

TP64230 Field development and operations

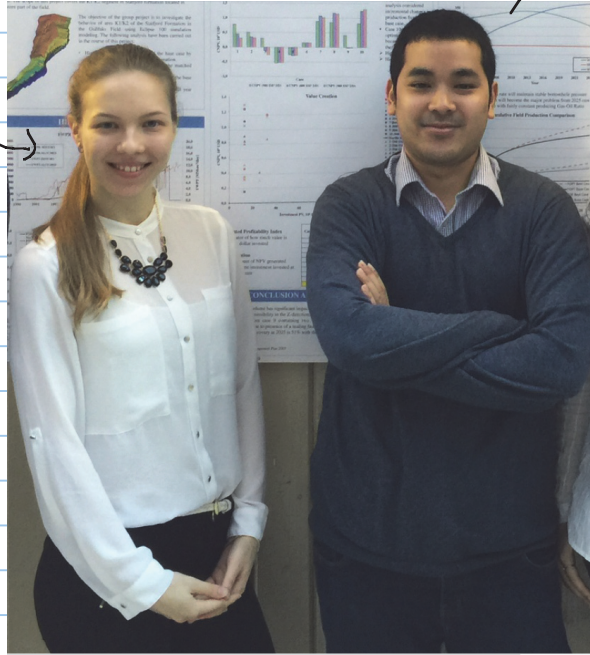
Prof. Milan Stanko

- Classes P1

mondays 15:15-17:00	} theory and exercises
tuesdays 14:15-17:00	

- student assistants

Anna Damlova



Reizky Azhar

- Evaluation : 40% mandatory exercises 5-6 exercises
: 60% written examination 2016.06.06 kl. 09:00

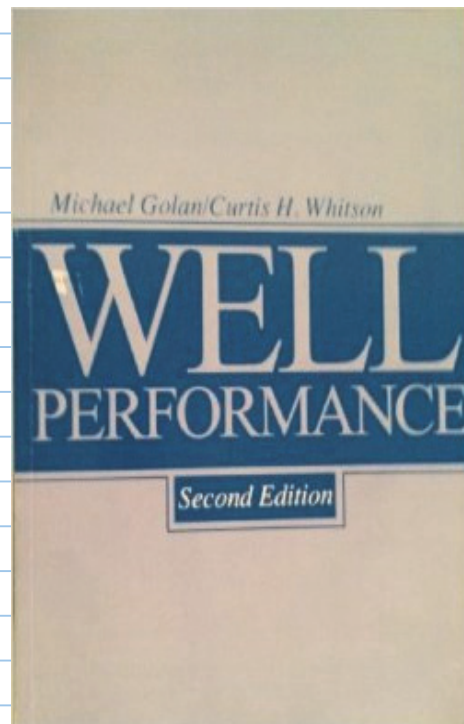
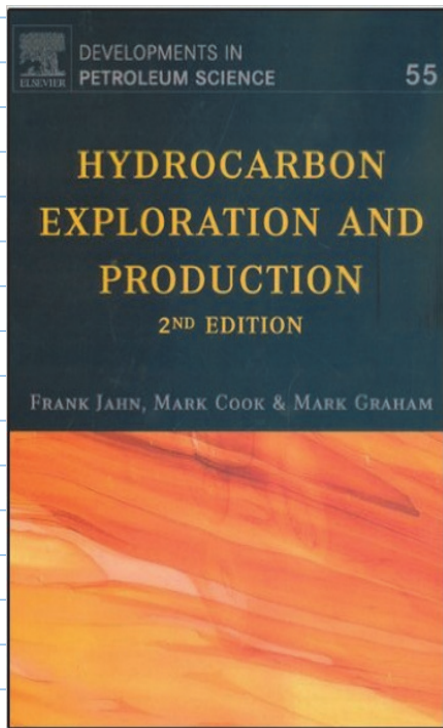
Reference group: Per Henrik Field

