Graduate Academic Board

October 24, 2014
ADM 204
9:30 to 11:30

I. Roll Call
   () Arlene Schmuland
   () Cindy Knall
   () Jervette Ward
   () FS CAS

Ex-Officio Members
   () Anthony Paris
   () Dennis Drinka
   () FS at Large

II. Approval of Agenda (pg. 1)

III. Approval of Meeting Summary (pg. 2-3)

IV. Administrative Reports
   A. Associate Dean of the Graduate School David Yesner
   B. University Registrar Lora Volden
   C. GAB Chair Arlene Schmuland

V. Program/Course Action Request - Second Readings
   Add ANTH A654 Advanced Studies in Culture and Ecology (stacked with ANTH A454) (3 cr)(3+0)(pg. 4-19)
   Chg AE A681 Frozen Ground Engineering (3 cr)(3+0)(pg. 20-23)
   Chg AE A682 Ice Engineering (3 cr)(3+0)(pg. 24-27)
   Chg AE A683 Arctic Hydrology and Hydraulic Engineering (3 cr)(3+0)(pg. 28-31)
   Chg AE A684 Arctic Utility Distribution (3 cr)(3+0)(pg. 32-35)
   Chg AE A685 Arctic Mass and Heat Transfer (3 cr)(3+0)(pg. 36-39)
   Chg AE A689 Cold Regions Pavement Design (3 cr)(3+0)(pg. 40-43)
   Add AE A698 Arctic Engineering Project (3 cr)(0+9)(pg. 44-47)

VI. Program/Course Action Request - First Readings
   Chg BA A648 Business Intelligence and Data Mining (3 cr)(3+0)(pg. 48-51)
   Add ME A651 Aerodynamics (stacked with ME A451)(3 cr)(3+0)(pg. 52-61)
   Add Doctor of Education in Education, Culture, and Leadership (pg. 62-68)

VII. Old Business

VIII. New Business

IX. Informational Items and Adjournment
Graduate Academic Board

Agenda

October 10, 2014
ADM 204
9:30 to 11:30

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I. **Roll Call**

(x) Arlene Schmuland  (x) Anthony Paris  (x) Peter Olsson  (e) Hsing-Wen Hu  
(x) Cindy Knall  (x) Dennis Drinka  (x) Clayton Trotter  (x) Sam Thiru  
(x) Jervette Ward  () FS at Large  () FS at Large  () FS at Large  
() FS CAS  

Ex-Officio Members:

(x) David Yesner  
(e) Lora Volden  
(x) Scheduling and Publications

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II. **Approval of Agenda** (pg. 1)

Approved

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III. **Approval of Meeting Summary** (pg. 2-3)

Approved

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IV. **Administrative Reports**

A. Associate Dean of the Graduate School David Yesner

- *Doctor of Nursing Practice was approved in SAC and will be on the December Board of Regents agenda*
- *Finished final documentation for the Master of Science in Computer Engineering, the transferal letter is read for the Provost and Chancellor to sign. It will proceed to the November SAC meeting*
- *The Doctorate of Education in Education, Culture, and Leadership is being reworked for GAB consideration*
- *Looking at Board of Regents policy for 600-level post-baccalaureate credits to count towards degree*

B. University Registrar Lora Volden

*Draft III of CIM will come out next week, more information will be provided at the next meeting*

C. GAB Chair Arlene Schmuland

*Update on the Doctorate of Education, Culture, and Leadership*

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V. **Program/Course Action Request - Second Readings**

Chg  ANTH A615  Advanced Applied Anthropology (stacked with ANTH A415)  (3 cr)(3+0)(pg. 4-13)

Approved for second

Add  ANTH A654  Advanced Culture and Ecology (stacked with ANTH A454)  (3 cr)(3+0)(pg. 14-29)

Will come back for second read

Chg  AE A603  Arctic Engineering (stacked with AE A403)  (3 cr)(3+0)(pg. 30-37)

Approved for second

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VI. **Program/Course Action Request - First Readings**

Chg  AE A681  Frozen Ground Engineering  (3 cr)(3+0)(pg. 38-41)
Chg  AE A682  Ice Engineering  (3 cr)(3+0)(pg. 42-45)
Chg  AE A683  Arctic Hydrology and Hydraulic Engineering  (3 cr)(3+0)(pg. 46-49)
Chg  AE A684  Arctic Utility Distribution  (3 cr)(3+0)(pg. 50-53)
Chg  AE A685  Arctic Mass and Heat Transfer  (3 cr)(3+0)(pg. 54-57)
Add  AE A686  Arctic Engineering Project  (3 cr)(0+9)(pg. 58-61)

Accepted with course number change from AE A686 to AE A698

All AE courses accepted for first reading

Chg  BIOL A662  Advanced Virology (Stacked with BIOL A462)  (3 cr)(3+0)(pg. 66-77)

Waived first, approved for second

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VII. **Old Business**

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VIII. **New Business**

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IX. Informational Items and Adjournment

A. **Credit Hour Review Process:** In response to a new NWCCU policy on credit hours, an AY14 subcommittee of the UAB and GAB recommended a process to review class scheduling practices relative to approved CAR/CCG credit hours. In Fall 2014 UAA ran a pilot, which focused on traditional face-to-face offerings. After filtering for apparent face-to-face delivery, a total of 143 course sections were sent to the colleges for review. Findings and Actions: Most of the courses integrated nontraditional components, such as a practicum or 0-credit lab, and were found to be in compliance. Sixteen sections were rescheduled to meet the required contact hours. Departments will revise the curriculum documents for nine courses in order to reflect current practice.
Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College
AS CAS

1b. Division
ASSC Division of Social Science

1c. Department
Anthropology

2. Course Prefix
ANTH

3. Course Number
A654

4. Previous Course Prefix & Number
N/A

5a. Credits/CEUs
3

5b. Contact Hours
(3+0)

6. Complete Course Title
Advanced Studies in Culture and Ecology

7. Type of Course
☑ Academic
☐ Preparatory/Development
☐ Non-credit
☐ CEU
☐ Professional Development

8. Type of Action:
☒ Add
☐ Change
☐ Delete

9. Repeat Status No

# of Repeats

Max Credits

10. Grading Basis
☒ A-F
☐ P/NP
☐ NG

11. Implementation Date
From: Spring/2015
To: Fall/9999

12. Cross Listed with
☒ Stacked
☐ ANTH A454

Cross-Listed Coordination

Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

<table>
<thead>
<tr>
<th>Impacted Program/Course</th>
<th>Date of Coordination</th>
<th>Chair/Coordinator Contacted</th>
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<td>Anthropology MA</td>
<td>10/20/2013</td>
<td>Paul White</td>
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Initiator Name (typed): Diane K. Hanson
Initiator Signed Initials: ____________ Date: ____________

13b. Coordination Email
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)
Date: 10/31/2013

13c. Coordination with Library Liaison
Date: 10/31/2013

14. General Education Requirement
Mark appropriate box:
☐ Oral Communication
☐ Written Communication
☐ Quantitative Skills
☐ Humanities
☐ Fine Arts
☐ Social Sciences
☐ Natural Sciences
☐ Integrative Capstone

15. Course Description (suggested length 20 to 50 words)
Applies ecological concepts to human societies; examines impacts of environmental change on human societies and of human societies on environments; explores ethnology and tribal ecologic knowledge of indigenous communities and the values of nature among Western and non-Western societies; and highlights political ecology in the context of the modern world-system and globalization.

16a. Course Prerequisite(s) (list prefix and number or test code and score)
16b. Co-requisite(s) (concurrent enrollment required)

16c. Other Restriction(s)
☐ College
☐ Major
☐ Class
☒ Level

16d. Registration Restriction(s) (non-codable)
Graduate standing and completed undergraduate course in cultural anthropology with a minimum C grade

17. Mark if course has fees

18. Mark if course is a selected topic course

19. Justification for Action
Graduate students have need for a course in ecological anthropology that reflects both Western and non-Western (indigenous) approaches to human-environment interaction.
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<th>Date</th>
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I. Date of Initiation Date: Fall 2013

II. Course Information

A. College: College of Arts and Sciences
B. Course Prefix: ANTH
C. Course Number: A654
D. Number of Credits: 3
E. Contact Hours: 3+0
F. Course Title: Advanced Studies in Culture and Ecology
G. Grading Basis: A-F
H. Implementation Date: Spring 2015
I. Course Description: Applies ecological concepts to human societies; examines impacts of environmental change on human societies and of human societies on environments; explores ethnoecology and traditional ecological knowledge of indigenous communities and the values of nature among Western and non-Western societies; and highlights political ecology in the context of the modern world-system and globalization.

J. Status of Course Relative to a Degree or Certificate Program: Elective in the MA Anthropology
K. Course Fees: No
L. Registration Restrictions: Graduate Standing and completed undergraduate course in cultural anthropology with a minimum C grade

M. Stacking

III. Course Activities

In a lecture and discussion format, information will be presented concerning the diversity of ways in which human societies adapt and have adapted to their natural environments and have transformed those environments, from prehistory to the present, in global perspective.

IV. Course Evaluation

Evaluation procedures are at the discretion of the instructor and will be discussed at the first class meeting of the semester. Students will be evaluated on all class content and assigned readings. Evaluation vehicles will include (but are not limited to) examinations, research papers, student journals/reflections, student questions on readings, and class discussions. The requirement for research papers differentiates the undergraduate (A454) and graduate (A654) versions of this course.

V. Course Level Justification

This course provides a thorough and comprehensive opportunity for graduate students to explore ecological anthropology and reflect on both Western and non-Western approaches to human-environment interaction. The course structure requires high-level
critical thinking and effective written and oral communication skills. As a stacked course with undergraduates at the 400-level, ANTH A654 is designed to develop discussion leadership skills in graduate students and to provide the opportunity for graduate students to research in-depth a topic within ecological anthropology of their own interest. Cross-cultural and critical perspectives on the human-environment interaction are critical for a graduate-level education in anthropology.

VI. Instructional Goals and Defined Outcomes

A. Instructional Goals. The Instructor will:

1. Present fundamental ecological concepts and their relationship to human societies
2. Discuss human adaptations from a variety of cultural perspectives
3. Describe the impacts of environmental changes on human societies, and of human societies on their environments
4. Relate the traditions of environmental anthropology and their perspectives on human/environment interactions
5. Present Western and Non-western (Indigenous) perspectives on ecological knowledge

B. Student Learning Outcomes. The Student will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes:</th>
<th>Assessment Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Apply fundamental ecological concepts to human societies</td>
<td>Examinations, student journals/reflections from class discussions, graded daily questions</td>
</tr>
<tr>
<td>2. Analyze the impacts of environmental change on human societies and the impacts of human societies on environments through human history</td>
<td>Examinations, student journals/reflections from class discussions, graded daily questions</td>
</tr>
<tr>
<td>3. Explain the various traditions in anthropology and their approaches to understanding human/environment interactions</td>
<td>Examinations, student journals/reflections from class discussions, graded daily questions</td>
</tr>
<tr>
<td>4. Interpret different approaches of societies to nature, and the differences and similarities between indigenous environmental knowledge and that of contemporary Western societies</td>
<td>Examinations, student journals/reflections from class discussions, graded daily questions</td>
</tr>
</tbody>
</table>

VII. Topical Outline:

A. Introduction
B. Environmental Anthropology Overview
   1. Development and Branches of Environmental Anthropology
2. Steward’s Cultural Ecology
3. Beyond Boundaries in Cultural Ecology
4. Ethnoecology
5. System Approaches in Environmental Anthropology

C. Fundamentals of Ecology and Human Biological Ecology
   1. Principles of Cultural Ecology
   2. Human Adaptive Strategies
      a. Hunting and Gathering
      b. Origins of Food Production/Horticulture
      c. Pastoralism/Intensive Agriculture
      d. Modern Models

D. Population & Environment

E. Development & Urbanization

F. Political Ecology
   1. Politics of Knowledge
   2. Knowing the Environment
   3. Biodiversity
   4. Managing the Environment
   5. Gender, Feminism, & Environment
   6. Politics of Global Environmentalism

G. Indigeneity & the Environment
   1. Traditional Ecological Knowledge
   2. Indigenousness & Environmentalism
   3. Indigenous Rights

H. Contemporary Issues in Environmental Anthropology
   1. Health & Environment
   2. Climate Change
   3. Consumption & Globalization

VIII. Suggested Textbooks:


IX. Bibliography:


*Classic References

**Sources that illustrate historic development of the field
Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

<table>
<thead>
<tr>
<th>1a. School or College</th>
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<tr>
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<td>ASSC Division of Social Science</td>
<td>Anthropology</td>
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<tr>
<th>2. Course Prefix</th>
<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
<th>5a. Credits/CEUs</th>
<th>5b. Contact Hours (Lecture + Lab)</th>
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<tr>
<td>ANTH</td>
<td>A454</td>
<td>ANTH A354</td>
<td>3</td>
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**6. Complete Course Title**
Culture and Ecology

**Abbreviated Title for Transcript (30 character)**

**7. Type of Course**
- [ ] Academic
- [ ] Preparatory/Development
- [ ] Non-credit
- [ ] CEU
- [ ] Professional Development

**8. Type of Action:**
- [ ] Add
- [x] Change
- [ ] Delete

If a change, mark appropriate boxes:
- [ ] Prefix
- [x] Course Number
- [ ] Credits
- [ ] Title
- [ ] Grading Basis
- [ ] Cross-Listed/Stacked
- [ ] Course Description
- [ ] Course Prerequisites
- [ ] Test Score Prerequisites
- [ ] Co-requisites
- [ ] Registration Restrictions
- [ ] General Education Requirement
- [ ] Other Restrictions (please specify)

**9. Repeat Status No # of Repeats Max Credits**

**10. Grading Basis**
- [x] A-F
- [ ] P/NP
- [ ] NG

**11. Implementation Date**
From: Spring/2015 To: Fall/9999

**12. Cross Listed with**
- [ ] Stacked with ANTH A654

**13a. Impacted Courses or Programs:**
List any programs or college requirements that require this course.
If more than three entries, submit a separate table. A template is available at [www.uaa.alaska.edu/governance](http://www.uaa.alaska.edu/governance).

