# **Manufacturing Engineering Technology Minor**

# **Demonstrate Effective Professional Communication Skills**

# **Goal Description:**

Students will develop effective communication skills through written reports, oral presentations, and graphical documents

# Providing Department: Manufacturing Engineering Technology Minor

RELATED ITEMS/ELEMENTS

## **RELATED ITEM LEVEL 1**

# Demonstrate Effective Professional Communication Skills Learning Objective Description:

This course provides an in-depth review of parametric design and drafting using SolidWorks software package. Fundamental concepts, techniques, and tools for developing engineering technical drawings with parametric design incorporated will be discussed. By the end of this course, students will be able to:

- perform basic technical drawing related tasks such as projection and dimensioning
- apply parametric design concepts in developing technical drawing
- develop assembly model and conduct basic analysis such as motion studies
- understand and apply advanced topics and techniques such as sheet metal and stress analysis
- use standard components such as thread and fasteners in modeling and designing processes

# **RELATED ITEM LEVEL 2**

# **Demonstrate Effective Professional Communication Skills**

# **Indicator Description:**

- ETDD4388 3D Parametric Design is a required course for students enrolled in the Manufacturing Engineering Technology minor. This course addresses the development of parametric technical models and engineering drawings
- Students are expected to achieve a 70 or higher on a scale of 100 and standard in which  $90\% \le A$ ,  $80\% \le B < 90\%$ ,  $70\% \le C < 80\%$ ,  $60\% \le D < 70\%$ , F < 60%
- The overall grade for the ETDD4388 3D Parametric Design course is broken down as follows: Assignments and in-class lab activities 70%, midterm and final exams 30%

# **Criterion Description:**

# Homework Assignments

An assignment and popup quiz associated with each learning module published on Blackboard learning management system (LMS) is given to students to assess students' learning and their ability to apply the knowledge to solve practical problems

#### **In-class Activities**

Students perform various in-class activities related to the materials covered during the lectures

#### Midterm and Final Exams

A midterm and a final exam are given to students at the mid and end of the semester correspondingly.

# **Findings Description:**

ETDD 4388 was offered as a Face-to-Face course during Spring 2022 with 23 students enrolled in it. This course introduces students to the SolidWorks Computer-Aided Design (CAD) tool for the development of 3D models, assembly models, and analysis for effective communication of technical details. Ten hands-on assignments addressing students' comprehension of the knowledge and skills to apply the knowledge to develop practical 3D models were given together with two exams to assess students' performance.

The final letter grade distribution is shown below with the table showing the grade distribution of all assignments and exams.

A: 16 students (69.5%)

B: 4 students (17.4%)

C: 2 students (8.7%)

D: 0 students

F: 1 student (4.4%)

Assignmen	tAssignment	02.	Assignmen	itAssignment							
01:	02:	05: Constructive	04: Feature	e 05:	Midterm	Assignmen	tAssignmen	tAssignmer	tAssignment 09:	Assignmen	ıtFinal
Syllabus &	Parametric	Constructive	Manager	Geometric	Exam	06: Part	07: Sheet	08:	Design Analysis	10: Mold	Exam
Getting	Modeling	Geometry	Design	Construction	n[Total	Drawing	Metal	Assembly	with	Design	[Total
Ready	Fundamentals	S S Concepts	Tree [Total	Tools [Total	Pts: 20	[Total Pts:	[Total Pts:	[Total Pts:	SimulationXpres	s[Total Pts:	Pts: 10
[Total Pts:	[Total Pts: 10	Total Dta	Pts: 10	Pts: 10	Score]	10 Score]	10 Score]	10 Score]	[Total Pts: 10	10 Score]	Score]
10 Score]	Score]	$\begin{bmatrix} 10tar \\ Fts. \end{bmatrix}$	Score]	Score]	2500723	3 2508314	2511663	2517708	Score]  2522822	2527983	2539900
2442449	2479621	2484280	2487391	2493503							
10	0 10	) 1(	) 10	0 10	0 20	) 10	)	8 1	0 10	0 0	0 10
10	0 (	) (	)	0 (	0 (	) (	)	0	0	0 0	0 0
10	0 9.5	5 10	) 9.:	5 9.:	5 20	) 10	) 1	0 1	0 10	) 10	0 10
10	0 9	) 10	) 1	0 8	8 20	) 9.5	5	8 1	0 10	) 10	0 9.5
10	0 9.5	5 9.5	5 10	0 10	0 19	) 10	) 10	0	8	8 10	0 9
10	0 8.5	5 9	9 9.	5	9 18.5	5 (	5	7 1	0 10	) 10	0 9
10	0 10	) 1(	) 10	0 10	0 19	) 10	)	9 1	0 10	0 10	0 10

