I. Roll Call
   () Arlene Schmuland  () Hsing-Wen Hu  () CAS vacancy
   () Susan Garton  () Peter Olsson  () FSAL vacancy (CAS)
   () Greg Protasel  () Anthony Paris  () FSAL vacancy
   () Dennis Drinka  () GSA Vacancy  () FSAL vacancy
   () Laura Kelly  () Jervette Ward

II. Approval of Agenda (pg. 1)

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

IV. Program/Course Action Request – Second Reading

V. Program/Course Action Request - First Readings
   Chg GEOL A654 Glacial and Quaternary Geology (Stacked with GEOL A454) (3 cr)(3+0)(pg. 4-11)
   Chg GEOL A655 Permafrost (Stacked with GEOL A455)(3 cr)(3+0)(pg. 12-19)
   Chg GEOL A656 Geoarchaeology (Stacked with GEOL A456)(3 cr)(3+0)(pg. 20-28)
   Chg GEOL A660 Environmental Geochemistry (Stacked with GEOL A460)(3 cr)(3+0)(pg. 29-38)
   Chg GEOL A690 Graduate Topics in Geology (stacked with GEOL A490)(1-4 cr)(1-4+0)(pg. 39-48)

VI. Administrative Reports
   A. Associate Dean of the Graduate School David Yesner
   B. Graduate Student Jaime Spatrisano
   C. University Registrar Lora Volden

VII. Chair’s Report
   A. GAB Chair- Arlene Schmuland
   B. Faculty Alliance
   C. Graduate Council

VIII. Old Business

IX. New Business
   A. Electronic Catalog Update

X. Informational Items and Adjournment
I. Roll Call

(x) Arlene Schmuland  (x) Hsing-Wen Hu  () CAS vacancy
() Susan Garton  (e) Peter Olsson  () FSAL vacancy (CAS)
(x) Greg Protasel  (x) Anthony Paris  () FSAL vacancy
(x) Dennis Drinka  () Jamie Spatrisano  () FSAL vacancy
() Laura Kelly  () CAS vacancy

Ex-Officio Members:
(x)  Greg Protasel  (x) Anthony Paris  () FSAL vacancy  (x) David Yesner
(x)  Dennis Drinka  () Jamie Spatrisano  () FSAL vacancy  (x) Lora Volden
()  Laura Kelly  () CAS vacancy                     (x ) Scheduling & Publications

II. Approval of Agenda (pg. 1-2)

Addition of a brief introduction from the chair before first readings
Geology is postponed until September 13th
Chemistry will be reviewed first under first readings
Approved as amended

III. Approval of Meeting Summary (pg. 3-4)

Approved

IV. Program/Course Action Request – Second Reading

V. Program/Course Action Request - First Readings

Chg  BA A603  Fundamentals of Finance (3 cr)(3+0)(pg. 5-9)
Waive first reading, approve for second

Chg  BA A636  Financial Decision Making (3 cr)(3+0)(pg. 10-13)
Waive first reading, approve for second

Chg  BA A686  Management Simulation (3 cr)(3+0)(pg. 14-19)
No initiator present

Chg  Master of Public Health (pg. 20-29)
Waive first reading, approve for second

Add  CHEM A611 Advanced Biophysical Chemistry (Stacked with CHEM A411) (3 cr)(3+0)(pg. 30-40)
Add  CHEM A650 Advanced Environmental Chemistry (Stacked with (CHEM A450)
A651  (3 cr)(3+0)(pg. 41-50)
Add  CHEM A677 Advanced Bioanalytical Chemistry (Stacked with CHEM A477)
(3 cr)(3+6)(pg. 51-61)
Add  CHEM A680 Advanced Nuclear Magnetic Resonance (stacked with CHEM A480)
(3 cr)(3+0)(pg. 62-70)
Add  CHEM A690 Advanced Lecture Topics in Chemistry (Stacked with CHEM A490)
(1-3 cr)(1-3+0)(pg. 71-81)
Add  CHEM A698 Graduate research (1-6)(0+3-18)(pg. 82-85)
All CHEM courses are accepted for first reading

Chg  GEOL A654 Glacial and Quaternary Geology (Stacked with GEOL A454) (3 cr)(3+0)(pg. 86-93)
Chg  GEOL A655 Permafrost (Stacked with GEOL A455)(3 cr)(3+0)(pg. 94-101)
Chg  GEOL A656 Geoarchaeology (Stacked with GEOL A456)(3 cr)(3+0)(pg. 102-110)
Chg  GEOL A660 Environmental Geochemistry (Stacked with GEOL A460)(3 cr)(3+0)(pg. 111-120)
Chg  GEOL A690 Graduate Topics in Geology (stacked with GEOL A490)(1-4 cr)(1-4+0)(pg. 121-130)
Postponed for next meeting; Initiator not able to be present

VI. Administrative Reports
A. Associate Dean of the Graduate School David Yesner

B. Graduate Student Jaime Spatrisano

C. University Registrar Lora Volden
VII. Chair’s Report
   A. GAB Chair- Arlene Schmuland
      Presented the board with a summary of what to look for when reviewing curriculum, including Section 2 of the curriculum handbook (Issues in Curriculum)
   B. Faculty Alliance
   C. Graduate Council

VIII. Old Business

IX. New Business

X. Informational Items and Adjournment
### Glacial and Quaternary Geology

Examines glacial processes of erosion and deposition, and the modern and ancient landforms produced by ice. Topics include:

- Quaternary history of glaciers
- Climate fluctuation
- Changes in terrestrial and marine environments
- Evidence and techniques used

1. Provide their own transportation to field locales

Independent research project and weekend field trip required. Special note: Students are required to

<table>
<thead>
<tr>
<th>1a. School or College</th>
<th>AS CAS</th>
<th>1b. Division</th>
<th>AMSC Division of Math Science</th>
<th>1c. Department</th>
<th>Geological Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Course Prefix</td>
<td>GEOL</td>
<td>3. Course Number</td>
<td>A654</td>
<td>4. Previous Course Prefix &amp; Number</td>
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6. Complete Course Title
**Glacial and Quaternary Geology**

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
- [ ] Credits
- [ ] Title
- [ ] Grading Basis
- [ ] Cross-Listed/Stacked
- [ ] Course Description
- [ ] Test Score Prerequisites
- [ ] Co-requisites
- [ ] Registration Restrictions
- [ ] Class
- [ ] Major
- [ ] Other CCG (please specify)

9. Repeat Status No
- [X] # of Repeats
- [ ] Max Credits

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

11. Implementation Date
- [ ] Semester/year
From: Spring/2013
To: /

12. [ ] Cross Listed with
- [X] Stacked with GEOL A454
- [ ] 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.

<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. Geological Sciences - BS</td>
<td>2-26-13</td>
<td>L. Munk</td>
<td></td>
</tr>
<tr>
<td>2. AAEST - COE</td>
<td>2-26-13</td>
<td>A. Dotson</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initiator Name (typed): Kristine J Crossen
Initiator Signed Initials: _________
Date:_____________

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

13c. Coordination with Library Liaison
Date: 4-1-13

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)
Examines glacial processes of erosion and deposition, and the modern and ancient landforms produced by ice. Topics include: Quaternary history of glaciers, climate fluctuation, changes in terrestrial and marine environments, and evidence and techniques used to reconstruct past environments. Independent research project and weekend field trip required. Special note: Students are required to provide their own transportation to field locales.