Guest Lecturers : Prof. Michael Golam

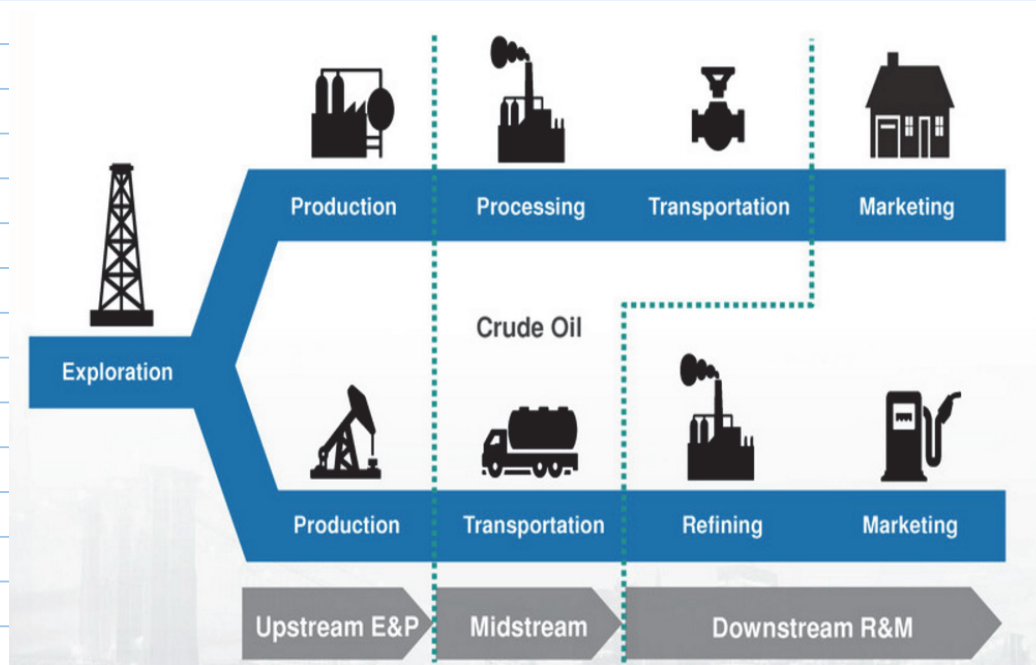
Prof. Curtis Whitson

Dr. Jesus De Andrade

Bibliography



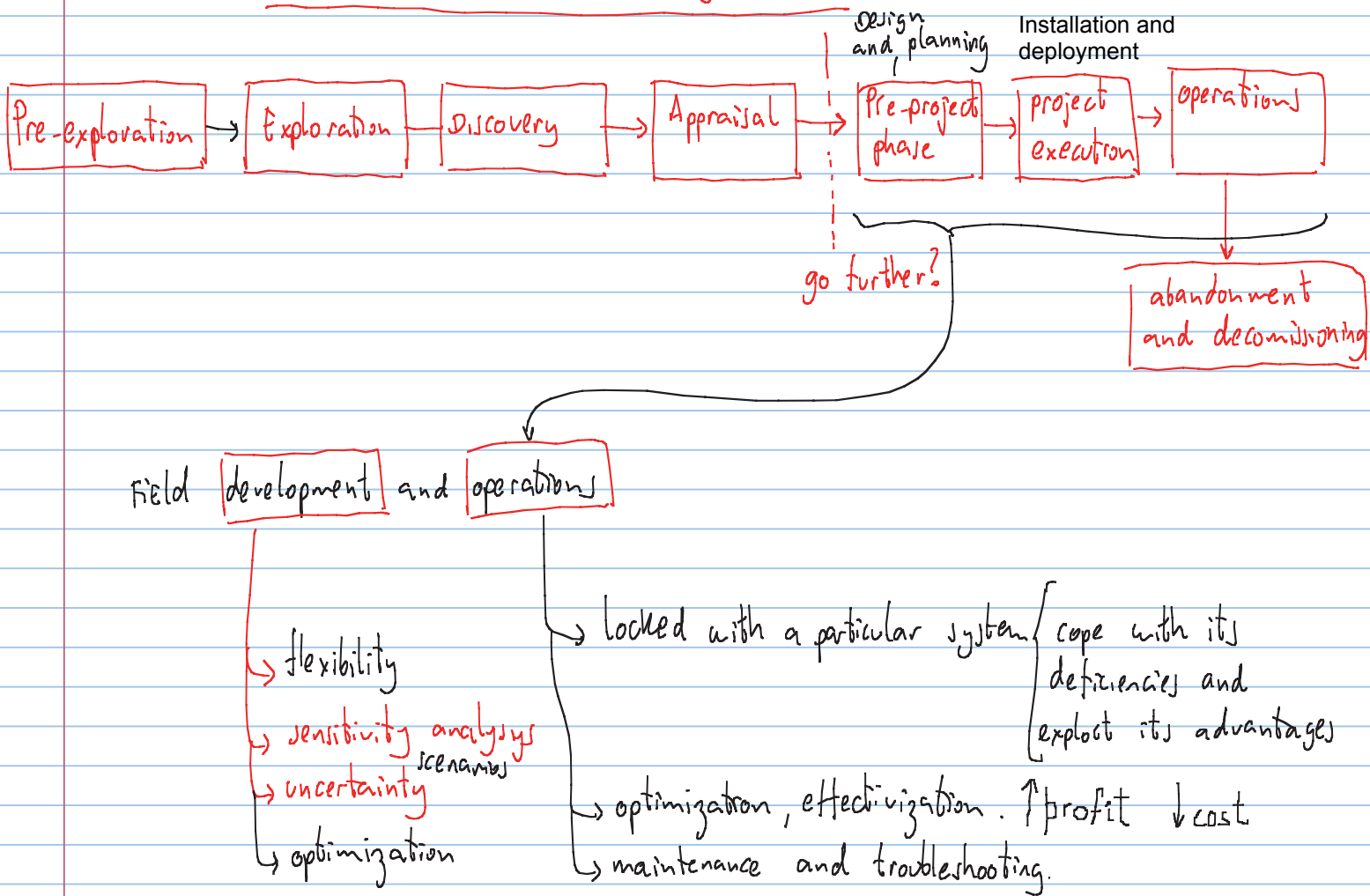
Field development and operations : E&P Exploration and production, upstream sector



