

**EN 232 Experimental Mechanics
for Nano- and Micro-Mechanics of Solids
K.-S. Kim, Spring Semester, 2004**

Chapter 1 Introduction

Principles of Mechanical Testing
*Principles of Fourier Optics**
Principles of Transducers, Actuators and Sensors

Chapter 2 Measurement Techniques

Optical methods: Interferometries
Moire Interferometry and Temporal Interferometries
Digital Image Correlation and Speckle Interferometry*
Optical Tweezers and Applications
Electron Optics and Electron Microscopy
High Resolution Transmission Electron Microscopy
Scanning Electron Microscopy and Electron Spectroscopy
Scanning Probe Microscopy
Atomic Force Microscopy*
Scanning Tunneling Microscopy

Chapter 3 Data Processing

Error and Noise Analysis
Digital Filters and Data Smoothing
Digital Processing for Inverse Problems

Chapter 4 Applications

Multi-Scale Experiments
Nano- and Micro- Indentation(*)
Nano- and Micro-Tribology; AFM vs SFA
Experimental Mechanics of Defects
Experimental Mechanics for Thin film Technology
Thin Film Testing; Wafer Curvature Measurement*
Surface Roughness Evolution Spectroscopy
Experimental Mechanics for Self Organizing Structures

* Laboratory Projects: Four reports and one final presentation are required for grading .