

HSC/PRELIMINARY INDUSTRIAL TECHNOLOGY

Syllabus Notes 2007

Andrew Harvey

**COMMON CONTENT
GRAPHICS INDUSTRIES
MULTIMEDIA INDUSTRIES**

1st Edition

DRAFT

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Based on a work at andrew.harvey4.googlepages.com.

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A. INDUSTRY STUDY

“Students will study an individual business related to the focus area industry.”

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1. Structural factors

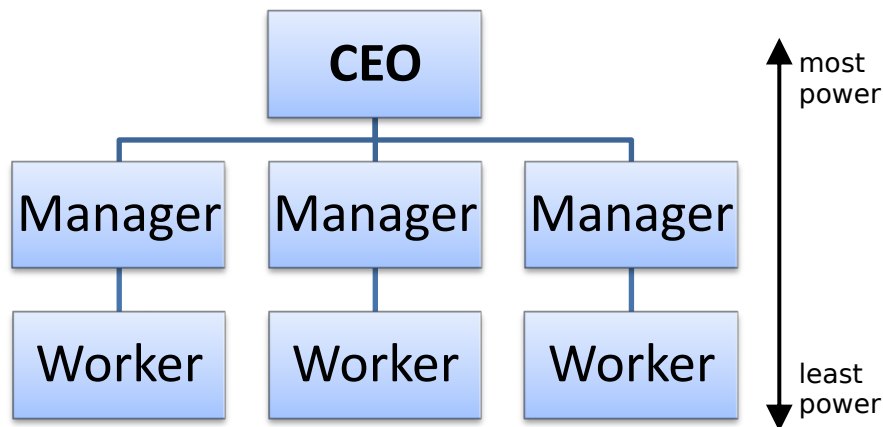
1. organisation and management

The 3 main types of private businesses are:

- **Sole Trader** – Where one or more people run a business one main trader. They may employ others to help.
- **Partnership** – Where two or more people run a business together.
- **Company** – Where the business is owned by shareholders. Advantages include that the company as a whole is held liable rather than one individual.

The two main management structures used are:

- **Hierarchy management structure**



In these structures there is no communication between the CEO and the workers. Information is passed through the ranks. In this type of structure, the business runs how one person wants it to run.

- **Flat management structure**



The CEO is still above the rest however, all the workers can communicate with each other, each has a direct line to each other, this can improve efficiency. However it doesn't work well when there are disagreements.

2. marketing and sales

Marketing is the promotion of a product by an industry. Marketing strategies include:

- E-marketing – Includes banner ads, search engine ads, internet site, spam, etc.
- Exhibitions – Good as you only get the people who are interested in that product/service.
- Promotions – Discount vouchers, free sample, etc.
- Advertising – TV, radio, newspaper, yellow pages, etc.

3. production and efficiency

Production is the process of making something. **Efficiency** is how fast and for how much money the product is produced along with the quality of the product. Efficiency can be improved by:

- Mass production
- Standardisation
- Outsourcing
- CAD/CAM
- Quality control
- Multiskilling

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- Specialisation

4. technology and restructuring

Technology is the applications of science. New technology is emerging all the time. The introduction of technology into the business can drastically improve the quality and speed of the production line.

Restructuring is when a business has to change certain things to stay in the changing market.

Restructuring may be needed when/by:

- Emergence of new technologies
- Change in demographics of target audience → market research
- New production techniques and processes available
- Environmental issues
- OHS issues

5. quality control

Quality control refers to the process of making sure that the products quality does not fall below standard. Quality control results in **improved products**. Quality control can be done at different stages of production. It can be done pre-production (ensuring production steps are adequate), it can be done during production (monitoring the quality of the produce), and it can be done post-production (checking the product once finished but prior to release to buyer). Quality control can also be done on the raw materials coming in.

6. prepare a report on the organisation and structure of a range of businesses related to the specific organisation studied in the Preliminary course

7. identify factors that affect quality control within the industries

2. Technical factors

1. mechanisation, specialisation

Mechanisation refers to using a machine to complete a task, instead of doing it by hand. The advantages of mechanisation include:

- the task can be completed **faster**
- more **accurately**
- **risk of injury** is reduced
- and the person does not suffer from effects associated with repeating the same task over and over, such as **RSI** or **boredom**

Staff that were trained in the task could be assigned to maintaining and implementing the mechanical systems. Mechanisation would require **computer systems, robotics, sensors** and other connected electronic devices to operate.

Specialisation refers to specialising in the production of one specific product or service. This means that more time and effort can be put into the product to ensure it is of a high standard. The disadvantages include workers can become less motivated as they always do the same thing. One way to avoid wide specialisation is to outsource/contract certain tasks to other companies.

2. mass production and automation

When a product is **mass produced**, each part is **produced** in **masses** and **assembled** in **masses**. For example when you produce a wood cupboard, you cut the wood to size, then glue it together then paint it. However if you were to mass produce that cupboard you would cut lots of the wood to shape, the glue that lots of wood together, then paint lots of the glued together wood.

Advantages of mass production include:

- Much **faster** to produce one item, also more **efficient**.
- Workers only need to be trained in 1 or 2 tasks.

Disadvantages of mass production include:

- **Boredom** of workers
- **Low** worker **morale**

A. INDUSTRY STUDY

- **Large stockpiles** of stock
- **Difficult to change the production process**

Automation is the making a process automatic. This might include introducing new equipment that will do things without human interaction. It also refers to using a computer to do things automatically. An example of this on a computer level is **macros**.

Sociological **effects** of automation include:

- **Tedious** and **unpleasant** tasks are **easier, faster** and more **enjoyable** for workers.
- Less workers needed.
- **Hazardous** tasks are no longer done by humans.
- Training of the use of machines, etc. is needed. -> **Retaining** of staff in new areas.

3. emerging technologies

An **emerging technology** is a technology that has only been produced recently. A few years ago an emerging technology was **CAD**. However now days CAD is almost completely dominant over manual drafting. Emerging technologies can greatly improve the **efficiency** of the production of a product.

Such ways CAD does this include:

- **Faster** production (allowed by automation (dimensioning, rendering, creation of 2D drawings from 3D model); multiple people working on a drawing simultaneously)
- Higher **quality** product (in terms of neatness and accuracy)
- **Ease** of production
- Easier to comply with standards (and change to new or updated standards)
- Easy to make **changes**
- Multiple production of one drawing

Another emerging technology in the graphics industry is **rapid prototyping** machines. These allow for physical models to be produced from 3D models on the computer. Advantages include:

- Much **faster**
- Once the equipment has been bought, much **cheaper**
- Staff with skills in physical modelling are not needed as much
- Models are extremely **accurate**
- **Easier** to produce

4. describe the significance that the various technical factors have in the efficiency of the industries studied

Mechanisation, specialisation, mass production, automation and emerging technologies increase efficiency of production.

3. Environmental and sociological factors

1. resources, alternatives, limitations

The main resource used in the Graphics industry is **paper** and **ink**. Lots of paper is used. Paper comes from trees and we must monitor how much we use compared with the number of new trees we build. An alternative to cutting down trees for paper is **recycling**.

2. recycling

Recycling is the process of taking excess waste products and modifying them to a state so that they can be used again. The resource that the graphics industry could recycle most is waste paper. Other examples include inks and computers. Most businesses would already be recycling waste **paper**. Another resource that can be recycled is printer **inks**, these can be refilled, instead of throwing it away into land fill and purchasing a new one.

Advantages of recycling are that it is **better for the environment**. However often it can be more **expensive** to recycle materials rather than purchase non-recycled materials.

Recycling programs that could be incorporated into the workplace includes:

- **Repairing** parts rather than replacing it
- **Refill ink cartridges**
- Recycle **paper**
- Use **re-writable CD's**

3. pollution

The **Environmental Protection Authority (EPA)** is a government sector which

- ensures that set **regulations, policies** and **guidelines** are in order to **minimise pollution** and its **effects**
- implements those **policies**
- **monitors** pollution levels, and
- **prosecutes** organisations for breaches of environmental laws.

To avoid pollution waste products should be properly disposed, reused or recycled.

4. government legislation

5. Environmental Impact Studies (EIS)

Environmental Impact Studies investigate how the proposed, business/building/industry will **affect** the **environment** including:

- the **social aspects** of the community
- the physical environment:
 - **air**
 - **waterways**
 - flora (**plants**)
 - fauna (**animals**)
 - **cultural heritage**
 - **historical significance**

6 sustainable development

Recently the government has introduced a BASIX certificate. This is a Building Sustainability Index and it measures how sustainable a building is. This will prove to be an integral part of sustainable development. Sustainable development is important to insure that our environment is protected and to ensure that we have enough resources for living and future development. The BASIX certificate aims to cut household water and energy consumption and cut greenhouse gas emissions.

Specifically to the Graphics Industry, when an architect designs a building they should aim to design a building that will perform well on the BASIX certificate test.

7. distinguish between the approaches to the various environmental and sociological factors adopted by each industry studied

8. discuss and justify the ramifications of Environmental Impact Statements (EIS) and sustainable development when studying the overall industry

4. Personnel issues

1. industrial relations

Industrial Relations regulate things such as, award wages, penalty rates, hours of work and allowances.

2. entry level training requirements

Upon entering a business the employee should be trained. This is also known as induction training. Induction training is training that employees receive upon entering employment at a company. Employees may be trained in company specific procedures including the **structure** of **management** and the departments of the company, also **policies** that stipulate rules and regulations, **emergency procedures**, correct and **safe** use of machinery and equipment, etc.

3. retraining and multiskilling

Multiskilling refers to an employee being able to do a number of different tasks and having skills in more than one area. Multiskilling is kind of the opposite to specialisation. Advantages of multiskilling include:

- The worker can do more work themselves without needed to outsource part to other departments in the organisation or other businesses. This results in increased productivity.
- Worker boredom from repeating repetitive task becomes less as they are doing more than one thing.
- Communication between workers would be easier as they would have some knowledge of what the other person is talking about.

Retraining is providing existing employee's training for emerging technologies and other skills or knowledge that they don't already have to allow them to work better, safer or more efficiently.

4. unions

"A union is an **association of workers**, from a similar field of employment, which uses its strength of numbers to initiate changes in working conditions, by bringing areas of concern to the attention of the employer.

Unions developed to **protect workers** from being exploited by unscrupulous employers who expected long hours of work for low rates of pay.

Unions are involved in:

- **negotiating** terms and conditions of awards and enterprise agreements
- **investigating** suspected breaches of award or underpayment of wages
- **health and safety** and workers compensation issues
- **unfair dismissals**
- redundancies
- sexual **harassment** and **discrimination** claims
- superannuation
- industrial disputes"¹

5. roles of industry personnel

6. equity/EEO

EEO (Equal Employment Opportunity) is legislation that is in place to give all employees a fair go no matter what their **gender, race, religion, age, disability, physical appearance**, etc. is.

To ensure that EEO principles are followed in a company procedures could be implemented by management that stipulate **rules, regulations** and **procedures** regarding the treatment of staff. They must specify and **enforce** the fair and equal treatment of all employees regardless of their gender, race, religion, age, disability, physical appearance, etc.

Training of staff of requirements in the area of EEO and why it is important to follow EEO guidelines could be implemented. Also **reporting policies** of reporting discrimination in the workplace could be set up.

