

E282 TECHNICAL GRAPHICS

(YEAR 12) - 2008-2009

Rationale

Graphic language is an important form of communication, conveying information which cannot be expressed adequately by the written or spoken word. Using the graphic language of conventions, symbols and standards, concise and accurate recording and transmission of information can take place.

Technical Graphics provides students with opportunities to develop ideas and learn to convey them clearly and concisely to others. This subject provides students with the skills to move into employment in one of the many design and drafting areas, as well providing personal and life skills.

This is a practical subject used to develop an understanding of technical graphics as applied to industry and the community. The subject will focus on the application of current technology in the drafting and graphics industries.

Subject Design

This subject stipulates a set of outcomes. These describe what the student can do as a result of studying the subject. On completion of the subject the student must have been provided with at least two opportunities to demonstrate achievement of each outcome.

A set of components is listed under each outcome. These components are specified for the development of each outcome and indicate how students will demonstrate achievement of the outcome in this subject. The teaching/learning program will give coverage to all components in order to ensure each outcome is appropriately addressed.

If schools wish to vary these components they may do so, provided it can be demonstrated that the outcomes are still able to be achieved and that the subject is still assessed through the common assessment framework described for the subject. Proposals for variations must be submitted to the Curriculum Council for approval.

The assessment framework, based on a series of generally defined common assessment tasks, has been stipulated for the subject. Each task measures student performance on a subset of subject outcomes. A generalised set of performance criteria supports the assessment framework.

A procedure for rating student performance on each outcome and allocating grades has also been stipulated.

Subject Outcomes

Within the context of Technical Graphics the student is provided with opportunities to meet each of the following outcomes.

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| <p>Outcome 1: Applies an identified process to produce a graphic solution to a design problem.</p> <p>Outcome 2: Applies orthogonal drawing skills and applications.</p> <p>Outcome 3: Applies pictorial drawing skills and applications.</p> <p>Outcome 4: Applies freehand drawing skills and applications.</p> <p>Outcome 5: Applies graphic illustration techniques and applications.</p> <p>Outcome 6: <u>Examines and responds to drawing</u> information in relation to its suitability for the intended purpose.</p> <p>Outcome 7: Applies solid geometry drawing skills and applications.</p> |
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Components of Outcomes

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| <p>Outcome 1: Applies an identified process to produce a graphic solution to a design problem.</p> |
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The following components amplify the context and meaning of the outcome. The student:

- selects, applies and justifies a process to produce a graphic solution to a design problem
- demonstrates the key elements of structuring a design process
- can locate, collect and analyse data relevant to a chosen design situation
- demonstrates an understanding of the role of technical graphics in solving design problems.

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| <p>Outcome 2: Applies orthogonal drawing skills and applications.</p> |
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The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- produces orthogonal drawings to represent a solution to a design problem
- uses Australian Drawing Standards
- produces detail and assembly drawings in third angle orthogonal projection to full size and scale (including nut and bolt detail)
- uses standard dimension practice on full size and scale drawings.

Outcome 3: Applies pictorial drawing skills and applications.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- draws axonometric drawings (e.g. isometric, planometric, oblique) of common objects, including single and compound curves.
- produces perspective drawings
- applies appropriate pictorial techniques in representing a solution to a design problem.

Outcome 4: Applies freehand drawing skills and applications.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- applies appropriate sketching techniques in order to represent information proportionally and economically
- sketches complex shapes in space using isometric oblique or perspective techniques
- applies appropriate sketching techniques in representing a solution to a design problem.

Outcome 5: Applies graphic illustration techniques and applications.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- applies modelling techniques (e.g. rendered pictorial drawings, computer-aided drafting models, prototypes, card models) to represent a solution to a design problem
- designs graphic symbols and their applications
- represents data or information in a graphical form such as graphs, charts and diagrams.

Outcome 6: Examines and responds to drawing information in relation to its suitability for the intended purpose.

The following components amplify the context and meaning of the outcome. The student:

- analyses design information presented by drawings
- interprets information presented in drawings
- analyses information relevant for manufacture based on the information contained in a drawing.

