GRAPHIC COMMUNICATION

ADVANCED HIGHER

STUDY & REVISION PACK

SOLUTIONS

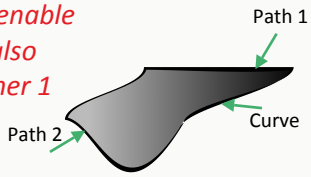
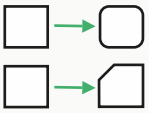
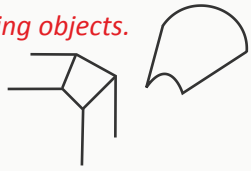
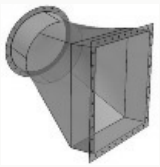
KINROSS HIGH SCHOOL

NAME _____

TEACHER _____

COMPUTER-AIDED DESIGN & DRAUGHTING

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Knowledge and skills in applying: Recognised techniques, customs and practices across 3D modelling and 2D draughting software, including drawing and editing commands and terms	
Recognised techniques, customs and practices across 3D modelling and 2D draughting software, including drawing and editing commands and terms. Standard 2D draughting commands including import and export. Standard 3D modelling techniques and including **morphing**, **extrusion along a path (sweeps)**, **regular** and **irregular fillets and chamfers, lofting, blending** and **surface modelling**. Techniques in the production of orthographic and pictorial work using computer-aided design	Describe the use and benefits of the following 3D CAD techniques: **Morphing:** *The simplest way of looking at Morphing is to imaging that your 3D model is surrounded by a mesh which you can pull, stretch, scale etc. Morphing can be used to manipulate your 3D design so that it can be manufactured effectively - for instance, smoothing out a bottle design so that it can be blow moulded. Morphing can also add strength to areas which, under testing show weakness.* **Extrusion along a path (sweeps):** *Sweep is a 3D command to enable a profile to follow a path (like a handle on a cup). Sweep can also generate surfaces where a curve is created and can follow either 1 or two paths (used to create body work for vehicles).*  **Regular** and **irregular fillets and chamfers:** *A fillet is a curve to smooth off an edge. A chamfer is a 45 ° cut on an edge an irregular version of either of these describes tapering or adjusting the size or angle at either end of the feature.* *This is especially useful when applying these features to intersecting objects.*   **Lofting, Blending:** *Lofting is creating surfaces or solids between 2 or more profiles/curves on different work planes. This feature is particularly useful when creating transition pieces (prisms or pyramids with different shapes top and bottom). Classic examples of lofting are toilets or wash basins or ducting like the extractors in the workshop.*  **Solid and surface modelling** (explain the difference between the two techniques) **Solid Modelling:** *Solid models are made by drawing 2D shapes and using a 3D feature (extrude, loft etc) to create various 3D forms which can then be edited. The starting point of the solid model is a closed shape.* **Surface modelling:** *(Explain the difference between surface and solid modelling)* *For the purposes of this course surface modelling begins with an entity (a line) which can be extruded or revolved and given a thickness in order to create a surface.* *In industry surface modelling develops a "Skin" between 2D or 3D curves (like a mesh). The intersections between the surfaces are very controlled so they can be very smooth or crisp like a crease. It allows for more freeform and organic structures than an object that was created with solid modelling. These surface models have no thickness and the object can be geometrically incorrect; whereas a solid model must be geometrically correct. Think, video game characters.*

Computer-aided Illustration

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Knowledge and skills in applying: Professional use of rendering technology to create scenes or illustrations with visual impact	
Including the use of texture mapping, bump-mapping, lighting, reflection, specularity, ambience, depth-of-field, Image Based Lighting/High Dynamic Range Imagery (IBL/HDRI) and volumetrics	List of CAD Illustration and lighting techniques: explain and describe the benefits of: **Texture mapping**: *Used by CAD Technicians Texture Mapping is the process of applying a 2D pattern or texture to a 3D object. The 2D bitmap image is 'wrapped around' the 3D object similar to applying wallpaper or paint to a real object. The software will distort the pattern or detail on the image so the detail appears to be correctly applied. Benefits of this include the production of realistic renderings which enhance the realism of a 3D CAD model. It Allows the designer to visualise the finished product.* **Bump-mapping**: *Used by CAD technicians Bump Mapping is the process of applying a texture to a particular surface. In its simplest form each pixel within the image has its own designated level of brightness which creates the appearance of light shining down the edge or the creation of a shadow. By turning each pixel into a vector the level of brightness can be changed as the software carries of a series of calculation to create the desired effect. For more complicated textures within the gaming industry more complex calculations are required. Benefits include the ability to create complex scenes and environments in the gaming and architectural industries* **Lighting techniques:** **Reflection**: *Light that is bounced of an object or subject, the light retraces back into the same medium, meaning that it must bounce off at the same angle that it was initially generated. Some surfaces reflect better than others, a shiny metal object will reflect light better than a darker dull wood surface. A darker object will absorb more light meaning less light that is reflected. This will allow engineers to create realistic rendered images of products.* **Specularity:** *This determines the level of reflectiveness a particular surface has, working with bitmap images white pixels will provide full specular highlights and black remove the highlights completely. Adjusting the levels of the specular highlight will determine how reflective the appeared image is, equally an object can be made to appear glossy and or blurry in its reflection by changing the level of specular reflection. If a surface is deemed to be rough, it will spread the light out more meaning it will have a blurred reflection.* **Ambience (ambient lighting)**: *Ambient or Available light is a source of light which is used for providing an area of a 3D environment with a constant illumination. Ambient lighting applies the same lighting, of a fixed intensity and fixed colour, to all surfaces. Ambient lighting appears to have no particular source and no particular direction. This style of lighting is mainly used to provide an environment* ***with a simple form of lighting,*** *it can look bland and is generally not used when completing dramatic rendered views in CAD packages.* **Depth-of-field:** *DOF is the distance between the nearest and farthest objects within an image. The primary purpose of the depth of field is as a visualization aide, for improving the understanding of the relationship between objects in a 3D projection. The applications of depth of field include visualization of highly complex data sets, such as CAD designs and file structures. Depth of field has the potential for being an intuitive way to increase the users sense of depth in both projected and immersive environments* **Image Based Lighting/High Dynamic Range Imagery (IBL/HDRI)**:*IBL is the process of illuminating objects and scenes with objects from the real world. It allows you to light your scene by applying an HDR image to a virtual sphere that encompasses your scene or environment. This is particularly useful if you want your object to appear in a real environment. When using the HDR image the reflections used on this environment will also appear on your model.* **Volumetrics:** *Volumetric rendering refers to a technique for generating a visual representation of data that is contained in a three dimensional space (volume). It is used to render objects based on their complete structure as opposed to the surface render. These type of renders are used within the scientific and medical professions. Particularly good for rendering of smoke in the games based industry.*

Computer-aided design

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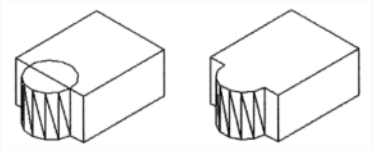
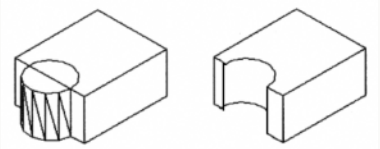
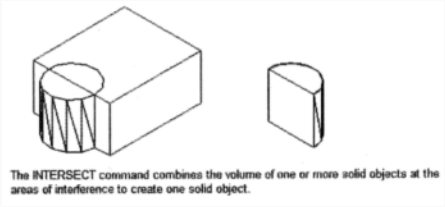
Topics	Information Gathered
CAD Techniques	
The use of polygons in the production of 3D graphics, including Boolean functions of add, subtract and intersect, slice.	List of CAD Illustration techniques: explain and describe the benefits of: Use of polygons in the production of 3D graphics. *Polygons are used in computer graphics to compose images that are three-dimensional in appearance. They object is spilt into lots of polygons which are sometimes but not always triangular. This is quicker to display than a shaded model. It also allows for texture mapping to be placed on the polygons to give a more realistic looking surface. The advantage is that polygons provide faster rendering for animation.* Boolean functions of **add**, **subtract** and **intersect**, **slice:** Sketch and annotate simple graphics which explain these Boolean operations **Add:**  *Add allows the user to combine the total volume of two or more solids or two or more regions into a composite object.* **Subtract:**  *Subtract allows the user to remove one volume of two solids or one of two or more regions into a composite object.* **Intersection:**  *Intersect allows the user to create a composite solid from the common volume of two or more overlapping solids. INTERSECT removes the non-overlapping portions and creates a composite solid from the common volume.* **Slice:** *Slice allows for a solid model to be clipped along a work plane to show a sectional view in the modelling mode using the sketch plane.* *This can allow for you to utilise project geometry mode of parts that can't be seen normally.*

Simulation

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Topics	Information Gathered
Simulation Knowledge and skills in the use of: ● digital testing methods, eg Finite Element Analysis (FEA) or Computational Fluid Dynamics (CFD) to simulate how parts of a 3D model would perform if produced in reality, mechanical animation	**Investigate and describe the benefits of the following simulation methods:** **Finite Element Analysis (FEA)** What is it? It is the digital testing of products used to test all sorts of mechanical components from pipelines to controlled car crashes. It is also to referred to as Digital Prototyping and allows conceptual designs (new designs) the ability to be virtually tested before it's built. Industrial designers, manufacturers, and engineers use Digital Prototyping to design, test, optimize, validate and visualize their products digitally throughout the product development process. Innovative digital prototypes can be created via CAD to meet multiple design objectives (such as maximised output, energy efficiency, highest speed and cost-effectiveness) reducing development time and time-to-market. Marketers also use Digital Prototyping to create photorealistic renderings and animations of products prior to manufacturing. It gives product development teams a way to assess the operation of moving parts, to determine whether or not the product will fail, and see how the various product components interact with others. In a nutshell, FEA is determining how a solid body will respond to various forces applied to it. How does it work? The computer is able to analyse and calculate areas of a structure and determine how strong or weak each area is. It then adds all these areas together to give an all over strength/weakness for a given component. What benefits does it provide? Instead of needing to build multiple physical prototypes and then testing them to see if they'll work, companies can conduct testing digitally throughout the process by using Digital Prototyping, reducing the number of physical prototypes needed to validate the design. Using Digital Prototyping to catch design problems up front, manufacturers experience fewer changes downstream. Companies can also perform simulations in early stages of the product development cycle, so they avoid failure during testing or manufacturing phases. **Computational Fluid Dynamics (CFD)** What is it? CFD is a form of digitally testing the airflow through the internals of a building and can be beneficial to Architects for the following reasons; It is a cost effective way of improving internal/external building design. The use of CFD can increase building design performance by establishing how the air flow through rooms is going to affect the people working/living in that area. It could be used to establish where to locate various furniture, heating systems, height of ceilings, etc. How does it work? It shows Architects how the airflow through a design of say an office could be detrimental to the workers, i.e. warm/cold areas thus allowing fact based decisions to be made, e.g. where to place duct venting, positions of internal walls and furniture, height of ceilings, etc. As with FEA it uses complex mathematical formula to analyse and establish volumes and flow rates through confined areas What benefits does it provide? It instantaneously yields volume data which is useful to the overall design. It allows Architects to visualise and manipulate new building designs, determine heat flow and heat control and loss and the environmental efficiency of the build at an early stage.