7. describe the personnel issues that businesses have to address in their organisation

8. identify government legislation and policies that ensure the rights and protection for employees

¹ Charles Sturt University. (n.d.). *Unions in the workplace*. Retrieved June 27, 2006, from HSC Online: http://www.hsc.csu.edu.au/ind_tech/ind_study/unions/unions.html

5. Occupational health and safety

Occupational Health and Safety (**OHS**) is an act that puts the employer responsible for the safety and wellbeing of their employees. This involves **investigating** risks or hazards that may arise in the workplace, and also **implementing** methods to minimise or eradicate the risk such as training employees, wearing protective clothing, implementing warning signs and/or testing equipment.

1. government legislation

The main government legislation relating to occupational health and safety is the [Occupational Health and Safety Act 2000 \(NSW\)](#).

Extracts from the act are presented firstly, and these are summarised below.

“The objects of this Act are as follows:

- (a) **to secure and promote the health, safety and welfare of people at work,**
- (b) to protect people at a place of work against risks to health or safety arising out of the activities of persons at work,
- (c) to promote a safe and healthy work environment for people at work that protects them from injury and illness and that is adapted to their physiological and psychological needs,
- (d) to provide for consultation and co-operation between employers and employees in achieving the objects of this Act,
- (e) to ensure that risks to health and safety at a place of work are identified, assessed and eliminated or controlled,
- (f) to develop and promote community awareness of occupational health and safety issues,
- (g) to provide a legislative framework that allows for progressively higher standards of occupational health and safety to take account of changes in technology and work practices,
- (h) to deal with the impact of particular classes or types of dangerous goods and plant at, and beyond, places of work.”²

Both employees and employers have legal responsibilities.

“An **employer** must ensure the health, safety and welfare at work of all the employees of the employer.

That duty extends (without limitation) to the following:

- (a) ensuring that any premises controlled by the employer where the employees work (and the means of access to or exit from the premises) are safe and without risks to health,
- (b) ensuring that any plant or substance provided for use by the employees at work is safe and without risks to health when properly used,
- (c) ensuring that systems of work and the working environment of the employees are safe and without risks to health,
- (d) providing such information, instruction, training and supervision as may be necessary to ensure the employees’ health and safety at work,
- (e) providing adequate facilities for the welfare of the employees at work.”²

The duties of the **employees** include:

- (1) “An employee must, while at work, take reasonable care for the health and safety of people who are at the employee’s place of work and who may be affected by the employee’s acts or omissions at work.
- (2) An employee must, while at work, co-operate with his or her employer or other person so far as is necessary to enable compliance with any requirement under this Act or the regulations that is imposed in the interests of health, safety and welfare on the employer or any other person.”²

This means that:

² Occupational Health and Safety Act 2000 No 40, <http://www.legislation.nsw.gov.au/>

A. INDUSTRY STUDY

- “A person must not, intentionally or recklessly, interfere with or misuse anything provided in the interests of health, safety and welfare under occupational health and safety legislation.
- An employer must not impose a charge on an employee, or permit a charge to be imposed on an employee, for anything done or provided in pursuance of a specific requirement of this Act or the regulations.
- An employer must not dismiss an employee, injure an employee in his or her employment or alter an employee’s position to his or her detriment because the employee:
 - makes a complaint about a workplace matter that the employee considers is not safe or is a risk to health, or
 - is a member of an OHS committee or an OHS representative.
- A person must not, by intimidation or by any other act or omission, intentionally hinder or obstruct or attempt to hinder or obstruct, without reasonable excuse:
 - the giving or receiving of aid in respect of the illness or injury of a person at work, or
 - the doing of any act or thing to avoid or prevent a serious risk to the health or safety of a person at work.
- A person at a place of work must not, without reasonable excuse, refuse any reasonable request:
 - for assistance in the giving or receiving of aid in respect of the illness or injury of a person at work at that place of work, or
 - for the doing of any act or thing to assist in the avoidance or prevention of a serious risk to the health or safety of a person at work at that place of work.
- A person must not, without reasonable excuse, deliberately create a risk (or the appearance of a risk) to the health or safety of people at a place of work with the intention of causing a disruption of work at that place.”²

Both employees and employers have legal responsibilities.

The **employer** must:

- provide safe **equipment**
- ensure **substances** in the workplace are handled, stored and transported safely
- provide adequate **training** and **information** to employees about safe work practices
- provide **free PPE, first aid** and OHS training

The **employee** must:

- **cooperate** with the employer and **comply** with OHS responsibilities
- **not endanger** others, or interfere with equipment or other provided for OHS

Also people or organisations supplying equipment for use in a business must ensure that the equipment is safe to use.

OHS **committees** are groups in a business who investigate, overlook and implement OHS practices and policies.

[Workcover NSW](#) is a government department which polices and administers the *Occupational Health and Safety Act 2000* (NSW) and associated legislation.

2. industry requirements (standards)

Australian Standards set out the occupational health and safety requirements however these industry standards only become law when they are incorporated into legislation.

Some Standards that are part of NSW occupational health and safety laws include:

- AS/NZS 4360: 1999 - Risk Management
- AS/NZS 1269.0: 1998 - Occupational Noise Management
- AS/NZS 4804: 1997 - OHS Management Systems - General guidelines on principles, systems and supporting techniques.

3. first aid

First aid is the aid given to someone when they are injured. In a workplace, a company should provide first aid resources (**first aid kit**, including things such as **bandages**, aspirin, etc.) and **training**. In a large business, particularly in a factory where the risk of injury is high specialised and trained first aid **personnel** should be on-site. Also first aid **facilities** and rooms should be present. A

A. INDUSTRY STUDY

first aid **plan** should also be set out by the company on **procedures** that employees must follow if an incident occurs. **Signage** is also a key aspect of first aid.

4. safety training and human factors

5. materials handling

Material Safety Data Sheets (MSDS) are a main part of material handling. They are the primary source of **information** for employees about the risks, hazards and precautions to take when handling materials. Also, under NSW law, **suppliers** of materials **must provide** material safety data sheets with any materials that are supplied to manufacturers.

Material Safety Data Sheets must contain the following information:

- Contact details of manufacturer/supplier
- Emergency contacts
- Specific details of the material
- Chemical safety classification (eg. radioactive, corrosive, toxic, poisonous, explosive, etc.)

Employers must ensure that employees are safe and aware of correct procedures of handling materials. Materials handling includes the principals of signage, personal protective equipment (PPE) and Occupational Health and Safety (OHS).

6. workplace culture

Workplace culture influences OHS. If the culture of the workplace (as it was a few years ago) is that OHS and PPE is not important, then employees and employers will not take OHS seriously, and more accidents will occur. The culture now days is more that OHS and PPE is important and this means that more employees and employers will comply and less accidents will occur.

7. workplace communication

The workplace must have communication techniques in place to ensure safety. This includes methods of communicating OHS. Some methods include **signs**, **verbal** communication, written **documentation**, **memos**, etc.

8. discuss the importance of OH&S factors in a successful business

9. identify significant government legislation and industry requirements that ensure a safe working environment

B. DESIGN AND **MANAGEMENT**

“Students learn to design, plan and manage their work through the completion of a management folio linked to each project produced.”

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1. Designing

1. research and analysis

Research can be done to find out things like, product designs, materials used, research is mostly used for ideas. Research can be done through a range of mediums including, manufactures web sites, advertisements, exhibitions, etc. Things to research on include the things listed below (2. elements).

2. elements

When designing something the following should be taken into consideration

- function
- aesthetics (what it looks like)
- ergonomics
- safety
- durability
- ecology (how it affects the environment)

3. sequence planning

When designing and producing a set of related drawings for a client, sequencing may involve the process taken, eg. initial **meeting with client** to discuss needs, **research**, **sketching** initial ideas, **evaluation**, **feedback** from client, final design **sketches**, begin **production**, meet again with **client** then produce final product(s).

4. material suitability and selection

5. explain and justify decisions made during the designing/modifying and planning stages of each project

6. select appropriate materials and justify decision

2. Drawing

1. interpretation

2. sketching

Freehand drawings (sketching) are rough drawings done without the aid of a drawing board and tee-square. They may be done with a ruler or not. Freehand drawings are produced because;

- They are **quick** to produce.
- They can **graphically** show an idea or concept.
- They can be done **on site**.
- **Few materials** and **equipment** is needed
- Medium of **communication** between client and designer/architect/engineer

3. production

4. refine skills in interpreting and creating drawings relevant to the focus area

5. prepare all necessary sketches and working drawings required for the production of the major project

3. Computer applications

1. computer software related to management and development of folio and project

Computer software is used to produce the folio because it is **easier** to make changes, it is **faster** to produce and the **presentation** is of higher quality. Software used for the folio includes word processing, spreadsheets, graphics applications, web browsers, etc. (eg. Microsoft Word, Microsoft Excel, Adobe Photoshop, Microsoft Internet Explorer, Mozilla Firefox, etc.) Software used for the production of the project specific to Graphics Industries include CAD software. eg. Autodesk AutoCAD, Autodesk 3ds max, Rhinoceros, Solidworks, Pro/Engineer, UGS NX, Autodesk Inventor, Pro/Desktop, etc.

2. utilise computer software in the development of the management folio

4. Project management

1. planning

2. documentation

3. group activities

4. apply time and finance plans

5. select and use appropriate industrial processes and equipment

6. incorporate a range of presentation skills and techniques in the development of the management folio

C. WORKPLACE **COMMUNICATION**

“Students will learn communication and information processing skills in the following areas.”

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1. Literacy

1. industry terminology

2. written reports

Written reports may be needed to communicate things to employees such as OHS rules and guidelines.

3. materials list

4. management folio

5. computer software – word processing

6. incorporate the full range of literacy skills in the development of their management folio, Industry study and the production of projects

7. utilise appropriate word processing in the management folio

8. use appropriate terminology

2. Calculations

1. ordering

2. sizing

3. quantities

4. costing

5. estimates

6. competently use current industry standards with all calculations

3. Graphics

1. reading and interpretation

2. freehand drawing and sketching

Freehand drawings (sketching) are rough drawings done without the aid of a drawing board and tee-square. They may be done with a ruler or not. Freehand drawings are produced because;

- They are **quick** to produce.
- They can **graphically** show an idea or concept.
- They can be done **on site**.
- **Few materials** and **equipment** is needed
- Medium of **communication** between client and designer/architect/engineer

3. working drawings

Working drawings are proper technical drawings drawn in proportion and to a set scale, either on CAD or manually using set squares and tee squares.

Working drawings are used to convey information about the design, workings and manufacture of the product, structure or mechanical system. The type of working drawings needed varies depending upon the industry.

Working drawings include:

- **Assembly Drawings** – Show the **parts fitted together** in their final place. Can also contain arrows and annotations that explain how the parts fit together.
- **Detail Drawings** – Show usually just **one part**. Usually in **orthogonal** and fully **dimensioned**.
- **Exploded Drawings** – Show all the parts **exploded**.

4. computer software graphics

In my personal opinion this dot point does not make sense. Computer software graphics is the graphics used in software, such as the GUI (graphical user interface), buttons, icons, etc. What this

has to do with Industrial Technology I don't know. I think that this dot point is referring to computer graphics software. The following assumes the latter case.

There are many different types of computer graphics software. There is software such as Adobe Illustrator which is used for producing non-technical illustrations. Microsoft Word's drawing component can also do this. This type of computer graphics software is **vector** based. Meaning that objects are stored as lines, circles, etc. instead of as pixels. This means that you can keep zooming in as far as you want without any pixilation. A common vector image file format is SVG (scalable vector graphics). PDF will also same vector image data as a vector image. 2D CAD computer graphics software can also be classed as vector graphics software, although it can be categorised in its own group. 2D CAD graphics software saves circles and lines as circles and lines, however it also stores and allows for extra features such as dimensions and paper spaces. The main this that sets CAD software apart from other vector software is CAD software is much more accurate and allows the easy creation of accurate drawings.

