

Scottish Certificate of Education

**Standard Grade Revised Arrangements in
Graphic Communication**

Foundation, General and Credit Levels in and
after 1993

STANDARD GRADE ARRANGEMENTS IN GRAPHIC COMMUNICATION

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Introduction

The Arrangements for Graphic Communication on the Standard Grade of the Scottish Certificate of Education are based on a Report of a Joint Working Party (JWP) of the Scottish Examination Board and the Scottish Consultative Council on the Curriculum (SCCC) which was issued to interested bodies for comment in May 1990. The original Report was presented in terms of “Technical Drawing”, however, in response to representations which were subsequently made, the Scottish Office Education Department agreed to the title being altered to “Graphic Communication”, on the grounds that this was more appropriate to the new course.

In finalising the Arrangements, the JWP and the Technical Subjects Panel of the Board have taken account of the submissions received from interested bodies. Where appropriate, aspects of the proposals contained in the Report have been clarified and modified in the light of these responses.

The Standard Grade examination in Graphic Communication at Foundation, General and Credit Levels will be offered in and after 1993 on the basis of the Arrangements detailed in this document.

In addition, it is planned that a series of Short Courses in Graphic Communication, based on the Standard Grade course, should be available from session 1991-92.

Section 1

Rationale

1 Rationale

- 1 1** In this rapidly changing society it is important to reflect the advances made in technology and communication in the educational provision available to young people. The ability to communicate effectively is an essential requirement in every field of endeavour and often communication requirements are inadequately served by the spoken or written word alone. Drawings, sketches and colour illustrations are often needed for clear and efficient communication. Also, since Graphic Communication is an international language, it should be recognised as an important aspect of the school curriculum.
- 1 2** The impact of the new technologies, in particular microelectronics, has encouraged industry and commerce to adapt to new methods and practices. In this technological society it is important to reflect this change in the education of young people and to ensure that they gain basic knowledge and skills in the various forms of associated graphics.
- 1 3** A major purpose of the course, therefore, is to provide interesting, logical and coherent learning experiences in a variety of topics which should enhance the ability to use more effectively graphical means of communication. On successful completion of the course, pupils should have gained useful knowledge and understanding of the language of graphic communication. Through the development of graphical skills, the course may also motivate pupils to pursue vocational interests in such careers as architecture, surveying, draughting, science, engineering, design and marketing.
- 1 4** The course introduces pupils to the diversity of presentation methods employed in Graphic Communication and enables them to select appropriate methods and media for the task in hand. It includes computer-aided graphics and draughting methods together with illustration and presentation techniques, formal drawing board skills and sketching. The use of computer is an essential part of the course and is advocated both as a practical experience for pupils and as an appropriate teaching/learning strategy.
- 1 5** Increased emphasis is given to interpretation of a wide range of graphics, as opposed to the focus on mechanical engineering which dominated previous courses in Technical Drawing. Because of its broad outlook on technical graphics, the course provides opportunity for developing confidence in presenting and interpreting technical graphics, while enabling pupils to exercise imagination, creative ability and logical thinking. By relating tasks, where possible, to real situations with which pupils are familiar or which they can easily comprehend, the course should offer opportunity for success to all pupils.
- 1 6** The course offers creative and technological experiences as well as contributing to the development of communication skills. As a result it offers experiences across three modes of learning: Creative and Aesthetic Activities, Technological Activities and Applications, and Language and Communication. The major contribution to the curriculum, however, is considered to lie in the Technological Activities and Applications mode. The extent to which there is contribution to the Creative and Aesthetic Activities mode will depend on the learning and teaching approaches adopted.

Section 2

Aims of the Course

2 Aims of the Course

The Standard Grade course in Graphic Communication fulfils the following aims:

- a)* to foster an awareness of the importance of Graphic Communication as an international language;
- b)* to foster the ability to initiate, develop and then communicate ideas graphically;
- c)* to stimulate an interest in, and enjoyment of, the study of graphical techniques and their application;
- d)* to develop a knowledge and understanding of the fundamentals of Graphic Communication;
- e)* to develop the ability to read and interpret a variety of types of drawings;
- f)* to develop the ability to use a range of draughting techniques;
- g)* to develop the ability to produce desired effects through the considered use of colour;
- h)* to develop the ability to select, organise and represent information graphically;
- i)* to develop expertise in computer-aided graphics;
- j)* to contribute to pupils' personal development and overall education.

Section 3

Course Structure

3 Course Structure

3 1 The course, which is designed to be overtaken in a time allocation of 160 hours, is comprised of three assessable elements, namely:

- Knowledge and Interpretation
- Drawing Abilities
- Illustration and Presentation.

The content is detailed in Section 4.

3 2 Compared to previous courses in Technical Drawing, the Standard Grade course in Graphic Communication introduces two major aspects:

- computer-aided graphics (CAG)
- Illustration and Presentation.

The exact amount of CAG involved in any particular school will be governed by the ease of access to suitable computer hardware and software. Hence, this aspect has been incorporated in a flexible way, to enable current resources to be utilised while encouraging greater involvement in CAG as and when additional school resources become available.

CAG should be used throughout the course, as appropriate, both for practical computer applications and as a learning/teaching approach. A minimum of 10 hours and a maximum of 20 hours hands-on experience is recommended for each pupil, with an additional 10 to 20 hours allocated to gaining knowledge and understanding of CAG. The maximum allocation of time for work utilising CAG should be 40 hours.

Illustration and Presentation should also feature throughout the course, up to a maximum of 40 hours' time allocation. From a variety of course activities, pupils should compile a portfolio of work from which a selection can be made for assessment of performance in this element.

3 3 The course offered should be structured around a series of tasks and assignments which integrate the content as appropriate and facilitate the progressive development of skills. Access to computers should be utilised where possible.

To encourage a meaningful approach, it is recommended that the course be delivered through the integration of relevant topics within tasks and assignments. Tasks, which may involve aspects of design, could derive from themes such as:

- home
- work
- environment
- products.

Section 4

Course Content

4 Course Content

4 1 The content is listed in paragraph 4 4 under the following five headings.

Topic	:	a major heading for cross reference purposes;
Content	:	a more detailed description of a topic;
Notes	:	statements of guidance on context and suggested activities;
Learning Outcomes	:	statements of what a pupil should be able to do;
Element	:	a note of the appropriate assessable element, using the following codes: KI Knowledge and Interpretation DA Drawing Abilities IP Illustration and Presentation.

4 2 It should be noted that:

- the content is presented as a list, not as a sequence for teaching
- appropriate content topics should be integrated, where possible, into tasks and assignments
- the term “draw” should be interpreted as referring to precision work using instruments, while “sketch” refers to informal methods
- the “third angle” projection system should be used for orthographic drawings.

Where reference is made to the element Illustration and Presentation (IP), it should be recognised that evidence of each pupil’s work will require to be retained for possible inclusion in the Portfolio to be used for internal assessment purposes.

4 3 With regard to the teaching of basic colour theory, pupils should be introduced to ideas and conventions concerning the use of colour for practical purposes. Initially, pupils should be invited to experiment with and explore the use of colour; having developed an awareness of the possibilities offered by its use, pupils may then choose to express their own individuality and personality through the application of colour.

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
Reading and Interpreting	At all stages, emphasis should be placed on reading and interpreting drawings and diagrams.	Throughout the course, pupils should be given opportunities to read and interpret drawings and other source material. Some material may be quite complex and demand a standard of reading ability which is higher than the pupil's drawing ability. A range of source material, including industrial drawings and circuit diagrams, should be used.	Pupils should be able to: LO 1 read and interpret a variety of drawings and diagrams.	KI
Use of drawing instruments and draughting aids	Drawing board, T-square, set square, compasses, dividers, pencils, pens, radius curves, french curves or flexicurve, ellipse aids, grids, templates, computer input devices.	The use of instruments, draughting aids and computers should be utilised as appropriate throughout the course.	LO 2 understand that drawings are required for specific purposes. LO 3 demonstrate an appropriate standard of draughtsmanship for effective communication.	KI IP
Line	Feint, heavy, thick, thin, broken. Informal, formal, straight and curved.	Exploration of various media, eg variety of pencil grades, pens, line marker, on various grounds (paper, card, etc). Use of lines, horizontal, vertical, angled, radiating. Loose and tight curves, wavy, random, radiating curves. Pupils should make comparisons between as wide a range of methods as is practical, through a brief explorative assignment/task.	LO 4 use instruments and other aids as appropriate. LO 5 demonstrate the use of appropriate media and line types for sketching and drawing.	IP IP

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
Shape	Straight line regular shapes and circles.	Geometric shapes. Positive and negative shapes, eg repeat patterns and tessellations, examples taken from advertising/graphics.	Pupils should be able to: LO 6 sketch, construct and draw the following regular shapes: triangle, rectangle, square, parallelogram, hexagon, octagon and circle.	DA
Form/geometric solids	Cube, cylinder, cone, sphere and derivations.	Analysis of simple products as basic forms, individually or in combination, eg sketching and drawing of familiar artefacts such as bottles, buildings and vehicles.	LO 7 sketch and draw pictorial views of the following individually and in combination: cube, cylinder, cone, sphere and derivations.	DA
Form/geometric solids	Upright prisms, pyramids, cylinders, cones, (individually and in combination).	Familiarisation and practice in orthographic representation, (third angle projection) by sketching and drawing geometric solids pictorially and orthographically. (Everyday items should be represented where possible).	LO 8 sketch and draw the following geometric solids, individually and in combination, in pictorial and orthographic projection: upright prisms, pyramids, cylinders, cones.	DA
	Sectional views (horizontal, vertical and inclined cutting planes).		LO 9 draw sections of solids cut by horizontal, vertical and inclined planes.	DA
	True shapes and surface developments.	The production of surface developments involving true shapes, eg packaging, models, buildings.	LO 10 draw true shapes and surface developments of complete and sectioned geometric solids.	DA

