**Subject Name: Thermal and Fluid Machines**

Code: MK3HOAGL05GX17-EN

ECTS Credit Points: 5

Evaluation: exam

Year, Semester: 2nd year, 1st semester

Its prerequisite(s): -

Further courses are built on it: No

Number of teaching hours/week:

Lecture: 2

Practice: 2

**Topics**:

Turbo machine equation, Velocity triangles, Pump curves, Pump curve drawing, Hydraulics, Hydraulic resistances, Fluid machine utilization, Fluid machine choosing, Wind and water turbines, Turbine properties and efficiency, Gas and steam turbines, Turbine properties and efficiency, Heat exchangers, Practice: Heat exchanger choosing, Cooling towers, Mass and energy equations, Combustion, Practice: Heating values and dew point, Boilers, Boiler efficiency, Heat pump, COP calculations, Complex thermal and fluid machines, Efficiency of power plants

**Literature:**

*Compulsory:*

D. Yogi Goswami, Frank Kreith (2008), Energy conversion, CRC PressINC, ISBN: 9781420044317, 686 pages.

Charles Fayette Taylor (1985) The Internal Combustion Engine in Theory and Practice: Vol. 1 - 2nd Edition, The MIT Press, ISBN 978-0262700269, 584 pages.

Keith Herold, Reinhard Radermacher, Sanford A. Klein, (1996) Absorption Chillers and Heat Pumps, CRC-Press, ISBN 978-0849394270, 330 pages.

Arthur P. Fraas (1989), Heat Exchanger Design Wiley, 9780471628682, 560 pages.

Yunus A. Çengel, John M. Cimbal Boston : McGraw-Hill Higher Education, cop. 2010 Fluid mechanics: fundamentals and applications ISBN: 9780073529264

Renewable energy resources John Twidell, Tony Wier Routledge, 2015

Renewable Energy Engineering Nicholas Jenkins, Janaka Ekanayake Cambridge University Press, 2017

**Schedule**

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| **0th week Registration week** | |
| **1st week:**  **Lecture:** Turbo machine equation  **Practice:** Velocity triangles | **4th week:**  **Lecture:** Fluid machine utilization  **Practice:** Fluid machine choosing |
| **2nd week:**  **Lecture:** Pump curves  **Practice:** Pump curve drawing | **5th week:**  **Lecture:** Wind and water turbines  **Practice:** Turbine properties and efficiency |
| **3rd week:**  **Lecture:** Hydraulics  **Practice:** Hydraulic resistances | **6th week:**  **Lecture:** Gas and steam turbines  **Practice:** Turbine properties and efficiency |
| **7th week: 1st drawing week** |  |
| **8th week:**  **Lecture:** Heat exchangers  **Practice:** Heat exchanger choosing | **11th week:**  **Lecture:** Boilers  **Practice:** Boiler efficiency |
| **9th week:**  **Lecture:** Cooling towers  **Practice:** Mass and energy equations | **12th week:**  **Lecture:** Heat pump  **Practice:** COP calculations |
| **10th week:**  **Lecture:** Combustion  **Practice:** Heating values and dew point | **13th week:**  **Lecture:** Complex thermal and fluid machines  **Practice:** Efficiency of power plants |
| **14th week: 2nd drawing week** | |

**Requirements**

**A, for signature:**

Student must attend on the seminars and may not miss more than three lectures during the semester. In case a student misses more than three, the subject will not be signed and the student must repeat the course. Being 5 minute late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Active participation is evaluated by the lecturer in every class. If student’s behaviour or conduct doesn’t meet the requirements of active participation, the teacher may evaluate their participation as an absence due to the lack of active participation in class.

**B, for grade:**

The course ends in **exam grade**.

Examination, consisting a 60-minute theory test.