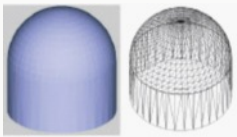
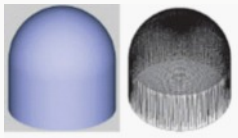
CAD/CAM SYSTEMS

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
CAD CAM systems Knowledge and skills in the use of: ● 3D model manipulation to prepare for CAM production ● communicating surface finish and datums ● gathering model information on volume, centre of mass and mass of the model	**Investigate and describe the benefits of the following CAD/CAM methods & techniques:** **3D model manipulation to prepare for CAM production** What is it? *During the manufacturing process, production engineers will use the models and CAD drawings that have been produced by the draughtperson. For this to work correctly, the CAD technician will be required to follow strict protocols when producing the models so that all the data required is set to the same layer. For shafts that are going to be turned in a CNC lathe, a half profile is required. This half profile will be used to produce the tool path for the lathe. All sizes must be drawn to mid tolerance. 3D CAD models must also be drawn to mid tolerance; once again, there must be a clean shape without additional features such as text or borders. This model will be used by the production engineer to convert the model into the required tool paths for the specific machine that will be used.* How does it work? *The model that is produced during the design process is used for the purpose of producing the CNC program to save on time and the reproduction of work. By producing the original model to mid tolerance, the production department can ensure that the finished model will be produced at the desired size.* **Communicating surface finish and datums** What is it? *During the production process it is necessary to ensure that the tolerance between features remains within prescribed limits. To ensure this happens, a working drawing will have additional features added along with the original dimensions. These are datum features and control boxes as well as surface finish cymbals.* How does it work? *The Datum feature such as concentricity, parallel, flatness and perpendicularity can be added to a dimensioned surface then the corresponding surface has a control box that has the values and tolerance connected to that face.* **Gathering model information on volume, centre of mass and mass of the model.** What is it? *Within the engineering industry, there will be occasions when the mass of a finished assembly or volume of a casting is required. This will allow the weight of this object to be determined. If the assembly is a large piece of equipment, the manufacturer may require the total mass for shipping purposes or handling.* How does it work? *CAD software allows us to quickly establish the total mass of irregular shapes once the specific material has been established.* *The software will also determine the centre of gravity for an irregular shape which will allow the fixing of lifting eyes and also informs engineers if a particular assembly requires a counter balance weight.*

TECHNICAL GRAPHIC FILE FORMATS

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Technical graphic file formats and their use Knowledge and skills in the use of: ● Standard Tessellation Language/stereo lithography file format (STL), ● Direct Exchange Format (DXF), ● Drawing Format (DWG), ● Virtual Reality Modelling Language (VRML) and ● 3D Studio (3DS) files	Investigate and describe the benefits of the following CAD/CAM file formats: **Standard Tessellation Language/stereo lithography file format (STL).** What is special or different about this file? *This file format is supported by many other software packages; it is widely used for rapid prototyping, 3D printing and computer-aided manufacturing. STL files describe only the surface geometry of a three-dimensional object without any representation of colour, texture or other common CAD model attributes.* What is it used for? *STL is the standard file type used by most additive manufacturing systems. STL is a triangulated representation of a 3D CAD model (Figure 1). The triangulation of a surface will cause faceting of the 3D model. The parameters used for outputting a STL will affect how much faceting occurs (Figures 2 and 3).* Solid test Facet normal 0 1 0 Outer loop Vertex 0 4 0 Vertex 0.517638 3.93185 0 Vertex 0.5 3.93185 -0.133975 Endloop Endfacet Endsolid test Figure 1: Sample triangulation code *You cannot build the model smoother than the STL file, so if the STL is coarse and faceted, that is what you can expect in the final model. When exporting to STL in your CAD package, you may see parameters for chord height, deviation, angle tolerance, or something similar. These are the parameters that affect the faceting of the STL. You don't necessarily want to design too small. The more detailed the STL, the larger the file size, which will affect processing time in, as well as build time.*  Figure 2: Example of course triangulation  Figure 3: Example of fine triangulation **Direct Exchange Format (DXF).** What is special or different about this file? *DXF stands for Direct Exchange Format. Files that contain the .dxf file extension and contains CAD vector image files. The DXF file format is a 2D drawing format similar to the DWG file format, but DXF files are ASCII based and are therefore more compatible with other computer applications.* What is it used for? *DXF files are commonly used to in 2D manufacture such as plasma cutting and laser cutting.* **Drawing Format (DWG).** What is special or different about this file? *The native file format for AutoCAD data files is .dwg. It contains all the pieces of information a user enters, such as: Designs, Geometric data, Text, Maps, Photos.* What is it used for? *The .dwg file format is one of the most commonly used design data formats, found in nearly every design environment. It signifies compatibility with AutoCAD technology.*

TECHNICAL GRAPHIC FILE FORMATS

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Topics	Information Gathered
Technical graphic file formats and their use Knowledge and skills in the use of: ● Standard Tessellation Language/stereo lithography file format (STL), ● Direct Exchange Format (DXF), ● Drawing Format (DWG), ● Virtual Reality Modelling Language (VRML) and ● 3D Studio (3DS) files	Investigate and describe the benefits of the following CAD/CAM file formats: **Virtual Reality Modelling Language (VRML).** What is special or different about this file? *VRML (Virtual Reality Modeling Language) is a language for describing three-dimensional (3-D) image sequences and possible user interactions to go with them.* What is it used for? *Using VRML, you can build a sequence of visual images into Web settings with which a user can interact by viewing, moving, rotating, and otherwise interacting with an apparently 3-D scene. For example, you can view a room and use controls to move the room as you would experience it if you were walking through it in real space.* **3D Studio (3DS) files.** What is special or different about this file? *A 3DS file is a file format used by 3D modeling, animation and rendering software. The format has become industry standard for transferring models between 3D programs, or for storing models for 3D resources.* What is it used for? *The 3DS format aims to provide an import/export format, retaining only essential geometry, texture and lighting data.*

Desktop Publishing

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Desktop publishing Knowledge and skills in the application of: ● techniques, customs and practices across a range of packages, generic terms and techniques in supporting context and audience requirements ● planning strategies	Consider two users (Audiences) of DTP and describe the benefits to them of DTP in printed media and/or electronic media. **Describe the benefits of DTP in printed media and/or electronic media in general.** • Using DTP allows companies to improve page layout and create an effective design by balancing the contrast, space and colours to grab the attention of consumers. • An enhanced appearance with an attractive page layout will encourage consumers to buy a product increasing sales revenue. • DTP can allow a document to be customised to target a particular consumer. • Templates with common features can be produced to reduce the time and cost required to produce page layouts • Layouts can be constructed accurately using grid, guidelines, snap, align, scale, rotate and crop functions. • Modifications can be made quickly and easily using DTP editing tools. • Images can be edited and manipulated easily: colour, size, cropping and shaping can all be edited creatively • The time it takes to design and publish a document (the lead time) is greatly reduced **Describe the benefits of DTP in printed media and/or electronic media for:** **User 1: A Fast food company requiring posters, menus, booklets and large scale in-store advertising materials.** Additional to above • The quantities of paper and inks can be controlled digitally to minimise waste. • Modern printing technology can use paper that is 100% re-cycled without loss of quality. **Describe the benefits of DTP in printed media and/or electronic media for:** **User 2: Sportswear company hoping to expand into a Scandinavian market place and requiring a web-site.** Additional to above • Electronic newspaper and news feeds / websites further reduce the use of paper. • Text and graphics can be imported electronically from remote locations around the world. • Files can be sent electronically using email to the editor or client for approval. • Communication between the graphic designer, client and print company is easily done via email • Websites can be viewed globally, developed in one country and posted in another. • Can be made available in a variety of different languages

DESKTOP PUBLISHING - FILE TYPES

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Desktop publishing file formats and their use Knowledge and understanding of: • • JPEG, • PNG, • BMP, • PDF, • AI, • WMV, • AVI, • 3GP, • QuickTime file formats	Investigate and describe the benefits of the following DTP file formats: JPEG *Joint photographic Expert Group* What is special or different about this file? • *Raster image file.* • *A commonly used method for compression of digital image files.* • *Can be optimised to find the right balance of small file size and high quality.* What is it used for? • *Most commonly used image format by digital cameras and mobile devices.* • *Most common method of storing and sending images over the internet.* • *Ideal for websites due to small file size but high quality image*. PNG *Portable Network Graphic* What is special or different about this file? • *Raster image file.* • *Can have transparent background and generally larger and higher quality than JPG.* • *Not ideal for high quality professional prints.* What is it used for? • Web use where transparent background is preferred to allow background colours to show. • Logos, icons, overlay images. BMP *Bitmap Image File* What is special or different about this file? • *Raster image file.* • *Stores colour data for each pixel in the image without any compression.* • *Results in crisp, high-quality graphics but produces large file sizes.* What is it used for? • *Hard copy print outs – high quality results due to no compression* PDF *Portable Document Format* What is special or different about this file? • *Multi-platform file format; works on all computers.* • *Regardless of creation software/platform, fonts and graphics are 'flattened' into a single file.* • *Normally reduces file size from original creation software.* What is it used for? • *Sending documents (external storage or e-mail) that can be read on any platform.* • *Doesn't require individual computers to have matching hardware, OS or software types.*

