MNE2020: ENGINEERING WORKSHOP PRACTICE

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Engineering Workshop Practice

Subject Code
MNE - Mechanical Engineering
Course Number
2020

Academic Unit
Mechanical Engineering (MNE)

College/School
College of Engineering (EG)

Course Duration
Non-standard Duration

Other Course Duration
Minimum One Semester or Summer Term

Credit Units
0

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Additional Information

This course is exclusively designed for students who do not have any experience in engineering workshop practices. (Students who have HD or AD and relevant experience in workshop practices may be granted waiver or exempted from taking this course).

Part II Course Details

Abstract

Through a number of structured practical training modules, this course is designed to provide students with an opportunity to understand and appreciate the practical skills required in a modern engineering workshop, including the selection and operation of some traditional workshop tools and machines, as well as the more modern CNC machines, additive manufacturing systems and reverse engineering equipment.

Upon successful completion of the course, students are expected, under the supervision of technical staff, to be able to fabricate some simple engineering parts by operating traditional workshop machine tools such as lathes, milling machines and drilling machines, as well as modern manufacturing systems such as CNC milling machines, 3D printers and 3D scanners.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Use hand tools, marking and measuring devices to prepare a typical workpiece for machining and in a safe manner.			x	
2	Operate conventional drilling machine to produce holes with required roundness and fitness, and in a safe manner.			x	
3	Operate conventional lathe to fabricate simple engineering parts to the required dimension and tolerance and in a safe manner.			x	
4	Operate conventional milling machine to fabricate simple engineering parts to the required dimension and tolerance and in a safe manner.			x	
5	Report and present the results in a professional manner.			x	

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Orientation	Brief explanation about the overall workshop training programme, characteristics of the materials, tools and equipment and their importance in manufacturing engineering components/ parts, safety issues that are of high importance, procedures to be followed to create and work in a safe environment.	1, 2, 3, 4, 5	39 contact hours (3.5 hours / session / week in ONE semester)
2	Practices on engineering hand tools	Introducing the safe use of various hand tools that are typically used in a production shop and hands-on practice by the student.	1, 5	
3	Practice on drilling operation	Use of bench-top drilling machine for producing holes in workpieces of different materials in a safe manner.	2, 5	
4	Practice on lathe and milling operation to fabricate engineering parts	A series of sessions that involves learning the use of a conventional lathe and a milling machine, their capabilities and limitations, and safe operational practices for producing simple engineering parts that could be fitted to accomplish an engineering function in a product.	3, 5	

5	Practice on using the latest CNC machines, additive manufacturing systems and reverse engineering equipment to fabricate engineering parts	A series of sessions that involves learning the use of a CNC machine, a 3D Scanner, a 3D printer, CAD/CAM software and STL editing software, their capabilities and limitations, and safe operational practices for producing simple engineering parts that could be fitted to accomplish an engineering function in a product.	4, 5	

Additional Information for LTAs

Remarks: *indirectly

Orientation: **(CILO No. 1*, 2*, 3*, 4*, 5*)**

Practices on engineering hand tools: **(CILO No. 5*)**

Practice on drilling operation: **(CILO No. 5*)**

Practice on lathe and milling operation to fabricate engineering parts: **(CILO No. 5*)**

Practice on using the latest CNC machines, additive manufacturing systems and reverse engineering equipment to fabricate engineering parts: **(CILO No. 5*)**

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Short quizzes^	1, 2, 3, 4	30	5 quizzes covering the scope of different training modules; students are required to pass all 5 quizzes.	No
2	Logbook^	5	30	12 reports, including two assignments on lathes and milling machines to be submitted on a weekly basis	Yes
3	Safety of Operations and Quality of the parts machined^	1, 2, 3, 4	40	-	No

Continuous Assessment (%)

100

Additional Information for ATs

^ For a student to pass this professional training course, student must complete all parts of the training and pass all the assessed components. Students who have not completed the training module are not allowed to take the related assessment components.

Assessment Rubrics (AR)

Assessment Task

1. Short quizzes

Criterion

Exhibit knowledge related to the use of appropriate tools and techniques towards obtaining the part features and safety aspects of the machine tools used.

Pass (P)

Able to answer correctly at least 50% of the questions of each quiz; students are required to pass all 5 quizzes in order to pass this assessment component.

Failure (F)

Unable to answer correctly at least 50% of the questions of each quiz.

Assessment Task

2. Logbook

Criterion

Describe the operational principles and applications of two major machine tools, lathe and vertical milling machine. Accurate reflection of all the training exercises carried out, important tools, techniques and safety features involved, progress of the work towards accurately obtaining the features of machined parts.

Pass (P)

Able to submit the logbook on time with reasonably accurate descriptions of all the training exercises.

Failure (F)

Unable to submit the logbook on time and to provide acceptable descriptions of the training exercises.

Assessment Task

3. Safety of Operations and Quality of the parts machined

Criterion

Surface finish and accuracy of the part(s) produced.

Pass (P)

Able to produce parts safely with acceptable surface finish and accuracy.

Failure (F)

Unable to produce parts safely with acceptable finish and accuracy.

Additional Information for AR

Note: ^ For a student to pass this professional training course, student must complete all parts of the training and pass all the assessed components. Students who have not completed the training module are not allowed to take the related assessment components.

Part III Other Information

Keyword Syllabus

In this course, students shall have chance to work on the following subject areas.

- Use and practice on hand tools and small bench-top machines including files, drills, taps, etc.
- Use and practice on measuring devices including calibre, micro-meter, gauges.
- Use and practice on conventional lathe for typical operations including turning, facing, chamfering, parting, drilling, etc.
- Use and practice on conventional milling machine for typical operations including pocketing, end-mill, face-mill, etc.
- Use and practice on CNC machine and CAD/CAM software, including 3D CAD design, tool path generation and GCode programming.
- Use and practice on 3D Scanner, STL editing software and 3D printer.

Reading List

Compulsory Readings

	Title
1	There are no specified compulsory readings for this training course. Students can select any books or other type of literature that would enhance their understanding of the manufacturing techniques and machines that are used in training. The resource listed under “Additional Readings” will be able to provide basic knowledge to do well in training and preparation of the logbook.

Additional Readings

	Title
1	A. Roberts and S. Lapidge, “Manufacturing Processes”, McGraw Hill. Or Any other books covering basic manufacturing processes and engineering workshop training, 2000 or later editions.