10	9	9.5	9.5	9	18	10	6	10	10	10	9.5
10	9	7.5	8	7.5	19	4	7	8	8	10	9
10	9	10	10	10	20	10	9	10	10	10	9.5
10	9.5	9.5	8	9	19.5	8	6	8	8	10	10
10	9.5	7	8	8	14.5	10	8	8.5	8	7	9
10	9.5	9	10	10	20	6	9	10	10	10	10
10	9.5	9	10	10	20	10	7	10	8	10	9.5
10	7	7	7	7	17.5	6	3	8	8	10	9
10	9.5	10	10	10	19	9	3	10	10	10	9.5
10	9	8	7	7	16	6	7	6	8	10	7
10	9	10	10	10	19.5	10	10	8	10	10	8.5
10	7.5	4	8	7	16	6	2	10	8	0	9
10	7	7	7	7	17	7	0	8	6	0	9.5
10	9.5	9	10	10	18	10	8	9	8	2	9.5
10	9.5	10	9	9	17	9.5	8	10	10	10	9.5
10	9	10	10	8	20	10	8	9.5	10	10	9.5

This assessment shows that the students were performing well using the practical problems for their hands-on exercises.

## **RELATED ITEM LEVEL 3**

# **Action - Professional Communication Skills**

## **Action Description:**

Engineering materials are essential for manufacturing in general. We plan to continue our current practices and adopt new hands-on experiences where the facility and schedule allow so that students will have more opportunities to practice their professional communication skills primarily via technical writing.

# **Demonstrate Knowledge and Skills**

## **Goal Description:**

Students will develop theoretical knowledge and practical skills relevant to manufacturing engineering technology, including engineering graphics, machining technology, manufacturing materials and processes in addition to materials testing

# Providing Department: Manufacturing Engineering Technology Minor

RELATED ITEMS/ELEMENTS

#### **RELATED ITEM LEVEL 1**

#### **Demonstrate Knowledge and Skills**

#### **Learning Objective Description:**

This course introduces engineering materials, such as metals, plastics, and ceramics, used in various industries. The mechanical, thermal, optical, electrical, and magnetic properties of these materials will be discussed. The physical and chemical structure of these materials will also be presented. Students will be able to

- apply fundamental concepts and parameters used to describe the physical properties of various engineering materials to solve practical problems
- apply knowledge of the structure-properties relationship of various engineering materials to explain physical phenomena
- apply knowledge of physical laws and principles that governs the behaviors of materials with application to select engineering materials for various applications
- conduct standard experimental tests to measure and evaluate properties of engineering materials

#### **RELATED ITEM LEVEL 2**

# Demonstrate Knowledge and Skills

# **Indicator Description:**

- ETEC 3367 Engineering Materials Technology is required for students enrolled in the Manufacturing Engineering Technology minor program. This course addresses key concepts and skills relevant to fundamental properties, behaviors, and applications of various engineering materials
- Students are expected to achieve a 70 or higher on a scale of 100 and standard in which <60 = fail,  $60 \sim 69 =$  meet minimum expectations,  $70 \sim 79 =$  satisfied,  $80 \sim 89 =$  good, >=90 excellent. It is expected that 80% of the students evaluated will score 70 or higher
- The overall grade for the ETEC 3367 Engineering Materials Technology is broken down as 50% Chapter assignments, lab activities, and quizzes, 30% midterm and final exams, 20% term project

# **Criterion Description:**

#### Homework Assignments and Quizzes

An assignment and popup quiz associated with each learning module published on the Blackboard learning management system (LMS) is given to students to assess students' learning and their ability to apply the knowledge to solve practical problems

#### **Midterm and Final Exams**

A midterm and a final exam are given to students at the mid and end of the semester correspondingly. The exams are not accumulative.

