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

   (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