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

17. [X] Mark if course has fees
18. [ ] Mark if course is a selected topic course

19. Justification for Action
Designed as 600-level graduate course requiring independent research.

Initiator (faculty only) Date
Kristine J Crossen
Initiator (TYPE NAME)

[ ] Approved
[ ] Disapproved

Dean/Director of School/College Date

[ ] Approved
[ ] Disapproved

Undergraduate/Graduate Academic Date

[ ] Approved
[ ] Disapproved

Board Chairperson

[ ] Approved
[ ] Disapproved

Provost or Designee Date
I. Date of Initiation: Spring 2013

II. Course Information:
   A. College: CAS
   B. Course Subject: Geological Sciences
   C. Course Number: GEOL A654
   D. Number of Credits: 3.0 (3+0)
   E. Course Title: Glacial and Quaternary Geology
   F. Grading Basis: A-F
   G. Course Description: Examines glacial processes of erosion and deposition, and the modern and ancient landforms produced by ice. Topics include: Quaternary history of glaciers, climate fluctuation, changes in terrestrial and marine environments, and evidence and techniques used to reconstruct past environments. Independent research project and weekend field trip required. Special note: Students are required to provide their own transportation to field locales.
   H. Course Prerequisites: GEOL A221
   I. Restrictions: Graduate Standing
   J. Fee: Yes

III. Instructional Goals and Student Outcomes
   A. Instructional Goals
      The instructor will:
      1. Present information concerning formation of, and the processes associated with, a variety of glaciers and their landforms.
      2. Present evidence for and reconstructions of the past Ice Ages.
      3. Teach students to analyze and critically evaluate the professional literature concerning glaciers and climate change.

   B. Student Outcomes
      The students will:
      1. Determine changes in environments based on glacial features and landforms.
         Assessment: Exams and exercises.
      3. Critique the relevant professional literature considering both the techniques used to gather data and the resulting interpretations made by the authors.
         Assessment: Written summaries and discussion.
IV. Course Evaluations

Based on grades received on exams, class exercises, field trip attendance and independent research project report.

V. Course Level Justification

Requires students to analyze and critique the professional literature. Graduate students must select and complete an appropriate research topic, and make a professional presentation on their topic.

VI. Topical Course Outline

Glaciology – Modern Glacial Processes
   Subglacial Processes
   Meltwater Processes

Glacial Geology – Glacial Processes and Landforms
   Erosional Processes and Landforms
   Debris Transport
   Glacial Depositional Processes and Landforms
   Glacial Marine and Glacial Lacustrine Processes and Landforms
   Glacial Reconstructions

Quaternary Geology- Reconstructing past Ice Ages
   Isostacy and Eustacy
   Palynological Evidence and Paleoenvironmental Reconstructions
   Vertebrate and Invertebrate Evidence and Paleoenvironments
   Dating Techniques
   Deep Sea Cores and Oxygen Isotopes
   Ice Cores and Interpretations

Professional Papers – Summaries and Discussions
   Beringian Paleoecology
   Cook Inlet Quaternary Geology
   Little Ice Age Reconstructions
   Mammoths
   Ice Man of the Alps

Professional Quality Presentation
   Selection of appropriate topic
   Topic research
   Professional presentation
VII. Suggested Text(s)


VIII. Bibliography


### Course Action Request

**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>
</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 (Lecture + Lab)</th>
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</thead>
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<td>GEOL</td>
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<td>(3+0)</td>
</tr>
</tbody>
</table>

**6. Complete Course Title**

Glacial and Quaternary Geology

**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:**

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

**9. Repeat Status No**

<table>
<thead>
<tr>
<th># of Repeats</th>
<th>Max Credits</th>
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</thead>
<tbody>
<tr>
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</tbody>
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**10. Grading Basis**

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

**11. Implementation Date**

- Semester/year:
  - From: Fall/2014
  - To:

**12. Cross Listed with**

- [x] Stacked with GEOL A654

**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).

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<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

**13b. Coordination Email**

To: fall_2014_coordination@lists.uaa.alaska.edu

**13c. Coordination with Library Liaison**

Date: 4-1-13

**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)**

Examines glacial processes of erosion and deposition, and the modern and ancient landforms produced by ice. Topics include: Quaternary history of glaciers, climate fluctuation, changes in terrestrial and marine environments, and evidence and techniques used to reconstruct past environments. Weekend field trip required. Special note: Students are required to provide their own transportation to field locales.

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

GEOL A221

**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. Mark if course has fees**

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

**19. Justification for Action**

Course stacking to allow graduate students access to the course offering. Additional information concerning field trips.

**Initiator Name (typed): Kristine J Crossen**

Initiator Signed Initials: _________

Date: __________________

**13b. Coordination Email**

To: fall_2014_coordination@lists.uaa.alaska.edu

**13c. Coordination with Library Liaison**

Date: 4-1-13

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

Examines glacial processes of erosion and deposition, and the modern and ancient landforms produced by ice. Topics include: Quaternary history of glaciers, climate fluctuation, changes in terrestrial and marine environments, and evidence and techniques used to reconstruct past environments. Weekend field trip required. Special note: Students are required to provide their own transportation to field locales.

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

GEOL A221

**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. Mark if course has fees**

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

**19. Justification for Action**

Course stacking to allow graduate students access to the course offering. Additional information concerning field trips.

**Initiator (TYPE NAME)**

Kristine J Crossen

Initiator (TYPE NAME)

Date: __________________

**Approved**

**Disapproved**

Dean/Director of School/College

Date: __________________

**Approved**

**Disapproved**

Undergraduate/Graduate Academic

Date: __________________

**Approved**

**Disapproved**

Provost or Designee

Date: __________________
I. Date of Initiation: Spring 2013

II. Course Information:
   A. College: CAS
   B. Course Subject: Geological Sciences
   C. Course Number: GEOL A454
   D. Number of Credits: 3.0 (3+0)
   E. Course Title: Glacial and Quaternary Geology
   F. Grading Basis: A-F
   G. Course Description: Examines glacial processes of erosion and deposition, and the modern and ancient landforms produced by ice. Topics include: Quaternary history of glaciers, climate fluctuation, changes in terrestrial and marine environments, and evidence and techniques used to reconstruct past environments. Weekend field trip required. Special note: Students are required to provide their own transportation to field locales.
   H. Course Prerequisites: GEOL A221
   I. Fee: Yes

III. Instructional Goals and Student Learning Outcomes
   A. Instructional Goals
      The instructor will:
      1. Present information concerning formation of, and the processes associated with, a variety of glaciers and their landforms.
      2. Present evidence for and reconstructions of the past Ice Ages.
      3. Teach students to analyze and critically evaluate the professional literature concerning glaciers and climate change.

   B. Student Learning Outcomes.
      The students will:
      1. Determine changes in environments based on glacial features and landforms. Assessment: Exams and exercises.
      3. Critique the relevant professional literature considering both the techniques used to gather data and the resulting interpretations made by the authors. Assessment: Written summaries and discussion.
IV. Course Evaluations

Based on grades received on exams, class exercises, field trip attendance and report.

V. Course Level Justification

Refines skills students have learned in earlier courses and requires students to analyze and critique the professional literature.