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</thead>
<tbody>
<tr>
<td>1. Integrative Capstone (Tier 3 GER), p. 87, 2012-13 catalog</td>
<td>10/31/2013</td>
<td>Faculty List Serv</td>
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**Initiator Name (typed):** Diane K. Hanson **Initiator Signed Initials:** __________ **Date:** __________________

**13b. Coordination Email**
Date: 10/31/2013
submitted to Faculty Listserv: [uaa-faculty@lists.uaa.alaska.edu](mailto:uaa-faculty@lists.uaa.alaska.edu)

**13c. Coordination with Library Liaison**
Date: 10/31/2013

**14. General Education Requirement**
Mark appropriate box:
- [ ] Oral Communication
- [ ] Written Communication
- [ ] Quantitative Skills
- [ ] Humanities
- [ ] Fine Arts
- [ ] Social Sciences
- [ ] Natural Sciences
- [x] Integrative Capstone

**15. Course Description** *(suggested length 20 to 50 words)*
Examines anthropological approaches to the relationships between cultural and ecological systems. Explores culture as an adaptive system and the role of various cultural subsystems in different adaptations. Applies ecological concepts to human societies; impacts of environmental change on human societies, and impacts of human societies on environments; ethnecology and traditional ecological knowledge of indigenous communities; values of nature among Western and non-Western societies; and political ecology in relation to the juxtaposition of indigenous peoples within contemporary nation-states.

**16a. Course Prerequisite(s)** *(list prefix and number or test code and score)*
ANTH A202 minimum grade of C

**16b. Co-requisite(s) (concurrent enrollment required)**

**16c. Other Restriction(s)**
- [ ] College
- [ ] Major
- [ ] Class
- [ ] Level

**16d. Registration Restriction(s) (non-codable)**

**17. Mark if course has fees**

**18. Mark if course is a selected topic course**

**19. Justification for Action**
This capstone course has been taught at the advanced undergraduate level for the past several years, and its movement to the 400 level reflects its content level as a capstone course in Anthropology.
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<th>Date</th>
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</table>
I. Date of Initiation Date: Fall 2013

II. Course Information
   A. College: College of Arts and Sciences
   B. Course Prefix: ANTH
   C. Course Number: A454
   D. Number of Credits: 3
   E. Contact Hours: 3+0
   F. Course Title: Culture and Ecology
   G. Grading Basis: A-F
   H. Implementation Date: Spring 2015
   I. Course Description: Examines anthropological approaches to the relationships between cultural and ecological systems. Explores culture as an adaptive system and the role of various cultural subsystems in different adaptations. Applies ecological concepts to human societies; impacts of environmental change on human societies, and impacts of human societies on environments; ethnoecology and traditional ecological knowledge of indigenous communities; values of nature among Western and non-Western societies; and political ecology in relation to the juxtaposition of indigenous peoples within contemporary nation-states.
   J. Status of Course Relative to a GER Integrative Capstone Degree or Certificate Program: BA Anthropology capstone
   K. Course Fees: No
   L. Course Prerequisite: ANTH A202, minimum grade of C
   M. Stacking: ANTH A654

III. Course Activities

In a lecture and discussion format, information will be presented concerning the diversity of ways in which human societies adapt and have adapted to their natural environments and have transformed those environments, from prehistory to the present, in global perspective.

IV. Course Justifications:
A. Justification of course level: This course contains advanced content; it is a synthetic course requiring specialized knowledge

B. Justification for capstone status: This course integrates general knowledge about human cultural adaptations to produce a synthetic but detailed understanding of the long-term history of human-environmental relations, including both environmental impacts on human societies and vice versa, as well as an understanding of distinctions between Western and non-Western approaches to ecological knowledge and values of nature, and a consideration of the ecological circumstances of indigenous peoples embedded within contemporary nation-states.

V. Instructional Goals and Defined Outcomes

A. Instructional Goals. The Instructor will:

1. Present fundamental ecological concepts and their relationship to human societies
2. Discuss human adaptations from a variety of cultural perspectives
3. Describe the impacts of environmental changes on human societies, and of human societies on their environments
4. Relate the traditions of environmental anthropology and their perspectives on human/environment interactions
5. Present Western and non-Western (indigenous) perspectives on ecological knowledge

B. Student Learning Outcomes and Assessment Measures. The Student will:

<table>
<thead>
<tr>
<th>Student Learning Outcomes:</th>
<th>Assessment Measures</th>
<th>Integrative Capstone Goals</th>
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</thead>
<tbody>
<tr>
<td>1. Apply fundamental ecological concepts to human societies</td>
<td>Examinations, student journals/reflections from class discussions, graded daily questions</td>
<td>Knowledge integration, critical thinking</td>
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<tr>
<td>2. Analyze the impacts of environmental change on human societies and the impacts of human societies on environments through human history</td>
<td>Examinations, student journals/reflections from class discussions, graded daily questions</td>
<td>Critical thinking, information literacy, knowledge integration,</td>
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<td>3. Explain the various traditions in anthropology and their approaches to</td>
<td>Examinations, student journals/reflections from class discussions, graded daily</td>
<td>Critical thinking, information literacy, knowledge integration,</td>
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understanding human/environment interactions | questions | Critical thinking, information literacy, knowledge integration

4. Interpret different approaches of societies to nature, and the differences and similarities between indigenous environmental knowledge and that of contemporary Western societies

Examinations, student journals/reflections from class discussions, graded daily questions

VI. Topical Outline:

A. Introduction
B. Environmental Anthropology Overview
   a. Development and Branches of Environmental Anthropology
   b. Steward’s Cultural Ecology
   c. Beyond Boundaries in Cultural Ecology
   d. Ethnoecology
   e. System Approaches in Environmental Anthropology
C. Fundamentals of Ecology and Human Biological Ecology
   a. Principles of Cultural Ecology
   b. Human Adaptive Strategies
      i. Hunting and Gathering
      ii. Origins of Food Production/Horticulture
      iii. Pastoralism/Intensive Agriculture
      iv. Modern Models
D. Population & Environment
E. Development & Urbanization
F. Political Ecology
   a. Politics of Knowledge
   b. Knowing the Environment
   c. Biodiversity
   d. Managing the Environment
   e. Gender, Feminism, & Environment
   f. Politics of Global Environmentalism
G. Indigeneity & the Environment
   a. Traditional Ecological Knowledge
   b. Indigenousness & Environmentalism
   c. Indigenous Rights
H. Contemporary Issues in Environmental Anthropology
   a. Health & Environment
   b. Climate Change
   c. Consumption & Globalization

VII. Suggested Textbooks:


VIII. Bibliography:


*Classic References

**Sources that illustrate historic development of the field
### Course Action Request

**University of Alaska Anchorage**

Proposal to Initiate, Add, Change, or Delete a Course

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<td>1c. Department</td>
<td>Civil Engineering</td>
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<tr>
<td>2. Course Prefix</td>
<td>AE</td>
</tr>
<tr>
<td>3. Course Number</td>
<td>A681</td>
</tr>
<tr>
<td>4. Previous Course Prefix &amp; Number</td>
<td>CE A681</td>
</tr>
<tr>
<td>5a. Credits/CEUs</td>
<td>3</td>
</tr>
<tr>
<td>5b. Contact Hours</td>
<td>(Lecture + Lab) (3+0)</td>
</tr>
</tbody>
</table>

#### 6. Complete Course Title

Frozen Ground Engineering

**Abbreviated Title for Transcript (30 character)**

#### 7. Type of Course

- [x] Academic
- [ ] Preparatory/Development
- [ ] Non-credit
- [ ] CEU
- [ ] Professional Development

#### 8. Type of Action:

- [ ] Add
- [x] Change
- [ ] Delete

If a change, mark appropriate boxes:

- [x] Prefix
- [ ] Credits
- [ ] Title
- [ ] Grading Basis
- [x] Course Description
- [ ] Cross-Listed/Stacked
- [ ] Test Score Prerequisites
- [x] Co-requisites
- [x] Registration Restrictions

#### 9. Repeat Status No

- [ ] # of Repeats
- [ ] Max Credits

#### 10. Grading Basis

- [x] A-F
- [ ] P/NP
- [ ] NG

#### 11. Implementation Date

- [ ] semester/year
- From: Fall/2015 To: 99/9999

#### 12. Cross Listed with

- [ ] Stacked with

#### 13a. Impacted Courses or Programs:

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<th>Chair/Coordinator Contacted</th>
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</thead>
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<td>336</td>
<td>1/24/2014</td>
<td>Hannele Zubeck</td>
</tr>
<tr>
<td>2. MS of Civil Engineering</td>
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<td>1/24/2014</td>
<td>Osama Abaza</td>
</tr>
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<td>3.</td>
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Initiator Signed Initials: __________ Date: __________

#### 13b. Coordination Email

Date: 2/4/2014

submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

#### 13c. Coordination with Library Liaison

Date: 2/4/2014

#### 14. General Education Requirement

Mark appropriate box:

- [ ] Oral Communication
- [ ] Written Communication
- [ ] Quantitative Skills
- [ ] Humanities
- [ ] Fine Arts
- [ ] Social Sciences
- [ ] Natural Sciences
- [ ] Integrative Capstone

#### 15. Course Description (suggested length 20 to 50 words)

Introduces students to physical, thermal, and mechanical properties of frozen soils; frost action; heat flow in soils; thaw behavior of frozen ground; foundations in frozen ground; construction ground freezing; and pavement design, earthwork, and field investigations for frozen ground.

#### 16a. Course Prerequisite(s) (list prefix and number)

N/A

#### 16b. Test Score(s)

N/A

#### 16c. Co-requisite(s) (concurrent enrollment required)

N/A

#### 16d. Other Restriction(s)

- [x] College
- [ ] Major
- [ ] Class
- [x] Level

#### 16e. Registration Restriction(s) (non-codable)

Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering.

#### 17. [x] Mark if course has fees CoEng fee

#### 18. [ ] Mark if course is a selected topic course

#### 19. Justification for Action

For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix. Prerequisite removal: current prerequisite limits the attendance to Civil Engineers only.

---

Initiator (faculty only) __________ Date __________

Initiator (TYPE NAME) __________ Date __________

[Mark if approved or disapproved]

- [x] Approved
- [ ] Disapproved

Dean/Director of School/College __________ Date __________

[Mark if approved or disapproved]

- [x] Approved
- [ ] Disapproved

Undergraduate/Graduate Academic __________ Date __________

Board Chairperson __________ Date __________

[Mark if approved or disapproved]

- [x] Approved
- [ ] Disapproved

Provost or Designee __________ Date __________

---

20
I. Initiation Date: February 20, 2014

II. Course Information
A. College: College of Engineering
B. Course Title: Frozen Ground Engineering
C. Course Subject/Number: AE A681
D. Credit Hours: 3.0
E. Contact: 3+0
F. Grading Information: A-F
G. Course Description: Introduces students to physical, thermal and mechanical properties of frozen soils; frost action; heat flow in soils; thaw behavior of frozen ground; foundations in frozen ground; construction ground freezing; and pavement design, earthwork, and field investigations for frozen ground.

H. Status of course relative to degree or certificate program:
   Applies to the MS programs in Arctic Engineering.

I. Lab Fees: CoEng fee
J. Coordination: UAA/CoEng/CE faculty list serves
K. Course Prerequisites: NA
L. Registration Restrictions: Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering.

III. Course Activities
Faculty presentations, homework assignments, exams, class discussions and activities relating to course’s term paper conference.

IV. Evaluation
Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on homework assignments, exams and term paper.

V. Course Level Justification
Presentations and reading will include advanced scientific and engineering topics that require a background in math and science equivalent to that obtained in a bachelor’s degree in engineering.
VI. Course Topics

1. Introduction to Frozen Ground
2. Physical and Thermal Properties of Soils
3. Frost Action
4. Heat Flow in Soils
5. Thaw Behavior of Frozen Ground
6. Mechanical Properties of Frozen Soils
7. Foundations in Frozen Ground
8. Construction Ground Freezing
9. Pavement Design
10. Field Investigations and Earthwork
11. Current Research Topics

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will demonstrate how to
   1. Analyze properties of frozen soils,
   2. Analyze frozen soil's behavior under stress and strain,
   3. Design foundations, earth structures and pavements for frozen ground,
   4. Explain how to prepare conference papers.