#### Lab Activities

Students perform various lab activities such as performing standard material tests to help with understanding the fundamental concepts and measuring material properties by analyzing data obtained during these lab activities

#### **Term Project**

Students are required to complete a term project to discuss the development of an engineering material or techniques used for processing, fabrication, or manufacturing of the engineering material they are interested in, and then propose possible future research to further develop the material

#### **Findings Description:**

ETEC 3367 is offered as an in-person course in the Fall 2021 and Spring 2022 semesters, with 15 and 19 students enrolled, respectively. The course address the fundamental properties of engineering materials and their applications in various industries. Assignments, Lab demos & data analysis, a term project, and two exams were given as the assessment tool to evaluate students' performance, and the following grade distributions were observed.

Fall 2021:

A: 10 students (66.7%)

B: 3 students (20%)

C: 2 students (13.3%)

and the following is the detailed grade distribution

Assignment 01: Syllabus & Getting Ready [Total Pts: 10 Score]  2272101	t Assignment 02: Introduction [Total Pts: 10 Score]  2272190	Assignmen 03: Atomic Structure of Materials [Total Pts: 10 Score]  2322514	t Assignment 04: Stress and Strain [Total Pts: 10 Score]  2327630	Assignment 05: Tensile Test [Total Pts: 10 Score]  2335630	Assignment 06: Thermal Properties of Materials [Total Pts: 10 Score]  2343293	Assignment 07: Optical Properties of Materials [Total Pts: 10 Score]  2347624	t Midterm Exam [Total Pts: 30 Score]  2349276	Assignmen 08: Electrical Properties of Materials [Total Pts: 10 Score]  2367950	t Term Project: Literature Review [Total Pts: 10 Score]  2367953	Assignment 09: Phase Diagram [Total Pts: 10 Score]  2375891	Assignment 10:1 Bending of Concrete Beam [Total Pts: 10 Score] [2382665	Final Exam [Total Pts: 30 Score] 2395366
10	) 1(	)	) 0	0	0	6.5	22.5	2007900	7 10	0	0	22
10	) 9	) 1(	) 6	8	8.5	7	18	1(	) 10	10	10	20.5
10	) 1(	)	7 0	0	0	6	22	8	3 10	8	8	23.5
10	) 1(	) 9	) 10	10	8.5	8	24.5	1(	) 10	10	10	24
10	) 1(	) 1(	) 10	7	4.5	9	24	10	) 10	10	10	23
10	) 1(	) 1(	) 9	10	10	10	27.5	1(	) 10	10	10	29
10	) 1(	) (	) 0	8	8	7	22	ç	) 10	9	10	18
10	) 1(	) 1(	) 6	7	8.5	10	22.5	1(	) 10	10	7	27
10	) 1(	) 1(	) 6	9.5	8.5	10	15	1(	) 10	10	10	22
10	) 1(	) 1(	) 10	9	8.5	10	24.5	1(	) 10	6	0	25
10	) 1(	) 1(	) 6	8	8	10	24	3	3 10	8	10	23.5
10	) 1(	) 1(	) 10	0	10	10	13	10	) 10	8	8	21.5
10	) 1(	) 1(	) 8	7	0	6	14	3	3 0	8	8	26
10	) 1(	) 1(	) 8.5	9	8	10	23.5	10	) 10	8	In Progress(10.00)	25.5
10	) 1(	) 1(	) 0	9	8	10	25	10	) 10	10	10	26

Spring 2022:

A: 11 students (57.9%)