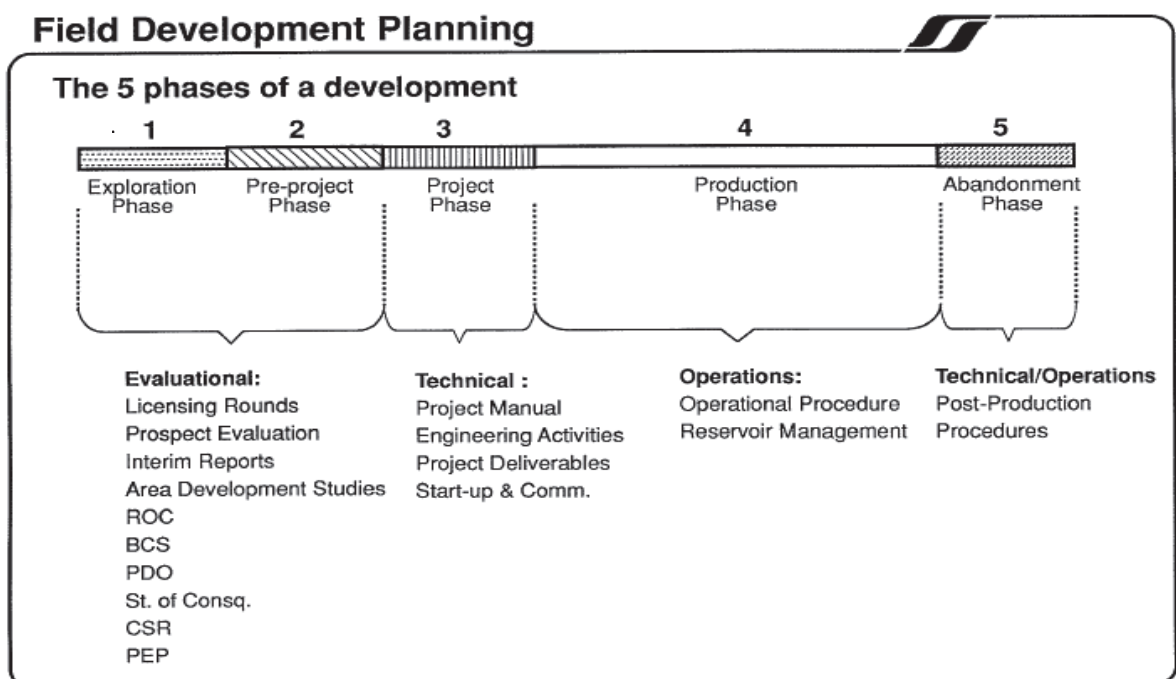
where are we?

