DURHAM COLLEGE
SUCCESS MATTERS

School of Science & Engineering Technology

Manufacturing Sciences

2021-22 Academic Year

Program	Year	Semester
SET-Mechanical Engineering Technician	1	1
SET-Mechanical Engineering Technology	1	1
SET-Electromechanical Engineering Technology	1	2

Course Code:	MANF 1131	**Course Equiv. Code(s):**	TFBM 2104
Course Hours:	56	**Course GPA Weighting:**	4
Prerequisite:	N/A		
Corequisite:	N/A		
Laptop Course:	**Yes** [ ] **No** [X]		
Delivery Mode(s):	**In class** [X] **Online** [X] **Hybrid** [ ] **Correspondence** [ ]		

Pandemic remote teaching delivery mode	[ ]	**Fully asynchronous**	[X]	**Combined asynchronous and synchronous**	
Remote proctoring required	**Yes** [ ]	**No** [X]			
Authorized by (Dean or Director):	Rebecca Milburn	**Date:**	May 2021		

Prepared by		
First Name	**Last Name**	**Email**
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Course Description:

This course is designed to give the Student a fundamental, entry-level introduction to some of the many varied processes utilized in a conventional machine/fabrication shop. Student will also apply some of this theoretical information while performing safe, effective operation of hand and machine tools by practical demonstration within a "shop" environment. Safety will be an integral, on-going topic.

Campus Closure Notice

In the event of a campus closure during which time classes cannot be conducted or attended in person, course delivery will be conducted remotely where possible. Should teaching and learning resume on campus, students may be organized into smaller groups for classroom delivery, in accordance with directions from public health authorities. In either situation, the learning plan sequence and/or evaluation methods may be adjusted to address topics requiring hands-on, practical learning activities.

Subject Eligibility for Prior Learning Assessment & Recognition (PLAR):

Prior Learning Assessment and Recognition (PLAR) is a process a student can use to gain college credit(s) for learning and skills acquired through previous life and work experiences. Candidates who successfully meet the course learning outcomes of a specific course may be granted credit based on the successful assessment of their prior learning. The type of assessment method (s) used will be determined by subject matter experts. Grades received for the PLAR challenge will be included in the calculation of a student's grade point average.

The PLAR application process is outlined in http://www.durhamcollege.ca/plar. Full-time and part-time students must adhere to all deadline dates. Please email: PLAR@durhamcollege.ca for details.

PLAR Eligibility

Yes [X] **No** [ ]

PLAR Assessment (if eligible):

- [ ] Assignment
- [ ] Exam
- [ ] Portfolio
- [ ] Other

Course Learning Outcomes

Course Learning Outcomes contribute to the achievement of Program Learning Outcomes for courses that lead to a credential (e.g. diploma). A complete list of Vocational/Program Learning Outcomes and Essential Employability Skill Outcomes are located in each Program Guide.

Course Specific Learning Outcomes (CLO)

Student receiving a credit for this course will have reliably demonstrated their ability to:

CLO1	Apply safe work procedures within the machine shop area.
CLO2	Interpret relevant documentation necessary for the fabrication of components.
CLO3	Describe and demonstrate the principles of measuring fabricated components using rules, calipers, micrometers, & comparators.
CLO4	Describe and demonstrate the principles of setting up and operating a vertical milling machine.
CLO5	Describe and demonstrate the principles of laying out components for machining and forming.
CLO6	Describe and demonstrate the principles of setting up and operating a lathe.
CLO7	Describe and demonstrate the principles of setting up and operating a surface grinder.

