Linn-Benton Community
College Machine Tool
Technology Course Syllabus

Course name: Material Science

Course number: MA3.437

Credits: 2

Prerequisite: None

Days, Hours: Tuesday 1:00 PM to 2:50 PM

Location: Internet

Instructor: Teryk Morris

Office, office hours: email, text or zoom. Tuesday at 1:00pm

Phone#: 541-246-0435

Email address: teryk.morris@linnbenton.edu

Catalog description: This course investigates the relationships that exist between structures and properties of materials. The study of atomic structure and chemical makeup provides the basis for material classification. The subjects of material bonding forces and crystal structures are explored. Lecture topics include dislocations, strengthening mechanisms, slip systems, phase transformations, and plastic deformation in polycrystalline materials. The mechanical properties of metals are a major focus in the lecture, demonstration and laboratory aspects of this course. Other topics include the applications and processing of metals, ceramics, polymers as well as composites.

Course learning outcomes: Students successfully completing this course will be able to:

- Name property classifications of materials that determine their applicability.
- Apply knowledge of subatomic, molecular, crystal and grain structures to material science.
- Identify materials commonly used in the manufacturing environment and safety/health issues.
- Apply knowledge of chemical composition and phase transformations to the heat treating of iron alloys.

- Perform Rockwell and Brinell hardness tests.
- Read and interpret Material Safety Data Sheets (MSDS).

Learning activities: A series of lectures, instructor demonstrations and focused discussions

Assessment tasks: A student's progress will b evaluated as follows:

- Class participation 10%
- Assignments and Quizzes 60%
- Midterm examination 15%
- Final Project 15%

Course content: The following topics will be covered:

- Subatomic, atomic, micro and macro structures
- Relationship of atomic bonding to metals, ceramics and polymers
- Relationship of metal crystal structures to properties
- Physical properties of materials
- Materials identification
- Hardness testing using Rockwell and Brinell scales
- Metallographic (microscope) examination
- Phase diagrams
- Heat treating including hardening and tempering of various steels
- Laboratory safety and machine shop safe practices
- Material Safety Data Sheets (MSDS) internet information, exposure limits, first aid procedures

Request for Special Needs or Accommodations

Direct questions about or requests for special needs or accommodations to the LBCC Disability Coordinator, RCH-105, 6500 Pacific Blvd. SW, Albany, Oregon 97321, Phone 541-917-4789 or via Oregon Telecommunications Relay TTD at 1-800-735-2900 or 1-800-735-1232. Make sign language

interpreting or real-time transcribing requests 2-4 weeks in advance. Make all other requests at least 72 hours prior to the event. LBCC will make every effort to honor requests.
LBCC is an equal opportunity educator and employer.

LBCC Comprehensive Statement of Nondiscrimination

LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws. For further information see Board Policy BP-1015. Title II, IX, & Section 504: Scott Rolen, CC-108, 541-917-4425; Lynne Cox, T-107B, 541-917-4806, LBCC, Albany, Oregon. To report: http://linnbenton-advocate.symplicity.com/public_report

Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know, or who need special arrangements in an emergency should speak with their instructor during the first week of class. If you believe you may need accommodations but are not yet registered with the Center for Accessibility Resources (CFAR), please visit the CFAR Website for steps on how to apply for services or call 541-917-4789.