Justification for New Course  
NREM 494 Environmental Problem Solving

This narrative follows the guidelines issued by CTAHR for new course proposals. The questions posed in the guidelines are repeated below in italics.

1. *What is the course modification?*

   This proposal is to add a new course NREM 494 Environmental Problem Solving. An application for designation as an Oral Communication (OC) focus course will be submitted in the fall, when the form for Spring 2006 designation becomes available.

2. *Why is this course being requested or modified?*

   The NREM B.Sc. program currently requires NREM 458 Project Evaluation and Resource Management as its capstone course. The 458 course was originally developed as a disciplinary economics course for the AREC (Agricultural and Resource Economics) major, is still cross-listed with the Economics Dept. and required for the Graduate Resource Management Certificate program. However, few NREM undergraduate students meet the prerequisite (ECON 301) and a 400-level economics course is inappropriate as a major requirement.

   In Fall 2003, there was an attempt to reorient NREM 458 toward natural resource assessment using a project-based learning (PBL) approach. The mixture of students from NREM’s undergraduate population, other undergraduates (e.g., Economics), and graduate students in the Resource Management program was awkward and hindered skills instruction. Moreover, it was difficult to find a single project of interest to such a diverse group of students.

   Since then, the Geography Dept. has hired a new faculty to reactivate the GEOG 412 Environmental Impact Assessment course, which overlaps the content of the Fall 2003 NREM 458 class. NREM has also been planning a distance education program to Maui. An electronic version of NREM 458, with its original economics orientation, may be offered as an elective for NREM students on Maui, distance students from other UH social science programs and/or as a professional development course for Outreach College. For UHM general education, now OC focus courses must be upper division. NREM does not have an OC course at this time.

   The assessment plan for the NREM B.Sc. degree includes two goals for the program, with

   “Goal 2: NREM students will have a broad understanding of the environmental sciences and be able to apply scientific methods in managing natural resource systems and solving environmental problems. Objective a: Students will be able to explain the ecological processes and relationships that determine given environmental conditions in core course assignments; Objective b: Students will demonstrate technical competencies in natural resource management, develop and implement solutions to real-world problems in integrative core course projects and extracurricular/service-learning activities.” Student self-evaluations of their problem-solving abilities were surveyed in the Fall 2003 NREM 458 class. The results were mixed with an average 3.5 score on a 1-5 (worst-best) scale.

   NREM 494 is being proposed to strengthen the curriculum in problem solving and skill areas needed by NREM graduates. Given the strong growth in undergraduate majors, there are now
sufficient students to offer a NREM-only capstone course. The topic lends itself to PBL and the course can easily meet OC focus requirements. If this proposal is approved, major requirements can be changed to replace NREM 458 with NREM 494. If disapproved, NREM advisers will have to find a substitute course from other departments. The latter are unlikely to provide the skills needed by NREM seniors. NREM students would also have to find an outside OC course, which are few and may not meet other degree requirements. This could delay their graduation.

3. How will the content be organized?

See enclosed syllabus. Content is outlined on pages 4-5. A class schedule from Spring 2005 is given on page 3.

4. What other courses at UHM closely parallel the proposed course and in what way will the latter make a distinct contribution?

The course most closely parallel to NREM 494 is GEOG 412 Environmental Impact Assessment. The latter course focuses on formal EIS analysis including regulatory procedures. The GEOG 412 instructor, Dr. Brian Szuster, was contacted to review the NREM 494 syllabus (see email messages in appendix). He saw little overlap between the courses. There was no reply from others in the Geography Dept.

NREM 494 will make a distinct contribution to the UHM curriculum by
- adopting an ecosystem management approach
- emphasizing higher-level career-related skills
- providing a forum for NREM seniors to integrate knowledge from their track studies
- allowing NREM students to meet the OC requirement within their major.

5. Where or how does the proposed course fit into the current and future curriculum?

Page 3 diagrams the curriculum for the NREM undergraduate program. In the upper division, NREM students diverge into two tracks. The latter courses are mostly given by other departments in many different fields. The NREM 492 Internship class is usually taken by juniors, and can integrate learning from intermediate-level courses. The proposed NREM 494 course is intended as a capstone for seniors. It will provide instruction in advanced management concepts and techniques, and real-world exercises to integrate advanced track knowledge.

