



Republic of the Philippines  
**DEPARTMENT OF EDUCATION**



## **K to 12 BASIC EDUCATION CURRICULUM**

**TECHNOLOGY AND LIVELIHOOD EDUCATION**

# **TEACHER'S GUIDE**

**Exploratory Course on  
MECHANICAL DRAFTING**

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

**TABLE OF CONTENTS**

Introduction .....	3
Background Information	
The Overall Goal of the K to 12 Curriculum .....	3
The Conceptual Framework of the Teaching of TLE ... ..	3
The TLE Exploratory Courses .....	5
The Learning Modules and Lessons .....	6
New Feature of the Teaching of TLE .....	6
About the Learning Module	
Design of the Module .....	7
Parts of the Lesson .....	8
Reflection .....	11
Curriculum Guide .....	12

## K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

### **INDUSTRIAL ARTS - MECHANICAL DRAFTING (Exploratory)**

#### **Teacher's Guide for TLE Exploratory Course on MECHANICAL DRAFTING**

#### **Introduction**

This Teacher's Guide is intended for you, the TLE teacher, who teaches any of the more than 24 TLE exploratory courses in the Grades 7 and 8 of the K to 12 curriculum. To ensure that you teach the TLE exploratory courses the way they were intended to be taught, you must see the big picture of the K to 12 curriculum and the teaching of TLE. Some background information is necessary.

#### **Background Information**

##### **1. The Overall Goal of the K to 12 Curriculum**

The K to 12 Curriculum has as its overarching goal *the holistic development of every Filipino learner with 21<sup>st</sup> century skills who is adequately prepared for work, entrepreneurship, middle level skills development and higher education*. The over arching goal of the K to 12 curriculum, tells you that the teaching of TLE plays a very important role in the realization of the overall goal of the curriculum. Whether or not the K to 12 graduate is skilled and ready for work, entrepreneurship and middle skills development depend to a great extent on how effectively you taught TLE.

##### **2. The Conceptual Framework of the Teaching of TLE**

Below is a schematic diagram of Technology and Livelihood Education (TLE) framework in general secondary schools. This should guide you in the teaching of the TLE exploratory courses.

