

Kierunek studiów: **GEOFIZYKA**

Specjalność: **APPLIED GEOPHYSICS**

Stopień studiów: **STACJONARNE II STOPNIA**

**Grupy zagadnień egzaminacyjnych:**

1. Theoretical basis of geophysical methods.
2. Processing of geophysical data
3. Interpretation of geophysical data
4. Applications of geophysical research

**PROBLEMS**

**1. Theoretical basis of geophysical methods**

- Fresnel zone.
- Seismic velocities.
- Wave attenuation in seismic.
- Parameters of 3D seismic data.
- Gravity prediction of mining tremors.
- Magnetic properties of matter, minerals and rocks.
- Methods of grouping data in cluster analysis.
- Convolution and cross-correlation of two functions (signals).
- Python libraries.
- Artificial neural networks.
- CSAMT method.
- TDEM method.
- The basic equation (range equation) of GPR method.
- The horizontal and vertical resolution of GPR measurements.
- Seismometer equation.

## **2. Processing of geophysical data**

- Vertical and horizontal resolution of seismic data.
- Noise attenuation in seismic.
- Seismic migration.
- Anomaly in gravity and magnetic methods.
- Processing of borehole gravity data.
- Data processing in microgravimetric underground survey.
- Well logs corrections.
- Procedures for processing and interpretation of well logs
- Model 1D in TDEM method.
- AMT method opposite to CSAMT method.
- CSAMT method opposite to TDEM method.
- The gain procedures used in GPR data processing.
- The 1D and 2D filtration of GPR data.
- Processing in REFLEX.
- Processing of seismology data.

## **3. Interpretation of geophysical data**

- Trace and its attributes.
- Direct Hydrocarbon Indicators on seismic data.
- Tie-up between borehole and seismic data.
- Possible errors in gravity method.
- Ambiguity in gravity method.
- Characteristics of magnetic anomalies
- Evaluation of the domain state of ferromagnetic minerals
- Determination of porosity, permeability, saturation, mineral composition in well logging
- Well logging methods for water and hydrocarbons prospection.
- Interpretation of geoelectrical data.
- LMA and Occam algorithms in the interpretation of 1D DC and AMT/MT data.

- The phenomenon of equivalence in DC-resistivity soundings and in the electrical resistivity tomography method.
- The attenuation and reflection coefficient in GPR method.
- The methods of determining the velocity of electromagnetic waves in the GPR measurements.
- Beach ball charts

#### 4. **Applications of geophysical research**

- Refracted waves.
- VSP survey.
- The advantage of 3D seismic research over 2D research
- Tools and materials useful for interpreting seismic data.
- Seismic attributes in the structural interpretation of seismic data.
- Seismic attributes in the interpretation of stratigraphic seismic data.
- Carbonate structures (reefs) in seismic.
- Electrical resistivity tomography method for voids detection.
- DC-resistivity methods in the study of groundwater pollution.
- Magnetic parameters used in the assessment of ferrimagnetic minerals content in soil.
- Magnetic method in engineering prospection.
- Microgravity in mining and post – mining area.
- Borehole gravity.
- Application of well logging in geology
- Monitoring of seismological activity