Another main type of computer graphics software is **bitmap** based software. This includes Microsoft Paint, Adobe Photoshop and Jasc Paint Shop Pro. This type of computer graphics software stores and edits each pixel in terms of its colour. Bitmap images cannot be enlarged easily without pixilation.

The other main type of computer graphics software is **3D** graphics software. This includes 3D CAD programs which focus on mechanical parts, assemblies and data accuracy, such as Solidworks or Pro/ENGINEER, and it also includes the less technical 3D graphics software such as Maya or 3ds Max which take a more artistic approach. These types of programs are usually used for 3D visual effects in films or computer animation. 3D data is often created in a 3D CAD software package and then exported to software like Maya or 3ds Max for rendering and animation.

5. signage

Signs are used as they provide a medium of communication. Signs can contain text, simple graphics or a combination. Universal symbols and signs are used as they are universally understood and recognised, regardless of origin. Safety signs are a significant component of OHS.



Don't Do Signs
(Red Circle with line)



Must Do Signs
(Blue Circle)



Hazard Warning Signs
(Yellow Triangle with
black edge)



Emergency
Information Signs
(Green Square)

The placement of safety signs is important. They must be placed near the hazard, danger, etc. They should be placed in clear sight where they are not going to be obstructed. They should not be placed where they will cause danger from being there. They should not be placed on movable objects.

7. utilise the full range of graphics techniques and standards used in the focus area

Different industries require different types of drawings. For example the Electronics Industry mostly uses circuit board diagrams, or the Timber Products and Furniture Industry often uses exploded drawings.

D. INDUSTRY – SPECIFIC CONTENT AND PRODUCTION

FOCUS AREA: GRAPHICS INDUSTRIES

“Students should develop a series of drawings around a product or theme to gain skills in the areas of engineering, product and architectural drawing. They should complete at least one project or theme in each area.”

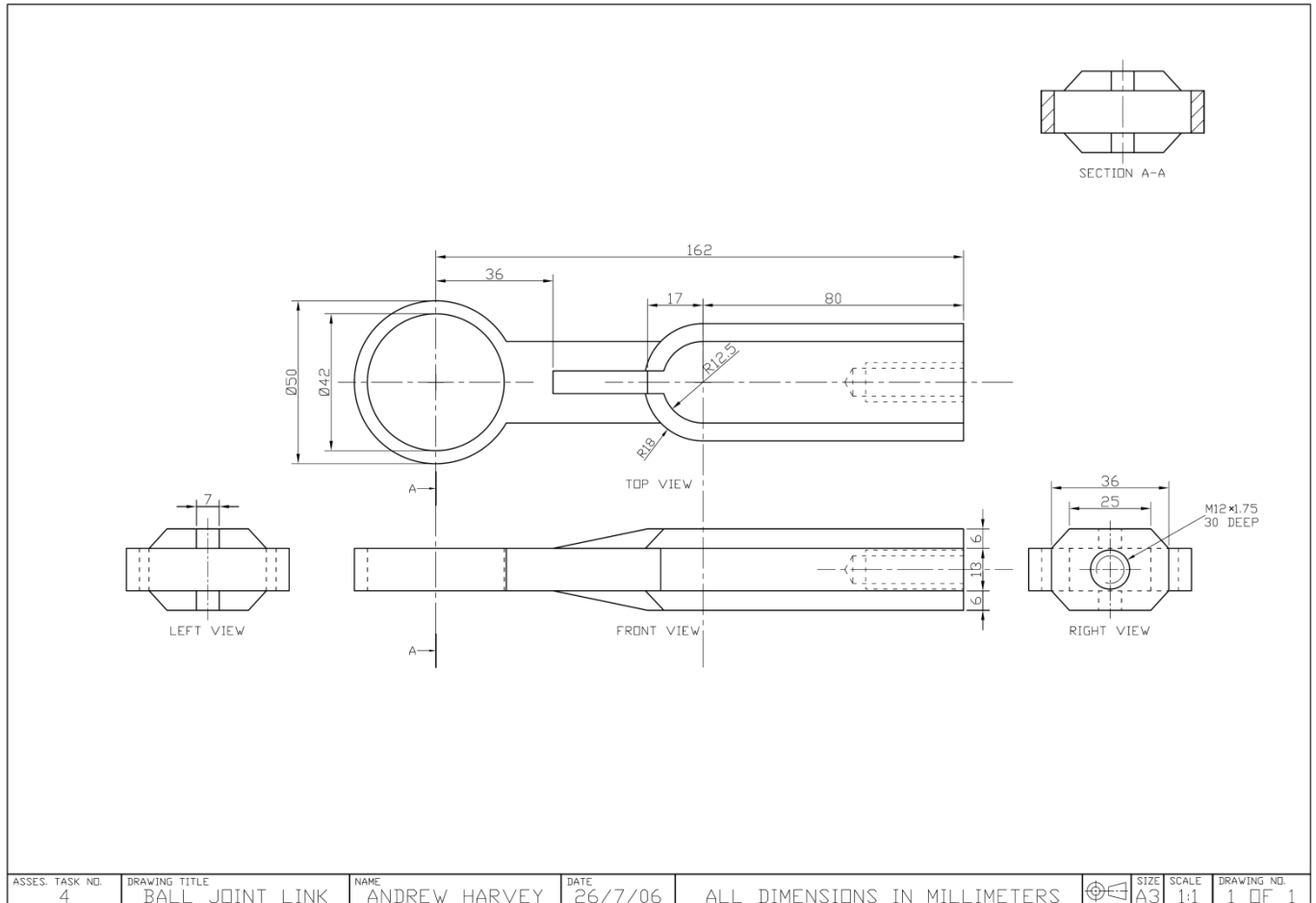
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These notes document the theory. You still need practical skills to produce your project.

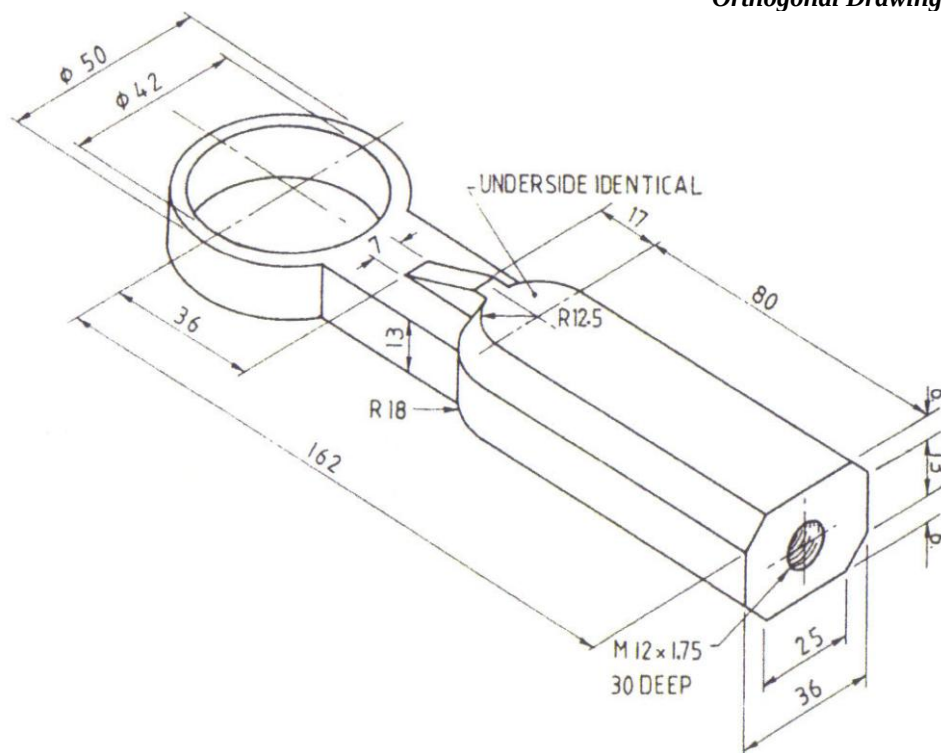
1. Processes

1. Engineering and product drawing

a) orthogonal and pictorial details of machine, product components and common appliances



Orthogonal Drawing – Mechanical Part



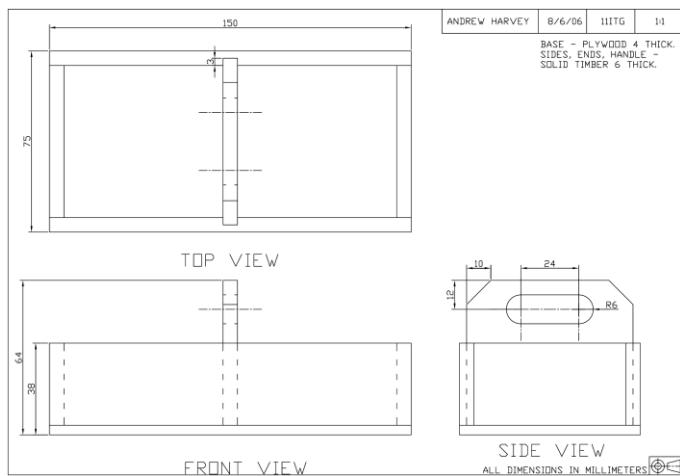
Pictorial (Isometric) Drawing – Mechanical Part

Orthogonal drawings use parallel lines of sight. They can consist of a maximum of 6 views of one object. Orthogonal drawings show more detail and more show it more accurately than any other drawing types.

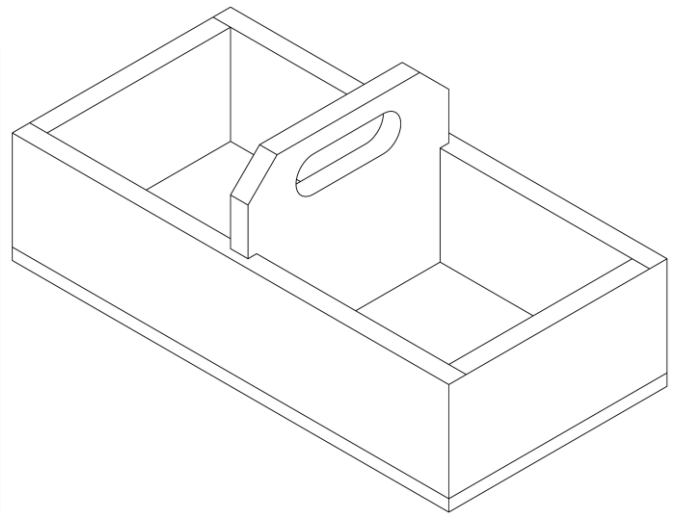
Pictorial drawings are non orthographic drawings. They show three principal faces of the object on the one view. Visualising a product from pictorial drawings is much easier than from orthogonal drawings. Some types of pictorial drawings include:

- Isometric
- Perspective (1pt, 2pt & 3pt)
- Oblique
- Axonometric
- Planometric

use orthogonal and a range of pictorial drawing types to communicate design ideas and solutions



Orthogonal Drawing of Toolbox



Pictorial Drawing of Toolbox

2. Architectural drawing

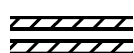
Architects plan, design and supervise the construction of buildings, and the spaces around these buildings.