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

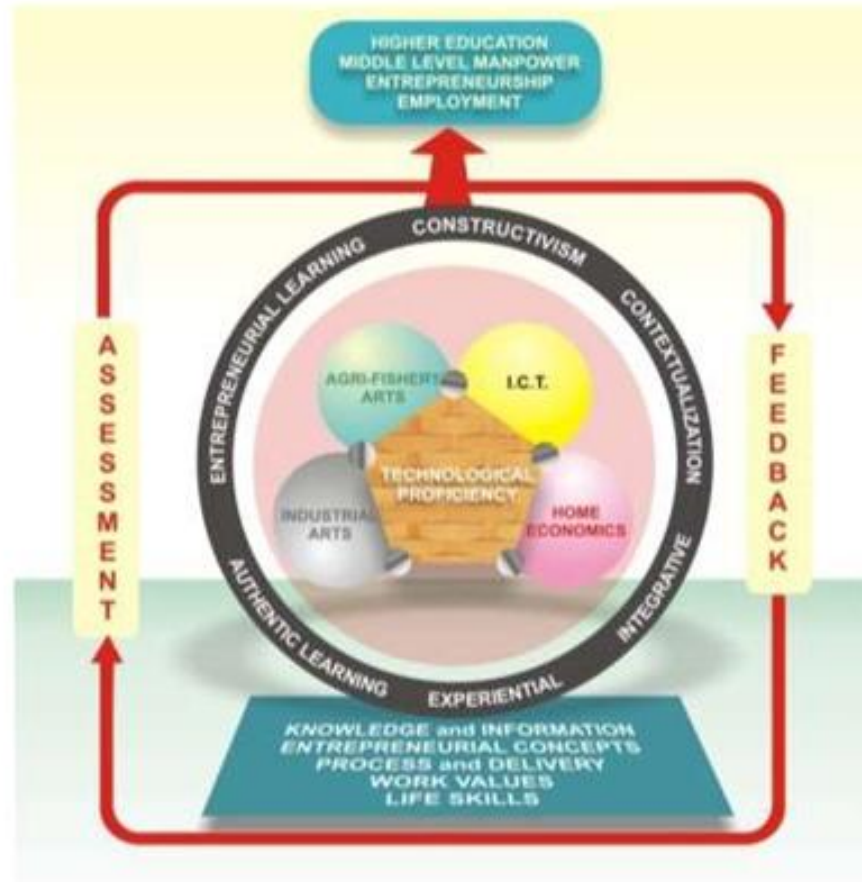


Figure 1.TLE Framework

The diagram shows that Technology and Livelihood Education encompasses the field of Home Economics, Industrial Arts, Agri-Fishery Arts and ICT. The 24 TLE courses can be categorized under any of these fields.

## K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

### **INDUSTRIAL ARTS - MECHANICAL DRAFTING (Exploratory)**

TLE is geared towards the development of technological proficiency and is anchored on knowledge and information, entrepreneurial concepts, process and delivery, work values and life skills. K to 12 TLE is...

- a. one that is built on adequate mastery of knowledge and information, skills and processes, acquisition of right work values and life skills;
- b. one that equip students with skills for lifelong learning; and
- c. one that is founded on cognitive, behavioral or psychomotor and affective dimensions of human development.

The diagram likewise shows that entrepreneurial concepts also form part of the foundation of quality TLE. It is expected that your TLE students, after using the Learning Module on Entrepreneurship, imbibe the entrepreneurial spirit and consequently set up their own businesses in the areas of Agri-Fishery Arts, Industrial Arts, Home Economics, and Information and Communication Technology.

TLE by its nature is dominantly a skill subject and so you must engage your students in an experiential, contextualized, and authentic teachinglearning process. It is a subject where your students learn best by doing. It is integrative in approach. For instance, it integrates entrepreneurship with all the areas of TLE. It integrates concepts, skills and values.

### **3. The TLE Exploratory Courses**

TLE in Grades 7 and 8 are exploratory in nature. Your school will choose at least 4 from the list of 24 courses for which 23 Learning Modules have been prepared. <sup>1</sup>Your school's choice is determined by the availability of its resources (faculty and facilities) as well as the local needs and resources of the community.

The 24 TLE exploratory courses focus on four basic common competencies: 1) use and maintenance of tools and equipment; 2) mensuration and calculation; 3) occupational health and safety procedures, and 4) preparation and interpretation of technical drawing. Why are these competencies called basic? Because they are competencies that you must acquire in order that you can do higher level competencies. They are also described common because these are true to all TR-based TLE courses.

---

<sup>1</sup> There are 24 TLE courses but there are only 23 Learning Modules because there is one Learning Module for Tailoring and Dressmaking

## K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

### INDUSTRIAL ARTS - MECHANICAL DRAFTING (Exploratory)

#### The Learning Modules and Lessons

There is a Learning Module for each exploratory course. If there are 24 exploratory courses then you have 24 Learning Modules in your hands. But you will use 4 Modules only for the entire year in Grade 7 (plus a fifth one on Entrepreneurship) and another 4 Modules in Grade 8 (plus a fifth one on Entrepreneurship).

Each Learning Module consists of 4 to 5 Lessons<sup>2</sup>. The Lessons are focused on the 4 to 5 basic competencies. To avoid meaningless repetition of the teaching of the 5 common competencies, you have to teach them in the context of the TLE course. For example, you teach “use and maintenance of tools” in beauty care when you are teaching the course on Beauty Care. You teach the same competencies - use and maintenance of tools-in Horticulture but in the context of Horticulture and so your tools will not be entirely the same.

#### New Feature on the Teaching of TLE

***What’s new in the teaching of TLE in the K to 12 curriculum?*** In the K to 12 curriculum, the TLE courses are taught based on the learning outcomes and performance criteria stated on the Training Regulations (TR) from Technical Education and Skills Development Authority (TESDA). They are TR-based.

