



## **Drafting and Design 11/12** **Course Overview – Level 1**

**Teacher: Mr. J. Pinto**

Welcome to Drafting and Design 11/12. The focus of this course is to develop the students' skills and understanding of Drafting and Design: concepts, terminology, and techniques. The main focus is to develop students' practical skills and basic understanding of the Design Process through a combination of Manual and Computer Drafting.

### **OUTCOMES:**

Students will:

- identify and demonstrate employability skills
- use appropriate technical vocabulary and information technology tools to communicate solutions
- explore career opportunities in the field of drafting and design
- use appropriate drafting and design terminology to communicate effectively
- create drawings including sketches, orthographic projections, pictorials, working drawings, and development drawings
- consistently apply drawing standards and conventions
- prepare drawing details, including auxiliary views, sections, threads and fasteners, tolerances, and surface finishes
- identify and develop the components of working drawings including bill of materials and schedules
- demonstrate understanding and use of computer hardware and software related to drafting and design
- apply fundamental drafting techniques in using CADD programs
- use CADD programs to create and manage drawings and to solve problems
- complete a design project from design brief to the presentation of a solution
- develop and maintain a design portfolio
- apply research methods and techniques to solve design problems
- use appropriate tools and materials to develop and present design ideas
- use appropriate representation and drafting techniques to detail solutions, proposals, and plans, using a variety of techniques
- use a variety of scales to measure accurately, reduce or enlarge object size for technical drawings
- use scale and proportion appropriately when sketching
- develop ethical practice and commitment relating to copyright, licensing, and plagiarism
- assess the appropriateness of technological solutions when engaged in design activities

Student input is essential in order to make this course fun, interesting and relevant. Therefore, your participation and ideas for projects or just ways to make this class more relevant are always welcome.

### **Topics of study**

#### 1. Introduction

- *What is Drafting and Design?*
- *Why do we need / use Drafting and Design?*
- *Communication*

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2. Sketching
  - *Freehand drawing, drawing reproduction*
  - *Line construction techniques (vertical, slope, circles, and ellipse)*
  - *Proportioning*
3. Design Process
4. Printing
  - *Lettering*
  - *Numbering*
  - *Guide line construction and applications*
5. Pictorial Drawings
  - *Oblique*
  - *Isometric*
  - *Perspective*
6. Multiview Drawings
  - *Introduction - orthographic projection*
  - *Necessary views*
  - *Centering views*
  - *Lines - centre lines, Hidden lines, Object lines*
7. Dimensioning
  - *Lines and symbols*
    - *Extension lines*
    - *Dimension lines*
    - *Arrowheads*
    - *Numbering*
  - *Placing dimensions*
  - *Angles, chamfers, tapers, curves, and holes,*
  - *Limit dimensioning*
8. AutoCad
9. Inventor (time permitting)

# **Drafting and Design 11/12**

## **Course Overview – Level 1, 2, 3**

### **SUPPLIES**

Each student will be required to bring the following supplies to each class:

- Binder / Duo-Tang with lined paper
- Pencils – (1) HB and (1) 2H or 4H
- Eraser (white)
- Pen (red and blue)

### **ASSESSMENT:**

Evaluation will be based on the individual student's performance, combining self, peer, and teacher evaluation of assigned work, quizzes and tests.

It is important that students COMPLETE and SUBMIT all assignments by the assigned due date. There will be very little additional time available for assignments that are not handed in on time, therefore, students will need to complete overdue assignments outside of the scheduled class time.

All drawing assignments will have sufficient class time for completion. If students need extra time on assignments, room 501 will be available before class starting at 8:00 am and during lunch 11:20 a.m. to 12:00 pm (Mon – Fri).

Assessment is based on 4 classifications:

- **(N) – Not Meeting Expectations:** Have not met assignment specifications.  
*(Incomplete – many flaws, quality not evident)*
- **(A) - Approaching Expectations:** Most project components meet the assignment specifications. *(Incomplete/Complete, some flaws, quality evident)*
- **(M) - Meeting Expectations:** Completed to assignment specifications  
*(Complete - some flaws, high quality)*
- **(E) - Exceeding Expectations:** Completed to assignment specifications.  
Student has gone above and beyond project or course requirements.  
*(Complete – no or minimal flaws, extremely high quality)*

## ***Have Fun!***

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## **Drafting and Design 11/12** **Course Overview – Level 2**

### **DRAFTING AND DESIGN 12: ENGINEERING AND MECHANICAL DRAFTING**

This course provides students who have demonstrated a proficiency and interest in engineering/mechanical drafting with the opportunity to expand their knowledge base in this area of drafting and design. Students will be introduced to more advanced techniques in engineering/mechanical drafting through a project-based approach. This will expand on the basic drafting fundamentals taught in Drafting and Design 11 and 12.