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
3D sketching and drawing	Perspectives – one- and two-point (not measured perspective) with basic theory to support.	The importance of perspective in presenting sketches and drawings of basic forms, leading to simple line drawings of common objects, eg interiors, exteriors, 3D lettering, furniture, objects in different positions.	Pupils should be able to: LO 11 sketch and draw using one- and two-point perspective.	DA
	Oblique, isometric and planometric views.	Specialist viewing systems to suit particular illustration and presentation tasks, eg planometric for interior design, kitchen layout, etc.	LO 12 sketch and draw in isometric, oblique and planometric projection.	DA
	Assemblies, exploded views and simple cut-away sections.	From engineering components and domestic products, production of simple presentation drawings and sketches showing how components are assembled and dismantled, eg toys, door handle, craft knife. Reading and interpretation of more complex objects given assembly information, eg exploded along more than on axis.	LO 13 select the most effective form of graphical presentation.	KI
			LO 14 sketch and draw simple exploded drawings to illustrate assembly, movement and location.	DA
			LO 15 draw pictorial views of an assembly with component parts exploded or partially cut away.	DA
			LO 16 sketch and draw a simple assembly in orthographic or pictorial form, given orthographic or pictorial views of component parts.	DA

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
2D sketching and drawing	Plans. Elevations.	Views in isolation, sketched and drawn.	Pupils should be able to: LO 17 sketch and draw isolated plans and elevations in order to convey information and detail.	DA
		The purpose and use of plans – through exercises in environmental design, home layout, routes, maps, control systems, circuit diagrams, architectural details, garden layout. Elevations, eg introduction to graphic design applied to labels, logos, displays, road signs. From a given view, generation of a new view, eg production of an elevation from a contour map of a mountain.	LO 18 display knowledge and understanding of common drawing conventions.	KI
		Drawing of related views of products and buildings.	LO 19 draw related plans and elevations in third angle projections.	DA
	Orthographic projection in third angle.	A comprehensive explanation of the advantages of orthographic projection, based on the value of presenting related views in a systematic way, eg bungalow, machined component, radio or hairdryer. (Use of examples requiring multiple views to convey full information.)	LO 20 draw whole or part sections taken on the principal horizontal and vertical planes. LO 21 sketch and draw orthographic views from pictorial views and vice versa.	DA DA

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
Dimensioning	Scaling.	Scaling as a feature of activities already identified, eg plans, isolated views, electrical components.	Pupils should be able to: LO 22 use an appropriate (either enlarged or reduced) scale.	DA
	Basic principles, as illustrated in PP7308.	Dimensioning of drawings of buildings, components and products, to give specific detail, on orthographic and pictorial views – to meet manufacturing or assembly needs. At this Grade, the recommendations given in PP7308 should be adopted as a common approach to dimensioning all types of drawing.	LO 23 show dimensions on orthographic and pictorial views in accordance with PP7308.	DA
Design features*	Basic principles of common design features.	Examination of how familiar objects are made and assembled, drawing attention to various design features and the effect of method of manufacture and choice of material. (This should be distinguished from the design tasks suggested in paragraph 4 of the Appendix to the Arrangements.)	LO 24 show an awareness of the criteria affecting design features in simple components (not assessed).	
Information display and diagrammatic representation	Bar/pie/3D charts and graphs.	From lists of statistical information, (eg nutritional information, rainfall, economic factors), reading, interpretation and presentation of information to show facts, trends, performance relationships or comparison.	LO 25 represent given data graphically to show the relationship of one quantity with another.	IP
	Flow, sequence and instruction diagrams.	Reading, interpretation and drawing of schematic representations of simple operation and planning systems, and processes which utilise symbols.	LO 26 extract information from simple diagrams, graphs and charts.	KI

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
Colour	Knowledge of graphical symbols selected from PP7307: 1989, (sections 6,7, 8, 11, 12, 14, 15, 17, 18, 19).	Much of this work will involve reading and interpretation through the use of pre-printed worksheets, computer library, data retrieval, etc.	Pupils should be able to: LO 27 display knowledge and understanding of common graphical symbols.	KI
	Theory of the colour wheel: primary, secondary; tertiary; harmonious, complementary; warm, cold; advancing, receding; hue; tone, tonal range (by adding black/white).	Application and use of various media. Justification of choice and relationship with reference to colour theory. Educated, sensitive and reasoned use of colour and rendering should be encouraged and developed.	LO 28 demonstrate an understanding of basic colour theory with reference to a simple colour wheel and tonal scale.	KI
	*Knowledge of this topic is not assessed.		LO 29 demonstrate the effective use of colour, with justification for choice.	IP
	Rendering	Representation of light, shade, shadow, reflection, tone, texture using black/white and colour.	Use of a variety of media. (The variety of media used will depend on available resources – a range of three media will suffice.) wet – paint, ink, brush, spray, etc dry – pencil, pen, marker, dry transfer etc.	LO 30 demonstrate appropriate rendering techniques using pencil and other media.
Layout, lettering and display	Lettering, borders, mounts, binding, overlays, models.	Careful consideration and planning of the integration of differing elements in a graphic presentation. Appropriate choice of technique for specified purpose, eg folder, folio, brochure, booklet, report, poster, packaging, display, etc.	LO 31 use suitable layout to achieve visual impact and clarity.	IP

