

Precision and micro engineering – in the application

The content of this online course has been designed by **Fraunhofer IPT**, Aachen, Germany based on a course held at the institute in October 2004.

Introduction

Components of innovative and successful products are characterised more and more frequently by outstanding levels of surface quality, form tolerances on a nano-meter scale or an extremely high degree of miniaturisation. As a result of that the market of highly integrated, miniaturised systems or ultra-precise manufactured parts is increasing continuously. Applications are to be found in the branches mechatronics, micro-electronics, bio-medical engineering, optics, automotive engineering or chemical engineering.

If such extremely demanding manufacturing specifications are to be met, it is vital to have the right production equipment, including ultra-precision and micro machine tools. Wherever precision on a nano-meter scale is required in the production processes or there is a need for part sizes on a micro-meter scale, a combination of thorough theoretical knowledge and practical know-how is essential for the manufacturer.

Course Overview

The module *“Precision and Micro Engineering - In the Application”* is the second course about Precision and Micro Engineering within the VisionOnline programme. The first course *“Precision and Micro Engineering - An Overview”* presented the technical basis of micro-machining operations, micro-machining with lasers and micro-plastics processing. The aim of course two is to expand on the contents of the first course and covers the following:

- Manufacturing of optical and micro-optical components,
- Tool making and replication techniques in precision and micro engineering and
- Metrology methods in ultra-precision and micro technology.

Course Objectives

This course will provide you with a deep insight into the state of the art technologies and future trends in the field of precision and micro technology.

Audience

Managers, postgraduate, microsystems engineers & scientists wishing to expand their knowledge of precision and micro engineering.

Course content

Manufacturing of optical and micro optical components

Technology marketing – why should I care?

Dr. Neuy, IVAM NRW e.V.

Technical solutions for manufacturing optimised optical implants

Dr. Kreiner, Acri. Tec GmbH

The mechano-chemical polishing technique for the manufacturing of high precision optical components

Mr. Danbon, Fraunhofer IPT

Face polishing of large glass plates for the manufacturing of precision optics

Mr. Brunner, Stahli AG

Diamond machining of large scale optical surfaces

Mr. Wenzel, Fraunhofer IPT

Ultra precision milling of optical freeform surfaces

Mr. Wanders, Precitech Inc.

Machining of a aspheric mirrors using a fast-tool-servo

Mr. Niehaus, Fraunhofer IPT

ELID grinding of optical surfaces

Prof. D. Reynaerts, KU Leuven

Tool making and replication techniques in precision and micro engineering

Micro milling of steel for the mould and die industry

Mr. von Bodenhausen, Fraunhofer IPT

Proceeding and manufacturing methods in the replication with high precision and micro mold tooling

Mr. Schulz, WAHL – optoparts GmbH

Ultrasonic assisted manufacturing technologies in the application

Mr. Weber, Fraunhofer IPT

Laser microfabrication for moulds and forming parts

Dr. Gillner, Fraunhofer ILT

Micro injection moulding – micro assembly injection moulding

Mr. Opfermann, IKV

Mould making and precision glass moulding process

Mr. Pongs, Fraunhofer IPT

Micro-forming of metallic micro parts

Mr. Geißdorfer, LFT

Metrology methods in ultra-precision and micro technology

Topography measurements of large optical surfaces: New deflectometric and interferometric scanning techniques

Dr. Geckeler, PTB

Surface metrology for production and development

Dr. Koglin, Fries Research Technology

Machine-integrated measurement of ultraprecise surfaces

Mr. Schneefuß, Fraunhofer IPT

Contributing companies and institutes:

