

FACULTY OF **ENGINEERING**

DEGREE COURSE: **INDUSTRIAL ENGINEERING**

MASTER DEGREE: **INDUSTRIAL ENGINEERING / ENERGY**

SUBJECT: ENVIRONMENTAL IMPACT OF ENERGY SYSTEMS

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OBJECTIVES

The scope of this course is to provide the essential knowledge to evaluate the environmental impact of the most common energy conversion systems.

In particular, gaseous, liquid, solid, thermal and acoustic emissions of fossil fuelled energy systems and renewables are discussed in detail.

Subsequently, technologies for pollutants control of the most common energy conversion systems are introduced. In particular, the Carbon Capture and Storage technology for the mitigation of the carbon dioxide environmental impact is presented.

Eventually, the last part of the course is focused on the international policies adopted in order to mitigate and control the environmental impact of the energy systems (i.e. EU-Emission Trading Scheme).

CONTENTS

Introduction on the environmental impact of the energy systems

Liquid emissions of energy conversion systems

Thermal pollution of energy conversion systems

Acoustic emission of energy systems

Sources of emission

Technologies for pollutants control

The Carbon Capture and Storage technology

International policies for emissions control

LEARNING OUTCOMES

At the end of this course students will own the essential knowledge for understanding the environmental impact of the most important energy systems.

In particular, students should know the impact on the environment in terms of gaseous, liquid, solid, thermal and acoustic emissions of the most common fossil fuelled energy conversion systems and renewables.

In addition, students should know also the most common technologies and international policies for pollutants and emissions control.

ASSESSMENT

Written exam: multiple-choice tests and open-ended questions

RECOMMENDED TEXTBOOKS

M. Kutz, Environmentally Conscious Alternative Energy Production, Wiley & Sons, 2007.

T.C. Lieuwen, V. Yang, Gas Turbine Emissions, Cambridge Aerospace Series, 2013