DESKTOP PUBLISHING - FILE TYPES

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Desktop publishing file formats and their use Knowledge and understanding of: • • JPG, • PNG, • BMP, • PDF, • AI, • WMV, • AVI, • 3GP, • QuickTime file formats	Investigate and describe the benefits of the following DTP file formats: **AI** *Adobe Illustrator File* What is special or different about this file? • *Vector graphic file created using Adobe Illustrator* • *Due to algorithm based image creation, produces super crisp, high quality images.* • *Can be scaled up or down without loss of quality.* What is it used for? • *Images that can be used on small or large scales – therefore no loss in quality at either end.* • *Logos, illustrations, graphics and general high quality print outs.* **WMV** Windows Media Video What is special or different about this file? • *Video file type developed by Microsoft.* • *A file type which compresses video formats for optimum storage.* What is it used for? • Originally designed as a file format for internet video streaming applications. • Simple file playback but doesn't allow other data (subtitles etc). **AVI** Audio Video Interleave What is special or different about this file? • *Video file type developed by Microsoft.* • *Contains both audio and video data in a file container, allows for synchronous payback.* • *Umbrella file format to be used for various types of video playback (DivX, MPEG etc).* What is it used for? • *Popular file format for standard definition video playback on PCs.* • *AVI container files can also include additional features such as subtitles and chapters.* **3GP** 3rd Generation Partnership Project (3GPP) What is special or different about this file? • *Multimedia file container format used by 3G compatible mobile phones and devices.* What is it used for? • *Transmitting text, audio and video between 3G phones/devices and over the internet.* **Quicktime file formats** What is special or different about this file? • *Multimedia format developed by Apple.* • *Can handle various forms of digital video, picture, sound, panoramic images and interactivity.* What is it used for? • *Playback of a variety of digital video/audio files and formats.* • *Standard/default player associated with iTunes and most Mac systems.*

DESKTOP PUBLISHING- PRINTING TECHNOLOGIES

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: ● various printing technologies, including ● Laser, ● ink-jet, ● wide-format, ● screen printing, ● offset lithography and ● solid ink systems	Describe the special features of this process. Explain the types of printing jobs it is used for in terms of: Economy of print run size. Materials to be printed on, Print Quality, Printing speed **Laser printing** Main features • *Main features: The toner or ink in a laser printer is dry. In an inkjet, it is wet. The ink does not need to be changed as often as it does in an inkjet printer. The ink on a laser printed document will not smear.* Economy of print run size • *Economy of print run size: Personal laser printers are sufficient for printing an average of 200 pages per week. A workgroup printer is needed if an average of 1000 pages per week is needed. Production printers are needed for printing 50,000 or more pages per week. These are quite expensive and are used by commercial publishers.* Materials to be printed on • *Most laser printers use standard paper sizes. High-end production printers use continuous sheet paper. Laser printers can print on transparencies, adhesive labels, and lightweight cards.* Print Quality ● *The standard resolution in most laser printers is 600 dots-per-inch (dpi). This resolution is sufficient for normal everyday printing including small desktop publishing jobs. A high-end production printer might have a resolution of 2400 dpi. Lower resolutions can cause jagged lines to appear on the outer edge of an image. Hewlett Packard created RET (Resolution Enhancement Technology) to correct this. RET inserts smaller dots at the edges of lines and to smooth the rough edges. RET does not improve the resolution, but the document looks better.* Printing speed ● *Personal laser printers can print up to eight ppm (pages per minute). A workgroup printer can print up to 24 ppm. Production printers can print up to 700 ppm and can print 24 hours a day, seven days a week.* **Ink Jet Printers** Main features • *Inkjet printers are, in the main, inexpensive, lightweight and small. This makes them ideal for a personal computer. The copy from an inkjet printer needs a little time to dry. Adequate drying time is especially important if the hard copy contains large regions of solid black or colour.* Economy of print run size • *A limitation is the fact that most inkjet printers are slow and they are not designed for high-volume print jobs.* Materials to be printed on ● *Inkjet printers also require non-porous paper. In bond paper containing cotton or other fibres, the ink may bleed along the fibres. Paper designed especially for inkjet printers is heavier than the paper used with laser printers, has a higher brilliance and is more expensive.* Print Quality • *A typical inkjet printer can produce copy with a resolution of at least 300 dots per inch (dpi). Some inkjet printers can make full color hard copies at 600 dpi or more* Printing speed ● *Slow.*

DESKTOP PUBLISHING- PRINTING TECHNOLOGIES

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: ● various printing technologies, including ● Laser, ● ink-jet, ● wide-format, ● screen printing, ● offset lithography and ● solid ink systems	Describe the special features of this process. Explain the types of printing jobs it is used for in terms of: Economy of print run size. Materials to be printed on, Print Quality, Printing speed **Wide-format Printing** Main features: *Wide format printers usually employ inkjet print technology to produce the printed image. CMYK colours are also used. The greatest difference between digital wide format printing and traditional methods such as lithography, flexography, or letterpress is that there is no need to replace printing plates in digital printing; in the other methods printing the plates are repeatedly replaced and are expensive to produce.* Economy of print run size: *They are more economical than other print methods such as screen printing for most short-run (low quantity) print projects, depending on print size, run length (quantity of prints per single original), and the type of substrate or print medium.* Materials to be printed on: *The media can be paper based, sheet vinyl, various banner materials, mesh, canvas or any other printable materials available. Wide format printers are usually designed for printing onto a roll of print media that feeds incrementally during the print process, rather than onto individual sheets. Wide format printers are used to print banners, posters, trade show graphics, wallpaper, murals, backlit film (aka duratrans), vehicle image wraps, electronic circuit schematics, architectural drawings, construction plans, backdrops for theatrical and media sets, and any other large format artwork or signage.* Print Quality: *High quality* Printing speed: *Slow, but bear in mind print runs will generally be very small or even one-off banners etc.*

DESKTOP PUBLISHING- PRINTING TECHNOLOGIES Cont..

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: ● various printing technologies, including ● Laser, ● ink-jet, ● wide-format, ● screen printing, ● offset lithography and ● solid ink systems	Describe the special features of this process. Explain the types of printing jobs it is used for in terms of: Economy of print run size. Materials to be printed on, Print Quality, Printing speed **Screen printing** Main features: *At its simplest, Screen printing involves making a stencil which is adhered to a fine nylon mesh screen attached to a frame. Using a squeegee, the ink is pushed through the stencil and onto the print surface. Screen printing is the best option for designs that require a high level of vibrancy, when printing on dark shirts, or for specialty products. The ink in screen printing is applied thicker than digital printing, which results in brighter colours even on darker shirts.* Economy of print run size: *Screen printing has a strong commercial presence, and as press speeds increase. Screen printing is also economical over short print runs because it is relatively cheap to set up. High speed, large format inkjet printing and other advances in print technology have made Screen printing less competitive for certain types of work. Screen-printing also tends to be used for more specialist items, such as printing onto metals, plastics or for one-off items for which digital printing is not viable, due to the shape or thickness of the surface.* Materials to be printed on: *The advantage of screen-printing is the ability to print on a wide range of materials. These include cloth (T-shirts) self-adhesive vinyl, aluminium, PVC, wood and plastics. This means that a very wide range of products can be created, including posters, point-of-sale displays, dashboard markings, estate agents' boards, industrial and office equipment markings, labels and decals – just about anything you can think of. The vinyl fire exit signs in your school may well be screen printed.* Print Quality: *An advantage of Screen printing is its adaptability. One screen can be used again and again. There are no limits on the amount of colours that may be used and light colours can be overprinted easily onto dark colours. Screen printing is the best option for designs that require a high level of vibrancy, when printing on dark shirts, or for specialty products. The ink in screen printing is applied thicker than digital printing, which results in brighter colours even on darker shirts. The print quality can be excellent.* Printing speed: *Modern cylinder-based screen presses are capable of 4,000:6,000 impressions per hour and ink-drying systems shorten the drying time of the inks. The modern process can be very economical.* **Offset lithography** Main features: *This is the most popular printing technique used for most printed matter we encounter such as leaflets, booklets, magazines, catalogues.* Economy of print run size: *The cost of offset printing is the cheapest method of producing high quality printing in commercial printing (high volume) quantities. It is too expensive to set up to be useful on smaller print runs.* Materials to be printed on: *Offset lithography is one of the most common ways of creating printed materials. Common applications include: newspapers, magazines, brochures, stationery, and books. Compared to other printing methods, offset printing is best suited for economically producing large volumes of high quality prints.* Print Quality: *For offset printing a lot more attention to detail is required but the quality of the results is excellent. The advantages of this are:* ● *Allows the widest range of colour re-production. Bright florescence, Pantones®. metallic, foils and varnishes can all be produced using this method of printing.* ● *Allows the most accurate colour re-production and consistency.* ● *A wide variety paper weights, size and textures.* Printing speed: *It is the fastest and most economical method of printing large runs (magazines & newspapers etc) hence the reason it is widely used.*

DESKTOP PUBLISHING- PRINTING TECHNOLOGIES Cont..