Architectural drawings:

- Design Drawings
 - Schematic Drawings – Preliminary Sketches
 - Development Drawings
- Production Drawings
 - Location Drawings – Includes Site plans, Floor plans, Elevations, etc.
 - Component Drawings – Show parts of the building necessary for different purposes.
 - Assembly Drawings – Shows construction details

a) architectural styles

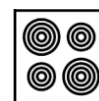
b) architectural details



Double
Brick Wall



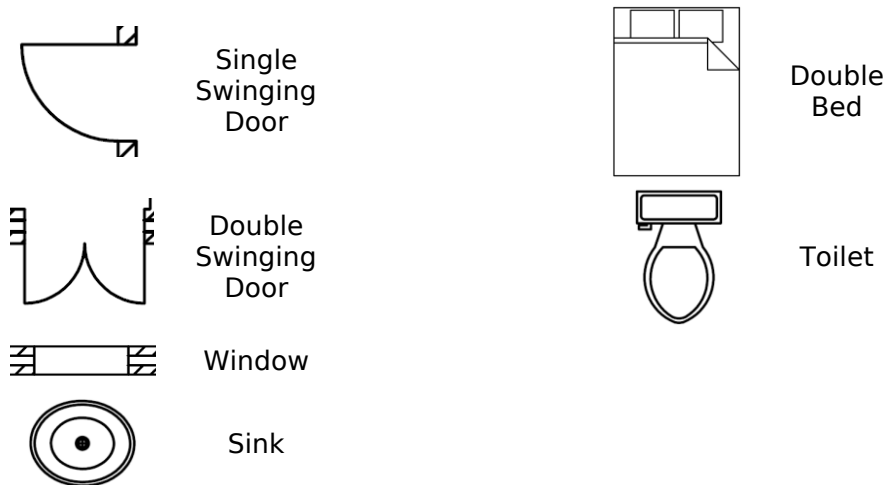
Single
Brick Wall



Stove



Table

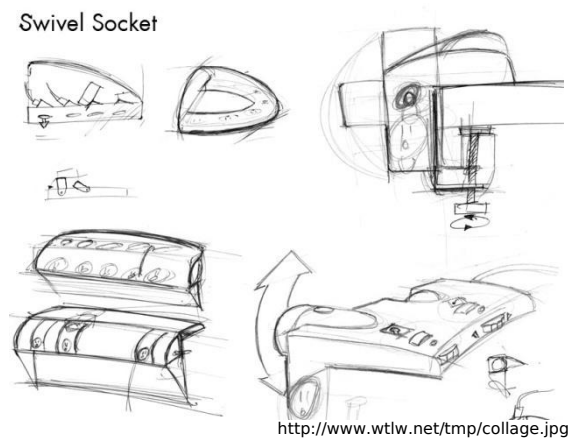


recognise and sketch examples of Australian architectural styles and details

3. Freehand drawing

Freehand drawings are rough drawings done without the aid of a tee square. They may be done with a ruler or not. Freehand drawings are produced because;

- They are quick to produce.
- They can graphically show an idea or concept.
- They can be done on site.
- Few materials and equipment is needed
- Medium of communication between client and designer/architect/engineer



Freehand Drawings

a) 2D and 3D

Sketches can be 2D or 3D as shown above.

sketch an overall outline and develop it into freehand orthogonal, isometric, oblique and perspective sketches

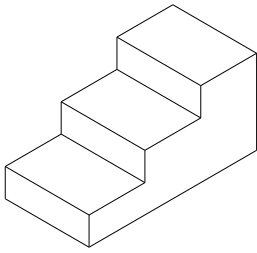
4. Pictorial drawing

Pictorial drawings show 3 faces on the one view. They are used because they make visualizing the final product easier, than visualizing it from an orthogonal drawing.

a) isometric

Isometric is a method of projection. (projection is when 3D coordinates are converted to 2D coordinates. It is done to represent a 3D object on a 2D screen or sheet of paper.) It fits between

orthogonal drawings and perspective drawings on the scale of technicality. It is slightly more technical than a perspective, but not as technical as an orthogonal drawing. In isometric drawings lines are drawn at 30° and 90° to the horizontal. Also the scale on each axis is full scale.



Isometric Projection

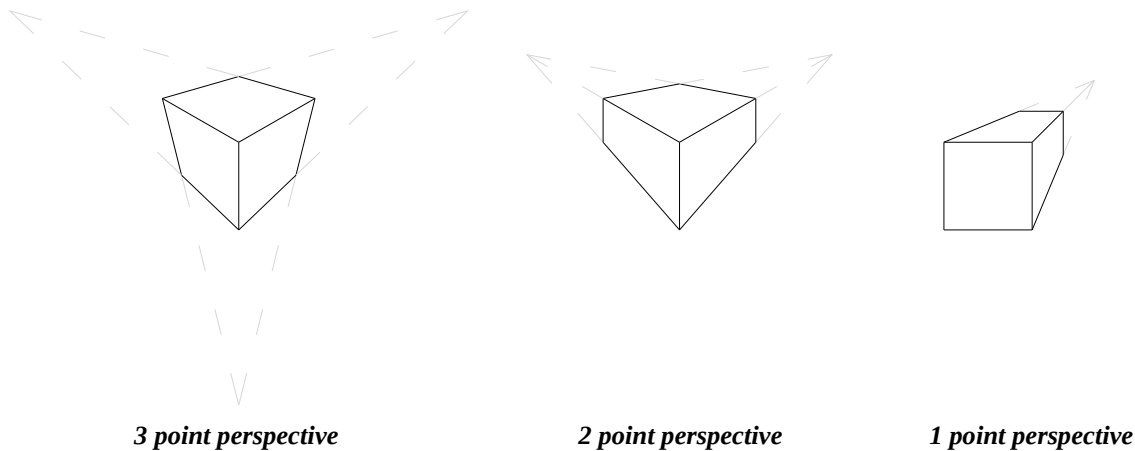
construct isometric drawings of simple product parts and architectural details using mechanical and/or CAD techniques

Isometric drawings can be created using mechanical techniques, on both paper and CAD, and CAD techniques. Mechanical techniques involve drawing each line. CAD techniques involve modelling a 3D model of the object and allowing the computer software to generate the isometric drawing for you.

b) perspective (mechanical and measuring point)

In perspective drawings the object gets smaller as it goes back into the distance. This is how we see in real life, therefore a perspective image is more realistic than any other drawing projection.

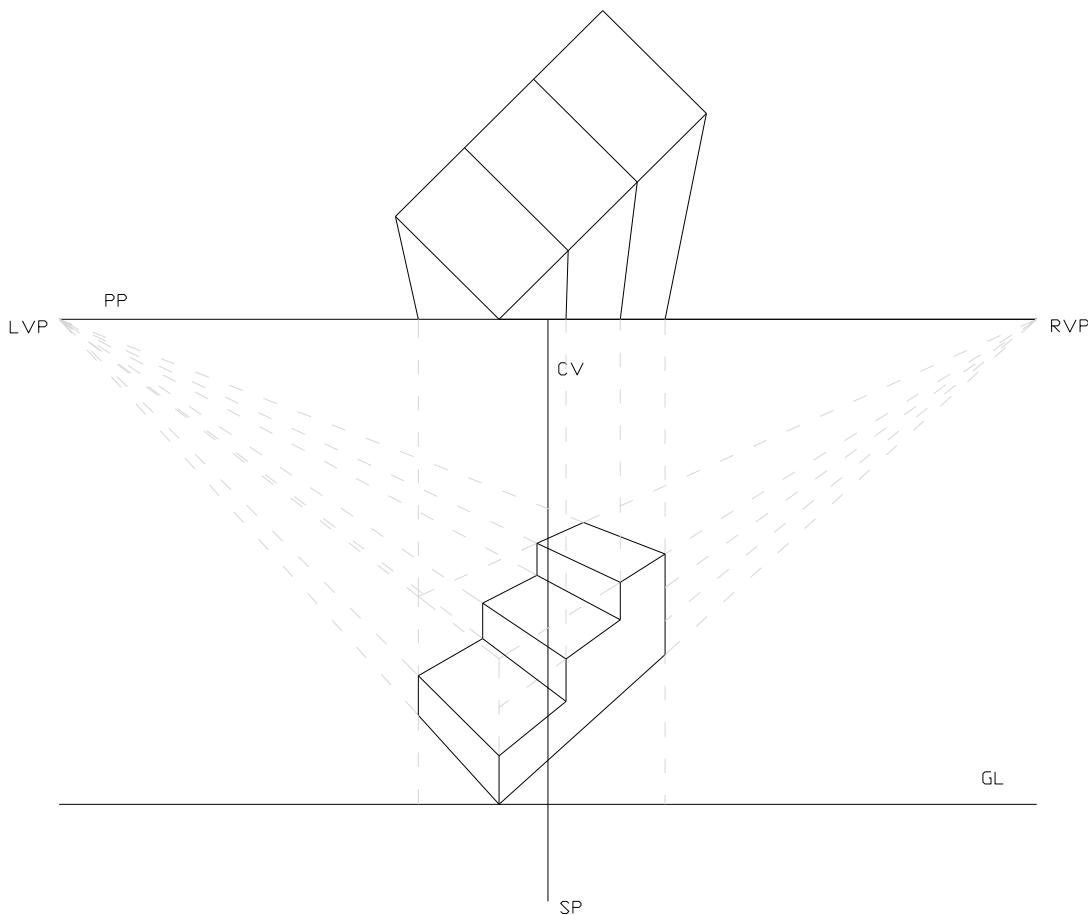
The picture below shows how in 3 point perspective there are 3 vanishing points, and similarly with 1 and 2 point perspective there are 1 and 2 vanishing points.



There are 2 main methods for creating perspective drawings, Mechanical Method and Measuring Point Method.

Mechanical Perspective:

As shown below, mechanical perspective involves using a top orthographic view and a SP to determine the perspective distortion. Everything is measured out graphically.



Mechanical Perspective (Two point)

Measuring Point Perspective:

...

Vocabulary:

Station Point (SP) – the fixed position of the viewer.

Centre of Vision (CV) – the centre line (or axis) of the viewer's field of vision.

Field of Vision (FV) – a cone within which the viewer can see objects. Objects outside this cone are unseen or highly distorted. Recommended angle of cone is 30°.

Picture Plane (PP) – a flat surface on which the image of an object can be recorded. Objects behind the PP project to the PP smaller than true size; objects in front of the PP project to the PP larger than true size.

Measuring Line (ML) – lines located on the PP. They are the only true scale lines on a perspective drawing.

Horizon Line (HL) – a horizontal line representing the intersection of the horizontal plane through the viewer's eye and the PP.

Vanishing Points (VP) – Points at which parallel lines appear to meet. They are on the HL.

Ground Line (GL) – the intersection of the PP and the ground plane.

plot or generate mechanical and measuring point perspective drawings and/or a range of computer-generated perspective drawings

Computer generated perspective drawings work slightly different to the above mechanical and measuring point perspective drawing methods. Computer generated perspective drawings as the name suggest are created automatically by the computer. The computer takes 3D data of the model and then calculates the 2D perspective drawing. The technical details are not necessary for this course, however the advantages and feature of using computer generated perspective drawings are.

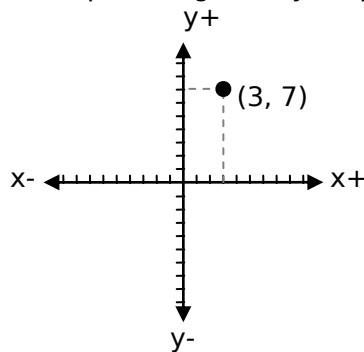
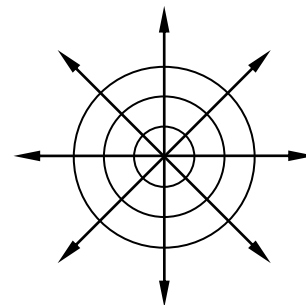
Advantages include:

- Extremely **fast**. Less than a fraction of a second, compared to the hours it may take manually.
- Much **easier** for the draftsman.
- Much more **efficient**.

