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| Module Title Tribology | Module Code MSDE 480 | Semester (Sem 1 / Sem 2) Sem 2 |
| Credits 10 | Level 6 | Professor and email Hyo-Sok Ahn hsahn@seoultech.ac.kr |
| Delivery Method Lecture | Delivery Location SeoulTech, Mugung Hall | |

Module Synopsis

This module aims to provide students with a fundamental understanding of tribology. Students will gain insight into how the functioning of many practical systems depends on friction and wear values. Students will learn ways of characterising tribological properties of materials through both lectures and hands-on experiments. Assessment is through a group presentation and individual report of experimental results in addition to the examination at the end of the course.

Outline Syllabus

Theory

Introduction

Surface properties. Surface characterisation. History of tribology

Contact mechanics

Mechanics of solid contacts. Hertzian contact theory. Elastic/plastic contacts

Friction, wear and lubrication

Mechanism of friction. Wear modes. Factors affecting friction and wear. Lubrication regime and principle of lubrication. Friction and wear test. Test standards

Laboratory

Friction and wear tester: operation training.

Testing materials: identifying their tribological properties.

Laboratory work with the friction and wear tester

Equipment training

Testing materials and identifying their tribological properties.

Laboratory report and presentation



Indicative Reading

- 1) Principles of Tribology, Ed. J. Halling, MACMILLAN EDUCATIONAL LTD, London, 1978.
- 2) Introduction to Tribology, B. Bhushan, John Wiley & Sons, Inc., 2002.
- 3) Experimental Methods in Tribology, G. W. Stachowiak, A. W. Batchelor, G. B. Stachowiak, Elsevier, 2004.

| NOTIONAL STUDENT WORKLOAD | Hours |
|--|-------|
| MODE OF DELIVERY (FT / PT / DL) | FT |
| Lectures | 40 |
| Seminars | |
| Tutorials | |
| Laboratories/studios/practical | 30 |
| Directed learning | 10 |
| Independent Learning | 10 |
| Work experience/fieldwork | |
| Other: eg formal presentation | 10 |
| Total Workload 100 hours for a 10 credit module 200 hours for a 20 credit module | 100 |

Module Learning Outcomes

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| KU1,2,4 | KU1. Evaluate and apply complex knowledge of the scientific and mathematical principles of engineering to solve Real-World problems. KU2. Perform advanced analysis of unfamiliar engineering systems. KU4. Define and investigate complex problems and constraints that occur in engineering design with the aid of advanced tools. |
| IPSA1,2,3 | IPSA1. Apply advanced approaches to solving unfamiliar real world engineering problems. IPSA2. Professionally communicate a broad range of engineering concepts to expert and non-expert audiences using a variety of advanced formats and media. IPSA3. Derive solutions to complex health and safety, sustainability and environmental issues in the engineering sector. |
| PVA2 | PVA2. Critically analyse advanced solutions to complex engineering problems. |



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MSDE Module Descriptor

| Assessments | Assessment Type | Weighting % | Mid-Term/interim/final |
|--------------------|------------------------|--------------------|-------------------------------|
| Coursework | | | |
| Project | Individual report | 10 | |
| Quiz | | | |
| Test | | | |
| Laboratory | | | |
| Exam | 2 hrs exam | 70 | Final |
| Presentation | Team presentation | 20 | |