

- I. Instructor: Dr. Peter Filip, A108, email: filip@siu.edu, phone 453-1166**
- II. Department, Number, and Title of Course:**
Mechanical Engineering and Energy Processes, ME 468 (3), Friction Science and Applications
- III. Designation as a 'Required' or 'Elective' Course:**
Elective
- IV. Course (catalog) Description:**
Study of systems and materials used for friction applications with a focus on aerospace and ground transportation vehicles. Course covers theories and experimental methods regarding friction and wear, contact mechanics, friction materials, vibration and noise, thermal transport, thermo-elastic phenomena and environmental and economical aspects of wear and friction. The course approach uses a materials emphasis. Lectures are complemented by exposure to laboratory methods and equipment. Design of a friction component, system, or testing device.
- V. Prerequisite(s):** ME 312 and Senior Standing
- VI. Textbook(s) and/or Other Required Material:**
1. P.J. Blau, Friction Science and Technology, Marcel Dekker, Inc (1996 and later editions), ISBN: 0-8247-9576-8
 2. Bharat Bhushan: Introduction to Tribology, Wiley, ISBN: 0-471-15893-3
 3. Supplemental materials provided by instructors.
- VII. Course Objectives:**
To introduce students to friction related phenomena and applications in transportation vehicles. To gain knowledge of the materials used in these systems. Give an understanding of the analysis of thermal and vibration characteristics of friction systems and methods for assessing friction and wear behavior.
- VIII. Topics Covered:**
1. Introduction to Friction (P. Filip)
 2. Wear and Environment - Testing Concepts Surfaces, Interfaces and Wear Particulates (P. Filip)
 3. Friction Materials (P. Filip)
 4. Characterization of Friction Materials (P. Filip)
 5. Vibration and Noise Effects (2 guest lectures, K. Farhang)
 6. Thermal Properties of Materials (P. Filip)
 - o Thermal Analysis of Braking Process (P. Filip, 1 guest lecture Dr. Chu)
 7. Design of Aircraft and Automotive Brakes (P. Filip)
- VIII. Class/Laboratory Schedule:**
Meets 2 times/week, each period 75 minutes duration.
- IX. Contribution of Homework, Quizzes, Tests, Laboratory Reports, or Research Papers:**
Hour Exams 35%; Lab/Projects 40%; Final Exam 25%

**X. Contribution of Course to Meeting the Professional Component:
Medium**

Mechanical Engineers are required to have knowledge of materials and their behavior. Course work includes using knowledge of math, chemistry, physics and engineering topics. Students are required work on laboratories and write project reports.

Engineering Design: 2 credits (67 %) **Engineering Science:** 1 credit (33 %)

XI. Relationship of Course to Program:

Outcome Code	Outcome Description	ME 468
ME-OUT 1	The ability to apply knowledge of mathematics, science and engineering to problem solving	W
ME-OUT 2	The ability to design and conduct experiments, as well as to analyze and interpret data	S
ME-OUT 3	The ability to design a system, component, or process to meet desired needs within realistic constraints	S
ME-OUT 4	The ability to function on multi-disciplinary teams	M
ME-OUT 5	The ability to identify, formulate and solve engineering problems	M
ME-OUT 6	An understanding of professional and ethical responsibility	M
ME-OUT 7	The ability to communicate effectively	S
ME-OUT 8	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	S
ME-OUT 9	A recognition of the need for and an ability to engage in life-long learning	S
ME-OUT 10	Knowledge of contemporary issues	S
ME-OUT 11	The ability to use the techniques, skills and modern engineering tools necessary for engineering practice	M

S = Strong, M = Medium, W = Weak

XII. Person(s) who prepared this description and date of preparation:

Peter Filip, August 18, 2014

“We emphasize student achievement and success because achievement and success are essential if we are to shape future leaders and transform lives.” 1

<http://pvcaa.siu.edu/>

Syllabus Attachment Fall 2014

IMPORTANT DATES

* Semester Class Begins.....08/18/2014

Last day to add a class (without instructor permission):08/24/2014

Last day to withdraw completely and receive a 100% refund:08/31/2014

Last day to drop a course using SalukiNet:10/26/2014

Last day to file diploma application (for name to appear in Commencement program):
.....10/31/2014

Final examinations:12/8–12/12/2014

Note: For outreach, internet, and short course drop/add dates, visit Registrar’s Academic webpage
<http://registrar.siu.edu/>

FALL SEMESTER HOLIDAYS

Labor Day 09/01/2014 Fall Break 10/11—10/14/2014

Veterans Day 11/11/2014

Thanksgiving Vacation 11/26—11/30/2014

WITHDRAWAL POLICY ~ Undergraduate only Students who officially register for a session may not withdraw merely by the stopping of attendance. An official withdrawal form needs to be initiated by the student and processed by the University. For the proper procedures to follow when dropping courses and when withdrawing from the University,

please visit <http://registrar.siu.edu/pdf/ugradcatalog1314.pdf> INCOMPLETE POLICY~ Undergraduate only An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within one semester following the term in which the course was taken, or graduation, whichever occurs first. Should the student fail to complete the course within the time period designated, that is, by no later than the end of the semester following the term in which the course was taken, or graduation, whichever occurs first, the incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. For more information please visit: <http://registrar.siu.edu/grades/incomplete.html>

REPEAT POLICY

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit no more than two times (two total enrollments) unless otherwise noted in the course description. For students receiving a letter grade of A,B,C,D, or F, the course repetition must occur at Southern Illinois University Carbondale. Only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned. See full policy at <http://registrar.siu.edu/pdf/ugradcatalog1314.pdf>

GRADUATE POLICIES

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please visit <http://gradschool.siu.edu/about-us/grad-catalog/index.html> DISABILITY POLICY

Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must come to the DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements.

<http://disabilityservices.siu.edu/>

1 Southern Illinois University Carbondale. (2013). Pathways to Excellence: A Strategic Plan. Retrieved from http://chancellor.siu.edu/_common/docs/A_Strategic_Plan.pdf

PLAGIARISM CODE

http://pvcaa.siu.edu/_common/documents/Plagiarism/Guide%20to%20Preventing%20Plagiarism.pdf

SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: (618) 453-5714, or siucares@siu.edu, <http://salukicare.siu.edu/index.html>

EMERGENCY PROCEDURES

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. We ask that you become familiar with the SIU Emergency Response Plan and Building Emergency Response Team (BERT) programs. Emergency response information is available on posters in buildings on campus, available on BERT's website at www.bert.siu.edu, Department of Safety's website at www.dps.siu.edu (disaster drop down) and the Emergency Response Guideline pamphlet. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.

INCLUSIVE EXCELLENCE

SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ is an important part of education as well as an essential preparation for any career. For more information please visit: <http://www.inclusiveexcellence.siu.edu/>

MORRIS LIBRARY HOURS

<http://www.lib.siu.edu/about>

LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website: Tutoring : <http://tutoring.siu.edu/>

Math Labs http://tutoring.siu.edu/math_tutoring/index.html WRITING CENTER The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit <http://write.siu.edu/> AFFIRMATIVE ACTION & EQUAL OPPORTUNITY Our office's main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: <http://diversity.siu.edu/#>

Additional Resources Available:

SALUKINET: <https://salukinet.siu.edu/cp/home/displaylogin> ADVISEMENT: <http://advisement.siu.edu/>