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
Layout, lettering and display (continued)	Cutting and fixing techniques.	Page layout, photo-montage, packaging, desk-top publishing, collage.	Pupils should be able to: LO 32 plan and execute a presentation for display.	IP
Modelling	Paper, card or other suitable materials.	Packaging or models of real items.	LO 33 make a model in paper, card or other suitable material.	IP
2D draughting (computer applications)	Plans and elevations, drawn in third angle projection.	Use of simple 2D draughting software to produce related views of products. Titled and dimensioned drawings of simple everyday objects, eg bicycle pedal, vice, towel rail, bathroom door snib, skateboard wheel. Hard copies should be produced.	LO 34 use a software package to produce a drawing, including textual information.	IP
	Library symbols and shapes.	The manipulation and layering of component drawings to build up required solutions to given tasks.	LO 35 use and manipulate a CAD library of standard symbols and shapes to produce a simple solution to a given task.	IP
Display presentation (computer applications)	Text, symbols and charts.	Use of 2D draughting software with library facilities to produce drawings such as kitchen layouts, assemblies, circuit diagrams, maps, etc. Hard copies should be produced. Graphic presentations of displays. Selection of software determined by content and purpose of displays.	LO 36 use computer graphics to achieve visual impact and clarity in a display presentation.	IP

TOPIC	CONTENT	NOTES	LEARNING OUTCOMES	ELEMENT
Display presentation (computer applications) (continued)		The use of desk-top publishing, graphic, graph and chart software packages in the production of items such as folders, brochures, posters, reports, etc. Hard copies should be produced.	Pupils should be able to:	
Introduction to computer-aided graphics (computer awareness)	Advantages and disadvantages of computer-aided graphics.	Discussion of social, financial and industrial implications to enable pupils to gain an awareness of the changes brought by new technologies.*	LO 37 state the advantages and disadvantages of computer graphic systems and their effects in social, financial and industrial terms.	KI
Computer graphics hardware (computer awareness)	Input and output devices for computers.	Awareness of the function of graphics-related input and output devices.*	LO 38 identify and understand the function of various computer graphic hardware devices.	KI
Computer graphics software (computer awareness)	Capabilities of software packages to provide 2D draughting, 3D modelling, visualisation, animation.	Capabilities of software packages and awareness of the progression from simple 2D software packages to modern industrial and commercial software graphic systems.* *Where appropriate, classroom presentations – supported by books, product literature, videos, computer demonstrations and industrial visits.	LO 39 demonstrate a knowledge of graphic software packages.	KI

Section 5

Assessment for Certification

5 Assessment for Certification

5.1 Assessable Elements

The three assessable elements of the course will be:

- Knowledge and Interpretation
- Drawing Abilities
- Illustration and Presentation.

5.2 System of Assessment

Candidates will be assessed by a system common to all Levels.

The Certificate will record an overall award on a 7-point scale of grades, Grade 1 being the highest. The Certificate will also record attainment in each assessable element. The overall award will be derived from the mean of the element grades, each element having equal weighting.

5.3 Form of Assessment

The elements Knowledge and Interpretation and Drawing Abilities will be assessed externally, on the basis of performance in examination papers. The element Illustration and Presentation will be assessed internally on the basis of a candidate portfolio, with assessments being subject to external moderation as required by the Board.

5.4 Presentations

Candidates presented for the examination may attempt the written papers at two adjacent Levels, ie Foundation and General or General and Credit, but may not attempt both the Foundation and Credit Level papers. Candidates are not obliged to attempt papers at two Levels but in most cases are strongly advised to do so, since, other than as the result of an appeal, candidates can only be awarded one of the grades assessed by the paper(s) attempted, or Grade 7 for the element(s) concerned. Candidates who attempt papers at two Levels will be awarded the better of the two grades achieved on these papers. Performance at one Level will not be taken into account in grading at the other Level.

The following table may be a helpful guide to papers which candidates are advised to attempt:

Expected External Grade	Paper(s)	Grades Assessed
7, 6	Foundation	6, 5
5, 4	Foundation and General	6, 5, 4, 3
3, 2, 1	General and Credit	4, 3, 2, 1

This arrangement allows in each case for the award of a grade higher or lower than expected (except at Grades 1 and 7 respectively). A candidate expected to achieve either Grade 7 or Grade 6 may attempt both the Foundation and General Level papers.

Irrespective of external papers attempted, the full range of grades is available for the internally assessed element Illustration and Presentation.

5 5 External Assessment

The elements Knowledge and Interpretation and Drawing Abilities will be assessed on the basis of performance in external papers. One paper, testing both elements, will be set at each Level. The time allocated to each examination will be as follows:

Foundation Level – 1 hour 15 minutes
General Level – 1 hour 30 minutes
Credit Level – 1 hour 45 minutes

In each paper, questions based on the EGRC will be set to test:

- knowledge of conventions
- symbols
- techniques
- computer aspects
- interpretation of charts
- diagrams
- detailed drawings
- sketching ability
- drawing ability.

5 6 Marking

The following procedure will apply to marking by the Board.

Assessment of Knowledge and Interpretation and of Drawing Abilities will be based on questions and marking instructions which conform to the Grade Related Criteria. Marks will be allocated to questions, and cut-off scores will then be applied to totals of marks to determine element grades.

The two grades associated with each Level will be distinguished by setting two cut-off scores for each Level. The lower score will reflect a satisfactory overall standard of performance, the upper score a high overall standard of performance (usually in the range of 40-50% and 70-80% of the available marks respectively).

5 7 Estimates

Presenting centres must submit to the Board, by 31 March of the year of the examination, an estimate grade for each candidate for each of the externally assessed elements (Knowledge and Interpretation, Drawing Abilities). The teacher should determine the estimate grades on the basis of each candidate's work. Estimates may be used by the Board for its internal procedures, including such cases as absence from external examinations, adverse circumstances and appeal. Evidence in support of these estimates should be retained by centres for submission to the Board if required.

