Submit original with signatures + 1 copy + electronic copy to UAF Governance. See http://www.uaf.edu/uafgov/faculty/cd for a complete description of the rules governing curriculum & course changes.

**TRIAL COURSE OR NEW COURSE PROPOSAL**

<table>
<thead>
<tr>
<th>Submitted by:</th>
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<tbody>
<tr>
<td>Department</td>
<td>M&amp;GE</td>
</tr>
<tr>
<td>Prepared by</td>
<td>Debasmita Misra</td>
</tr>
<tr>
<td>Email Contact</td>
<td><a href="mailto:debu.misra@alaska.edu">debu.misra@alaska.edu</a></td>
</tr>
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</table>

1. ACTION DESIRED (CHECK ONE):
   - Trial Course
   - New Course [X]

2. COURSE IDENTIFICATION:
   - Dept: GE  
   - Course #: 624  
   - No. of Credits: 3

3. PROPOSED COURSE TITLE: Stochastic Hydrology & Geohydrology

4. CROSS LISTED?  
   - YES/NO: No  
   - (Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. STACKED?  
   - YES/NO: No  
   - If yes, Dept:  
   - Course #:  

6. FREQUENCY OF OFFERING: As Demand Warrants (Every or Alternate) Fall, Spring, Summer – or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved): Spring 2011

8. COURSE FORMAT: 
   - NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school’s curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee. 
   - COURSE FORMAT: (check one)  
     - 1 2 3 4 5 6 weeks to full semester 
   - OTHER FORMAT (specify): Lecture

9. CONTACT HOURS PER WEEK: 
   - 3 LECTURE hours/week  
   - LAB hours/week  
   - PRACTICUM hours/week 
   - Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See http://www.uaf.edu/uafgov/faculty/cd/credits.html for more information on number of credits.

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):
   - GE 624
3 Credits    As Demand Warrants
This course will present an overview of the stochastic methods used to study and analyze
hydrologic and geohydrologic processes. Emphasis will be provided on modeling hydrologic
processes using statistical methods and stochastic interplay of processes between surface and
subsurface hydrology. Prerequisites: GE F620 or equivalent and Graduate standing in Engineering or
permission of instructor. (3+0)

11. COURSE CLASSIFICATIONS:  (undergraduate courses only. Use approved criteria found
on Page 10 & 17 of the manual. If justification is needed, attach on separate
sheet.)

H = Humanities   N = Natural Science   S = Social Sciences

Will this course be used to fulfill a requirement for the
baccalaureate core?  YES X NO

IF YES, check which core requirements it could be used to fulfill:
Format 6         Format 7         Natural Science,
O = Oral Intensive, W = Writing Intensive, Format 8

12. COURSE REPEATABILITY:
Is this course repeatable for credit?  YES X NO

Justification: Indicate why the course can be repeated
(for example, the course follows a different theme each time).

How many times may the course be repeated for credit? TIMES

If the course can be repeated with variable credit, what is the
maximum number of credit hours that may be earned for this course? CREDITS

13. GRADING SYSTEM:
LETTER: X    PASS/FAIL: 

RESTRICTIONS ON ENROLLMENT (if any)
14. PREREQUISITES  GE620, Graduate Standing or Permission of the Instructor
These will be required before the student is allowed to enroll in the course.

RECOMMENDED
Classes, etc. that student is strongly encouraged to complete prior to this course.

15. SPECIAL RESTRICTIONS,
CONDITIONS

16. PROPOSED COURSE FEES  $
Has a memo been submitted through your dean to the Provost & VCAS for
fee approval? Yes/No

17. PREVIOUS HISTORY
Has the course been offered as special topics or trial course
previously? Yes/No

If yes, give semester, year, course #, etc.:
18. **ESTIMATED IMPACT**

   WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

   None

19. **LIBRARY COLLECTIONS**

   Have you contacted the library collection development officer (ffkij@uaf.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

   No [ ] Yes [X] The library has all the requisite materials for this course.

20. **IMPACTS ON PROGRAMS/DEPTS**

   What programs/departments will be affected by this proposed action? Include information on the Programs/Departments contacted (e.g., email, memo)

21. **POSITIVE AND NEGATIVE IMPACTS**

   Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

   This course is not currently offered in UAF. So, it will have a positive impact on graduate students in CEM and elsewhere who are involved in hydrologic studies.

**JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

A course in Stochastic Hydrology and Geohydrology does not exist as a course in UAF. It is a significant component for graduate students whose major focus is in Hydrogeology. This is an attempt to impart knowledge in the most advanced stochastic methods that are used for flow and transport in porous media. The course might be of interest to GE, CEE, and PETE students who would like to learn more about Stochastic methods in hydrogeologic modeling.
**APPROVALS:**

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<thead>
<tr>
<th>Signature, Chair, Program/Department of:</th>
<th>Date</th>
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<tr>
<td>M4GE</td>
<td>9/29/09</td>
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<tr>
<th>Signature, Chair, College/School Curriculum Council for:</th>
<th>Date</th>
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<tr>
<td>CEM</td>
<td>10/7/09</td>
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<tr>
<th>Signature, Dean, College/School of:</th>
<th>Date</th>
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<tbody>
<tr>
<td>CEM</td>
<td>10/30/09</td>
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</table>

Signature of Provost (if applicable)

Offerings above the level of approved programs must be approved in advance by the Provost.

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

<table>
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<tr>
<th>Signature, Chair, UAF Faculty Senate Curriculum Review Committee</th>
<th>Date</th>
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**ADDITIONAL SIGNATURES: (If required)**

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</table>
ATTACH COMPLETE SYLLABUS (as part of this application). 
Note: syllabus must follow the guidelines discussed in the Faculty Senate Guide 
http://www.uaf.edu/uafgov/faculty/cd/syllabus.html.

The department and campus wide curriculum committees will review the syllabus to 
ensure that each of the items listed below are included. If items are missing or 
unclear, the proposed course change will be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES
During the first week of class, instructors will distribute a course syllabus. 
Although modifications may be made throughout the semester, this document will 
contain the following information (as applicable to the discipline):

1. Course information:
   - Title, number, credits, prerequisites, location, meeting time
     (make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) information:
   - Name, office location, office hours, telephone, email address.

3. Course readings/materials:
   - Course textbook title, author, edition/publisher.
   - Supplementary readings (indicate whether required or recommended) and
   - any supplies required.

4. Course description:
   - Content of the course and how it fits into the broader curriculum;
   - Expected proficiencies required to undertake the course, if applicable.
   - Inclusion of catalog description is strongly recommended, and
   - Description in syllabus must be consistent with catalog course description.

5. Course Goals (general) and Student Learning Outcomes (more specific)

6. Instructional methods:
   - Describe the teaching techniques (e.g. lecture, case study, small group 
     discussion, private instruction, studio instruction, values clarification, 
     games, journal writing, use of Blackboard, audio/video conferencing, etc.).

7. Course calendar:
   - A schedule of class topics and assignments must be included. Be specific
     so that it is clear that the instructor has thought this through and will
     not be making it up on the fly (e.g. it is not adequate to say “lab”.
     Instead, give each lab a title that describes its content). You may call
     the outline Tentative or Work in Progress to allow for modifications during
     the semester.

8. Course policies:
   - Specify course rules, including your policies on attendance, tardiness,
     class participation, make-up exams, and plagiarism/academic integrity.

9. Evaluation:
   - Specify how students will be evaluated, what factors will be
     included, their relative value, and
   - how they will be tabulated into grades (on a curve, absolute scores,
     etc.)

10. Support Services:
    - Describe the student support services such as tutoring (local and/or
        regional) appropriate for the course.

11. Disabilities Services:
    The Office of Disability Services implements the Americans with Disabilities
    Act (ADA), and insures that UAF students have equal access to the campus and
    course materials.
    - State that you will work with the Office of Disabilities Services (203
      WHIT, 474-7043) to provide reasonable accommodation to students with
      disabilities.”
Department of Mining and Geological Engineering
Geological Engineering Program

Stochastic Hydrology and Geohydrology

GE 624
As Demand Warrants

Course Description

GE 624
3 Credits As Demand Warrants
This course will present an overview of the stochastic methods used to study and analyze hydrologic and geohydrologic processes. Emphasis will be provided on modeling hydrologic processes using statistical methods and stochastic interplay of processes between surface and subsurface hydrology. Prerequisites: GE F620 or equivalent and Graduate standing in Engineering or permission of instructor. (3+0)

Meeting: TBD Duckering Building

Prerequisites: GE 620, Graduate Standing or Permission of the Instructor.

