



**University of Nicosia, Cyprus**

<b>Course Code</b> OGEE-220	<b>Course Title</b> Rock and Fluid Properties	<b>ECTS Credits</b> 8
<b>Department</b> Engineering	<b>Semester</b> Fall, Spring	<b>Prerequisites</b> GEOL-210
<b>Type of Course</b> Required	<b>Field</b> Oil & Gas Engineering	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 2 <sup>nd</sup>	<b>Lecturer(s)</b> Dr Ernestos Sarris
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

**Objectives of the Course:**

The main objectives of the course are to:

- Introduce the basic types of rock and fluid properties and their attributes.
- Provide basic understanding of rock and fluid properties necessary for reservoir management and recovery calculations.
- Provide basic understanding of geological and engineering processes used in hydrocarbon recovery.
- Introduce via laboratory exercises the process of measurement of rock and fluid properties.

**Learning Outcomes:**

After completion of the course students are expected to:

- Explain the physical nature of a reservoir.
- Design appropriate logging and coring programs.
- Discuss reservoir wettability characteristics.
- Classify petroleum fluids and determine their chemical composition.
- Effectively understand, discuss and interpret the well logs and core test results.

**Course Contents:**

**Theory**

- Introduction to the fundamentals of Rock properties.
- Porosity. Significance and definition. Types and Classifications. Canonical and non-canonical methods. Averaging of Porosity.
- Absolute permeability. Mathematical expression and Darcy's Law. Dimensional Analysis. Parallel and serial flow. Affecting factors.
- Mechanical and Electrical properties of reservoir rocks. Rock strength and mechanics. Archie equation. Wettability and clay on Electrical properties.
- Fluid Saturation. Mathematical expressions and rock samples. Special Types.
- Interfacial Tension and Wettability. Definitions, practical aspects. Relationship between Wettability and Irreducible Water saturation.

**Laboratory**

- Porosity Lab: Bulk, Pore and Grain measurements.
- Permeability Lab: Measurements using Liquids and using Gases.
- Rock Strength Lab.
- Fluid Saturation Lab: Retort Distillation. Dean-Stark Extractions.
- Wettability Lab: Measurements of contact angle. Core samples for Ammott test. USBM method.

**Learning Activities and Teaching Methods:**

Lectures, in-class examples, laboratory assignments

**Assessment Methods:**

Homework, laboratory, tests, final exam, lab reports

**Required Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
A. Y. Dandekar	Petroleum Reservoir Rock and Fluid Properties, 2 <sup>nd</sup> Edition	CRC Press	2013	9781439876367

**Recommended Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
D. Tiab, E. C. Donaldson	Petrophysics, Third Edition: Theory and Practice of Measuring Reservoir Rock and Fluid Transport Properties	Gulf Professional Publishing	2011	9780123838483
D. William , Jr. Mc Cain	The Properties of Petroleum Fluids	Pennwell Pub	1990	9780878143351