VI. Topical Course Outline

Glaciology – Modern Glacial Processes
  Subglacial Processes
  Meltwater Processes

Glacial Geology – Glacial Processes and Landforms
  Erosional Processes and Landforms
  Debris Transport
  Glacial Depositional Processes and Landforms
  Glacial Marine and Glacial Lacustrine Processes and Landforms
  Glacial Reconstructions

Quaternary Geology- Reconstructing past Ice Ages
  Isostacy and Eustacy
  Palynological Evidence and Paleoenvironmental Reconstructions
  Vertebrate and Invertebrate Evidence and Paleoenvironments
  Dating Techniques
  Deep Sea Cores and Oxygen Isotopes
  Ice Cores and Interpretations

Professional Papers – Summaries and Discussions
  Beringian Paleoeecology
  Cook Inlet Quaternary Geology
  Little Ice Age Reconstructions
  Mammoths
  Ice Man of the Alps
VII. Suggested Text(s)


VIII. Bibliography


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

**1a. School or College**  
AS CAS

**1b. Division**  
AMSC Division of Math Science

**1c. Department**  
Geological Sciences

**2. Course Prefix**  
GEOL

**3. Course Number**  
A655

**4. Previous Course Prefix & Number**  
N/A

**5a. Credits/CEUs**  
3

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

**6. Complete Course Title**  
Permafrost

**7. Type of Course**  
☑ Academic

**8. Type of Action:**  
☑ Add

**9. Repeat Status No**  
☐ # of Repeats

**10. Grading Basis**  
□ A-F  □ P/NC  □ NG

**11. Implementation Date**  
From: Fall/2014

**12. Cross Listed with**  
☑ Stacked with GEOL A455

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

**13b. Coordination Email**  
Date: 2/28/13

**13c. Coordination with Library Liaison**  
Date: 4/1/13

**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):**

Examines permafrost geomorphic processes, environments and landforms. Topics include: properties of ground ice and patterned ground, permafrost landscape dynamics, engineering and environmental problems, and impacts of climate change on permafrost systems. One weekend field trip and independent research required. Special note: Students are required to provide their own transportation to field locales.

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

GEOL A221

**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)***

Graduate Standing

**17. ☑ Mark if course has fees***

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

**19. Justification for Action**

Designed as 600-level graduate course requiring independent research.

---

**Initiator Name (typed):** Kristine J Crossen  
Initiator Signed Initials: _________  
Date: 2/28/13

**To:**  
provost@uaa.alaska.edu

**From:**  
Kristine J Crossen

**Date:**  
2/28/13

---

**Mark if course has fees**

☑ Approved

☐ Disapproved

**Dean/Director of School/College**  
Date

---

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

☑ Approved

☐ Disapproved

**Undergraduate/Graduate Academic**  
Date

---

**Mark if course has fees**

☑ Approved

☐ Disapproved

**Board Chairperson**  
Date

---

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

☑ Approved

☐ Disapproved

**Provost or Designee**  
Date

---

**Initiator (TYPE NAME):** Kristine J Crossen  
Date

---

**Mark if course has fees**

☑ Approved

☐ Disapproved

**Department Chairperson**  
Date

---

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

☑ Approved

☐ Disapproved

**Curriculum Committee Chairperson**  
Date

---

**Mark if course has fees**

☑ Approved

☐ Disapproved

**Provost or Designee**  
Date

---

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

☑ Approved

☐ Disapproved
I. Date of Initiation: Spring 2013

II. Course Information:
   A. College or School: CAS
   B. Course Subject: Geological Sciences
   C. Course Number: GEOL A655
   D. Number of Credits: 3.0 (3+0)
   E. Course Title: Permafrost
   F. Grading Basis: A-F
   G. Course Description: Examines permafrost geomorphic processes, environments and landforms. Topics include properties of ground ice and patterned ground, permafrost landscape dynamics, engineering and environmental problems, and impacts of climate change on permafrost systems. One weekend field trip and independent research required. Special note: Students are required to provide their own transportation to field locales.
   H. Prerequisites: GEOL A221
   I. Restrictions: Graduate standing
   J. Fee: yes

III. Instructional Goals and Student Outcomes:
   A. Instructional Goals.
      The instructor will:
      1) Present concepts, methods, and problems important to the study of permafrost and periglacial geomorphology.
      2) Guide students toward an understanding of the linkages between cryosphere processes and resulting patterns in landforms, surface features, and ecosystems.
      3) Design lectures and class exercises that will focus on aspects of theoretical and applied methods of describing and investigating frozen ground phenomena.

   B. Student Learning Outcomes. The students will:
      1) Demonstrate knowledge of permafrost geomorphic processes, physical principles, and the factors affecting these processes. Assessment: Exams and exercises.
      2) Combine knowledge gained about cryogenic processes with both predicted and observed patterns in landform and sediments. Assessment: Exams and exercises.
3) Integrate observational and conceptual information to interpret field data. Assessment: Projects.

4) Assess and critique current literature, formulate, justify, and adequately communicate educated opinions. Assessment: Summaries and projects.

5) Develop, investigate, and give a professional presentation of an independent research project. Assessment: Project.

IV. Course Evaluation
Students will be evaluated through exams focused on basic concepts, methods, and terminology. Essay components will be used to evaluate student ability to synthesize and communicate information. Exercises will be graded for quality of work, degree of understanding, and integration of outside knowledge. Students will discuss professional quality papers and make presentations.

V. Course Level Justification
This course uses both the conceptual and intellectual skills obtained in previous geology courses to apply to the study of permafrost geology. Students will not only learn new material, but will continue to develop and apply critical thinking skills, practice in scientific method, and synthesize the professional literature as characteristic of upper division courses. Independent research of appropriate topic is required.

VI. Topical Course Outline
A. Introduction / Concepts
   a. Laws of Thermodynamics / Heat flow
   b. Physical properties of ice / ice mechanics

B. Cold regions weathering processes
   a. Frost cracking, riving, weathering
   b. Frost action: heaving, frost mounds, needle ice
   c. Slope processes: creep, solifluction, rock glaciers, nivation, altiplanation

C. Permafrost
   a. Definitions, distribution, current research
   b. Permafrost processes
      i. Ice aggradation: sygenetic and epigenetic wedges
      ii. Lens ice, reticulated ice, remnant ice
   c. Active layer processes and landforms
      i. Frost heave, frost boils, sorted circles, stripes
      ii. Pingos and palsas
      iii. Polygonal ground patterns and processes
   d. Thermokarst processes and landforms

D. Cold Regions Hydrology / Fluvial Geomorphology
   a. Fluvial processes and problems
      i. Freeze-up / break-up, channel scour
      ii. Aufeis, overflow, channel morphology of frozen rivers
   b. Ground water in permafrost environments
   c. Cold regions lake dynamics / limnology
E. Engineering / Environmental issues in Permafrost environments
   a. Methods in mapping and detecting permafrost hazards
   b. Infrastructure, contaminants, hydrologic issues
F. Permafrost Landscape Dynamics
   a. Associated processes (aeolian, glacial, coastal) & landscape assemblage
   b. Cold region ecosystems and transitions (boreal, sub arctic, artic, high arctic tundra / vegetations assemblages)
   c. Plant and animal adaptations to periglacial environments
   d. Periglacial and permafrost soils
G. Climate Change
   a. Pleistocene Environments (permafrost taphonomy, paleoenvironmental reconstruction)
   b. Changing landscapes of the present – land use, climate change
   c. Global warming in permafrost environments
H. Student Research
   a. Research of appropriate topic
   b. Professional quality presentation

VII. Suggested Text(s)


VIII. Bibliography


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

1a. School or College: AS CAS
1b. Division: AMSC Division of Math Science
1c. Department: Geological Sciences

2. Course Prefix: GEOL
3. Course Number: A455
4. Previous Course Prefix & Number: N/A
5a. Credits/CEUs: 3
5b. Contact Hours (Lecture + Lab): (3+0)

6. Complete Course Title:
Permafrost

Abbreviated Title for Transcript (30 character):

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

8. Type of Action: ☑ Add or ☑ Change or ☐ Delete
If a change, mark appropriate boxes:
☐ Prefix ☐ Credits ☐ Course Number ☐ Contact Hours ☐ Grading Basis ☐ Title ☐ Repeat Status ☐ Cross-Listed/Stacked ☐ Course Description ☐ Test Score Prerequisites ☐ Co-requisites ☐ Other 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/2014 To:  /

12. ☑ Cross Listed with ☐ Stacked with GEOL A655 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.