***Why is this necessary?*** To prepare the K to 12 graduate for lucrative work, he/she must earn a National Certificate (NC) I, II or even an NC of higher level that is required by industries. This he/she earns after passing an assessment given by TESDA.

***How can you ensure that the K to 12 high school student (Grade 9 to 12) pass TESDA assessment and obtain an NC?*** By seeing to it that you teach the TLE course in accordance with the performance criteria and learning outcomes laid down in the TESDA Training Regulations.

***Do the exploratory courses enable the high school student to earn already an NC?*** Not yet. Completion of the exploratory courses may not yet qualify a high school student to take an assessment for an NC. Instead, it helps him/her earn a Certificate of Competency (COC) at least in Grade 9 that will lead eventually him/her to an NC. In short, the COC paves the way to the earning of an NC.

---

<sup>2</sup> Some Learning Modules combined use and maintenance of tools to make one Lesson, so the number of Lessons amount to 4; others made separate Lessons for use of tools and for maintenance of tools, thus the total is 5 Lessons

## K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

### INDUSTRIAL ARTS - MECHANICAL DRAFTING (Exploratory)

Student's choice of TLE specialization begins in Grades 9. After having been exposed to an array of TLE courses during the exploratory phase in the first two years, the student will be most benefited, if in Grades 10, 11, or 12 he/she continues with a TLE course in which he/she already has a COC. In that way, he/she will get an NC faster.

#### About the Learning Module

##### 1. Design of the Module

- a. The Module is designed to be a teacher-assisted learning kit or a self-learning kit on competencies that a Grade 7 TLE ought to possess. It explores the course on Aquaculture which helps your student earn a Certificate of Competency in Grade 9 which leads to a National Certificate Level I / II (NCI / II) in Grades 10, 11 or 12.
- b. The Learning Module is made up of 4 to 5 Lessons based on the competencies. Each Lesson contains the following:
  - 1) Learning Outcomes
  - 2) Performance Standards
  - 3) Materials/Resources
  - 4) Definition of Terms
  - 5) What Do You Already Know?
  - 6) What Do You Need to Know?
  - 7) How Much Have You Learned?
  - 8) How Do You Apply What You Learned?
  - 9) What Is Your Score?
  - 10) References

There are some TLE Modules which have a section on "How Do You Extend Your Learning?", This section is meant for enrichment. It is usually given as an assignment for not everything can be taught and done in the classroom given a limited time.

c. The **Self-check** can also serve as the posttest of the lesson.

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING**  
(Exploratory)

2. Parts of the Lesson. -The following explain the parts of each Lesson and describe what your students' - as well as your tasks are.

Part of the Lesson	Students' Task	Teacher's Task
<p><b>1. Learning outcomes</b> are what your TLE student is supposed to know and be able to do after using the module. Since our TLE courses are TR-based, all learning outcomes are lifted from the TESDA TR. In the Curriculum Guide (the matrix which contains Content Standard, Performance Standard, Learning Competencies, Projects/Activities, Assessment, Duration), the identified Learning Outcomes are written in the column of Learning Competencies.</p>	<p>Students acquaint themselves with the learning outcomes and performance standards and make them their personal goals.</p>	<p>You introduce the learning outcomes to your students and make sure that they understand them and make these learning targets their own.</p> <p>Make these your goals for instruction.</p>
<p><b>2. Performance Standards</b> are referred to as "performance criteria" in the TESDA TR. They are more specific descriptions of the student's behavior that serve as evidence that the expected learning outcomes have been realized with the expected level of proficiency or in accordance with established standards.</p> <p>The learning outcomes and performance standards set the direction of your lessons.</p>	<p>Students clearly understand the performance standards and make them their own learning goals.</p>	<p>You introduce the performance standards to your students and make sure that they understand them and make these performance standards their own.</p> <p>Let these standards give your lesson its specific direction.</p>



