

SAN DIEGO COMMUNITY COLLEGE DISTRICT  
CONTINUING EDUCATION  
COURSE OUTLINE

**SECTION I**

**SUBJECT AREA AND COURSE NUMBER**

DIES 401

**COURSE TITLE**

MEASURING TOOLS AND APPLIED MATHEMATICS

**TYPE COURSE**

NON-FEE

VOCATIONAL

**CATALOG COURSE DESCRIPTION**

Students learn how to care for and use precision measuring tools and common shop measuring tools. They also learn industry- standard mathematical concepts and applications as related to the diesel maintenance industry. (FT)

**LECTURE HOURS**

18

**LABORATORY HOURS**

54

**ADVISORY**

Completion of or concurrent enrollment in DIES 400

**RECOMMENDED SKILL LEVEL**

NONE

**INSTITUTIONAL STUDENT LEARNING OUTCOMES**

1. Social Responsibility  
SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication  
SDCE students demonstrate effective communication skills.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

3. Critical Thinking  
SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development  
SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self-advocacy skills to cope with changing situations in their lives.

COURSE GOALS

To provide classroom instruction in the operational theory of equipment maintenance and service for today's diesel-powered highway trucks, off-road heavy equipment, and stationary engines; to enhance the students' reading, writing, math and communication skills so they may interact successfully with employers and customers; and to provide work experience in a simulated work environment representative of those encountered in the diesel powered equipment industry today.

COURSE OBJECTIVES

Upon successful completion of the course the student will be able to:

1. Solve arithmetic problems in the customary and metric measurement systems
2. Solve common measuring problems related to diesel technology
3. Differentiate the fundamental principles of the inch and metric measuring systems
4. Describe the proper use of inch and metric torque wrenches
5. Describe the proper use of feeler gauges
6. Describe the proper use of screw pitch gauges
7. Describe the proper use of straight edges
8. Describe the proper use of a 6-inch steel rule; demonstrate the manipulative skills necessary for its correct use
9. Describe the proper use of an outside micrometer; demonstrate the manipulative skills necessary for its correct use
10. Describe the proper use of a depth micrometer; demonstrate the manipulative skills necessary for its correct use
11. Describe the proper use of an inside micrometer; demonstrate the manipulative skills necessary for its correct use
12. Describe the proper use of general dial indicators; demonstrate the manipulative skills necessary for their correct use
13. Describe the proper use of special purpose dial indicators; demonstrate the manipulative skills necessary for their correct use
14. Describe the proper use of vernier calipers; demonstrate the manipulative skills necessary for their correct use
15. Describe the proper use of dial calipers; demonstrate the manipulative skills necessary for their correct use

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16. Describe the proper use of analog test gauges; demonstrate the manipulative skills necessary for their correct use
17. Describe the proper use of digital test gauges; demonstrate the manipulative skills necessary for their correct use
18. Demonstrate the manipulative skills needed to read micrometers
19. Demonstrate the manipulative skills needed to read dial indicators
20. Evaluate and record the condition of a diesel crankshaft
21. Calculate the depth-of-cut for cylinder block counterbores.

## **SECTION II**

### **COURSE CONTENT AND SCOPE**

The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

1. Measuring systems
  - 1.1. Inch
  - 1.2. Metric.
2. Calculator functions
  - 2.1. Addition
  - 2.2. Subtraction
  - 2.3. Multiplication
  - 2.4. Division.
3. Torque wrenches
  - 3.1. Function
  - 3.2. Uses
  - 3.3. Care and maintenance.
4. Feeler gauges
  - 4.1. Function
  - 4.2. Uses
  - 4.3. Care and maintenance.
5. Screw pitch gauges
  - 5.1. Function
  - 5.2. Uses
  - 5.3. Care and maintenance.
6. Straight edges
  - 6.1. Function
  - 6.2. Uses
  - 6.3. Care and maintenance.
7. Six-inch steel rule
  - 7.1. Function
  - 7.2. Uses
  - 7.3. Care and maintenance
  - 7.4. Usage.
8. Outside micrometer
  - 8.1. Function
  - 8.2. Uses

COURSE CONTENT AND SCOPE (CONTINUED)

