

UNIVERSITY CURRICULUM COMMITTEE

PROPOSAL FOR COURSE CHANGE

1. Is this a Liberal Studies or Diversity Course? Liberal Studies ☐ Diversity ☐ Both ☐
2. Course change effective beginning of what term and year?
(ex. Spring 2008, Summer 2008) See effective dates schedule. Fall 2007
3. College CENS 4. Academic Unit CENE
5. Current course subject/catalog number CENE 480
6. Current catalog title, course description, and units. (Copy and paste from [current on-line academic catalog](#)).

ENVIRONMENTAL TRANSPORT PROCESSES (3)

Fundamental engineering concepts of momentum, mass, and energy balances, with applications for environmental engineering. Prerequisite: ME 395 with grade greater than or equal to C

7. Is course currently cross-listed or co-convened? yes ☒ no ☐
If yes, list course CENE 502
Will this continue? Yes
8. Is course an elective? ☐ or required for an academic plan/subplan? ☒
If required, for what academic plan/subplan? Environmental Engr.
If required, also submit *Proposal for New Plan or Plan Change*.
9. Will other courses or academic units, be affected by this change? (Consider prerequisites, degree requirements, etc.) yes ☐ no ☒
If yes, explain in the justification and provide supporting documentation from the affected departments.
10. Does this change affect community college articulation? yes ☐ No ☒
If yes, explain how in the justification and provide supporting documentation from the affected institutions.
- Is the course a Common Course as defined by your Articulation Task Force? yes ☐ no ☒
If yes, has the change been approved by the Articulation Task Force? Yes ☐ no ☐
- If this course has been listed in the [Course Equivalency Guide](#), should that listing be left as is, ☒ or be revised? ☐
If revised, how should it be revised? _____

FOR SECTION 11 ONLY COMPLETE WHAT IS CHANGING.

11. a. Proposed course subject /catalog number _____ b. Proposed units _____
- c. If subject/catalog number change, is there a course fee attached to the current subject/catalog number that needs to be moved?** Yes ☐ No ☐
- If yes, please attach a Justification Form for Instructional Fees indicating the new course subject/catalog number change.
- d. Proposed to co-convene with CENE 502 Date approved by UGC _____
(Must be approved by UGC prior to bringing to UCC. Both course syllabi must be presented.)
- e. Proposed to cross-list with _____
(Please submit a single cross-listed syllabus that will be used for all cross-listed courses.)
- f. Proposed long course title _____
(max 100 characters including spaces)
- g. Proposed short course title _____
(max 30 characters including spaces)
- h. Proposed catalog course description (max. 30 words, excluding requisites)

Fundamental engineering concepts of mass transfer, with applications for environmental engineering design.

- i. Proposed grading option: Letter grade ☐ Pass/Fail ☐ or Both ☐
(If both, the course may only be offered one way for each respective section.)
- j. May course be repeated for additional units ? yes ☐ no ☐
- j.1. If yes, maximum units allowed? _____
- j.2. If yes, may course be repeated for additional units in the same term? (ex. BIO 300, PES 100)
yes ☐ no ☐
- k. Please check **ONE** of the following that most appropriately describes the proposed course change(s):
- Lecture w/0 unit embedded lab ☐ Lecture only ☐ Lab only ☐ Clinical ☐ Research ☐
- Seminar ☐ Field Studies ☐ Independent Study ☐ Activity ☐ Supervision ☐
- l. Proposed prerequisites (must be completed before) _____
- m. Proposed corequisites (must be completed with) _____
- n. If course has no requisites, will all sections of the course require: (If course has pre or co requisite, skip to question 12)
Instructor consent ☐ Department consent ☐ No consent ☐

12. Justification for course change. Please indicate how past assessments of student learning prompted proposed changes.

Description revised to better reflect course content. Co-convening with CENE 502 needs to be approved and is being submitted to UGC.

13. Approvals



11/15/06

Department Chair/ Unit Head (if appropriate)

Date

Chair of college curriculum committee

Date

Dean of college

Date

For Committee use only

For University Curriculum Committee

Date

Action taken: _____ approved as submitted _____ approved as modified

Note: Submit original to associate provost's office. That office will provide copies to college dean, department chair, and Academic Information Office.

Course Syllabus

CENE 480 Environmental Transport Processes

General Information:	Name of College and Department: Civil & Environmental Engineering, College of Engineering and Natural Sciences Course Prefix, Number, and Title: CENE 480, Environmental Transport Processes Semester: Fall 2007 Clock Hours / Credit Hours: 3 clock hours, 3 credit hours. Instructor: Bridget Bero, Ph.D., P.E., Associate Professor Office Address: Room 321, Engineering, Bldg. 69 (928) 523-2051 Bridget.Bero@nau.edu Office Hours: Tu/Wed/Th, 9:00am-10:00am
Course Prerequisites:	ME 395
Course Description:	Fundamental engineering concepts of mass transport with applications for environmental engineering.
Student Learning Expectations / Outcomes for this Course:	On completing this course, students will be able to: 1. Apply the differential equation of mass transfer to environmental engineering problems and solve. 2. Identify, simplify and diagram two-phase convective mass transfer systems; formulate and solve associated environmental engineering problems. 3. Select appropriate mass transfer coefficient correlations and apply them to the design and analysis of mass transfer equipment.
Course Structure and Approach:	This course presents material during lectures and through assigned reading and homework that are expected to be completed outside of class.
Textbook and Required Materials:	Welty, J.R., Wicks, C.E., Wilson, R.E and Rorrer, G. <i>Fundamentals of Momentum Heat, and Mass Transfer</i> , 4th Ed. Wiley, 2001. ISBN#0-471-38149-7.
Recommended Optional Material / References:	Internet, library resources will be used as recommended by the instructor.
Course Outline:	Weeks 1 – 4: Chapters 24 and 25 Weeks 4 – 5: Chapter 26 Weeks 6 – 9: Chapters 28 and 29 Weeks 9 – 11: Chapter 30 Weeks 11 – 15: Chapter 31 Week 16: Final Exam
Assessment of Student Learning Outcomes:	Methods of Assessment Assessing students' achievement of this course's learning outcomes is done using homework, quizzes, examinations and project assignments. Homework: Homework is assigned to reinforce and assess the concepts and skills discussed or assigned as readings. Examinations: Examinations are used to assess overall learning. There will be a mid-term and a final exam. Each exam is comprehensive in that it covers any material previously presented since the beginning of the semester. There may be take-home portions for each exam.

	In-class Participation: In-class participation consists of answering questions, in-class assignments and quizzes (group and individual) and is used to assess what is being understood in a quick and timely manner. Timeline for Assessment Homework is typically assigned weekly throughout the semester. The mid-term exam will be given mid-semester (approx week 7-8) and the final exam will be given during finals week (week 16). In-class participation will consist of daily activities; some activities will be specifically graded, others (such as answering questions) are subject to the instructor's judgement and will be graded at the end of the semester.																			
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Course Policies:	Retests / Makeup Tests There are NO make-up assignments or tests without prior consent of the instructor. Attendance Attending class is MANDATORY; tardiness and unexcused absences are considered lack of in-class participation and will be reflected in your grade. Out-of-class Work Expectations: A 3-credit course consists of 3 hours per week of in-class time; it is expected that for each 1 hour of in-class time, 2 hours of out-of-class work is to be performed. Out-of-class work consists of PREPARATION FOR CLASS (PREreading material assigned), doing homework, and STUDYING and REVIEWING material that was presented each day. It is expected that each student will perform 6 hours per week of out-of-class work for this course. (Ref: NAU Academic Contact Hour Policy) Statement on Plagiarism and Cheating Plagiarism and cheating are subject to the Arizona Board of Regents' Code of Conduct and the procedures outlined in the NAU Student Handbook concerning the charges for these offenses. Websites for these documents may be consulted at: Arizona Board of Regents' Code of Conduct: http://www.abor.asu.edu/1_the_regents/policymanual/chap5/index.html NAU Student Handbook: http://www4.nau.edu/stulife/handbook.htm NAU Student Code of Conduct: http://www4.nau.edu/stulife/handbookcode.htm Disciplinary Action: http://www4.nau.edu/stulife/handbookdisciplinary.htm																			
University Policies:	Safe Working and Learning Environment: http://oak.ucc.nau.edu/dam1/Safe%20Policy.htm Students with Disabilities: http://www2.nau.edu/dss/																			

	Institutional Review Board: http://www4.nau.edu/ovp/irb/index.htm Academic Integrity Guidance: http://www.nau.edu/library/information/guides/plagiarism.html
College of Engineering and Natural Sciences Policies:	Professional Ethics and Code of Conduct Exceptionally high standards of honor and integrity are fundamental and essential to the study and practice of engineering. Academic preparation for the profession must be conducted in an atmosphere which fosters these values. In addition to compliance with the Student Code of Conduct and Policy that apply to all students at NAU, engineering students are expected to conduct themselves professionally. Violation of the National Society of Professional Engineers (NSPE) Code of Ethics, found at http://www.nspe.org/ethics/eh1-code.asp or the Association of Computing Machinery (ACM) Code of Ethics and Professional Conduct, found at http://www.acm.org/constitution/code.html may lead to dismissal from the College's academic programs. Violations of any of these codes will be handled as detailed in the publications listed above, and will be documented in the student's advisement file. Faculty members may ask students to affirm in writing that they have neither given nor received unauthorized aid on an examination or assignment.

Course Syllabus

CENE 502 Principles of Environmental Transport Processes

General Information:	Name of College and Department: Course Prefix, Number, and Title Semester: Clock Hours / Credit Hours: Instructor: Office Address: Office Hours:	Civil & Environmental Engineering, College of Engineering and Natural Sciences CENE 502, Environmental Transport Processes Fall 2007 3 clock hours, 3 credit hours. Bridget Bero, Ph.D., P.E., Associate Professor Room 321, Engineering, Bldg. 69 (928) 523-2051 Bridget.Bero@nau.edu Tu/Wed/Th, 9:00am-10:00am
Course Prerequisites:	ME 395	
Course Description:	Fundamental engineering concepts of mass transport with applications for environmental engineering.	
Student Learning Expectations / Outcomes for this Course:	On completing this course, students will be able to: 4. Apply the differential equation of mass transfer to environmental engineering problems and solve. 5. Identify, simplify and diagram two-phase convective mass transfer systems; formulate and solve associated environmental engineering problems. 6. Select appropriate mass transfer coefficient correlations and apply them to the design and analysis of mass transfer equipment. 7. Analyze and critique the current literature on a mass transfer problem and present your conclusion 8. Experimentally determine mass transfer coefficients and use to design a scaled-up system.	
Course Structure and Approach:	This course presents material during lectures and through assigned reading and homework that are expected to be completed outside of class. Additional work required for CENE 502 is a critical analysis and presentation of a published journal article that has been approved by the instructor and an associated laboratory component that requires experimental work, scale up calculations and a lab report.	
Textbook and Required Materials:	Welty, J.R., Wicks, C.E., Wilson, R.E and Rorrer, G. <i>Fundamentals of Momentum Heat, and Mass Transfer</i> , 4th Ed. Wiley, 2001. ISBN#0-471-38149-7.	
Recommended Optional Material / References:	Internet, library resources will be used as recommended by the instructor.	
Course Outline:	Weeks 1 – 4: Weeks 4 – 5: Weeks 6 – 9: Weeks 9 – 11: Weeks 11 – 15: Week 16:	Chapters 24 and 25 Chapter 26 Chapters 28 and 29 Chapter 30 Chapter 31 Final Exam
Assessment of Student Learning Outcomes:	Methods of Assessment Assessing students' achievement of this course's learning outcomes is done using homework, quizzes, examinations and project assignments. Homework: Homework is assigned to reinforce and assess the concepts and	