K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING**  
**(Exploratory)**

<p>These are what you should teach and, in turn, what you should assess. They are identified and are written for you in the Curriculum Guide.</p>		
<p><b>3. Materials/Resources and References</b> To teach effectively, you need <b>materials</b> and <b>references</b>. Materials may include equipment, hand tools or consumables. The <b>references</b> are the books, magazines, articles, websites you yourself and your students will read or refer to in order to gain greater understanding of the lesson. They are either in soft copy or hard copy.</p>	<p>Get to know the materials. They are part of the Lesson.</p> <p>By all means, read the references for lesson mastery.</p>	<p>Prepare the materials you need in advance. For gadget, tool or equipment, it is always wise to prepare, check and try them in advance to ensure that they function when you use them. As the saying goes “forewarned is forearmed.”</p> <p>Be resourceful in the preparation of materials. You are strongly encouraged to use appropriate local materials as substitute for listed materials that are not available.</p> <p>For effective teaching, your lesson preparation should include reading the list of references.</p> <p>Do not limit yourself to the list of references. If you discover good reference material/s, add to the list of references.</p> <p>Introduce the references to your students. Motivate them to read these references as they go through the module for mastery of the lesson.</p>
<p><b>4. The definition of terms and acronyms</b> will help you understand the meaning of key words in your lesson. Defining key words as they are used in your lesson will</p>	<p>Refer to the definition of terms for greater understanding of the lesson.</p>	<p>Remind your students to refer to the definition of terms and acronyms for clearer understanding of the lesson.</p>

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

<p>ensure that the key terms in your lesson mean one and the same for everyone in class and so avoid misunderstanding.</p>		
<p><b>5.</b> The section “<b>What Do You Already Know</b>” is intended to determine entry knowledge and skills of your students to find out if you have to teach the lesson, teach some parts of the lesson or skip it entirely because your students already know it. This is done by way of a pretest.</p>	<p>Take the test honestly.</p> <p>Check answers against the answer key provided.</p>	<p>Tell your students to accomplish the pretest. Explain that the purpose of the pretest is to find out how much they already know about the lesson in order to determine your next steps. It is, therefore, necessary that they take the test honestly, if they want to learn or want to be helped.</p> <p>Make it clear to them that their scores will not be recorded for grading purposes and will not be taken against them.</p> <p>If you find out that your students already know what you are about to teach, logic dictates that you do not need to teach it anymore. You may as well proceed to the next lesson. If, however, you find out that they do not yet know what you are about to teach, then by all means teach. Or if you discover that your students have some erroneous concepts, then teach and correct their misconceptions. To know what your students already know and do not yet know will guide you in adjusting your instruction.</p>
<p><b>6.</b> “<b>What Do You Need To Know?</b>”- This section contains one or more Information Sheets and for some modules an Operation Sheet. These are important notes for the TLE student to read after which he/she is asked to do a Self-check to</p>	<p>Read and understand the Information Sheet/s and /or Operation Sheet.</p> <p>Be prepared For a Self-check which serves as a posttest.</p>	<p>Make sure students are engaged in reading the Information Sheet/Observation Sheet and in answering the self-check.</p> <p>Give assistance to your students where needed.</p>

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

determine how much he/she has learned. The self-check functions as a pretest.	Correct answers by referring to the answer key.	
<b>7. “How Do You Apply What You Learned?”</b> - In this section, you give your student the opportunity to transfer what he/she has learned in another activity or in real life situation. Ideally, this should be a performance test, what you usually call practical test. If “the proof of the pudding is in the eating”, then your student must be able to apply what she/he learned in real-life setting or must be able to come up with a product as an evidence of learning.	Do the Activity.  To determine level of performance, use the scoring rubrics or check answers against the answer key, which ever is applicable.  Reflect on assessment results.	Find a way to test real life application of what your students have learned.  Do not hesitate to use ways of determining how your students can apply learned facts and concepts which are more authentic and realistic than that/those given in the Module.  Reflect on assessment results. Use assessment results in planning your instruction.
<b>8. How Do You Extend Your Learning?</b> - As the word implies, this activity is done outside class hours for enrichment purposes. This can reinforce lesson mastery.	Do the task assigned outside class hours.	Motivate the students to do the task by making clear what the enrichment activity is about -why it is given, how it is done, how it relates to the class lesson .