B. Student Learning Outcomes. After successful completion of the course, the students will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Define frozen ground and describe its characteristics.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>2. Assess physical and thermal properties of frozen soils,</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>heat flow and frost heave rates in soils.</td>
<td></td>
</tr>
<tr>
<td>3. Analyze thaw weakening of frozen soils and estimate thaw settlement.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>4. Determine strength and creep parameters of frozen soils.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>5. Design to prevent foundation/pavement failure due to seasonally frozen ground or permafrost.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>6. Identify important issues in earthwork, field investigations, and construction ground freezing project.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>7. Author papers acceptable for publication.</td>
<td>Term paper</td>
</tr>
</tbody>
</table>

VIII. Suggested Text

IX. Bibliography and Resources

### Course Action Request

**University of Alaska Anchorage**

**Proposal to Initiate, Add, Change, or Delete a Course**

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>1b. Division</th>
<th>1c. Department</th>
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<tbody>
<tr>
<td>EN SOENGR</td>
<td></td>
<td>Civil Engineering</td>
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<table>
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<tr>
<th>2. Course Prefix</th>
<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
<th>5a. Credits/CEUs</th>
<th>5b. Contact Hours</th>
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<tr>
<td>AE</td>
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<td>CE A682</td>
<td>3</td>
<td>(3+0)</td>
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<tr>
<th>6. Complete Course Title</th>
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<tr>
<td>Ice Engineering</td>
<td>Ice Engineering</td>
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<table>
<thead>
<tr>
<th>7. Type of Course</th>
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<th>8. Type of Action:</th>
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<th>Delete</th>
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</tbody>
</table>

If a change, mark appropriate boxes:

- Prefix
- Credits
- Title
- Grading Basis
- Course Description
- Other Restrictions (please specify)
- Cross-Listed/Stacked
- Course Prerequisites
- Co-requisites
- Registration Restrictions
- College
- Major
- Class
- Level

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<th>9. Repeat Status No</th>
<th># of Repeats</th>
<th>Max Credits</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Grading Basis

- A-F
- P/NP
- NG

11. Implementation Date

- semester/year
- From: Fall/2015
- To: 99/9999

12. Cross Listed with

- Stacked with

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

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<td>Arctic Engineering MS Program</td>
<td>337</td>
<td>1/24/2014</td>
<td>Hannele Zubeck</td>
</tr>
<tr>
<td>Civil Engineering MS Program</td>
<td>NA</td>
<td>1/24/2014</td>
<td>Osama Abaza</td>
</tr>
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<td></td>
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</tbody>
</table>

Initiator Name (typed): Hannele Zubeck
Initiator Signed Initials: __________
Date: __________

13b. Coordination Email

- Date: 2/4/2014
- submitted to Faculty Listserv: uaa-faculty@lists.uaa.alaska.edu

13c. Coordination with Library Liaison

- Date: 2/4/2014

14. General Education Requirement

Mark appropriate box:

- Oral Communication
- Written Communication
- Quantitative Skills
- Humanities
- Fine Arts
- Social Sciences
- Natural Sciences
- Integrative Capstone

15. Course Description (suggested length 20 to 50 words)

Introduces students to factors governing design of engineering works contending with the presence of ice. Includes fundamental ice properties, ice processes, ice navigation and control of ice in channels, structural and non-structural ice control measures, ice jams, bearing capacity of floating ice sheets, and ice forces on riverine and ocean structures.

16a. Course Prerequisite(s) (list prefix and number)

- NA

16b. Test Score(s)

- N/A

16c. Co-requisite(s) (concurrent enrollment required)

- N/A

16d. Other Restriction(s)

- College
- Major
- Class
- Level

16e. Registration Restriction(s) (non-codable)

Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a mechanics of materials course with a minimum grade of C.

17. Mark if course has fees

- CoEng fee

18. Mark if course is a selected topic course

19. Justification for Action

For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix.

Initiator (faculty only) Hannele Zubeck
Initiator (TYPE NAME) __________
Date __________

- Approved
- Disapproved

Dean/Director of School/College
Date __________

- Approved
- Disapproved

Undergraduate/Graduate Academic Board Chairperson
Date __________

- Approved
- Disapproved

Provost or Designee
Date __________

24
I. Initiation Date: February 20, 2014

II. Course Information

A. College: College of Engineering
B. Course Title: Ice Engineering
C. Course Subject/Number: AE A682
D. Credit Hours: 3.0
E. Contact: 3+0
F. Grading Information: A-F
G. Course Description: Introduces students to factors governing design of engineering works contending with the presence of ice. Includes fundamental ice properties, ice processes, ice navigation and control of ice in channels, structural and non-structural ice control measures, ice jams, bearing capacity of floating ice sheets, and ice forces on riverine and ocean structures.

H. Status of course relative to degree or certificate program: Applies to the MS program in Arctic Engineering.

I. Lab Fees: CoEng fee
J. Coordination: UAA/CoEng/CE faculty list serves
K. Course Prerequisites: None
L. Registration Restrictions: Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a mechanics of materials course with a minimum grade of C.

III. Course Activities

Faculty presentations, homework assignments, exams, class discussions and activities relating to course’s term paper conference.

IV. Evaluation

Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on homework assignments, exams and term paper.

V. Course Level Justification

Presentations and reading will include advanced scientific and engineering topics that require a background in math and science equivalent to that obtained in a bachelor’s degree in engineering.
VI. Course Topics

1. Physical Ice Properties and Processes
2. River, Lake, and Sea Ice
3. Ice Navigation and Control of Ice in Channels
4. Structural and Non-structural Ice control Measures
5. Ice Jam Processes and Classification
6. Ice Jam Data Collection, Hydraulics, and Mitigation
7. Bearing Capacity of Floating Ice Sheets
8. Ice Forces on Structures and Related Processes
9. Construction of Ice Roads and Bridges
10. Current Research Topics

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will present materials, lead discussions, and assign exercises intended to give students ability to
1. Analyze properties of lake, river, and sea ice.
2. Predict behavior of ice under natural conditions.
3. Evaluate ice forces on engineering structures.
4. Design ice roads and bridges.
5. Evaluate bearing capacity of ice sheets.
6. Predict other ice effects pertinent to safety and efficiency of human endeavors in cold regions.
7. Explain how to prepare conference papers.

B. Student Learning Outcomes. After successful completion of the course, the students will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
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<tbody>
<tr>
<td>1. Analyze properties of lake, river, and sea ice.</td>
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<td>4. Design ice roads and bridges.</td>
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<td>5. Evaluate bearing capacity of ice sheets.</td>
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<td>8. Author papers acceptable for publication.</td>
<td>Term paper</td>
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VIII. Suggested Text:


IX. Bibliography and Resources

1a. School or College  
EN SOENGR  

1b. Division 
No Division Code  

1c. Department 
Civil Engineering  

2. Course Prefix 
AE  

3. Course Number 
A683  

4. Previous Course Prefix & Number 
CE A683  

5a. Credits/CEUs 
3  

5b. Contact Hours 
(Lecture + Lab) 
(3+0)  

6. Complete Course Title 
Arctic Hydrology and Hydraulic Engineering  
Arctic Hydrology/Hydraulic Eng  

Abbreviated Title for Transcript (30 character)  

7. Type of Course  
[ ] Academic  
[ ] Preparatory/Development  
[ ] Non-credit  
[ ] CEU  
[ ] Professional Development  

8. Type of Action:  
[ ] Add  
[ ] Change  
[ ] Delete  

If a change, mark appropriate boxes:  

[ ] Prefix  
[ ] Credits  
[ ] Title  
[ ] Grading Basis  
[ ] Course Description  
[ ] Test Score Prerequisites  
[ ] Other Restrictions  
[ ] Class  
[ ] College  
[ ] Major  
[ ] Level  
[ ] Registration Restrictions  

9. Repeat Status No  
# of Repeats  
Max Credits  

10. Grading Basis  
[ ] A-F  
[ ] P/NP  
[ ] NG  

11. Implementation Date  
semester/year  
From: Fall/2015  
To: 99/9999  

12. Cross Listed with  
[ ] Stacked with  
Cross-Listed Coordination Signature  

13a. Impacted Courses or Programs:  
List any programs or college requirements that require this course.  
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<td>Hannele Zubeck</td>
</tr>
<tr>
<td>2. AEST MS Program</td>
<td>335</td>
<td>1/24/2014</td>
<td>Rob Lang</td>
</tr>
<tr>
<td>3.</td>
<td></td>
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</tbody>
</table>

Initiator Name (typed): Hannele Zubeck  
Initiator Signed Initials: _________  
Date: __________________  

13b. Coordination Email  
Date: 2/4/2014  
submitted to Faculty Listserv:  
(uaa-faculty@lists.uaa.alaska.edu)  

13c. Coordination with Library Liaison  
Date: 2/4/2014  

14. General Education Requirement  
Mark appropriate box:  

[ ] Oral Communication  
[ ] Written Communication  
[ ] Quantitative Skills  
[ ] Humanities  
[ ] Fine Arts  
[ ] Social Sciences  
[ ] Natural Sciences  
[ ] Integrative Capstone  

15. Course Description (suggested length 20 to 50 words)  
Introduces students to aspects of hydrology and hydraulics unique to engineering problems of the North. Although emphasis is placed on Alaskan conditions, information from Canada and other circumpolar countries is included.  

16a. Course Prerequisite(s) (list prefix and number)  
NA  

16b. Test Score(s)  
N/A  

16c. Co-requisite(s) (concurrent enrollment required)  
N/A  

16d. Other Restriction(s)  
[ ] College  
[ ] Major  
[ ] Class  
[ ] Level  

16e. Registration Restriction(s) (non-codable)  
Graduate standing, with a baccalaureate degree in engineering or physical science, or upper class standing in an accredited undergraduate program in engineering, having completed a water resources course with a minimum grade of C.  

17. [ ] Mark if course has fees SCoEng fee  

18. [ ] Mark if course is a selected topic course  

19. Justification for Action  
For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix.  

Initiator (faculty only)  
Hannele Zubeck  
Initiator (TYPE NAME)  
[ ] Approved  
[ ] Disapproved  
Date: __________________  

[ ] Approved  
[ ] Disapproved  
Dean/Director of School/College  
Date: __________________  

[ ] Approved  
[ ] Disapproved  
Undergraduate/Graduate Academic Board Chairperson  
Date: __________________  

[ ] Approved  
[ ] Disapproved  
Provost or Designee  
Date: __________________  

---

28
UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 20, 2014

II. Course Information
A. College: College of Engineering
B. Course Title: Arctic Hydrology and Hydraulic Engineering
C. Course Subject/Number: AE A683
D. Credit Hours: 3.0
E. Contact Time: 3+0
F. Grading Information: A-F
G. Course Description: Introduces students to aspects of hydrology and hydraulics unique to engineering problems of the North. Although emphasis is placed on Alaskan conditions, information from Canada and other circumpolar countries is included.
H. Status of course relative to degree or certificate program: Applies to in Arctic Engineering MS program and Applied Environmental Science and Technology MS program.
I. Lab Fees: CoEng fee
J. Coordination: UAA/CoEng/CE faculty list serves
K. Course Prerequisites: NA
L. Registration Restrictions: Graduate standing, with a baccalaureate degree in engineering or physical science, or upper class standing in an accredited undergraduate program in engineering, having completed a water resources course with a minimum grade of C.

III. Course Activities

Faculty presentations, homework assignments, exams, class discussions and activities relating to course’s term paper conference.

IV. Evaluation

Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on homework assignments, exams and term paper.
V. **Course Level Justification**

Presentations and reading will include advanced scientific and engineering topics that require a background in math and science equivalent to that obtained in a bachelor’s degree in engineering.

VI. **Outline**

A. **Review**
   1. Units of measure, static fluid behavior, and basics of fluid flow
   2. Principles of dynamic fluid behavior and fundamentals of open channel flow
   3. Fundamentals of hydrology and river hydraulics

B. **Ice in hydrologic and hydraulic systems**
   1. Ice formation in turbulent and quiescent water
   2. Evolution of river ice
   3. River ice jams overview
   4. Ice jam force balance

C. **Modeling river flows with ice effects**
   1. Use of the U.S. Army Corps of Engineers Hydrologic Engineering Center’s River Analysis System program (HEC-RAS) to model river flows with ice of known thickness and roughness
   2. Using HEC-RAS for wide rivers with ice jams
   3. Using HEC-RAS to estimate ice jam flood levels

D. **Effects of snow on Arctic Hydrology**
   1. Snow properties
   2. Snowmelt hydrology

VII. **Instructional Goals and Student Learning Outcomes**

A. **Instructional Goals.** The instructor will demonstrate how to
   1. Employ hydrology and hydraulics fundamentals and related physical principles in cold regions.
   2. Consider cold regions natural conditions and engineering challenges, with particular regard to lakes and streams of the north.
   3. Use associated specialized language and units of measure.
   4. Locate, interpret, and apply public information about cold regions precipitation, streamflow, and related physical conditions.
   5. Apply fundamental principles to solve common cold regions hydraulic engineering problems.
   6. Explain how to prepare conference papers.

B. **Student Learning Outcomes.** Upon completion of the course, the students will be able to:
1. Recognize natural conditions and engineering challenges that are unique to rivers and streams in cold regions.

   Assessment Procedures: Homework assignments, exams and term paper

2. Interpret associated specialized language and units of measure.

   Assessment Procedures: Homework assignments, exams and term paper

3. Locate, interpret, and apply public information about cold regions hydrology and related physical conditions.

   Assessment Procedures: Homework assignments, exams and term paper

4. Apply physical principles for specialized solutions to cold regions hydraulic engineering problems, including:
   a. Prediction of river ice growth and decay,
   b. Analysis of river ice hydraulics,
   c. Prediction of ice jams and design of mitigation measures,
   d. Simulation of river flow and water level changes, including effects of ice, using HEC-RAS, and
   e. Prediction and analysis of snow properties and snowmelt effects on stream flow.

