

**SYLLABUS**

**STUDY YEAR 2023/2024**

# **Master programme in Tribology of Surfaces and Interfaces**

## **Enrollment semester Autumn 2022**

DATE

**2021-10-14**

REFERENCE NO.

**LTU-3503-2021**

DECISION MAKER

**Dean of the Faculty of Science and Technology**

## Programme content and structure

The field of mechanical engineering includes the subjects of product engineering, production engineering, mechanics, strength of materials, advanced computer calculations, machine components, tribology and materials. The program consists of 120 credits which are required for all students, including mandatory courses and a thesis. All courses are at the advanced level in mechanical engineering, specializing in tribology.

The TRIBOS Master Programme is given in collaboration with the Universities of Ljubljana (Slovenia), Leeds (UK) and Coimbra (Portugal). The programme is taught in English. Students spend their first semester in Leeds and the second in Ljubljana. Then select a specific track for term 3. The track "surfaces" is given in Coimbra while "lubrication" is given in Luleå university of technology. The project work, thesis, performed during term 4 may be done at any of the four participating universities.

All courses have a focus on deepening knowledge and understanding of tribology as a multidisciplinary subject. The first term in Leeds, focuses on lubrication, corrosion and basic tribology. The second term in Ljubljana builds on knowledge in design and engineering. The third term in Coimbra involves a focus on material and surface related issues with specialization in choice of tribological materials and characterization of tribological surfaces. The third term in Luleå instead focuses on lubrication and mechanical engineering and aims to develop skills to select lubricants, materials and component for lubricated systems. The thesis, to be conducted during the fourth semester can be accomplished at any of the four participation universities.

The mandatory courses must be completed prior to the start of the master's thesis. Specific information about application and selection for master's theses is controlled by the each university.

All courses include close collaboration with industry, which allows potential for summer internship.

Swedish for beginners is offered to overseas students. The course is not included in the degree, and is read in addition to the obligatory courses

## Credits

120 credits

## Degree

- Degree of Master of Science (120 credits) - Major; Mechanical Engineering with specialisation Tribology

## Entry requirements

Bachelor degree of at least 180 credits or equivalent, which includes courses of at least 60 ECTS in one of the following areas: Mechanical Engineering, Materials Science or equivalent, and a minimum of 22,5 ECTS in mathematics. Basic required knowledge in mathematics: M0029M (Calculus for beginner), M0030M (linear algebra and calculus) and M0031M (linear algebra and differential Equations) OR similar knowledge in mathematics is required.

Good knowledge in English, equivalent to English 6

## Selection

The selection procedure is based on academic qualifications, quality and quantity aspects

### Selection group

Academic: 100%

## Compulsory courses

### Compulsory courses 30 credits

Course code	Course	Cr	Level	Comment
	Materials Selection and Failure Analysis	7.5		
	Oilfield chemistry and corrosion (Second cycle)	7.5		
	Engineering computational methods (Second cycle)	7.5		
	Lubrication and lubricants (Second cycle)	7.5		

### Compulsory courses 30 credits

Course code	Course	Cr	Level	Comment
	Maintenance Tecnology	5		
	Contact mechanics	5		
	Technical diagnostics (Second cycle)	5		
	Nanotechnology (Second cycle)	5		
	Random Phenomena	5		
	Tribology (Second cycle)	5		

### Compulsory courses 30 credits

Selective space is 30 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
	Materials selection and processing (Second cycle)	6		Selectable
	Protection and degradation of surfaces (Second cycle)	6		Selectable
	Design of surface contacts (Second cycle)	12		Selectable
	Advanced characterisation techniques (Second cycle)	6		Selectable

Or

### Compulsory courses 60 credits

Selective space is 30 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
M7018T	Advanced Machine Elements	7.5	Master's level	
M7033T	Scientific Computing with Applications in Tribology	7.5	Master's level	
M7034T	Advanced Project course in Tribology	15	Master's level	

## Compulsory courses 30 credits

Course code	Course	Cr	Level	Comment
E7017T	Degree project in Tribology of Surfaces and Interfaces, master	30	Master's level	

Or

## Thesis at any of the four participation universities 30 credits

Course code	Course	Cr	Level	Comment
	Degree project	30		

## Course offered outside the obligatory courses - not compulsory - For non Scandinavian students

Course code	Course	Cr	Level	Comment
S0046P	Swedish for International Students 1	3	Bachelor's level	Selectable

## Study schedule

### Year of study 1 Enrollment semester Autumn 2022, Is offered in 2022/2023

Study-period	Course code	Course	Cr	Comment
1-2		Materials Selection and Failure Analysis	7.5	
1-2		Oilfield chemistry and corrosion (Second cycle)	7.5	
1-2		Lubrication and lubricants (Second cycle)	7.5	
1-2		Engineering computational methods (Second cycle)	7.5	
3-4		Tribology (Second cycle)	5	
3-4		Random Phenomena	5	
3-4		Maintenance Tecnology	5	
3-4		Technical diagnostics (Second cycle)	5	
3-4		Nanotechnology (Second cycle)	5	
3-4		Contact mechanics	5	

### Year of study 2 Enrollment semester Autumn 2022, Is offered in 2023/2024

Study-period	Course code	Course	Cr	Comment
1	M7018T	Advanced Machine Elements	7.5	
1	S0046P	Swedish for International Students 1	3	Selectable
1-2	M7034T	Advanced Project course in Tribology	15	
1-2		Materials selection and processing (Second cycle)	6	Selectable
1-2		Design of surface contacts (Second cycle)	12	Selectable
1-2		Advanced characterisation techniques (Second cycle)	6	Selectable
1-2		Protection and degradation of surfaces (Second cycle)	6	Selectable
2	M7033T	Scientific Computing with Applications in Tribology	7.5	
3-4	E7017T	Degree project in Tribology of Surfaces and Interfaces, master	30	Entry requirements