METHODS AND INSTRUMENTATION FOR ENVIRONMENTAL MEASUREMENTS

Introduction of Environmental Physics Measurements Techniques

Atmospheric Physics measurements:

- Principles of operation of basis and modern instrumentation for the measurement of temperature, humidity, wind and pressure
- Principles of operation of modern instrumentation for the measurements of refractive index, rainfall and evaporation
- Principles of operation of modern instrumentation for the measurements of solar radiation and daylight
- Meteorological instrumentation platforms: meteorological masts, balloons (free-tethered), aircraft's satellites etc.

Air quality measurements:

- Principles of operation for the measurement of SO2, NOX, CO, O3, CH, TSP concentrations
- Air quality measurements platforms

Remote sensing:

- Introduction to the measurement techniques
- Radar equation for the case of electromagnetic, acoustic and optical waves
- Meteorological parameters
- Parameters relevant to the air quality

Recording of data and data processing:

- Basic principles for recording
- Basic principles for processing

Laboratory work relevant to the above-mentioned topics

COMPUTATIONAL METHODS

- Time series analysis
- Spectrum analysis
- Time series analysis –application of the Markov Chains – Autoregression
- Weather prediction related time series analysis (scores, thread scores, Heidke scores)
- Principal Component Analysis – Discriminant Analysis – Cluster Analysis
- Neural Networks. Principles and use of NN for prediction and calculation of meteorological parameters
- Laboratory work relevant to the above-mentioned topics