   Assessment Procedures: Homework assignments, exams and term paper

5. Author papers acceptable for publication.

   Assessment Procedures: Term paper

VIII. Suggested Text

Although no text is required, students are encouraged to download the following free manual from the U.S. Army Corps of Engineers:


IX. Bibliography and Resources

**Course Action Request**

**University of Alaska Anchorage**

Proposal to Initiate, Add, Change, or Delete a Course

<table>
<thead>
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<tr>
<th>6. Complete Course Title</th>
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<tr>
<th>Abbreviated Title for Transcript (30 character)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>7. Type of Course</th>
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</thead>
<tbody>
<tr>
<td>☒ Academic</td>
</tr>
<tr>
<td>☐ Preparatory/Development</td>
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<tr>
<td>☐ Non-credit</td>
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<tr>
<td>☐ CEU</td>
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<tr>
<td>☐ Professional Development</td>
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<table>
<thead>
<tr>
<th>8. Type of Action:</th>
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<tbody>
<tr>
<td>☒ Add</td>
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<td>☐ Delete</td>
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<table>
<thead>
<tr>
<th>If a change, mark appropriate boxes:</th>
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<tbody>
<tr>
<td>☒ Prefix</td>
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<tr>
<td>☐ Credits</td>
</tr>
<tr>
<td>☐ Title</td>
</tr>
<tr>
<td>☐ Grading Basis</td>
</tr>
<tr>
<td>☐ Cross-Listed/Stacked</td>
</tr>
<tr>
<td>☒ Course Description</td>
</tr>
<tr>
<td>☒ Course Prerequisites</td>
</tr>
<tr>
<td>☒ Test Score Prerequisites</td>
</tr>
<tr>
<td>☒ Other Restrictions</td>
</tr>
<tr>
<td>☐ Registration Restrictions</td>
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<table>
<thead>
<tr>
<th>9. Repeat Status No # of Repeats Max Credits</th>
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<tbody>
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<table>
<thead>
<tr>
<th>10. Grading Basis</th>
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<tbody>
<tr>
<td>☒ A-F</td>
</tr>
<tr>
<td>☑ P/NP</td>
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<td>☑ NG</td>
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<table>
<thead>
<tr>
<th>11. Implementation Date semester/year</th>
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<tr>
<td>From: Fall/2015 To: 99/9999</td>
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<table>
<thead>
<tr>
<th>12. ☐ Cross Listed with</th>
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<tr>
<td>☐ Stacked with</td>
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<table>
<thead>
<tr>
<th>13a. Impacted Courses or Programs:</th>
</tr>
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<tbody>
<tr>
<td>List any programs or college requirements that require this course.</td>
</tr>
<tr>
<td>Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at <a href="http://www.uaa.alaska.edu/governance">www.uaa.alaska.edu/governance</a>.</td>
</tr>
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</table>

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<thead>
<tr>
<th>Impact Program/Course</th>
<th>Catalog Page(s) Impacted</th>
<th>Date of Coordination</th>
<th>Chair/Coordinator Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arctic Engineering MS Program</td>
<td>337</td>
<td>1/24/2014</td>
<td>Hannele Zubeck</td>
</tr>
<tr>
<td>Civil Engineering MS Program</td>
<td>NA</td>
<td>1/24/2014</td>
<td>Osama Abaza</td>
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<table>
<thead>
<tr>
<th>Initiate Name (typed): Hannele Zubeck</th>
<th>Initiate Signed Initials:</th>
<th>Date:</th>
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<tr>
<td>13b. Coordination Email Date: 2/4/2014</td>
<td>submitted to Faculty Listserv: <a href="mailto:uaa-faculty@lists.uaa.alaska.edu">uaa-faculty@lists.uaa.alaska.edu</a></td>
<td>13c. Coordination with Library Liaison Date: 2/4/2014</td>
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</table>

<table>
<thead>
<tr>
<th>14. General Education Requirement</th>
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<tr>
<td>Mark appropriate box:</td>
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<tr>
<td>☐ Oral Communication</td>
</tr>
<tr>
<td>☐ Written Communication</td>
</tr>
<tr>
<td>☐ Quantitative Skills</td>
</tr>
<tr>
<td>☐ Humanities</td>
</tr>
<tr>
<td>☐ Fine Arts</td>
</tr>
<tr>
<td>☐ Social Sciences</td>
</tr>
<tr>
<td>☐ Natural Sciences</td>
</tr>
<tr>
<td>☐ Integrative Capstone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. Course Description (suggested length 20 to 50 words)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduces students to physical principles and current practices associated with the planning and design of safe, efficient, and affordable water supply, fire protection, wastewater collection and disposal, and solid waste disposal works in cold regions, with a view toward conditions in rural arctic Alaska.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>16a. Course Prerequisite(s) (list prefix and number)</th>
</tr>
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<tbody>
<tr>
<td>NA</td>
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<table>
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<tr>
<th>16b. Test Score(s)</th>
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<tr>
<th>16c. Co-requisite(s) (concurrent enrollment required)</th>
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<th>16d. Other Restriction(s)</th>
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<tbody>
<tr>
<td>☐ College</td>
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<tr>
<td>☐ Major</td>
</tr>
<tr>
<td>☐ Class</td>
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<tr>
<td>☒ Level</td>
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<table>
<thead>
<tr>
<th>16e. Registration Restriction(s) (non-codable)</th>
</tr>
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<tbody>
<tr>
<td>Graduate standing, with a baccalaureate degree in engineering or physical science, or upper class standing in an accredited undergraduate program in engineering, having completed a water resources course with a minimum grade of C.</td>
</tr>
</tbody>
</table>

| 17. ☒ Mark if course has fees SCoEng |

| 18. ☐ Mark if course is a selected topic course |

<table>
<thead>
<tr>
<th>19. Justification for Action</th>
</tr>
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<tbody>
<tr>
<td>For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix.</td>
</tr>
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<table>
<thead>
<tr>
<th>Initiator (faculty only) Hannele Zubeck</th>
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<tr>
<td>Initiator (TYPE NAME)</td>
</tr>
<tr>
<td>------------------------</td>
</tr>
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<tr>
<td>☑ Disapproved</td>
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<tr>
<th>Dean/Director of School/College Date</th>
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<table>
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<tr>
<th>Undergraduate/Graduate Academic Date</th>
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<table>
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<tr>
<th>Board Chairperson</th>
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<tr>
<td>☐ Disapproved</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Provost or Designee Date</th>
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32
I. Initiation Date: February 20, 2014

II. Course Information
A. College: College of Engineering
B. Course Title: Arctic Utility Distribution
C. Course Subject/Number: AE A684
D. Credit Hours: 3.0
E. Contact: 3+0
F. Grading Information: A-F
G. Course Description: Introduces students to physical principles and current practices associated with the planning and design of safe, efficient, and affordable water supply, fire protection, wastewater collection and disposal, and solid waste disposal works in cold regions, with a view toward conditions in rural arctic Alaska.
H. Status of course relative to degree or certificate program: Applies to the MS programs in Arctic Engineering
I. Lab Fees: CoEng fee
J. Coordination: UAA/CoEng/CE faculty list serves
K. Course Prerequisites: NA
L. Registration Restrictions: Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a water resources course with a minimum grade of C.

III. Course Activities

Faculty presentations, homework assignments, exams, class discussions and activities relating to course’s term paper conference.

IV. Evaluation

Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on homework assignments, exams and term paper.

V. Course Level Justification

Presentations and reading will include advanced scientific and engineering topics that require a background in math and science equivalent to that obtained in a bachelor’s degree in engineering.
VI. Course Topics

1. Overview of Cold Regions Utilities
2. Planning and Project Development
3. Frozen Ground – Foundations for Utilities
4. Thermal Considerations
5. Water Sources and Development
6. Water Treatment
7. Water Storage
8. Water Distribution
9. Wastewater Collection, Treatment and Disposal
10. Current Research Topics

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. Instructors will present materials, lead discussions, and assign exercises to teach students how to
   1. Plan and design safe, efficient, and affordable water supply, fire protection, wastewater collection and disposal, and solid waste disposal methods in cold regions.
   2. Prepare conference papers.

B. Student Learning Outcomes. After successful completion of the course, the students will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Use physical properties, mathematics, analytical methods and specialized language necessary for solving water and wastewater system design and analysis problems encountered in cold regions.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>2. Identify and summarize governing processes associated with freezing and thawing phenomena.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>3. Locate, interpret, and apply public information about cold regions physical conditions and engineering variables.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>4. Determine foundation and support conditions and common designs for water and wastewater infrastructure, including piles, post and pad, and frozen foundation designs.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>5. Author papers acceptable for publication.</td>
<td>Term paper</td>
</tr>
</tbody>
</table>

VIII. Suggested Text:

IX. Bibliography and Resources

Course Action Request
University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

1a. School or College  
EN SOENGR

1b. Division  
No Division Code

1c. Department  
Civil Engineering

2. Course Prefix  
AE

3. Course Number  
A685

4. Previous Course Prefix & Number  
ME A685

5a. Credits/CEUs  
3

5b. Contact Hours  
(Lecture + Lab) (3+0)

6. Complete Course Title  
Arctic Heat and Mass Transfer Applications
Arctic Heat/Mass Transfer App
Abbreviated Title for Transcript (30 character)

7. Type of Course  
☑ Academic  ☐ Preparatory/Development  ☐ Non-credit  ☐ CEU  ☐ Professional Development

8. Type of Action:  
☐ Add  ☑ Change  ☐ Delete

If a change, mark appropriate boxes:
☒ Prefix  ☐ Credits  ☐ Course Number  ☐ Contact Hours  ☐ Repeat Status  ☐ Grade
☒ Grading Basis  ☐ Title  ☐ Cross-Listed/Stacked  ☐ Course Prerequisites
☒ Course Description  ☐ Test Score Prerequisites  ☐ Co-requisites  ☐ Cohort
☒ Other Restrictions  ☐ Registration Restrictions  ☐ Class  ☐ Level  ☐ College  ☐ Major
☒ Other CCG (please specify)

9. Repeat Status No  
# of Repeats  Max Credits

10. Grading Basis  
☒ A-F  ☐ P/NP  ☐ NG

11. Implementation Date  
semester/year
From: Fall/2015  To: 99/9999

12. ☐ Cross Listed with  ☐ Stacked with  
Cross-Listed Coordination Signature

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

<table>
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<tr>
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<th>Catalog Page(s) Impacted</th>
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<th>Chair/Coordinator Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Arctic Engineering MS Program</td>
<td>336</td>
<td>1/24/2014</td>
<td>Hannele Zubeck</td>
</tr>
<tr>
<td>2. Engineering BS Program ME</td>
<td>261</td>
<td>12/6/2013</td>
<td>Jeff Hoffman</td>
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13b. Coordination Email  
Date: 2/4/2014  
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison  
Date: 2/4/2014

14. General Education Requirement  
Mark appropriate box:
☐ Oral Communication  ☐ Written Communication  ☐ Quantitative Skills  ☐ Humanities  ☐ Fine Arts  ☐ Social Sciences  ☐ Natural Sciences  ☐ Integrative Capstone

15. Course Description (suggested length 20 to 50 words)
Introduces principles of heat and mass transfer with special emphasis on application to problems encountered in the Arctic, such as ice and frost formation, permafrost, condensation, and heat loss in structures.

16a. Course Prerequisite(s) (list prefix and number)  
NA

16b. Test Score(s)  
N/A

16c. Co-requisite(s) (concurrent enrollment required)  
N/A

16d. Other Restriction(s)  
☐ College  ☐ Major  ☐ Class  ☑ Level

16e. Registration Restriction(s) (non-codable)  
Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a thermodynamics course with a minimum grade of C.

17. ☒ Mark if course has fees CoEng fee

18. ☐ Mark if course is a selected topic course

19. Justification for Action  
For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix.

Initiator Name (typed): Hannele Zubeck  
Initiator Signed Initials: _________  Date:________________

Mark if course has fees CoEng fee
Mark if course is a selected topic course

Initiator (faculty only)  
Hannele Zubeck
Initiator (TYPE NAME)

Provost or Designee

Approved  ☐ Disapproved
Dean/Director of School/College

Department Chairperson

Approved  ☐ Disapproved
Board Chairperson

Approved  ☐ Disapproved
Curriculum Committee Chairperson

Approved  ☐ Disapproved

1.5. Course Action Request University of Alaska Anchorage Proposal to Initiate, Add, Change, or Delete a Course
UNIVERSITY OF ALASKA ANCHORAGE
COURSE CONTENT GUIDE

I. Initiation Date: February 20, 2014

II. Course Information
A. College: College of Engineering
B. Course Title: Arctic Heat and Mass Transfer Applications
C. Course Subject/Number: AE A685
D. Credit Hours: 3.0
E. Contact Time: 3+0
F. Grading Information: A-F
G. Course Description: Introduces principles of heat and mass transfer with special emphasis on application to problems encountered in the Arctic, such as ice and frost formation, permafrost, condensation, and heat loss in structures.
H. Status of course relative to degree or certificate program:
   Applies to the Arctic Engineering MS program and Engineering BS program in Mechanical Engineering concentration.
I. Lab Fees: CoEng fee
J. Coordination: UAA/SOE/CE faculty list serves
K. Course Prerequisites: NA
L. Registration Restrictions: Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a thermodynamics course with a minimum grade of C.

III. Course Activities

Faculty presentations, homework assignments, exams, class discussions and activities relating to course’s term paper conference.

IV. Evaluation

Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on homework assignments, exams and term paper.