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University Policies:	Safe Working and Learning Environment: http://oak.ucc.nau.edu/dam1/Safe%20Policy.htm Students with Disabilities: http://www2.nau.edu/dss/ Institutional Review Board: http://www4.nau.edu/ovp/irb/index.htm Academic Integrity Guidance: http://www.nau.edu/library/information/guides/plagiarism.html
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NORTHERN ARIZONA UNIVERSITY

UNIVERSITY GRADUATE COMMITTEE

GRADUATE CURRICULUM

PROPOSAL FOR GRADUATE COURSE CHANGE

1. New course effective with what term and year? (i.e., Spring 2007): **Fall 2007**
2. College: **CENS**
3. Department: **CENE**
4. Course Subject/Catalog Number: **CENE 502**
5. Current catalog **title**, course **description**, and **units**: **PRINCIPLES OF ENVIRONMENTAL TRANSPORT PROCESSES (3) Development of the balance laws for chemical species and application of these laws to describe mass transport processes in engineered and natural environmental systems. Prerequisite: MAT 239 and CHM 152 and (ME 395 or ME 291). Prerequisite: Admission to Egr-Civil Egr (MEng) or Egr-CompSci & Egr (MEng) or Egr-ElectEgr (MEng) or Egr-EnvEgr (MEng) or Egr-IndProgStdy (MEng) or Egr-MechEgr (MEng) or Egr (MEng) or Master of Engineering TriU or Non-Degree Graduate**
6. If co-convened or cross-listed, identify course:
(Must be approved by UGC prior to submission to UCC. Both course syllabi must be submitted.)
7. Is the course ☒ elective or ☐ required
If required, for which plan?
(Must be approved by UGC prior to submission to UCC. Both course syllabi must be submitted.)
8. Will this change affect other courses or other academic units?
☐ Yes ☒ No
If Yes, letters of support from each department affected must accompany this form.

9. For the following, please complete only those fields for which information is changing

9.a. **Proposed** course subject/catalog number:

9.b. **Proposed** Units:

9.c. Is there a *current fee* that must be attached to this proposed change?

☐ Yes ☐ No

If Yes, please attach a *Justification for Instructional Fees* form and indicate the new course change.

9.d. **Proposed** to co-convene with CENE 480 Date Approved by UGC:

9.e. **Proposed** to cross-list with Date Approved by UGC:

9.f. **Proposed** Long Course Title:

9.g. **Proposed** Short Course Title (30-character/space maximum):

9.h. **Proposed** Catalog Course Description (60-word maximum): Development of the balance laws for chemical species and application of these laws to describe mass transport processes in engineered and natural environmental systems.

9.i. **Proposed** Grading Option: ☐ Letter Grade ☐ Pass/Fail ☐ Both
(If both, the course may be offered one way for each respective section.)

9.j. May **proposed** course change be repeated for *additional* units?
☐ Yes ☐ No

If Yes, maximum units that may be repeated:

9.k. Please check **ONE** of the following that most accurately describes the format of the course:

- | | |
|---|--|
| ☐ Lecture Only | ☐ Seminar |
| ☐ Lab Only | ☐ Field Studies |
| ☐ Lecture and Lab Combined | ☐ Independent Study |
| ☐ Clinical | ☐ Activity |
| ☐ Research | ☐ Supervision |

9.l. If the course will be delivered electronically, check **ONE** of the following:

- ☐ Web
☐ ITV
☐ Other (hybrid, for example). Please explain:
-

10. Prerequisites: (must be completed *before* taking proposed course): **ME 395 and admission to Egr-Civil Egr (MEng) or Egr-CompSci & Egr (MEng) or Egr-ElectEgr (MEng) or Egr-EnvEgr (MEng) or Egr-IndProgStdy (MEng) or Egr-MechEgr (MEng) or Egr (MEng) or Master of Engineering TriU or Non-Degree Graduate**

11. Corequisites: (must be completed *with* proposed course):

12. If course has no requisites, what consent will be required for all sections?
(Check only one.)

- ☐ Instructor Consent
☐ Department Consent
☐ No Consent Required.

