



<b>Course Code</b> CVEE-467	<b>Course Title</b> Industrial Waste Treatment Technologies	<b>ECTS Credits</b> 6
<b>Department</b> Engineering	<b>Semester</b> Fall, Spring	<b>Prerequisites</b> CVEE-260, CHEM-120
<b>Type of Course</b> Elective	<b>Field</b> Civil and Environmental Engineering	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 4 <sup>th</sup>	<b>Lecturer(s)</b> Dr Michalis Loizides
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### **Objectives of the Course:**

The main objectives of the course are to:

- Introduce students to the different types of engineering technologies and systems commonly used in twenty-first century industrial sector to effectively treat and remove pollutants from liquids, gases, and solids
- Identify the fundamental chemical and physical characteristics of each target pollutant
- Identify the mechanisms by which the target pollutant is held in suspension by the waste stream
- Determine the most efficient and effective method by which each target pollutant can be isolated and removed from the waste stream
- Provide students valuable information on different case studies (industries) explaining the most effective engineering mechanisms used for waste treatment (solids, gases, and liquids)
- Expose students to a real-case scenario with on-site visits to local industrial partners

### **Learning Outcomes:**

After completion of the course students are expected to:

- Identify and evaluate the performance of different types of waste treatment systems found in industry
- Use appropriate system technologies and equipment (e.g. cyclones, filters) for pollution control and prevention
- Demonstrate thorough knowledge on the characteristics of pollutants in different waste streams
- Explain the laws and regulations that are in place which concern water pollution, groundwater pollution, and air pollution
- Apply engineering methods of waste (air, solids, liquids) treatment in different

types of industry

- Evaluate the performance of an installed system of waste treatment and provide sustainable solutions to pollution hazards

### **Course Contents:**

- Evaluating and selecting industrial waste treatment systems
- Treatment evaluation process for industrial wastewater, air emissions, and solid wastes
- Laws and regulations concerning water pollution, groundwater pollution, and air pollution
- Pollution prevention (air, groundwater, etc)
- Characteristics of industrial wastewater, discharges to the atmosphere, and solid waste streams from the factories
- Methods of treating wastewater from industry including waste equalization, pH control, chemical methods of treatment, biological methods of treatment, aerobic technologies, and physical methods
- Methods of treating air discharges to the atmosphere
- Solid waste treatment methods (e.g. the method of composting industrial wastes, solid waste incineration, solid waste landfill cover and cap systems, etc)
- Case studies from different industries (e.g., manufacture of lead acid batteries, synthetic rubber industries, cement industries, wine/beer making industries, etc)
- Educational visits to a number of local industries for evaluation and further study of the waste treatment methods and technologies used

### **Learning Activities and Teaching Methods:**

Lectures, in-class examples and exercises, discussion, projects, on-site visits

### **Assessment Methods:**

Homework, midterm exams, final exam, project reports, in-class presentations

### **Required Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Woodard & Curran	Industrial Waste Treatment Handbook	Elsevier	2006	978-0-7506-7963-3

### **Recommended Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Published Articles				