V. Course Level Justification

Presentations and reading will include advanced scientific and engineering topics that require a background in math and science equivalent to that obtained in a bachelor’s degree in engineering.
VI. Outline

1. Information Collection
2. Regional Temperature Data
3. Physical Properties of Construction Materials
4. Zone Refining
5. Fundamentals of Heat Transfer
6. Temperature Distribution in Soils
7. Temperature Measurement
8. Foundation Design in Cold Regions
9. Heat Transfer in Structures
10. Heat and Mass Transfer in Buried Pipelines, Roads, and Utilidors
11. Current Research Topics

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will demonstrate how to:
   1. Apply hydrology and hydraulics fundamentals and related physical principles.
   2. Apply physical properties, mathematics including calculus, and analytical methods necessary for solving heat and mass transfer problems encountered in cold regions.
   3. Identify governing processes associated with freezing and thawing phenomena in cold regions.
   4. Use specialized language and units of measure for heat and mass transfer in cold climates.
   5. Locate, interpret, and apply public information about cold regions physical conditions and engineering.
   6. Apply governing principles to solve common cold regions engineering problems,
   7. Apply heat and mass transfer problem solving techniques to analyze roads, buildings, pipelines, and utilidors under cold climate conditions.
   8. Prepare conference papers.

B. Student Learning Outcomes. After successful completion of the course, the students will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Determine and summarize the mathematical and physical properties governing heat and mass transfer in cold climates.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>2. Interpret and apply associated specialized language and units of measure.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>3. Gather specialized scientific and engineering public information about cold regions physical conditions.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>4. Apply fundamental physical principles in solving common cold regions engineering problems.</td>
<td>Homework assignments, exams and term paper</td>
</tr>
<tr>
<td>5. Predict temperature variations in soils based upon</td>
<td>Homework assignments, exams and</td>
</tr>
</tbody>
</table>
climatic and physical soil data.

6. Determine temperature profiles in structure walls, roof, and foundations. 
   Homework assignments, exams and term paper

7. Predict moisture content and mass flow rates in structures. 
   Homework assignments, exams and term paper

8. Determine soil freeze and thaw rates associated with buried pipelines and utilidors. 
   Homework assignments, exams and term paper

9. Author papers acceptable for publication. 
   Term paper

VIII. Suggested Text


Additional supplemental material will be gathered as needed from public information sources, such as data from the NOAA's National Climatic Data Center.

IX. Bibliography and Resources

# Course Action Request

## University of Alaska Anchorage

Proposal to Initiate, Add, Change, or Delete a Course

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>1b. Division</th>
<th>1c. Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN SOENGR</td>
<td></td>
<td>Civil Engineering</td>
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<table>
<thead>
<tr>
<th>2. Course Prefix</th>
<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
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<th>5b. Contact Hours (Lecture + Lab)</th>
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<tbody>
<tr>
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<td>A689</td>
<td>CE A689</td>
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<td>(3+0)</td>
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## 6. Complete Course Title

Cold Regions Pavement Design

Abbreviated Title for Transcript (30 character): Cold Regions Pavement Design

<table>
<thead>
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<th>Academic</th>
<th>Preparatory/Development</th>
<th>Non-credit</th>
<th>CEU</th>
<th>Professional Development</th>
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<tr>
<th>8. Type of Action:</th>
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## 9. Repeat Status

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<th>P/NP</th>
<th>NG</th>
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## 11. Implementation Date

From: Fall/2015 To: 99/9999

## 12. Cross Listed with

Stacked with

## 13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

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<th>Catalog Page(s) Impacted</th>
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<th>Chair/Coordinator Contacted</th>
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</thead>
<tbody>
<tr>
<td>Master of Science Arctic Engineering</td>
<td>337</td>
<td>1/24/2014</td>
<td>Hannele Zubeck</td>
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</tbody>
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<th>Initiator Name (typed):</th>
<th>Initiator Signed Initials:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Hannele Zubeck</td>
<td></td>
<td></td>
</tr>
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## 13b. Coordination Email

Date: 2/4/2014

submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

## 13c. Coordination with Library Liaison

Date: 2/4/2014

## 14. General Education Requirement

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<tr>
<th>Mark appropriate box:</th>
<th>Oral Communication</th>
<th>Written Communication</th>
<th>Quantitative Skills</th>
<th>Humanities</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Fine Arts</td>
<td>Social Sciences</td>
<td>Natural Sciences</td>
<td>Integrative Capstone</td>
</tr>
</tbody>
</table>

## 15. Course Description (suggested length 20 to 50 words)

Design, maintenance and rehabilitation of pavement structures in cold regions where frost, snow and ice threaten expected service life.

## 16a. Course Prerequisite(s) (list prefix and number)

| NA |

## 16b. Test Score(s)

| N/A |

## 16c. Co-requisite(s) (concurrent enrollment required)

| N/A |

## 16d. Other Restriction(s)

<table>
<thead>
<tr>
<th>College</th>
<th>Major</th>
<th>Class</th>
<th>Level</th>
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</table>

## 16e. Registration Restriction(s) (non-codable)

Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a transportation engineering course with a minimum grade of C.

## 17. Mark if course has fees

CoEng fee

## 18. Mark if course is a selected topic course

## 19. Justification for Action

For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix.

<table>
<thead>
<tr>
<th>Initiator (faculty only)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannele Zubeck</td>
<td></td>
</tr>
</tbody>
</table>

Initiator (TYPE NAME)

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<th>Approved</th>
<th>Disapproved</th>
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</thead>
</table>

Dean/Director of School/College | Date

<table>
<thead>
<tr>
<th>Approved</th>
<th>Disapproved</th>
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</thead>
</table>

Undergraduate/Graduate Academic | Date

<table>
<thead>
<tr>
<th>Approved</th>
<th>Disapproved</th>
</tr>
</thead>
</table>

Board Chairperson

<table>
<thead>
<tr>
<th>Approved</th>
<th>Disapproved</th>
</tr>
</thead>
</table>

Provost or Designee | Date

<table>
<thead>
<tr>
<th>Approved</th>
<th>Disapproved</th>
</tr>
</thead>
</table>

Department Chairperson | Date

<table>
<thead>
<tr>
<th>Approved</th>
<th>Disapproved</th>
</tr>
</thead>
</table>

Curriculum Committee Chairperson | Date

<table>
<thead>
<tr>
<th>Approved</th>
<th>Disapproved</th>
</tr>
</thead>
</table>

I. **Initiation Date:** February 20, 2014

II. **Course Information**
   
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. College:</td>
<td>College of Engineering</td>
</tr>
<tr>
<td>B. Course Title:</td>
<td>Cold Regions Pavement Design</td>
</tr>
<tr>
<td>C. Course Subject/Number:</td>
<td>AE A689</td>
</tr>
<tr>
<td>D. Credit Hours:</td>
<td>3.0</td>
</tr>
<tr>
<td>E. Contact:</td>
<td>3+0</td>
</tr>
<tr>
<td>F. Grading Information:</td>
<td>A-F</td>
</tr>
<tr>
<td>G. Course Description:</td>
<td>Design, maintenance and rehabilitation of pavement structures in cold regions where frost, snow and ice threaten expected service life.</td>
</tr>
<tr>
<td>H. Status of course relative to degree or certificate program:</td>
<td>Applies to the MS program in Arctic Engineering</td>
</tr>
<tr>
<td>I. Lab Fees:</td>
<td>CoEng fee</td>
</tr>
<tr>
<td>J. Coordination:</td>
<td>UAA/CoEng/CE faculty list serves</td>
</tr>
<tr>
<td>K. Course Prerequisites:</td>
<td>NA</td>
</tr>
<tr>
<td>L. Registration Restrictions:</td>
<td>Graduate standing, with a baccalaureate degree in engineering, or upper class standing in an accredited undergraduate program in engineering, having completed a transportation engineering course with a minimum grade of C</td>
</tr>
</tbody>
</table>

III. **Course Activities**

   Faculty presentations, homework assignments, exams, class discussions and activities relating to course’s term paper conference.

IV. **Evaluation**

   Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on homework assignments, exams and term paper.

V. **Course Level Justification**

   Presentations and reading will include advanced scientific and engineering topics that require a background in math and science equivalent to that obtained in a bachelor’s degree in engineering.
VI. Course Topics

1. Cold Regions Pavements
2. Pavement Environment
3. Calculation of Engineering Parameters
4. Pavement Deterioration Modes
5. Soil Investigation and Material Testing
6. Design Approaches
7. Mix Design of Bound Layers
8. Pavement Structural Design
9. Maintenance and Rehabilitation
10. Pavements on Permafrost
11. Current Research Topics

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will demonstrate how to:
   1. Apply factors and calculate engineering parameters for pavement design in cold
      regions.
   2. Analyze failure modes of pavements.
   3. Plan for site investigation and material testing.
   4. Compare alternatives for design and maintenance strategies.
   5. Design pavement surfaces and structures.
   6. Plan maintenance operations, select rehabilitation techniques and seasonal load
      restrictions.
   7. Design pavements in a permafrost environment.

B. Student Learning Outcomes. After successful completion of the course, the students
   will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Analyze factors affecting pavement design in cold regions.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>2. Analyze failure modes of pavements under the effects of traffic, environmental stresses and the combination of the two.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>3. Manage site investigations and material testing.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>4. Evaluate alternatives for design and maintenance techniques, strategies and their financial impacts.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>5. Manage and perform pavement designs in cold regions.</td>
<td>Homework assignments, exams, term paper</td>
</tr>
<tr>
<td>6. Author papers acceptable for publication.</td>
<td>Term paper</td>
</tr>
</tbody>
</table>
VIII. Suggested Text


IX. Bibliography and Resources

**Course Action Request**  
University of Alaska Anchorage  
Proposal to Initiate, Add, Change, or Delete a Course

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>EN SOENGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b. Division</td>
<td>No Division Code</td>
</tr>
<tr>
<td>1c. Department</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>2. Course Prefix</td>
<td>AE</td>
</tr>
<tr>
<td>3. Course Number</td>
<td>A698</td>
</tr>
<tr>
<td>4. Previous Course Prefix &amp; Number</td>
<td></td>
</tr>
<tr>
<td>5a. Credits/CEUs</td>
<td>3</td>
</tr>
<tr>
<td>5b. Contact Hours</td>
<td>(Lecture + Lab)</td>
</tr>
</tbody>
</table>

**6. Complete Course Title**  
Arctic Engineering Project  
Arctic Engineering Project  
Abbreviated Title for Transcript (30 character)

**7. Type of Course**  
- Academic  
- Preparatory/Development  
- Non-credit  
- CEU  
- Professional Development

**8. Type of Action:**  
- Add

**9. Repeat Status No**  
- # of Repeats:  
- Max Credits: 3

**10. Grading Basis**  
- A-F

**11. Implementation Date**  
- semester/year
- From: Spring/2015  
- To: 99/9999

**12. Cross Listed with**  
- Stacked with

**13a. Impacted Courses or Programs:**  
List any programs or college requirements that require this course.  
Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

<table>
<thead>
<tr>
<th>Impacted Program/Course</th>
<th>Catalog Page(s)</th>
<th>Date of Coordination</th>
<th>Chair/Coordinator Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS in Arctic Engineering</td>
<td>337</td>
<td>1/24/2014</td>
<td>Hannele Zubeck</td>
</tr>
</tbody>
</table>

Initiator Name (typed): Hannele Zubeck  
Initiator Signed Initials:  
Date: ____________

**13b. Coordination Email**  
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

**13c. Coordination with Library Liaison**  
Date: 2/4/2014

**14. General Education Requirement**  
Mark appropriate box:
- Oral Communication
- Written Communication
- Quantitative Skills
- Humanities
- Fine Arts
- Social Sciences
- Natural Sciences
- Integrative Capstone

**15. Course Description (suggested length 20 to 50 words)**  
Culminating project for MS Arctic Engineering student. The project is arranged among the advisor, graduate advisory committee, and student to solve a practical cold regions engineering problem.

**16a. Course Prerequisite(s) (list prefix and number)**  
N/A

**16b. Test Score(s)**  
N/A

**16c. Co-requisite(s) (concurrent enrollment required)**  
N/A

**16d. Other Restriction(s)**  
- College:  
- Major:  
- Class:  
- Level:  

**16e. Registration Restriction(s) (non-codable)**  
Graduate standing in Arctic Engineering with a completion of minimum of 9 graduate Arctic Engineering credits.

**17. Mark if course has fees CoEng fee**

**18. Mark if course is a selected topic course**

**19. Justification for Action**  
For identity and assessment purposes, the key graduate courses of the Arctic Engineering program are being given the Arctic Engineering prefix. This course is added, since the students are currently taking CE A686 Civil Engineering Project.

Initiator (faculty only)  
Hannele Zubeck  
Initiator (TYPE NAME)  

Approved  
Disapproved  

Dean/Director of School/College  
Date  

Approved  
Disapproved  

Undergraduate/Graduate Academic  
Date  

Approved  
Disapproved  

Board Chairperson  
Date  

Approved  
Disapproved  

Provost or Designee  
Date  

Department Chairperson  
Date  

Curriculum Committee Chairperson  
Date  

Disapproved  
Approved  

Provost or Designee  
Date  

Undergraduate/Graduate Academic  
Date  

Board Chairperson  
Date  

Provost or Designee  
Date  

Department Chairperson  
Date  

Curriculum Committee Chairperson  
Date  

Disapproved  
Approved  

Provost or Designee  
Date  

Department Chairperson  
Date  

Curriculum Committee Chairperson  
Date  

Disapproved  
Approved  

Provost or Designee  
Date  

Department Chairperson  
Date  

Curriculum Committee Chairperson  
Date  

Disapproved  
Approved  

Provost or Designee  
Date  

Department Chairperson  
Date  

Curriculum Committee Chairperson  
Date  

Disapproved  
Approved  

Provost or Designee  
Date  

Department Chairperson  
Date  

Curriculum Committee Chairperson  
Date  

Disapproved  
Approved  

Provost or Designee  
Date

44
I. Initiation Date: February 20, 2014

II. Course Information
A. College: College of Engineering
B. Course Title: Arctic Engineering Project
C. Course Subject/Number: AE A698
D. Credit Hours: 3.0
E. Contact: 0+9
F. Grading Information: A-F
G. Course Description: Culminating project for MS Arctic Engineering student. The project is arranged among the advisor, graduate advisory committee and student to solve a practical cold regions engineering problem.
H. Status of course relative to degree or certificate program: Applies to the MS program in Arctic Engineering
I. Lab Fees: CoEng fee
J. Coordination: UAA/CoEng/CE faculty list serves
K. Course Prerequisites: NA
L. Registration Restrictions: Graduate standing in Arctic Engineering with a completion of minimum of 9 graduate Arctic Engineering credits.

