

UNIVERSITY CURRICULUM COMMITTEE

Proposal for New Course

1. Is this course being proposed for Liberal Studies designation? Yes No
If yes, route completed form to Liberal Studies.
2. New course effective beginning what term and year? (ex. Spring 2008, Summer 2008) Fall 2007
[See effective dates schedule.](#)
3. College CENS 4. Academic Unit CENE
5. Course subject/catalog number CENE 460 6. Units 3
7. Co-convened with CENE 560 7a. Date approved by UGC _____
(Must be approved by UGC prior to bringing to UCC. Both course syllabi must be presented.)
8. Cross-listed with _____
(Please submit a single cross-listed syllabus that will be used for all cross-listed courses.)
9. Long course title CLASSICAL OPEN CHANNEL FLOW
(max 100 characters including spaces)
10. Short course title (max. 30 characters including spaces) CLASSICAL OPEN CHANNEL FLOW
11. Catalog course description (max. 30 words, excluding requisites).

Free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. Incompressible flow, flow potential and resistance, uniform and gradually varying flow regimes.

12. Grading option: Letter grade Pass/Fail or Both
(If both, the course may only be offered one way for each respective section.)
13. Is this a topics course? Yes No
14. May course be repeated for *additional* units? yes no
a. If yes, maximum units allowed? _____
b. If yes, may course be repeated for additional units in the same term? (ex. PES 100) yes no

15. Please check **ONE** of the following that most appropriately describes the course:

Lecture w/0 unit embedded lab Lecture only Lab only Clinical Research
Seminar Field Studies Independent Study Activity Supervision

16. Prerequisites (must be completed **before** proposed course) _____

17. Corequisites (must be completed **with** proposed course) _____

18. If course has no requisites, will all sections of the course require *(If course has pre or co requisite, skip to question 19):*

instructor consent department consent no consent

19. Is the course needed for a plan of study (major, minor, certificate)? yes no

Name of new plan? _____

Note: A new plan or plan change form must be submitted with this request.

20. Does course duplicate content of existing courses within or outside of your college? yes no

If yes, list any courses this course may have duplicative material with and estimate percentage of duplication: _____

Please attach letters of support from each department whose course is listed above.

21. Will this course affect other academic plans, academic units, or enrollment? yes no

If yes, explain in justification and provide supporting documentation from the affected departments.

22. Is a potential equivalent course offered at a community college (lower division only)? yes no

If yes, does it require listing in the [Course Equivalency Guide](#)? yes no

Please list, if known, the institution, subject/catalog number of the course. _____

23. Justification for new course, including unique features if applicable. (Attach proposed syllabus in the approved university format).

Provides much-needed technical elective for civil and environmental engineering students.

24. Names of current faculty qualified to teach this course **Rand Decker and Wilbert Odem**

25. If course will require additional faculty, space, or equipment, how will these requirements be satisfied? _____

26. Will present library holdings support this course? yes no

If the course being submitted for approval is NOT a LIBERAL STUDIES course, please go to step 42.

LIBERAL STUDIES ONLY

Contact name: _____

Contact email: _____

Dept. Chair name: _____

Dept. Chair email: _____

College Contact name : _____

College Contact email: _____

27. This course is a Single section Multi-section

28. List names of faculty who may teach this course: _____

29. Section enrollment cap: _____

If this course is being submitted for approval as a new LIBERAL STUDIES course, please complete questions 30-33.

OR

If this course is being submitted for approval as a new JUNIOR LEVEL WRITING course, please complete questions 37-38.

OR

If this course is being submitted for approval as a new SENIOR CAPSTONE course, please complete questions 39-41.

