

PRELIMINARY SYLLABUS (PENSUMLISTE)

PHYS328 – Selected Topics in Measurement Science **AUTUMN 2014**

This is a preliminary syllabus (pensumliste) for the PHYS328 course. Due to the somewhat wide range of topics covered in this course, there will not be any set textbooks. All reading material will be uploaded onto MiSide in due time. In the following, the relevant document titles are listed for each topic covered in the course:

Radioisotope methods:

- Radioisotope_methods_I.pdf
- Radioisotope_methods_II.pdf
- Radioisotope_methods_III.pdf
- Radioisotope_methods_IV.pdf
- Compendium for PHYS328 (Radioisotope_measurements_2014.pdf)

The lecture notes in this section will be based upon the following chapters of the textbook by Johansen and Jackson “Radioisotope Gauges for Industrial Process Measurements”, 2004.

- **Chapter 2 – Radiation Sources**
- **Chapter 3 – Interaction of Ionizing Radiation with Matter**
- **Chapter 4 – Radiation Detectors**
- **Chapter 5 – Radiation Measurement**

Permittivity methods:

- Permittivity_sensors_part1.pdf
- Permittivity_sensors_part2.pdf
- Permittivity_sensors_part3.pdf
- Agilent Application Note: Basics of Measuring the Dielectric Properties of Materials
- Lecture note by Lars Egil Helseth: Permittivity of dielectric materials and mixtures

Magnetic Field Sensors & Electrical Impedance Spectroscopy:

- Measurement of magnetic fields (Compendium + lecture notes)
- Electrical Impedance Spectroscopy Measurements (Compendium or lecture notes)

Industrial Process Tomography:

- IPT_revision_compendium_2013.pdf (latest version to be uploaded in due time)
- IPT_revision_slides_2013.pdf (latest version to be uploaded in due time)

Multiphase Flow Measurement & Gamma-ray Tomography:

- Thorn R, Johansen GA and Hjertaker BT: Three-phase flow measurement in the petroleum industry Meas. Sci. & Instr. 24 (2013) 012003 (17pp)
- Johansen GA, Hampel U and Hjertaker BT Flow imaging by high speed transmission tomography Appl. Rad. and Isotopes 68 (2010) 518-524