



National Graduate Research School in Tribology

Course plan

Title: Metrology and Properties of Engineering Surfaces

Points: 4hp

Time: 22-24 September 2009

Objectives: To gain basic understanding of contact and non-contacting metrology technologies in 2D and 3D (mechanical and optical 2D- as well as 3D profilers), with main focus on characterisation of surface texture. When the student has finished the course she/he will be able to:

- understand the workflow needed in order to design the “optimal” process route towards measurements and documentation of tribology testing
- understand fundamentals of 2D and 3D characterisation concerning pre-processing, filtration, segmentation and parameterisation of engineering surfaces.
- understand limitations and possibilities with the current metrology framework (hardware and software) in conjunction with practical applications in tribology.
- apply the surface topography characterisation on her/his own research.
- describe current research in the field.

Content: The course focus on metrology and characterisation of engineering surfaces at different stages in the test, manufacturing and operation stages. Included are practical applications applied on the students own research projects. The course will cover sensor technology: Atomic force Microscopy, -AFM, Scanning Electron Microscopy -SEM, Light Optical Microscopy -LOM, Stripe projection technique, Confocal microscopy, Optical- and mechanical profilers for 2D and 3D as well as 2D and 3D filtering, segmentation and parameterisation techniques according to the on-going ISO 3D standardisation. Much efforts will also be devoted to the study of history of engineering surfaces as a research topic, reference research work from the literature, as well as information and discussions of on-going research and finally the courses' consequence on the PhD students' "own" project.. The course will be finalised with a Poster exhibition initially in Halmstad but later moved to desired Universities. The exhibition will be made by the students and cover the course content and on-going "own" applications.

Teaching: The teaching will be based on the course days in Halmstad and 3 Marratech work shops. Measurements will be made using Optical profilers, mechanical profilers, AFM and analysed using state-of-the-art software e.g. Mountain Map software (3D) and Surfproc (2D).

Prerequisites: Engineering Master degree or similar

Examination: web based (via Marratech); 4 weeks after the week when the course was given

Grading: Pass or Fail

Examiner: Bengt-Göran Rosén, Box 823, 301 18 Halmstad; e-mail: bg.rosen@set.hh.se

Literature: Books (T.R. Thomas; “Rough Surfaces”), papers, handouts and software;