Course: Municipal Solid Waste: System Management and Design

Mandatory: X
Elective: 
Specialization: 

Semester: F X S
Teaching Units: 4 ECTS: 6

Teaching Hours per week: T 3 E 1 L 2/2

Instructors: E. Gidarakos

Textbooks (Eudoxus):
Δημήτριος Παναγιωτακόπουλος, 2007. Βιώσιμη διαχείριση αστικών στερεών αποβλήτων, Εκδόσεις ΖΥΓΟΣ, Θεσσαλονίκη.

Other recommended books:
2. Ευάγγελος Γιδαράκος, 2010. Σχεδιασμός Σταθμών Μεταφόρτωσης & Χώρων Υγειονομικής Ταφής Απορριμμάτων. Πανεπιστημιακές Σημειώσεις, Πολυτεχνείο Κρήτης.

Notes: E-class (Notes – Excercises – Laboratory guide)

Labs: # of lab exercises: 4 Individual Reports X Team Reports X
Lab final written exam X % of Final Lab Grade 50

Final Grade:
Final Exam 70 %
Project 
Labs 30 %
Other ( ) 

Course Syllabus:
- Solid waste classification and characterization
  - Solid waste categories
  - Municipal Solid Waste
  - Qualitative and quantitative analysis
  - MSW composition studies in Greece and abroad
- Recycling
• Basic Principles
  • Recycling Performance Assessment
  • Recycling Materials
  • Packaging Waste

  • Mechanical – Biological Treatment
    • Basic principles and brief description of operation
    • Methods for biological treatment of municipal solid waste
    • Composting
    • Types of composting
    • Compost
    • Advantages and disadvantages of composting
    • The process of composting
    • Stages of Composting
    • Influence of Chemical factors
    • Influence of Physical factors
    • Quality requirements
    • Anaerobic digestion

  • Thermal Treatment
    • Introduction
    • Incineration
    • Emissions
    • Pyrolysis
    • Gasification
    • Plasma Technique
    • Mechanisms of formation and behavior of hazardous substances

  • Processes Balance
    • Mass balances
    • Balances pollutants
    • Energy balances
    • Summary

  • Integrated Waste Management Facilities (IWMF)
    • Disposal
    • Landfill
    • Production and composition of leachates
    • Biogas
    • Restoration period of a landfill
    • Restoration of a landfill

  • Selection criteria of IWMF location
    • Waste Management Strategy
    • Choice of the appropriate location
    • Criteria for choosing location

  • Insulation Systems, Management and Collection of leachetes
    • Leachete Production
    • Slope and collection of leachete/exhaust pipe installation
    • Hydraulic conductivity of the drainage zone
    • Selection and characteristics of the pipe
    • Blocking and filtering
    • Insulation Leaks

  • Biogas Collection and Control Systems
    • Estimate quantity of biogas
    • Passive monitoring of biogas
    • Active monitoring of biogas
    • Concentrates on biogas recovery systems
- Biogas Management
  - Design of landfills and Compost cover
    - Design of landfill
    - Compost cover
  - Closing a Landfill: Final Cover and Restoration
  - Sustainable Landfills