13. Justification for course change: **Update course description to reflect current content. Revise course prerequisites.**

Approvals



11/15/06

Department Chair (if appropriate)

Date

Chair of college curriculum committee

Date

Dean of College

Date

For University Graduate Committee use only

Approved: _____

Date

Course Syllabus

CENE 502 Principles of Environmental Transport Processes

General Information:	Name of College and Department: Course Prefix, Number, and Title Semester: Clock Hours / Credit Hours: Instructor: Office Address: Office Hours:	Civil & Environmental Engineering, College of Engineering and Natural Sciences CENE 502, Environmental Transport Processes Fall 2007 3 clock hours, 3 credit hours. Bridget Bero, Ph.D., P.E., Associate Professor Room 321, Engineering, Bldg. 69 (928) 523-2051 Bridget.Bero@nau.edu Tu/Wed/Th, 9:00am-10:00am
Course Prerequisites:	ME 395	
Course Description:	Fundamental engineering concepts of mass transport with applications for environmental engineering.	
Student Learning Expectations / Outcomes for this Course:	On completing this course, students will be able to: 1. Apply the differential equation of mass transfer to environmental engineering problems and solve. 2. Identify, simplify and diagram two-phase convective mass transfer systems; formulate and solve associated environmental engineering problems. 3. Select appropriate mass transfer coefficient correlations and apply them to the design and analysis of mass transfer equipment. 4. Analyze and critique the current literature on a mass transfer problem and present your conclusion 5. Experimentally determine mass transfer coefficients and use to design a scaled-up system.	
Course Structure and Approach:	This course presents material during lectures and through assigned reading and homework that are expected to be completed outside of class. Additional work required for CENE 502 is a critical analysis and presentation of a published journal article that has been approved by the instructor and an associated laboratory component that requires experimental work, scale up calculations and a lab report.	
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	http://www4.nau.edu/stulife/handbookdisciplinary.htm
University Policies:	Safe Working and Learning Environment: http://oak.ucc.nau.edu/dam1/Safe%20Policy.htm Students with Disabilities: http://www2.nau.edu/dss/ Institutional Review Board: http://www4.nau.edu/ovp/irb/index.htm Academic Integrity Guidance: http://www.nau.edu/library/information/guides/plagiarism.html
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Course Syllabus

CENE 502 Principles of Environmental Transport Processes

General Information:	Name of College and Department: Course Prefix, Number, and Title Semester: Clock Hours / Credit Hours: Instructor: Office Address: Office Hours:	Civil & Environmental Engineering, College of Engineering and Natural Sciences CENE 502, Environmental Transport Processes Fall 2007 3 clock hours, 3 credit hours. Bridget Bero, Ph.D., P.E., Associate Professor Room 321, Engineering, Bldg. 69 (928) 523-2051 Bridget.Bero@nau.edu Tu/Wed/Th, 9:00am-10:00am
Course Prerequisites:	ME 395	
Course Description:	Fundamental engineering concepts of mass transport with applications for environmental engineering.	
Student Learning Expectations / Outcomes for this Course:	On completing this course, students will be able to: 6. Apply the differential equation of mass transfer to environmental engineering problems and solve. 7. Identify, simplify and diagram two-phase convective mass transfer systems; formulate and solve associated environmental engineering problems. 8. Select appropriate mass transfer coefficient correlations and apply them to the design and analysis of mass transfer equipment. 9. Analyze and critique the current literature on a mass transfer problem and present your conclusion 10. Experimentally determine mass transfer coefficients and use to design a scaled-up system.	
Course Structure and Approach:	This course presents material during lectures and through assigned reading and homework that are expected to be completed outside of class. Additional work required for CENE 502 is a critical analysis and presentation of a published journal article that has been approved by the instructor and an associated laboratory component that requires experimental work, scale up calculations and a lab report.	
Textbook and Required Materials:	Welty, J.R., Wicks, C.E., Wilson, R.E and Rorrer, G. <i>Fundamentals of Momentum Heat, and Mass Transfer</i> , 4th Ed. Wiley, 2001. ISBN#0-471-38149-7.	
Recommended Optional Material / References:	Internet, library resources will be used as recommended by the instructor.	
Course Outline:	Weeks 1 – 4: Weeks 4 – 5: Weeks 6 – 9: Weeks 9 – 11: Weeks 11 – 15: Week 16:	Chapters 24 and 25 Chapter 26 Chapters 28 and 29 Chapter 30 Chapter 31 Final Exam
Assessment of Student Learning Outcomes:	Methods of Assessment Assessing students' achievement of this course's learning outcomes is done using homework, quizzes, examinations and project assignments. Homework: Homework is assigned to reinforce and assess the concepts and	

