Last class 20.04.2017

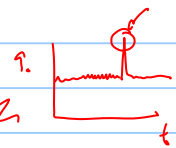| Topic	Level	In exam	Methods/Tools	Software
Life cycle of a hydrocarbon field	Appreciation	NO	-	-
Field development workflow - Probabilistic reserve estimation - Cost estimation and NPV calculations	Appreciation/ configuration/ design	YES	Gant chart, NPV calculations, Spider plot, decision trees, Monte Carlo simulation, basic probability, tornado chart	Excel VBA
Offshore (and some onshore) field architectures and layout of production systems - Production manifold - Pigging facilities	Configuration	YES	Engineering diagrams and drawings.	-
Offshore structures for oil and gas production - Wave statistics - Loads	Configuration/ design	YES	Fast Fourier Transform for signal analysis. Probability distributions.	Excel VBA
Reservoir depletion and field performance - Production potential - Production scheduling - Flow equilibrium in production systems, choking and boosting - Flow performance of surface and downhole production networks	Design	YES	Flow in porous media. Material balance. Single and multiphase flow in conduits. Flow equilibrium	Excel VBA, Gap, Prosper, Mbal
Production Processing - Overview	Appreciation, Design	YES	Flash calculations and PVT behavior	Hysys, Excel VBA
Flow assurance - Modeling of gas and condensate transport in pipeline and hydrate formation - Simplified modeling of oil and water emulsions	Appreciation, Design	YES	Pressure and temperature drop in flowlines and pipelines	Hysys, Excel VBA
ESP fundamentals, design and plan for the field life	Design	YES	Pump performance. Operational constraints.. Production system analysis	Excel VBA
Early subsea boosting planning	Design	YES	Compressor performance. Operational constraints.	Excel VBA
Data management and allocation	Appreciation/ design	YES	Data analysis, filtering, QC, averaging, aggregating.	Excel VBA
Production optimization.	Design	YES	Basics on practical and mathematical optimization.	Excel VBA
Integrated asset modeling	Appreciation	NO	-	-
Generic skills exercised			Modeling, Analysis, Problem solving, critical thinking, Excel skills, Excel etiquette, programming	
Additional skills gained by home and class exercises			Group work. Develop written and oral engineering communication skills.	

solver
solver

Spring	Written examination	60/100	C	2017-05-15	09:00	13:00
Spring	Work	40/100				

ex 1   ex

- 40 exercise $\frac{6.8}{100}$ +
- 60 exam

Content
- covered in class
- topics covered in the exercises, class exercises
- additional material
  { - Compendium
    - offshore structures write-up
    - FD of Åsta Hansteen field }

Exam?

- Descriptive questions. { theory question }

- Sketch to explain and describe the system

- Hand calculations. { aided with plots / with some help expressions. }

$$q' = C(p_R^2 - p_{wf}^2)^{n'}$$

-Design (schematically) and propose excel spreadsheets to perform calculations

C. Specified printed and hand-written support material is allowed. A specific basic calculator is allowed.

Check ITslearning! old exercises
old exams

$P_{wh} = 7 \text{ bara}$
14 bara

$f = 50 \, hz$

$q_{o,tgp} = q_{o_R} + q_{o_d}$

new $M_o = f$ blend

new $M_{mix} = f(wc)$ emulsion

q_{od}

P_R

$-f \cdot wc$

P_{wf}

q_{o_R}

q_{o_R}

$\left\{ \% = \left\{ \dfrac{q_{d,l} \cdot 100}{q_{o_R} + q_{d,l}} \right. \right.$

1000 sm^3/d

q_{od}