**Course number and name:** **Introduction to Tribology and Lubrication**

**Credits and contact hours:** 3 Credits. Walk in or by appointment

**Instructor’s or course coordinator’s name**: Dr. Diana Berman

T/Th 11:30-12:50, B 158

**Text book, title, author, and year**

K.C. Ludema, A textbook in Tribology: Friction, Wear, Lubrication, CRC Press 1996. electronic or paper.

G.W. Stachowiak, Engineering Tribology, Butterworth Heinemann.

1. *Other supplemental materials*

Electronic copies of lectures on Canvas.

**Specific Course Information**

1. *Brief description of the content of the course (catalog description)*

Friction, wear, and lubrication; surface properties and surface topography; friction of surfaces in contact; wear and surface failures; biotribology; boundary lubrication; fluid properties; hydrodynamic lubrication; bearing selection; introductory micro- and nanotribology.

1. *Prerequisites or co-requisites*

PHYS 1710. CHEM 1410/CHEM 1430 (for MTSE Undergraduates) or CHEM 1415/CHEM 1435.

1. *Indicate whether a required, elective, or selected elective course in the program*

Elective

**Brief list of topics to be covered**

1. Introduction & Engineering Surfaces
2. Contact Mechanics

                      Real Area of Contact & Hertzian Elastic Contacts

                      Elastic-Plastic Contacts & Sliding of Elastic Contacts

                      Sliding of Elastic-Plastic Contacts & Contact of Rough Surfaces

III.       Mechanisms of Friction and Wear

                      Origin of Friction

                      Frictional Heating

                      Wear of Solids: Metals, Ceramics & Polymers

                      Measuring Friction & Uncertainty

1. Fundamental of Lubrication

                      Lubricant Properties

                      Hydrodynamic Lubrication

                      Elastohydrodynamic Lubrication

                      Lubricant Types/Additives & Friction and Wear Testing

1. Tribology in Real Life Applications

                      Coatings & Surface Engineering

                      Biotribology: Minimizing Friction and Wear in Biosystems

                      Nanotribology

**Homework**  
Four homework sets will be assigned and graded. At least one week is given for the completion of a homework set. To this end, some collaboration among students in preparing the homework is acceptable. However, in the main, the work should be primarily yours. Because of this tight timeline, late homework will not be accepted.  
  
**Exams**  
Three take home examinations will be given. No copying answers from other students will be allowed, i.e., the work must be your own.

**Grading**  
Homeworks are 25%, Exams are 75% (25% each).  
  
**Attendance**

Regular attendance in class and active listening/participating in classroom discussion is necessary for optimal learning. Please notify me if you have to miss a class or will be late.

**Disabilities Accommodation**

The University of North Texas complies with Section 504 of the 1973 Rehabilitation Act and with the Americans with Disabilities Act of 1990. The University of North Texas provides academic adjustments and auxiliary aids to individuals with disabilities, as defined under the law. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please see the instructor and/or contact the Office of Disability Accommodation at 940-565-4323 during the first week of class.

**Academic Integrity**  
Your enrollment in this class presupposes your commitment to this Honor Code. If you have any questions about your responsibility or my responsibility as a faculty member under this Honor Code, please bring them to me or discuss them with someone in the Office of Academic Integrity.