#### DTTNU | Norwegian University of Science and Technology

# OG621 – Oil and Gas Production wells

Spring Semester 2022

## Information

- Lecturer: Assoc. Prof. Milan Stanko (Production Tech) (<u>milan.stanko@ntnu.no</u>).
- Prof. Adela Syikilili
- Assistant professor Beatrice Issara



### **Course scope**

- Production performance of wells and gathering systems.
- Addresses the integrated production system, inflow, tubing and pipe flow, and technologies such as artificial lift
- Developing skills for planning, operating, monitoring, troubleshooting and controlling production of oil and gas production systems



# Goals of the course

At the end of the course, the student should be able to:

- Perform common production engineering calculations
- Understand the fundamentals of petroleum production engineering
- Describe the main components of the production system, the most common well completions, artificial lift methods and configurations of production systems
- Describe, understand and explain the functionality of the main components of a production system
- Understand the factors and drivers involved in the planning and operation of oil and gas wells



## **Course content**

- Introduction (well layout, production engineering domain)
- Flow equilibrium
- Inflow performance relationship
  - Undersaturated Oil
    - Radial and horizontal wells
    - Water coning
  - Dry Gas
    - High velocity flow
  - Saturated oil
- Tubing performance
  - Dry Gas flow
  - Tubing size considerations
  - Multiphase flow of oil, gas and water
- Artificial lift
  - Gas lift
  - Electric submersible pump
- Temperature calculations in wellbore
- Choke performance



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# **Reference** material

- Milan's <u>Compendium</u>
- Book: Well performance (Golan and Whitson)
- Other relevant material, e.g. articles, Excel files, notes, links, will be provided or mentioned in the videos

#### Other

- Production wells compendium (Asheim)
- Book Nodal analysis of Oil and Gas production Systems, (Jansen)





# Teaching

- Flipped classroom
  - Participants watch by themselves pre-recorded videos (ca 15-40 min) (on <u>Youtube</u>)
  - Live classes every week/2 weeks
    - Discussing further theory, exercises, tutorials on software, Q&A, advanced topics
    - In Zoom



### How to watch the videos

- Watch the entire video (can be watched at 1.5-2x speed)
- At certain time stamps (or at the end of the video), the videos might have embedded links to other relevant videos and material
- Pause when needed. Try to summarize what was presented with your own words. Take notes.
- DO THE EXERCISES BY YOURSELF
- Read the additional material provided, if any



# Tools

- Excel (VBA)
- Python (Jupyter Notebook) using Google Colab maybe?



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#### **Questions?**