	skills discussed or assigned as readings. Examinations: Examinations are used to asses overall learning. There will be a mid-term and a final exam. Each exam is comprehensive in that it covers any material previously presented since the beginning of the semester. There may be take-home portions for each exam. In-class Participation: In-class participation consists of answering questions, in-class assignments and quizzes (group and individual) and is used to assess what is being understood in a quick and timely manner. Timeline for Assessment Homework is typically assigned weekly throughout the semester. The mid-term exam will be given mid-semester (approx week 7-8) and the final exam will be given during finals week (week 16). In-class participation will consist of daily activities; some activities will be specifically graded, others (such as answering questions) are subject to the instructor's judgement and will be graded at the end of the semester.																														
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Course Policies:	Retests / Makeup Tests There are NO make-up assignments or tests without prior consent of the instructor. Attendance Attending class is MANDATORY; tardiness and unexcused absences are considered lack of in-class particiation and will be reflected in your grade. Out-of-class Work Expectations: A 3-credit course consists of 3 hours per week of in-class time; it is expected that for each 1 hour of in-class time, 2 hours of out-of-class work is to be performed. Out-of-class work consists of PREPARATION FOR CLASS (PREreading material assigned), doing homework, and STUDYING and REVIEWING material that was presented each day. It is expected that each student will perform 6 hours per week of out-of-class work for this course. (Ref: NAU Academic Contact Hour Policy) Statement on Plagiarism and Cheating Plagiarism and cheating are subject to the Arizona Board of Regents' Code of Conduct and the procedures outlined in the NAU Student Handbook concerning the charges for these offenses. Websites for these documents may be consulted at: Arizona Board of Regents’ Code of Conduct: http://www.abor.asu.edu/1_the_regents/policymanual/chap5/index.html NAU Student Handbook: http://www4.nau.edu/stulife/handbook.htm NAU Student Code of Conduct: http://www4.nau.edu/stulife/handbookcode.htm Disciplinary Action:																														

	http://www4.nau.edu/stulife/handbookdisciplinary.htm
University Policies:	Safe Working and Learning Environment: http://oak.ucc.nau.edu/dam1/Safe%20Policy.htm Students with Disabilities: http://www2.nau.edu/dss/ Institutional Review Board: http://www4.nau.edu/ovp/irb/index.htm Academic Integrity Guidance: http://www.nau.edu/library/information/guides/plagiarism.html
College of Engineering and Natural Sciences Policies:	Professional Ethics and Code of Conduct Exceptionally high standards of honor and integrity are fundamental and essential to the study and practice of engineering. Academic preparation for the profession must be conducted in an atmosphere which fosters these values. In addition to compliance with the Student Code of Conduct and Policy that apply to all students at NAU, engineering students are expected to conduct themselves professionally. Violation of the National Society of Professional Engineers (NSPE) Code of Ethics, found at http://www.nspe.org/ethics/eh1-code.asp or the Association of Computing Machinery (ACM) Code of Ethics and Professional Conduct, found at http://www.acm.org/constitution/code.html may lead to dismissal from the College's academic programs. Violations of any of these codes will be handled as detailed in the publications listed above, and will be documented in the student's advisement file. Faculty members may ask students to affirm in writing that they have neither given nor received unauthorized aid on an examination or assignment.