quadrilaterals	
(Ref Page 30, 31 & 32 of book)	
Polygons	
(Ref Page 36 -39 of book)	
Contd next term.	

1St Year.

Outline of topics to be covered from

January - June

Topics to be covered	No of Sheets
Polygons *(Ref Page 36 -39 of book)* *Contd from previous term.*	**5** **9**
Circles in Contact *(Ref Page 45 & 50 of book)*	**2** **7**
Tangents to Circles *(Ref Page 51 & 54 of book)*	
Orthographic Projection *(Ref Page 92 - 95 of book)*	

Outline of approach to 2nd Year Technical Graphics.

The students will carry out their work on A3 sheets and their work is kept in an A4 display folder with clear plastic pockets. This format is preferable to cardboard folders as it keeps the sheets neat, it is easily carried by the students and it is easy to browse through for revision purposes.

The main emphasis in 2nd year is to build on the foundation established in 1st year.

In relation to course content the aim in 2nd year would be to introduce all the major topics listed below and teach them to a Junior Cert OL standard.

- Orthographic Projection

- Pictorial Drawing – Isometric and Oblique
- Ellipse and Parabola
- Rotated and Inclined solids.
- Developments.
- Transformation Geometry.
- Area Conversion

In conjunction with the sheet work carried in class the workbook can be used for homework and as a revision tool, to reinforce the work carried out in class.

2nd Year.

Outline of topics to be covered from

September - December

Topics to be covered	**No of Sheets**
Orthographic Projection Simple Objects and Hidden detail. *(Ref Page 84 - 90 of book)* Ortho of Geometric Solids *(Ref Page 91 -97 of book)* Pictorial Drawing Oblique. *(Ref Page 98 - 101 of book)*	

Isometric *(Ref Page 102 - 106 of book)* Ellipse *(Ref Page 113 – 118 of book)* Parabola *(Ref Page 164 - 166 of book)*	

2nd Year.	
Outline of topics to be covered from ***January - June***	
Topics to be covered	**No of Sheets**
Rotated and Inclined solids. *(Ref Page 185 - 187 of book)* Developments. Basic introduction simple objects and geometric shapes *(Ref Page 107 – 111 & 279-284 of book)* More complex truncated geometric objects *(Ref Page 279-284 of book)* Transformation Geometry. Translations *(Ref Page 121 - 128 of book*	

Axial Symmetry *(Ref Page 129 - 131 of book*

Central Symmetry *(Ref Page 132 - 133 of book*

Enlargement & Reduction *(Ref Page 134 - 136 of book*

Area Conversion

Area Calculation

(Ref Page 144 - 145 of book

Conversion of triangles and Polygons

(Ref Page 147 - 148 of book

Conversion of Rectangles - Squares

(Ref Page 149 - 150 of book

Division of Areas

(Ref Page 157 - 158 of book

Outline of approach to 3rd Year Technical Graphics.

The students will carry out their work on A3 sheets and their work is kept in an A4 display folder with clear plastic pockets. This format is preferable to cardboard folders as it keeps the sheets neat, it is easily carried by the students and it is easy to browse through for revision purposes.

The main emphasis in 3rd year is to build on the foundation established in 2nd year and develop each topic to a Junior Cert examination level.

In relation to course content the aim in 3rd year would be to cover each of the topics below and as part of the work on each topic cover past examination questions so as to give the students an idea of the level of knowledge required at both high and ordinary level.

- Orthographic Projection and Auxiliary elevations
- Pictorial Drawing – Axonometric Projection.
- Ellipse and Parabola
- Rotated and Inclined solids.
- Developments.
- Solids in Contact.
- Transformation Geometry.
- Area Conversion

In conjunction with the sheet work carried in class exam papers can be used for homework

3rd Year.

Outline of topics to be covered from

September - December

Topics to be covered	No of Sheets
Orthographic Projection and Auxiliary Elevations *(Ref Q1 of past exam papers at HL)* Pictorial Drawing Axonometric or Isometric Scale (Teachers choice) *(Ref Q3 of past exam papers at HL)* Isometric and Oblique *(Ref Q4 of past exam papers at OL)* Ellipse and Parabola *(Ref Q6 of past exam papers at HL)* *(Ref Q4 of past exam papers at HL)* Rotated and Inclined solids. *(Ref Q2 of past exam papers at HL)*	

3rd Year.

Outline of topics to be covered from

January - June

Topics to be covered	**No of Sheets**
Developments. *(Ref Q4 of past exam papers at HL)* Transformation Geometry. Translations, Axial Symmetry, Central Symmetry and Rotations *(Ref Q5 of past exam papers at HL)* *(Ref Q5 of past exam papers at OL)* Solids in Contact *(Ref Q4 of past exam papers at HL)* Revision of General Topics for Short Questions. Area Conversion Freehand Sketching Scales Auto CAD Isometric Tangents to circles and Ellipses Enlargement and Reductions	

Homework Procedures

Home can be given at each teacher's discretion as a revision tool and to reinforce what was covered in class. Homework can involve completing a sheet started in class or to do some shading and rendering to enhance a drawing. The workbook can also be used or in 3rd year the exam papers can be used.

The teacher should keep a record of homework given in their diary.

Assessments/Examinations Procedures

In line with our school procedures the students are given exams at October mid – Term, Christmas, Easter & Summer. These results are recorded in the teacher's diary and are written into reports by the teacher along with a subject comment and are sent out twice a year.

Teachers are free to give separate topic tests at any other stage during the year.

Record Keeping Procedures

At the start of each school year the school provides each teacher with an attendance diary and a record keeping book. The teacher can use these to keep a record of all work given, test results and any behavioural issues.

The teacher has the option of purchasing a separate school dairy if they so wish.