

EEE 36000

EFD 11-14

Office of the Registrar  
FORM 40 REV. 5/11

PURDUE UNIVERSITY  
REQUEST FOR ADDITION, EXPIRATION,  
OR REVISION OF AN UNDERGRADUATE COURSE  
(10000-40000 LEVEL)

DEPARTMENT Environmental and Ecological Engineering EFFECTIVE SESSION Fall 2014 201510

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

<input checked="" type="checkbox"/> 1. New course with supporting documents	<input type="checkbox"/> 7. Change in course attributes (department head signature only)
<input type="checkbox"/> 2. Add existing course offered at another campus	<input type="checkbox"/> 8. Change in instructional hours
<input type="checkbox"/> 3. Expiration of a course	<input type="checkbox"/> 9. Change in course description
<input type="checkbox"/> 4. Change in course number	<input type="checkbox"/> 10. Change in course requisites
<input type="checkbox"/> 5. Change in course title	<input type="checkbox"/> 11. Change in semesters offered (department head signature only)
<input type="checkbox"/> 6. Change in course credit/type	<input type="checkbox"/> 12. Transfer from one department to another

PROPOSED: Subject Abbreviation <u>EEE</u>	EXISTING: Subject Abbreviation _____	TERMS OFFERED Check All That Apply: <input type="checkbox"/> Summer <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring
Course Number <u>36000</u>	Course Number _____	CAMPUS(ES) INVOLVED <input type="checkbox"/> Calumet <input type="checkbox"/> N. Central <input type="checkbox"/> Cont Ed <input checked="" type="checkbox"/> Tech Statewide <input type="checkbox"/> Ft. Wayne <input checked="" type="checkbox"/> W. Lafayette <input type="checkbox"/> Indianapolis
Long Title <u>Environmental and Ecological Engineering Laboratory</u>		
Short Title <u>Env &amp; Ecol Engr Lab</u>		

Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

CREDIT TYPE	COURSE ATTRIBUTES: Check All That Apply
1. Fixed Credit Cr. Hrs. _____	<input type="checkbox"/> 1. Pass/Not Pass Only
2. Variable Credit Range: _____	<input type="checkbox"/> 2. Satisfactory/Unsatisfactory Only
Minimum Cr. Hrs. <u>1</u>	<input type="checkbox"/> 6. Registration Approval Type
(Check One) To <input checked="" type="checkbox"/> Or <input type="checkbox"/>	Department <input type="checkbox"/> Instructor <input type="checkbox"/>
Maximum Cr. Hrs. _____	<input checked="" type="checkbox"/> 7. Variable Title
3. Equivalent Credit: Yes <input type="checkbox"/> No <input type="checkbox"/>	<input type="checkbox"/> 8. Honors
	<input type="checkbox"/> 9. Full Time Privilege
	<input type="checkbox"/> 10. Off Campus Experience
	<input type="checkbox"/> 3. Repeatable
	Maximum Repeatable Credit: <u>9</u>
	4. Credit by Examination <input type="checkbox"/>
	5. Fees <input type="checkbox"/> Coop <input type="checkbox"/> Lab <input type="checkbox"/> Rate Request
	Include comment to explain fee

Schedule Type	Minutes Per Mfg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	U-110	0-2	5 or 15	U-5 / %
Recitation				
Presentation				
Laboratory	110-170	1-2	5 or 15	33-100%
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

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Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):  
 An introduction to laboratory methods of analysis of Environmental and Ecological Engineering systems. Topics will change from semester to semester and will be announced in advance. The list of possible topics includes experimental design, treatment of data, the analytical determination of chemical and biological constituents in water, soil and air; analysis of environmental and ecological engineering processes; and analysis of life-cycle characteristics and impacts of consumer products and commodities; methods of prevention and remediation of manufacturing waste streams. Pre-requisites: CHM 11200 or CHM 11600 or CHM 13600.

COURSE LEARNING OUTCOMES

1. An ability to acquire experimental data and evaluate experimental error and variability
2. An understanding of data reduction, analysis and presentation
3. An ability to produce professional technical communication of experimental conclusions
4. An ability to summarize results of quantitative analysis to propose management strategies for environmental problems.

