



ANTELOPE VALLEY COLLEGE
Academic Affairs
Course Outline of Record

Academic Affairs Only

<input type="checkbox"/>	New Course
<input type="checkbox"/>	Effective Date (for articulation)
<input checked="" type="checkbox"/>	COR Revision 5/13/2010
<input type="checkbox"/>	Pre Req/Advisories
<input type="checkbox"/>	Other Changes
<input checked="" type="checkbox"/>	SLOs 5/27/2008

COURSE SUBJECT & NUMBER: ENGR 130L

COURSE NAME: Materials Science Lab

COURSE UNITS: 1 **COURSE HOURS:** 3 hours weekly

COURSE REQUISITES: *(Follow format of similar courses found in the college catalog.)*

COREQUISITE: concurrent enrollment in ENGR 130 .

COURSE DESCRIPTION: *(Write a short paragraph providing an overview of topics covered. Be sure to identify target audience--transfer, major, GE, degree/certificate, etc. If repeatable, state the number of times at end of description as (R#) .*

A laboratory course designed to accompany ENGR 130 Materials Science. (CSU, AVC)

COURSE OBJECTIVES: *(Title 5 requires that courses show evidence of critical thinking skills. Use Bloom 's taxonomy to formulate concise, performance-based measurable objectives common to all students. Objectives must be closely aligned with course content, assignments, and methods of evaluation)*

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

1. Conduct and interpret data of the following material tests:
 - a. Steel and aluminum in tensile and rockwell hardness tests.
 - b. Steel, aluminum and wood using metallographic and Charpy impact tests.
2. Predict the effects of cold working and recrystallization on steel and aluminum.
3. Create a phase diagram for steel and other materials using heat treatments.
4. Conduct heat treatment of steel and influencing tensile properties effecting semiconductor property.
5. Conduct specialized testing and fabrication of plastic, ceramics and composite materials.
6. Write short technical reports.
7. * Read and apply technical literature to analysis of technical problems.
8. * Listen to technical lectures and apply these lectures to technical problems.

* Denotes SCANS competencies.

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COURSE CONTENT: *(Enter course content in terms of specific topics or a specific body of knowledge that each instructor must cover. Put topics in outline form with major and minor headings. Each instructor must cover all material listed below.)*

- I. Tensile test of steel
- II. Charpy impact tests
- III. Cold working
- IV. Recrystallization
- V. Creating phase diagrams
- VI. TTT Curves
- VII. Hardenability Jominy test
- VIII. Heat treatment of steel
- IX. Semiconductors
- X. Corrosion of metals
- XI. Plastics, composites
- XII. Wood
- XIII. Precipitation hardening in aluminum
- XIV. Report writing techniques

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TYPICAL HOMEWORK ASSIGNMENTS: (Do not include in-class work, quizzes, or tests)

This information is necessary for all credit courses. Assignments should be closely related to course objectives, content, and methods of evaluation. (See sample of a “Model Outline” in the AP&P Standards & Practices Handbook.) Include a range of assignments (minimum of three) from which faculty may choose when designing their syllabus.

1. Describe nature and frequency of typical reading assignments if applicable; note if any are required:

Reading may include approximately 30 pages from the textbook and technical journals.

2. Describe nature and frequency of typical writing assignments if applicable; note if any are required:

Writing assignments may include, but are not limited to, keeping a journal of lab tests and data, plus writing summary lab reports with conclusions.

3. Describe nature and frequency of typical computational assignments if applicable; note if any are required:

Most of the assignments involve calculations utilizing algebra, trigonometry and elementary calculus.

4. Describe other types of homework assignments that students may be asked to complete (oral presentations; special projects; visual/performing arts; etc); note if any are required:

For categories 1-4 above, list the estimated hours per week it would take a student to complete assignments. Title 5 (section 55002) requires that each unit must be shown to require three hours of work per week by the student either in or out of class. Homework formula: 3 hours of class work times each unit of credit minus classroom hours equals required homework hours.

Reading Assignments: 3

Writing Assignments: 5

Computational Assignments: 2

Other Assignments: 0

Course Subject & Number: ENGR 130L
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METHODS OF INSTRUCTION: *(Methods must be consistent with content and appropriate to objectives; state in terms of what instructor will be doing in order to present course content to students: for example, lecture, demonstration, present audio/visual materials; facilitate group work, etc. Do not list specific instructional equipment.)*

Some lecture with laboratory experimentation and work. The latter may involve group work.

METHODS OF EVALUATION: *(These must be clearly related to course objectives and reflect course content and assignments in order to comply with Title 5 requirements. Describe what instructor will be looking for when evaluating various assignments and tests in order to determine whether students have met course objectives. Grades must be based on demonstrated proficiency in subject matter and determined, where appropriate, by essays, objective and essay tests, research papers or projects, problem solving exercises, or skills' demonstrations.)*

Written reports summarizing the lab tests will be evaluated based on the accuracy of the data interpretation, conclusions drawn from data interpretation. Conciseness and quality of the written reports (Objectives 1-8).

Quizzes will be used to verify independent mastery of the learning objectives (Objectives 1-8).

Suggested Texts or Other Instructional Materials

(List several when possible; include title, author, publisher, date, and latest edition. If older than five years, provide brief rationale.)

1. Title: Material Science and Engineering an Introduction, 8th edition
Author: Callister and Rethwisch
Publisher: Wiley, 2010