<table>
<thead>
<tr>
<th>Impacted Program/Course</th>
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<th>Chair/Coordinator Contacted</th>
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</thead>
<tbody>
<tr>
<td>Geological Sciences - BS</td>
<td>2/28/13</td>
<td>L. Munk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment and Society - BA, BS</td>
<td>2/28/13</td>
<td>D. VanDommelen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initiator Name (typed): Kristine J Crossen
Initiator Signed Initials: __________ Date: __________

13b. Coordination Email: Date: 2/28/13 submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)
13c. Coordination with Library Liaison Date: 4/1/13

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)
Examines permafrost geomorphic processes, environments and landforms. Topics include properties of ground ice and patterned ground, permafrost landscape dynamics, engineering and environmental problems, and impacts of climate change on permafrost systems. One weekend field trip required. Special note: Students are required to provide their own transportation to field locales.

16a. Course Prerequisite(s) (list prefix and number)
GEOL A221
16b. Test Score(s)
16c. Co-requisite(s) (concurrent enrollment required)

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

17. ☑ Mark if course has fees
18. ☐ Mark if course is a selected topic course

19. Justification for Action
Course stacking to allow graduate students access to the course offering. Additional information concerning field trips.

Initiator (faculty only) Kristine J Crossen
Initiator Signed Initials: __________ Date: __________

Approved Disapproved Date
Dean/Director of School/College __________

Approved Disapproved Date
Undergraduate/Graduate Academic __________

Approved Disapproved Date
Department Chairperson __________

Approved Disapproved Date
Board Chairperson __________

Approved Disapproved Date
Curriculum Committee Chairperson __________

Approved Disapproved Date
Provost or Designee __________
I. **Date of Initiation:** Spring 2013

II. **Course Information:**
   A. College or School: CAS
   B. Course Subject: Geological Sciences
   C. Course Number: GEOL A455
   D. Number of Credits: 3.0 (3+0)
   E. Course Title: Permafrost
   F. Grading Basis: A-F
   G. Course Description: Examines permafrost geomorphic processes, environments and landforms. Topics include properties of ground ice and patterned ground, permafrost landscape dynamics, engineering and environmental problems, and impacts of climate change on permafrost systems. One weekend field trip required. Special note: Students are required to provide their own transportation to field locales.
   H. Prerequisites: GEOL A221
   I. Fee: yes

III. **Instructional Goals and Student Outcomes:**
   A. Instructional Goals.
      The instructor will:
      1) Present concepts, methods, and problems important to the study of permafrost and periglacial geomorphology.
      2) Guide students toward an understanding of the linkages between cryosphere processes and resulting patterns in landforms, surface features, and ecosystems.
      3) Design lectures and class exercises that will focus on aspects of theoretical and applied methods of describing and investigating frozen ground phenomena.
   
   B. Student Learning Outcomes. The students will:
      1) Demonstrate knowledge of permafrost geomorphic processes, physical principles, and the factors affecting these processes. Assessment: Exams and exercises.
      2) Combine knowledge gained about cryogenic processes with both predicted and observed patterns in landform and sediments. Assessment: Exams and exercises.
      3) Integrate observational and conceptual information to interpret field data.
Assessment: Projects.
4) Assess and critique current literature, formulate, justify, and adequately communicate educated opinions. Assessment: summaries and projects.

IV. Course Evaluation
Students will be evaluated through exams focused on basic concepts, methods, and terminology. Essay components will be used to evaluate student ability to synthesize and communicate information. Exercises will be graded for quality of work, degree of understanding, and integration of outside knowledge. Students will discuss professional quality papers and make presentations.

V. Course Level Justification
This course uses both the conceptual and intellectual skills obtained in previous geology courses to apply to the study of permafrost geology. Students will not only learn new material, but will continue to develop and apply critical thinking skills, practice in scientific method, and synthesize the professional literature as characteristic of upper division courses.

VI. Topical Course Outline
A. Introduction / Concepts
   a. Laws of Thermodynamics / Heat flow
   b. Physical properties of ice / ice mechanics
B. Cold regions weathering processes
   a. Frost cracking, riving, weathering
   b. Frost action: heaving, frost mounds, needle ice
   c. Slope processes: creep, solifluction, rock glaciers, nivation, altiplanation
C. Permafrost
   a. Definitions, distribution, current research
   b. Permafrost processes
      i. Ice aggradation: sygenetic and epigenetic wedges
      ii. Lens ice, reticulated ice, remnant ice
   c. Active layer processes and landforms
      i. Frost heave, frost boils, sorted circles, stripes
      ii. Pingos and palsas
      iii. Polygonal ground patterns and processes
   d. Thermokarst processes and landforms
D. Cold Regions Hydrology / Fluvial Geomorphology
   a. Fluvial processes and problems
      i. Freeze-up / break-up, channel scour
      ii. Aufeis, overflow, channel morphology of frozen rivers
   b. Ground water in permafrost environments
   c. Cold regions lake dynamics / limnology
   d. Sea ice processes, current issues, and remote sensing
E. Engineering / Environmental issues in Permafrost environments
   a. Methods in mapping and detecting permafrost hazards
   b. Infrastructure, contaminants, hydrologic issues
F. Permafrost Landscape Dynamics
   a. Associated processes (aeolian, glacial, coastal) & landscape assemblage
   b. Cold region ecosystems and transitions (boreal, sub arctic, artic, high
   arctic tundra / vegetations assemblages)
   c. Plant and animal adaptations to periglacial environments
   d. Periglacial and permafrost soils
G. Climate Change
   a. Pleistocene Environments (permafrost taphonomy, paleoenvironmental
   reconstruction)
   b. Changing landscapes of the present – land use, climate change
   c. Global warming in permafrost environments

VII. Suggested Text(s)


VIII. Bibliography


Institute of Northern Engineering, Fairbanks, 2100 p.

Knight, J. and Harrison, S., eds. (2009) Periglacial and Paraglacial Processes and


Vandenberghe, J. (2001) Typology of Pleistocene cold-based rivers: The response of
river systems to climate change. Quaternary International 79, 111-121.
# Proposal to Initiate, Add, Change, or Delete a Course

**Initiator Name (typed):** Kristine J Crossen  
Initiator Signed Initials: _________  
Date: __________________

1. **School or College**  
AS CAS

2. **Course Prefix**  
GEOL

3. **Course Number**  
A656

4. **Previous Course Prefix & Number**  
N/A

5. **Credits/CEUs**  
3

6. **Complete Course Title**  
Geoarchaeology

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  
☐ Course Number  
☐ Contact Hours  
☐ Repeat Status  
☐ Cross-Listed/Stacked  
☐ Co-requisites  
☐ 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**  
From: Fall/2014  
To: 9/999

12. **Cross Listed with**  
☐ Stacked  
☐ with GEOL A456  
☐ 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.