Outcome 7: Applies solid geometry drawing skills and applications.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- produces developments of prisms and pyramids, both regular and truncated
- draws true shape sections of solids
- applies techniques to correctly ascertain the true length and size of lines and planes inclined to the principal planes of projection
- produces developments of cylindrical or conical intersections
- draws practical applications of the helical solid.

Common Assessment Framework

The framework outlined below specifies a series of common assessment tasks for this subject. The teacher has the flexibility to select from the Technical Graphics outcomes those to be assessed in each task. On completion of the subject the student must have been given at least two opportunities to demonstrate achievement of each outcome.

Each common assessment task measures student performance on a subset of subject outcomes. For each outcome measured in a task, student performance will be rated as Very High (V), High (H), Satisfactory (S) or Not Demonstrated (ND).

Task and Task Description

The term ‘task’ should not be confused with ‘project’. Each task may not be a separate individual project but a broad description of the type of activity that the student is to complete to satisfy the specified outcomes within that task. The organisation and number of projects is up to the individual school, as long as all tasks are covered during the subject.

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Task	Outcomes	Task Description
One	The teacher has the flexibility to select from the Technical Graphics outcomes those to be assessed in each task.	Architectural Produce a series of drawings to demonstrate understanding and application of graphic information and presentation relevant to architectural communication.
Two		Sketching Produce a series of drawings demonstrating application of freehand drawing techniques and sketching using various systems and three dimensional modelling techniques.
Three		Manufacturing Produce a series of drawings to demonstrate application of orthogonal drawing, skills, techniques, standards and terminology.
Four		Geometry Produce a series of graphic solutions that demonstrate application of solid geometry drawing skills and applications.

The above set of tasks represent assessable activities that would be undertaken within a range of projects defined by the teacher at the commencement of the subject.

Common Assessment Tasks Booklet

The *Common Assessment Tasks* booklet for this subject further describes each task, and defines parameters for its completion. Schools are free to determine specific assessment details within these parameters. Copies of the booklet are available from the Curriculum Council and are included with the syllabus, on the Curriculum Council website (<http://www.curriculum.wa.edu.au>).

Performance Criteria

Ratings for student performance of each outcome will be based on the following criteria:

Outcome 1: Applies an identified process to produce a graphic solution to a design problem.

Satisfactory	High	Very High
The student applies elements of a design process to produce a graphic solution to a design problem.	The student structures the key elements of a design process to produce a detailed graphic solution, which shows development of design, to solve a design problem.	The student independently selects and applies a design process to produce a solution, structures the key elements of the process, demonstrates progression through the process, and produces varied solutions in solving design problems.

Outcome 2: Applies orthogonal drawing skills and applications.

Satisfactory	High	Very High
The student produces accurate and detailed orthogonal drawings, using Australian Drawing Standards and appropriate occupational health and safety practices and procedures.	The student produces quality, accurate and detailed orthogonal drawings representing solutions to design problems, using Australian Drawing Standards and appropriate occupational health and safety practices and procedures	The student independently produces quality, accurate and detailed orthogonal drawings representing solutions to design problems, using Australian Drawing Standards and appropriate occupational health and safety practices and procedures

Outcome 3: Applies pictorial drawing skills and applications.

Satisfactory	High	Very High
The student produces accurate pictorial drawings of common objects and uses appropriate occupational health and safety practices and procedures.	The student produces quality, accurate pictorial drawings of common objects and uses appropriate occupational health and safety practices and procedures.	The student independently produces quality, accurate and detailed pictorial drawings of common objects and uses appropriate occupational health and safety practices and procedures.

Outcome 4: Applies freehand drawing skills and applications.

Satisfactory	High	Very High
The student produces freehand drawings in areas of work requiring freehand solutions that resemble the intended object, and uses appropriate occupational health and safety procedures and practices.	The student produces quality freehand drawing solutions demonstrating reasonable dimensional proportion in areas of work requiring freehand application, and uses appropriate occupational health and safety procedures and practices.	The student independently produces quality, detailed freehand solutions demonstrating accurate dimensional proportion and incorporating all elements involved in freehand drawing, and uses appropriate occupational health and safety procedures and practices.