5 8 Internal Assessment

Throughout the course, each candidate will be required to compile a Portfolio of work which will form the basis for internal assessment of the element Illustration and Presentation.

The Portfolio should contain evidence of work in a range of media and demonstrate the candidate's ability to use a range of techniques, including computer applications. The evidence should be selected from work done throughout the course, although it is anticipated that the selected work will have been produced after the development of basic competences.

The requirement for candidates to compile a Portfolio of evidence, as itemised below, should be established early in the course. As part of a continuous process, candidates should gather and select material from classroom activities and, as the course progresses, the evidence available should be reviewed to ensure that the final Portfolio selection represents **an accumulation of the candidate's best work**. Notes to assist in monitoring the compilation of Portfolio evidence will be issued by the Board.

At General and Credit Levels in particular, Portfolio evidence should include, where appropriate, relevant development work and evaluation by the candidate of the effectiveness of the mode of graphical communication selected. Such development work or written evaluations should be attached or appended to the relevant drawings/sketches.

The element Illustration and Presentation contains ten sub-elements. The suggested evidence for each is itemised in the table below. It should be noted that an item of work may contribute towards the evidence for more than one sub-element/topic. The letters a – j refer to the EGRC for each sub-element against which the evidence should be assessed. It is anticipated therefore that a Portfolio should comprise a maximum of 10 sides of A3-size paper or equivalent.

EGRC Ref	Topic	Suggested Evidence
a	2D and 3D charts	1 example of 3 different types, including 1 computer-produced item
b	use of colour to illustrate a range of drawings/sketches	3 pieces of work covering a suitable range*
c	use of shading, toning and rendering	3 pieces of work covering a suitable range*
d	layout and lettering	No separate evidence – based on 3 examples of work in Portfolio
e	display	1 display and/or presentation; evidence of planning
f	modelling	1 model (photograph of 3D model may be submitted)
g	computer-aided draughting	2 pieces of work
h	use of a CAD library	1 piece of work
i	CAG for display	1 piece of work
j	draughtsmanship	No separate evidence – based on examples of work in the Portfolio

*Range

58 (continued)

In the context of building, engineering, architectural and domestic situations, content should be selected to cover a range of the following, as appropriate:

- orthographic views
- pictorial views
- sectional views
- developments
- computer-aided graphics.

An internally assessed grade for each candidate for Illustration and Presentation, is to be submitted to the Board by 31 March in the year of the examination. **The grade should be based on the evidence in the Portfolio and should be the mean of the grades awarded for each of the ten sub-elements.** The necessary forms for submitting grades will be issued annually by the Board.

In exceptional circumstances the situation may arise where a candidate is unable to submit a complete Portfolio, there being no evidence in respect of one or more sub-elements. Such Portfolios should be assessed by awarding Grade 7 for any “missing” sub-element(s).

Internal assessments may be moderated by the Board to ensure that national standards have been applied. In this connection, centres concerned will be required to submit for moderation the Portfolio work of a sample of 12 candidates selected by the Board. Portfolios submitted for moderation purposes will be returned to centres if this is requested at the time of submission.

59 **Grade 7 and No Overall Award**

For any element, Grade 7 will indicate that the candidate has, in the element concerned, completed the course but has not demonstrated achievement of any specified level of performance as defined by the Grade Related Criteria.

The Board will regard submission of an estimate grade for an externally assessed element as evidence that the course has been completed in that element.

Candidates who have not complied with the assessment requirements in any element (eg due to unauthorised absence from the external examination) will be deemed not to have completed the course, in that element. Such candidates **will not receive a grade** for that element and hence **will not receive an overall award** for the subject. In such cases, however, if a grade is gained for any other element, that grade will be recorded on the Certificate.

Section 6

Grade Related Criteria

6 Grade Related Criteria

6.1 Definition

Grade Related Criteria (GRC) are positive descriptions of performance against which a candidate's achievement is measured. Direct comparisons are not made between the performance of one candidate and that of another.

6.2 Application of GRC

GRC are defined at three Levels of performance: Foundation, General and Credit.

Awards will be reported on six grades, two grades being distinguished at each Level. The upper of the two grades at a given Level will be awarded to candidates who meet the stated criteria demonstrating a high standard of performance; the lower grade to those who demonstrate a lower, but still satisfactory standard of performance.

There will be a seventh grade for candidates who complete the course but fail to meet the criteria for any Level.

6.3 Types of GRC

Summary GRC are broad descriptions of performance. They are published as an aid to the interpretation of the profile of attainment by candidates, parents, employers and other users of the Certificate.

Extended GRC are more detailed descriptions of performance. They are intended to assist teachers in making their assessments for each element, and to be used by examiners when conducting external assessment.

6.4 Knowledge and Interpretation – Summary GRC

Foundation Level (Grades 6, 5)

The candidate has demonstrated ability to read and interpret simple drawings and extract information using a key, to understand basic colour theory, to demonstrate a knowledge of conventional drawing systems and to demonstrate awareness and knowledge of computer applications and related hardware devices commonly used in schools.

General Level (Grades 4, 3)

The candidate has demonstrated ability to read and interpret detailed diagrams and drawings, to extract information, to select the most appropriate method of presenting graphical information, to recognise the use of colour theory in relation to function, to demonstrate an understanding of common drawing conventions and to demonstrate knowledge and understanding of the advantages and disadvantages of computer-aided graphic systems.