Calumet Department Head	Date	Calumet School Dean	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date
North Central Faculty Senate Chair	Date	Vice Chancellor for Academic Affairs	Date
<i>John W. Southward</i>	11/18/13	<i>Michael Y. Harris</i>	1/24/14
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date
		West Lafayette Registrar	Date
		<i>Sandra Schaffner</i>	2/7/14

OFFICE OF THE REGISTRAR

1 AM 2/7/14



TO: The Faculty of the College of Engineering  
FROM: The Division of Environmental and Ecological Engineering  
SUBJECT: New Undergraduate Course, EEE 36000, Environmental and Ecological Engineering Laboratory

The Faculty of the Division of Environmental and Ecological Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

**EEE 36000: Environmental and Ecological Engineering Laboratory**  
*Sem. 1, 2, Lecture 0-2, Laboratory 2-6, Credits 1-3*  
Pre-requisites: CHM 11200 or CHM 11600 or CHM 13600.

**Course description:**

An introduction to laboratory methods of analysis of Environmental and Ecological Engineering systems. Topics will change from semester to semester and will be announced in advance. The list of possible topics includes experimental design, treatment of data, the analytical determination of chemical and biological constituents in water, soil and air; analysis of environmental and ecological engineering processes; and analysis of life-cycle characteristics and impacts of consumer products and commodities; methods of prevention and remediation of manufacturing waste streams.

**Reasons:**

This variable-credit laboratory course is planned as a core course in the Environmental and Ecological Engineering undergraduate curriculum. Laboratory experience is a foundational component of Environmental and Ecological Engineering professional preparation. Students will typically take this course during their sophomore or junior year. Students will be required to complete a minimum of 3 credits of this course to earn the BSEEE degree. Students who complete unique laboratory experiences in excess of 3 credits will be allowed to count the credits as EEE Selectives.

**Course Attributes:** Variable Title

**Repeatable for Additional Credit:** Yes – May be repeated for up to 9 credits



John W. Sutherland, Head  
Division of Environmental and Ecological Engineering

APPROVED FOR THE FACULTY  
OF THE SCHOOLS OF ENGINEERING  
BY THE ENGINEERING  
CURRICULUM COMMITTEE

ECC Minutes 1/28/14

Date 1/28/14

Chairman ECC 

**EEE 36000: Environmental and Ecological Engineering Laboratory (EFD 11-14)**

**Level:** Undergraduate

**Potential Topics:**

- **EEE Laboratory Skills**
  - Design of Experiments
  - Statistical Analysis of Data
  - Propagation of Error
  - Technical Writing
- **Environmental Chemistry**
  - pH Measurement, Acid-Base Titrations, Alkalinity
  - UV/Vis Spectroscopy, Buffer Design,  $pK_a$  Determination
  - Ion Selective electrodes, ion activity
  - $Ca^{2+}$  and  $Mg^{2+}$  Measurement by EDTA Chelation/Titration
  - Chlorine Analysis by DPD Titration
  - Chemical Oxygen Demand (COD)
  - Dissolved Oxygen Measurement
- **Environmental Microbiology**
  - E. Coli* Measurement and Disinfection
  - Membrane Filtration for total Fecal Coliform Bacteria
  - Biochemical Oxygen Demand (BOD)
  - Microbial Growth Kinetics
  - Microbial Decay of Pollutants
  - Nitrification/Denitrification Reactions
  - Biofilms
- **Environmental Processes**
  - Completely Mixed Systems in Series
  - Alum Coagulation, Turbidity
  - Lime softening, settling and Stoke's Law
  - First Order Decay
  - Ion Exchange ( $Cu^{2+} - Na^+$ )
  - Henry's Law ( $O_2$  solubility with temperature)
  - Contaminant Transport in Porous Media
  - Adsorption of Pesticides to Soils
- **Environmental Sustainability and Life Cycle Assessment**
  - EEE Impacts of Adhesives
  - Fasteners and Disassembly
  - Recycling of Composites and Mixed Material Systems
  - Sensors for Remanufacturing Assessment
  - Alloys and Secondary Supply Chains
  - Quantifiable Material Carbon/Water/Energy Footprints
  - Materials Flow Analysis
  - Energy and Water Transport/Drying
  - Industrial energy measurement
  - Assembly and disassembly of mechanical/electromechanical/electronic products
  - Materials testing/characterization

**Course Objectives:**

Students successfully completing the Environmental and Ecological Engineering Laboratory will demonstrate:

1. An ability to acquire experimental data and evaluate experimental error and variability
2. An understanding of data reduction, analysis and presentation
3. An ability to produce professional technical communication of experimental conclusions
4. An ability to summarize results of quantitative analysis to propose management strategies for environmental problems.

**Textbooks and readings:**

There is no textbook for this course. Readings will be compiled from peer-reviewed literature and custom written lab manuals.

**Grading:**

Participation -	15%
Lab Reports -	85%

**Previous Teaching:**

This course was first offered for 3 credits in Fall 2013 as EEE 495.