B: 8 students (42.1%)

and the following is the detailed grade distribution

Accienta	+					Assignment	t	Assignmen	t				
Assignmen		Assignmen	tAssignmen	t .	Assignment	07:	M: 14 arres	08:	Tama	A		Assignmen	t Einel
01: Sec11-1-con P	Assignmen	<sup>11</sup> 03: Atomic	04: Crystal	Assignmen	06: Tensile '	Thermal	France	Electrical	Demor	Assignmen	Assignmen	t11: Cement	Final
Synabus &	1 02:	Structure o	fStructure of	f 1 Stress	Test Data	Properties	Exam	Properties	Paper	09: Phase	10: Plastics	sand	Exam
Getting	Introductio	n Materials	Materials	and Strain	Analysis	of	[ lotal	of	[ lotal	Diagram	[Total Pts:	Concrete	[ lotal
Ready	[ Total Pts:	[Total Pts:	[Total Pts:	[ Total Pts:	[Total Pts:	Materials	Pts: 30	Materials	Pts: 20	[Total Pts:	10 Score]	[Total Pts:	Pts: 30
[ Iotal Pts:	10 Score	10 Score]	10 Score]	10 Score	10 Score]	Total Pts:	Score	[Total Pts:	Score	10 Score	2525498	10 Score]	Score
10 Score	2441098	2478844	2484275	248/145	2491855	10 Score]	2500720	10 Score]	2508261	2515866		2527890	2539901
2441094						2495511		2508254					
10	0 1	0 1	0 10	) 1(	) 10	10	26	10	) 20	) 10	)	7 10	) 28
10	0 1	0 1	0 10	) 10	) 10	8.5	25	10	) 20	) 10	) 10	3 0	3 25
10	0 1	0	9 10	) 10	) 10	10	24	. 10	) 20	) 10	) 10	0 10	) 28
10	0 1	0 1	0 10	) 1(	) 8	10	28	10	) 20	) 10	) 10	0 10	) 25
10	0	8 1	0	7 10	) 7	10	19	1(	) 18	3 10	) 10	0 10	) 24
10	0 1	0 1	0 10	) 8	8 10	5	18	9.5	5 20	) 1(	)	9 10	) 26
10	0 1	0 1	0 10	) 1(	) 8	8	26	5 8	8 18	3	3	8 8	\$ 27
10	0 1	0 1	0 10	) 9	) 9	9	25	9	9 18	3 10	) 10	0 10	) 22
10	0 1	0	8 10	) 7	9	9	22	9	9 20	) (	3	8 2	18
10	0 1	0 1	3 0	3 7	7 7	8	20.5	9	9 20	) (	3 9.:	5 10	) 21
10	0 1	0 1	3 0	3 10	) 9	9.5	25	10	) (	) 10	) 10	0 10	) 25
10	0 1	0 1	0 10	) 8	3 9	10	27		8 20	) 10	) 10	0 10	) 25
10	0	8 1	3 0	3 7	5	8	17.5	8	8 20	) (	3	8 7.5	24
10	0	0 1	0 10	) 9	) 7	4.5	24	. 10	) 20	) (	3 9.:	5 10	23
10	0 1	0 1	0 10	) 1(	) 9	9.5	27	10	) 20	) 10	) 10	0 10	) 24
10	0 1	0 1	0 10	) 9	) 10	9	23	10	) 20	) 10	) 10	0 10	23
10	0 1	0 1	0 9	) (	3 5	6	19.5	8	8 18	3 7.:	5	0 7.5	24
10	0	8 1	3 0	8 8	6	7.5	24.5	5	8 20	) 10	) 9.:	5 8	23
10	0 1	0	9 10	) 9.5	5 9	9	21.5	7.5	5 20	) (	3	9 10	) 23

#### **RELATED ITEM LEVEL 3**

# Action - Knowledge and Skills

# Action Description:

Consider incorporating Additive Manufacturing into the instruction to allow students to build physical prototypes of individual parts and their assembly.

# New Update to Previous Cycle's Plan for Continuous Improvement Item

# Previous Cycle's Plan For Continuous Improvement (Do Not Modify):

This is a new plan for the 2021-2022 assessment cycle. No previous PCI available.

# Update of Progress to the Previous Cycle's PCI:

This is a new plan for the 2021-2022 assessment cycle. No previous PCI available.

# New Plan for Continuous Improvement Item

# **Closing Summary:**

Since this is a new minor, we will continue our practice to continuously solicit feedback from our industrial advisory board (IAB) to improve instructional materials and the curriculum further.