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topics	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: ● various printing technologies, including ● Laser, ● ink-jet, ● wide-format, ● screen printing, ● offset lithography and ● solid ink systems	Describe the special features of this process. Explain the types of printing jobs it is used for in terms of: Economy of print run size. Materials to be printed on, Print Quality, Printing speed **Solid ink systems** Main features: *Solid ink technology utilizes solid ink sticks instead of the fluid ink or toner powder. Some types of solid ink printer use small spheres of solid ink, which are stored in a hopper before being transferred to the printing head. After the solid ink is loaded into the printing device, it is melted and used to produce images on paper in a process similar to offset printing. Xerox claims that solid ink printing produces more vibrant colours than other methods, is easier to use, can print on a wide range of media, and is more environmentally friendly due to reduced waste output. The sticks are non-toxic and safe to handle.* Economy of print run size: *Solid-ink printing has several advantages that make it attractive for business, including good print quality at speeds up to 40 pages per minute and less packaging waste compared to inkjet and laser models. The technology also has a few downsides, such as the time needed to heat the ink.* Materials to be printed on: Mainly paper where it maintains its quality on a range of paper types. Print Quality *When evaluating print quality, you should examine print samples across a variety of prints on a variety of media. Solid Ink pixels are much more discrete and can be precisely placed to within ½ of a pixel. Although Solid Ink pixels (spots) are not smaller than toner particles, they can be placed as a single pixel, unlike toner particles that are placed on the image in "clumps" to create a single pixel. Color-to-color output is more consistent with Solid Ink than with laser toner* *Due to the way solid ink printers put the ink onto the page, print quality is considered to be excellent, with bright colours. Excellent results can be achieved with low-quality stock, as the wax covers the stock with a glossy, almost opaque, surface. Solid ink printers are able to print on many different types and thicknesses of media.* *Because solid blocks of ink are used, there is less waste generated than is with laser printers or inkjet printers, which produce empty ink or toner cartridges, in addition to packaging and packing materials. A loose ink block does not leave any residual cartridge after it is consumed - only a crushable, thin, plastic packing tray and a recyclable cardboard packaging box.* *Solid ink printers have an advantage over ink-jet printers for situations involving intermittent use with long periods of downtime. This is because melted solid ink that has subsequently cooled and re-solidified inside the ink-delivery pathways is a normal part of printer operation. So, this cooled-and-solidified ink does not dry out. And, while the printer is not operating, the solidified wax helps to prevent oxygen and moisture from interacting with many internal parts of the ink-delivery components.* Printing speed: *The average solid ink printer can print up to 40 pages per minute. Not as quick as offset litho printing.*

DESKTOP PUBLISHING - PRINTING TECHNOLOGIES - COLOUR SYSTEMS

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: quality and standards in colour printing, including an understanding of ● RGB, ● CMYK, and ● Pantone ● edge-to-edge, bleed, gutter, registration marks, colour calibration, dots-per-inch (DPI) ● photo-reduction, ● Duplexing, ● camera-ready copy, ● paper weight, ● paper opacity, ● use of calendaring for glossy print	Investigate and describe the benefits of the following colour standards: **RGB** RED, GREEN & BLUE Where is this standard applied? *The RGB colour model is an additive colour model in which red, green, and blue light are added together in various ways to reproduce a broad array of colours. The name of the model comes from the initials of the three additive primary colours, red, green, and blue.* *The main purpose of the RGB colour model is for the sensing, representation, and display of images in electronic systems, such as televisions and computers, though it has also been used in conventional photography.* What are it's special features? *Typical RGB input devices are colour TV and video cameras, image scanners, video games, and digital cameras. Typical RGB output devices are TV sets of various technologies (CRT, LCD, plasma, OLED, Quantum-Dots etc.), computer and mobile phone displays, video projectors, multicolor LED displays.* *Each pixel on the screen is built by driving three small and very close but still separated RGB light sources. At common viewing distance, the separate sources are indistinguishable, which tricks the eye to see a given solid color. All the pixels together arranged in the rectangular screen surface conforms the color image.* **CMYK** CYAN, YELLOW, MAGENTA, BLACK (Key Colour) Where is this standard applied? *The CMYK colour model is a subtractive colour model, used in coloured printing, and is also used to describe the printing process itself. CMYK refers to the four inks used in some color printing: cyan, magenta, yellow, and black.* What are it's special features? *CMYK colour space, traditionally, when the final proof is agreed, the designer will make up "Colour Separations". These split the image up into its constituent colours for four-colour printing. There will be one separation each for Cyan (Blue), Magenta (Red), Yellow and Key (Black), known as CMYK colour.* *In theory, there need only be three colours in printing, because every colour is made up from the three primary colours, red, yellow and blue. As a result of the impurities of printing ink and the reflective qualities of paper, the three colours mixed would make up a muddy brown, so a black separation is added to give definition.*

DESKTOP PUBLISHING - PRINTING TECHNOLOGIES - COLOUR SYSTEMS

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: quality and standards in colour printing, including an understanding of ● RGB, ● CMYK, and ● Pantone ● edge-to-edge, bleed, gutter, registration marks, colour calibration, dots-per-inch (DPI) ● photo-reduction, ● Duplexing, ● camera-ready copy, ● paper weight, ● paper opacity, ● use of calendaring for glossy print	Investigate and describe the benefits of the following colour standards: **Pantone** Where is this standard applied? *The Pantone Matching System (PMS) is a proprietary colour space used in a variety of industries, primarily printing, though sometimes in the manufacture of coloured paint, fabric and plastics.* *The Pantone colour guides have been widely adopted and are used by artists, designers, printers, manufacturers, marketers and clienThe Pantone Matching System (PMS) is a proprietary colour space used in a variety of industries, primarily printing, though sometimes in the manufacture of coloured paint, fabric and plastics.* *The Pantone colour guides have been widely adopted and are used by artists, designers, printers, manufacturers, marketers and clients in all industries worldwide for accurate colour identification, design specification, quality control and communication. ts in all industries worldwide for accurate colour identification, design specification, quality control and communication.* What are it's special features? *The PANTONE® name is known worldwide as the standard language for colour communication from designer to manufacturer to retailer to customer.* *The Pantone Colour Matching System is largely a standardised colour reproduction system. By standardising the colours, different manufacturers in different locations can all refer to the Pantone system to make sure colours match without direct contact with one another.* *Pantone can be used for both CYMK and RGB colour spaces. Colour variance also occurs based on the paper stock used (coated, matte or uncoated).*

DESKTOP PUBLISHING - PRINTING TERMS

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: quality and standards in colour printing, including an understanding of • RGB, • CMYK, and • Pantone • edge-to-edge, bleed, gutter, registration marks, colour calibration, dots-per-inch (DPI) • photo-reduction, • Duplexing, • camera-ready copy, • paper weight, • paper opacity, • use of calendaring for glossy print	Explain the following printing terms: use sketches where possible. **Edge-to-edge printing** *A full bleed or edge to edge printing is when the graphics extend to the physical edge of the paper on all edges. A bleed is required on all edges of the publication. Usually commercial printers will achieve an edge to edge look by cropping the paper to size after the print however modern inkjet printers now can print to the actual edge of the paper by over spraying the page, this method however does waste ink. Off-set litho printing (the most common commercial method) requires printing on OS (oversized) paper which is then trimmed to size.* **Bleed** *If you want a graphic to reach the edge of the paper you need to extend the graphic outside the edge of the publication. This is known as a bleed. Graphic designers usually add a bleed margin during the page set up and extend items by 3mm or 5mm to achieve a bleed. The publication is printed on oversized (OS) paper to enable this additional bleed size. The paper is trimmed to size after printing.* **Gutter** *The vertical space or alley space between columns of text is referred to as the gutter. It also refers to the inside margins or blank space between two facing pages. In this case the gutter space may need to be adjusted to allow for creep, the movement associated with some book binding methods.* **Registration marks** *When off-set litho printing with multiple plates for each individual colour (e.g. CMYK) precise alignment is needed to ensure each plate/colour is printed exactly on top of the others.* *This is called registration. The registration marks (right) are positioned in the margins of each page to help the printer operator to align the colours on the press properly.* *They are trimmed off during cropping.* *The duck image shows the result of poor registration.*   **Colour calibration** *Colours will appear duller when printed than to what they look like on screen (difference of RGB/CMYK colours and issues of monitors having independent colour values). This can cause issues for a designer who may unwittingly make his colours too bright or too warm (monitors are often too blue-ish in hue). In order to avoid this, the monitor should be calibrated to match the printer. A colour calibration device is set on the screen which reads the colours and brightness of the display and then adjusts the colour settings of the output to match a dataset of colour values. Likewise it is important that a printer also bases it colours on the same dataset of colour values - so that both printer and screen match. The colour values of a printed sheet can be scanned and checked by a calibration device and then the printer colour data calibrated accordingly.* **Dots-per-inch (DPI)** *Refers to the number of dots that can be printed within 1 inch. The higher the number of dots (resolution), the sharper and clearer the image. For photos to appear crisp and sharp they need to have a resolution of around 300 dpi. Many screens only output at around approx 100 pixels per inch (PPI) so images for screen can have a smaller file size. Your school printer will print to a resoulution of 300dpi.* **Photo-reduction** *This refers to the compression of image files so that they are a smaller file size but with limited loss of quality. This is useful for images for the web as it allows for quicker load times. Photo editing programs reduce file size by removing meta data such as camera model, white balance and photo date and so on. This could reduce a file from around 4MB to 1MB relatively easily.*

DESKTOP PUBLISHING - PRINTING TERMS

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Topic	Information Gathered
Commercial print media Print technologies Knowledge and understanding of: quality and standards in colour printing, including an understanding of ● RGB, ● CMYK, and ● Pantone ● edge-to-edge, bleed, gutter, registration marks, colour calibration, dots-per-inch (DPI) ● photo-reduction, ● Duplexing, ● camera-ready copy, ● paper weight, ● paper opacity, ● use of calendaring for glossy print	Explain the following printing terms: use sketches where possible. **Duplexing** Put simply, it is when a printer can print on both sides of a sheet of paper. Duplexing is achieved when the printer catches the piece of paper after the first side has been printed on, then flips it, and prints again. **Camera-ready copy** This is the final stage of a publication before it is printed. The document will have been exported as either a EPS file or a PDF file; it will be set for the correct colour scheme, and will be set to the correct size for printing without any need for scaling. Fonts should be set to vector graphics, and any raster images should be at least 300 Dpi. **Paper weight** Paper is measured in GSM - “Grams per Square Metre”. Low quality sheets have a Low GSM value; such as the paper used in a photocopier (approx. 80 GSM). High quality paper has a higher value GSM; such as the paper used to print on Leaflets/flyers (approx. 130 GSM). **Paper opacity** Paper opacity describes how much light can pass through a piece of paper. Paper with High Opacity is good for duplex printing as not much light can pass through and you are unlikely to be able to see what’s been printed on the opposite side. Paper with Low Opacity allows light to pass through easily; for example Tracing Paper. **Use of calendaring for glossy print** Calendaring is the process of smoothing the surface of a piece of paper by pressing it between cylinders or rollers. This produces a very smooth, uniform surface on the paper, which then makes it suitable to have a gloss coating applied. The gloss coating requires a very smooth, flat surface rather than a rough, bumpy one.