It should also be noted that unfortunately much of the mainstream commercially available software only supports three point perspective and not one or two point. Also the current software does not allow you to set your projection variables in terms of those used in manual mechanical or measuring point. Instead you can only choose the rotation of the camera and lens length (amount of perspective distortion). However if this is fine if you are just generating your perspective drawing for rendering instead of just say a technical approach.

5. Principles of planes and coordinates

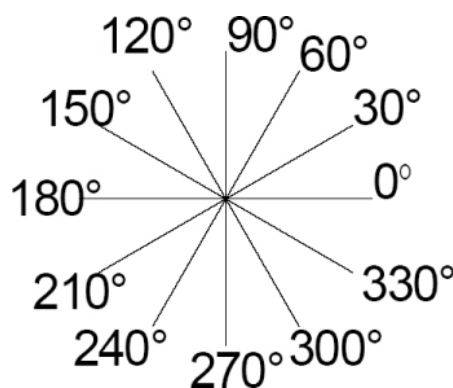
By convention a 2D point is given by (x, y). This point is plotted on a 2D Cartesian plane.

*2D Cartesian Coordinate System**2D Polar Coordinate System*

In 2D CAD systems when you draw you are drawing in this Cartesian plane. When you draw lines you can draw them by specifying coordinates (the main CAD software support Cartesian and polar coordinates).

Cartesian and Polar Coordinates:

As well as being either relative or absolute, coordinates can be either rectangular or polar. eg. (2,2), (1,5), (@3,2), these are all rectangular. Unlike rectangular coordinates that specify an x and a y value, Polar coordinates specify a distance and an angle. For example the rectangular point (1,1) has a polar point of $(\sqrt{2}, 45^\circ)$. In AutoCAD to specify polar coordinates use $r < \theta$. ie. distance < angle. Note: the angle that goes from the horizontal (1st quadrant) in an anti clockwise direction. See below.

*AutoCAD Polar Coordinate System*Absolute and Relative Coordinates:

In CAD it is important to understand relative and absolute coordinates. Absolute coordinates are just the regular coordinates of that point. Relative coordinates are relative to the previous entered point. For example (using the diagram above as a reference), if you first plotted the point (1,2) then you wanted to plot (3,7) but relative to the last point it would be (2,5) this can be calculated mathematically as follows, $x_2 - x_1, y_2 - y_1$. In AutoCAD relative coordinates are signified by an @ symbol before the coordinates. eg, @2,2 is relative and 2,2 is absolute.

use planes and coordinates to plot outlines

6. Presentation techniques

a) composition/balance

recognise and apply good composition and balance in developing well presented drawings

b) colour

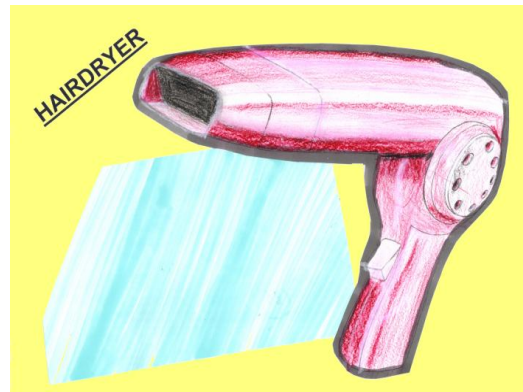
use colour as a means of defining texture, shape and colour of materials

c) rendering

Rendering is adding colour and/or shade to a drawing. Any drawing projection can be rendered. Rendered drawings are used to help people visualise what the final product will look like. They also show what colours and materials the product will be made of. This includes how the object will behave in light, eg. shadows, shading, etc.



Rendered Perspective Drawing
Rendered on computer using AIR Rendering Engine. Modelled in Rhinoceros 3.0.



Rendered Hairdryer
Rendered with colour pencil.



Photorealistic Presentation Rendering

d) modelling

use various materials to construct simple models of design

Modelling (in this dot point) refers to constructing a physical model of designs. Physical models:

- can be to **scale** to show the real size of a design
- allow for **non-technical** people to understand a see a design
- can be used to **test** a design in its final location and purpose

Models can be made from the actual materials the product will be made from or substitute materials.

Models can be produced by one of two main methods:

- **Manually** – involves someone shaping and/or building the model by hand
- **Mechanically** – involves a mechanical machine producing a model from 3D CAD data

Manual methods are dying out as they are slow, expensive, tedious and inaccurate tasks. Whereas mechanical methods are becoming common place as they are fast (compared to manual methods), cheap and accurate. Mechanical methods includes CNC milling, 3D printing, stereo lithography and many others. These are often referred to as **rapid prototyping**.



3D Printed Model

7. Computer-generated drawing

a) 2D and 3D

CAD drawings are preferred over manual ones because;

- looks **neater**
- easier to make **changes**
- easier to work on **collaboratively**
- **faster** to produce drawings

operate at least one software package to communicate a design solution or design process through text or drawing

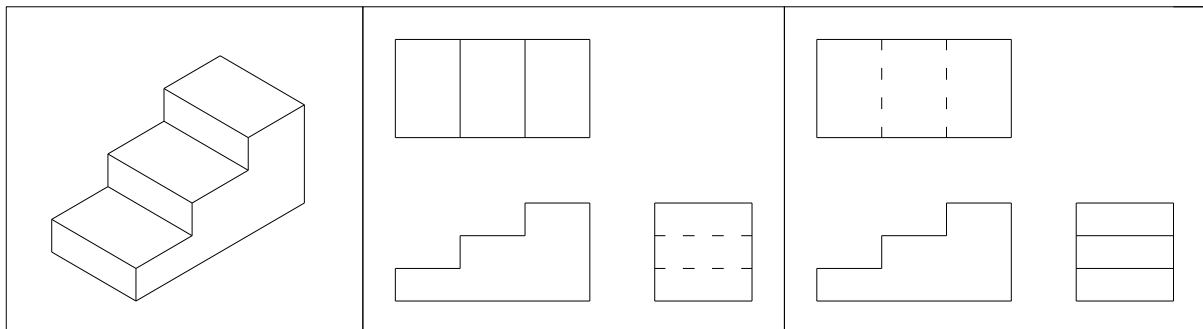
3D designs can be produced in Rhinoceros (can get high precision), 3ds Max (less technical more aimed at artistic designs), Maya (similar to 3ds Max), AutoCAD (not the best for 3D), Solidworks (good for mechanical designs), Pro/ENGINEER (similar to Solidworks), Inventor (similar to Solidworks), etc.

2. Principles/standards

1. 3rd and 1st angle projection

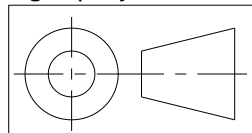
3rd and 1st angle projection are different projections for an orthogonal drawing. In 3rd angle the top view is placed above the front view, however in 1st angle the top view is placed below the front view. Similarly in 3rd angle the right view is placed to the right of the front view, but in 1st angle the right view is to the left of the front view.

An example is included below. The centre drawing is in 3rd angle projection. The right view is placed to the right and the top view is placed to the top. The rightmost drawing is in 1st angle projection, the top view is placed below the front view and the bottom view is placed above the top view.

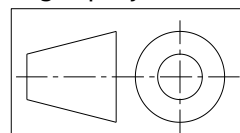


Shows Isometric, 3rd angle Orthogonal and 1st angle Orthogonal respectively.

The symbol for 3rd angle projection is:



The symbol for 1st angle projection is:



2. AS1100 and AS1100.301

"A Standard is a published document which sets out specifications and procedures designed to ensure that a material, product, method or service is fit for its purpose and consistently performs in the way it was intended.

Standards establish a common language which defines quality and establishes safety criteria. Standards and conformance are the keys to ensuring the quality and consistency of physical, chemical and biological measurement throughout Australian society and the economy."

Standards Australia Limited. (n.d.). Retrieved 2007, from Standards Australia Limited: <http://www.standards.org.au/>

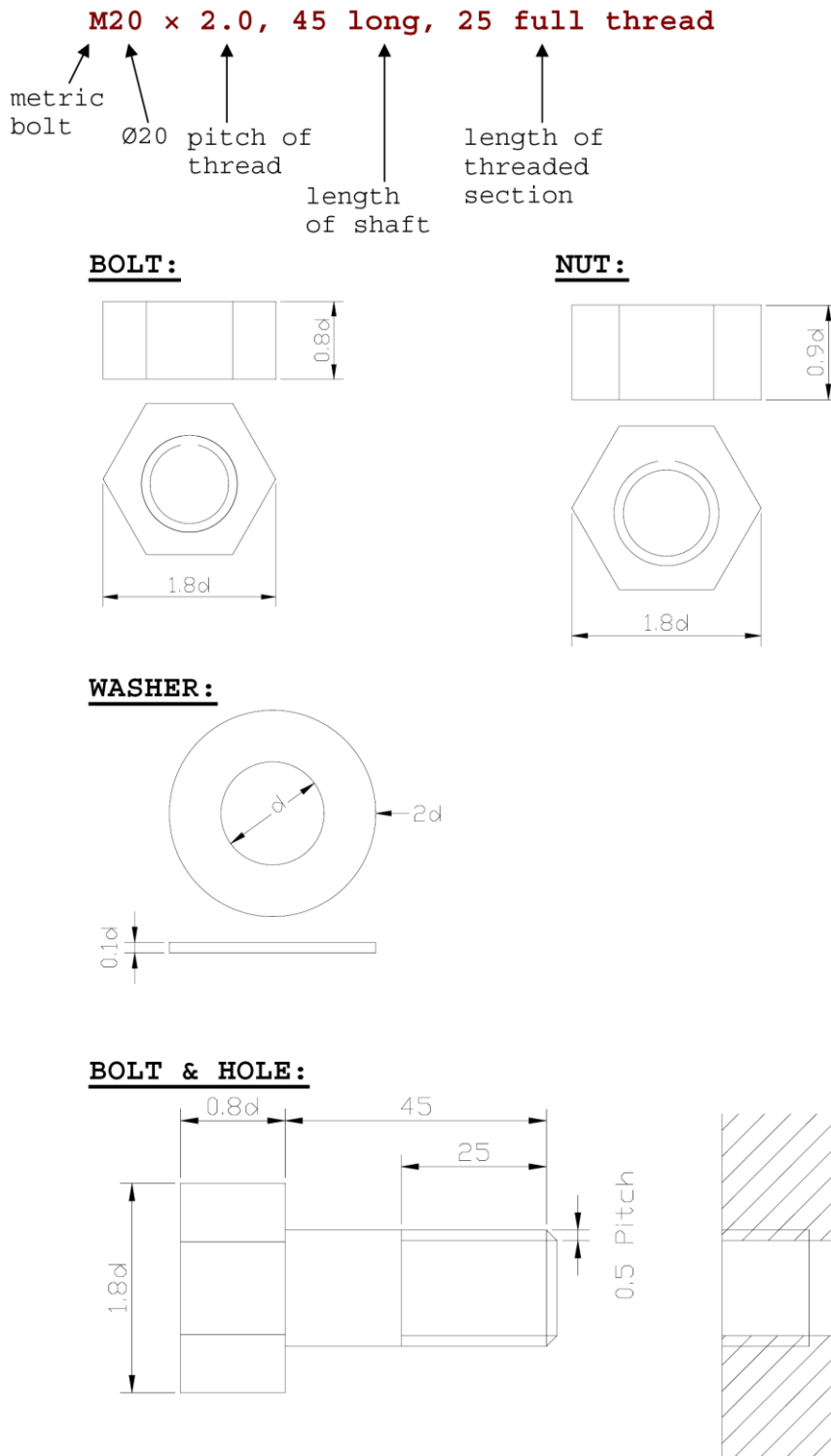
AS1100 are a set of standards set out by [Standards Australia](#). Standards are necessary so that the information obtained from a drawing is exactly what the drafter intended it to be. Standards specify things like linetypes, lineweights, dimensions, projection methods, title blocks, margins, etc.