6 4 *(continued)*

Credit Level (Grades 2, 1)

The candidate has demonstrated ability to read and interpret complex drawings and diagrams, to extract information, to select an appropriate method of presenting graphical information, to understand and justify the use of colour in the presentation of graphical information, to demonstrate a knowledge of specialised industrial and architectural conventions and to demonstrate knowledge and understanding of complex computer-aided graphics and draughting systems, including social, financial and industrial implications.

6 5 **Drawing Abilities – Summary GRC**

Foundation Level (Grades 6, 5)

In representing real items, the candidate has demonstrated the ability to sketch and draw common regular shapes, pictorial, orthographic and sectional views of simple straight-edged forms, to draw true shapes of surfaces parallel to the horizontal or vertical planes and surface developments of uncut prisms, to show overall dimensions on orthographic views and to draw simple items to a straightforward scale in orthographic projection.

General Level (Grades 4, 3)

In representing real items, the candidate has demonstrated the ability to sketch and draw pictorial, orthographic, sectional and exploded views of items which use combinations of straight-edged forms, simple assembly drawings in orthographic projection, to draw true shapes of sections through straight-edged forms and surface developments of cut prisms and pyramids, to show dimensions on orthographic and pictorial views and to draw to a given scale in orthographic or pictorial projection.

Credit Level (Grades 2, 1)

In representing real items, the candidate has demonstrated the ability to sketch and draw pictorial, orthographic, sectional, exploded and assembly views of complex items, to construct true shapes and surface developments of curved surfaces, to show dimensions on detailed orthographic and pictorial views and to draw to a given scale in orthographic or pictorial projection.

6 6 **Illustration and Presentation – Summary GRC**

Foundation Level (Grades 6, 5)

In presenting a Portfolio of selected work, the candidate has demonstrated the ability to apply an elementary standard of draughting skill, to present simple statistical information on bar and pie charts, to use primary and secondary colours, to use simple layout, shading and toning techniques, to produce a model and a simple display and to use computer software to produce simple drawings.

6 6 (continued)

General Level (Grades 4, 3)

In presenting a Portfolio of selected work, the candidate has demonstrated the ability to apply a good standard of draughting skill, to present statistical information on 2D and 3D charts and graphs, to use a range of colours giving reasons for their choice, to use modelling and layout techniques for display purposes, to use rendering techniques suited to a range of drawings and to use computer software packages to produce orthographic and pictorial drawings.

Credit Level (Grades 2, 1)

In presenting a Portfolio of selected work, the candidate has demonstrated the ability to apply a high standard of draughting skill, to present statistical information with visual impact in 2D and 3D charts and graphs, to use a range of colours in illustrating items with detailed reasons for their choice, to create a model, to use creative layout techniques to achieve visual impact and clarity, to use complex rendering techniques to highlight drawings and diagrams, to plan and execute a display, and to use and manipulate computer software packages to produce orthographic and pictorial drawing of complex artefacts.

6 7 **Descriptions of grades**

These describe performance within Levels. They apply to each element.

- | | |
|---------|--|
| Grade 6 | The candidate has met the criteria for Foundation Level, demonstrating a satisfactory overall standard of performance. |
| Grade 5 | The candidate has met the criteria for Foundation Level, demonstrating a high overall standard of performance. |
| Grade 4 | The candidate has met the criteria for General Level, demonstrating a satisfactory overall standard of performance. |
| Grade 3 | The candidate has met the criteria for General Level, demonstrating a high overall standard of performance. |
| Grade 2 | The candidate has met the criteria for Credit Level, demonstrating a satisfactory overall standard of performance. |
| Grade 1 | The candidate has met the criteria for Credit Level, demonstrating a high overall standard of performance. |

6 8 Knowledge and Interpretation – Extended GRC

	Foundation Level (Grades 6, 5)	General Level (Grades 4, 3)	Credit Level (Grades 2, 1)
	The candidate can:	In addition, the candidate can:	In addition, the candidate can:
LO 1	a) read and interpret simple diagrams and drawings to extract information and use a key or supplementary guide;	read and interpret detailed drawings and diagrams;	read and interpret complex drawings and diagrams;
LO 18 LO 27	b) demonstrate a knowledge of conventional line types, projection systems, simple dimensioning, cut sections;	demonstrate an understanding of common drawing conventions and symbols;	demonstrate a knowledge of specialised industrial and architectural conventions and symbols;
LO 26	c) extract information from different types of diagrams ¹ ;		
LO 2 LO 13	d) demonstrate awareness of and recognise the need for different types of graphical presentation;	select an appropriate method of graphical presentation for a particular purpose or end-user;	select appropriate methods of graphical presentation, of a more sophisticated or specialised nature;
LO 28	e) demonstrate knowledge and understanding of basic colour theory by using a colour wheel;	recognise some advantages of the use of colour in relation to function;	apply colour theory in the synthesis of a colour scheme by justifying the colours selected;
LO 37	f) identify, from a given list, advantages/disadvantages of using commercial CAG systems;	demonstrate knowledge and understanding of the reasons for the use of commercial CAG systems and of the advantages/disadvantages of their use within organisations;	demonstrate knowledge and understanding of the wider national and international implications of CAG and of its effect in social, financial and industrial terms;
LO 38	g) demonstrate knowledge of basic input and output devices relating to CAG, commonly used in schools;	demonstrate knowledge of common industrial input and output devices relating to CAG;	demonstrate knowledge and understanding of how these devices are utilised in CAG;