III. Course Activities
A. Weekly work includes conducting literature review, designing experiments (if applicable), describing methodology (if applicable), conducting experiments or conducting modeling (if applicable), analyzing results, formulating conclusions, providing recommendations for future research and implementation.
B. Student project proposal that is reviewed by the graduate advisory committee.
C. Student project report that is reviewed by the graduate advisory committee.
D. Student project report with incorporated edits/comments from the graduate advisory committee.

IV. Evaluation
Evaluation procedures are at the discretion of the instructor and will be disclosed during the first class in the semester. Students will be evaluated on project proposal and project report.

V. Course Level Justification
A. The course will involve application of engineering and scientific knowledge and skills typical of graduate engineering students.
B. Students are required to accomplish a project demonstrating their command of the principles and skills introduced in the graduate program (MSAE). Significant responsibility for critical thinking and interpretation of technical information will fall on the student at a level commonly associated with graduate education.

VI. Course Outline

The course will be conducted as individual research, and includes the following items that the student submits to the advisory committee:
A. Project Proposal to be approved by the graduate advisory committee.
B. Project Report to be reviewed by the graduate advisory committee. The report should consist of introduction, literature review, methodology (if applicable), results, conclusions, recommendations, and references.
C. Final Project Report incorporating suggestions and improvements as prescribed by reviewers.

VII. Instructional Goals and Student Learning Outcomes

A. Instructional Goals. The instructor will:
   1. Provide students with understanding of and skills how to create a concise project proposal with a relevant background, problem statement, hypothesis and scope of work.
   2. Provide students with skills to formulate appropriate outlines for reports.
   3. Provide students with understanding of the clarity, accuracy, precision, relevance, depth, breadth, logic, significance and fairness required for engineering research reports.
   4. Prepare students to create professional engineering reports.

B. Student Learning Outcomes. After successful completion of the course, the students will be able to:

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formulate engineering research proposals.</td>
<td>Project proposal</td>
</tr>
<tr>
<td>2. Formulate appropriate research methodology.</td>
<td>Proposal and report</td>
</tr>
<tr>
<td>3. Conduct literature reviews and collect information pertinent to the research topics.</td>
<td>Project report</td>
</tr>
<tr>
<td>4. Comprehend the clarity, accuracy, precision, relevance, depth, logic, significance and fairness required for engineering research reports.</td>
<td>Project report</td>
</tr>
<tr>
<td>5. Author professional engineering reports.</td>
<td>Project report</td>
</tr>
</tbody>
</table>

VIII. Suggested Text: NA
IX. Bibliography and Resources

1. Cold Regions Engineering, Proceedings, ASCE, Reston, VA.
5. Journal of Cold Regions Engineering, ASCE Press, Reston, VA.
### Course Action Request

University of Alaska Anchorage
Proposal to Initiate, Add, Change, or Delete a Course

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>CB  CBPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b. Division</td>
<td>ADBP Division of Business Programs</td>
</tr>
<tr>
<td>1c. Department</td>
<td>BA</td>
</tr>
<tr>
<td>2. Course Prefix</td>
<td>BA</td>
</tr>
<tr>
<td>3. Course Number</td>
<td>A648</td>
</tr>
<tr>
<td>4. Previous Course Prefix &amp; Number</td>
<td>N/A</td>
</tr>
<tr>
<td>5a. Credits/CEUs</td>
<td>3</td>
</tr>
<tr>
<td>5b. Contact Hours</td>
<td>(3+0)</td>
</tr>
</tbody>
</table>

**6. Complete Course Title**  
Business Intelligence and Data Mining  
Bus. Intel. & Data Mining

**Abbreviated Title for Transcript (30 character)**

**7. Type of Course**  
- [x] Academic  
- [ ] Preparatory/Development  
- [ ] Non-credit  
- [ ] CEU  
- [ ] Professional Development

**8. Type of Action**  
- [ ] Add  
- [ ] Change  
- [ ] Delete

*If a change, mark appropriate boxes:*

- [ ] Prefix  
- [ ] Credits  
- [ ] Title  
- [ ] Grading Basis  
- [ ] Course Description  
- [ ] Test Score Prerequisites  
- [ ] Automatic Restrictions  
- [ ] Other (please specify)

- [ ] Course Number  
- [ ] Contact Hours  
- [ ] Repeat Status  
- [ ] Cross-Listed/Stacked  
- [ ] Course Prerequisites  
- [ ] Registration Restrictions  
- [ ] General Education Requirement

**9. Repeat Status No**  
- # of Repeats  
- Max Credits

**10. Grading Basis**  
- [x] A-F  
- [ ] P/NP  
- [ ] NG

**11. Implementation Date**  
- semester/year

  - From: Spring/2015  
  - To: 9/999

**12. Cross Listed with**  
- [ ] Stacked with

  - Cross-Listed Coordination Signature

**13a. Impacted Courses or Programs:** List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

**Impacted Program/Course**  
- Date of Coordination  
- Chair/Coordinator Contacted

<table>
<thead>
<tr>
<th>1. Masters of Business Administration</th>
<th>09/06/2014</th>
<th>Minnie Yen</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Initiator Name (typed): Yonggang Lu**  
Initiator Signed Initials: ____________  
Date: ____________

**13b. Coordination Email**  
- Date: 9/16/2014  
- submitted to Faculty Listserv: (.uaa-faculty@lists.uaa.alaska.edu)

**13c. Coordination with Library Liaison**  
- Date: 9/16/2014

**14. General Education Requirement**  
- Mark appropriate box:
  - [ ] Oral Communication  
  - [ ] Written Communication  
  - [ ] Fine Arts  
  - [ ] Social Sciences  
  - [ ] Quantitative Skills  
  - [ ] Natural Sciences  
  - [ ] Humanities  
  - [ ] Integrative Capstone

**15. Course Description** *(suggested length 20 to 50 words)*

Covers basic business intelligence and data mining including Data Warehousing and Querying. Applies business intelligence and data mining techniques to marketing campaigns, fraud detection, and terrorism detection. Uses SAS Enterprise Miner to illustrate decision trees, classification algorithms, and other data mining techniques. Students may apply for SAS Data Mining Certification.

**16a. Course Prerequisite(s) (list prefix and number or test code and score)**  
- N/A

**16b. Co-requisite(s) (concurrent enrollment required)**  
- N/A

**16c. Automatic Restriction(s)**  
- [x] College  
- [ ] Major  
- [ ] Class  
- [ ] Level  

**16d. Registration Restriction(s) (non-codable)**  
- Graduate Standing and undergraduate statistics course with a minimum grade of C

**17. Mark if course has fees** Standard CBPP computer lab fee

**18. Mark if course is a selected topic course**

**19. Justification for Action**  
Change contact hours as this is not a lab course. Update registration restrictions.

**Initiator (faculty only)***  
Yonggang Lu  
Initiator (TYPE NAME)

- [ ] Approved  
- [ ] Disapproved

**Initiator/Department Chair**  
- Approved  
- Disapproved

**Dean/Director of School/College**  
- Approved  
- Disapproved

**Undergraduate/Graduate Academic**  
- Approved  
- Disapproved

**Board Chair**  
- Approved  
- Disapproved

**Provost or Designee**  
- Approved  
- Disapproved

Date

48
I. Date Initiated
   October 20, 2014

II. Course Information
   College/School: College of Business and Public Policy
   Department: Business Administration
   Program: Master of Business Administration, General Management
   Course Title: Business Intelligence and Data Mining
   Course Number: BA A648
   Credits: 3
   Contact Hours: 3 per week x 15 weeks = 45 hours
                  6 hours outside of class per week x 15 weeks = 90 hours
   Grading Basis: A-F
   Course Description: Covers basic business intelligence and data mining
                      including Data Warehousing and Querying. Applies business intelligence and data
                      mining techniques to marketing campaigns, fraud detection, and terrorism
                      detection. Uses SAS Enterprise Miner to illustrate decision trees, classification
                      algorithms, and other data mining techniques. Students may apply for SAS Data
                      Mining Certification.
   Course Prerequisites: N/A
   Registration Restrictions: Graduate Standing and undergraduate statistics course
                          with a minimum grade of C
   Fees: Standard CBPP computer lab fee

III. Course Activities
   A. Discussion
   B. Case studies
   C. Lecture

IV. Course Level Justification
   This course requires rigorous data analysis and synthesis of quantitative and logical
   thinking skills gained at the undergraduate level.
V. Outline

A. Business Decision Modeling
   1. Decision making process
   2. Decision making with uncertainty

B. Business Data Environment
   1. Database and data warehousing
   2. Data reporting and querying
   3. Online analytical processing
   4. Data preprocessing and transformation

C. Introduction to Business Intelligence (BI)
   1. The BI Lifecycle
   2. BI implementation
   3. BI and technology

D. Data Mining Techniques
   1. Unsupervised learning methods
      a. Decision trees
      b. Association rule learning
      c. K-Mean cluster analysis
   2. Supervised learning methods
      a. Classification analysis
      b. Neural network
      c. Regression analysis

VI. Suggested Texts


VII. Bibliography


VIII. Instructional Goals and Student Outcomes

<table>
<thead>
<tr>
<th>A. Instructional Goals.</th>
<th>The instructor will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduce students to business intelligence and data mining</td>
</tr>
<tr>
<td>2.</td>
<td>Present the role and significance of business intelligence organizations</td>
</tr>
<tr>
<td>3.</td>
<td>Introduce classical data mining techniques used in business intelligence projects</td>
</tr>
<tr>
<td>4.</td>
<td>Describe how to use data mining techniques and business intelligence concepts to solve various business decision making problems</td>
</tr>
<tr>
<td>5.</td>
<td>Demonstrate how to use popular data mining software</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Student Outcomes.</th>
<th>Students will be able to:</th>
<th>Assessment Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Describe the role of business intelligence in everyday business decision making</td>
<td>Exams and written assignments</td>
</tr>
<tr>
<td>2.</td>
<td>Explain the BI implement process</td>
<td>Exams and written assignments</td>
</tr>
<tr>
<td>3.</td>
<td>Explain mechanisms of some popular data mining techniques</td>
<td>Exams and written assignments</td>
</tr>
<tr>
<td>4.</td>
<td>Apply selected data mining techniques</td>
<td>Case studies and presentations</td>
</tr>
</tbody>
</table>
## Course Action Request

**University of Alaska Anchorage**  
**Proposal to Initiate, Add, Change, or Delete a Course**

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>EN SOENGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b. Division</td>
<td>No Division Code</td>
</tr>
<tr>
<td>1c. Department</td>
<td>Mechanical Engineering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Course Prefix</th>
<th>ME</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Course Number</td>
<td>A651</td>
</tr>
<tr>
<td>4. Previous Course Prefix &amp; Number</td>
<td>N/A</td>
</tr>
<tr>
<td>5a. Credits/CEUs</td>
<td>3</td>
</tr>
<tr>
<td>5b. Contact Hours (Lecture + Lab)</td>
<td>(3+0)</td>
</tr>
</tbody>
</table>

### 6. Complete Course Title

**Aerodynamics**  
**Mechanical Engineering**  
**Abbreviated Title for Transcript (30 character)**

### 7. Type of Course

- [x] Academic  
- [ ] Preparatory/Development  
- [ ] Non-credit  
- [ ] CEU  
- [ ] Professional Development

### 8. Type of Action:

- [x] Add  
- [ ] Change  
- [ ] Delete

*If a change, mark appropriate boxes:

- [ ] Prefix  
- [ ] Course Number  
- [ ] Contact Hours  
- [ ] Repeat Status  
- [ ] Grading Basis  
- [ ] Cross-Listed/Stacked  
- [ ] Course Prerequisites  
- [ ] Co-requisites  
- [ ] Registration Restrictions  
- [ ] Class  
- [ ] Level  
- [ ] College  
- [ ] Major  
- [ ] Other

### 9. Repeat Status No

- # of Repeats  
- Max Credits

### 10. Grading Basis

- [x] A-F  
- [ ] P/NP  
- [ ] NG

### 11. Implementation Date

- semester/year  
- From: Fall/2015  
- To: 99/9999

### 12. Cross Listed with

- [x] Stacked with ME A451  
- Cross-Listed Coordination

### 13a. Impacted Courses or Programs

List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at [www.uaa.alaska.edu/governance](http://www.uaa.alaska.edu/governance).