AS1100.301 refers to standards in Architectural Drawings.

Some linetypes and their uses are;

----- hidden detail
 ----- centre line
 ----- section line

The AS1100 standards for threads, nuts, bolts and holes are summarised in the diagram below.

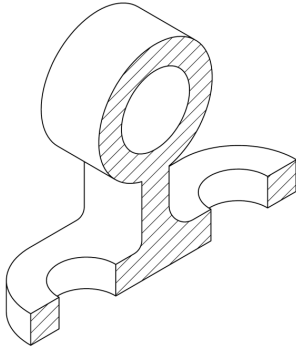


3. section drawings

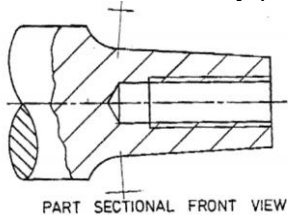
Sectional drawings are used to show internal detail. Section drawings show what the object will look like if cut by a plane.

The main types of sectioned drawings are:

- **Full Section** (remove half the object)

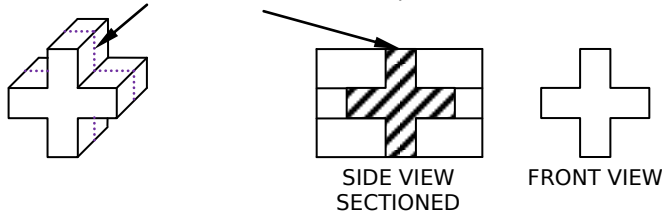


- **Half Section** (remove a quarter of the object)
- **Part Section** (only part of the object is sectioned, broken by a freehand line)



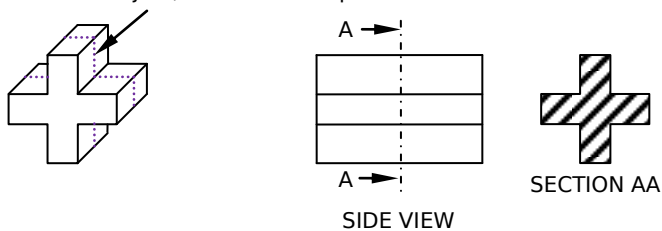
2001 HSC Specimen Paper Engineering Studies, © 2000 Copyright Board of Studies NSW

- **Revolved Section** (the section plane is revolved in place and shown on the drawing)
section is taken and rotated in place



- **Removed Section** (the section plane is taken off the object (view) and drawn as a separated orthographic view)

section is taken, rotated and removed from the object, shown on a separate view.



Some key points to remember when sectioning include:

- do **not** section **webs** (support members)
- do **not** show **hidden detail** (even on parts of half section drawings that are not sectioned).

4. detail drawings

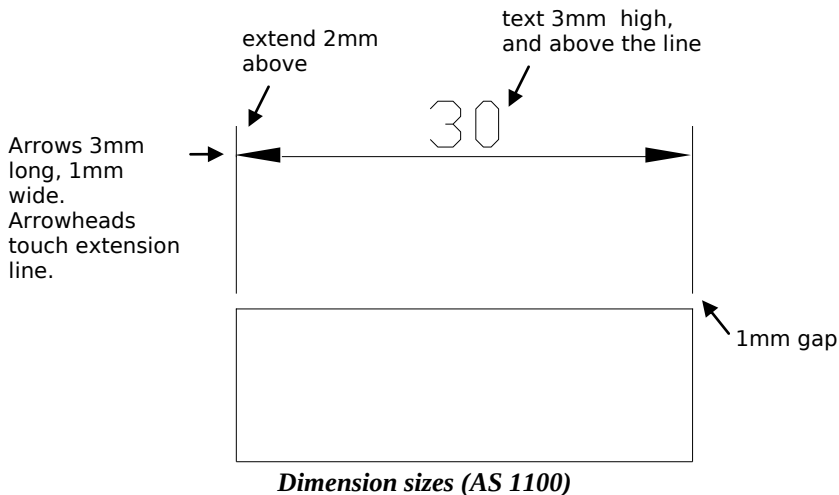
Detail drawings are a type of working drawing. They show usually just **one part** and are usually in **orthogonal** and fully **dimensioned**.

5. symbols

Diameter	Ø
Radius	R

Square	□
Taper	▷
Slope	◁

6. dimensions



7. manuscript identification

3. Equipment

1. computer software packages and/or mechanical drafting equipment

Mechanical Drafting Equipment:

Tee Squares are used to draw straight horizontal lines. They are also used to hold other instruments in place.

There are two types of **set squares**, a 30/60 and a 45. The 30/60 is used to draw angles of 30°, 60° and 90°. This set square is used in isometric drawings. The 45 is used to draw angles of 45° and 90°, used in oblique drawings, and also orthogonal drawings.

Pacers are used to draw lines on paper. Advantages of the pacer of pencil and pen are that the line width is constant and can be erased.

CAD Equipment:

The equipment used for CAD drawings includes a computer, computer software and plotter/printer. Names of some popular CAD programs include Autodesk's AutoCAD, IMSI's TurboCAD, Solidworks, Pro/ENGINEER, Inventor, NX, SolidEdge, Rhinoceros, AutoSketch, etc.

2. photocopiers/printers

Photocopiers are useful for creating duplicates of manual drawings. This may need to be done so that the drawing may be rendered or to distribute multiple copies.

Printers or Plotters (prints with pens) are used to transfer CAD drawings to paper.

3. laminators

Laminators are used to coat a piece of paper with plastic so that it will not deteriorate or get damaged.

D. INDUSTRY – **SPECIFIC CONTENT** **AND PRODUCTION**

FOCUS AREA: MULTIMEDIA **INDUSTRIES**

1. Tools and machines

1. computers capable of multimedia

Multimedia applications use extensive processing power. For a computer to be capable of creating and viewing complex multimedia systems it must have enough RAM (random access memory), enough processing power (CPU, measured in FLOPS), enough hard drive space, a large enough and high resolution monitor and also a good graphics card. A modern computer with a good Intel or AMD CPU, 2-4GB of RAM, a 19-22" monitor and a good ATI or NVIDIA graphics card is sufficient for most purposes.

2. colour printers

Old **impact printers** produce output by striking hammer, paper and ribbon together. They were generally black and white and were slow and noisy. They were generally dot matrix printers where text was reproduced as tiny dots rather than each character individually.

Newer non impact printers are inkjet and laser printers. **Laser printers** are fast and high quality. They have a laser beam which creates a pattern of electrical charges on a rotating drum, those charged particles attract toner and transfer it onto the paper as the drum rotates.

Inkjet printers are generally less expensive than laser printers and slightly slower than laser printers. They work by spraying liquid inks onto the paper.

Both laser and inkjet printers can produce output of 600dpi or more.

Plotters are another type of printer. They work by mechanically drawing lines with pens. They can produce fine lines, such as those in engineering drawings. Also they are usually made to produce output on large sized paper.

3. colour scanners

Flatbed scanners are the most common type of scanner. They have a scanner camera that detects the intensities of red, green and blue light. This information is sent to the computer where an image is constructed.

4. appropriate software relevant to the project in the areas of authoring, publishing, sound editing, image editing, 2D/3D drawing, web page design

authoring

publishing

sound editing

image editing

2D/3D drawing

web page design

5. access to additional equipment that allows the relevant projects to be undertaken, to include modem, CD writer, digital camera, video and in and out cards etc

6. select and justify an appropriate computer system for use in the production of projects

7. select and use a suitable software package and identify requirements of memory, processing speed, storage and peripherals to complete a selected project

2. Processes

1. storyboarding in relation to:

- information
- entertainment
- training and development
- marketing

2. image creation/editing

3. sound creation/editing

4. publishing/page layout

InDesign

Page Maker

5. authoring

6. copyright

GNU

Creative Commons

All rights reserved.

...

Obtaining images.

7. competently plan all processes and stages required to complete selected projects

8. obtain, create and modify images, sound and text

9. apply ethical constraints relating to authoring and copyright

10. outsource appropriate expertise where necessary to complement personal practical skills

3. Materials and resources

1. file formats/compatibility

2. image formats

The two main image formats are vector based and raster based.

Raster based formats include:

- JPG – Lossy compression, fast compression, small file size, compression artifacts
- PNG – Good for web
- GIF
- TIFF
- BMP

Vector based formats include:

- SVG
- PDF
- DXF

Do in table. Eg. support compression? Lossy? Transpanrany? 32bit/24bit?...

3. pictorial 2D/3D

4. video formats

Avi

Mpg

Wmv

Also codec's

...

5. text creation/formats/importing

6. sound files

Wav
Mp3
Wma

7. world wide web resources

8. paper types and print resolution

Weight...
Photo
Matt
Gloss

Dpi

9. digital libraries (clip art, fonts, images, photos, sounds)

10. select from a wide range of industry techniques and strategies and apply them in the production and presentation of the major project

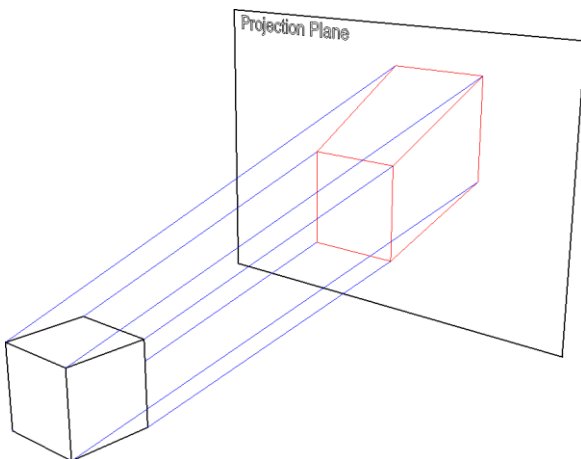
APPENDIX A – **GRAPHICS WITH A** **MATHEMATICAL** **APPROACH**

The information in this section is not required for the NSW Board of Studies, 1999 Industrial Technology Stage 6 Syllabus. However, in my opinion, it is the theory and technical details of exactly what much of the Graphics Industry content is about. If you understand the technical details behind what you are doing and why it is the way it is then you will have a much better understanding and appreciation of the subject.

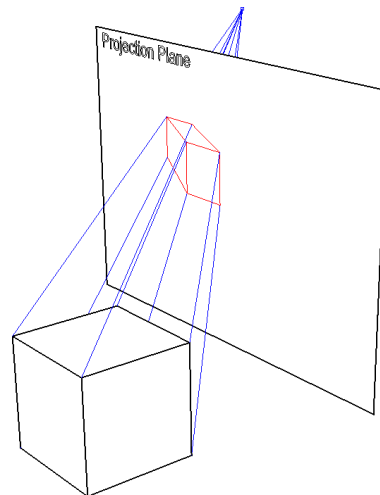
Drawing projections can be explained in a mathematical way involving space and projection planes, or it can be explained in a more traditional way of the final result. The mathematical explanation involves the how and why, which makes understanding much easier. That is why both methods are investigated.

