



**COURSE OUTLINE : T ED 142**  
**D Credit – Degree Applicable**  
**COURSE ID 001540**  
**Cyclical Review: September 2020**

**COURSE DISCIPLINE :** T ED  
**COURSE NUMBER :** 142  
**COURSE TITLE (FULL) :** Technical Measurements and Calculations  
**COURSE TITLE (SHORT) :** Tech Meas and Calcs

### **CATALOG DESCRIPTION**

T ED 142 covers a practical application of basic measurements and calculations to typical industrial problems and activities. Topics include units of measure and conversions, reading measurement tools and making calculations that are common technical career jobs. Project based hands-on activities in a variety of technical areas such as surveying, manufacturing, electronics, construction, engineering and environmental technology are emphasized. Students' understanding of mathematical concepts are reinforced through contextualized learning and applied technology based projects.

### **CATALOG NOTES**

This course cannot be used to substitute for any college math requirements.

Total Lecture Units: 2.00

Total Laboratory Units: 1.00

**Total Course Units: 3.00**

Total Lecture Hours: 36.00

Total Laboratory Hours: 54.00

Total Laboratory Hours To Be Arranged: 0.00

**Total Contact Hours: 90.00**

**Total Out-of-Class Hours: 72.00**

Recommended Preparation: MATH 90 or equivalent.



**ENTRY STANDARDS**

	Subject	Number	Title	Description	Include
1				None provided	No
2	MATH	90	Intermediate Algebra for BSTEM	Solve absolute value equations and inequalities;	No
3	MATH	90	Intermediate Algebra for BSTEM	solve linear equations and compound inequalities;	No
4	MATH	90	Intermediate Algebra for BSTEM	perform operations with polynomials;	No
5	MATH	90	Intermediate Algebra for BSTEM	simplify complex fractions;	No
6	MATH	90	Intermediate Algebra for BSTEM	perform operations with radical expressions;	No
7	MATH	90	Intermediate Algebra for BSTEM	simplify expressions with rational exponents;	Yes
8	MATH	90	Intermediate Algebra for BSTEM	solve rational equations;	Yes
9	MATH	90	Intermediate Algebra for BSTEM	solve equations with radicals;	No
10	MATH	90	Intermediate Algebra for BSTEM	find the equation of a line parallel or perpendicular to a given line;	Yes
11	MATH	90	Intermediate Algebra for BSTEM	solve a system of linear equations using elimination substitution;	No
12	MATH	90	Intermediate Algebra for BSTEM	solve systems of linear inequalities;	No
13	MATH	90	Intermediate Algebra for BSTEM	find the composition of two functions;	No
14	MATH	90	Intermediate Algebra for BSTEM	solve applied problems;	Yes
15	MATH	90	Intermediate Algebra for BSTEM	solve quadratic equations with real and complex solutions;	No



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16	MATH	90	Intermediate Algebra for BSTEM	find the inverse of a function;	No
17	MATH	90	Intermediate Algebra for BSTEM	use the properties of logarithms to simplify and expand expressions;	No
18	MATH	90	Intermediate Algebra for BSTEM	solve logarithmic and exponential equations;	No
19	MATH	90	Intermediate Algebra for BSTEM	graph parabolas and circles centered at any point.	No
20	MATH	90	Intermediate Algebra for BSTEM	graph functions (linear, quadratic, exponential, logarithmic);	Yes

**EXIT STANDARDS**

- 1 Calculate areas and volumes of various shapes;
- 2 use measurement tools such as rulers, calipers, and multimeters;
- 3 reference industry standards and vocabulary such as pipe schedules;
- 4 graph data from measurement experiments.

**STUDENT LEARNING OUTCOMES**

- 1 demonstrate the use of tools to collect data used in technical calculations;
- 2 apply industry standards to calculate or analyze problems and choose appropriate solution processes;
- 3 characterize and compare systems of units and how they are used in various industries.