**Impacted Program/Course**  
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Geological Sciences - BS</td>
<td>2/28/13</td>
<td>L. Munk</td>
</tr>
<tr>
<td>2. Anthropology = BS, BA</td>
<td>2/28/13</td>
<td>S. Langdon</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Initiator Name (typed): Kristine J Crossen  
Initiator Signed Initials: _________  
Date: __________________

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

Date: 2/28/13

13c. **Coordination with Library Liaison**  
Date: 4/1/13

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)  
Integration of geology and archaeology. Rock identification of lithic sources, sediment analysis of site deposits, paleolandscape reconstruction, geochronology, and environmental change. Response to changes in resources and climate by past societies and application to contemporary problems and issues. Independent research project required. Special Note: Students are required to provide their own transportation to field locales.

16a. **Course Prerequisite(s)**  
(list prefix and number)  
ANTH A211 and GEOL A221

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. ☑ Mark if course has fees

18. ☐ Mark if course is a selected topic course

19. **Justification for Action**  
Designed as 600-level graduate course requiring independent research. Stacked with GEOL A456.

---

Initiator (faculty only)  
Date  
☑ Approved  
☐ Disapproved  
☐ Approved  
☐ Disapproved  
☐ Approved

Initiator (TYPE NAME)

☑ Approved  
☐ Disapproved

Department Chairperson  
Date  
☑ Approved  
☐ Disapproved  
☐ Approved  
☐ Disapproved

Curriculum Committee Chairperson  
Date  
☑ Approved  
☐ Disapproved  
☐ Approved  
☐ Disapproved

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

Undergraduate/Graduate Academic  
Date  
☑ Approved  
☐ Disapproved  
☐ Approved  
☐ Disapproved

Board Chairperson  
Date  
☑ Approved  
☐ Disapproved  
☐ Approved  
☐ Disapproved

Provost or Designee  
Date  
☑ Approved  
☐ Disapproved  
☐ Approved  
☐ Disapproved

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Date: 2/28/13  
S. Langdon

Date: 2/28/13  
L. Munk

Date: 4/1/13  
Kristine J Crossen

Date: 4/1/13

Date: 4/1/13

Date: 4/1/13

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Date: 4/1/13

Date: 4/1/13

Date: 4/1/13
Course Content Guide  
University of Alaska Anchorage  

GEOL A656  
Geoarchaeology  

I. Date of Initiation: Spring 2013  

II. Course Information:  
A. College: CAS  
B. Course Subject: Geological Sciences  
C. Course Number: GEOL A656  
D. Number of Credits: 3.0 (3+0)  
E. Course Title: Geoarchaeology  
F. Grading Basis: A-F  
G. Course Description: Integration of geology and archaeology. Rock identification of lithic sources, sediment analysis of site deposits, paleolandscape reconstruction, geochronology, and environmental change. Response to changes in resources and climate by past societies and application to contemporary problems and issues. Independent research project required. Special Note: Students are required to provide their own transportation to field locales.  
H. Course Prerequisites: ANTH A211 and GEOL A221  
I. Restrictions: Graduate Standing  
J. Fees: Yes  

III. Instructional Goals and Student Learning Outcomes  

A. Instructional Goals: The instructor will:  
1) Present the use of geologic concepts and methods to solve archaeological problems.  
2) Apply earth science approaches of chronology, sedimentology, and environmental reconstructions to archaeological situations.  
3) Assign reading and writing exercises that incorporate quantitative and critical thinking skills applied to investigate past societies and their links to modern environmental and climatic problems.  

B. Student Learning Outcomes. The students will be able to:  
1) Identify different lithologies used in tool making, determine Alaskan lithic sources, and analyze sediments and soils. Assessment: Exams and exercises.  
2) Assess the processes that produce different types of landforms, and evaluate landforms using aerial photography. Assessment: Exams.  
3) Critique the different dating techniques used in archaeological sites. Assessment: exams and exercises.  
4) Assess the major climate sequences over the past 4 million years, and judge the effect on site formation processes. Assessment: Exercises and discussion.
5) Demonstrate the ability to think critically about problems associated with partial data, discrepancies in dating techniques, and differences in data from a variety of sources. Assessment: Discussion.
6) Judge problems logically and resolve them reasonably using scientific methods. Assessment: Exercises and exams.
7) Assess past environmental changes and their impacts of human society and relate these to contemporary issues facing modern societies. Assessment: Discussion.
8) Investigate an appropriate research topic, complete independent research and make a professional quality presentation to the class. Assessment: Presentation.

IV. Course Evaluations

The course will assess each student's ability to communicate effectively in both the written and oral formats through individual and group oral projects and through written synthesis of the professional literature. Projects will require students to locate and appropriately use a variety of library and web resources to complete their projects. The assignments will require quantitative and critical thinking skills to apply the lessons learned from past societies to understand and critically judge the responses of modern societies to problems of resource utilization, shortages, and climate change. The outcome will be evaluated using essay exams, research papers and/or oral presentations, class exercises, annotated bibliographies, and class discussions. Graduate students are required to complete an independent research topic and make a professional quality presentation.

V. Course Level Justification

This interdisciplinary capstone course incorporates both archaeology (anthropology) and geology. This course requires prerequisites from two different disciplines, and requires the students to have the ability to read, analyze and synthesize the professional literature. The course requires graduate standing and independent research.

VI. Topical Course Outline

Section 1 – Lithics
Identification of rocks and minerals
Lithics used for tools and Alaskan lithic sources

Section 2 – Sediments
Depositional Environments
Soil formation

Section 3 – Paleolandscape reconstruction
Processes of landscape formation
Interpretation of aerial photography
Section 4 - Geochronology
Dating techniques used in archaeology

Section 5 - Quaternary Climate Change
Effect of climate change on site formation and preservation
Human response to past climate change
Modern climate change and its effect on human societies

Section 6 - Professional literature on important sites
Reading professional papers, writing annotated bibliographies, class discussion.

Section 7 – Independent research project and class presentation

VII. Suggested Text(s)


VIII. Bibliography


## Course Action Request

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

### 1a. School or College
- **AS CAS**

### 1b. Division
- **AMSC Division of Math Science**

### 1c. Department
- **Geological Sciences**

### 2. Course Prefix
- **GEOL**

### 3. Course Number
- **A456**

### 4. Previous Course Prefix & Number
- **N/A**

### 5a. Credits/CEUs
- **3**

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

### 6. Complete Course Title
**Geoarchaeology**

**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

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

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

### 11. Implementation Date
- **From:** Fall/2014
- **To:** 1/999

### 12. Cross Listed with
- [ ] Yes
- [ ] No
- **Stacked with GEOL A656**

### 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).

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<td></td>
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**Initiator Name (typed): Kristine J Crossen**

**Initiator Signed Initials:** __________

**Date:** __________

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

### 15. Course Description
**Suggested length 20 to 50 words**
Integration of geology and archaeology. Rock identification of lithic sources, sediment analysis of site deposits, paleolandscape reconstruction, geochronology, and environmental change. Response to changes in resources and climate by past societies and application to contemporary problems and issues. Special Note: Students are required to provide their own transportation to field locales.

### 16a. Course Prerequisite(s) (list prefix and number)
- ANTH A211 and GEOL A221

### 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. Mark if course has fees
- [ ] Yes

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

### 19. Justification for Action
- Course stacking to allow graduate students access to the course offering. Additional information concerning field trips.

