Lubricants and Tribology

1. **Course number and name:** 020MLTCS5 Lubricants and Tribology

2. **Credits and contact hours:** 4 ECTS credits, 2x1:15 contact hours

3. **Names of instructors:** Melissa Said

4. **Instructional materials:**
   - Course PDF shared with students (slides format)
   - References:
     - Tribology, Friction and Wear of Engineering Materials Second Edition, I. Hutchings, and P. Shipway, 2017
     - Tribology for Engineers a Practical Guide, J. P. Davim, 2011
     - Introduction to Tribology Second Edition, B. Bhushan, 2013
     - Industrial Tribology Tribosystems, Friction, Wear and Surface Engineering, Lubrication, T. Mang, K. Bobzin, and T. Bartels, 2011

5. **Specific course information**
   a. **Catalog description:**
   This course explores the study of tribology and lubricants, covering fundamental principles related to friction, wear and lubrication. Moreover, the course explores topics such as lubricant base oils and their significance in engineering applications.

   b. **Prerequisites:** 020PRPCS3 Refining processes - 020MEFCS2 Fluid mechanics

   c. **Required/Selected Elective/Open Elective:** Selected elective

6. **Specific goals for the course**

   a. **Specific outcomes of instruction:**
   - Understand the fundamentals of tribology and recognize its importance in everyday life.
   - Evaluate surface characteristics, including roughness and hardness.
   - Study the contact theories governing interactions between two solid surfaces.
   - Analyze different friction models designed to estimate the friction coefficient of a system.
   - Examine and compare the coefficients of friction for metals, polymers, and ceramics to understand material-specific tribological behavior.
   - Investigate the influence of viscosity on lubrication performance.
   - Categorize lubrication regimes, understanding their application in diverse scenarios.
   - Examine different types of lubricant base oils and their properties.
   - Explore types of lubricant for engineering applications

   b. **PIs addressed by the course:**

PI	1.3
Covered	x
Assessed	x

7. Brief list of topics to be covered

- Chapter 1: Introduction to tribology
- Chapter 2: Fundamentals of friction
- Chapter 3: Wear mechanisms
- Chapter 4: Lubrication and viscosity
- Chapter 5: Lubricant base oils
- Chapter 6 (project): Lubricants in engineering applications