# COURSE OUTLINE
# GTMDTM – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

This course will run the two units, 3 and 4, concurrently. The student Semester 1 grade will therefore be an estimate.

| Term and Weeks | Topic and key teaching points | Syllabus content | Assessments |
|---|---|---|---|
| Term 1<br>Weeks 1-5 | **Design** | **Design**<br>**Design fundamentals and skills**<br>• investigate<br>▪ designs in practice<br>▪ needs, values and beliefs of the designer/developer<br>▪ sources of design inspiration<br>▪ performance criteria for products<br>▪ application of design fundamentals and factors affecting design<br>o aesthetics<br>o function<br>o cost<br>o measurements<br>o environmental impact and considerations<br>o safety<br>• devise<br>▪ using communication and documentation techniques<br>o sketching and drawing<br>o rendering<br>o annotating<br>▪ understanding the elements and principles of design where applicable in context<br>o line<br>o shape<br>o form<br>o texture<br>o contrast<br>o proportion<br>o balance<br>o colour<br>▪ rapid concept development techniques to generate design ideas and concepts<br>▪ final design concept using design brief and performance criteria<br>▪ review of best idea using design brief and performance criteria<br>▪ design solution | ***Workshop Safety Induction N/A***<br>***Task 1: Parts Tray Design Folio***<br>***Task 3: Parts Tray***<br>**Task 7: Oxy Weld Exercises** |

| | | | |
|---|---|---|---|
| | | ○ develop best concept using annotated hand or computer generated graphics (front, back views and detailed sketches as necessary)<br>○ 2D illustrations (working/technical drawings)<br>○ 3D illustration (presentation drawings)<br>○ inspiration/concept/storyboard<br>▪ production plans<br>○ materials list<br>○ costing for all materials components<br>○ time line for stages of production<br>• evaluate<br>▪ final product against design brief, initial design and performance criteria related to needs, values and beliefs of the end user<br>**Use of technology**<br>**Skills and techniques**<br>• ICT, portfolio development and communication skills<br>▪ photography – ongoing record of progress and processes used and final product<br>▪ documenting presentations and evaluations<br>• context appropriate drawing and relevant technical information to produce the final product to demonstrate:<br>▪ sketching rapid concept developments<br>▪ 3D presentation drawings<br>▪ rendering techniques<br>▪ 2D working drawings or using templates<br>▪ inspiration/concept or storyboard development and presentation<br>▪ design and making specification sheets<br>• select appropriate materials and calculate the quantities of materials required to complete the project<br>• with supervision, operate machinery and tools appropriate to context<br>**Safety**<br>• correct use of personal protective equipment (PPE) where applicable<br>• occupational safety and health (OSH) practices appropriate to tasks being undertaken in workshops | |

| | | | |
|---|---|---|---|
| | | • apply risk management strategies in the workshop/studio<br>• assess the condition of tools and machinery<br>**Production management**<br>• production planning<br>▪ maintain a production plan<br>▪ maintain time management while using tools, equipment and machinery to complete production<br>o follow instructions from plans<br>o maintain safety requirements<br>▪ record changes to materials lists or costing<br>▪ record regular journal/diary entries<br>• ongoing evaluation techniques: diary, journal or portfolio notes and use of photography, to record ongoing progress/decision changes made to the project | |
| Term 1<br>Weeks 6-8 | **Safety** | | **Task 10: Semester 1**<br>**Response Booklet;**<br>**Ferrous, Non-Ferrous and Fixings**<br>**Work sheet** |

# COURSE OUTLINE
# GTMDTM – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| Term 1<br>Weeks 9-10 | **Materials** | | **Task 2: Tool Box Folio**<br>**Task 4: Tool Box**<br>**Task 7: Oxy Weld Exercises**<br>**Task 10:**<br>**Response Booklet;**<br>**OSH Worksheet Work sheet** |
| Term 2<br>Weeks 1-2 | **Use of technology** | **Use of technology**<br>**Skills and techniques**<br>• select and apply appropriate and accurate marking out tools and techniques for measuring and marking out in sheet metal, bar and tube projects, that include the use of:<br>▪ rule<br>▪ square<br>▪ scriber<br>▪ centre punch<br>▪ inside/outside callipers<br>▪ combination squares<br>• select and safely apply technical skills using a range of tools and machinery, that could include:<br>▪ hand tools for shaping<br>▪ files and filing<br>▪ hacksaws and blades<br>▪ metal lathe<br>▪ vice and clamps<br>▪ hand tools for cutting<br>▪ electric hand drill<br>▪ drill press/pedestal drill<br>**Materials in context**<br>• name and operate machines for folding and shaping metals<br>• apply correct methods of gas and electric metal welding<br>▪ metal preparation<br>▪ welding operations<br>▪ set up<br>▪ testing | **Task 10: Semester 1**<br>**Response Booklet;**<br>**Tools Checklist**<br>**Work sheet** |