NEW LIBERAL STUDIES COURSE

30. Thematic Focus (check all that apply): *If a topics course, must apply to ALL sections.*

Environmental Consciousness Technology and Its Impact Valuing the Diversity of Human Experience

31. Distribution Block (check one): *If a topics course, must apply to ALL sections.*

Aesthetic and Humanistic Inquiry Cultural Understanding Lab Science

Science/Applied Science Social and Political Worlds

32. Skills (check two): *If a topics course, must apply to ALL sections.*

Creative Thinking Critical Reading Effective Oral Communication Effective Writing Critical Thinking

Ethical Reasoning Quantitative/Spatial Analysis Scientific Inquiry Use of Technology

33. Is this a topics course? Yes No

If YES, please complete questions 34-36. If NO, please go to question 42.

TOPICS COURSE ONLY

34. Identify the Student Learning Outcomes that will be found in ALL topic syllabi offered under this course number. _____

35. Explain by what method(s) Student Learning Outcomes will be assessed in ALL topic syllabi offered under this course number.

36. Please attach an example of a Topic Syllabus offered under this course number.

GO TO question 42

revised 8/06

NEW JUNIOR LEVEL WRITING COURSE (refer to question 19)

37. To which degree programs offered by your department/academic unit does this proposal apply? _____

38. Do you intend to offer ABC 300 and ABC 300W? yes no

If no, please submit a course delete form for the ABC 300.

GO TO question 42

NEW SENIOR CAPSTONE COURSE (refer to question 19)

39. To which degree programs offered by your department/academic unit does this proposal apply? _____

40. Does this proposal replace or modify an existing course or experience? yes no

If yes, which course(s)? _____

41. Do you intend to offer ABC 400 and ABC 400C? yes no

If no, please submit a course delete form for the ABC 400.

42. Approvals



11/15/06

Department Chair (if appropriate)

Date

Chair of college curriculum committee

Date

Dean of college

Date

For Committees use only

For Liberal Studies Committee

Date

Action taken:

_____ Approved as submitted

_____ Approved as modified

For University Curriculum Committee

Date

Action taken:

_____ Approved as submitted

_____ Approved as modified

Course Syllabus
CENE 460 Classical Open Channel Flow

General Information:	Name of College and Department: Civil & Environmental Engineering, College of Engineering and Natural Sciences Course Prefix, Number, and Title: CENE 460, Classical Open Channel Flow Semester: Fall 2007 Clock Hours / Credit Hours: 3 clock hours, 3 credit hours. Hours: Instructor: Rand Decker, Ph.D., Professor Office Address: Room 314, Engineering, Bldg. 69 (928) 523-6083 Rand.Decker@nau.edu Office Hours: MW, 9:30am-10:00am and 1:00pm-3:00pm
Course Prerequisites:	Consent of instructor.
Course Description:	Free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. Incompressible flow, flow potential and resistance, uniform and gradually varying flow regimes.
Student Learning Expectations / Outcomes for this Course:	CENE 460 and 560, Classical Open Channel Flow is an elective and co-convened graduate class designed to provide selective students with sufficient skills to analyze free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. These analysis skills are one step in and support the process of engineering design. Study will include a rigorous examination of the theory of incompressible flow, flow potential and resistance; and analytic and computational methods for uniform and gradually varying open channel flow regimes. Those individuals who choose to register for this class at the graduate level will further exercise these learning objectives by developing and presenting an in depth project of their own choosing in the general area of open channel flow. Moreover, NAU's ABET Accredited Civil Engineering curriculum requires that our graduates have an opportunity to learn in a suite of areas (the ABET a thru k criteria). In this course, we will address ABET learning criteria a, e, and k, given below. A student's success in meeting these learning objectives will be assessed through your ability to complete of the course's homework and exams, and pass the course. (a) an ability to apply knowledge of mathematics, science, and engineering (e) an ability to identify, formulate, and solve engineering problems (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
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:	<i>Open Channel Hydrology</i> , T. Sturm, First Edition.
Recommended Optional Material / References:	Internet, library resources will be used as recommended by the instructor.
Course Outline:	1 Introduction and Fundamentals of the Engineering Science of Fluid Mechanics 2 Fundamentals of the Engineering Science of Fluid Mechanics, continued 3 Conservation Law, Kinematics and Constitutive Equations of Fluid Mechanics 4 Characteristics of Open Channel Flows and Specific Energy Bal & Applications; 1.3,4,5,8 & 2.1,2,5,7,9,12,13,15,17 5 Momentum Balance Applications; 3.1,2,5,8,11,13

