

Fall 2019

Materials Science: MEC*K262; CRN (for Electric Boat MDA Program)

Course Text: *Engineering Materials Properties and Selection*, by Budinski, 9th edition
Publisher: Pearson

Course Instructor: Name: Mark Vesligaj
Office: C128
Office Hours: Monday from 12:30 – 1:30 pm **AND** 5:00 – 6:00 pm
Wednesday from 4:15 – 5:15 pm ...
...or by appointment. **Please set appointments in advance.**
Phone: 860 215 9442 (office)
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Course Description:

A study of the structure and properties of engineering materials in which materials selection, processing, and heat treatment are presented. The changes in structure and properties during forming, machining, and heat treating operations will be discussed.

Course Objectives:

The student will be able to:

- Identify major classes of materials, their chemical background and basic properties;
- Understand atomic structure, atomic arrangements and impact on material properties;
- Understand mechanical testing and usefulness in application development;
- Look at product applications and have an understanding of the choices in available materials;
- Develop basic product designs based upon application requirements, available materials and processing techniques.

Special Needs:

Any student in the class who may have special needs should feel free to contact me. I am interested in any situation which may impact your ability to be successful in this course. If you are a student with a disability and you believe you will need accommodations for this class, it is your responsibility to please contact one of the college's Disability Service Providers as soon as possible. Kathleen Gray (860/215-9248) generally works with students who have physical, visual, hearing, medical, mobility, and psychiatric disabilities. Matt Liscum (860/215-9265) also works with students who have disabilities. If you will need accommodations for this class, you must contact the Disabilities Counseling Services. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. *The instructor cannot provide accommodations until an accommodation letter from the Disabilities Counselor is received.* Please see me if you have any questions.

Digication:

All students are required to maintain an online learning portfolio in Digication that uses the college template. Through this electronic tool students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her learning

portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportunities. If desired, students will have the option to create multiple portfolios.

Class Cancellation: In case of inclement weather, check the college website for class cancellations or call 860-215-9000 for recorded message.

MyCommNet Alert: *MyCommNet* is a system that sends text messages and emails to anyone signed up in the event of a campus emergency. Additionally, TRCC sends messages when the college is delayed or closed due to weather. All students are encouraged to sign up for *MyCommNet* Alert. A tutorial is available on the Educational Technology and Distance Learning Students page of the web site.
http://www.trcc.commnet.edu/div_it/educationaltechnology/Tutorials/myCommNetAlert/MIR3.html

BOARD OF REGENTS FOR HIGHTER EDUCATION AND CONNECTICUT STATE COLLEGES AND UNIVERSITIES POLICY REGARDING SEXUAL MISCONDUCT REPORTING, SUPPORT SERVICES AND PROCESSES POLICY

Statement of Policy for Public Act No. 14-11: An Act Concerning Sexual Assault, Stalking and Intimate Partner Violence on Campus:

“The Board of Regents for Higher Education (BOR) in conjunction with the Connecticut State Colleges and Universities (CSCU) is committed to insuring that each member of every BOR governed college and university community has the opportunity to participate fully in the process of education free from acts of sexual misconduct, intimate partner violence and stalking. It is the intent of the BOR and each of its colleges or universities to provide safety, privacy and support to victims of sexual misconduct and intimate partner violence.”

United States Department of Education and Office of Civil Rights Title IX Statement of Policy:

“Title IX of the Education Amendments of 1972 (Title IX) prohibits discrimination based on sex in education programs and activities in federally funded schools at all levels. If any part of a school district or college receives any Federal funds for any purpose, all of the operations of the district or college are covered by Title IX.

Title IX protects students, employees, applicants for admission and employment, and other persons from all forms of sex discrimination, including discrimination based on gender identity or failure to conform to stereotypical notions of masculinity or femininity. All students (as well as other persons) at recipient institutions are protected by Title IX – regardless of their sex, sexual orientation, gender identity, part-or full-time status, disability, race, or national origin-in all aspects of a recipient’s educational programs and activities.”

If any student experiences sexual misconduct or harassment, and/or racial or ethnic discrimination on Three Rivers Community College Campus, or fears for their safety from a threat while on campus, please contact:

Maria Krug, Title IX Coordinator OR Ken Saad, Equity & Diversity Officer
Three Rivers Community College
574 New London Turnpike, Norwich CT 06360
(860) 215-9208, MKrug@trcc.commnet.edu

OR

(860) 215-9319, KSaad@trcc.commnet.edu

Academic Integrity: Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to succeed in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor.