6. Why is the number of credits and level justified? Explain the prerequisites and the absence thereof.

NREM 494 is proposed for 3 credits. This is justified because the course will meet three times per week for 50-minute lecture or discussion sessions. The course is high 400-level with a prerequisite of senior standing in NREM or other environmental science major. This is appropriate for a capstone course.

7. How will the course assist students to achieve the critical skills and competencies expected of CTAHR graduates?

In developing an assessment plan for its B.Sc. degree program, NREM identified critical skills for its field. The table on page 4 shows the skills addressed by NREM 494. NREM 494 covers all major skill areas and most subareas.
Basic Core
- CHEM 161+L or CHEM 151+L for Track II
- GEOG 101+L Natural Environment
- BIOL 171+L and BIOL 172+L Introductory Biology
- MATH 203/215/241 or NREM 203 Calculus

NREM 210 Environmental Resources: Issues and Options
NREM 220 Agricultural and Resource Economics
NREM 301 Natural Resources Management (with lab)
NREM 302 Natural Resource and Environmental Policy
NREM 310 Statistics in Agriculture and Human Resources
GEOG 370 Map and Aerial Photo Interpretation
NREM 492 Internship
NREM 477 GIS for Resource Managers (new proposed)*
NREM 494 Environmental Problem Solving (new proposed)

Track I 30 cr. natural sciences including 15 cr. upper division natural resources
Track II 30 cr. including social science discipline, management, methods, 6 cr. upper division natural resources

*NREM 477 proposal pending. Required for Track I, optional for Track II.
Core Skills Covered in NREM 494

NREM has identified 7 major undergraduate skill areas, each with several with subareas. NREM 494 content, assignments and activities to develop such student competencies are given in bullets.

1. **Oral Communications**: extemporaneous, business, scientific report, presentation graphics
   - case study team meetings, organization of team-led class sessions
   - class discussions
   - final oral presentation

2. **Written Communications**: business, scientific report, graphics
   - class and case study team emails
   - case study summaries
   - final technical report

3. **Human and Work Relations**: personal, interpersonal/group, professionalism, organization, perspective
   - case study teams
   - multicultural/international case study topics

4. **Problem Solving**: logical/critical thinking, problem definition, analysis, conclusion
   - ecosystem management approach
   - case studies in problem solving

5. **Business Management**: administration, operations, decision-making
   - case study team management
   - evaluation methods, project planning and management

6. **Technical and Analytical Methods**: library research, site research, scientific laboratory, data, quantitative analysis, assessment
   - case study research, field reconnaissance
   - quantitative modeling and simulation, environmental impact indicators, feasibility analysis

7. **Computer Software**: network, business, analytical, graphics
   - email, Internet research
   - spreadsheet modeling
   - final written report and PowerPoint presentation with illustrations
8. **How will students be evaluated?**

The following assignments account for the given portion of final grades:

- Participation in 4 case teams (15% each) 60%
- Other class participation 25
- Final reporting on Hawaii case 15
  - oral presentation OR
  - written report and critique of oral presentation

General class participation is evaluated by the instructor based on the extent of student involvement and contribution to group learning during a class session. The criteria for case study team participation are developed by the class early in the semester. The table below shows features and actions defining good team performance, identified by the Spring 2005 class. Students are assigned to write self or peer evaluations. These are advisory to the instructor, who performs their own evaluation and assigns a grade.

<table>
<thead>
<tr>
<th>Team Activity</th>
<th>Features</th>
<th>Actions</th>
</tr>
</thead>
</table>
| Teamwork      | - all do their part  
- participatory communications  
- leader(s) and followers (no laid backs)  
- respect, understanding, open-minded, not bossy | - select team leaders  
- divide up work to match skills  
- contact addresses  
- help each other on work |
| Discussions   | - insightful, informative  
- broad, thoughtful participation  
- allow for different points of view, manage disagreement  
- effective per objectives | - teamwork  
- main goal, agenda/plan/questions  
- have facilitator, leadership  
- stay on topic, time  
- connect with audience |
| Other Exercises | - complete job per assignment, no loose ends/omissions  
- organized, coherent  
- good scientific methodology (appropriate, professional)  
- accomplish clearly defined goals, objectives  
- significant positive outcomes, no adverse outcomes, widespread benefits | - teamwork  
- action plan  
- research, understanding |

