G11OP Managing the Reservoir

COURSE DETAILS

Course Code: G11OP
Full Course Title: Managing the Reservoir
SCQF Level: 11
SCAF Credits: 15
Available as Elective: No

DELIVERY LEVEL

Undergraduate: No  Postgraduate Taught: Yes  Postgraduate Research: No

COURSE AIMS

The objectives will be to enable the students to:

- Understand the fundamentals of a producing reservoir system
- Interpret production performance from oil and gas field data
- Use reservoir simulation for field management
- Apply the mathematical tools required for optimisation with simulation and other models
- Understand and apply surveillance techniques

LEARNING OUTCOMES – SUBJECT MASTERY

Students should have an understanding of:

- Surveillance techniques and the value of data
- How to choose which models are appropriate for a given mature field
- The creation, updating and application of numerical simulation models.
- Theoretical basis for modelling enhanced oil recovery and how they are used in practice.
- The best approaches to history matching and field optimisation

Students will be explicitly encouraged to:

- Read around the subject area to understand the current research being conducted here and elsewhere
- Become involved in research in the subject area via projects and assignments as appropriate

LEARNING OUTCOMES – PERSONAL ABILITIES

Students will be explicitly encouraged to:

- Develop a clear understanding of how the subject matter links to other topics and courses
- Apply theoretical knowledge gained during the course to practical problems and to their professional
G11OP Managing the Reservoir

Students will be explicitly encouraged to:

- Develop their personal skills including study skills, time management and interpersonal relationships (teamwork)
- Provide constructive feedback to the course leaders on the subject and the delivery of the course

Students will be explicitly encouraged to:

- Develop their personal skills in communicating within a team and to the academic staff
- Develop their skills in problem solving using both paper based and IT solutions

**SYLLABUS**

- Introduction to reservoir management in a mature field which includes development of an appreciation of the field development to date, understanding the data available, modelling options, the decisions that must be made and the economic links to value versus cost.
- Review and assessment of existing and potential surveillance techniques such as chemical tracers, 4D seismic, other geophysical methods, well monitoring, Production Logging Tools, Modular formation Dynamics Tester, Pressure Build Up etc. to determine when these methods add value.
- Suitable modelling methods given the reservoir conditions and available data. These will include decline curve analysis, material balance, analytical models, capacitance resistance modelling, and proxy models.
- Reservoir simulation methods will be revised to consider the appropriate grid and fluid representation appropriate to the reservoir conditions and the field management decision that is to be made.
- Simulation of various enhanced oil recovery for chemical, thermal and CO₂ methods. Predicting which method may work best.
- History matching using appropriate methods such as experimental design to understand the link between reservoir properties and field behaviour and to develop reduced order proxy models.
- Linking production controls to field behaviour for optimal field performance.
- Optimisation algorithms for automatic history matching and field optimisation.
- Linking production and economic models.

**COURSE RELATIONSHIPS**

N/A
### LOCATION AND ASSESSMENT METHODS

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