

## Near-natural and Cleaner Production Technologies

Code: MK5TKTTK03K117-EN

ECTS Credit Points: 3

Evaluation: mid-semester grade

Year, Semester: 2<sup>nd</sup> year/1<sup>st</sup> semester

Number of teaching hours/week (lecture + practice): 1+2

### Topics:

Students attending the course can get acquainted with the importance of near natural and cleaner production technologies. They get an overview about an approach, which takes into account impacts on the environment of a product or a service over its entire life cycle (Cleaner Production Options, Cleaner Production and its Relation to Other Similar-Sounding Concepts, Cleaner Production and Environmental Management Systems,), that is from its design to its final disposal (e. g. Integrated Product Policy, Extended Producer Responsibility, Integrated Pollution Prevention and Control).

Students get knowledge about how to introduce the basic concepts of Clean Production (CP) and how CP can be applied in practice to be the benefit of industry, while they clarify several common misconceptions about CP. The subject also provides an overview of the main obstacles to successful CP policy development and how to mainstream Cleaner Production.

Within the frame of different kind of production technologies ( e.g. paper production, biogas production; composting; poultry rearing; eco-farming; slaughterhouses and animal by-products; food, drink and milk industries) students get acquired with the implementation and operation of these technologies.

### Literature:

#### *Required:*

- Lennart Nilsson, Per Olof Persson Lars Rydén, Siarhei Darozhka, Audrone Zaliauskiene (2005) Cleaner Production Technologies and Tools for Resource Efficient Production. The Baltic University. Environmental Management book series.
- Zainura Zainon Noor (ed.) INTRODUCTION TO CLEANER PRODUCTION Prepared by Universiti Teknologi Malaysia, Skudai, Johor.

#### *Recommended:*

- EUROPEAN COMMISSION (2015) Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board.
- EUROPEAN COMMISSION (2017) Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry or Pigs
- EUROPEAN COMMISSION (2005) Reference Document on Best Available Techniques in the Slaughterhouses and Animal By-products Industries.
- EUROPEAN COMMISSION (2006) Integrated Pollution Prevention and Control Reference Document on Best Available Techniques in the Food, Drink and Milk Industries

- Pawel Kazmierczyk (UNIDO CP Policy Consultant) (2002) Manual on the Development of Cleaner Production Policies—Approaches and Instruments, Guidelines for National Cleaner Production Centres and Programmes. UNIDO. Vienna.

## Schedule

<b>1<sup>st</sup> week Registration week</b>	
<p><b>2<sup>nd</sup> week:</b></p> <p><b>Lecture:</b> Introduction into cleaner production. Industrial Impacts on the Environment.</p> <p><b>Practice:</b> Case study.</p>	<p><b>3<sup>rd</sup> week:</b></p> <p><b>Lecture:</b> Environmental management systems, environmental management tools, LCA.</p> <p><b>Practice:</b> Environmental tools in decision support system, LCA in practice.</p>
<p><b>4<sup>th</sup> week:</b></p> <p><b>Lecture:</b> CP policy development cycle</p> <p><b>Practice:</b> Policy tools and instruments. Analyses, planning.</p>	<p><b>5<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Recent trends in CP policy.</p> <p><b>Practice:</b> Background regulations.</p>
<p><b>6<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Promoting Cleaner Production</p> <p><b>Practice:</b> Case studies, corporate social responsibility.</p>	<p><b>7<sup>th</sup> week:</b></p> <p><b>Lecture:</b> air-water-soil pollution reduction, energy conservation, waste reduction.</p> <p><b>Practice:</b> Case studies - Sustainability reports.</p>
<b>8<sup>th</sup> week: 1<sup>st</sup> drawing week</b>	
<p><b>9<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Green engineering, cleaner production practices.</p> <p><b>Practice:</b> Case study, analyses in practice, end of pipe and clean(er) technologies.</p>	<p><b>10<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Food industry.</p> <p><b>Practice:</b> Best available techniques, case studies.</p>
<p><b>11<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Intensive rearing of poultry, slaughterhouses and animal by-products industries.</p> <p><b>Practice:</b> BAT technologies.</p>	<p><b>12<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Biogas production.</p> <p><b>Practice:</b> BAT for biogas production.</p>
<p><b>13<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Eco-farming.</p> <p><b>Practice:</b> Eco-farming in practice (cop production, animal husbandry).</p>	<p><b>14<sup>th</sup> week:</b></p> <p><b>Lecture:</b> Production of paper.</p> <p><b>Practice:</b> Paper production technologies. BAT technologies.</p>
<b>15<sup>th</sup> week: 2<sup>nd</sup> drawing week</b>	

## Requirements

A, for a signature:

Attending practices is compulsory. Attendance at lectures is recommended. Students have to attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students cannot make up any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes have to be made up for at a later date previously discussed with the tutor.

**B, for a grade:**

The course ends with a written end-term test.

The minimum requirement of the end-term test is 60%. The grade is given according to the following (score/grade): 0-59 = fail (1); 60-69 = pass (2); 70-79 = satisfactory (3); 80-89 = good (4); 90-100 = excellent (5). If the score of the test is below 60, students can retake that test in conformity with the EDUCATION AND EXAMINATION RULES AND REGULATIONS.