when in the life of the field is this course located

Life cycle of an oil and gas field

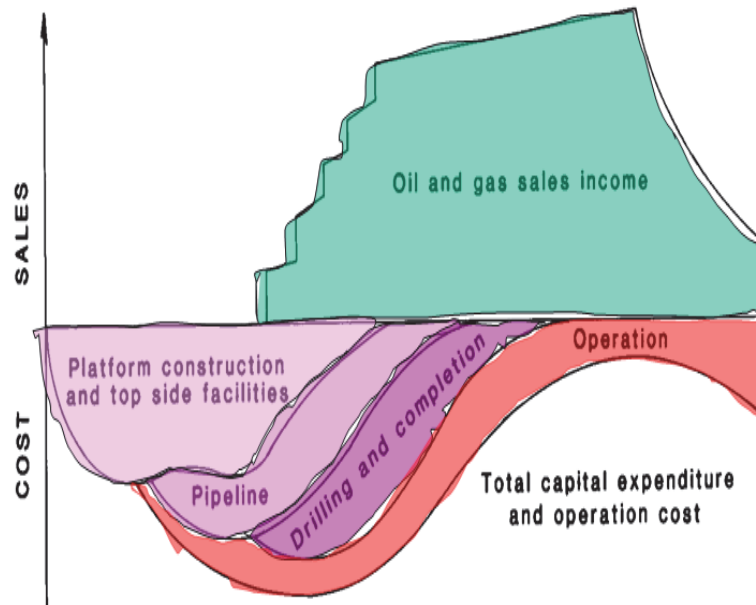


focused on offshore developments, on the Norwegian sector.



Both in the development phase or during operations it is very important to look at the cash flow, cost and revenue of the asset.

Revenue and Cost Profiles



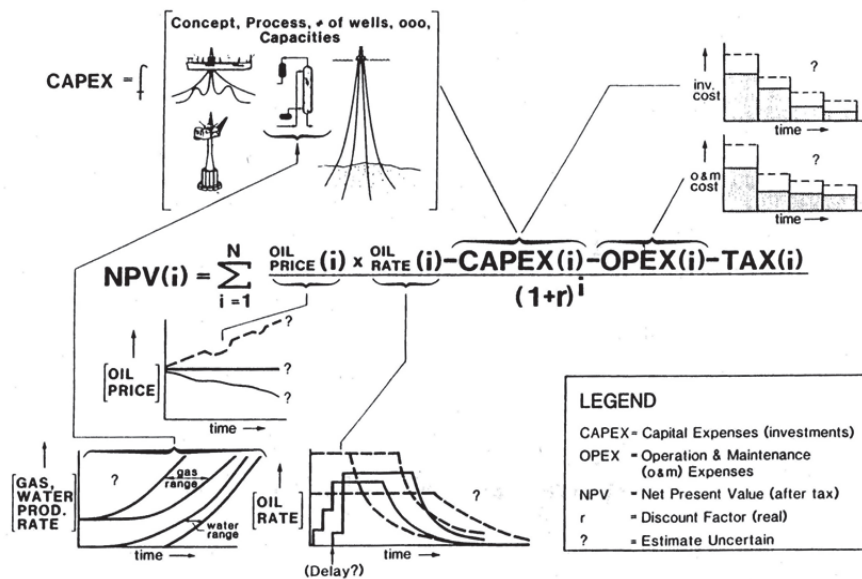
The Ultimate driver in E&P operations

$$NPV = \sum_{i=0}^N \frac{OIL\ PRICE(i) \times OIL\ PROD(i) - CAPEX(i) - OPEX(i) - TAX(i)}{(1+r)^i}$$

