

DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	UNIVERSITY OF ORADEA
1.2 Faculty	FACULTY OF ENVIRONMENTAL PROTECTION
1.3 Department	ENVIRONMENTAL ENGINEERING
1.4 Field of study	ENGINEERING SCIENCE
1.5 Cycle of study	LICENSE
1.6 Study programme/Qualification	BIOTECHNICAL AND ECOLOGICAL SYSTEMS ENGINEERING / ENGINEER

2. Information on the discipline

2.1 Name of discipline	INTEGRATED WASTE MANAGEMENT II						
2.2 Course holder	Lecturer PhD. Eng. BODOG MARINELA						
2.3 Project holder	Lecturer PhD. Eng. BODOG MARINELA						
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of evaluation	E	2.7 Regime of discipline	C

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week out of which:	4	3.2. course	2	3.3. project	2
3.4 Total hours in the curriculum out of which:	56	3.5. course	28	3.6. project	28
Time allotment					hours
Study assisted by manual, course support, bibliography and notes					35
Additional documentation in the library/ on specialized electronic platforms and in the field					35
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					30
Tutorship					12
Examinations					6
Other activities.....					5
3.7 Total hours of individual study				112	
3.9 Total hours per semester				179	
3.10 Number of credits				4	

4. Prerequisites (where appropriate)

4.1 curriculum	Chemistry, Microbiology, Ecology
4.2 competences	Mathematics, Soil science, Air pollution, Water pollution.

5. Conditions (where appropriate)

5.1. related to course	Students will not present at lectures, project with open mobile phones. Also, telephone conversations will not be tolerated during the course, nor do students leave the classroom to take personal phone calls; There will be no tolerance for students' attendance at the course and project as this proves to be disruptive to the educational process;
5.2. related to project	Rules of conduct of students in the project classes are those expressed in the course. The learning conditions are: active and interactive, practically-applicative, heuristic, problematic;

6. Specific competences acquired

Professional competences	C2. Management and resolution of specific environmental issues for sustainable development C2.2. Explanation and interpretation of concepts, methods and models of basic environmental engineering problems C4. Assessment of environmental degradation factors C4.2. Understand the interdependence of pollution factors and direct effects on the environment
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Transversal competences	<p>CT1. Identifying and compliance with ethical and professional conduct, responsibilities for decisions and risks.</p> <p>CT2. Identifying roles and responsibilities in a multidisciplinary team and application techniques and effective work relationships within the team.</p> <p>CT3. Effective use of information sources and communication resources and training assistance (portals, Internet, specialized software, databases, online courses, etc.) both in Romanian and in an international language.</p>
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7. Objectives of discipline (coming from the specific competences acquired)

7.1 General objective	Study of the characteristics of solid waste, the use of analyses taken from solid waste and their disposal options, ways of managing solid waste correctly. Management options are compared for their technical feasibility and environmental health. The focus will be on energy recovery and use of natural resources by using the best technologies to implement environmental projects.
7.2 Specific objectives	Explanation and interpretation processes and effects of natural or anthropogenic origin that determine and influence environmental pollution by waste storage or improper disposal of any kind. Presentation the design of a waste landfill (roof, bottom, geotextiles and geomembranes types), alternatives to reuse some of them; determine areas likely pollution from old locations, criteria analysis and environmental impact assessment both in the old and new and we take responsibility using the new Cradle-to-Cradle concept, etc.

8. Content*/

8.1 Course	Methods of teaching	No. of hours/R emarks
1-2. The notion of waste. Waste management hierarchy. Prevention of waste formation. Waste minimization. Strategic Elements of Waste Management Planning Waste Regulations in Romania	Systematic exposure with video projector, heuristic conversation	4
3. The notion of waste. Waste classification. Classification of hazardous waste according to the Basel Convention	Systematic exposure with video projector, heuristic conversation	2
4-5. Waste composition. Solid household waste. Industrial waste. Construction and demolition waste. Packaging. Dangerous waste	Systematic exposure with video projector, heuristic conversation	4
6-7. Biogas production and collection	Systematic exposure with video projector, heuristic conversation	4
8-9. The concept of ecological landfill of solid household waste. Classification of deposits. Deposit location requirements.	Systematic exposure with video projector, heuristic conversation	4
10-11. Ecological landfill. Construction scheme, classic construction, operation, closure and reuse of land for landfill.	Systematic exposure with video projector, heuristic conversation	4
12. Constructive variants of composition of the eraser and the roof of a warehouse. Case study: Ecological landfill in Oradea.	Systematic exposure with video projector, heuristic conversation	2
13-14 Geotextiles, geomembranes, geocomposites, etc.	Systematic exposure with video projector, heuristic conversation	4
Note: Visit to the Ecologic waste landfill and to the transfer station and sorting station in Episcopia Bihor village will be held outside the classroom on a date determined later.		