The same process will be used later in the semester to develop criteria for the final written report and oral presentation. The tables on pages 6-7 present the criteria used in the Fall 2003 NREM 458 class.
## Final Project Oral Presentation

<table>
<thead>
<tr>
<th>score</th>
<th>Language, Delivery</th>
<th>Organization</th>
<th>Content</th>
<th>Visual Aids (final oral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Highly effective use of language enhances message. No/few grammar mistakes. Speech enthusiastic, engaging; casual use of notes as aid. Excellent volume, fluid delivery with varied intonation. Frequent eye contact; expressive but relaxed body language.</td>
<td>Coherent, logical sequence throughout. Clear, effective introduction and conclusion. Controlled timing with appropriate length; succinct but not choppy. Smooth transitions.</td>
<td>All assigned elements addressed with depth. Complete, accurate, pertinent factual information; engaging details, examples. Critical thought, insightful analysis, well chosen justified methods. Explicit citation of important references. Clear conclusion supported by material presented.</td>
<td>Accurate, clear, concise. Appropriate quantity, style, flow that enhances presentation.</td>
</tr>
<tr>
<td>1</td>
<td>Major grammar errors make it difficult/impossible to follow message. Speech read directly from notes in monotone voice; too rapid to easily understand. Volume low and difficult to hear. Strained delivery, tense body language, little/no contact with audience.</td>
<td>Little organization, disordered; difficult to follow. No introduction or conclusion. Jumps between points without transition. No flow or logical connections among material.</td>
<td>Missing important elements of assignment. Minimal research effort. Scattered information with major omissions or inaccuracies. Little/no analysis, references given. Unclear, confusing explanations. Conclusion unclear or not supported by material.</td>
<td>Few, inaccurate, disorderly. Detract from oral delivery.</td>
</tr>
</tbody>
</table>
## Final Project Report

<table>
<thead>
<tr>
<th>Score</th>
<th>Language</th>
<th>Organization</th>
<th>Research Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>No errors in spelling, grammar, punctuation (SGP). Highly effective style that enhances message. Attractive presentation. Illustrations clear, concise, visually appealing; content enhances communication.</td>
<td>Complete, includes all major parts–title, introduction, body, conclusion, bibliography. Logical sequence, smooth transitions between sections. Title, introduction concise and accurately reflect scope. Conclusions address issues raised, supported by evidence presented.</td>
<td>Clear researchable purpose, critical contribution to team study objectives; purpose accomplished by presented output. Logical sequence of evidence. Factual information and analysis complete, accurate, detailed, support purpose. Clear explanation of findings, insightful interpretations. Well chosen references with proper citation.</td>
</tr>
<tr>
<td>3</td>
<td>Few minor SGP errors. Effective style that supports message. Clean and neat presentation. Illustrations neat, easy to read, complement text message.</td>
<td>Generally complete. Good organization, some breaks in logical flow. Identifiable introduction but too much information. Explicit conclusions that address some issues raised, relate to evidence presented.</td>
<td>Addresses researchable issue(s) that important to team study objectives; presented output supports purpose. Logical sequence; most steps understandable but some lack detail or confusing. Factual information complete and accurate; relevant analysis. Adequate explanation of findings, some interpretation. Valid references, explicit citation.</td>
</tr>
<tr>
<td>2</td>
<td>Multiple SGP errors, may interfere with message. Some misalignment of style and message. Legible presentation. Readable illustrations; some confusing or do not contribute to message.</td>
<td>All major sections present. A few organizational flaws such as little introduction, weak/disjointed transitions, underdeveloped ideas. Conclusions address some issues but extrapolate from evidence presented.</td>
<td>Addresses some issue(s) related to team study objectives. Some steps confusing or lack important details. Valid information presented but incomplete, a few irrelevant or questionable accuracy. Adequate analysis, only minor errors. Some explanation of findings but little interpretation. Sporadic use of references.</td>
</tr>
<tr>
<td>1</td>
<td>Many SGP errors so difficult to understand. Inappropriate style. Illegible/difficult to read. Few illustrations, disorderly presentation so difficult to interpret.</td>
<td>Incomplete; missing major parts. Disorganized, little continuity so difficult to follow. Uninformative introduction. Conclusions absent, irrelevant to issues or unsupported by evidence presented.</td>
<td>No clear issue addressed or unrelated to team study. Many missing or confused steps, disorderly progression. Scattered information with major omissions or inaccuracies. No valid analysis. Illogical explanation of findings or interpretations. Little or no referencing.</td>
</tr>
</tbody>
</table>
9. What are the minimum qualifications for teaching this course? Is a qualified instructor now available?