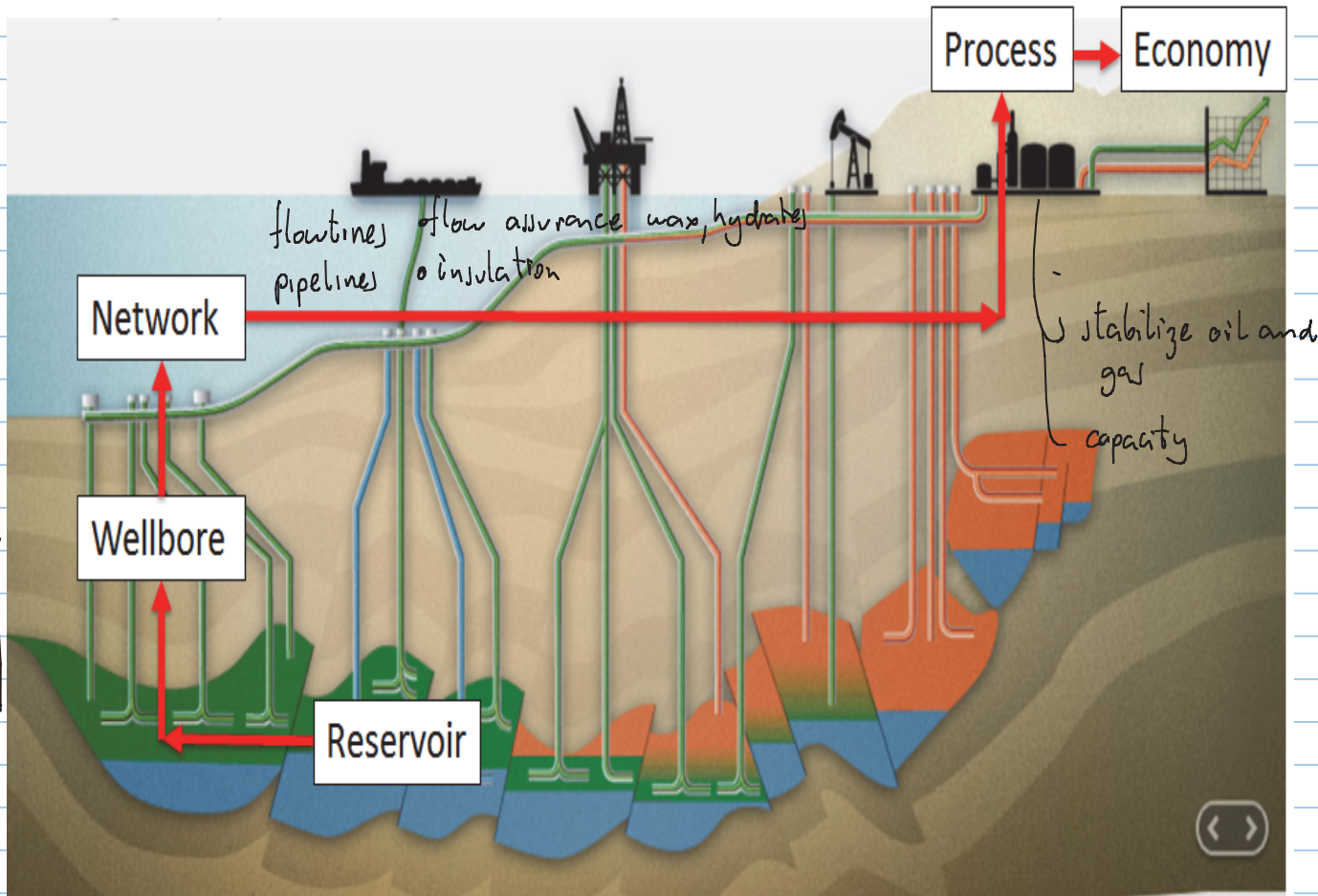
Production profile → defined by field performance

The hydrocarbon production is the most important cash generator in a petroleum asset

What can we control?



