UNIT: 7 PRECISION MEASUREMENT

INTRODUCTION

Course: Foundations of Engineering (ET-FET)

Unit Development Template Annotation

This unit introduces students to practices using significant digits, units of measure, unit conversions, and measurement of power and energy. This unit also introduces students to efficiency ratios.

Grade(s)

- 9-Ninth
- 10-Tenth
- 11-Eleventh
- 12-Twelfth

Time: 10 hours

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Students with disabilities: For students with disabilities, each instructor should refer to the student's IEP to be sure that the accommodations specified in the IEP are being provided within the classroom setting. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation within any given instructional activity or requirement.

STANDARDS

GPS Focus Standards:

ENGR-FET4 – Students will apply mathematics and science to the solution of a technological problem.

(a) Describe the role of mathematics and science in technological development.

(b) Construct a mathematical model for a known technological system.

CTAE-FS-2 – Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-2 – Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

UNDERSTANDING AND GOAL

Unit Understandings, Themes, and Concepts:

Students will learn the methods of calculating simple measurements.

Primary Learning Goals:

How are significant digit practices demonstrated?

How are math models used to solve measurement activities?

How is algebra used to solve single variable equations pertaining to measurement?

What is the proper use of the engineering solution spreadsheet?

BALANCED ASSESSMENT

Assessment Method/Type:

x	Constructed Response		Peer Assessment
x	Combined Methods		Selected Response
	Informal Checks		Self Assessment

Assessment Title:

Questions 1, 2, 3, 4, 5a, and 5b

Description/Directions:

It is recommended that the instructor review the PowerPoint titled Precision Measurement with the class. The PowerPoint is student-interactive using MS Excel in the preparation of spreadsheets solving various equations.

Attachment – Supplemental Resource Title:

PowerPoint: Precision Measurement
Excel Spreadsheets: Conversion Worksheet, Conversion Worksheet Solutions
Document: Precision Measurement Vocabulary

Web Resources:

www.onlineconversions.com
www.efunda.com
http://www.physics.ccsu.edu/LEMAIRE/genphys/virtual_physics_labs.htm - Virtual Physics Lab with virtual measurement tools and formulas.

UNIT PERFORMANCE TASK(S)

Performance Task Title:

Mathematics Models on Excel

Description/Directions:

Students will use the engineering problem solving Excel spreadsheet titled Power & Energy Measurements to solve for measurement equations in power & energy.

Attachment – Supplemental Resource Title:

Excel Spreadsheets: Power & Energy Measurements *(problems 1-5)*

SEQUENCE OF INSTRUCTION AND LEARNING

Sequence of Instruction and Learning:

Step 1: Lead students in a class discussion using the PowerPoint: Precision Measurement.
Step 2: Slides 5-7, lead students in practice of significant digits.

Step 3: Slides 8-10, introduce students to the importance of units. Show students the websites www.onlineconversions.com and www.efunda.com. Show students any other websites you normally use.

Step 4: Conversion Worksheet is assignment 1. Solutions have been provided for you.

Step 5: Distribute the Precision Measurement Vocabulary sheet. Students will use this to define terms and equations.

Step 6: Teachers discretion; have students complete Problems 1, 2, 3, 4, 5a and 5b as a test or class discussion.