	<p>6 Introduction to Uniform Flow; 4.1,2,3,6,7,9,11,13,16,18,19 7 Uniform Flow, continued; - 8 Uniform Flow, continued; - 9 Exam Prep and Exam 1 10 Gradually Varying Flow; TBA 11 Gradually Varying Flow, continued; - 12 Hydraulic Structures for Open Channel Flows; 6.5,6,7,8,12 13 Hydraulic Structures, continued; - ; no class on Wednesday, November 22nd 14 Oral Presentations of 599 Registrants' Projects; 15 Final Exam Prep; 16 Final Exam</p>																								
<p>Assessment of Student Learning Outcomes:</p>	<p>Methods of Assessment Assessing students' achievement of this course's learning outcomes is done using homework, quizzes, examinations and project assignments.</p> <p>Homework: Homework will be collected and checked for both completion as well as content. The homework solutions will be posted.</p> <p>Examinations: You will have to work efficiently to complete exams in the time allotted. The exams will be very similar to the homework problems, hence, if one does not do the homework the likelihood of successfully writing the examinations is greatly diminished.</p> <p>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.</p> <p>Timeline for Assessment Homework is typically assigned weekly throughout the semester. The mid-term exam will be given mid-semester (week 9) and the final exam will be given during finals week (week 16).</p>																								
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<p>Course Policies:</p>	<p>Retests / Makeup Tests There are NO make-up assignments or tests without prior consent of the instructor.</p> <p>Attendance Attending class is MANDATORY; tardiness and unexcused absences are considered lack of in-class participation and will be reflected in your grade.</p> <p>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)</p>																								

	<p>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:</p> <p>Arizona Board of Regents' Code of Conduct: http://www.abor.asu.edu/1_the_regents/policymanual/chap5/index.html</p> <p>NAU Student Handbook: http://www4.nau.edu/stulife/handbook.htm</p> <p>NAU Student Code of Conduct: http://www4.nau.edu/stulife/handbookcode.htm</p> <p>Disciplinary Action: http://www4.nau.edu/stulife/handbookdisciplinary.htm</p>
<p>University Policies:</p>	<p>Safe Working and Learning Environment: http://oak.ucc.nau.edu/dam1/Safe%20Policy.htm</p> <p>Students with Disabilities: http://www2.nau.edu/dss/</p> <p>Institutional Review Board: http://www4.nau.edu/ovp/irb/index.htm</p> <p>Academic Integrity Guidance: http://www.nau.edu/library/information/guides/plagiarism.html</p>
<p>College of Engineering and Natural Sciences Policies:</p>	<p>Professional Ethics and Code of Conduct</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Faculty members may ask students to affirm in writing that they have neither given nor received unauthorized aid on an examination or assignment.</p>