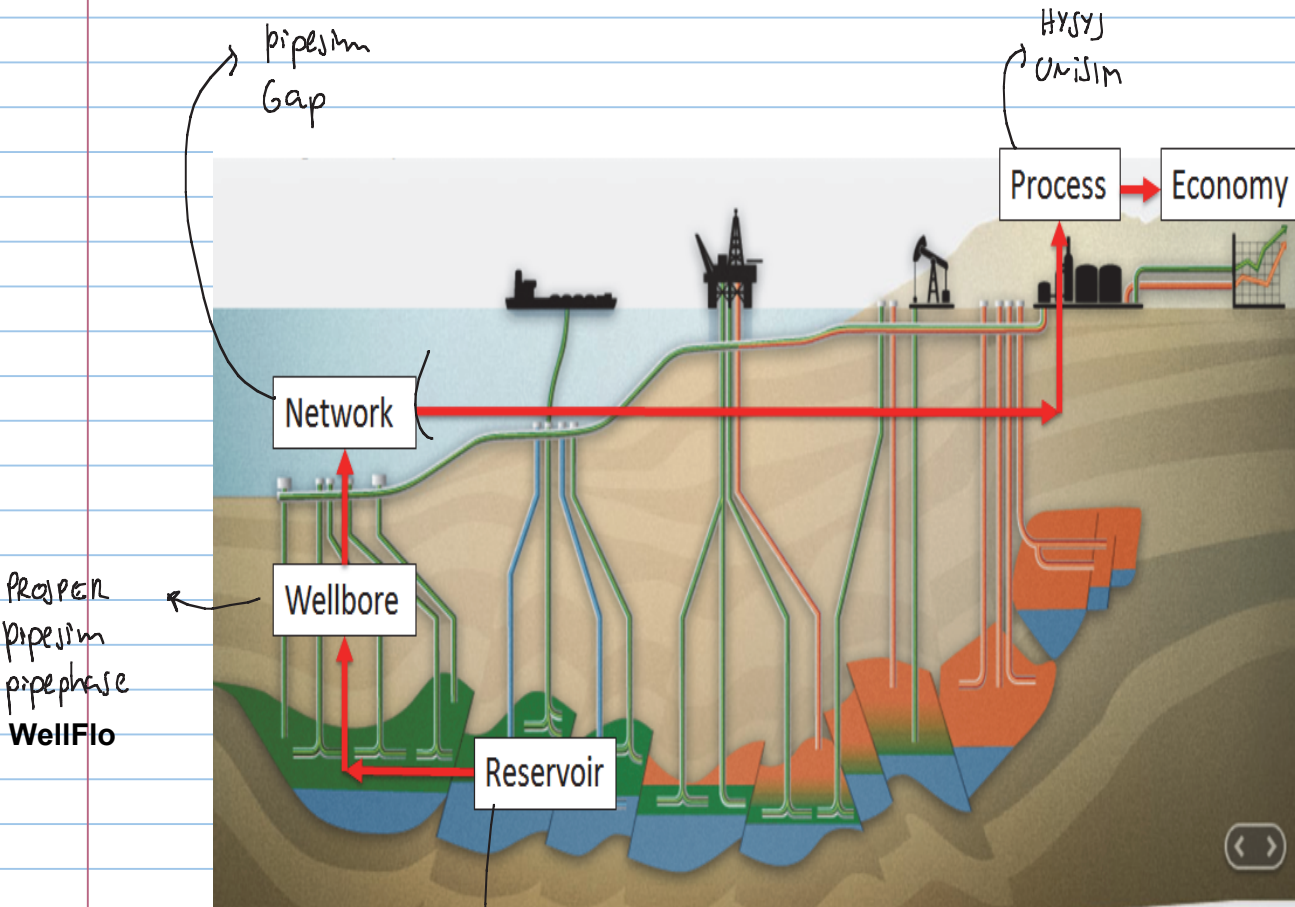
Components defining the field performance



- Recoverable reserve
- initial pressure
- Reservoir characteristics
- Geological structures
- pressure support
- fluid characteristics
- reservoir communication

Commercial software used in the oil industry to compute field performance

ReO



→ Eclipse

→ CMG

→ MOCAP

→ sensor

→ material balance { MBAL. SOS

→ Decline curve analysis (DCA)

→ Reveal

IAM
Integrated asset modeling

RESOLVE

IAM (Avoce)

