Voorbeelden blended learning
TU Delft
Blended Learning Wave

- **Online**
  - Watch video
  - Read material
  - Online Quiz
  - Calculations
  - Prepare lecture

- **F2F**
  - Discuss Quiz
  - Peer Instruction
  - Discuss calculations
  - In-depth Lecture
Examples
Railway Engineering

• Redesign 5 master course
• All blended
Railway Engineering

- Watch video
- Read material
- Online Quiz
- Calculations
- Prepare lecture
- Discuss calculations
- In-depth Lecture

Online

F2F
Peer Instruction

ALL
SOME
NONE
PRIME

- **PRoject Innovation Mathematics Education**
- 1st & 2nd year math courses
- Whole university
Write the following product with a single base. Do not simplify further.

\[(2t)^5 \times 3\]
Write the following product with a single base. Do not simplify further.

\[
(2t)^5 \times (2t)^3
\]

Your answer: \((2t)^8\)

Your answer is incorrect.

Use the power rule to simplify the expression
Write the following product with a single base. Do not simplify further.

\[ \left( (2t)^5 \right)^3 \]

Your answer: \( (2t)^{15} \)

Yeah! That's right. The correct answer is \( (2t)^{15} \)

Use the power rule to simplify the expression

\[ \left( (2t)^5 \right)^3 = (2t)^{15-3} = (2t)^{15} \]
Docent Climate physics

- Climate physics
- Using MIT MOOC materials
Climate physics

Watch video

Discuss cases

Quiz

Watch video

Discuss cases

Quiz

Lab Work

Online

F2F
Docernt 3ME

- Materials Sciences
- Online exam questions
- Condensed Lecture
- Problem solving
3ME

Online

Read book

Maple TA exams

Textbook Questions

Condensed Lecture

Discuss questions

F2F

Bonus materials

College-rama

Old slides

Summaries
Na de hoofdvraag krijg je nog 3 vragen waarmee je je antwoord onderbouwt.

Een lange, dunwandige buis met een gegeven lengte $L$ en een gegeven inwendige straal $R_i$ wordt op buiging belast door een centraal aangebrachte kracht $F$, zie figuur.

De buis wordt aan de uiteinden ondersteund zoals aangegeven in de figuur. De elastische uitwijking van de buis mag maximaal gelijk zijn aan $\delta$.

De wanddikte van de buis, $t$, is tot op zekere hoogte een vrij te kiezen parameter. De enige beperking is dat de wanddikte van de buis veel kleiner moet zijn dan de inwendige straal: $t << R_i$.

De volgende benaderingen moeten toegepast worden (waar relevant):

\[
R_u = R_i + t \\ R_u^2 - R_i^2 \approx 2R_t \\ R_u^3 - R_i^3 \approx 4R_t^3 t
\]

waarin $R$ (m) de effectieve straal van de buis is. Gebruik deze benaderingen in de uitwerking van de vraag. Gebruik de effectieve straal $R$ en niet $R_i$ en $R_u$ in de uitwerking.
Docent - TPM

• Complex Problem Solving
• Together with Student Assistants
TPM

Question Hour

• All kinds of questions
  – Content
  – Course Structure
  – …

• Real life examples
Propulsion and Power

- 2\textsuperscript{nd} year bachelor, 300 students
- Free up classroom time for practice and calculations
- Flipped: video’s online existing videos self-created videos
Propulsion and Power

Online

- Watch video

F2F

- Calculations
- Demonstration
- Specific Topics

Quiz (4X) (bonus point)

- Calculations
- Demonstration
- Specific Topics
Where Did We Stand?

- We have derived the basic equations to define the performance of a rocket:

\[ F_T = (m \cdot v_e) \cdot \left( p_e - p_a \right) \cdot A_e \]

\[ v_e = \frac{p_e - p_a}{m} \cdot A_e \]

\[ \Delta v = v_e \cdot \ln \left( \frac{M_e}{M_e - M_f} \right) \]

\[ I_{sp} = \frac{v_e}{g_0} \]

- Some parameters in these equations \((v_e, p_e, m)\) depend on the propellant heating and acceleration process inside the rocket.

- A simplified evaluation of these parameters can be made by means of the ideal rocket theory, consisting of:
  - A simplified rocket geometry
  - A set of physical assumptions

Why an “ideal” rocket theory?

Our objective is to find simplified equations for:

- The jet velocity \(v_e\)
- The mass flow rate \(m\)
- The exit pressure \(p_e\)

This can be achieved with the Ideal Flow Theory, consisting of:

- A simplified rocket geometry
- A set of physical assumptions
Video Dynamics (Aerospace engineering)

https://www.youtube.com/watch?v=JqCMyExOhUA&feature=youtu.be
Programming and data science

• Master course
• Flipped with materials ‘Data analysis to the max’
• Students created course materials
Programming and data science

Online
- Watch video
- Submit a question
- Feedback on questions
- Discuss Questions

F2F
- Watch video
- Simple exercises
- Feedback on questions
- Discuss Questions

- Write a syllabus
- Create a video
Data Analysis: Take It to the MAX()

Enhance your data analysis skills using spreadsheets and data visualization. Increase your productivity and make better business decision.
In 2014 Sochi hosted the Winter Olympics where many countries competed to win some medals. For this assignment we provide you with data that lists all the achievements of the different skating athletes. This spreadsheet can be found here.

Better to be a loser than a spectator

(2 points possible)
For the following two questions, ensure you just copy/paste the excel cells as your answers.

Which man participated in the most events?

Which woman participated in the most events?
How can you start?