

PENSUM:

- Field development workflow.
 - Overview – The field development process (ppt)
 - Production modes
 - Discounting
 - Relationship between plateau height and length
 - Rule of thumb between plateau height and TRR
 - Bottlenecking
 - Onshore vs offshore
 - Oil vs gas
- Field production performance
 - Dry gas production system: material balance, IPR, TPR, FPR. Flow equilibrium, production scheduling (Class exercise, Home exercise)
 - Production potential dry gas system (Class exercise)
 - Home exercise: Multi-field production scheduling using the production potential
 - Home exercise: production scheduling in a saturated oil field.
 - Dry gas networks (class exercise)
 - Tubing tables (home exercise)
 - Gap, Prosper and MBAL (ppt, class exercise)
 - Coupling reservoir and well and network models
- Value chain model, cost estimation and NPV calculations (Class exercise, Home exercise)
- Subsea compression (Class exercise)
- Probabilistic reserve estimation
 - Monte Carlo (Class exercise in Excel and Jupyter notebook)
 - Latin Hypercube Sampling – LHS (Class exercise in Jupyter notebook)
- Decision and probability tree analysis (Class exercise in Jupyter notebook)
- Home exercise: quantification of uncertainty in NPV - early field development
- Offshore structures
 - Overview (ppt)
 - Layout of production systems (ppt) (Home exercise, problem 4)
 - Marine loads on offshore structures (Class exercise in Jupyter notebook)
- Flow assurance considerations (ppt)
 - General overview
 - Inhibitor subsea system. Disposal.
 - Home exercise: Hydrate and p and T calculations on wet gas pipeline.
- Production optimization (ppt)
 - Introduction
 - Time scales
 - Cases (examples)
 - Algorithms for production optimization
 - Examples
 - Limitations and pitfalls
 - Class exercise
- Electric submersible pumps (class exercise)

Tools:

-Excel with VBA, Excel solver, Jupyter Notebook (python), gap, prosper and MBAL (Petex)

Generic Skills and topics

- Sampling with Monte Carlo, Latin Hypercube
- Probability trees
- Optimization
- Marine loads on offshore structures
- FFT

INDUSTRY PRESENTATIONS:

- Subsea transport and processing
- Flow assurance in Aasgard
- Hydrates
- Flow assurance in field development
- Compact separation

Exercise grades:

- To be uploaded in the following weeks

Exam

- Guest lectures are not to be included in the exam

Type of exercises:

- Theory, writing
- Hand calculations and fill results and procedure in Inspira
- Use of Excel and upload Excel file to Inspira. Excel can be run from the local machine or from examfarm.ntnu.no