Politechnika Krakowska
im. Tadeusza Kościuszki

FACULTY: ENVIRONMENTAL AND THERMAL POWER ENGINEERING

COURSE TITLE: Thermal Power Engineering
Number of contact hours: 60
Duration: 1 semester
ECTS credits: 6

Programme description: The course comprises lectures, classes and projects. Familiarizing students with thermal, thermal-electric, gas and nuclear power stations. Introduction to real fuel cycle and water management. After completing the course students will be able to distinguish different types of power stations properly and evaluate their basic parameters: parameters of water, electric power, efficiency and specific fuel consumption. They will also know the methods of increasing the efficiency of such structures.
Specific problems discussed during the course will cover:

- domestic and global energy and fuel resources
- local and worldwide requisition of electric energy and heat
- structure of primary energy sources
- thermal power plants thermodynamic cycle – structure and parameters
- conventional condensing power-stations (steam)
- gas-turbine and combined cycles with heat-recovery boiler power plants,
- combined heat and power plants (CHP)
- nuclear power-stations
- fuel and water management at thermal power plants

Students will gain new skills and competences. They will understand the requirements for design, components and methods for contemporary water and wastewater systems. They will know how modern water and wastewater systems should be designed and economically operated.

Course type: lectures (30), classes (15), projects (15)
Literature:

1. Cengel Y.A., Boles M.A., Kanoglu M., Thermodynamics: An Engineering Approach, 9th Edition, 2019, McGraw-Hill, New York
2. Tomei G.L. (Ed.), Steam. Its generation and use, The Babcock & Wilcox Company, Charlotte, 2015

3. Miller B.G., Coal Energy Systems, Elsevier Academic Press, Burlington, 2005
4. Drbal L., Westra K., Boston P., Power Plant Engineering, 1995, Springer
5. Nag P.K., Power Plant Engineering, 2008, Tata McGraw-Hill, New Delhi
6. Gill A.B., Power Plant Performance, 1984, Butterworth-Heinemann, London
7. Fossil Fuel-Fired Power Generation. Case Studies of Recently Constructed Coal- and Gas-Fired Power Plants, International Energy Agency, Paris, 2007
8. King C.W.(Ed.), Thermal power plant cooling: context and engineering, 2014, ASME, New York
9. Buecker B., Power plant water chemistry: a practical guide, 2006, PennWell Publishing Company, Tulusa
10. Myerscough P.B. (Ed), Modern power station practice. Volume J. Nuclear power generation, 1992, Pergamon Press, Oxford
11. Kok K., Nuclear Engineering Handbook, CRC Press, Boca Raton, 2009
12. Boyce M.P., GasTurbine Engineering Handbook, Gulf Professional Publishing, Houston, 2002
13. Kehlhofer R., Combined-Cycle Gas and Steam Turbine Power Plants, PennWell Publishing Company, Tulusa, 1997

Assessment method: test, projects

Lecturer: Tomasz Sobota

Contact person: Tomasz Sobota, tsobota@mech.pk.edu.pl