| | | | |
|---|---|---|---|
| | | | |
| Term 2<br>Weeks 3-4 | **Use of technology** | **Use of technology**<br>• **Skills and techniques**<br>• select and apply appropriate and accurate marking out tools and techniques for measuring and marking out in sheet metal, bar and tube projects, that include the use of:<br>▪ rule<br>▪ square<br>▪ scriber<br>▪ centre punch<br>▪ inside/outside callipers<br>▪ combination squares<br>• select and safely apply technical skills using a range of tools and machinery, that could include:<br>▪ hand tools for shaping<br>▪ files and filing<br>▪ hacksaws and blades<br>▪ vice and clamps<br>▪ hand tools for cutting<br>▪ electric hand drill | **Task 8: MIG Welding Exercises**<br>**Task 12: EST** |
| Term 2<br>Weeks 5-10 | **Production management** | **Production management**<br>• production planning<br>▪ maintain a detailed production plan<br>▪ maintain time management while using tools, equipment and machinery to complete production<br>o adhere to sequential instructions<br>o apply safety and risk management<br>▪ record changes to materials lists or costing | **Task 2: Tool Box Folio**<br>**Task 4: Tool Box**<br>**Task 8: MIG Welding Exercises**<br>**Task 11: Semester 2 Response Booklet** |

| | | | |
|---|---|---|---|
| | | ▪ record regular journal/diary entries<br>• ongoing evaluation techniques: diary, journal or portfolio notes and use of photography to record ongoing progress/decision changes made to the project<br>**Use of technology**<br>**Skills and techniques**<br>• operate machinery and tools appropriate to context<br>• identify, remove and report blunt, dull or damaged tools and machinery appropriate to context<br>**Design**<br>**Design fundamentals and skills**<br>• investigate<br>▪ needs, values and beliefs of the designer/developer<br>▪ needs, values and beliefs of the client/target audience/market<br>▪ performance criteria related to needs, values and beliefs of the end user<br>▪ application of design fundamentals and factors affecting design<br>o aesthetics<br>o function<br>o cost<br>o critical measurements<br>o environmental impact and considerations<br>o safety<br>• devise<br>▪ communication and documentation techniques<br>o sketching and drawing<br>o rendering<br>o annotating<br>o sampling<br>o modelling<br>▪ applying of elements and principles of design where applicable in context<br>▪ rapid concept development techniques, images and annotation<br>▪ design development<br>o review and justification of best ideas using design brief and performance criteria<br>o best ideas developed using annotated hand or computer generated graphics (front, back views and detailed sketches as necessary) | |

| | | | |
|---|---|---|---|
| | | ○ 2D illustrations (working/technical drawings)<br>○ 3D illustration (presentation drawings)<br>○ inspiration/concept/storyboard development and presentation<br>▪ production plan<br>○ materials list<br>○ estimated and actual costing for all materials and components<br>○ production plan and time line<br>• evaluate<br>▪ design and production processes<br>▪ production plan/journal/diary and accompanying photographic evidence to record ongoing evaluation<br>▪ product against design brief, initial design and performance criteria related to needs, values and beliefs of the end user<br>**Use of technology**<br>**Skills and techniques**<br>• ICT, portfolio development and communication skills<br>▪ client and market research techniques<br>▪ client presentation techniques<br>▪ photography – ongoing record of progress and processes used and final product<br>▪ documenting presentations and evaluations<br>• develop context appropriate drawings and relevant technical information to produce the final product<br>▪ sketching rapid concept developments<br>▪ 3D presentation drawings<br>▪ 2D working drawings or using templates<br>▪ inspiration/concept or storyboard development and presentation<br>▪ design and making specification sheets<br>• use workroom/studio terminology appropriate to context select appropriate materials and calculate the correct amount required to order and purchase materials to complete the project | |