Essential Employability Skill Outcomes (ESSO)

This course will contribute to the achievement of the following Essential Employability Skills:

- [ ] EES 1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
- [X] EES 2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.
- [X] EES 3. Execute mathematical operations accurately.
- [X] EES 4. Apply a systematic approach to solve problems.
- [X] EES 5. Use a variety of thinking skills to anticipate and solve problems.
- [ ] EES 6. Locate, select, organize, and document information using appropriate technology and information systems.
- [ ] EES 7. Analyze, evaluate, and apply relevant information from a variety of sources.
- [ ] EES 8. Show respect for the diverse opinions, values, belief systems, and contribution of others.
- [X] EES 9. Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.
- [X] EES 10. Manage the use of time and other resources to complete projects.
- [X] EES 11. Take responsibility for one's own actions, decisions, and consequences.

Evaluation Criteria:

The Course Learning Outcomes and Essential Employability Skills Outcomes are evaluated by the following evaluation criterion.

Evaluation Description	Course Learning Outcomes	EESOs	Weighting
Quiz: Quizzes (12 @ 1%)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7	EES2, EES3, EES4, EES5, EES9, EES10, EES11	12
Lab Activity: Milling machine - manufacture block type project parts	CLO1, CLO2, CLO3, CLO4, CLO5	EES2, EES3, EES4, EES5, EES9, EES10, EES11	14
Lab Activity: Lathe - manufacture round project parts	CLO1, CLO2, CLO3, CLO5, CLO6, CLO7	EES2, EES3, EES4, EES5, EES9, EES10, EES11	14
Exam: Week 7 Mid-Term Assessment	CLO1, CLO2, CLO3, CLO4, CLO5	EES2, EES3, EES4, EES5, EES9, EES10, EES11	30
Exam: Week 14 Final-Term Assessment	CLO1, CLO2, CLO3, CLO5, CLO6, CLO7	EES2, EES3, EES4, EES5, EES9, EES10, EES11	30
Total			**100%**

Notes:

1. To successfully pass this course, the student is required to achieve a minimum average mark of 50% or higher for Week 7 Mid-Term and Project Assessment and a minimum average mark of 50% or higher for Week 14 Final-Term and Project Assessment. Inability to do so will result in a failing grade!

Required Text(s) and Supplies:

1. Machining Fundamentals handbook 10th edition by John R. Walker & Bob Dixon (publisher: Goodheart-Willcox)

Recommended Resources (purchase is optional):

1. 6" steel rule with fractional inch graduations to 1/64" and metric graduations to .5mm.
2. Dial or digital caliper with a measuring range of at least 6" with .001" graduations (dial) or 3 decimal places (digital).
3. Outside micrometer with a measuring range from zero to 1" with .001" graduations.
4. Consult your teacher as to what would be considered good quality for the items listed above.
5. CSA approved safety glasses (available in the bookstore). For students that wear prescription glasses: protective side shields.
6. CSA approved safety shoes.

Policies and Expectations for the Learning Environment:

General Policies and Expectations:

General College policies related to	General policies related to
+ Acceptable Use of Information Technology + Academic Policies + Academic Honesty + Student Code of Conduct + Students' Rights and Responsibilities can be found on-line at http://www.durhamcollege.ca/academicpolicies	+ attendance + absence related to tests or assignment due dates + excused absences + writing tests and assignments + classroom management can be found in the Program Guide (full time programs only) in MyCampus http://www.durhamcollege.ca/mycampus/

Course Specific Policies and Expectations:

COURSE DELIVERY:

Students assigned to the milling module of the course will participate in Weeks: 1~7
At the end of week 7, you will then participate in Weeks: 8~14 the turning/grinding module.

Students assigned to the turning/grinding module of the course will participate in Weeks 8~14
At the end of week 14, you will then participate in Weeks: 1~7 the milling module.

CLASS TIMES:

Theory classes will start ten minutes past the hour, ending on the hour.

Practical classes will start ten minutes past the hour, ending ten minutes before the last hour. This last ten minutes will be used for cleaning of equipment, returning tools, etc.

No additional Practical shop time will be available outside regularly scheduled classes without approval.

BEHAVIOUR:

Students are expected to conduct themselves in a manner that respects the right of their peers and the teacher to learn and work in an environment that is safe and free from distraction.