Pipe-it

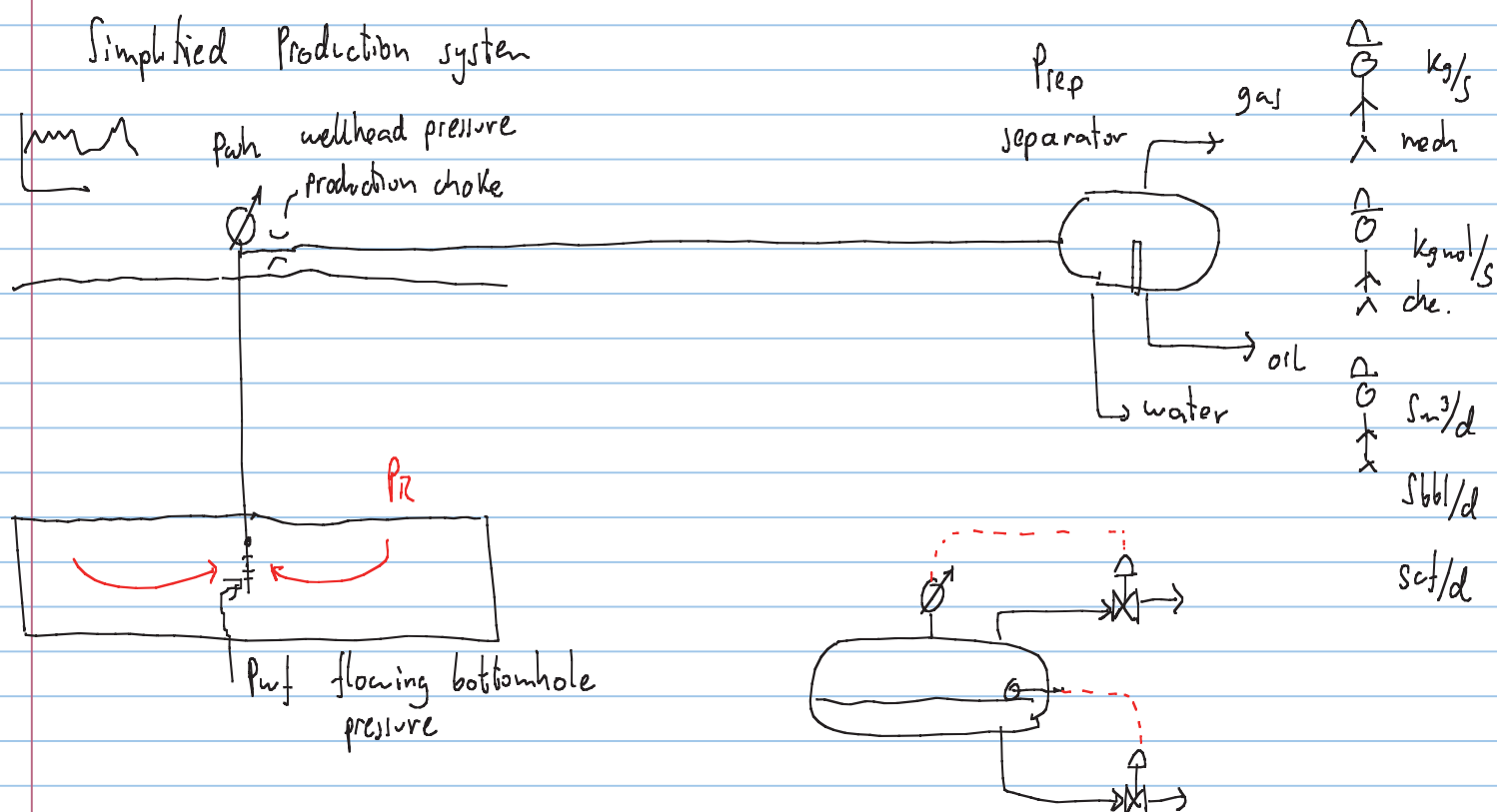
Skills to exercise and develop in this course

- specific to oil and gas industry:
 - field architecture
 - well technology
 - process and flow technology
 - control and instrumentation
 - offshore technology