Course Syllabus
CENE 560 Classical Open Channel Flow

General Information:	Name of College and Department: Civil & Environmental Engineering, College of Engineering and Natural Sciences Course Prefix, Number, and Title: CENE 460, Classical Open Channel Flow Semester: Fall 2007 Clock Hours / Credit Hours: 3 clock hours, 3 credit hours. Hours: Instructor: Rand Decker, Ph.D., Professor Office Address: Room 314, Engineering, Bldg. 69 (928) 523-6083 Rand.Decker@nau.edu Office Hours: MW, 9:30am-10:00am and 1:00pm-3:00pm
Course Prerequisites:	Consent of instructor.
Course Description:	Free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. Incompressible flow, flow potential and resistance, uniform and gradually varying flow regimes.
Student Learning Expectations / Outcomes for this Course:	CENE 460 and 560, Classical Open Channel Flow is an elective and co-convened graduate class designed to provide selective students with sufficient skills to analyze free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. These analysis skills are one step in and support the process of engineering design. Study will include a rigorous examination of the theory of incompressible flow, flow potential and resistance; and analytic and computational methods for uniform and gradually varying open channel flow regimes. Those individuals who choose to register for this class at the graduate level will further exercise these learning objectives by developing and presenting an in depth project of their own choosing in the general area of open channel flow. Moreover, NAU's ABET Accredited Civil Engineering curriculum requires that our graduates have an opportunity to learn in a suite of areas (the ABET a thru k criteria). In this course, we will address ABET learning criteria a, e, and k, given below. A student's success in meeting these learning objectives will be assessed through your ability to complete of the course's homework and exams, and pass the course. (a) an ability to apply knowledge of mathematics, science, and engineering (e) an ability to identify, formulate, and solve engineering problems (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
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:	<i>Open Channel Hydrology</i> , T. Sturm, First Edition.
Recommended Optional Material / References:	Internet, library resources will be used as recommended by the instructor.
Course Outline:	1 Introduction and Fundamentals of the Engineering Science of Fluid Mechanics 2 Fundamentals of the Engineering Science of Fluid Mechanics, continued 3 Conservation Law, Kinematics and Constitutive Equations of Fluid Mechanics 4 Characteristics of Open Channel Flows and Specific Energy Bal & Applications; 1.3,4,5,8 & 2.1,2,5,7,9,12,13,15,17 5 Momentum Balance Applications; 3.1,2,5,8,11,13

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<p>University Policies:</p>	<p>Safe Working and Learning Environment: http://oak.ucc.nau.edu/dam1/Safe%20Policy.htm</p> <p>Students with Disabilities: http://www2.nau.edu/dss/</p> <p>Institutional Review Board: http://www4.nau.edu/ovp/irb/index.htm</p> <p>Academic Integrity Guidance: http://www.nau.edu/library/information/guides/plagiarism.html</p>
<p>College of Engineering and Natural Sciences Policies:</p>	<p>Professional Ethics and Code of Conduct</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Faculty members may ask students to affirm in writing that they have neither given nor received unauthorized aid on an examination or assignment.</p>

- Seminar
- Field Studies
- Independent Study

- Activity
- Supervision

13b. If the course will be delivered electronically, check **ONE** of the following:

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

14. Prerequisites: (must be completed *before* taking proposed course):

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

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

- Instructor Consent
- Department Consent
- No Consent Required.

17. Justification for new course (including unique features, if any): **Provides additional course for Master of Engineering and anticipated Master of Science in Engineering programs.**

18. Is this course required for a new plan? Yes No
If plan has not been approved, you must also submit a plan form that includes the addition of this course.

18.b. If yes, has the plan been approved? Yes No

18.c. When?

18.d. Name of plan:

19. Does this course duplicate content of existing courses? Yes No

19.b. If yes, list every course with duplicate material and estimate the percentage of duplication.

Letters of support from each department with a course listed above must accompany this form.

20. Will this course affect other academic plans, units, or enrollment? Yes No
Letters of support from each department affected must accompany this form.

21. Names of current faculty qualified to teach this course:

22. If this course requires additional faculty, space, or equipment, how will these requirements be met?

23. Will present library holdings support this course? Yes No

24. 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 460 Classical Open Channel Flow

General Information:	Name of College and Department: Civil & Environmental Engineering, College of Engineering and Natural Sciences Course Prefix, Number, and Title: CENE 460, Classical Open Channel Flow Semester: Fall 2007 Clock Hours / Credit Hours: 3 clock hours, 3 credit hours. Hours: Instructor: Rand Decker, Ph.D., Professor Office Address: Room 314, Engineering, Bldg. 69 (928) 523-6083 Rand.Decker@nau.edu Office Hours: MW, 9:30am-10:00am and 1:00pm-3:00pm
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Course Syllabus
CENE 560 Classical Open Channel Flow