DIGITAL VISUAL MEDIA - ANIMATION

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Animation Knowledge, understanding of, and application as required of: • creation of animated graphics making use of motion-capture, stop-frame, or motion tweening • post-editing of video files and use of video graphic technologies, including blend/fade, zoom, transition and overlays	Investigate and describe the benefits of the following digital animation techniques: Creation of animated graphics making use of: **Motion-capture:** *Motion capture involves the process of recording live motion events and translating it into actionable data that allows the recreation of the motion in a digital environment.* *Optical motion capture requires the use of special markers , these markers are attached to a special suit and are easily identified by image processing software.* *The benefits are that it is accurate ,reliable but is expensive to set up and is time consuming.* *The latest developments are in markerless motion capture using advanced computer vision technology will identify and track subjects without the use of specialist suits.* *The benefits of this latest technology are that there is an increase in accuracy and a reduction of set up time, reducing the overall costs.* **Stop-frame animation:** *Stop frame animation is a cinematic process or technique used to make static objects appear as if they are moving. The process involves recording the position of an object (normally a photograph) then a small incremental change is made and new position is recorded . This process is repeated a number of times to create a sequence which when played back gives the illusion of movement.* *Stop frame animation has a relatively low set up cost but is labour intensive and time consuming.* **Motion tweening:** *Motion tweening is a process where the user defines the start and finish key frames and the system automatically calculates and create the in- between frames . This will then appear to move the shape over a specified distance within a specific period of time.* *The benefits of this process is that it gives a smoother animation without the need to draw every frame, giving a quicker more cost effective animation.*

DIGITAL VISUAL MEDIA - ANIMATION

HOMEWORK - RESEARCH THE TOPICS LISTED BELOW AND WRITE CONCISE DESCRIPTIONS

Topic	Information Gathered
Animation Knowledge, understanding of, and application as required of: ● post-editing of video files and use of video graphic technologies, including blend/fade, zoom, transition and overlays	Investigate and describe the benefits of the following digital animation techniques: Post-editing of video files and use of video graphic technologies, including: Blend/fade ● *"Blending" and "fading" refers to the transition effect when a film/animation dissolves from one scene to another.* ● *"Fade to black" is a common technique where a scene dissolves to total blackness. This helps soften the transition between scenes rather than simply cut from one scene to the next.* ● *A blend can be used to dissolve two scenes together without first fading to black. This is useful as it can be used to convey a passage of time or separate parts of film/animation.* Zoom ● "Zoom" is similar to the term used in CAD software. It refers to enlarging or reducing the view of an object or scene. ● Zoom can be used to focus in on a particular part of a scene to draw the viewers attention to it. ● Inversely, "zooming out" will reduce the size of view for a scene, allowing the viewer to see more of a scene. ● The speed of a zoom can be critical in creating an effect or mood. For example a very quick zoom-in can be used to really emphasise an object within a scene and create a dramatic or exciting mood. ● A slower zoom-in will instead create a more relaxed mood. Transition ● Transitions are techniques used to combine scenes and shots. Fading and blending are examples of transitions. ● Other transition techniques include: Wipe, Dissolve, Cut, Flip, Pan. Overlays ● PIP (Picture in Picture) is when two or more video clips share the display at the same time. ● Text overlays - where static or moving written information is displayed on top of the video itself. ● Image overlay - where an image is displayed on top of the video. ● A combination of the above can also be used. ● In the example shown below, of a sports news programme, the main film has a number of layers above it, including a PIP, static text and dynamic text (text that moves across the screen). 

TECHNICAL GRAPHICS - Graphic Types & Techniques

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Graphic Types	Knowledge, understanding and skills in interpreting audience requirements and producing effective graphic responses for: *preliminary*, *production* and *promotional* graphics.
Preliminary: Planning (Gantt charts) manual sketching, illustration.	Write briefly, describing the Audiences, Purpose and Benefits of: **Planning (Gantt charts)** Purpose: *Gannt charts are used to visually plan and allocate time to tasks which are required to be completed as part of a project. Each individual task is given a start date and deadline for completion. These charts allow those who are in charge of the projects to track the progress of the project ensuring that all task are completed on time.* *Audience: Project Managers, Lead Designer, Manufacturing Engineer, Quantity Surveyor etc* *Benefits: This visual method helps user to understand the length of time each task has in proportion to the other tasks. It also helps to minimise down time.* **Manual Sketching** Purpose: *Manual sketching is a skill that is used during the preliminary phase of the design process. It enables the designer to record the ideas quickly; it is immediate. It requires no specialised equipment or power source. It is a free-flowing, intuitive method not restricted by the limitations of software drawing tools. Manual sketches are also used to communicate early stages of the design process with either clients or other professional before the time is then spent creating production or promotional materials. Free-hand sketching can also be done on an electronic sketch pad which enables ease of editing etc..* Audience: *Designers, engineers and joiners, clients etc* Benefits: *Sketching is a quick and immediate process and allows the designer to produce and record a range of solutions quickly. These ideas can then be shown to and discussed with the design team. If mistakes are made during this phase their are quick and inexpensive to fix. Can be used to create both 2D and pictorial graphics sketched ideas can be scanned and sent to clients or team members. Scanned images can be developed directly on an electronic sketch pad.* **Illustrations** Purpose: *Illustrations are used to share design ideas with Clients. These promotional graphics use Light, shade, texture, materials and environments to create realistic renderings of products that Clients will be able to visualise and gain an understanding of what the final manufactured product will look like. Illustrations can also be used for promotional materials I.e billboard advertisements.* Audience: *Clients, customers, Design team.* Benefits: *Final ideas can be shared with clients without the expensive cost of creating a prototype. Files be easily sent digitally. Products can be visualised in a range environments and lighting conditions without the expense of photographing a prototype in numerous locations.*

TECHNICAL GRAPHICS - Graphic Types & Techniques

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Graphic Types	Knowledge, understanding and skills in interpreting audience requirements and producing effective graphic responses for: *preliminary*, *production* and *promotional* graphics.
Production Graphics: CAD, orthographic projection, pictorials, dimensional Tolerances.	Write briefly describing the Audiences, Purpose and Benefits of: CAD Production drawings: *Audience: Engineer, assembly technician.* *Purpose: To allow the product to be manufactured using CAD/CAM.* *Benefit: Can simulate prior to manufacture to see if it works/fits together. Easily modified. Can support manufacture through CNC processes. Can support rapid protoyped modelling.* Orthographic Projection: Audience: *Engineer, Building Contractor.* Purpose: *Representing 3D objects as 2D. It is a universally understood drawing method and the application of appropriate drawing standards means that the drawing can be readily understood by all users.* Benefit: *Can show section/detail views for specific requirements or trades. Shows true shapes of surfaces. Always drawn to scale. Can be easily dimensioned. Can show internal details and technical details required by the manufacturer.* Pictorial drawings: Audience: Client, advertising team, interior designer. Purpose: To represent image in 3D. Benefit: More readily understood by a non-technical audience. Can simulate the look of a real 3D product. Exploded pictorial views can be useful in providing assembly details. The image can be rendered to look realistic; useful in advertising and marketing. Dimension Tolerances *Audience: Manufacturer, fitters (trades), construction trades.* *Purpose: Dimensions are normally applied to orthographic drawings aid manufacture and construction. Tolerances are applied to dimensions to allow acceptable variations in manufacturing dimensions. Uses symbolic language on a drawing to allow for variation on sizes.* *Benefit: Specifies the degree of accuracy and precision required to make the part to e ensure it will function in the product. A manufacturer cannot make components exactly to the sizes specified on a drawing and requires a range of acceptable error (limits). The tolerance specifies these acceptable manufacturing limits.*

TECHNICAL GRAPHICS - Graphic Types & Techniques

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Graphic Types	Knowledge, understanding and skills in interpreting audience requirements and producing effective graphic responses for: *preliminary*, *production* and *promotional* graphics.
Promotion: Creative layout techniques, Interactive screens, web sites.	Write briefly describing the Audiences, Purpose and Benefits of: Creative layout techniques: *Applying creative layout techniques to graphic design work can:* *Enhance the user experience by creating predictable patterns for users to follow.* *Lead to a more enjoyable audience experience.* *Be used to appeal to a specific target audience.* *Influence fashion trends in graphic design.* *Be used to reflect or convey the brand identity of a company.* *Convey an important message through use of elements and principles* *Can make a company stand out, motivate potential customers, cultivate brand recognition, and influence public perception of a company/service/product.* Interactive screens: Interactive screens refers to more than touchcreen smartphones or tablets, they can also be interactive kiosks used in retail or marketing. General benefits include: ● They can make technology more intuitive to use. ● Multiple languages can be added to the software, reaching out to a wider audience. ● Can hold the attention of an audience due to dynamic effects *"By interacting with a display, an opportunity for interacting with the brand and retailer is created. And, by interacting with the brand, customers are provided with a specific experience that allows retailers to build a relationship with their audience". (mechtron.com)* Web sites: General benefits of a website to an audience include: ● Accessible worldwide and in multiple languages. ● Can be accessed on multiple devices (Smartphones, tablet, computer, smart TV, etc) ● Can be accessed 24/7 ● Audiences can look at more than one page at the one time by opening numerous windows. ● Interactive media content can be displayed on a website. Can also include dynamic effects, videos/multimedia and links to social media. Advantages to a company include: ● Websites can be easily updated. ● Can link to other websites ● They are less expensive to promote/advertise a company compared to printed media, television advertising. ● They are more environmental friendly when it comes to advertising and marketing compared to printed media. ● Increases the credibility of a company/brand.

TECHNICAL GRAPHICS - Graphic Types & Techniques

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Graphic Techniques	Skills, knowledge and application of: creative techniques when using graphic instruments or devices, and a range of graphics media.
Use of 3D CAD, Animation, 3D Printing, CNC applications	Write briefly describing the Audiences, Purpose and Benefits of:

3DCAD

Audiences: Designers (product, interior,landscape etc), Architects, Engineers (mechanical, civil,naval etc), Bio-medical industry (prosthetics, dentistry etc) Games Industry. Clients.