# COURSE OUTLINE
# GTMDTM – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| Term 2<br>Weeks 6-10 | **Use of technology** | **Use of technology**<br>**Skills and techniques**<br>• select and apply appropriate and accurate marking out tools and techniques for measuring and marking out in sheet metal, bar and tube projects, that include the use of:<br>▪ rule<br>▪ square<br>▪ scriber<br>▪ centre punch<br>▪ inside/outside callipers<br>▪ combination squares<br>• select and safely apply technical skills using a range of tools and machinery, that could include:<br>▪ hand tools for shaping<br>▪ files and filing<br>▪ hacksaws and blades<br>▪ metal lathe<br>▪ vice and clamps<br>▪ hand tools for cutting<br>▪ electric hand drill<br>▪ drill press/pedestal drill<br>**Materials in context**<br>• apply methods of drilling different metals<br>▪ preparations for drilling<br>▪ drill speeds<br>▪ lubricants for different metals<br>• select and apply appropriate methods of fixing metals together through permanent and non-permanent joining, that could include:<br>▪ welding<br>▪ types of nuts and bolts<br>▪ riveting<br>▪ screws<br>• name and operate a powered cutting machine or mechanical cutting device<br>**Use of technology**<br>**Skills and techniques**<br>• handle and store sectional tube, bar and sheet metal and material correctly<br>• select and apply appropriate and accurate marking out tools and techniques for measuring and marking out in sheet metal, bar and tube projects<br>• ensure safety guards and devices are fitted correctly before operating a machine<br>• select and apply technical skills using a range of tools and machinery | **Task 2: Toolbox Folio**<br>**Task 4: Toolbox**<br>**Task 5: Machine Vice**<br>**Task 11: Semester 2 Response Booklet** |

| | | | |
|---|---|---|---|
| | | • select and safely apply technical skills using a range of tools and machinery that could include:<br>▪ cutting, shaping and folding techniques<br>▪ adjusting and changing components of machinery<br>▪ welding equipment, both gas and electric<br>▪ pedestal grinder<br>▪ metal lathe and basic manual and/or automatic turning operations<br>• prepare metal surfaces for finishing<br>apply a metal finish<br>**Safety**<br>• correct use of personal protective equipment (PPE) where applicable<br>• conduct risk assessment for using specific tools/machinery<br>• demonstrate occupational safety and health (OSH) practices appropriate to tasks being undertaken in workshops<br>• apply risk management strategies in the workshop/studio<br>• recognise need and purpose of materials safety data (MSD) with regard to storage and handling of hazardous substances and hazardous operations appropriate to situation<br>• apply a metal finish | |
| Term 3<br>Weeks 1-5 | **Materials in context** | **Materials in context**<br>• the environmental impact of metals production<br>▪ raw material extraction and processing – steel and aluminium<br>▪ end-of-life of a product – recycling and safe disposal<br>examples of re-cycling methods for different metal materials<br>**Safety**<br>• correct use of personal protective equipment (PPE) where applicable<br>• conduct risk assessment for using specific tools/machinery<br>• demonstrate occupational safety and health (OSH) practices appropriate to | **Task 2: Toolbox Folio**<br>**Task 4: Toolbox**<br>**Task 5: Machine Vice**<br>**Task 11: Semester 2 Response Booklet;**<br>**Sustainable Materials Work sheet** |

| | | | |
|---|---|---|---|
| | | tasks being undertaken in workshops<br>• apply risk management strategies in the workshop/studio<br>recognise need and purpose of materials safety data (MSD) with regard to storage and handling of hazardous substances and hazardous operations appropriate to situation | |
| Term 3<br>Weeks 6-7 | **Materials** | **Materials**<br>• **Nature and properties of materials**<br>• applications of the following metal finishes<br>▪ painting<br>▪ galvanising<br>▪ lacquering<br>▪ enamelling<br>▪ tin plating<br>▪ electroplating<br>▪ anodising<br>▪ plastic or powder coatings | **Task 11: Semester 2 Response Booklet; Identification Aesthetics Work sheet**<br>**Task 5: Machine Vice**<br>**Task 9: ARC Welds** |

# COURSE OUTLINE
# GTMDTM – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4

| | | | |
|---|---|---|---|
| Term 3<br>Weeks 8-10 | **Materials** | **Materials**<br>**Nature and properties of materials**<br>• the properties of materials<br>  ▪ non-ferrous – copper, aluminium<br>• the properties of steel using the following terms<br>  ▪ malleable<br>  ▪ ductile<br>  ▪ hardness<br>  ▪ brittleness<br>  ▪ corrosion resistance<br>  ▪ thermal conductivity<br>  ▪ electrical conductivity<br>• relationship between properties and end uses of metals<br>• identification of thread types, taps and dies<br><br>**Use of technology**<br>**Skills and techniques**<br>• select and safely apply technical skills using a range of tools and machinery that could include:<br>  ▪ cutting, shaping and folding techniques<br>  ▪ adjusting and changing components of machinery<br>  ▪ welding equipment, both gas and electric<br>  ▪ pedestal grinder | **Task 6: Trivet**<br>**Task 9: Arc Welding exercises** |

# COURSE OUTLINE
# GTMDTM – GENERAL YEAR 12: 2022
# UNIT 3 AND UNIT 4