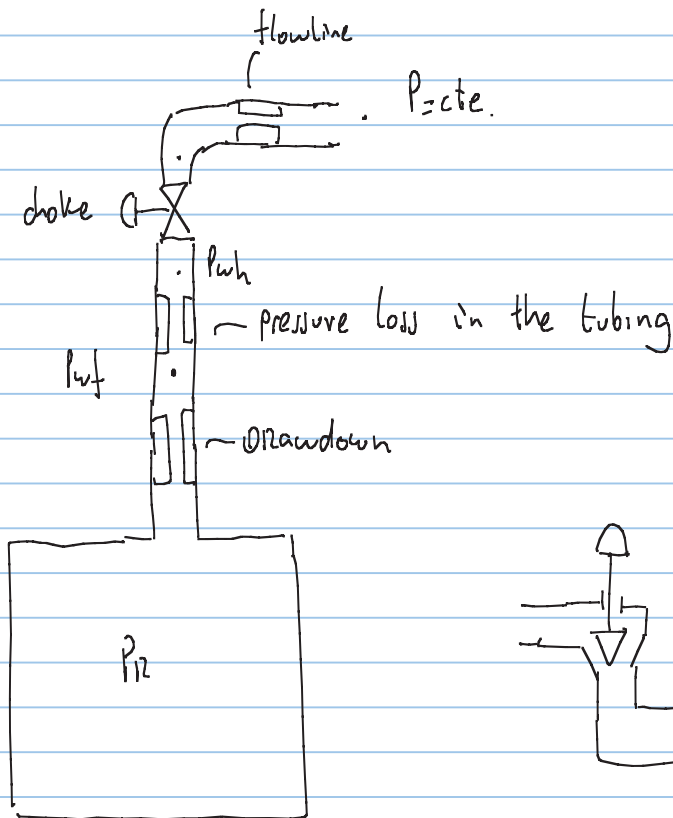
- Fluid mechanics
- thermodynamics
- math and data handling, statistics
- economical analysis

Production profile $\leadsto$ production scheduling

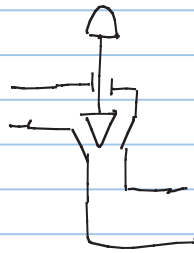
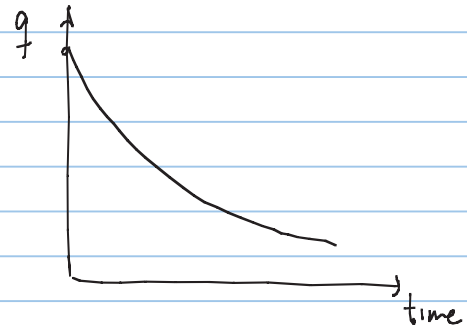
how much the field is going to produce
" " each well is going to produce



Analogy of the production system

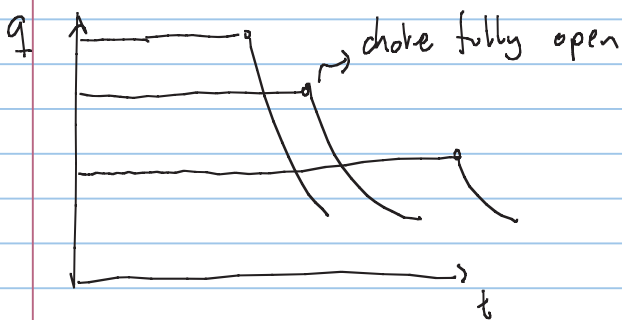


$$q \propto P_R - P_{sep}$$



mode A: constant rate

- Requires a constant adjustment of the choke



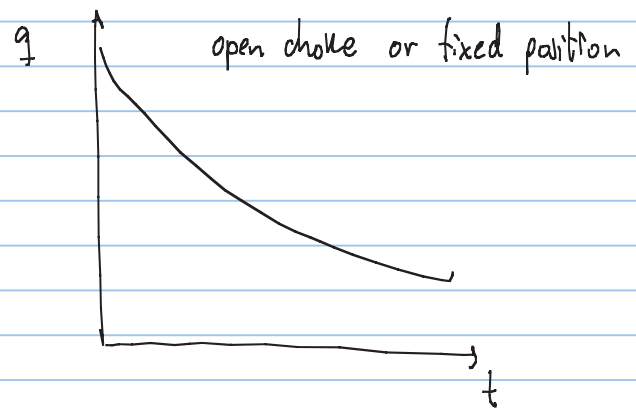
- when is it used?;

- standalone development
- build the infrastructure from scratch.

go to our field simulator:

mode B: constant pressure

- choke is left at a fixed position



as much as possible, as fast as possible

- satellite field to tie-in to an existing field with spare capacity
- no new for new infrastructure

