NC State University
BAE 478 Agricultural Waste Management
Course Syllabus – Belgium Study Abroad

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Course Objectives:
State of the art environmental engineering systems will be studied in this class with a focus on biological systems used for water and waste treatment. U.S. and European practices will be compared. Best management practices (BMPs) for treatment of wastes containing biosolids, including biological treatment processes and land application, and constructed wetlands for waste water treatment and groundwater protection will be presented.

Learning Outcomes:
At the completion of this course, students should be able to
1. understand water quality analyses;
2. determine treatment requirements for utilization of water resources for municipal, agricultural, or industrial uses;
3. design systems for treating water and wastewater using physical, chemical and biological processes to meet quality standards for municipal, agricultural, or industrial needs or for discharge to the environment;
4. design systems for treating biosolid wastes to provide economic benefit and minimize environmental impact.

Textbook:
Extensive notes will be available on the class web page.
Recommended text: *Principles of Environmental Engineering and Science*, 2nd Ed., M.L. Davis and S.J. Masten, McGraw-Hill, New York, 2009.

Testing:
Questions on the tests will be on lecture material, reading assignments, seminars, field trip investigations and homework problems. The grading scale and weighting factors are specified below:

Grading	
Exams	35%
Homework	20%
Design project	5%
Field trip reports	30%
Seminar reports	10%

Grading Scale	
90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F

Homework:
All assignments must be presented in a neat, professional manner. A word processor will be required for all written assignments. Some assignments may require the use of spreadsheets and graphics. Sample calculations will be required for all spreadsheet solutions. All homework assignments are due at the beginning of the class period on the due date. ***A maximum of half credit will be given for late homework.***

Field Trip Reports:
Four field trips to tour European technology applied to water resources and waste management in Belgium and the Netherlands will be conducted. A comprehensive field trip report that includes discussion of the water resources or waste treatment technology involved is required for each trip, i.e., each report must include discussion of how the field trip relates to this course. Reporting requirements will be provided in a separate handout.

Seminar Reports:
Two seminars will be presented by EU or Belgian environmental officials relating to this course. A brief report summarizing each seminar, its relationship to the course, and a comparison of practices in Europe with those in the U.S. will be required. Reporting requirements will be provided in a separate handout.

Tentative schedule:

CLASS	TOPIC	ESTIMATED TIME (Hr) (In Class / Out of Class)
1	Introduction / Water Quality	3 / 6
2	Wastewater Characteristics, Sedimentation	3 / 6
3	Publicly Owned Treatment Works (POTWs)	3 / 6
4	Field Trip 1	4 / 6
5	Biological Treatment Processes	3 / 6
6	Potable Water Treatment	3 / 6
7	Field Trip 2	4 / 6
8	Biosolid Waste Characteristics, Exam 1	3 / 11
9	Waste Treatment Lagoons	3 / 6
10	Field Trip 3	4 / 6
11	Land Application of Biosolids	3 / 6
12	Energy from Waste, Composting, Constructed Wetlands	3 / 6
13	Field Trip 4	4 / 6
14	Onsite Domestic Wastewater Treatment	3 / 6
15	Final Exam	2 / 5
	Total (Hr)	48 / 94

Note: This course has been assigned three credit hours based upon the work represented by verifiable student achievement of institutionally established learning outcomes, direct faculty instruction, and academically engaged time. (Federal Rule GEN 11-06)

Additional Accommodations:
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Resource Office at: https://dro.dasa.ncsu.edu/ . If any student in this class requires accommodation related to a unique circumstance, please make an appointment to see me as soon as possible. Appropriate arrangements will be made.

Academic Integrity:
The NCSU Code of Student Conduct will be strictly followed. Please review the Code of Student Conduct at: https://studentconduct.dasa.ncsu.edu/code/ .