- 8.3. Care and maintenance
- 8.4. Usage
- 9. Depth micrometer
  - 9.1. Function
  - 9.2. Uses
  - 9.3. Care and maintenance
  - 9.4. Usage
- 10. Inside micrometer
  - 10.1. Function
  - 10.2. Uses
  - 10.3. Care and maintenance
  - 10.4. Usage.
- 11. General dial indicators
  - 11.1. Function
  - 11.2. Uses
  - 11.3. Care and maintenance
  - 11.4. Usage.
- 12. Specific dial indicators
  - 12.1. Function
  - 12.2. Uses
  - 12.3. Care and maintenance
  - 12.4. Usage.
- 13. Vernier calipers
  - 13.1. Function
  - 13.2. Uses
  - 13.3. Care and maintenance
  - 13.4. Usage
- 14. Dial indicators
  - 14.1. Function
  - 14.2. Uses
  - 14.3. Care and maintenance
  - 14.4. Usage.
- 15. Analog measuring tools
  - 15.1. Function
  - 15.2. Uses
  - 15.3. Care and maintenance
  - 15.4. Pressure gauges
  - 15.5. Vacuum gauges
  - 15.6. Mercury manometer
  - 15.7. Water manometer.
- 16. Digital measuring tools
  - 16.1. Function
  - 16.2. Uses
  - 16.3. Care and maintenance
  - 16.4. Tachometer
  - 16.5. Pyrometer.

COURSE CONTENT AND SCOPE (CONTINUED)

17. Micrometer reading
  - 17.1. Inch
  - 17.2. Metric
18. Dial indicator reading
  - 18.1. Inch
  - 18.2. Metric

APPROPRIATE READINGS

Reading assignments are required and may include but, are not limited to, the following:

1. Chapters from course textbook(s)
2. Articles related to diesel repair in professional journals such as Service Tech, Diesel Progress, Commercial Carrier Journal (CCJ), Utility Fleet, Fleet Owner, and Transportation Equipment News
3. Reports, repair manuals, on-line resources, and laboratory guides associated with diesel technology.

WRITING ASSIGNMENTS

Writing assignments are required and may include, but are not limited to, the following:

1. Preparing a shop notebook
2. Writing an crankshaft evaluation report
3. Responding to short essay questions about related topics such as the use and care of precision measuring tools.

OUTSIDE ASSIGNMENTS

Outside assignments may include, but are not limited to, the following:

1. Conducting research
2. Completing all reading and writing assignments, including a shop notebook and a measuring project report
3. Completing field assignments/projects.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Critical thinking assignments are required and may include, but are not limited to, the following:

1. Analyzing methods learned in class and utilizing appropriate methods for completing laboratory tasks
2. Evaluating and recording the condition of a diesel crankshaft
3. Calculating the depth-of-cut for cylinder block counterbores
4. Calculating and solving mathematical problems.

### EVALUATION

A student's grade will be based on multiple measures of performance unless the course requires no grade.

Multiple measures may include, but are not limited to, the following:

1. Performing manipulative skills as needed to complete laboratory assignments satisfactorily
2. Successfully applying theory to laboratory assignments
3. Performing on written and/or practical examinations
4. Performing on out-of-class assignments including a measuring project report
5. Contributing to class discussion Maintaining attendance per current department policy.

### METHOD OF INSTRUCTION

Methods of instruction may include, but are not limited to, the following:

Lecture

Lecture Discussion

Computer Assisted Instruction

Laboratory

Discussion Seminar

Lecture-Lab Combination

Learning Modules

Audio-Visual

Collaborative Learning

Shadowing

Other

1. Demonstration
2. Field trips and/or field assignments.

### TEXTS AND SUPPLIES

Textbooks may include, but are not limited to:

TEXTBOOKS:

*Moore, George. Practical Problems in Math F/Auto Technology, 5th edition, Delmar, 1998, ISBN: 0827379447*

MANUALS:

PERIODICALS:

SOFTWARE:

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TEXTS AND SUPPLIES (CONTINUED)

SUPPLIES:

1. Shop notebook (8 1/2 x 11)
2. Safety glasses
3. Calculator
4. Appropriate clothing and footwear for shop work
5. Scantron answer sheets

PREPARED BY: Jane Signaigo-Cox DATE: April 22, 2008

DATA REVISED BY: Instructional Services, SLOs added DATE: March 8, 2017

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

REFERENCES:

San Diego Community College District Policy 3100  
California Community Colleges, Title 5, Section 55002  
Continuing Education Catalog