#### **OUTCOMES:**

Students will:

- communicate with local businesses/industries to determine career opportunities, market trends, and required skills
- research opportunities, education and training requirements for a range of mechanical drafting careers
- prepare a personal career plan for one or more selected mechanical drafting careers
- produce advanced working drawings or solid models of gears, cams, fasteners, and complex machine parts including all drafting standards and details
- produce assembly drawings to show the relationship of various components
- apply developments and intersections in complex drawings
- apply drafting symbols and conventions for welding fabrication, and electrical and piping drawings
- utilize advanced measuring techniques to modify an existing object to meet a new set of criteria.
- demonstrate proficient use of computer hardware and software related to engineering and mechanical drafting standards
- use advanced software customization techniques
- use 3D modelling techniques for object creation
- participate in and complete CADD certification
- employ technical visualization to explain the function/ operation of a specific object/model
- review and evaluate the use of a variety of materials to the design of objects
- review and evaluate the use of a variety of manufacturing processes as they apply to engineering
- develop/design an object based on a set of specifications presented in a design brief and then visualize, sketch, and model the problem
- apply engineering principles to a variety of situations, such as stress, live/dead loads, compression, tension
- participate, where possible, in engineering /design competitions to gain practical experience in applied engineering principles
- utilize advanced measuring techniques to modify an existing object to meet a new set of criteria (e.g., modify a disk brake to fit another car)
- apply responsible environmental, social, and technological considerations to the design of products, systems, and graphic images

# **Drafting and Design 11/12**

## **Course Overview – Level 3**

### **DRAFTING AND DESIGN 12: ADVANCED DESIGN**

Advanced Design builds on basic concepts and principles developed in Drafting and Design 11 and 12 courses. The expectation is that students develop higher levels of awareness and sensitivity towards industrial design. Society's need for industrial designers is increasing, as consumers continue to demand better products and sophistication in lifestyle. Industrial designers are typically engaged in a broad variety of projects, as more and more companies, businesses, and industries seek their services. Students who enjoy technical subjects, creative designing, and problem solving will be attracted to this advanced option. Documented school activities in this area would effectively support a portfolio application for entrance to post-secondary options in this field.

Contemporary industrial design combines elements from many other disciplines. Schools provide exciting opportunities for collaboration between curriculum areas including Engineering, Physics, Math, Home Economics, and Graphic and Fine Arts. Where possible these collaborations should be encouraged and developed.

#### **OUTCOMES:**

Students will:

- identify design principles in existing examples of products, architecture, and other made objects
- identify design elements in existing examples of products, architecture, and other made objects
- use design principles when developing new solutions
- apply design elements when developing new solutions
- describe major design themes, styles, and movements in historical and contemporary contexts
- articulate the relationships between form, function, and structure in a variety of examples
- assess and manipulate ergonomic and human factors in the design of new objects
- compile end-user profiles and design for a target group
- prepare formal briefs, portfolios and required documentation in support of a formal design process
- present their design concepts in a number of formats including graphic image, written/spoken word, and constructed models
- use a design process to develop new ideas, specific to a problem statement
- participate and contribute to class critiques to facilitate development of ideas
- describe the role and contribution of a designer in the process of creating manufactured goods
- explain the need for connections between design and other technical disciplines
- apply basic concepts and techniques of drafting to communicate design information
- work independently or in groups when engaged in design activities
- conduct research on relevant aspects of design topics using a variety of sources including the library, the Internet, business, and industry
- acknowledge source and respect proprietary information when conducting research and development for design problems
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## **Drafting and Design 11/12**

### **Course Overview – Level 3 cont.**

- include the results of their research and development as part of their design portfolio and documentation
- use the information from research to support active design work
- relate major trends and styles in design to a greater social context
- identify a culture's needs and wants by studying design preferences in the products and life-styles found there
- formulate and defend opinions on local and international issues surrounding design and manufacture of products
- follow safe work practices when engaged in design activities