Products, structures and mechanical systems are 3D. Traditionally these things need to be represented in 2D, usually on paper. To do this the 3D object is 'projected' onto a 2D plane. The orientation of the plane relative to the object and how the projection lines behave determine the projection method.

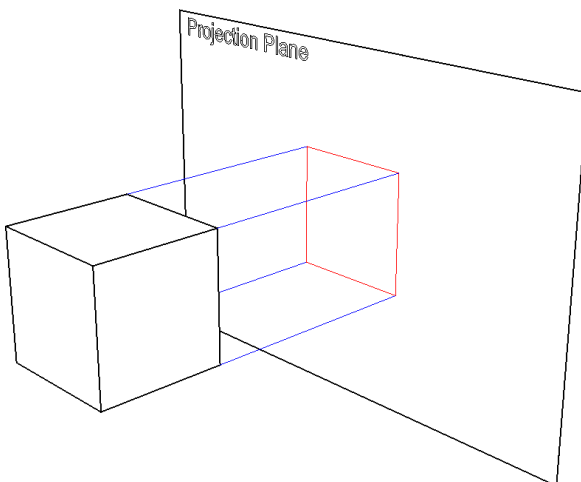
The projection lines can either be parallel or converging. Converging projection lines give you perspective projection. Parallel projection lines lead to axonometric, orthogonal and oblique projections. These can be distinguished in that axonometric and orthogonal projections both have the projection lines normal to the projection plane and oblique projection has the projection lines oblique (not normal or parallel to the projection plane, ie. at another angle). Orthogonal and axonometric projections can be discriminated by the fact that in orthogonal projection, one of the principal planes of the object is parallel to the projection plane. Axonometric is the complement of this, where one of the principal planes of the object is NOT parallel to the projection plane. Axonometric consists of three sub-categories, isometric, dimetric and trimetric. Isometric is where the angles between the three principal projected axis are all the same and equal to 120° . Isometric projection can be obtained by rotating the object in a specific way. Dimetric is where two of the angles between the three principal projected axis are equal but not all three. And Trimetric is where all the three angles between the three principal projected axis are different. Some of these different projections are shown graphically below.



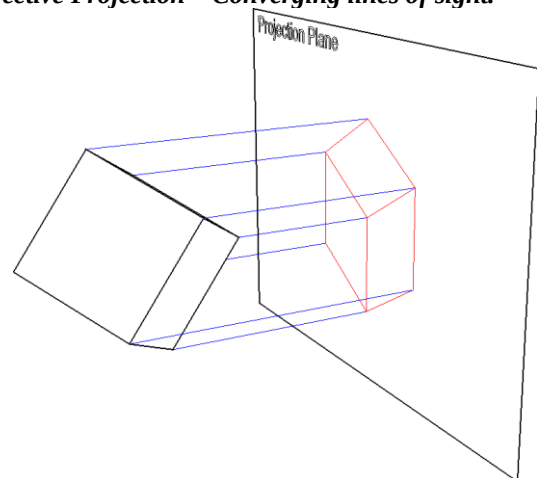
Oblique Projection – Parallel lines of sight, oblique to the projection plane.



Perspective Projection – Converging lines of sight.



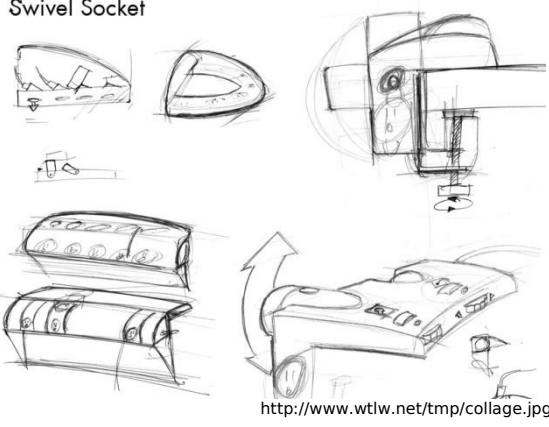
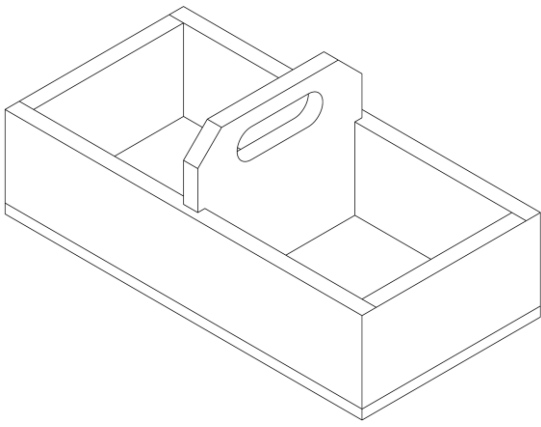
Orthogonal Projection – Parallel lines of sight, projection lines normal to projection plane, and principal face of object parallel to projection plane.

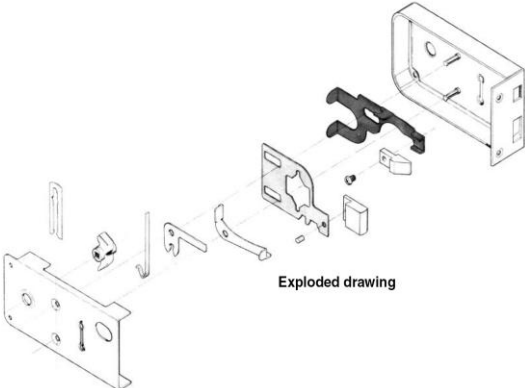
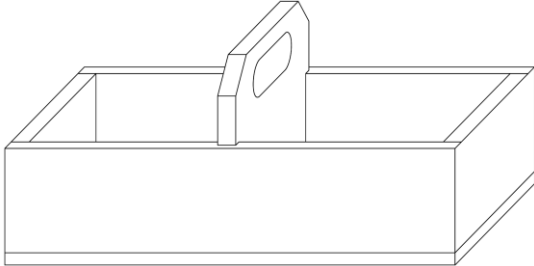


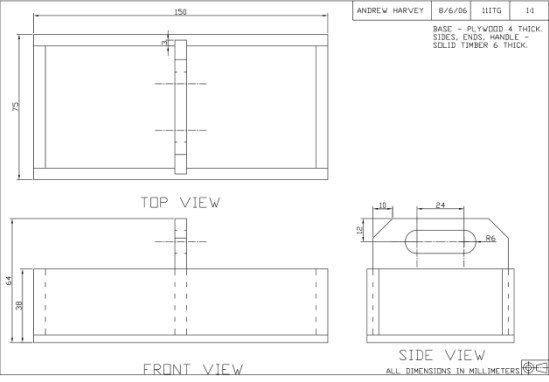
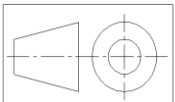
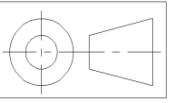
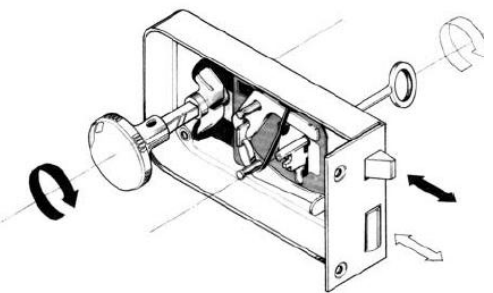
Isometric Projection – Parallel lines of sight, perpendicular to the projection plane, with the object rotated in a way that results in the projected axis in being equiangular.

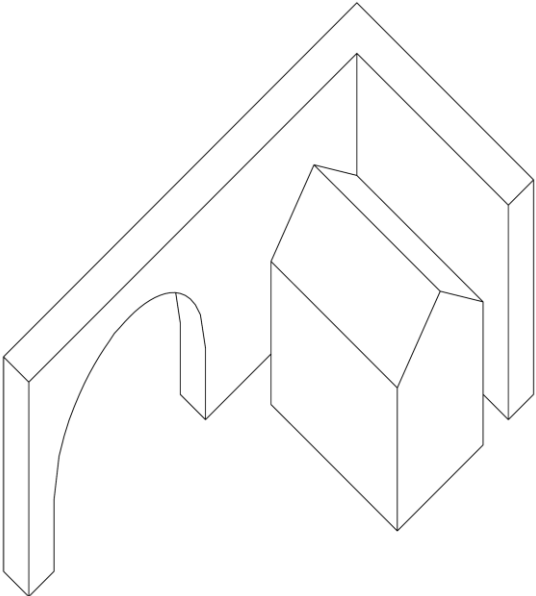
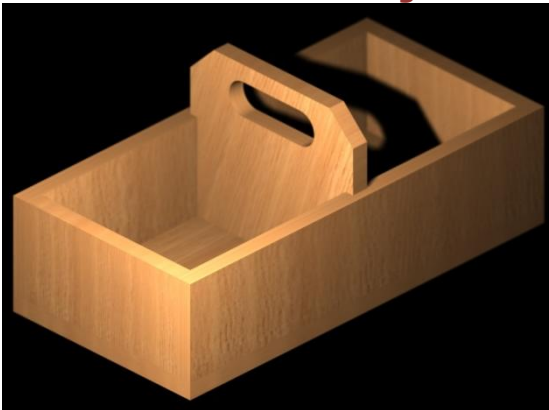
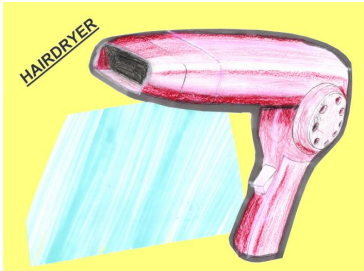
APPENDIX B – **SUMMARY OF** **DRAWING TYPES**

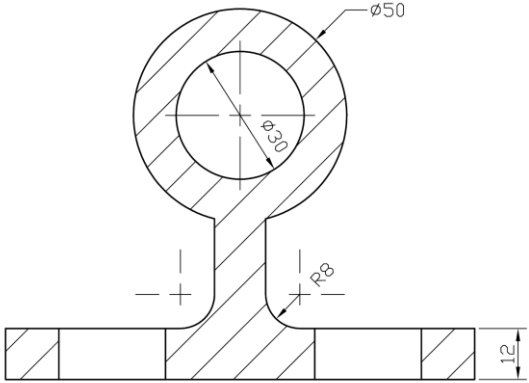
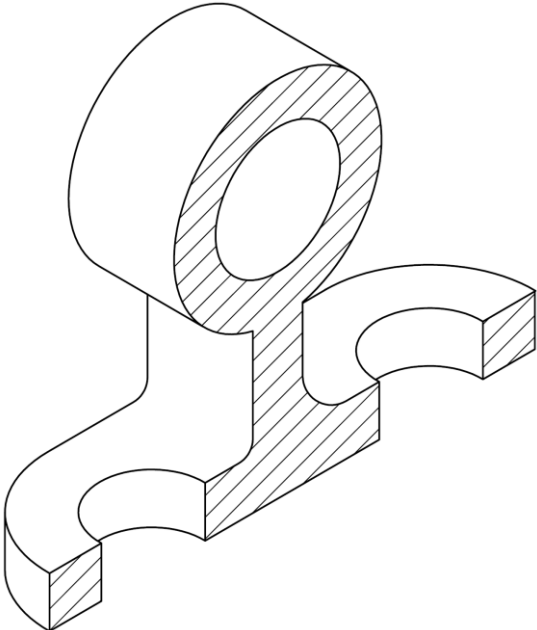
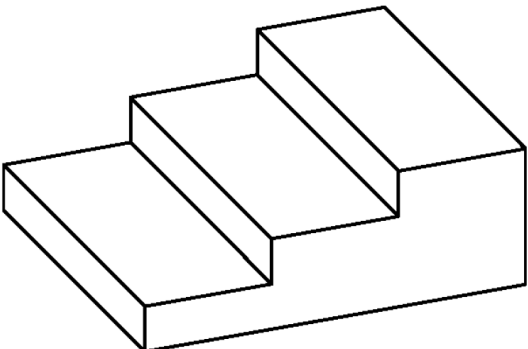
*This is related to graphics industries, however the content extends beyond the syllabus content.
However much of this content will help you in the exam as some is relevant.*