**Reflection**

It is a good habit to reflect on your teaching for the day - what went well, what did not go well, why this activity went well with this group, why it didn't work well with the other group. What are your realizations? What are lessons learned? Jot them down in your diary. Commit them to your memory. If you do this consistently, you will find your delivery improve substantially.

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

**Curriculum Guide for the Exploratory Course**

For you to get a complete picture of the complete TLE exploratory course on MECHANICAL DRAFTING, you are hereby provided with the Curriculum Guide on Mechanical Drafting .

Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
<b>LESSON 1: PREPARING DRAFTING MATERIALS AND TOOLS/DRAWING INSTRUMENTS</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Types and uses of drafting materials /tools and drawing instruments</li> <li><input type="checkbox"/> Proper manipulation of drafting materials tools and drawing instruments</li> </ul>	<ol style="list-style-type: none"> <li>1. Drafting materials, Tools and Drawing instruments are identified as per job requirements.</li> <li>2. Materials and drawing tools are classified according to their uses.</li> </ol>	<p>LO1. Identify drafting materials and tools/drawing instruments applicable to a specific job.</p>	<ol style="list-style-type: none"> <li>1. Compiling sample pictures of the different tools and drawing materials and classifying them.</li> <li>2. Demonstrating the proper manipulation of drawing instruments.</li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Performance test</li> <li><input type="checkbox"/> Written test</li> </ul>	6 hours
<ul style="list-style-type: none"> <li><input type="checkbox"/> Procedures in receiving and storing tools and materials</li> <li><input type="checkbox"/> Different requisition forms and procedures</li> </ul>	<ol style="list-style-type: none"> <li>1. Materials and tools are received and inspected based on the specified quantity as requisition.</li> <li>2. Tools and materials are checked for damages and manufacturing defects</li> </ol>	<p>LO2. Request, receive, inspect and store drafting materials and tools.</p>	<ol style="list-style-type: none"> <li>1. Preparing list of drafting materials and tools per job requirement</li> <li>2. Filling-up different forms such as requisition slip, borrower's slip, etc.</li> <li>3. Labeling tools and materials and storing/safekeeping them properly.</li> <li>4. Testing the functionality of delivered tools and</li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Performance test</li> <li><input type="checkbox"/> Written test</li> </ul>	3 hours

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
			materials.		
<b>LESSON 2: PERFORMING BASIC MENSURATION AND CALCULATION</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Different measuring instruments and their application</li> </ul>	<ol style="list-style-type: none"> <li>1. Measuring instruments are selected and used according to the level of accuracy required.</li> <li>2. Measurements taken are accurate to the finest gradation of the selected measuring instrument.</li> <li>3. Measuring techniques used are correct and appropriate to the instrument used.</li> </ol>	LO1. Select and use measuring instruments.	<ol style="list-style-type: none"> <li>1. Identifying the different measuring instruments</li> <li>2. Observing proper use of measuring instruments</li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Self-paced learning activities</li> <li><input type="checkbox"/> Guided demonstration (performance based)</li> </ul>	6 hours
<ul style="list-style-type: none"> <li><input type="checkbox"/> Cleaning and storing procedure for measuring instruments</li> </ul>	<ol style="list-style-type: none"> <li>1. Measuring instruments are cleaned in accordance with established standards.</li> <li>2. Measuring instruments are stored in accordance with established standards.</li> </ol>	LO2. Clean and store measuring instruments.	<ol style="list-style-type: none"> <li>1. Storing/safe keeping measuring tools properly</li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Performance test</li> </ul>	2 hours
<ul style="list-style-type: none"> <li><input type="checkbox"/> Conversion of fraction to decimal or decimal to fraction</li> </ul>	<ol style="list-style-type: none"> <li>1. Conversion results of fraction to decimal are accurate up to 2 decimal places.</li> <li>2. Conversion results of decimal</li> </ol>	LO3. Convert fraction to decimal and vice versa	<ol style="list-style-type: none"> <li>1. Solving problems and exercises correctly in:                             <ol style="list-style-type: none"> <li>a. converting fraction to decimal or decimal to</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Written test</li> </ul>	2 hours

