

This sheet will provide a general outline of the topics covered by **Geophysical Exploration** course and the expected outcomes of the course.
This is only a general list of key points.

Item	Basic Principles	Data Acquisition and Field procedures	Data Processing / corrections	Data Interpretation	Sources & Instrumentation
General	Classifications of geophysical methods. Direct vs Inverse interpretation of geophysical data.				
Seismic	<ul style="list-style-type: none"> ➤ What are: Huygen's principle? Fermat principle? Elastic constants? ➤ What is: Snell's law? Critical refraction? Critical angle? ➤ What are head waves and how/why do they form? ➤ Know the details associated with the direct ray, reflected ray, and the refracted ray. ➤ Know which ray will be the first arrival at any given location. ➤ What is delay time? What is it useful for? ➤ Know the various strengths/weaknesses of refraction vs reflection seismology ➤ What is: acoustic impedance? reflection coefficient? transmission coefficient? ➤ What are multiples? how do we recognize them in seismic sections? ➤ What is moveout? What is normal moveout? 	<ul style="list-style-type: none"> ➤ Know the basic types of seismic refraction field procedures ➤ Know the basic types of seismic reflection gathering. 	<ul style="list-style-type: none"> ➤ What is hidden layer? Low velocity layer? ➤ What is convolution / deconvolution? ➤ What is the purpose of applying deconvolution? ➤ Velocity analysis ➤ Know the types of seismic reflection velocities ➤ methods of velocity calculation and time to depth conversion ➤ What is stacking? ➤ What is migration? ➤ What are the common distortions that occur on unmigrated seismic section ➤ What is static correction? 	<ul style="list-style-type: none"> ➤ Be able to qualitatively and quantitatively determine: <ul style="list-style-type: none"> ✓ Velocity ✓ Thickness ✓ Which parts of the t-x are which ray ✓ Crossover distance ✓ Critical distance ➤ How do we recognize dipping interfaces in a refraction survey? ➤ What about fault offsets? ➤ Know how to determine dip direction (qualitatively) from a t-x diagram ➤ Know the problems and limitations of seismic methods ➤ How can one recognize a dipping reflector on a t-x diagram? ➤ Qualitative interpretation of reflection cross-sections: ➤ Quantitative interprétation 	<ul style="list-style-type: none"> ➤ What are the main seismic sources? Their advantages and limitations ➤ What is a seismograph? ➤ What is a geophone / hydrophone? ➤ What are the different types of geophones, their components and working principle?

	<ul style="list-style-type: none"> ➤ Applications of seismic reflection/refraction method 		<ul style="list-style-type: none"> ➤ What is the purpose of trace editing? ➤ What are wiggle trace, variable area, and variable wave forms? 		
Gravity	<ul style="list-style-type: none"> ➤ What is the gravitational law? ➤ What is the Geoid? ➤ What are the basic units of gravity measurements? 	<ul style="list-style-type: none"> ➤ What are the two basic methods of measuring gravity? 	<ul style="list-style-type: none"> ➤ What are the basic factors (corrections) influencing the measured gravity data? 	<ul style="list-style-type: none"> ➤ What is the direct interpretation of gravity data? ➤ What is the indirect interpretation of gravity data? ➤ Anomaly representation methods 	<ul style="list-style-type: none"> ➤ Basic types of gravimeters ➤ Electronic gravimeters
DC resistivity	<ul style="list-style-type: none"> ➤ What's ohms law? ➤ What is the measured signal? ➤ What is resistance/resistivity? ➤ What is the apparent resistivity? ➤ Advantages and drawbacks of gravity method ➤ Fields of application ➤ Factors controlling the resistivity of rocks ➤ Noise sources and how to overcome them ➤ Advantages and drawbacks 	<ul style="list-style-type: none"> ➤ What are the basic field procedures of resistivity measurements? ➤ What are the basic electrode configurations? ➤ What are the factors controlling the depth of penetration? 	<ul style="list-style-type: none"> ➤ What are the basic types of resistivity curves? ➤ What is equivalence? ➤ What is suppression? ➤ What is a parametric sounding? 	<ul style="list-style-type: none"> ➤ How do you qualitatively interpret field resistivity curves? ➤ How do you quantitatively interpret field resistivity curves? 	<ul style="list-style-type: none"> ➤ What are the basic components of a resistivity?
Induced Polarization	<ul style="list-style-type: none"> ➤ Definition of IP ➤ Domains of IP measurements ➤ Measured parameters ➤ Factors controlling IP effects ➤ Advantages and drawbacks 			<ul style="list-style-type: none"> ➤ Qualitative Data representation 	<ul style="list-style-type: none"> ➤ What types of electrodes are used? ➤ Instrumentation types
Self-Potential	<ul style="list-style-type: none"> ➤ Type of signal in SP ➤ Source of SP ➤ Fields of Application ➤ Advantages and drawbacks 			<ul style="list-style-type: none"> ➤ Data representation ➤ Depth of investigation 	