Minimum qualifications include a Ph.D. in NREM or a closely related field, professional experience with environmental management projects, expertise in systems analysis and environmental modeling. Dr. Carol Ferguson is the current instructor. Drs. Travis Idol and Tomoaki Miura are available as alternates.

10. How will the course be financed, assuming no further cutbacks?

No additional funds, equipment or supplies are needed for this course.

11. Has the course been offered before? Is there a demand for it?

As discussed under item 2, a capstone course in natural resource assessment was offered as NREM 458 in Fall 2003. Enrollment was 8 students. Since then, the NREM undergraduate program has seen significant growth. In Spring 2005, Environmental Problem Solving is being offered as a NREM 491 experimental course. Enrollment is 13 students, all but one from NREM. Due to extensive interactions among students and between students and instructor, future enrollment will be limited to ~15 students.

12. Is the course cross-listed with another department?

No cross-listing is being proposed. The course is intended for NREM majors, who will take up most of the available seats.
Appendix - Review by Other Department

Date: Mon, 31 Jan 2005 09:18:20 -1000
From: Brian Szuster <szuster@hawaii.edu>
To: Carol Ferguson <cafergus@hawaii.edu>
Subject: Re: NREM capstone course

Carol - I don't see any conflict with my course that is heavily focused on the EIS process - good luck - Brian

Date: Mon, 31 Jan 2005 08:51:21 -1000 (HST)
From: Carol Ferguson <cafergus@hawaii.edu>
To: Brian Szuster <szuster@hawaii.edu>
Cc: Mark Ridgley <ridgley@hawaii.edu>
Subject: Re: NREM capstone course

Hi Brian,

I am proposing a new course, NREM 494 Environmental Problem Solving, as a capstone for the NREM undergraduate program. It's being offered this semester on an experimental basis as a NREM 491 topics course. I've attached a syllabus. For the permanent 494 course, I'll be applying for oral communications focus designation.

Our college guidelines for new course proposals require circulating the proposal to other UH units where there's overlap with existing courses. So far, the proposal's only circulated within NREM (message below to Miura and Idol). I think the closest existing course is your GEOG 412. Therefore, I ask you to review the attachment and send me (email's OK) with your evaluation on the extent and nature of any overlap, plus any other comments you'd like to add. I am cc'ing the Geog chair, who is free to add his own comments or forward this to others in the dept.

I'd like to receive your comments by next Monday. I need to submit the proposal soon if it's going to be offered in Spring 06. Thanks for your help.

Carol

---------- Forwarded message ----------
Date: Sat, 29 Jan 2005 12:38:27 -1000 (HST)
From: Carol Ferguson <cafergus@hawaii.edu>
To: Tomoaki Miura <tomoakim@hawaii.edu>, Travis Idol <idol@hawaii.edu>
Cc: Carl Evensen <evensen@hawaii.edu>
Subject: NREM capstone course

Hi Tomoaki and Travis,
I'm preparing a proposal for a new capstone course NREM 494 Environmental Problem Solving (see attachment). It's intended to replace the NREM 458 requirement for the B.Sc. degree. I'm teaching it as NREM 491 this semester. In the new course proposal, I also plan to apply for oral communications focus designation.

CTAHR guidelines for proposing new courses ask about the availability of instructors. I could serve as permanent instructor but back-ups should be listed. I think you would make good alternates and I'd like to use your names in the application. This would not imply teaching more courses. Course load is a separate issue. I am cc'ing Carl in case he has other ideas.

Please get back soon if you are unwilling to be named as alternate instructor. I hope to finish the application packet in the coming week so it can be circulated to the curriculum committee. Thanks.

Carol

[ Part 2, "" Application/PDF 134KB. ]