**COURSE CONTENT WITH INSTRUCTIONAL HOURS**

	Description	Lecture	Lab	Total Hours
1	Introduction <ul style="list-style-type: none"> <li>• Introduction to technology</li> <li>• Units of measure</li> <li>• International System (SI) and American Standard Units</li> <li>• Reading measurement tools</li> </ul>	3	3	6
2	Piping and plumbing <ul style="list-style-type: none"> <li>• Calculating cross sectional area of pipes</li> <li>• Arithmetic of piping networks</li> <li>• Flow rates</li> <li>• Pipe schedules and standards</li> <li>• Piping materials, measuring mass and densities</li> </ul>	3	5	8



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3	<p>Surveying</p> <ul style="list-style-type: none"> <li>• Calculating elevations</li> <li>• Distances, angles and areas</li> <li>• Precision of instruments</li> <li>• Terminology of surveying</li> <li>• Error calculations</li> </ul>	3	4	7
4	<p>Construction</p> <ul style="list-style-type: none"> <li>• Lumber supply calculations</li> <li>• Measuring, adding and estimating materials</li> <li>• Roofing and flooring estimates</li> <li>• Building code calculations</li> <li>• Measuring and cutting</li> </ul>	3	5	8
5	<p>Machining</p> <ul style="list-style-type: none"> <li>• Standard sizes and tables</li> <li>• Calculating taper angles</li> <li>• End mill speed calculation</li> <li>• Screw Threads</li> <li>• Cutting Speed and Feed</li> <li>• Calculating gear ratios and mechanical advantage</li> <li>• Density of metals</li> <li>• Inspection and statistical analysis in quality assurance</li> </ul>	3	5	8
6	<p>Industrial technology</p> <ul style="list-style-type: none"> <li>• Manufacturing</li> <li>• Calculating efficiency in manufacturing</li> <li>• Welding calculations</li> </ul>	2	4	6
7	<p>Automotive trades</p> <ul style="list-style-type: none"> <li>• Speed and acceleration</li> <li>• Fluid calculations and volumes</li> <li>• Calculating power, compression ratios and volume ratios</li> <li>• Electric and hybrid car comparisons</li> <li>• Electric car voltage, current and power calculations</li> </ul>	3	5	8
8	<p>Electrical and electronics</p> <ul style="list-style-type: none"> <li>• Measuring voltage</li> <li>• Calculation electrical power</li> <li>• Electrical properties</li> <li>• Units in electricity</li> </ul>	3	5	8



9	<b>Energy</b> <ul style="list-style-type: none"> <li>• HVAC load calculations, humidity measurement</li> <li>• Solar power installation calculations</li> <li>• Calculating heat</li> <li>• Temperature measurement</li> </ul>	3	5	8
10	<b>Agriculture</b> <ul style="list-style-type: none"> <li>• Units in agriculture</li> <li>• Calculation of crop yields</li> <li>• Water measurement</li> <li>• Environmental calculations</li> <li>• Calculation of pesticide and fertilizer runoff</li> </ul>	3	4	7
11	<b>Aviation technology</b> <ul style="list-style-type: none"> <li>• Wind speed measurement</li> <li>• Fuel weight and density calculation</li> <li>• Altitude and air temperature relationship</li> <li>• Center of gravity of an aircraft</li> <li>• Pitot tube, pressure measurement and velocity calculation</li> </ul>	3	4	7
12	<b>Environmental sustainability</b> <ul style="list-style-type: none"> <li>• Reading pollution sensors</li> <li>• Calculating pollution accumulations</li> <li>• Environmental and societal issues in technology</li> <li>• Cost benefit comparisons</li> <li>• Water and wastewater treatment</li> <li>• Recycling costs, life-cycle assessment</li> </ul>	4	5	9
				<b>90</b>

**OUT OF CLASS ASSIGNMENTS**

- 1 calculations (e.g. calculate the density of an aluminum block);
- 2 individual project (e.g. measure a room at home and calculate the floor plan area).

**METHODS OF EVALUATION**

- 1 quizzes;
- 2 verbal practicum (e.g. student explains the proper use of a wrench);
- 3 projects (e.g. calculation of the flow rate of water through a pipe);
- 4 final exam.



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**METHODS OF INSTRUCTION**

- Lecture
- Laboratory
- Studio
- Discussion
- Multimedia
- Tutorial
- Independent Study
- Collaboratory Learning
- Demonstration
- Field Activities (Trips)
- Guest Speakers
- Presentations

**TEXTBOOKS**

<b>Title</b>	<b>Type</b>	<b>Publisher</b>	<b>Edition</b>	<b>Medium</b>	<b>Author</b>	<b>ISBN</b>	<b>Date</b>
Mathematics for the Trades: A Guided Approach	Required	Pearson	11	Print	Robert A. Carmen	9780134756967	2019