The use of cell phones during either Theory or Practical classes is not permitted.

The wearing of CSA approved safety glasses (wearers of prescription glasses: side shields) is a legal requirement not optional while working in the machine shop area.

No student must vacate the practical class before the scheduled end time without first notifying their teacher. The teacher is accountable for the student's safety and his or her's whereabouts in the shop area.

At the discretion of the teacher, students not meeting the above standards may be asked to leave the classroom or shop area.

ATTENDANCE

This subject is primarily practical in nature and conducted in a lab. Regular attendance is critical for success and the student is expected to attend all classes. When absent, the student will miss important lectures, quizzes, and teacher contact time. If the student is absent from class, it is his/her responsibility to catch up on missed work prior to the next class.

On a week to week basis you will be required to attend the one lecture in order to gain access to your lab class for that week.

Unless you have evidence to support your absence from the lecture, you will be denied access to the lab class!

Attendance will be taken at the beginning of the lecture, this information will be forwarded to your lab teacher.

These lectures are critical for the safety of yourself, your fellow students, and teacher!

ASSIGNMENTS

Assignments will require completion on a regular basis (see topical outline), to facilitate the student's understanding of the course material covered/contact time with the teacher. Assignments must be submitted by the due date/time. No assignments will be accepted past the due/date time.

PRACTICAL PROJECT

The college and relevant teachers are not responsible for a student's project assembly/associated components. It is the responsibility of the student to maintain the whereabouts of the their project assembly/associated components. No mark will be awarded for a missing project assembly/associated components.

General Course Outline Notes:

1. Students should use the course outline as a learning tool to guide their achievement of the learning outcomes for this course. Specific questions should be directed to their individual professor.
2. The college considers the electronic communication methods (i.e. DC Mail or DC Connect) as the primary channel of communication. Students should check the sources regularly for current course information.
3. Professors are responsible for following this outline and facilitating the learning as detailed in this outline.
4. Course outlines should be retained for future needs (i.e. university credits, transfer of credits etc.)
5. A full description of the Academic Appeals Process can be found at https://durhamcollege.ca/about/governance/policies/academic-policies .
6. Faculty are committed to ensuring accessible learning for all students. Students who would like assistance with academic access and accommodations in accordance with the Ontario Human Rights Code should register with the Access and Support Centre (ASC). ASC is located in room SW116, Oshawa Campus and in room 180 at the Whitby Campus. Contact ASC at 905-721-3123 for more information.
7. Durham College is committed to the fundamental values of preserving academic integrity. Durham College and faculty members reserve the right to use electronic means to detect and help prevent plagiarism. Students agree that by taking this course all assignments could be subject to submission either by themselves or by the faculty member for a review of textual similarity to Turnitin.com. Further information about Turnitin can be found on the Turnitin.com Web site.

Learning Plan

The Learning Plan is a planning guideline. Actual delivery of content may vary with circumstances.

Students will be notified in writing of changes that involve the addition or deletion of learning outcomes or evaluations, prior to changes being implemented, as specified in the Course Outline Policy and Procedure at Durham College.

Wk.	Hours: 1 Delivery: Online
1	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives Project expectations. Safety.
	Intended Learning Activities Lecture: introduction - project description Lecture: Chapter 3: pages 25~32 Chapter 5: pages 57~69
	Resources and References Machining Fundamentals handbook.
	Evaluation — **Weighting** Quiz: Quizzes (12 @ 1%) — 1%

Wk.	Hours: 3 Delivery: Shop
1	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives Project expectations. Safety.
	Intended Learning Activities Practical: Shop tour.
	Resources and References Machining Fundamentals handbook.
	Evaluation
Wk.	**Hours:** 1 **Delivery:** Online
2	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The milling machine & milling operations.
	Intended Learning Activities Lecture: Chapter 18: pages 297~303 Chapter 19: pages 327~331
	Resources and References Machining Fundamentals handbook.
	Evaluation **Weighting** Quiz: Quizzes (12 @ 1%) 1%