**Initiator (faculty only): Kristine J Crossen**

**Initiator Signed Initials:** __________

**Date:** __________

**Dean/Director of School/College:** __________

**Date:** __________

**Undergraduate/Graduate Academic:** __________

**Board Chairperson:** __________

**Date:** __________

**Provost or Designee:** __________

**Date:** __________
I. Date of Initiation: Spring 2013

II. Course Information:
   A. College: CAS
   B. Course Subject: Geological Sciences
   C. Course Number: GEOL A456
   D. Number of Credits: 3.0 (3+0)
   E. Course Title: Geoarchaeology
   F. Grading Basis: A-F
   G. Course Description: Integration of geology and archaeology. Rock identification of lithic sources, sediment analysis of site deposits, paleolandscape reconstruction, geochronology, and environmental change. Response to changes in resources and climate by past societies and application to contemporary problems and issues. Special Note: Students are required to provide their own transportation to field locales.
   H. Course Prerequisites: ANTH A211 and GEOL A221
   I. Restrictions: Junior Standing
   J. Fees: None

III. Instructional Goals and Student Learning Outcomes

   A. Instructional Goals: The instructor will:
   1) Present the use of geologic concepts and methods to solve archaeological problems.
   2) Apply earth science approaches of chronology, sedimentology, and environmental reconstructions to archaeological situations.
   3) Assign reading and writing exercises that incorporate quantitative and critical thinking skills applied to investigate past societies and their links to modern environmental and climatic problems.

   B. Student Learning Outcomes. The students will be able to:
   1) Identify different lithologies used in tool making, determine Alaskan lithic sources, and analyze sediments and soils. Assessment: Exams and exercises.
   2) Assess the processes that produce different types of landforms, and evaluate landforms using aerial photography. Assessment: Exams.
   3) Critique the different dating techniques used in archaeological sites. Assessment: Exams and exercises.
   4) Assess the major climate sequences over the past 4 million years, and judge the effect on site formation processes. Assessment: Exercises.
5) Demonstrate the ability to think critically about problems associated with partial data, discrepancies in dating techniques, and differences in data from a variety of sources. Assessment: Discussion.

6) Judge problems logically and resolve them reasonably using scientific methods. Assessment: Exercises and exams.

7) Assess past environmental changes and their impacts of human society and relate these to contemporary issues facing modern societies. Assessment: Exercises and discussion.

IV. Course Evaluations

The course will assess each student's ability to communicate effectively in both the written and oral formats through individual and group oral projects and through written synthesis of the professional literature. Projects will require students to locate and appropriately use a variety of library and web resources to complete their projects. The assignments will require quantitative and critical thinking skills to apply the lessons learned from past societies to understand and critically judge the responses of modern societies to problems of resource utilization, shortages, and climate change. The outcome will be evaluated using essay exams, research papers and/or oral presentations, class exercises, annotated bibliographies, and class discussions.

V. Course Level Justification

This interdisciplinary capstone course incorporates both archaeology (anthropology) and geology and satisfies the general education requirement. This course enables students to apply their background skills in GER basic college level courses (Tier 1) with geology and archeology disciplinary areas (Tier 2). Students must meet the criteria of Junior standing and have taken two 200-level courses as prerequisites. This course is part of the geology curriculum, requires prerequisites from two different disciplines, and requires the students to have the ability to read, analyze and synthesize the professional literature.

VI. Integrated Capstone Justification

1. Knowledge Integration/Interrelationships and synergy among GER disciplines: The course strives to integrate geology (natural science) and archaeology/anthropology (social science).

2. Effective Communication Skills: The course demands successful communication skills through essay examinations, individual and group classroom presentations, and discussions of current problems including climate change.

3. Critical Thinking: Students are required to integrate information across disciplines and to critically evaluate data, positions and arguments. They will be
required to demonstrate their critical thinking in writing assignments, class presentations and examinations.

4. Information Literacy: Students will use computer and internet skills to acquire information, research scientific literature for information, and show that they can organize and analyze information from diverse sources. Discussions and presentations will test these skills.

5. Quantitative Perspectives: Students will use statistical analyses, graphical data, and tables of scientific data to investigate concepts and conclusions, and will generate graphical displays of their own results. Examinations and presentations will test these skills.

6. Evolving Realities of the 21st century: Understanding modern and past climate change as well as the human influences on climate change (and other processes occurring on the earth’s surface) help illustrate the connections between science, policy and social attitudes. This course strives to help students understand the impact of climate change on human societies (and vice versa) and understand the effects geologic processes on human societies (and vice versa) both in the past and present times.

VII. Topical Course Outline

Section 1 – Lithics
Identification of rocks and minerals
Lithics used for tools and Alaskan lithic sources

Section 2 – Sediments
Depositional Environments
Soil formation

Section 3 – Paleolandscape reconstruction
Processes of landscape formation
Interpretation of aerial photography

Section 4 - Geochronology
Dating techniques used in archaeology

Section 5 - Quaternary Climate Change
Effect of climate change on site formation and preservation
Human response to past climate change
Modern climate change and its effect on human societies

Section 6 - Professional literature on important sites
Reading professional papers, writing annotated bibliographies, class discussion.

Section 7 – Preparation of a final project and class presentation
VIII. Suggested Text(s)


IX. 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>2. Course Prefix</th>
<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
<th>5a. Credits/CEUs</th>
<th>1b. Division</th>
<th>5b. Contact Hours</th>
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<th>1c. Department</th>
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<td>Geological Sciences</td>
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<th>5b. Contact Hours</th>
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<tr>
<th>13a. Impacted Courses or Programs:</th>
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<td>List any programs or college requirements that require this course.</td>
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<th>15. Course Description (suggested length 20 to 50 words)</th>
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<tr>
<th>16a. Course Prerequisite(s) (list prefix and number)</th>
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<th>16c. Co-requisite(s) (concurrent enrollment required)</th>
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<th>16e. Registration Restriction(s) (non-codable)</th>
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<thead>
<tr>
<th>17.</th>
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<tr>
<td>Mark if course has fees</td>
<td>Mark if course is a selected topic course</td>
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19. **Justification for Action**

   The course description, instructional goals, student outcomes, course outline, and course evaluation have been updated and/or condensed, the bibliography and suggested texts have been updated and this course will be stacked with GEOL A460.
<table>
<thead>
<tr>
<th>Initiator (faculty only)</th>
<th>Date</th>
<th>Dean/Director of School/College</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Kristine J Crossen</td>
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<th>Department Chairperson</th>
<th>Date</th>
<th>Undergraduate/Graduate Academic</th>
<th>Date</th>
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<th>Curriculum Committee Chairperson</th>
<th>Date</th>
<th>Provost or Designee</th>
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Course Content Guide  
University of Alaska Anchorage  
GEOL A660  
Environmental Geochemistry

I. Date of Initiation: Spring 2013

II. Course Information:
   A. College or School: CAS  
   B. Course Subject: Geological Sciences  
   C. Course Number: A660  
   D. Number of Credits: 3.0 (3+0)  
   E. Course Title: Environmental Geochemistry  
   F. Grading Basis: A-F  
   G. Course Description: Principles and applications of environmental geochemistry on a global scale. Geochemical cycles and chemical mass balance of elements. Chemical weathering and the composition of natural waters. Processes affecting the distribution of trace elements in geologic environments. Stable isotope fractionation and applications to modeling environmental systems. Review of specific cases of modern environmental geochemistry problems. Independent research project required.  
   H. Course Prerequisites: GEOL A360  
   I. Restrictions: Graduate standing  
   J. Fees: yes

III. Instructional Goals and Student Learning Outcomes:
   A. Instructional Goals. The instructor will:
      1) present the concepts important in the study of environmental geochemistry  
      2) guide students to an understanding of the principles and applications of geochemistry to various environmental problems  
      3) demonstrate how to utilize geochemical data to understand the geochemical cycles of metals  
      4) provide novel and challenging assignments that require students to take their knowledge beyond the classroom instruction to solve “real world” problems  
      5) Provide additional opportunities for graduate level students to develop their critical thinking skills through the analysis of professional literature in environmental geochemistry and the design and completion of independent research projects.
B. Student Learning Outcomes and Evaluation