Instructor: Dr. Debasmita (Debu) Misra, Room 307 Duckering Bldg.; 474-5339; debu.misra@alaska.edu

Office Hours: As Posted or By Appointment

Applied Stochastic Hydrogeology, Y. Rubin, Oxford University Press

References: Other notes and research papers as needed.

Objective: Upon completion of this course, you will
- have an understanding of the principles of stochastic hydrogeology,
- be able to apply those principles in the design of hydrogeologic experiments and investigations;
- be able to use the hydrogeologic literature to do research, including being able to read, understand, and apply ideas that appear in the literature; and
- be conversant in areas of current research in the field.

COURSE POLICIES:
- Students are expected to read the material assigned each week prior to attending the lecture.
• Homework will be assigned after a week's lecture. The homework will comprise of solution of problems using simple analytical models or equations used for practical applications in engineering design or assessment.

• Pop-quizzes based on the concepts covered in the lecture will be offered periodically. A minimum of 5 and a maximum of 8 quizzes will be offered over the semester.

• The final project will be accomplished in groups of 2-3 students and will be based on a simple but practical component of an engineering application.

• Besides a common set of questions and problems, both the Midterm and the Final exam will have challenge questions that may be attempted by the students for extra credits.

• Late submission of deliverables will not be accepted unless the student was sick and can produce proof of sickness, had loss of immediate family members, or was traveling on university business (e.g., athletes, professional presentations in conferences, etc.).

• Students are expected to be ethical in conduct, professional in demeanor and expected to adhere to the University of Alaska Honor Code.

**GRADING:** Grading will be based on the cumulative performance over the semester. The weighting scheme of each assignment will be as follows:

- **Quizzes** 10%
- **Homework** 15%
- **Midterm Exam** 15%
- **Final Project** 25% (Report 15% and Presentation 10%)
- **Final Exam** 35%

An absolute grading policy will be followed for your final grades:

- 85% < A <100%
- 75% < B < 85%
- 65% < C < 75%
- 50% < D < 65%
- F < 50%
TOPICS COVERED:

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture (Weekly Reading)</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td></td>
<td>Probability and Probability Distributions – Basic Concepts (CTH Ch.2)</td>
</tr>
<tr>
<td>2</td>
<td>Properties of Random Variables (CTH Ch.3)</td>
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<tr>
<td>3</td>
<td>Discrete Probability Distributions (CTH Ch. 4)</td>
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<td>4</td>
<td>Continuous Probability Distributions (CTH Chs. 5 &amp; 6)</td>
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<td>5</td>
<td>Confidence Intervals and Hypothesis Testing (CTH Ch. 8)</td>
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<tr>
<td>6</td>
<td>Linear Regression (CTH Chs. 9 &amp; 10)</td>
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<td>7</td>
<td>Multivariate Analysis (CTH Ch. 11)</td>
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<td></td>
<td><strong>MID TERM EXAM</strong></td>
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<td>8</td>
<td>Data Generation (CTH Ch. 12)</td>
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<td>Analysis of Hydrologic Time Series (CTH Ch. 13)</td>
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<tr>
<td>9</td>
<td>Stochastic Hydrologic Models (CTH Ch. 14)</td>
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<tr>
<td>10</td>
<td>Fundamentals of Stochastic Site Characterization (YR Ch.2)</td>
</tr>
<tr>
<td>11</td>
<td>Estimation and Simulation (YR Ch. 3)</td>
</tr>
<tr>
<td>12</td>
<td>Moments of Flow Variables (YR Ch. 4 &amp; 5)</td>
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<tr>
<td>13</td>
<td>Scaling Issues in Stochastic Processes (YR Ch. 6)</td>
</tr>
<tr>
<td>14</td>
<td>An Overview of Stochastic Tools for Modeling Transport Processes (YR Chs. 7, 8, 9 &amp; 10)</td>
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<tr>
<td>15</td>
<td><strong>FINAL EXAM</strong></td>
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STUDENT SUPPORT SERVICES:
CEM computer technicians are located in the Duckering building room 153 (contact phone: 474-6146). They can help with issues related to software and hardware problems in the computer lab (310 Duckering). Blackboard support is available through UAF OIT helpdesk. The instructor is available for any other support required during the offering of this course. Ms. Judy Johnson, Office Manager of Mining and Geological Engineering Department is available for departmental support in Room 301 Duckering (474-7338).

DISABILITIES SERVICES:
The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. The instructor and the office manager of Mining and Geological Engineering program will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.