Outcome 5: Applies graphic illustration techniques and applications.

Satisfactory	High	Very High
The student uses appropriate graphic illustration techniques to communicate information, and follows occupational health and safety practices and procedures.	The student uses appropriate graphic illustration techniques to accurately communicate information, and follows occupational health and safety practices and procedures.	The student independently applies appropriate graphic illustration techniques to accurately communicate information through quality presentations, and follows occupational health and safety practices and procedures.

Outcome 6: Examines and responds to drawing information in relation to its suitability for the intended purpose.

Satisfactory	High	Very High
The student explains the purpose of information presented in a drawing in terms of the design and manufacture of that product.	The student analyses information presented in a drawing in terms of the design and manufacture of that product.	The student evaluates the information presented in a drawing in terms of the design and manufacture of the product, making recommendations for its improvement.

Outcome: 7 Applies solid geometry drawing skills and applications.

Satisfactory	High	Very High
The student produces accurate solutions to solid geometry problems, and applies occupational health and safety practices and procedures.	The student produces accurate solutions to solid geometry problems, demonstrating the application of these drawing skills, and applies occupational health and safety practices and procedures.	The student produces accurate solutions to solid geometry problems, independently demonstrating the application of these drawing skills, and applies occupational health and safety practices and procedures.

Rating Procedure

Before a final grade can be awarded, the final rating achieved for each outcome must be determined. This is done using the following process:

- V is attained when at least 50% of ratings are at a Very High level, and at least 50% of the remainder are at a High level or better.
- H is attained when at least 50% of ratings are at a High level or better, and at least 50% of the remainder are at a Satisfactory level or better.
- S is attained when at least 50% of ratings are at a Satisfactory level or better.
- ND is attained when more than 50% of ratings are at a Not Demonstrated level.

Where a student fails to achieve a final rating of S for an outcome, teachers are encouraged to provide the student with an additional opportunity to demonstrate S if:

- the student has completed all the CATs incorporating that outcome; and
- the student has demonstrated S for that outcome in at least one task.

The additional opportunity should not simply be a repetition of a task, but should be an equivalent task which reflects a change of context in which the task is done.

Professional judgement should then be used to determine whether a final rating of ND or S is appropriate in each situation.

Grading Procedure

At the completion of this subject grades will be awarded in the following manner:

- A Very High in at least 50% of outcomes, and High or better in at least 50% of the remainder.
- B High or better in 50% of outcomes, and Satisfactory or better in the remainder.
- C Satisfactory or better in all outcomes.
- D Satisfactory or better in at least 50% of the outcomes.
- E Not Demonstrated in more than 50% of the outcomes.

A final rating of ND for any outcome will result in a grade of D being awarded.

Specific details giving examples of the combination of V, H and S resulting in different grades can be found in the *Common Assessment Tasks* booklet.

Time Allocation

The subject has been designed to be completed through a structured education program of approximately 120 hours in any suitable contexts and series of learning experiences. Typically the subject will be studied over the period of one school year. For administrative reasons schools wishing to vary this delivery pattern (e.g. over a shorter period or over a longer period up to two school years) are required to notify the Chief Executive Officer of the Curriculum Council.

Subject Completion

Students must complete the school's structured educational and assessment program for a subject in order to be eligible to receive a grade unless there are exceptional and justifiable circumstances. In situations where the school considers that insufficient information has been gathered to justify the award of a grade for the subject, a result of U (for unfinished) should be allocated. The Curriculum Council offers the flexibility for the U to be converted to a grade after the final grades have been submitted. Further details on assessment and grading are provided in Volume I of the Syllabus Manuals.

Resources

Support Material

Support material for this subject, including a resources list can be ordered through the Curriculum Council Publications Catalogue and is available on the Curriculum Council website (<http://www.curriculum.wa.edu.au>).