General Information:	Name of College and Department: Civil & Environmental Engineering, College of Engineering and Natural Sciences Course Prefix, Number, and Title: CENE 460, Classical Open Channel Flow Semester: Fall 2007 Clock Hours / Credit Hours: 3 clock hours, 3 credit hours. Instructor: Rand Decker, Ph.D., Professor Office Address: Room 314, Engineering, Bldg. 69 (928) 523-6083 Rand.Decker@nau.edu Office Hours: MW, 9:30am-10:00am and 1:00pm-3:00pm
Course Prerequisites:	Consent of instructor.
Course Description:	Free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. Incompressible flow, flow potential and resistance, uniform and gradually varying flow regimes.
Student Learning Expectations / Outcomes for this Course:	CENE 460 and 560, Classical Open Channel Flow is an elective and co-convened graduate class designed to provide selective students with sufficient skills to analyze free surface flows in engineered and natural channel systems, including common hydraulic structures and flow control facilities. These analysis skills are one step in and support the process of engineering design. Study will include a rigorous examination of the theory of incompressible flow, flow potential and resistance; and analytic and computational methods for uniform and gradually varying open channel flow regimes. Those individuals who choose to register for this class at the graduate level will further exercise these learning objectives by developing and presenting an in depth project of their own choosing in the general area of open channel flow. Moreover, NAU's ABET Accredited Civil Engineering curriculum requires that our graduates have an opportunity to learn in a suite of areas (the ABET a thru k criteria). In this course, we will address ABET learning criteria a, e, and k, given below. A student's success in meeting these learning objectives will be assessed through your ability to complete of the course's homework and exams, and pass the course. (a) an ability to apply knowledge of mathematics, science, and engineering (e) an ability to identify, formulate, and solve engineering problems (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
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:	<i>Open Channel Hydrology</i> , T. Sturm, First Edition.
Recommended Optional Material / References:	Internet, library resources will be used as recommended by the instructor.
Course Outline:	1 Introduction and Fundamentals of the Engineering Science of Fluid Mechanics 2 Fundamentals of the Engineering Science of Fluid Mechanics, continued 3 Conservation Law, Kinematics and Constitutive Equations of Fluid Mechanics 4 Characteristics of Open Channel Flows and Specific Energy Bal & Applications; 1,3,4,5,8 & 2.1,2,5,7,9,12,13,15,17 5 Momentum Balance Applications; 3.1,2,5,8,11,13

	<p>6 Introduction to Uniform Flow; 4.1,2,3,6,7,9,11,13,16,18,19 7 Uniform Flow, continued; - 8 Uniform Flow, continued; - 9 Exam Prep and Exam 1 10 Gradually Varying Flow; TBA 11 Gradually Varying Flow, continued; - 12 Hydraulic Structures for Open Channel Flows; 6.5,6,7,8,12 13 Hydraulic Structures, continued; - ; no class on Wednesday, November 22nd 14 Oral Presentations of 599 Registrants' Projects; 15 Final Exam Prep; 16 Final Exam</p>																								
<p>Assessment of Student Learning Outcomes:</p>	<p>Methods of Assessment Assessing students' achievement of this course's learning outcomes is done using homework, quizzes, examinations and project assignments.</p> <p>Homework: Homework will be collected and checked for both completion as well as content. The homework solutions will be posted.</p> <p>Examinations: You will have to work efficiently to complete exams in the time allotted. The exams will be very similar to the homework problems, hence, if one does not do the homework the likelihood of successfully writing the examinations is greatly diminished.</p> <p>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.</p> <p>Timeline for Assessment Homework is typically assigned weekly throughout the semester. The mid-term exam will be given mid-semester (week 9) and the final exam will be given during finals week (week 16).</p>																								
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