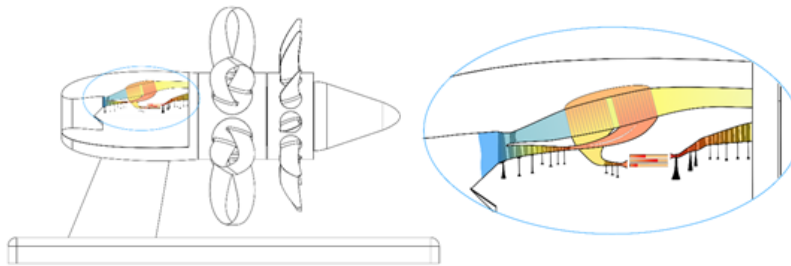


## Syllabus for

**SARC-PRO-01 - Turbomachinery and propulsion systems**

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**CREDITS** 7.5 credits

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**EXAMINER** Olivier Petit, Tomas Grönstedt

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**TARGET GROUP** Doctoral students in aeronautics who wants to improve upon their understanding of propulsion, conceptual design of turbomachinery and to gain knowledge on the technology that limits further progress of propulsion systems.

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**PREREQUISITES** Doctoral students in aeronautics with a basic background in fluid mechanics and thermodynamics. Gas dynamics and turbomachinery knowledge supports the learning but is not necessary.

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**AIM** The course covers the analysis of gas turbine cycles including some aspects of radical cycles. A broad coverage of the components of the gas turbine is covered (inlets, compressors, turbines, combustors) as well as some key aspects of turbine cooling and mechanical limitations. Mission aspects and gas turbine performance is covered as well the propulsion system relation to noise generation.

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**LEARNING OUTCOMES** After the course, the student shall demonstrate knowledge and understanding of:

- Be able to evaluate any type of gas turbine cycle
- Be able to optimize gas turbine cycles against realistic targets
- Understand trades of noise, weight, installation and performance

- Be able to setup models for mission analysis by formulating performance equations for a given cycle
- Have an understanding of certification of engines and how NOx and noise requirements interrelate with cycle choice.

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**CONTENTS** The course contains the following topics:

- Cycles and cycle analysis
- Turbomachinery (axial and radial machines, both compressing and expanding)
- Installation effects
- Combustion
- Aspects of mechanics and cooling
- Certification

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**ORGANISATION** Three physical meetings in different locations, 2 days per meeting.  
Oral exam.

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**LITERATURE** Dixon & Hall, Turbomachinery. Saravanamuttoo et al. Gas Turbine Technology

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**EXAMINATION** Each session is examined by a homework on the topic given. The main examination is a somewhat larger code development project or an oral exam, according to the student's preference.

The grade is passed/not passed.

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**FEE FOR  
INDUSTRIAL  
MEMBERS** --

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**REMARKS**

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