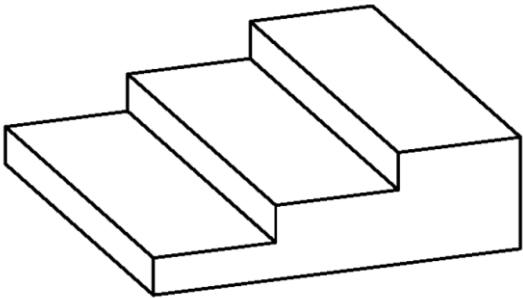
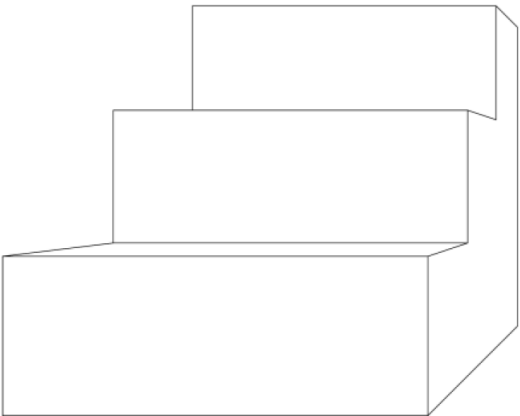
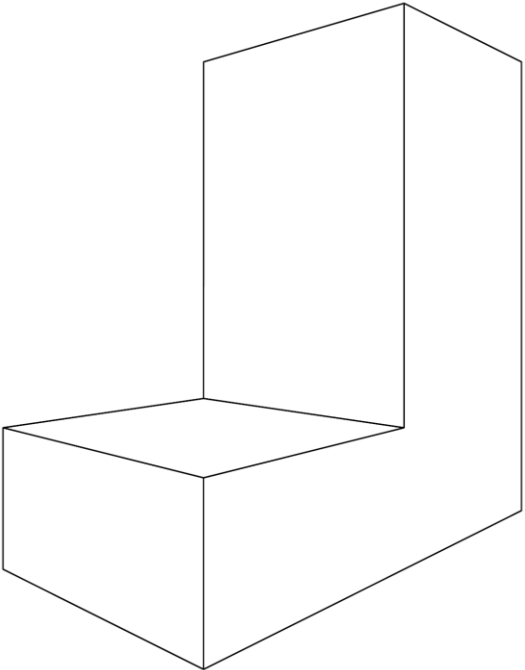
Drawing Type	Features	Advantages	Disadvantages
Freehand Drawing Swivel Socket  Category: Drawing Type	• Freehand drawings are rough sketches, done without the aid of tee square and board. • They are used to graphically show an idea or concept. • Can be done in any projection method or any other drawing type. (eg. you can have a freehand exploded oblique drawing)	• Fast to produce. • Can be done on site. • Minimal equipment required.	• Inaccurate • Requires Skill
Isometric  Category: Drawing Projection	• Each axis is drawn at full scale. • Two axis are drawn 30° to the horizontal and the other at 90°. • Isometric drawings are a type of pictorial drawing.	• Easy to visualize the final product. • Lengths can be measured off the drawing. • Shows 3 main views at the same time. • More technical than a perspective drawing, but less realistic. • More realistic than an orthogonal drawing, but less detail is shown.	• Slow to produce • Less technical than orthogonal.

Drawing Type	Features	Advantages	Disadvantages
Exploded Drawing  Exploded drawing K.J.Dodds and P.S. Jordan, technical Studies Book 1 Pearson Education Australia (Longman),1984 Category: Drawing Type	• Can be any projection method or drawing type (excluding assembled drawing). • The different parts of the object are separated.	• Shows how the parts fit together. • Shows internal parts clearly.	• Can be hard to produce.
Cabinet Oblique  Category: Drawing Projection	• Oblique is a type of pictorial drawing. • Receding axis is drawn at $\frac{1}{2}$ scale. • Front face is drawn orthographically.	• Shows 3 main views at the same time. • More true representation than Cavalier Oblique.	• Object is distorted. • Curved detail not on the front face is harder to show.
Cavalier Oblique Category: Drawing Projection	• Same as cabinet oblique. However receding axis is drawn at full scale.	• Show 3 main views at the same time.	• Object is distorted. • Curved detail is harder to show. • Object looks too long.

Drawing Type	Features	Advantages	Disadvantages
Orthogonal Drawing  Category: Drawing Projection	- Orthogonal drawings use parallel lines of sight, perpendicular to the picture plane. - They can consist of a maximum of 6 views of one object. - Most technical type of drawing. - Orthogonal is the only drawing projection that is not pictorial. - Can be done as, 1st angle  or, 3rd angle. 	- Shows more detail and shows it more accurately than any other drawing type. - No distortion. - Measurements can be accurately measured off the drawing.	- Slow to produce - Harder to visualize the object. - Need to have technical ability to understand it.
Assembly Drawing  Assembled drawing K.J.Dodds and P.S. Jordan, technical Studies Book 1 Pearson Education Australia (Longman),1984 Category: Drawing Type	- Shows how the parts fit together. The parts are shown in their final resting place. - Can shows instructions on how to assemble the object.		

Drawing Type	Features	Advantages	Disadvantages
Planometric  Category: Drawing Projection	• Type of Pictorial drawing. • Top plan is drawn first then walls are added, projecting down.	• Used to show the insides of a building. • Shows where furniture can be placed.	• Distorted.
Rendered Drawing  <i>Computer Rendered</i>  <i>Manuel Rendered</i> Category: Drawing Type	• Can be any drawing projection or any other drawing type.	• Rendered drawings are more photorealistic. • Shows surface colour and materials. • Can show how it will behave in certain lighting, including shadows.	• Can be hard to get it to look good. • Requires skill.

Drawing Type	Features	Advantages	Disadvantages
Sectioned Drawing  <i>Sectioned Orthogonal</i>  <i>Sectioned Isometric</i> Category: Drawing Type	• Shows a cross section of an object. • Shows internal detail. • Can be done of any drawing projection, and mixed with any other drawing type. • Hidden detail is not shown.	• Shows detail clearly that would be unclear on an isometric or orthogonal.	
Trimetric  Category: Drawing Projection	• Type of Pictorial drawing. • All three of the angles between the projected axis are different. Scales on each axis can be calculated from the angles.		

Drawing Type	Features	Advantages	Disadvantages
Dimetric  Category: Drawing Projection	• Type of Pictorial drawing. • Two of the angles between the projected axis are the same. Scales on each axis can be calculated from the angles.		
Perspective  <i>One Point Perspective</i>  <i>Two Point Perspective</i> Category: Drawing Projection	• Parallel lines go to a single point. • Perspective drawings are usually rendered to add to realism. • Type of Pictorial drawing. • Can be 1pt, 2pt or 3pt perspective.	• More photorealistic.	• Slower and harder to produce. • Distorted. • Cannot measure off distances.

APPENDIX C – HSC **MAJOR PROJECT**

“The major project is the principal means of examining the outcomes of the HSC course, including the content of the candidate's identified focus area.

Each candidate must present a major project consisting of a product and an accompanying management folio, which will be examined in conjunction with one another by Board of Studies appointed examiners.”

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The Major Project

The major project is the principal means of examining the outcomes of the HSC course, including the content of the candidate's identified focus area.

Each candidate must present a major project consisting of a product and an accompanying management folio, which will be examined in conjunction with one another by Board of Studies appointed examiners.

The major project must be completed by a date to be notified annually by the Office of the Board of Studies. It is not to be commenced until the beginning of the HSC course.

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The Major Project:

- (i) may consist of one or more related items and must be individually produced by the candidate. Group projects are not permitted
- (ii) must be certified on the appropriate form, provided by the Board of Studies, as the original work of the candidate and be identifiable only through the candidate and centre numbers
- (iii) may have parts completed by the candidate externally to the school. These must be monitored by the supervising teacher and documented in the folio to ensure certification as to being the original work of the candidate.

Any aspect of the major project undertaken by other persons or agencies must be documented in the folio. Candidates will not be given credit for work completed by others

- (iv) must include evidence of the range and depth of skills and knowledge developed in the course
- (v) may incorporate materials, processes and components drawn from other focus areas where appropriate
- (vi) must include a management folio where the use of computer software applications is evident.

The management folio will document the development of the project. Included in the folio will be a statement of intent and details relating to design, planning, management, Workplace communication and evidence of skills and knowledge associated with the focus areas.

The examiners have the right to call for a demonstration of particular aspects of the major project. This must be provided by a person other than the candidate responsible for the major project.

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Major Project Examination Criteria

The major project consists of a product and a folio, which will be examined in conjunction with one another. The criteria for examining the major project are shown below:

Marks	Criteria	Description
20	Design and management	- statement of intent - research - development of ideas - selection and justification of materials, components, processes and other resources - timeline plan – projected order of production and estimate of time allocation - finance plan – projected cost of materials and services (if applicable) - use of appropriate industrial processes and equipment - evidence of safe working practices and OH&S issues
	Workplace communication	Documentation of the major project from conception to completion including: - evidence of ongoing evaluation - appropriateness of design and/or design modification - student's evaluation of the major project and its relationship to the statement of intent - evidence of a range of communication techniques - evidence of a range of computer applications, eg word processing, spreadsheets, CAD, multimedia
40	Production	- quality of the product - evidence of a range of skills - degree of difficulty - links between planning and production - evidence of industrial processes - use of appropriate materials - use of industrial technologies - evidence of solutions to problems in production

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External Assessment

The major project contributes towards 60% of your external assessment. The other 40% is from the written HSC examination paper. The written examination is 1 ½ hours and has a total of 100 marks. 60 of the 100 marks will be based on sections A, B and C (common to all industries) (however the examination paper will not be exactly the same for all industries). The other 40 of the 100 marks will be based on section D (industry specific).

Industrial Technology Resources

Having myself sat 2007 HSC for Industrial Technology Graphics Industries. I could see firsthand the shortages of resources for this course. There exists very few text books on this syllabus (I am only aware of one which is outdated). Also I couldn't find any notes for Graphics Industries, and only a few for Industrial Technology (mostly different focus areas). What's more I had no idea of the standard require. I didn't know what standard major project would result in what marks. I got a bit of an idea from the 2002 and 2001 Industrial Technology Standards Package. However that only showed me the management folio. There were no samples for Graphics Industries. I cannot seem to find any past papers out there either, and in my opinion the quality of the NSW Independent Trial exams and CSSA Trial exams is quite poor. The HSC is a bit better but it is also quite terrible. The syllabus is very general. It has headings, and that's all. It does not specify how much detail we are required to know. I have tried to make many resources available.

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