6 8 (continued)

	Foundation Level (Grades 6, 5)	General Level (Grades 4, 3)	Credit Level (Grades 2, 1)
	The candidate can:	In addition, the candidate can:	In addition, the candidate can:
LO 39 h)	demonstrate knowledge of the capabilities of graphics software packages commonly used in schools.	demonstrate knowledge of industrial and commercial graphics software packages and show some understanding of their usage.	demonstrate knowledge and understanding of the techniques used in such software eg animation, 3D, simulation and some knowledge of the terms used, eg icons, libraries, layering.

Descriptions of grades are given in **6 7**.

Notes:

See Section 4 – Course Content for the appropriate learning outcomes (LO reference).

- 1 Diagrams:
- statistical – bar, pie and 3D charts, graphs;
 - procedural – sequence of events, planning diagrams;
 - schematic – systems, circuits.

6 9 Drawing Abilities – Extended GRC

	Foundation Level (Grades 6, 5)	General Level (Grades 4, 3)	Credit Level (Grades 2, 1)
	In representing where possible real items, the candidate can:	In addition, the candidate can:	In addition, the candidate can:
LO 6	a) sketch and draw common regular shapes ¹ ;		
LO 7 LO 8 LO 11 LO 12 LO 14	b) sketch and draw pictorial views ² of simple straight-edged forms;	sketch and draw pictorial views of regular forms ³ ; sketch and draw exploded views of combinations of straight-edged forms;	sketch and draw pictorial views of combinations of regular forms; sketch and draw exploded views involving curved surfaces;
LO 8 LO 17 LO 19	c) sketch and draw as single views and in orthographic projection ⁴ regular forms and shapes, maps, circuit diagrams, logos, etc;	sketch and draw combinations of forms and shapes in orthographic projection;	sketch and draw complex combinations of forms and shapes in orthographic projection;
LO 16 LO 21	d)	sketch and draw a simple assembly in orthographic projection, given component parts;	sketch and draw a simple assembly in pictorial projection, given component parts;
LO 9	e) draw, in orthographic projection, sectional views of upright regular forms, excluding cones, cut by horizontal or vertical planes;	draw, in orthographic projection, sectional views of upright regular forms, including cones, cut by an inclined plane;	draw sectional pictorial views of upright regular forms, excluding cones, cut by an inclined plane;
LO 15 LO 20		draw, in orthographic projection, whole or part sections of an assembly, product or building to reveal internal features;	draw, in pictorial views, whole or part sections of an assembly, product or building to reveal internal features;
LO 10	f) construct the true shape of surfaces parallel to the horizontal or vertical planes, dealing with straight-edged forms;	construct the true shape of sections through straight-edged forms, including sloping surfaces;	construct the true shape of sections of cut cylinders and cones;

6 9 (continued)

	Foundation Level (Grades 6, 5)	General Level (Grades 4, 3)	Credit Level (Grades 2, 1)
	In representing where possible real items, the candidate can:	In addition, the candidate can:	In addition, the candidate can:
LO 10 (cont)	draw the surface development of uncut prisms;	draw the surface development of cut prisms and pyramids;	draw the surface development of cut cylinders and cones;
LO 23	g) show overall dimensions on orthographic views;	show dimensions of specific details on orthographic and pictorial views;	show dimensions of features such as diameters, radii, small sizes and internal features.
LO 22	h) draw simple items to a straightforward scale in orthographic projection.	draw items to a given scale, in orthographic or pictorial projection, with an acceptable degree of accuracy.	

Descriptions of grades are given in 6 7.

Notes:

See Section 4 – Course Content for the appropriate learning outcomes (LO reference).

- 1 Common regular shapes – triangle, rectangle, square, parallelogram, hexagon, octagon, circle.
- 2 Pictorial views – oblique, isometric, planometric, 1-point and 2-point perspective.
- 3 Regular forms – derived from common regular shapes, eg prisms, pyramids.
- 4 Orthographic third angle projection.

6 10 Illustration and Presentation – Extended GRC

	Foundation Level (Grades 6, 5)	General Level (Grades 4, 3)	Credit Level (Grades 2, 1)
	In producing a Portfolio of selected work, the candidate can:	In addition, the candidate can:	In addition, the candidate can:
LO 25	a) present simple statistical information on bar and piecharts and line graphs;	present statistical information on 2D and 3D charts which convey relevant information clearly; select the most appropriate type of graph or chart for a specific task;	present statistical information on 2D and 3D charts enhanced to create visual impact which emphasises/highlights particular information;
LO 29	b) use primary and secondary colours simply, giving an elementary reason for choice;	use a colour range neatly, giving detailed reasons for choice, eg warm, cold, contrasting and harmonious colours; relate the choice of colour to function;	use a colour range effectively, to illustrate contrast, tone, cold, warm, advancing, receding, with justification of choice;
LO 30	c) represent simple form using pencil shading and toning techniques;	represent forms in combination using appropriate techniques, suited to different media ¹ ; show understanding of the use of light and shade by selecting and using appropriate rendering techniques;	represent complex forms using appropriate media and techniques; show understanding of the effect of texture by selecting and using appropriate techniques;
LO 31	d) use simple layout techniques ² to present information;	use a range of layout techniques;	demonstrate the creative use of layout to achieve visual impact and clarity;
LO 32	e) produce a simple display from existing resource material;	plan and execute a simple display showing evidence of planning such as a storyboard;	plan and execute an effective presentation for display;