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
	to fraction are accurate to the nearest standard measurement		fraction		
<input type="checkbox"/> Trade Mathematics and Measurement <input type="checkbox"/> Two system of measurements <input type="checkbox"/> Conversion of units of linear measurement.	1. English and metric measurements identified. 2. Conversion of English to metric system or metric to English system is performed according to standard procedure.	LO4. Convert English to metric measurement system and vice versa	1. Solving problems and exercises correctly. 2. Converting units of linear measurement. 3. Converting decimal to fraction	<input type="checkbox"/> Written test	2 hours
<b>LESSON 3: INTERPRETING WORKING PLANS AND SKETCHES</b>					
<i>Demonstrate understanding of/on:</i>  <input type="checkbox"/> Alphabet of lines <input type="checkbox"/> Line Sketching <input type="checkbox"/> Theories and principles of orthographic projections <input type="checkbox"/> Orthographic Projections <input type="checkbox"/> Pictorial drawing <input type="checkbox"/> More on Oblique Drawing <input type="checkbox"/> Scaling <input type="checkbox"/> Rules in Dimensioning <input type="checkbox"/> Preparation of Working Plans <input type="checkbox"/> Assembly and detailed drawing	1. Orthographic and pictorial drawings are interpreted according to drawing standards. 2. Assembly and detailed drawings are interpreted according to drawing standards.	LO1. Identify assembly and detailed drawing.	1. Practicing line sketching 2. Sketching sample detail and assembly drawings 3. Observing drawing standards 4. Sketching orthographic views and pictorial views 5. Preparing a working plan 6. Identifying proper line applications	<input type="checkbox"/> Written test <input type="checkbox"/> Performance test	13 hours

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
<b>LESSON 4: APPLYING SAFETY PRACTICES</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Occupational safety standards and enterprise safety policies.</li> <li><input type="checkbox"/> Practicing Proper Procedures in using drafting tools, materials and instrument</li> <li><input type="checkbox"/> Keeping Workplace Clean and organized following 5S</li> <li><input type="checkbox"/> Accident Prevention Signs and Symbols</li> <li><input type="checkbox"/> Hazards in the workplace</li> <li><input type="checkbox"/> Types of workplace hazards and examples</li> </ul>	<ol style="list-style-type: none"> <li>1. Hazards are identified correctly in accordance with OHS procedures.</li> <li>2. Safety signs and symbols are identified and adhered to in accordance with workplace safety procedures.</li> </ol>	<p>LO1. Identifying hazardous area</p>	<ol style="list-style-type: none"> <li>1. Observing safety work habits in the work place</li> <li>2. Multimedia presentation</li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Written test</li> <li><input type="checkbox"/> Performance test</li> </ul>	<p>4 hours</p>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Personal protective equipment (PPE) for different drafting operations</li> </ul>	<ol style="list-style-type: none"> <li>1. Personal protective clothing/equipment (PPE) identified per job requirements.</li> <li>2. Proper wearing of PPE is properly observed in accordance with workplace safety policies.</li> </ol>	<p>LO2. Use personal protective clothing and devices</p>	<ol style="list-style-type: none"> <li>2. Familiarizing oneself with the different types and uses of personal protective equipment (PPE)</li> <li>3. Multimedia presentation</li> </ol>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Written test</li> <li><input type="checkbox"/> Actual demonstration</li> </ul>	<p>2 hours</p>
					<p><b>40 hours</b></p>

**INDUSTRIAL ARTS - MECHANICAL DRAFTING  
(Exploratory)**

“By three methods we may learn wisdom: First, by reflection, which is noblest; second, by imitation, which is easiest; and third by experience, which is the bitterest.”

**- Confucius**