Purpose: Engineers and designers can create a digital prototype to experience their 3D CAD designs virtually, before they're built. It gives them an integrated way to explore a project's key physical and functional characteristics digitally. FEA and CFD testing. Virtual walk-through. Creation of production drawings and files for CNC manufacture.

Benefits: Digital Prototyping solutions let teams test and optimise 3D CAD designs, helping to drive innovation, achieve higher quality, and speed time to market.

3D Printing

Audiences: Product Designers, Architects, Engineers (mechanical, automotive, aerospace etc) Bio-medical industry (prosthetics, dentistry etc) . Fashion designers.

Key Issues
- Orientation of model
- Scaffolding
- Use of fillets and
- Chamfers
- Quality of finish
- Rafting
- Use of webs
- Solid v's Hollow
- Filetypes
- stl

Purpose: Allows designers and engineers to quickly create physical prototypes to test a project's key physical and functional characteristics or component assembly. Used to manufacture bespoke (one off) products, eg medical/dental prosthetics. Used to mass produce components which are lighter and stronger than other methods, eg aerospace components.

Benefits: ability to personalise products / levels of complexity that simply could not be produced physically in any other way / design faster and be more innovative / product development time reduced (no expensive tooling or moulds required) 3D scanning can replicate complex objects.

CNC Applications (Simulation)

Audiences: Designers and manufacturers who use subtractive (cutting) methods to manufacture components. (Eg. Laser or Vinyl Cutters, Routers).

Key Issues
- Orientation
- Setting Datums
- Billet size
- Tool selection
- Clearances
- Tool paths
- Surface finish

Purpose: To simulate/test in a digital environment the set-up and cutting of a component before production commences.

Benefits: Allows you to see the toolpaths. Visualise the resulting component. Collision detection prevents catastrophes. Speeds up product development time.

Animation

Audiences: Medical professionals or their patients. Forensic scientists. Architecture clients. Teachers and learners. Product designers and engineers.

Key Issues
- Stop Frame versus Motion Tweening /Keyframe
- Motion Capture
- Movie File types
  - .wmv
  - .avi
  - .mov
  - .mpeg
- Blend/Fade
- Morphing

Purpose: medical animation as an instructional tool. Forensics in which animated recreation of incidents are created to aid investigators & help solve cases. Used to explain theory and concepts to students in a more convincing manner.

Benefits:cutting down on development costs. Working in a virtual world can let developers eliminate problems that would normally require extensive physical test models & experimentation. Training packages can eliminate language barriers.

Drawing Standards, Protocols and Conventions

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Knowledge and skills in applying: Recognised standards, protocols and conventions in engineering and construction drawings, including line types, symbols for sections, including stepped sections according to context, display variances in use of scale, detail, layout, measurement, layering functions, materials and symbols, tolerances.	
Standards, protocols and conventions in engineering and construction drawings, including line types, materials and symbols.	Write briefly describing the Audiences, Purpose and Benefits of: Standards, Conventions and Protocols in engineering and construction drawing: *Standards, Protocols and conventions in engineering and construction drawings exist to allow absolute coherence and universality across all technical graphic audiences. Technical Audiences could include, but are not limited to, the following:* ● Designers ● Architectural technicians ● Construction trades ● Consultant engineers ● Architects ● Landscape architects ● Building/Quantity surveyors ● Manufacturers *Protocols and standards exist to eliminate ambiguity within engineering and construction drawings. As drawings will be used by and produced for a number of graphic audiences certain rules must be followed to allow for clear understanding.* *Technical drawings can also be used for a variety of purposes and may require more than one company/audience input meaning working drawings could be edited/formatted by different people. Standards, conventions and protocols allow for this to happen as drawing conventions create a universal language.* *Standards, Conventions and Protocols refer to BS8888 which is British Standard for technical product documentation, geometric product specification, geometric tolerance specification and engineering drawings.*
Sections and stepped sections	Write briefly describing the Audiences, Purpose and Benefits of Sections and Stepped sections in engineering and construction drawing: *There is variety of sectional views than can be employed to aid the clarity and understanding of production drawings. For complex engineered objects there may be a requirement for multiple or even stepped/part sections these are commonly known as local or part section, half section, revolved section or removed section.* *Step sections are used when it would not be desirable to show a full section or multiple sections of the same object. Stepped or Partial sections allow the audience to see interior details without over complication. Partial Views can also be used to enlarge a detail from a section to improve clarity. The benefit of these drawings are to allow technical graphic audiences to draw relevant information from drawings with minimal confusion/ambiguity. Section drawings allow an interior view or internal information to be explored in orthographic views. Drawings should be clear and use standard conventions*.
According to context, display variances in use of scale, detail, layout, measurement, and layering functions	Write briefly describing the: Audiences, purpose and benefits of: scaling, tolerances and layering in engineering and construction drawings: Scaling: *Scale, in construction and engineering drawings, means the proportion or ratio between the dimensions adopted for the drawing and the corresponding dimensions of the object. Scaling is used in a variety of contexts in multiple technical graphic drawing types. Scaling allows drawings to be printed or published on smaller or larger scale. Most commonly drawings are "scaled down" to allow printing within the bounds of common paper sizes. "Scaling up" is usually associated with small details being explored/shown at a larger size to improve clarity. Scaling is not always possible, and users should not assume a drawing can be scaled to infer a dimension not labelled. This is bad practice and will often be noted on a drawing 'DO NOT SCALE DRAWING'.* Tolerances: *Tolerancing is the practice of specifying the upper and lower limit for any permissible variation in the finished manufactured size of a feature. The difference between these limits is known as the tolerance for that dimension. Tolerances are often used on manufacture drawings to allow for some movement in manufacturing accuracy. In practice, all dimensions are subject to tolerances. There are however, two distinct types to consider: functional and non functional dimensions. Tolerances will also be used when manufactured items go through quality control testing. Tolerances ultimately exist to allow 'breathing space' for objects to be manufactured as absolute accuracy is very difficult to achieve.* Layering: *Layering in construction and engineering drawings often refer to a drawing or CAD file being split up into specific parts. Layers are commonly used in architecture and construction drawings as a means of splitting up the vast amount of information that could be on any one CAD file. The use of layers allows users to switch information on and off as and when desired. This allows greater clarity while working on drawings and when printing drawings for specific audiences. The use of layers and layer management allows users to apply certain conventions to each layer for example line type, line weight etc. Layers also allow for multiple input to a drawing allowing easier sharing and multi user drawings.*

Built Environment

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Creators and users	
Creators and users - Knowledge and understanding of the roles and needs of designers, architects, architectural technicians, landscape architects, construction trades, building surveyors, quantity surveyors, consultant engineers, town planners, conservation bodies, communities, model makers, interior designers, suppliers, production and planning, prospective purchasers and members of the general public.	Select one creator and one user and describe the types of graphics and the types of graphic technologies they require in order to carry out their work. Creator 1: **Architect** *Designs buildings ranging from small house extensions to large public buildings like schools, theatres and hospitals* Graphic types required: *Architects are responsible for producing drawings of buildings that adhere to planning and building regulations and inform/instruct construction. Producing orthographic drawings using 2D CAD software (AutoCAD, Vector Works) including: plans, sections, elevations and technical details at different scales (1:1250, 1:200, 1:100,1:50, 1:20, 1:5) to achieve building warrants, planning permission and inform construction. Will also produce 3D CAD models using 3D modelling software (Sketch-Up, Revit/BIM, Rhino) to communicate what a building will look like to planners, communities, other members of the design team and clients. 3D models may also be produced to communicate the construction of a particular feature of the building i.e. non-standard windows.* Graphic Technologies required: *BIM = Building Information Management. BIM is a single 3D CAD model shared and worked on by all members of the design team simultaneously from architects and engineers to suppliers and manufacturers of components like windows and doors.* User 1: **Construction trades** *Builders, plumbers, electricians, brick layers, joiners, roofers, landscape gardeners. They all Interpret Architects drawings for instruction on how different parts of a building are to be constructed and from what materials i.e. foundations, external wall construction and internal wall positioning, positioning of windows and doors, roof construction, energy saving features.* Creator 2: Building surveyors *Measures sites and buildings to give an accurate representation of existing sites and structures. They may also investigate the structural condition (rot, cracks, subsidence) and fabric (water ingress, roof condition, external walls) of an existing building.* Graphic types required: *Produces measured drawings (plans and elevations) of existing buildings and sites prior to any design or construction.* Graphic Technologies required: *Laser levels, Measuring rods, tripod, Ranging poles, Moisture meter.* User 2: **Conservation bodies** *UNESCO World Heritage, Historic Scotland. Edinburgh's New Town is a UNESCO World Heritage site which protects the architectural heritage of the New Town. George Heriot's School (old building) is a grade A listed building. This grading is assigned to protect the most architecturally important buildings in Scotland.* Graphic types required: *Conservation bodies may hold historical drawings and information of some listed buildings. May provide mapping of an urban area and comment on its architectural character and heritage for planning consultation.* Creator 3: Consultant Engineers: Graphic types required:

Built Environment

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Creators and users	
Creators and users - Knowledge and understanding of the roles and needs of designers, architects, architectural technicians, landscape architects, construction trades, building surveyors, quantity surveyors, consultant engineers, town planners, conservation bodies, communities, model makers, interior designers, suppliers, production and planning, prospective purchasers and members of the general public.	Select one creator and one user and describe the types of graphics and the types of graphic technologies they require in order to carry out their work. Creator 4: **Interior designer** *Responsible for the interior design of a building, including colour schemes, tiling, wall paper, paintwork, soft furnishings and sometimes lighting.* Graphic types required: *Use photoshop to edit/manipulate images and may produce 3D CAD models to generate rendered visuals to communicate the mood and style of interior spaces. Will also produce materials and texture sampling and mood boards.* Creator 5: **Production and planning** *Production: detailed construction information (drawings and schedules) in order to assemble a building. Planning: the creation of Gantt charts (usually by an Architect) to plan out the stages of construction.* Graphic types required: *Production: technical detail drawings that inform construction including Location, Site & Floor Plans, sections, elevations and details at a range of scales from 1:50, 1:20 and 1:5. Planning: gantt charts are typically produced on Microsoft Excel.* Creator 6: **Architectural Technicians** *Will produce orthographic drawings of buildings and/or parts of buildings at varying scales from 1:200 to 1:5. They will mainly produce plans and sections that detail the construction of walls, floors and the roof and the junctions between these features. The primary role of a technician is to ensure compliance with building regulations. This means understanding the minimum size requirements for all manner of building features from disabled toilets to corridor widths to the spacing of fire dampeners in wall construction and ensuring adequate ventilation for the size of room. Technicians do not have any involvement with building design.* Graphic technologies required: *2D drawing software such as Autodesk AutoCAD, Vector Works, power CAD, Microstation. Many technicians will also now use 3D Building Information Modelling (BIM) software such as Autodesk Revit. *BIM = Building Information Modelling. BIM involves a 3D model that can be shared and worked on by all members of the design team simultaneously from architects and engineers to suppliers and manufacturers of components. The model allows information such as technical specifications to be assigned to elements in the model like windows and doors. This allows schedules of items like windows to be generated directly from the model. Printer /plotter.* User 3: **Prospective purchasers :** *Potential end users of a building development who can be consulted during the design stage to influence the specification of certain elements of a project. i.e. home buyer purchasing a new house 'off-plan' specifying what kitchen they would like.* Graphic types required: *View (floor) plans, sections, elevations and rendered visuals of proposed developments.*

Built Environment

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Creators and users	
Creators and users - Knowledge and understanding of the roles and needs of designers, architects, architectural technicians, landscape architects, construction trades, building surveyors, quantity surveyors, consultant engineers, town planners, conservation bodies, communities, model makers, interior designers, suppliers, production and planning, prospective purchasers and members of the general public.	Select one creator and one user and describe the types of graphics and the types of graphic technologies they require in order to carry out their work. Creator 7: **Quantity Surveyor** Graphic Types required: *Use highly detailed architect's drawings to add up how much a construction project will cost. Quantity Surveyors interpret Architect's and Engineer's drawings (plans, sections and elevations at varying scales from 1:200 to 1:5) to price the cost of construction and produce Bills of Quantities based upon the quantity of different features of the building. Once a construction job has been costed, a quantity surveyor will advise on how costs can be saved. Often changes to finishes (flooring, tiling, kitchen and bathrooms), glazing and roofing is a way to save money.* Graphic Technologies required: *Quantity Surveyors often receive packages of physical drawings to work from. They tend to produce Bills of Quantities, based upon the drawings they have received, on Excel spreadsheets.* User 4: **Suppliers** Graphic Types required: *Produce highly technical graphic information to communicate how their product, i.e. a window system, is manufactured and can be constructed. Will produce 3D CAD models to communicate how components fit together along with detailed 2D production drawings to inform the manufacture of their product. Will also work with Architects and engineers to design bespoke components. Will produce details at a scale of 1:10 to 1:2 showing how their product or system is constructed and can be installed.* Graphic Technologies required: *3D modelling and rendering software (Sketch Up, Rhino, Autodesk Revit, 3D Studio Max, Maya, Inventor and many other software packages). 2D Drawing software (Autodesk AutoCAD, Vector Works, Microstation etc.) Files will generally be emailed between suppliers and Architects, Engineers and clients.* User 5: **Town planners** Graphic Types required: *Review Architect's drawings including: location plans, site plans, building plans, sections and elevations and rendered visual images produced from 3D CAD models to determine the suitability of the proposed development on the given site. These drawings are typically drawing at a scale of 1:200 for building information. Location and site information is usually at a scale of 1:1250 or 1:500. 3D walk through animations are produced to give client or the public a more realistic impression of the intended design from a users perspective.* Graphic Technologies required: *Contractors will view copies of location and site plans, sections and elevations, usually in pdf format on a planning portal website run by the local authority. For very large public developments, communities may also view full scale printed drawings and images at consultation events. Sometimes rendered images of the final building will appear on temporary security hoarding around the site during construction. A feature of major public developments is the use of 3D animated walk-through visuals to give the public a realistic feel for the interior space of the building. In major developments, physical 3D models are built in order to sell the development to the client and the public.*

Built Environment

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Creators and users	
Creators and users - Knowledge and understanding of the roles and needs of designers, architects, architectural technicians, landscape architects, construction trades, building surveyors, quantity surveyors, consultant engineers, town planners, conservation bodies, communities, model makers, interior designers, suppliers, production and planning, prospective purchasers and members of the general public.	Select one creator and one user and describe the types of graphics and the types of graphic technologies they require in order to carry out their work. Drawings are usually received physically in packages which are then scanned in to a computer system and uploaded onto a planning portal website for the public to view and comment on. Creator 8: **Building Surveyors** Graphic Types required: *Measure sites and buildings to give an accurate representation of existing sites and structures. They may also investigate the structural condition (rot, cracks, subsidence) and fabric (water ingress, roof condition, external walls) of an existing building. Produces measured drawings (plans and elevations) of existing buildings and sites prior to any design or construction, usually to a specification dictated by an Architect or client. The scale, level of detail and content of the survey depends upon the specification. Typically, detail is drawn at a scale of 1:50 to 1:100 for building information and 1:200 to 1:500 for site information.* Graphic technologies required: *Surveys are drawing up digitally using 2D CAD software like Autodesk AutoCAD and exchanged in .dwg (drawing) format file.* User 6: **Communities** Graphic Types required: *Consulted with to give input into new developments. May be invited to attend consultation events whereby developers and some members of the design team, principally architects, present drawings depicting what a new development is going to look like and how it is going to impact upon the local community. Drawings are typically those used for planning purposes (location and site plans, building plans, elevations and rendered visuals produced from 3D CAD models).* Graphic Technologies required: *Will view copies of location and site plans, sections and elevations, usually in pdf format on a planning portal website run by the local authority. For very large public developments, communities may also view full scale printed drawings and images at consultation events. Sometimes rendered images of the final building will appear on temporary security hoarding around the site during construction.* Creator 9: **Model makers:** *Makes physical scale models of proposed building designs which are typically made from card, wood, mount board, plastics. May also build 3D CAD models and create physical models via-rapid prototyping.* Graphic types required: *Measures plans, sections and elevations (produced by Architects) to get the correct sizes to build scale models of the proposed building.*

Built Environment

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Creators and users	
Creators and users - Knowledge and understanding of the roles and needs of designers, architects, architectural technicians, landscape architects, construction trades, building surveyors, quantity surveyors, consultant engineers, town planners, conservation bodies, communities, model makers, interior designers, suppliers, production and planning, prospective purchasers and members of the general public.	Select one creator and one user and describe the types of graphics and the types of graphic technologies they require in order to carry out their work. Creator 10**: Production Engineer** Graphic Types required: *Freehand sketches, initial computer sketches, initial computer models, 3D computer models, Manual drawings (drawing board), Orthographic drawings (assembled and parts), Technical detail drawings (sections etc), FEA Analysis, Exploded pictorial drawings, 3D prints, Animations, Flow diagrams, Parts lists, Model plans, tolerances, material details, systems diagrams, operation diagrams, instruction manuals, safety signage.* Graphic technologies required: *CAD packages (2D, 3d or multifunctional), 3D printer, animation packages, graphics tablets, digital photography, tablet computers, personal computers, printed materials (books, manuals etc), industrial printers, drum plotters. A Production engineer is mainly concerned with the efficient and safe production of whatever they are manufacturing, their interaction with graphics is both in relation to the products being manufactured and also the maintenance of the machinery used. They may use digital and print media in the process of production, both for direct production reasons and also to enhance quality and efficiency of the process. They need a complete understanding of the product.* Creator 11: **The General public** Graphic Types required: *Promotional materials such as brochures, leaflets, instructions, adverts, magazines, posters. Digital media such as Websites, digital publications, digital instructions, CD covers, DVD covers, Packaging, Logos, signage, digital applications, Digital interfaces,physical interfaces, wayfinding, animation, animated films, entertainment* Graphic technologies required: *Tablet computers, personal computers, actual signage (vinyl, etched etc), Print media (on paper or packaging), Televisions, Digital media players, 2D interfaces (digital lecterns, phones, tablets etc), physical interfaces (from cars to coffee machines to ATMs), Paint.* *The General public use graphics every single day, from getting from place to place to making a phone call. Without thinking about it they interact with graphics in both simple and sophisticated ways, the general public are very aware of when graphics work and when they don't, they understand when an interface is intuitive, they react to a well designed graphic on packaging and they can appreciate a well animated movie, the converse is also true. They may not have the technical understanding of how the graphics are generated (or care) but they have sophisticated and varied tastes.*

Built Environment

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Planning drawing: Knowledge of the use of: ● electrical drawings, plumbing drawings, drainage surveys, underground surveys — storm water, foul water, services, gas, electric and telecommunications ● feature surveys; textile paving, seating, lighting ● topological surveys; standards, layout and use	Investigate and prepare brief notes on the following planning drawings: Who will produce them, who might use them, what content do they have and how are they produced. **Electrical drawings:** *Produced by Electrical Draughtsman/CAD Operators, electrical drawings are schematics which contain information about the electrical and wiring needs for a given project. These may include power, lighting, data and telephony wiring; the location of outlets, switches, connections, breakers and distribution boards; other "hardwired" electrical systems and devices (fans, alarm systems, public address systems etc.). Drawings may be in the form of a floor plan showing location of features (outlets, devices, switches etc) and the general connections between, or wiring diagrams showing specific wiring and interconnection information. Drawings use an standard library of symbols to ensure understanding.* **Drainage surveys:** *Drainage surveys deal with locating and cataloguing the existence, location and condition of drainage systems and their components. They can comprise of tables containing data on the locations and conditions of components, drawings and diagrams of the systems, and CCTV footage/images showing internal details of pipe networks and components. These will be prepared by drainage surveyors/engineers and CAD Technicians/Draughtsmen. Drainage surveys are useful for planning and creating new engineering works, modifying existing ones, or for maintenance of drainage systems themselves. As such they may be used by a range of people including civil engineers, site engineers architects, planners and drainage engineers.* **Topographical Surveys:** *Topographical survey is used to create maps containing details of the land and the features on it. These include natural features such as trees, rocks and waterways , and man made ones like buildings, walls, fences, telecoms poles etc. The survey will also detail the contours of the land. A land surveyor (a specialist profession in it's own right) will make use of a variety of specialist equipment and GPS to take readings about the shape of the ground and the height and location of objects in and on it. The information gained from topographical surveys is used in construction for planning and building by architects, engineers and builders but may also be used by cartographers when preparing and updating maps.*