6 10 (continued)

	Foundation Level (Grades 6, 5)	General Level (Grades 4, 3)	Credit Level (Grades 2, 1)
	In producing a Portfolio of selected work, the candidate can:	In addition, the candidate can:	In addition, the candidate can:
LO 33	<i>f)</i> make a model of a simple item in paper or card;	make a model showing surface details in paper or card;	make a detailed model of a complex item in paper, card or other suitable material;
LO 34	<i>g)</i> use a software package to produce basic 2D drawings of simple artefacts, showing views in isolation and main dimensions;	use software packages to produce orthographic and pictorial drawings of simple artefacts;	use software packages to produce orthographic and pictorial drawings of complex artefacts, including textual information;
LO 35	<i>h)</i> use a simple CAD library of standard symbols and components;	manipulate ³ a CAD library of standard symbols and components to produce a simple drawing/diagram;	create additional symbols/icons for a CAD library and manipulate them to produce a drawing/diagram;
LO 36	<i>i)</i> use computer software to assist in the production of items such as folder covers, posters and brochures;	use computer software to produce items such as folder covers, posters and brochures;	use computer software to achieve visual impact and clarity in a display presentation;
LO 3 LO 4	<i>j)</i> demonstrate an elementary standard of draughting skill in the use of instruments LO 5 and other appropriate draughting aids; show evidence of: <ul style="list-style-type: none"> • use of a limited range of line types • line work of a rudimentary nature. 	demonstrate a good standard of draughting skills; show evidence of: <ul style="list-style-type: none"> • use of a suitable range of line types • care and attention in accuracy of line work • an overall impression of neatness. 	demonstrate a high standard of draughting skill; show evidence of: <ul style="list-style-type: none"> • use of a wide range of line types • a high degree of care and precision in line work.

Description of grades are given in 6 7.

6 10 *(continued)*

Notes:

See Section 4 – Course Content for the appropriate learning outcomes (LO reference).

- 1 Media – pencils, pens, markers, etc – a range of three will suffice.
- 2 Layout techniques – use of borders, lettering, lines, spaces, bindings and overlays to produce displays such as flowcharts, sequence diagrams, posters, brochures, folder covers.
- 3 Manipulate – rotate, distort, move, copy, reflect, invert.

Appendix

Teaching and Learning Approaches

- 1 The introduction of the Standard Grade course in Graphic Communication, with its different content and methodology, will require a change in teaching and learning approaches from those appropriate to the Ordinary Grade course in Technical Drawing. New aspects such as reading and interpreting a variety of drawings and charts, illustration and presentation, and computer-aided graphics will require not only the development of new skills but also changes in class management. More emphasis should be placed on pupil-centred and resource-based learning and less on didactic teaching approaches. The philosophy of Standard Grade, encouraging provision of opportunities for pupils of all ability levels, should be reflected in the course materials used.
- 2 The general content of the course has been broadened to embrace a variety of real-life situations and everyday products and items, and where possible the work of pupils should stem from these. Simple design tasks might support and complement work done in curricular areas such as Geography, Science, Home Economics and other subjects which require fieldwork or practical investigations.

Reading and interpreting of drawings and diagrams should feature throughout the course and involve pupils in reading quite complex drawings. Indeed, pupils should be expected to read stimulus material of greater complexity than the drawings they are able to produce. Real exemplars from industry or commerce should be utilised, possibly in a simplified form.
- 3 Colour and rendering have not recently been included in Technical Drawing courses, but with the advent of modern printing techniques, drawings and illustrations are now frequently produced in colour. Consequently colour will form a significant aspect of the course.
- 4 The content of the course should be covered and developed through tasks or assignments which have a specific purpose. For example, design tasks can provide the context for introducing many aspects of the course. Differentiation can be achieved by using assignments which have a common stimulus to which pupils can respond at their own level. Although design is suggested as a means of stimulating pupils, and as a vehicle for the delivery of the course, knowledge of “the design process” will not be assessed.
- 5 The use of computers as draughting/communication/design tools should be employed to enhance the teaching and learning approach throughout the course.

The immediacy and versatility of computer modelling, manipulating and evaluating design decisions affecting changes in colour, scale, layout, etc make the use of computer-aided graphics a dynamic, attractive and necessary element of the course. Other aspects which can be enhanced through computer applications are illustrations of charts, symbols, thread conventions, drawing of repetitive details and 3-dimensional modelling. Pupils should become familiar with the simple procedures required to operate a computer and peripherals. They should be aware of the general advantages offered by computer-aided graphics and know the functions and capabilities of peripherals. The ability to program will not be required.
- 6 Hardware and software devices or programs unavailable in the school can be explained and illustrated to pupils by using videos or by taking them on an industrial visit.

Most of the sketches, drawings, charts, diagrams, illustrations, models, displays and computer-produced material created by each pupil will have to be retained for possible inclusion in the portfolio of work to be used for assessment. This will require a disciplined approach to the storage of such material.