

SYLLABUS

1. **Number and Name:** 11:117:488/9 Bioenvironmental Engineering Design I and II
 2. **Credits and contact hours:** 4 credits, 1-80 minute lecture periods per week, individualized group meeting
 3. **Instructor:** Christopher C. Obropta
 4. **Required Text:** none
- Reference Materials:** NJ Stormwater Best Management Practices Manual
(http://www.njstormwater.org/bmp_manual2.htm)

5. Specific Course Information

a. Catalog Description: 11:17:488: *Design morphology. Case studies and special design problems. Solutions developed using creative design processes that include analysis, synthesis, and iterative decision making. Safety and professional ethics.* 11:117:489: *Completion of bioenvironmental engineering senior design project. Evaluation. Presentation of final report.*

b. Prerequisites: Open only to seniors in bioenvironmental engineering. 11:117:488 prior to 11:117:489.

c. Course Type: Required Course

6. Course Goals

a. Specific Instructional Outcomes: Students will be versed in the principles of engineering design and presentation of these designs. Student problem solving skills will be enhanced through the preparation of a paper on a sustainable concept, an engineering project involving considerable analytical and numerical skills, and oral and poster presentation of their work.

b. Specific Student Outcomes addressed by the course include:

c. Ability to design a system, component or process to meet desired needs

Instructional Activity: Successful completion of a preliminary design of an engineering solution that addresses an assigned real-world environmental problem and is technically acceptable.

Assessment Activity: Individual grading of student projects focused on the quality of the design and their level of participation in a team design project

f. Ability to understand professional and ethical responsibilities

Instructional Activity: Successful completion of an essay on engineering ethics

Assessment Activity: Individual grading of student essays focusing on the understanding of professional and ethical responsibilities.

g. Ability to communicate effectively

Instructional Activity: Successful completion of a paper on a sustainable practice and presentation of this paper. Successful completion of an engineers' report, design drawings, and a presentation of their final designs

Assessment Activity: Individual grading of student papers, reports, and presentations focused on quality of the paper, report and presentation

h. Ability to understand the impact of engineering solutions in a global, economic, environmental, and societal context

Instructional Activity: Successful completion of a preliminary design of an engineering solution that addresses an assigned real-world environmental problem and takes into consideration global, economic, environmental, and societal ramifications.

Assessment Activity: Individual grading of student projects focused on the quality of the design and their level of participation in a team design project.

i. Ability to recognize the need for, and the ability to engage in life-long learning

Instructional Activity: Successful completion of a research using peer-reviewed publication, trade journals and the internet to identify the latest available technologies for use in their design.

Assessment Activity: Individual grading of student papers, reports, and presentations focused on quality of research of available technologies.

7. Topics:

Design I:

Week 1: Low Impact Development Concepts and Designs

Week 2: Stormwater Design with TR55

Week 3: Stormwater Design with HydroCAD

Week 4: Sizing of Stormwater Systems

Week 5: Oral Presentation on LID and Sustainable Design

Week 6: Introduction to Design Project and Team Assignments

Week 7 through Week 14: Meeting with individual groups every other week

Week 15: Final presentation

Design II:

Week 1: Review of status report and scheduling for spring semester

Week 2-3: Lecture on stormwater best management practices

Week 4-6: Independent design

Week 7: Lecture on preparation of construction specification

Week 8: Lecture on preparation of engineers report

Week 9-10: Independent design

Week 11: Lecture on preparation of long-term operation and maintenance manual

Week 12: Lecture on preparation of final oral presentation and written report

Week 13-14: Independent design and report preparation

Week 15: Oral presentation and submittal of final design project

Grading:

Design I: 30% = Low Impact Development and Sustainable Design Paper (15%) and Presentation (15%); 10% = 500 word essay on Engineering Ethics; 60% = Formal Engineer Design (20%), Report (20%) and Oral Presentation (20%)

Design II : 80% = Formal End of the Semester Final Written Report (40%) and Oral Presentation (40%); 20% = Poster of Final Design

Prepared by: Christopher Obropta 04/15/18