8.2 Project	Methods of teaching	No. of hours/ Remarks
Project theme. Establish the number of bins and machines necessary sanitation. Calculation of landfill volume and the number of years of filling	In the first hour project classes will be a presentation on safety concepts related to specific waste disposal.	4
Scheme and landfill site (site plan, sections). Design	Interactive, systematic exposure, demonstration, exercise	2
Drainage to the bottom deposit	Interactive, systematic exposure, demonstration, exercise	2
Variant's composition of the bottom of a landfill	Interactive, systematic exposure, demonstration, exercise	2
Roof drainage	Interactive, systematic exposure, demonstration, exercise	2
Variants of the roof structure of a landfill (construction details) and perimeter drainage collector	Interactive, systematic exposure, demonstration, exercise	2
Sliding stability of geosynthetic layers on slopes. Determination of friction and angle of laying waste repository	Interactive, systematic exposure, demonstration, exercise	2
Determination of the permeability of the geotextile	Interactive, systematic exposure, demonstration, exercise	2
Calculation of the necessary degree of purification	Interactive, systematic exposure, demonstration, exercise	2
Ecological rehabilitation of a landfill	Interactive, systematic exposure, demonstration, exercise	4
Landfill drainage during filling (radial drainage plan view)	Interactive, systematic exposure, demonstration, exercise	2
Detail of construction of a biogas capture well	Interactive, systematic exposure, demonstration, exercise	2

Bibliography:

1. A. Wehry, M. Orlescu – *Depozitarea și reciclarea deșeurilor*, 2000, Orizonturi Publishing House, Timișoara
2. A. Wehry, Marinela Bodog – *Reciclarea apelor uzate*, 2004, University of Oradea Publishing House
3. Lia Keller, A. Găzdaru, V. Teodor - *Geosynthetics in hydrotechnics, transport and other fields of construction technology* - 2010, Bucharest.
4. Bodog Marinela – *Aplicații la disciplina Depozitarea și reciclarea ecologică a deșeurilor*, 2008, University of Oradea Publishing House
5. Burcea, S., „*Managementul deșeurilor urbane. Perspectiva europeană comparată*”, Ed. ASE, București, 2009;
6. Rusu, T., Bajan, M. “*Deșeul – sursă de venit*”, Ed. Mediamira, Cluj-Napoca, 2006;
7. McDougal, F., White, P., Franke, M., Hindle, P., “*Integrated solid waste management – a life cycle inventory*”, Blackwell Publishing, 2001;
8. Scorțar, L., “*Managementul deșeurilor menajere*”, Ed. Alma Mater, Cluj-Napoca, 2010.
9. Scorțar, L., “*Managementul deșeurilor*”, Ed. Risoprint, Cluj-Napoca, 2017.

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

Course content is adapted to meet the requirements of the labour market, being accepted by epistemic communities (studying the construction of a landfill as it should take place in the engineering sciences), social partners, professional associations and employers in the Environmental Engineering license. Course content can be found in the curriculum specialization ISBE and other universities in Romania who have accredited this specialization, knowing the basics is an urgent requirement employer in Engineering and Environmental Protection.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	General evaluation criteria (complexity and correctness of knowledge, logical coherence, fluency of expression, argumentative force). Criteria specific to the discipline Criteria for attitudinal and motivational aspects of student activity	Written exams	100%
10.5 Project	Students must have a project with the data received in the first working session and with all calculations made.	Power point presentation	100 %

10.8 Minimum standard of performance
Conduct studies and projects in coordination to solve specific issues with the correct assessment of workload, available resources and time required for completion of risk in terms of enforcement of ethics and professional ethics in the field and safety and health at work. Develop an environmental project based on the best available techniques. Analysis and interpretation of results obtained from experimental measurements and theoretical calculations. Develop a comparative study between different technologies in environmental engineering.

Date of completion

Signature of course holder

Signature of project holder

10.09.2020

PhD eng. Lect. **Marinela Bodog**
e-mail: marinelabodog@gmail.com

PhD eng. Lect. **Marinela Bodog**
e-mail: marinelabodog@gmail.com

Date of approval in the department

Signature of the Head of Department

17.09.2020

Assoc. prof. PhD eng. **LASLO VASILE**
e-mail: vasilelaslo@yahoo.com

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Dean signature

Prof. PhD. Eng. **Chereji Ioan**

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** - Name, first name, academic degree and contact details (e-mail, web page, etc.) will be specified.