Wk.	Hours: 3 Delivery: Shop
2	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives The milling machine & milling operations.
	Intended Learning Activities Practical: Milling practice component.
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 1 Delivery: Online
3	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The milling machine & milling operations.
	Intended Learning Activities Lecture: Chapter 18: pages 303~310 Chapter 18: pages 316~318
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 3 Delivery: Shop	
3	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	Intended Learning Objectives The milling machine & milling operations.	
	Intended Learning Activities Practical: Milling practice component.	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%)	**Weighting** 1%
Wk.	**Hours:** 1 **Delivery:** Online	
4	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**	
	Intended Learning Objectives The milling machine, milling, & layout operations.	
	Intended Learning Activities Lecture: Chapter 6: pages 85~94	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%)	**Weighting** 1%

Wk.	Hours: 3 Delivery: Shop
4	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives The milling machine, milling, & layout operations.
	Intended Learning Activities Lecture: Chapter 6: pages 85~94 Practical: Milling to length and milling angles.
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 1 Delivery: Online
5	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The milling machine, milling, & drilling operations.
	Intended Learning Activities Lecture: Chapter 12: pages 169~177 Chapter 12: pages 180~186 Chapter 12: pages 190~200
	Resources and References Machining Fundamentals handbook.
	Evaluation **Weighting** Quiz: Quizzes (12 @ 1%) 1%

Wk.	Hours: 3 Delivery: Shop	
5	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:**	**Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives The milling machine, milling, & drilling operations.	
	Intended Learning Activities Practical: Drilling & tapping of holes.	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%)	**Weighting** 1%
Wk.	**Hours:** 1 **Delivery:** Online	
6	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11	**Practiced:**
	Intended Learning Objectives The milling machine & milling operations.	
	Intended Learning Activities Lecture: Chapter 18: pages 319~324	
	Resources and References Machining Fundamentals handbook.	
	Evaluation	

Wk.	Hours: 3 Delivery: Shop	
6	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	Intended Learning Objectives The milling machine & milling operations.	
	Intended Learning Activities Practical: Milling slot, & radii.	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%) Lab Activity: Milling machine - manufacture block type project parts	**Weighting** 1%
Wk.	**Hours:** 1 **Delivery:** Online	
7	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**	
	Intended Learning Objectives Review milling theory assessment. Student evaluation. Completion of the two jaws.	
	Intended Learning Activities Lecture: Review all chapters week 1~6. Question answer period. Theory Assessment.	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%) Lab Activity: Milling machine - manufacture block type project parts	**Weighting** 1%

Wk.	Hours: 3 Delivery: Shop	
7	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO4, CLO5	
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	Intended Learning Objectives Review milling theory assessment. Student evaluation. Completion of the two jaws.	
	Intended Learning Activities Practical: Submission of project for inspection and evaluation (3 hrs).	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Exam: Week 7 Mid-Term Assessment	**Weighting** 30%
Wk.	**Hours:** 1 **Delivery:** Online	
8	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7	
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**	
	Intended Learning Objectives Project expectations. Safety.	
	Intended Learning Activities Lecture: Project assembly. Chapter 3: pages 25~32 Chapter 5: pages 57~69	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%) Lab Activity: Milling machine - manufacture block type project parts	**Weighting** 1%