Manufacturing and engineering

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Manufacturing and engineering Creators and users - Knowledge and understanding of the roles and needs of: ● designers, consultants ● engineering trades (civil, structural, electrical, mechanical, structural, systems) ● manufacturers, fabricators, ● model makers, test labs, materials technologists, ● specification engineers, ● Suppliers, ● production and planning.	Select one creator and one user and describe the types of graphics and the types of graphic technologies they require in order to carry out their jobs. User 1 **Heating Engineer** Graphic types required and their purpose: *3D Pictorial of gas / water pipe runs to show position of main inlets and outlets for water and sewage. CFD data showing optimal positions of radiators.* Graphic Technologies required and their purpose: *CFD Simulation software to simulate heat transfer in the room / building.* *2D/3D CAD drawings of heating system in the building. Isometric view of heating system shows exact position of fixtures and fittings and lengths of pipe runs in 3 dimensions.* User 1 **Interior Designer** Graphic types required and their purpose: *3D Renderings of proposed room layouts to show positions of furniture, doors, fixtures and fittings.* Graphic Technologies required and their purpose: *CFD Simulation software to simulate heat transfer in the room / building.* *3D Modelling software complete with rendering functions, texture mapping and lighting. IBL images could also be useful.*

TECHNICAL GRAPHICS - CREATORS and USERS

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Knowledge and understanding of the roles and needs of those who may encounter, use, draw, read or explain any form of technical, engineering or production drawing. Describe the roles of the following professionals and describe the graphic types the use and/or produce:

Design engineer/ Industrial Designer	*The Design Engineer works on the project at the beginning and at the end. It is their responsibility to fully understand what the client expects of them. They need to; be fully aware of the time frame by which the client wants the product to be completed, know the specification of the product and be able to produce concept sketches to help the client visualise what the engineer believes the finished product could look like.* *Their initial drawings would generally be sketches drawn up after a client meeting these could be produced manually or electronically. Once approved and with the consent of the client the Design Engineer would then have the authorisation to produce the production drawings. The production drawings would then be produced by the Design Engineer or they would pass it on to the Designer depending on the size of the company they worked with.* *The drawings involved in the Production drawings are: assembled orthographic and pictorials, component orthographic and pictorial, exploded, detailed views, sectional views and any range of movements. A parts list would be expected along with a bill of materials and even a Sequence of Operations to aid the assembly. The drawings would have to be produced to the standard for the country requiring them for example BSI in the UK or ANSI in the USA.* *These drawings would be approved and authorised before being passed on to the Manufacturing Engineer. The Design Engineer then reviews the finished product once it has been fully manufactured and assembled to ensure the product conforms to the client's specification.*
Manufacturing engineer	*The Manufacturing Engineer makes the physical product components. They are generally experienced in the machinery that they use to manufacture. However some can be qualified in a range* *of manufacturing areas such as; turning, milling and welding. The Manufacturing Engineer must take a piece of raw material and create a functioning component using the production drawings.* *The production drawings they would use are; component orthographic and pictorial drawings. On those drawings there would need to be sufficient dimensions and tolerances and technical detail (sectional views, exploded views etc) to allow the Manufacturing Engineer to have a clear understanding of the components that they are producing.* *The Manufacturing Engineer would have to ensure accuracy of production and always work to the tolerances stated on the production drawings. He will manage the manufacturing process to ensure a high quality is achieved and do so within the agreed time frame. In doing this he will ensure the components will work and assemble correctly and pass inspection and quality assurance procedures in place and managed by the Conformity Engineer. Meeting agreed time scales will ensure that no financial loss is accrued during the manufacturing process.* *In some instances the Manufacturing Engineer may never see the other components or the product* *fully assembled if their workshop cannot manufacture all of the necessary components. This heightens the importance of clarity and accuracy of the production drawings so that they fully describe the intended function of the components they are manufacturing.*

TECHNICAL GRAPHICS - CREATORS and USERS

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Knowledge and understanding of the roles and needs of those who may encounter, use, draw, read or explain any form of technical, engineering or production drawing. Describe the roles of the following professionals and describe the graphic types the use and/or produce:

Assembly Technician	*The Assembly Technician plans and organises the assembly of the components that the Manufacturing Engineer(s) produce.* *Prior to them assembling the product the components must be quality assured and inspected by a* *Conformity Engineer. Only once the batch of components pass inspection and are approved for use in* *this product can the Assembly Technician begin to assemble the product. Their main role is to ensure that all of the components are assembled in the product and that they fit securely to enable the product to function correctly.* *In order for the Assembly Technician to assemble the product they must refer to the production* *drawings. They would be focussed on the assembled & exploded pictorial drawings, sections and assembly notes, parts list and sequence of operations for the main assembly and visualisation of the final product. However, they would also refer to the orthographic and in particular sectional/detailed views to show the location and placement of any internal components.* *The product must be assembled correctly and to the exact requirements specified on the production* *drawings to ensure it functions correctly. It is then put through the next stage of the production process which is product testing.*

TECHNICAL GRAPHICS - CREATORS and USERS

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Knowledge and understanding of the roles and needs of those who may encounter, use, draw, read or explain any form of technical, engineering or production drawing. Describe the roles of the following professionals and describe the graphic types the use and/or produce:

Conformance/ Compliance Technician or Engineer	*Compliance engineers ensure that products are free of hazards whether they be electrical, mechanical, thermal or other hazards.* *They need mechanical ability and good communications skills to work with design and manufacturing teams. Compliance engineers will work closely with test Engineers.* *Compliance engineers create procedures and guidelines to ensure that industry regulations are met by manufacturers in both international (CE) and domestic (BSI) markets .* *Compliance engineers will use orthographic drawings, assembly drawings, test data etc. in their day to day role in addition to making reference to CE and BSi Standards.* *BSI - BRITISH STANDARDS INSTITUTE* *CE - "Conformité Européene" (European Conformity).*
Model Maker	*Model makers make three-dimensional (3D), physical scale models of products.* *Model makers work closely with the client or designer, either independently or as part of a team. They use freehand drawing skills or computer-aided design (CAD) to illustrate initial ideas, which may need to be amended as a result of further consultation before a detailed final model is produced.* *They will need to be able to read detailed engineering drawings, showing dimensions, assembly details etc. to allow accurate manufacture of a model.* *A model maker is now likely to make physical model from a 3D CAD model using rapid prototyping technology.*
Test engineer	*Test engineers are responsible for the quality of a product. They perform tests on a product to ensure that it will work properly under certain conditions and meet the product specifications by simulating the load and abuse that real users will place on the Product.* *Test engineers have to be able to read detailed technical drawings and use measuring equipment to ensure that the product complies with the dimensions and tolerances on the drawings.* *Test engineers are also likely to use Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) software to test structures, products and buildings.*

COMMERCIAL and VISUAL MEDIA - COMMON ELEMENTS

REVISION MATERIAL - MAKE NOTES FROM YOUR EXPERIENCES IN THE COURSE OR FROM RESEARCH

Topics	Information Gathered
Common elements to commercial and visual media graphics Creators and users - Knowledge and understanding of the roles and needs of: ● graphic designers, ● Artists, ● sales and marketing, ● Public & community, ● Advertising, ● creative industries, ● Retailers, ● Cinematic, ● Television, ● Electronic and interactive media, ● Animation, ● Web designers.	Select one **creator** and **one user** and describe the types of graphic and the types of graphic technologies they require in order to carry out their jobs. **Creator 1: Graphic Designer** Graphic types required and their purpose: *Preliminary Thumbnail Sketches – Initial planning, Recording ideas quickly, Client approval.* *Document design & Mock ups – Establish document structure, Creative design layouts and visuals, Project development, Client final approval to print.* *Camera-ready copy – Pre-press/pre-flight, Check image resolution, Check bleeds & registration marks, Check CMYK or PMS (spot) colours are set correctly, Convert to jpeg, Final layout print ready.* Graphic Technologies required and their purpose: *Preliminary graphics - Sketchbooks, Paper & pencil, Tablet computers with stylus. – To quickly generate and record ideas to discuss and show clients.* *Design work - DTP software, Photography – to progress the design to a completed stage.* *Production - lithographic plates, Digital file format – To migrate the design to the format required by the client.* Creator 2 ***Advertising designer*** Graphic types required and their purpose: *Preliminary - thumbnails, sketching - investigating a range of ideas, investigating fonts, colours, layout using principles and elements. Give a sense of how the layout or concept may look.* *Production - produce CAD model, (pictorial and technical detail) and DTP layouts including logos, create websites, gantt chart.* Graphic Technologies required and their purpose: *Promotional - creating graphics for packaging, posters, websites, interactive user interface, flyers, business cards, displays, animation. should be realistic graphics, CAD/ CAM - gather information of scale of production, animation and website software.* *Printing and digital media technologies - laser printer, inkjet, wide format, screen printing, offset lithography and solid ink systems - depending of the scale of production and client requirements.* **User 1: Retailers** Graphic types required and their purpose: *Promotional materials: Advertising, Posters/Billboards, Point of Sale displays, shelf edge Graphics. Web-site to convey information to shoppers, to contact as wide a market as possible, to drive up sales - packaging, posters, websites, interactive user interface, flyers, business cards, displays, animation, TV ads, popup ads to promote and sell the company/product/ brand to potential customers.* Technologies and their purpose: *Lithographic printing/ Screen-printing – to produce high quality graphic products.* *Wide format printing - To produce high-impact (large) banners and sineage.* *Web design - To display and promote goods and services, to be as user-friendly as possible. To make it easy to browse and order. To gather customer feedback. Access to TVs, computers, tablets, compatible software,*