<table>
<thead>
<tr>
<th>Impacted Program/Course</th>
<th>Catalog Page(s) Impacted</th>
<th>Date of Coordination</th>
<th>Chair/Coordinator Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mechanical Engineering</td>
<td>Courtesy Coordination</td>
<td>10/3/2014</td>
<td>Jennifer Brock</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initiator Name (typed): Jifeng Peng  
Initiator Signed Initials: _________  
Date: ___________

### 13b. Coordination Email

submitted to Faculty Listserv: [uaa-faculty@lists.uaa.alaska.edu](mailto:uaa-faculty@lists.uaa.alaska.edu)

**Date: 10/3/2014**

### 13c. Coordination with Library Liaison

**Date: 10/3/2014**

### 14. General Education Requirement

Mark appropriate box:

- [ ] Oral Communication  
- [ ] Written Communication  
- [ ] Quantitative Skills  
- [ ] Humanities  
- [ ] Fine Arts  
- [ ] Social Sciences  
- [ ] Natural Sciences  
- [ ] Integrative Capstone

### 15. Course Description (suggested length 20 to 50 words)

Fundamentals of aerodynamics, including boundary layer theories, aerodynamics of lifting flow over airfoils, wings of finite span, and airfoil theory in subsonic, transonic and supersonic flows. Literature review and research on selected aerodynamics topics. Special note: Students who have completed ME A451 may not receive credit for ME A651.

### 16a. Course Prerequisite(s)

(list prefix and number)

### 16b. Test Score(s)

### 16c. Co-requisite(s)

(concurrent enrollment required)

### 16d. Other Restriction(s)

- [ ] College  
- [ ] Major  
- [ ] Class  
- [x] Level

### 16e. Registration Restriction(s) (non-codable)

- Graduate standing or instructor permission

### 17. Mark if course has fees Standard CoENG

- [x] Fee

### 18. Mark if course is a selected topic course

### 19. Justification for Action

Added to satisfy demand for MSME ME electives.

Initiator (faculty only)  
Date

Initiator (TYPE NAME)  
Date

Approved  
Disapproved  
Dean/Director of School/College  
Date

Approved  
Disapproved  
Undergraduate/Graduate Academic Board Chairperson  
Date

Approved  
Disapproved  
Provost or Designee  
Date
COURSE CONTENT GUIDE
University of Alaska Anchorage, College of Engineering

ME A651
Aerodynamics

1. Course Starting Date  
   Fall 2015

2. Course Information
   A. College  
      College of Engineering (CoEng)
   B. Course Prefix  
      ME
   C. Course Number  
      A651
   D. Number of Credits and Contact Hours
      Number of Credits: 3
      Contact Hours: 3+0
   E. Course Title  
      Aerodynamics
   F. Grading Basis  
      A-F
   G. Implementation Date  
      Fall 2015
   H. Course Description
      Fundamentals of aerodynamics, including boundary layer theories, aerodynamics of lifting flow over airfoils, wings of finite span, and airfoil theory in subsonic, transonic and supersonic flows. Literature review and research on selected aerodynamics topics. Special note: Students who have completed ME A451 may not receive credit for ME A651.
   I. Registration Restriction  
      Graduate standing or instructor permission
   J. Course Fee  
      Standard CoEng fee
   K. Stacked  
      Yes, with ME A451

3. Course Level Justification
   This course introduces topics in aerodynamics for graduate students. Graduate standing or instructor permission required for course registration. The course is designed for students with background in mechanical engineering or aerospace engineering. The course also requires understanding of vector analyses, ordinary and partial differential equations. This 600-level course appropriate for graduate students is stacked with a 400-level course appropriate for senior undergraduate students. Graduate-level students taking this course will be expected to complete extra study, which may include but is not limited to research papers, extra assignments, or extra exam problems.
4. Instructional Goals

The instructor will

1. Present the basic aerodynamics principles of lift on airfoils.
2. Present analytical methods for determining lift, including the Navier-Stokes Equations, boundary layer theory, Kutta-Joukowsky theorem, Biot-Savert Law.
3. Present airfoil theory and finite-wing theory.
4. Present aircraft wing design, flight performance, stability and control.
5. Present examples of transonic and supersonic flows, shock and expansion waves.

5. Student Learning Outcomes and Assessment Methods

Students will be evaluated using a variety of tools at the instructor’s discretion which may include but are not limited to those listed below. Graduate students taking this course will be required to complete additional work, which may take the form of extra homework problems, extra exam questions, or a separate exam.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, students will be able to:</td>
<td></td>
</tr>
<tr>
<td>1. Demonstrate the understanding of boundary layer theory.</td>
<td>Homework assignments, projects, quizzes, midterm exams, in-class presentations, and a final/comprehensive exam</td>
</tr>
<tr>
<td>2. Determine the coefficients of lift and drag on airfoils.</td>
<td>Homework assignments, projects, quizzes, midterm exams, in-class presentations, and a final/comprehensive exam</td>
</tr>
<tr>
<td>3. Find exact solutions to simple inviscid, incompressible flows given the governing equations and boundary conditions.</td>
<td>Homework assignments, projects, quizzes, midterm exams, in-class presentations, and a final/comprehensive exam</td>
</tr>
<tr>
<td>4. Model the flow fields around aerodynamic bodies.</td>
<td>Homework assignments, projects, quizzes, midterm exams, in-class presentations, and a final/comprehensive exam</td>
</tr>
<tr>
<td>5. Formulate and apply appropriate aerodynamic models to predict the forces on aircraft wings.</td>
<td>Homework assignments, projects, quizzes, midterm exams, in-class presentations, and a final/comprehensive exam</td>
</tr>
<tr>
<td>6. Perform simple aerodynamic analysis and design.</td>
<td>Homework assignments, projects, quizzes, midterm exams, in-class presentations, and a final/comprehensive exam</td>
</tr>
<tr>
<td>7. Understand research articles on</td>
<td>Assignments of literature reviews on</td>
</tr>
</tbody>
</table>
6. Topical Course Outline

This course will cover a variety of topics related to aerodynamics, which may include but are not limited to:

1. Basic Aerodynamics
   a. The Fundamental Principles Governing Aerodynamics
   b. Navier-Stokes equations
   c. Boundary layer theory

2. Aerodynamics for Inviscid, Incompressible Flow
   a. Bernoulli’s equation
   b. Pitot-tube
   c. Kutta-Joukowsky theorem

3. Airfoils, Wings and other Aerodynamic Shapes
   a. Elements of Airplane Performance
   b. Lift and drag
   c. Classic thin airfoil theory

4. The Aerodynamic Analysis of Incompressible Flow Over Airfoils
   a. Vortex filament
   b. The Biot-Savart law
   c. Prandtl’s lifting-line theory
   d. The lifting surface theory

5. Aerodynamic Analysis of Flow Over Finite Wings
   a. Wing-tip vortex
   b. Induced drag

6. Principles of Stability and Control
   a. Aircraft stability
   b. Control

7. Introduction to Inviscid, Compressible Flow
   a. Thermodynamics
   b. Stagnation points
   c. Mach number

8. Introduction to Shock & Expansion Waves
a. Speed of sound
b. Normal shock wave properties
c. Expansion wave properties

9. Literature review and research on selected aerodynamics topics

7. Suggested Text


8. Bibliography


### Course Action Request

**University of Alaska Anchorage**  
Proposal to Initiate, Add, Change, or Delete a Course

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>1b. Division</th>
<th>1c. Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN SOENGR</td>
<td>No Division Code</td>
<td>Mechanical Engineering</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Course Prefix</th>
<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
<th>5a. Credits/CEUs</th>
<th>5b. Contact Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME</td>
<td>A451</td>
<td>N/A</td>
<td>3</td>
<td>(Lecture + Lab)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(3+0)</td>
</tr>
</tbody>
</table>

### Complete Course Title

**Aerodynamics**  
**Aerodynamics**  
*Abbreviated Title for Transcript (30 character)*

### Type of Course

- [x] Academic  
- [ ] Preparatory/Development  
- [ ] Non-credit  
- [ ] CEU  
- [ ] Professional Development

### Type of Action:

- [x] Add  
- [ ] Change  
- [ ] Delete

If a change, mark appropriate boxes:

- Prefix  
- Credits  
- Title  
- Grading Basis  
- Course Description  
- Course Prerequisites  
- Co-requisites  
- Registration Restrictions  
- Class  
- Level  
- College  
- Major  
- Other (please specify)

### Repeat Status No  
- [ ] # of Repeats  
- Max Credits

### Grading Basis

- [x] A-F  
- [ ] P/NP  
- [ ] NG

### Implementation Date

- From: Fall/2015  
- To: 99/9999

### Cross Listed with

- [ ] Stacked with ME A651  
- Cross-Listed Coordination

### General Education Requirement

- [ ] Oral Communication  
- [ ] Written Communication  
- [ ] Quantitative Skills  
- [ ] Humanities  
- [ ] Fine Arts  
- [ ] Social Sciences  
- [ ] Natural Sciences  
- [ ] Integrative Capstone

### Course Description

*(suggested length 20 to 50 words)*

Introduction to the fundamentals of aerodynamics, including boundary layer theories, aerodynamics of lifting flow over airfoils, wings of finite span, and airfoil theory in subsonic, transonic and supersonic flows.

### Course Prerequisite(s)

- (MATH A302, ES A341, and ME A313) with minimum grade of C.

### Test Score(s)

### Co-requisite(s)

(concurrent enrollment required)

### Other Restriction(s)

- [ ] College  
- [ ] Major  
- [ ] Class  
- [ ] Level

### Registration Restriction(s)

(non-codable)

13a. Impacted Courses or Programs: List any programs or college requirements that require this course.

Please type into fields provided in table. If more than three entries, submit a separate table. A template is available at www.uaa.alaska.edu/governance.

<table>
<thead>
<tr>
<th>Impacted Program/Course</th>
<th>Catalog Page(s) Impacted</th>
<th>Date of Coordination</th>
<th>Chair/Coordinator Contacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mechanical Engineering</td>
<td>Courtesy Coordination</td>
<td>10/3/2014</td>
<td>Jennifer Brock</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initiator Name (typed): Jifeng Peng  
Initiator Signed Initials: __________  
Date: __________

13b. Coordination Email  
Date: 10/3/2014  
submitted to Faculty Listserv: uaa-faculty@lists.uaa.alaska.edu

13c. Coordination with Library Liaison  
Date: 10/3/2014

14. General Education Requirement

Mark appropriate box:

- [ ] Oral Communication  
- [ ] Written Communication  
- [ ] Quantitative Skills  
- [ ] Humanities  
- [ ] Fine Arts  
- [ ] Social Sciences  
- [ ] Natural Sciences  
- [ ] Integrative Capstone

15. Course Description *(suggested length 20 to 50 words)*

Introduce the fundamentals of aerodynamics, including boundary layer theories, aerodynamics of lifting flow over airfoils, wings of finite span, and airfoil theory in subsonic, transonic and supersonic flows.

16a. Course Prerequisite(s) *(list prefix and number)*

(MATH A302, ES A341, and ME A313) with minimum grade of C.

16b. Test Score(s)

16c. Co-requisite(s) *(concurrent enrollment required)*

16d. Other Restriction(s)

- [ ] College  
- [ ] Major  
- [ ] Class  
- [ ] Level

16e. Registration Restriction(s) *(non-codable)*

17. [x] Mark if course has fees Standard CoENG fee

18. [x] Mark if course is a selected topic course

19. Justification for Action

*Added to satisfy demand for BSE ME Advanced Engineering Electives.*

Initiator (faculty only): Jifeng Peng  
Initiator Signed Initials: __________  
Date: __________

Approved  
Disapproved

Dean/Director of School/College

Date

Approved  
Disapproved

Undergraduate/Graduate Academic  
Board Chairperson  
Provost or Designee

Date
COURSE CONTENT GUIDE
University of Alaska Anchorage, College of Engineering

ME A451
Aerodynamics

1. Course Starting Date
   Fall 2015

2. Course Information
   A. College
      College of Engineering (CoENG)
   B. Course Prefix
      ME
   C. Course Number
      A451
   D. Number of Credits and Contact Hours
      Number of Credits: 3
      Contact Hours: 3+0
   E. Course Title
      Aerodynamics
   F. Grading Basis
      A-F
   G. Implementation Date
      Fall 2015
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   I. Course Prerequisites
      (MATH A302, ES A341, and ME A313) with minimum grade of C.
   J. Course Fee
      Standard CoENG fee
   K. Stacked
      Yes, with ME A651

3. Course Level Justification
   This course introduces topics in aerodynamics for upper-level undergraduate students. This course builds upon core 300 level engineering and mathematics courses.

4. Instructional Goals
   The instructor will
   1. Present the basic aerodynamics principles of lift on airfoils.
2. Present analytical methods for determining lift, including the Navier-Stokes Equations, boundary layer theory, Kutta-Joukowsky theorem, Biot-Savert Law.

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   c. Mach number

8. Introduction to Shock & Expansion Waves
   a. Speed of sound
   b. Normal shock wave properties
   c. Expansion wave properties

7. Suggested Text
8. Bibliography


1a. School or College  
EA COE  

1b. Department  
COE - graduate studies  

2. Complete Program Title/Prefix  
Doctor of Education in Education, Culture, and Leadership  

3. Type of Program  
Choose one from the appropriate drop down menu:  
Undergraduate: or Graduate:  
Other: specify type in box 2  

Doctoral Program  

This program is a Gainful Employment Program:  
☐ Yes or ☑ No  

4. Type of Action:  

![Program Options](https://via.placeholder.com/150)  

5. Implementation Date (semester/year)  
From: Fall 2015  
To: 2019  

6a. Coordination with Affected Units  
Department, School, or College: COE  
Initiator Name (typed): Ed McLain  
Initiator Signed Initials: _______ Date:___________  

6b. Coordination Email submitted to Faculty Listserv (uaa-faculty@lists.uaa.alaska.edu)  
Date: 3/31/14  

6c. Coordination with Library Liaison  
Date: 3/28/14  

7. Title and Program Description - Please attach the following:  
☑ Cover Memo  ☑ Catalog Copy in Word using the track changes function  

8. Justification for Action  
The Ed.D. in Education, Culture, and Leadership is a professional doctorate. The UAA Ed.D program is a practice-based program intended to prepare future leaders in P-12, higher education, and community-based educational contexts. A focus of this degree program is to prepare leaders who have a greater understanding of and who develop the knowledge and skills necessary to provide leadership and support in the Alaskan context, serving and working with diverse populations, and committed to equity for all students in these environments.  