Withdrawal: A student who finds it necessary to discontinue a course must complete a "Withdrawal Request Form" available in the Registrar's office within the time limits of the semester calendar. Students who do not withdraw, but stop attending will be assigned an "UF" which may impact their financial aid status. The last day to withdraw from classes can be found on the Academic Calendar the college website.

Course Components: The following components make up the course structure that will be used for the combined weighted final grade.

Participation: Class participation is a component of this course because of the diverse backgrounds of the students and the importance of collaboration via the Discussion board in the Blackboard course shell. I will post Discussion topics throughout the semester. Each of you will be responsible for posting constructive comments, expanding on the idea, posting additional websites / sources, and encouraging / conducting meaningful discussion. You must participate in this activity to gain credit in this grading component.

Homework: There will be regular homework assignments for this course via the Assignments tool in Blackboard. Homework is expected to be completed and will be graded. The assignments will help pace your though the material and reinforce the chapter's key concepts / prepare you for the exams. It is in your best interest to complete these on time. **Please note that a significant portion of your grade is based on homework** as this content will ensure student engagement and pacing throughout the class.

Research Paper: Each student will complete a materials research paper (1 – 2 pages) on a material, material processing technique, material development, material impact / innovation, e.g. Materials for Green Technologies. The due date for all research papers will be posted on the Blackboard course shell later in the semester, and I will send out reminders via the Messages tool Blackboard. The sooner you get approval, the sooner you can get started. Each student will post their research paper on a "Research Paper Discussion Board" **(please provide attachment in Word format so that everyone can download and keep in for reference in the future).**

Tooling U:* Each student will complete a group of Tooling U classes relating to material science topics. Additionally, each student will complete a review of the Tooling U class experience. I will provide more detail later in the semester when we launch this work.

Exams (2): There will be two scheduled exams throughout the semester.

Final Exam: There will be a cumulative final exam.

Your final average for the course is determined by:

Participation & HW	40%
Research Paper	15%
Tooling U	10%
Exam 1:	10%
Exam 2:	10%
<u>Final Exam:</u>	<u>15%</u>
TOTAL:	100%

**Pending successful grant award. If not awarded / processed in time, there will be no Tooling U and the Participation & HW will increase to 50% in the final average calculation..*

Final Grade Equivalents:

Your final letter grade will be determined according to the following equivalents:

A: 93 – 100, A-: 90 – 92
B+: 87 – 89, B: 83 – 86, B-: 80 – 82
C+: 77 – 79, C: 73 – 76, C-: 70 – 72
D+: 67 – 69, D: 63 – 66, D-: 60 – 62
F: below 60

Course Outline, Exam Schedule, and Module Overview

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Module 1: Chapters 1, 2, 3, 4

Module 2: Chapters 5, 6

Module 3: Chapters 7, 8, 9, 10

Exam#1: Chapters 1 – 10

Module 4: Chapters 11, 12

Module 5: Chapters 13, 14

Module 6: Chapters 15, 16

Module 7: Chapters 17, 18

Exam #2: Chapters 11 – 18

Module 8: Chapters 19, 20

Module 9: Chapters 21

Final Exam (Cumulative): Finals Week

Content / Chapter Summary

- Chapter 1: Importance of Engineering Materials
- Chapter 2: Forming Materials from Elements
- Chapter 3: Chemical and Physical Properties of Engineering Materials
- Chapter 4: Mechanical Properties of Engineering Materials
- Chapter 5: Tribology
- Chapter 6: Corrosion
- Chapter 7: Polymeric Materials
- Chapter 8: Polymer Families
- Chapter 9: Plastic and Polymer Composite Fabrication Processes
- Chapter 10: Selection of Plastic/Polymeric Materials
- Chapter 11: Ceramics, Cermets, Glass and Carbon Products
- Chapter 12: Steel Products
- Chapter 13: Heat Treatment of Steels
- Chapter 14: Carbon and Alloy Steels
- Chapter 15: Tool Steels
- Chapter 16: Stainless Steels
- Chapter 17: Cast Iron, Cast Steel, and Powder Metallurgy Materials
- Chapter 18: Copper and Alloys
- Chapter 19: Aluminum and Alloys
- Chapter 20: Nickel, Zinc, Titanium, Magnesium, and Special Use Metals
- Chapter 21: Surface Engineering