Wk.	Hours: 3 Delivery: Shop
8	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives Project expectations. Safety.
	Intended Learning Activities Practical: Shop tour.
	Resources and References Machining Fundamentals handbook.
	Evaluation **Weighting** Quiz: Quizzes (12 @ 1%) 1% Lab Activity: Milling machine - manufacture block type project parts
Wk.	**Hours:** 1 **Delivery:** Online
9	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The lathe & turning operations including facing & turning.
	Intended Learning Activities Lecture: Chapter 14: pages 211~220
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 3 Delivery: Shop
9	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives The lathe & turning operations including facing & turning.
	Intended Learning Activities Practical: Turning practice component.
	Resources and References Machining Fundamentals handbook.
	Evaluation
Wk.	**Hours:** 1 **Delivery:** Online
10	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The lathe & turning operations including facing & turning.
	Intended Learning Activities Lecture: Chapter 14: pages 221~227 Chapter 14: pages 235~247 .
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 3 Delivery: Shop
10	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives The lathe & turning operations including facing & turning.
	Intended Learning Activities Practical: Turning screw diameters. .
	Resources and References Machining Fundamentals handbook.
	Evaluation **Weighting** Quiz: Quizzes (12 @ 1%) 1% Lab Activity: Lathe - manufacture round project parts
Wk.	**Hours:** 1 **Delivery:** Online
11	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The lathe & turning operations including threading.
	Intended Learning Activities Lecture: Chapter 16: pages 269~272 Chapter 16: pages 278~285
	Resources and References Machining Fundamentals handbook.
	Evaluation **Weighting** Quiz: Quizzes (12 @ 1%) 1% Lab Activity: Lathe - manufacture round project parts

Wk.	Hours: 3 Delivery: Shop
11	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives The lathe & turning operations including threading.
	Intended Learning Activities Practical: Threading screws.
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 1 Delivery: In Class
12	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives The lathe & turning operations including knurling & grooving.
	Intended Learning Activities Lecture: Chapter 14: pages 227~236 Chapter 15: pages 251~258
	Resources and References Machining Fundamentals handbook.
	Evaluation **Weighting** Quiz: Quizzes (12 @ 1%) 1% Lab Activity: Lathe - manufacture round project parts

Wk.	Hours: 3 Delivery: Shop	
12	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7	
	Essential Employability Skills **Taught:** **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	Intended Learning Objectives The lathe & turning operations including knurling & grooving.	
	Intended Learning Activities Practical: Knurling & grooving screws.	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Quiz: Quizzes (12 @ 1%) Lab Activity: Lathe - manufacture round project parts	**Weighting** 1%
Wk.	**Hours:** 1 **Delivery:** Online	
13	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7	
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	Intended Learning Objectives Layout, component fabrication, & grinding operations.	
	Intended Learning Activities Lecture: Chapter 20: pages 359~372	
	Resources and References Machining Fundamentals handbook.	
	Evaluation	

Wk.	Hours: 3 Delivery: Shop
13	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** **Practiced:**
	Intended Learning Objectives Layout, component fabrication, & grinding operations.
	Intended Learning Activities Practical: Fabrication of clip(optional) & grinding practice component.
	Resources and References Machining Fundamentals handbook.
	Evaluation
Wk.	**Hours:** 1 **Delivery:** Online
14	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7
	Essential Employability Skills **Taught:** EES2, EES3, EES4, EES5, EES9, EES10, EES11 **Practiced:**
	Intended Learning Objectives Review turning/grinding theory assessment. Student evaluation. Completion of clip and two screws.
	Intended Learning Activities Lecture: Review all chapters week 8~13. Question answer period. Theory Assessment
	Resources and References Machining Fundamentals handbook.
	Evaluation

Wk.	Hours: 3 Delivery: Shop	
14	**Course Learning Outcomes** CLO1, CLO2, CLO3, CLO5, CLO6, CLO7	
	Essential Employability Skills **Taught:**	**Practiced:** EES2, EES3, EES4, EES5, EES9, EES10, EES11
	Intended Learning Objectives Review turning/grinding theory assessment. Student evaluation. Completion of clip and two screws.	
	Intended Learning Activities Submission of project for inspection and evaluation (3 hrs).	
	Resources and References Machining Fundamentals handbook.	
	Evaluation Exam: Week 14 Final-Term Assessment	**Weighting** 30%