<table>
<thead>
<tr>
<th>Student Outcomes</th>
<th>Evaluation Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Model the distribution of chemical elements between geochemical reservoirs on Earth</td>
<td>Homework assignments, quizzes and exams</td>
</tr>
<tr>
<td>2) Utilize geochemical models to understand the composition of natural waters and the effects of pollution</td>
<td>Homework assignments, quizzes and exams</td>
</tr>
<tr>
<td>3) Derive the principles of isotope fractionation and applications to environmental problems</td>
<td>Analysis, discussion, and synthesis of relevant professional literature, complete an original research project</td>
</tr>
<tr>
<td>4) Use a dataset to apply to the understanding of a local, regional, national or international environmental problem</td>
<td>Analysis of data set, discussion, and synthesis of relevant professional literature, presentation</td>
</tr>
<tr>
<td>5) Apply course content to thesis research or an environmental problem of interest</td>
<td>Research paper and presentation</td>
</tr>
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</table>

IV. Course Evaluation

Students are evaluated based on homework assignments, quizzes, exams, class project, research paper and oral presentation.

V. Course Level Justification

This course requires graduate level standing.

VI. Topical Course Outline

1. Global water cycle and origin of water on Earth
2. Atmospheric and oceanic circulation and chemical composition
3. Chemical composition of natural waters
4. Sulfur, nitrogen, carbon and oxygen cycles
5. Trace element cycles
6. Chemical weathering of rocks and soil formation
7. Stable isotope fractionation and environmental applications
8. Mixing models
9. Weathering of metallic mineral deposits
10. Geochemical exploration for ore deposits
VII. Suggested Text(s)


VIII. Example Bibliography

Chakhmouradian, A.R., Wall, F., eds., 2012. Rare Earth Elements, Elements, vol. 8, no. 5, ISSN 1811-5209, 321-400


Lyons, W.B., Harmon, R.S., eds., 2012. Urban Geochemistry, Elements, vol. 8, no. 6, ISSN 1811-5209, 401-480.

**Course Action Request**

**University of Alaska Anchorage**

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

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<th>1b. Division</th>
<th>1c. Department</th>
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<td>Written Communication</td>
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<td>Quantitative Skills</td>
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<tr>
<td>Fine Arts</td>
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<td>Natural Sciences</td>
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<tr>
<td>Humanities</td>
</tr>
<tr>
<td>Integrative Capstone</td>
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| 16b. Test Score(s) |

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

| 16d. Other Restriction(s) |

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

| 17. Mark if course has fees |

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

<table>
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<tr>
<th>19. Justification for Action</th>
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The course description, student outcomes, course outline, and course evaluation have been updated and/or condensed, the bibliography and suggested texts have been updated and this course will be stacked at the 600 level to allow graduate students to take it for graduate credit.
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<td></td>
<td></td>
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<td>Provost or Designee</td>
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Course Content Guide  
University of Alaska Anchorage  
GEOL A460  
Environmental Geochemistry  

I. Date of Initiation: Spring 2013

II. Course Information:  
   A. College or School: CAS  
   B. Course Subject: Geological Sciences  
   C. Course Number: A460  
   D. Number of Credits: 3.0 (3+0)  
   E. Course Title: Environmental Geochemistry  
   F. Grading Basis: A-F  
   G. Course Description: Principles and applications of environmental geochemistry on a global scale. Geochemical cycles and chemical mass balance of elements. Chemical weathering and the composition of natural waters. Processes affecting the distribution of trace elements in geologic environments. Stable isotope fractionation and applications to modeling environmental systems. Review of specific cases of modern environmental geochemistry problems.  
   H. Course Prerequisites: GEOL A360  
   I. Fees: yes

III. Instructional Goals and Student Learning Outcomes:  
   A. Instructional Goals. The instructor will:  
      1) present the concepts important in the study of environmental geochemistry  
      2) guide students to an understanding of the principles and applications of geochemistry to various environmental problems  
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<td>Analysis of data set, discussion, and synthesis of relevant professional literature, presentation</td>
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IV. Course Evaluation

Students are evaluated based on homework assignments, quizzes, exams, class project, and oral presentation.

V. Course Level Justification
This course has a 300-level prerequisite.

VI. Topical Course Outline

1. Global water cycle and origin of water on Earth
2. Atmospheric and oceanic circulation and chemical composition
3. Chemical composition of natural waters
4. Sulfur, nitrogen, carbon and oxygen cycles
5. Trace element cycles
6. Chemical weathering of rocks and soil formation
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8. Mixing models
9. Weathering of metallic mineral deposits
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VII. Suggested Text(s)


VIII. Example Bibliography


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

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<th>3. Course Number</th>
<th>4. Previous Course Prefix &amp; Number</th>
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<th>5b. Contact Hours</th>
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If a change, mark appropriate boxes:
- Prefix
- Credits
- Title
- Grading Basis
- Course Description
- Test Score Prerequisites
- Other Restrictions
- Class
- Level
- College
- Major
- Other CCG (please specify)

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<th>10. Grading Basis</th>
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<tr>
<td>☑ Stacked with GEOL A490</td>
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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).

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<thead>
<tr>
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<th>Chair/Coordinator Contacted</th>
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<tr>
<td>3.</td>
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</table>

Initiator Name (typed): Kristine J Crossen
Initiator Signed Initials: _________ Date: __________

13b. Coordination Email
Date: 10-8-12
submitted to Faculty Listserv: [ uaafaculty@lists.uaa.alaska.edu](mailto:uaafaculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison
Date: 10-8-12

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)
Intensive study of narrowly defined topic in geology with emphasis on current problems. Independent research project required.
Special note: May be repeated twice for a maximum of 12 credits with change of topic.

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

17. ☑ Mark if course has fees
18. ☑ Mark if course is a selected topic course

19. Justification for Action
Designed as 600-level graduate course requiring independent research. Course takes advantage of the expertise of resident faculty, visiting faculty and community professionals. Current issues and topics not normally taught on a scheduled basis will be offered under this heading.

Initiator (faculty only)  
Kristine J Crossen
Initiator (TYPE NAME)  

<table>
<thead>
<tr>
<th>Initiator Approved</th>
<th>Date</th>
<th>Disapproved</th>
<th>Dean/Director of School/College Date</th>
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39
II. Course Information:
   A. College or School: College of Arts and Sciences
   B. Course Title: Graduate Topics in Geology
   C. Course Subject/Number: GEOL A690
   D. Credit Hours: 1-4
   E. Contact time: (1-4 + 0)
   F. Grading Information: A-F
   G. Course Description: Intensive study of narrowly defined topic in geology with emphasis on current problems. Independent research project required. Special note: May be repeated twice for a maximum of 12 credits with change of topic.
   H. Status of course relative to degree program: Graduate level course to serve students in interdisciplinary studies, the AEST joint CAS/SOE master’s program, and other M.S. degree programs.
   I. Course Attributes: Applies toward graduate level degree programs in interdisciplinary studies, AEST and other M.S. programs.
   J. Lab fees: yes
   K. Coordination: UAA faculty list serve
   L. Registration restrictions: Graduate standing

III. Instructional Goals and Student Learning Outcomes:
   A. Instructional Goals. The instructor will:
      1) Convey the geological concepts to the study of the particular topic.
      2) Demonstrate the applications of the selected topic to solving geologic problems and problems related to environmental sciences or other areas of interest.
      3) Guide students to utilize their problem solving skills to understand both the principles and applications of the selected geologic topic.
      4) Guide students in choosing a research topic and completing it in a professional manner.
   B. Student Learning Outcomes. The students will:
      1) Apply the principles of the selected topic to geologic, environmental, and other appropriate fields of study. Assessment: exams.
      2) Analyze recent literature and examples of modern applications of geological studies. Assessment: literature reviews and discussions.
3) Demonstrate research skills by participating in original research projects. Assessment: presentations and written papers.

