Short Course
Geophysical Techniques for Multidisciplinary/Interdisciplinary Applications
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For the last several years, Geophysical techniques have become the method of choice for many high-resolution, near surface investigations. These techniques use state-of-art remote sensing non-invasive equipment and software to generate 2-D and 3-D high resolution near surface imaging. The usage of these techniques spans a wide range of applications that include natural resources, geotechnical, hydrological, archeological, engineering, forensic, and security problems. With the advancement of hardware, software, and imaging techniques, it becomes increasingly possible to collect data and perform interpretation in the field in almost real time fashion. Examples of these techniques are seismic, magnetic, gravity, well logging, resistivity, and Ground Penetrating (GPR). All of these techniques are based on the same fundamental principle: changes in the physical properties (seismic velocity, magnetism, density, resistivity, etc.) of rocks, sediments, and buried objects. These changes can be measured and used to illustrate stratigraphic and structural settings in the subsurface. It also can be used for natural resources such as ground water and mineral deposits. Other examples of implementing geophysics are investigating archeological sites, studying site specific conditions for engineering purposes, and tracking contaminant spill in the soil.

The proposed short course will concentrate on mainly two techniques: GPR and Electric Resistivity. The two techniques have the advantages of producing higher resolution data over other geophysical methods and it allows for less setup/survey time than traditional land based seismic methods. Although penetration depth is substantially less than that of shallow seismic methods, GPR and Resistivity penetrate deep enough (several meters) to study near-surface geological and other features. The course is designed to include three parts:

1. Lectures and classroom discussion. This first part will last three days and the participants will be given lectures about the theoretical and the applied aspects of the implemented techniques. They will also learn the principal of designing experiments and fieldwork layout.
2. Laboratory work. The participants will construct prototype experiments, learn the principals of operating the equipment, data acquisition, and analysis and interpretation.
3. Fieldwork. Two full-scale surveys will be conducted on two different sites and for different applications. The fieldwork will be preceded by a reconnaissance survey for quality control and assessment. Data collected will be analyzed and interpreted in the classroom.

The primary objective of this short course is to teach participant on implementing the geophysical techniques to help solve some of the problems they encounter in their work. It also help graduate students and faculty with their research.

Participants. Attendees of this short course are Geoscientists, Civil Engineers, Environmental Engineers, Water Resources Engineers, and Archeologists.

Duration. Ten days:

1. Three days lectures
2. Two days laboratory experimentations
3. Two days Fieldwork
4. Three day data analysis and interpretation

Location. Geology Department, University of Sulaymaniyah or Salahaddin.

Instrumentation. Instrumentation is available to the Geology Department, University of Sulaymaniyah.

Instructors.

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