

ENV-509

**Applied wastewater engineering**

Mattle Michael Jon

| Cursus                                 | Sem.     | Type |
|----------------------------------------|----------|------|
| Energy Management and Sustainability   | MA1, MA3 | Opt. |
| Environmental Sciences and Engineering | MA1, MA3 | Opt. |

|                            |                     |
|----------------------------|---------------------|
| Language of teaching       | English             |
| Credits                    | 3                   |
| Session                    | Winter              |
| Semester                   | Fall                |
| Exam                       | During the semester |
| Workload                   | 90h                 |
| Weeks                      | 14                  |
| <b>Hours</b>               | <b>2 weekly</b>     |
| Courses                    | 1 weekly            |
| Exercises                  | 1 weekly            |
| <b>Number of positions</b> |                     |

**Remark**

donné une année sur deux, les années impaires

**Summary**

This course on applied wastewater treatment focuses on engineering and scientific aspects to achieve high effluent water quality and to handle wastes and air emissions generated in wastewater treatment plants.

**Content****Organic micropollutant removal (major topic of course)**

Biological treatment, ozonation, activated carbon, combined and other processes, sand filtration, existing and planned installations in Switzerland

**Treatment of wastewater solids (major topic of course)**

Sludge characterisation, thickening/stabilisation/dewatering and drying of sludge, energy and nutrient recovery, elimination of sludge

**Air emission control**

Types of emissions, chemical and biological treatment methods, reduction of greenhouse gases

**Keywords**

organic micropollutants removal, sludge treatment, air emission control, nutrient and energy recovery, engineering

**Learning Prerequisites****Required courses**

- Water and wastewater treatment (can be taken during the same semester)

**Recommended courses**

- Traitement et valorisation des eaux et des déchets / Génie sanitaire, gestion des eaux et des déchets

**Learning Outcomes**

By the end of the course, the student must be able to:

- Design an organic micropollutant removal process
- Propose an adequate sludge treatment
- Analyze the interactions between the different processes of a wastewater treatment plant
- Plan an exhaust air treatment sub-unit
- Sketch all processes of an entire wastewater treatment plant

### **Transversal skills**

- Give feedback (critique) in an appropriate fashion.
- Make an oral presentation.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Continue to work through difficulties or initial failure to find optimal solutions.

### **Teaching methods**

Lectures ex cathedra, exercises and one or two visits to a wastewater treatment plant

### **Expected student activities**

Participation in homework sessions (group work) and in wastewater treatment plant visits

### **Assessment methods**

One written mid-term exam during the semester (20%) and one final exam (80%)

### **Resources**

#### **Bibliography**

Provided via moodle

#### **Notes/Handbook**

Provided weekly via moodle

#### **Websites**

- <http://moodle.epfl.ch/>