

# Μηχανική Κοιτασμάτων Υδρογονανθράκων

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### Abstract

Reservoir Engineering is the field of the Engineering Science that focuses on the study and characterization of oil and gas reservoirs aiming at proposing efficient hydrocarbon production strategies that are both financially viable and environmentally-friendly. The main objective of oil and gas production engineering is to recover the highest possible mass fraction of the hydrocarbon species that are initially resident in the reservoir using all available mature production technologies and techniques. During the commercial exploitation of a reservoir, the hydrocarbon fluids that are initially trapped in the pore space flow over several hundreds of meters from their initial position until the bottomhole of the production wells, from where they are recovered to the surface. Due to this flow through the porous matrix of the reservoir, the pressure field is continuously evolving in time, thus affecting the physical properties of the fluid phases. Therefore, the Petroleum Engineer should be familiar with the relevant physical processes and possess an in-depth understanding of the basic parameters that affect

the dynamic evolution of the pressure field and the spatial distribution of different phases during transient multiphase flow. This understanding should also be complemented with an in-depth understanding of the basic principles that govern liquid-vapor equilibrium of the extremely complex reservoir fluids and their changes in composition. These depend strongly on the dynamics of the flow field during the production period from the reservoir. This book is primarily intended for undergraduate students of Engineering Schools that include the course of Petroleum Engineering in their educational program. It aims at introducing the students to the main principles and terminology of the upstream sector in a systematic and progressive way starting from the fields of single and multiphase flows through the reservoir porous structure and progressing towards the thermodynamics of liquid-vapor equilibrium of reservoir fluids. Based on this theoretical background, more complex processes are presented, related to the basic oil production mechanisms and the technologies applied for optimizing oil recovery.

