



Course Code OGEE-410	Course Title Natural Gas Reservoir Engineering	ECTS Credits 6
Department Engineering	Semester Fall, Spring	Prerequisites OGEE-330
Type of Course Required	Field Oil & Gas Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 4 th	Lecturer(s) Dr Vasileios Drakonakis
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Familiarize students with the fundamental principles and governing laws associated with natural gas reservoir engineering
- Transfer knowledge on the behavior and important properties of natural gas
- Provide knowledge and expertise on contemporary practices and methodologies used in natural gas reservoir engineering
- Develop and discuss numerical models and techniques used for the characterization of gas flow in wellbores and reservoirs
- Describe techniques for gas well testing and performance evaluation of the well
- Discuss models and techniques used for volumetric estimation of gas in-place and recoverable hydrocarbons from gas reservoirs
- Discuss techniques used for performance evaluation of gas reservoirs
- Description of natural depletion and the development of gas-condensate reservoirs by gas injection

Learning Outcomes:

After completion of the course students will be able to:

- Use current techniques and methodologies for the effective simulation and characterization of gas reservoirs
- Perform calculations for the characterization of gas flow in wellbores and gas reservoirs based on measured rock and gas properties
- Apply techniques for volumetric estimation of gas in-place and recoverable hydrocarbons from gas reservoirs
- Use techniques for gas well testing and performance evaluation of gas wells
- Apply techniques to solve transient gas flow problems in gas reservoirs
- Apply techniques such as natural depletion and gas injection for the development of gas-condensate reservoirs

Course Contents:

- Introduction to natural gas and gas reservoir engineering
- Reservoir properties (rock types, porosity, viscous flow and inertial flow resistance, capillary pressure, etc.)
- Gas properties (composition, compressibility, condensate/gas ratio, viscosity, etc.)
- Phase behavior of gas
- Recoverable reserves (bulk volume, pore volume, etc.)
- Material balance
- Single-phase gas flow (steady-state Darcy flow, steady-state radial flow, transient flow, linear flow, etc.)
- Gas well testing (drawdown tests, buildup tests, etc.)
- Wellbore flow mechanics
- Water coning
- Natural depletion
- Gas injection

Learning Activities and Teaching Methods:

Lectures, in-class examples, exercises, design project

Assessment Methods/Reading:

Homework, tests, final exam, project report

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
J. Hagoort	Fundamentals of Gas Engineering	Elsevier Science	1988	9780444429919