



Nationell forskarskola i tribologi

Research school course plan

Title: Metrology and Properties of Engineering Surfaces

Points: 4hp

Time: 2-4 May 2012

Objectives:

To gain basic understanding of surface roughness and texture influence of engineering products as well as metrology associated technologies. Important is also the understanding the role and function 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 including geometrical form, waviness, roughness and imperfections will be important issues.

When the student has finished the course she/he will be able to:

- 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.

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 topics 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.



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Teaching:

The teaching will be based on the course days in Halmstad and Adobe Connect work shops. Measurements/ Laborations 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, talk to BG Rosén in Halmstad if unsure)

Examination: web based presentation of home assignments (via Adobe Connect); 2 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@hh.se

Literature:

0. "Course file" with collected presentations and tasks (to be presented at course start)
1. T.R. Thomas; *Rough Surfaces* –second edition; Imperial College Press, UK; ISBN 1-86094-100-1; (1999). –out of press but available through examiner –BG, or the author directly.
2. L. Blunt (editor), *Advanced Techniques for Assessment Surface Topography: Development of a Basis for 3D Surface Texture Standards 'Surfstand'*; pp. 197-215; London 2003, Kogan Page Science, ISBN 1-903996-11-2 . -Available through the examiner –BG or the author directly.
3. Additional handed-out material and software manuals.