4) Produce a professional quality presentation and a professional quality report at the conclusion of an individual research project. Improve their critical thinking skills through the analysis, discussion and synthesis of relevant professional literature. Assessment: professional quality presentations and written reports.

IV. Course Activities

The course consists of lectures, discussions, and small group collaboration facilitated by the instructor. Each student will initiate and complete a research project under the direction of the instructor.

VI. Methods of Assessment:

Students will be evaluated based on homework assignments, exams, presentations, reports, and analysis, discussion, and synthesis of professional literature and the design and completion of professional quality research projects. Grades will be determined according to the syllabus of the individual instructor.

VI. Course Level Justification

Designed to be used as graduate level course to serve students in interdisciplinary studies, the AEST joint CAS/SOE master’s program, and other M.S. degree programs. Independent research, professional quality presentations and written reports required.

VII. Topical Course Outline

Course outline will vary by topics selected.

Example from existing course - GEOL A665 - Isotope Geochemistry

1. Law of Radioactivity
2. Radioactive Decay Modes
3. Isotope geochronometers
4. Methods of Dating
5. Applications of Radioactive Isotopes to Environmental Problems
6. Principles of stable isotope geochemistry
7. Isotope fractionation
8. Equilibrium effects
9. Kinetic effects
10. Biological fractionation
11. Trace metal isotopes
12. Isotopes of other elements

VII. Suggested Text(s)

Texts will vary depending on the topic of the course.

Example from Isotope Geochemistry above:


IX. Bibliography

References will vary depending on the selected topic.

Example from Isotope Geochemistry above.


1a. School or College  
AS CAS
1b. Division  
AMSC Division of Math Science
1c. Department  
Geological Sciences

2. Course Prefix  
GEOL
3. Course Number  
A490
4. Previous Course Prefix & Number  
none
5a. Credits/CEUs  
1-4
5b. Contact Hours  
(Lecture + Lab)  
(1-4+0)

6. Complete Course Title  
Advanced Topics in Geology
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  ☐ Title  ☐ Grading Basis  ☐ Course Description  ☐ Test Score Prerequisites  ☐ Other Restrictions  
☐ Repeat Status  ☒ Cross-Listed/Stacked  ☒ Course Prerequisites  ☐ Co-requisites  ☐ Registration Restrictions  
☐ Class  ☐ Level  ☐ College  ☐ Major  ☐ Other CCG (please specify)

9. Repeat Status Yes  # of Repeats  2  Max Credits  12

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

11. Implementation Date  
semester/year  
From: Spring/2013  
To: /

12. ☐ Cross Listed with  
☐ GEOL A690  
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.

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Initiator Name (typed): Kristine J Crossen  
Initiator Signed Initials: __________  
Date: __________

13b. Coordination Email  
Date: 10-8-12  
submitted to Faculty Listserv: (uaa-faculty@lists.uaa.alaska.edu)

13c. Coordination with Library Liaison  
Date: 10-8-12

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)  
Detailed study of selected topics in geology. Special note: May be repeated twice for a maximum of 12 credits with change of topic.

16a. Course Prerequisite(s) (list prefix and number)  
GEOL A221

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. ☒ Mark if course has fees  
18. ☒ Mark if course is a selected topic course

19. Justification for Action  
Designed as 400-level undergraduate course. Course takes advantage of the expertise of resident faculty, visiting faculty and community professionals. Current issues and topics not normally taught on a scheduled basis will be offered under this heading.

Initiator (faculty only)  
Kristine J Crossen  
Initiator Signed Initials: __________  
Date: __________

Initiator (TYPE NAME)  

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

☐ Approved  ☐ Disapproved  
Undergraduate/Graduate Academic Board Chairperson  Date  

☐ Approved  ☐ Disapproved  
Provost or Designee  Date  

☐ Approved  ☐ Disapproved  
Curriculum Committee Chairperson  Date  

☐ Approved  ☐ Disapproved  
Department Chairperson  Date  

☐ Approved  ☐ Disapproved  

Course Content Guide  
University of Alaska Anchorage  
Department of Geological Sciences  

GEOL A490  
Advanced Topics in Geology  

I. Date of Initiation: Spring 2013  

II. Course Information:  
   A. College or School: College of Arts and Sciences  
   B. Course Title: Advanced Topics in Geology  
   C. Course Subject/Number: GEOL A490  
   D. Credit Hours: 1-4  
   E. Contact time: (1-4 + 0)  
   F. Grading Information: A-F  
   G. Course Description: Detailed study of selected topics in geology. Special note: May be repeated twice for a maximum of 12 credits with change of topic.  
   H. Status of course relative to degree program: May be used as upper-division elective to satisfy Geological Sciences major or minor.  
   I. Course Attributes: Applies toward upper division requirement for Geological Sciences major or minor.  
   J. Lab fees: yes  
   K. Coordination: UAA faculty list serve  
   L. Course Prerequisites: GEOL A221  

III. Instructional Goals and Student Learning Outcomes:  
   A. Instructional Goals. The instructor will:  
      1) Convey the geological concepts to the study of the particular topic.  
      2) Demonstrate the applications of the selected topic to solving geologic problems and problems related to environmental sciences or other areas of interest.  
      3) Guide students to utilize their problem solving skills to understand both the principles and applications of the selected geologic topic.  
   
   B. Student Learning Outcomes. The students will:  
      1) Apply the principles of the selected topic to geologic, environmental, and other appropriate fields of study. Assessment: exams.  
      2) Analyze recent literature and examples of modern applications of geological studies. Assessment: literature reviews.  
      3) Develop research skills by participating in original research projects with their peers. Assessment: professional presentation.
IV. Course Activities

The course consists of lectures, discussions, and small group collaboration facilitated by the instructor.

V. Methods of Assessment:

Students will be evaluated based on homework assignments, exams, presentations, reports, and analysis, discussion, and synthesis of professional literature and the design and completion of research projects. Grades will be determined according to the syllabus of the individual instructor.

VI. Course Level Justification

Designed for Geological Science majors as an elective undergraduate course comparable to 400-level offerings at other universities. Designed to provide flexibility to offer and teach innovative senior-level lecture courses on a developmental basis. Such courses are essential to the student’s ability to succeed and integrate content with other 400-level courses in geological sciences.

VII. Topical Course Outline

Course outline will vary by topics selected.

Example from existing course - GEOL A465 - Isotope Geochemistry

1. Law of Radioactivity
2. Radioactive Decay Modes
3. Isotope geochronometers
4. Methods of Dating
5. Applications of Radioactive Isotopes to Environmental Problems
6. Principles of stable isotope geochemistry
7. Isotope fractionation
8. Equilibrium effects
9. Kinetic effects
10. Biological fractionation
11. Trace metal isotopes
12. Isotopes of other elements
VIII. Suggested Text(s)

Texts will vary depending on the topic of the course.

**Example from Isotope Geochemistry above:**


IX. Bibliography

References will vary depending on the selected topic.

**Example from Isotope Geochemistry above.**


