Course Title	**Geophysical Methods**				
Course Code	**MOG683**				
Course Type	**Major Elective**				
Level	BSc/1st Cycle				
Year / Semester	4th/8th				
Teacher's Name	Dr Fotis Moustakis				
ECTS	7.5	Lectures / week	3 hours	Laboratories / week	
Course Purpose and Objectives	The main objectives of the course are to: • Introduce the students to the concepts of seismic waves. • Teach the students to handle basic calculations with refracted and reflected seismic waves. • Help the students to analyze and process data of recorded seismic waves from the field so as to interpret the position of possible hydrocarbon reserves in sedimentary basins. • Introduce the students to the concepts of gravitational methods in geophysical exploration. • Familiarize the students with explorational methods that rise from the magnetic anomalies of the earth's geodynamic system. • Application of numerical calculations with geo-electrical methods. • Software/numerical simulations.				
Learning Outcomes	After completion of the course students are expected to: • Understand the basic types of seismic waves (Compressional, Shear, Rayleigh and Love). • Perform calculations utilizing Snell's law and understand the importance of transmission and reflection coefficients. • Understand the reflection and refraction of waves from single and multi-layer structures in horizontal and dipping configurations so as to calculate parameters like velocity, layer thickness and dip angle of the layers. • Handle numerical calculations of the following methods: plus minus, normal moveout, root mean square velocities (RMS) and travel two way times. • Understand the concept of stacking for data enhancement, seismic migration, 3D seismic reflections and filtering of seismic data. • Understand the Bouguer gravity and the concepts of gravitational attraction of structures with simplified geometry (Sphere, Cylinder, Plate)				

	• Perform calculations and understand the concepts of anomalies caused by magnetized structures (horizontal and inclined plates). Specifically the students will perform calculations with the following methods: Dipole models, irregular 2D models and compound 3D models so as to gain knowledge in interpreting magnetic anomalies. • Apply geo-electrical methods in the search and discovery of hydrocarbons. The output of these methods basically includes the analysis of electrical resistivity of measurements obtained with the following methods: Barnes parallel resistor method, cumulative resistivity inversion method, characteristic curves method and electromagnetic surveying.		
Prerequisites		Required	
Course Content	• Seismic waves. • Refracted seismic waves. • Reflected seismic waves. • Data processing and interpretation. • Gravitational methods. • Magnetic methods. • Geo-electrical methods		
Teaching Methodology	Lectures, Discussion, Project, Case Studies		
Bibliography	Kearey Philip, Brooks Mike and Hill Ian An Introduction to Geophysical Exploration Wiley 2013 1118698932 Robinson S. Edwin and Coruh Cahit Basic Exploration Geophysics Wiley 1998 047187941		
Assessment	Final Exams 60% Assignment/ Project 20% Mid term 20%		
Language	English		