---  

Initiator (faculty only)  
Date  
Ed McLain  
Initiator (TYPE NAME)  

☑ Approved  
☑ Disapproved  
Dean/Director of School/College  
Date  

☑ Approved  
☑ Disapproved  
Department Chair  
Date  

☑ Approved  
☑ Disapproved  
Undergraduate/Graduate Academic  
Date  

☑ Approved  
☑ Disapproved  
Board Chair  
Date  

☑ Approved  
☑ Disapproved  
College/School Curriculum Committee Chair  
Date  

☑ Approved  
☑ Disapproved  
Provost or Designee  
Date
17 October 2014

To: Arlene Schmuland, chair of Graduate Academic Board
David Yesner, Associate Dean of the Graduate School

From: Hilary Seitz, Associate Dean in College of Education
Ed McLain, COE Faculty Initiator
Tim Jester, COE Faculty Initiator

CC: Heather Ryan, Dean in College of Education

Subject: Catalog Copy for EdD in Education, Culture, and Leadership

The College of Education is submitting the catalog copy, the Program Action Request (PAR), and the Assessment plan for the professional doctorate in education, the EdD in Education, Culture, and Leadership. The catalog copy has been reviewed and revised based on the suggestions of the GAB and registrar’s office (see response to the notes below). An assessment plan is also being submitted at this time.

The EdD program has been in development for six – plus years. The courses and programs have been developed and reassessed through several ongoing committees in the college. In addition to rigorous review in the COE, a team of external evaluators (from University of Vermont, Portland State, Arizona State University and Virginia Common Wealth University) have provided feedback about the courses and the program as a whole. Based on this feedback, some of the courses were approved in 2012 and others were approved in 2014. The evaluators made two suggestions that impact the CARs of 2012 courses. One of the suggested changes was to eliminate the EDEN A610 course from the program. Originally, this course was meant to be a prerequisite course for other coursework. Now that this course is gone, we respectfully request the removal of the prerequisite requirement in EDEN A611, 613, 615, 616, and 617. The second change we respectfully submit, is the change of repeat status in box 9 of the CAR. We would like students to be able to repeat EDEN A695 for a maximum of 6 credits.
The College of Education Professional Doctorate in Education, Culture, and Leadership closely supports the mission of the University of Alaska. In the UA Academic Master Plan (Spring 2011-Fall 2015), Goal 4 Objective 2 (page 10) states:

Goal 4: Develop and enhance programs to respond to state needs.
Objective 2: Educate teachers for the PK-12 school system across Alaska.

Activity: Proceed with UAA’s development of a professional doctorate in education leadership, with application for approval of this program by the Board of Regents and NWCCU.

The EdD in Education, Culture, and Leadership is supported by the College of Education Graduate Studies and Advanced Certification faculty and Dean Ryan.

The catalog package includes the following:

- Memo
- PAR EDEN Catalog copy
- Catalog copy
- Assessment plan

Appendix 1: responses to the notes provided by Chair Schmuland

<table>
<thead>
<tr>
<th>Notes for EDEN Program Copy:</th>
<th>Notes – COE Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDEN Prefix</strong> was approved in April 2011 and was sent to Scheduling and Publications April 18, 2014</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>EDEN A600</strong>: Approved in Spring 2011 with the title <em>Engaged Leadership</em> (3 credits)(Co-Requisite EDEN A610)</td>
<td>Course was updated and approved March 2014 – using new version</td>
</tr>
<tr>
<td><strong>EDEN A600</strong>: Approved in Spring 2014 under the title <em>Education, Culture, and Leadership Residency</em> (4 credits)(no co-requisite) – This course is the one listed in the catalog</td>
<td>yes</td>
</tr>
<tr>
<td><strong>EDEN A601</strong>: Approved in Spring 2014 with the title <em>Inquiry-Based Scholarship: Quantitative, Qualitative, Mixed-modes (3 cr)(Prerequisite EDEN A600)</em></td>
<td>yes</td>
</tr>
<tr>
<td><strong>EDEN A602</strong>: Approved in Spring 2014 with the title <em>Inquiry-Based Scholarship: Quantitative, Qualitative, Mixed-modes (3 cr)(Prerequisite EDEN A600 and EDEN A601)</em></td>
<td>yes</td>
</tr>
<tr>
<td><strong>EDEN A610</strong>: Approved in Spring 2011 under the title <em>Leadership and Self-Identity</em> (3 cr)(EDEN A600) This course is no longer in the Catalog Copy but is listed in the online catalog. This course is a prerequisite for: several courses listed in the current catalog copy</td>
<td>This course is no longer in the program. Can we write a memo removing it as a prereq for EDEN 611, 613, 615, 616, 617, 690, 695, 698? We would like to keep it on the books as a possible elective/cognate offering</td>
</tr>
<tr>
<td><strong>EDEN A611</strong>: Approved in Spring 2011 under the title <em>Engaged Leadership: Ethics and Stewardship</em> (3 cr)(Prerequisites EDEN A600 and EDEN A610)</td>
<td>Yes (remove prereq of 610)</td>
</tr>
<tr>
<td>Course Code</td>
<td>Approval Details</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>EDEN A612:</td>
<td>Approved in Spring 2014 with the title <em>Indigenous Epistemologies in Alaska</em> (3 cr) (Prerequisites EDEN A600, EDEN A601, EDEN A602) – this course is now listed as having the title <em>Indigenous ways of Knowing, Learning and Leading</em> in the current catalog copy.</td>
</tr>
<tr>
<td>EDEN A613:</td>
<td>Approved in Spring 2011 with the title <em>Leading Change and Innovation</em> (3 cr) (Prerequisites EDEN A600 and EDEN A610)</td>
</tr>
<tr>
<td>EDEN A615:</td>
<td>Approved in Spring 2011 with the title <em>Law, Policy, and Advocacy</em> (3 cr) (Prerequisites EDEN A600 and EDEN A610)</td>
</tr>
<tr>
<td>EDEN A616:</td>
<td>Approved in Spring 2011 with the title <em>Building Responsive Organizational Capacity</em> (3 cr) (Prerequisites EDEN A600 and EDEN A610)</td>
</tr>
<tr>
<td>EDEN A617:</td>
<td>Approved in Spring 2011 with the title <em>Engaging Communities</em> (3 cr) (Prerequisites EDEN A600 and EDEN A610)</td>
</tr>
<tr>
<td>EDEN A690:</td>
<td>Approved in Spring 2011 with the title <em>Current Topics in Engaged Leadership</em> (1-3 cr) (Prerequisites EDEN A600 and EDEN A610)</td>
</tr>
<tr>
<td>EDEN A695:</td>
<td>Approved in Spring 2011 with the title <em>Internship in Engaged Leadership</em> (1-3 cr) (Prerequisites EDEN A600 and EDEN A610) – is now listed as <em>Mentorship, Leadership, and Advocacy</em> in the current catalog copy as a 6 credit course</td>
</tr>
<tr>
<td>EDEN A698:</td>
<td>Approved in Spring 2011 with the title <em>Research and Creative Scholarship</em> (1-12 cr) (Prerequisites EDEN A600 and EDEN A610) – This course has not been sent to Scheduling and Publications</td>
</tr>
</tbody>
</table>
DOCTOR OF EDUCATION (EdD) in Education, Culture, and Leadership

The EdD in Education, Culture, and Leadership is a professional doctorate. The UAA EdD program is a practice-based program intended to prepare future leaders in P-12, higher education, and community-based educational contexts who can effectively translate research into practice, use data to inform decision-making, influence policy, and organize individuals and groups to collaboratively address challenges. A focus of this degree program is to prepare leaders who have a greater understanding of and who develop the knowledge and skills necessary to provide leadership and support in the Alaskan context, serving and working with diverse populations, and committed to equity for all students in these environments.

The doctoral degree requires completion of 52 credit hours. It is offered in cohort, part-time, and distance education modes and has a residency requirement. The program does not provide State certification or licensure.

STUDENT (Scholar-practitioners) LEARNING OUTCOMES

Scholar-Practitioners who complete this program will be able to:

1. Inquire about issues surrounding education, equity and social justice to bring about solutions to complex challenges in practice.

2. Construct and apply knowledge to make positive difference in the lives of individual, families, organizations, and communities.

3. Develop and demonstrate collaboration and communication skills to work with diverse communities and to build partnerships.

4. Analyze context and practice, and use multiple frames to develop meaningful, systemic systems that promote positive change.

5. Integrate both practical and research knowledge linking theory with systemic inquiry.

6. Emphasize transformation and use of professional knowledge and practice.

ADMISSION REQUIREMENTS

The College of Education requirements for admission to the doctoral program include the following:

1. Provide evidence of an earned master's degree, with evidence of successful research and study, or the equivalent from a regionally accredited institution or foreign equivalent.

2. Provide transcripts documenting a minimum grade point average in graduate study of 3.5; transcription of earned Master Degree; and six credits of approved
graduate-level research courses with a minimum GPA of 3.0. (The six credits in research will often be part of the candidate’s Masters degree program.)

3. Submit professional resume documenting appropriate preparation and experience pertinent to educational and/or organizational leadership and potential to benefit from the program.

4. Submit two professional letters of reference attesting to the leadership ability and scholarship of the applicant.

5. Submit a goal statement that reflects on career goals and how they relate to the EdD.

6. Meet all applicable admission requirements for graduate study as established by UAA and the UAA Graduate School.

7. Successfully pass an interview by a College of Education graduate admission committee (if requested by the Admission Committee).

ACADEMIC PROGRESS

1. All doctoral course work must be completed with a minimum cumulative GPA of 3.0. No more than two courses may be completed with a grade of C. Candidates must successfully complete all program course work prior to enrollment in the Scholarship courses - Research and Creative Scholarship (EDEN A698), and Internship in Engaged Leadership (EDEN A695).

GRADUATION REQUIREMENTS

See the beginning of this chapter for University Requirements for Doctoral Degrees.

PROGRAM REQUIREMENTS

This program includes courses delivered by distance technology. Admitted students must have the technological knowledge and skills to engage in distance learning. An initial intensive summer residency is required as the entry point and grounding experience for all members of the EdD program.

2. Initial Program Residency-Intensive (4 credits)
   EDEN A600 Education, Culture, and Leadership Residency 4

3. Inquiry-Based Scholarship Foundation (9 credits)
   STAT A601 Statistical Methods 3
   EDEN A601 Inquiry-Based Scholarship: Quantitative, Qualitative, Mixed-modes I 3
   EDEN A602 Inquiry-Based Scholarship: Quantitative, Qualitative, Mixed-modes II 3

4. Education, Culture, and Leadership Core (18 credits)
   EDEN A611 Engaged Leadership: Ethics and Stewardship 3
   EDEN A612 Indigenous Epistemologies in Alaska 3
   EDEN A613 Leading Change & Innovation (transformation and innovation) 3
   EDEN A615 Law, Policy, and Advocacy 3
   EDEN A616 Building Responsive Organizational Capacity 3
   EDEN A617 Engaging Communities 3
5. **Focused Inquiry**
Cognate in the candidate’s field of engagement and study by advisement. (9 credits)

6. **Final Scholarship** (12 credits)
   EDEN A695 Internship in Engaged Leadership 6
   EDEN A698 Research and Creative Scholarship 6

7. **Developmental Portfolio**
The organizing tool for the formative assessments used in the EdD program. The Developmental Portfolio is constructed and maintained by the student on an ongoing basis through the duration of the student’s engagement in the program. The portfolio consists of sample documents, reports, and reflections drawn from the student’s ongoing course and program work. It is reviewed and discussed by the student and the student's advisor on a regular schedule as directed by the advisor.

8. **Professional (summative) Portfolio**
The Portfolio is constructed by each student in the program serve as the organizing tool for the summative or culminating assessment of the student’s work in the program. The Professional Portfolio consists of examples selected by the student to document the student's refined mastery of target knowledge/skills set and provide examples of the student's academic and professional practice that reflect the students mastery and application of those target proficiencies within the student's academic and professional context or setting. These artifacts, examples of a student’s best work and writing are coupled with reflective commentary by the student and the student's advisor and other appropriate contributors familiar with the student's doctoral academic and professional contributions and accomplishments. It is expected that the student's Dissertation in Practice (DiP) and the defense of that dissertation will form an integral component of the Professional Portfolio.

9. **Dissertation in Practice**
The culminating experience of the doctoral program is the preparation, public presentation, and defense of the candidate’s “Dissertation in Practice”.

   As the culminating experience that demonstrates the scholarly practitioner’s ability to solve problems of practice, the Dissertation in Practice exhibits the doctoral candidate’s ability “to think, to perform, and to act with integrity” (Shulman, 2005).

   The dissertation in practice has the traditional five chapters. In this program, the dissertation in practice will focus on a problem of practice that;

1. Is understood through the lens of culturally responsive practices;
2. Is defined by a ‘process of systematic and intentional inquiry;
3. Is informed by a critical review of school academic and community data and perspective.

10. **Total credits for degree:** (52 credits)