September 15, 2014

MEMORANDUM

TO: Maria Gallo, Dean
College of Tropical Agriculture and Human Resources

FROM: Reed Dasenbrock
Vice Chancellor
for Academic Affairs

SUBJECT: Approved Authorization to Plan (ATP), Master of Environmental Management, University of Hawai‘i at Mānoa

Interim Chancellor Bley-Vroman has approved your ATP for the Master of Environmental Management (MEM) degree in the Department of Natural Resources and Environmental Management (NREM), College of Tropical Agriculture and Human Resources. We look forward to receiving the program proposal in Spring 2015.

Should you have any questions, please contact Program Officer Wendy Pearson at 956-7486.

Attachment

c: Interim Executive Vice President and Provost Itano
   Faculty Senate Chair Bontekoe
   Director Nagao
   Professor Garrod
   Program Officer Pearson
   Chair Chan-Halbrendt
MEMORANDUM

TO: Robert Bley-Vroman  
    Interim Chancellor

FROM: Reed Dasenbrock  
    Vice Chancellor for Academic Affairs

SUBJECT: Authorization to Plan for Master of Environmental Management, College of Tropical Agriculture & Human Resources

Attached please find an Authorization to Plan (ATP) for a Master of Environmental Management to be administered by the Department of Natural Resources and Environmental Management in the College of Tropical Agriculture & Human Resources.

The proposed Master of Environmental Management (MEM) is a professional master’s degree designed to replace the Plan B option of the established Master of Science in Natural Resources and Environmental Management. There are currently 84 students enrolled in the MS program, and 50% are pursuing Plan B.

The proposed program was reviewed and endorsed by the College, the Office of Graduate Education, and my office. As the program is identical to Plan B of the established MS degree program, the UH System determined that the Council of Chief Academic Officers did not need to be consulted on the ATP.

No additional resources are required as the MEM makes use of existing resources in the program. I recommend that you approve the attached ATP for a Master of Environmental Management. Upon receipt of your approval, the Department will submit a full degree proposal for review, consultation, and approval.

Should you have questions, please contact Wendy Pearson, Program Officer, at 956-6145.

Attachment

  c: Program Officer Pearson
Authorization to Plan (ATP) for a New Academic Program

Campus: Mānoa

School or College: College of Tropical Agriculture and Human Resources

Department: Natural Resources and Environmental Management

Planning Committee: Peter Garrod, Researcher, and Catherine Chan-Halbrendt, Chair

Natural Resources and Environmental Management

Degree Proposed: Master of Environmental Management (MEM)

Executive Summary
The Department of Natural Resources and Environmental Management (NREM) offers BS, MS and PhD degrees with current enrollments of 75, 47, and 24 students respectively (Fall 2013). The Master’s program has two tracks, Academic and Professional. The Academic or Plan A track requires a thesis and the Professional or Plan B track, requires more course work plus an externship/practicum. So far this century, 84 Master’s degrees have been awarded; of which 42 were academic (thesis) and 42 were professional degrees.

This request for an ATP is essentially a proposal to change the degree title on the non-thesis or Plan B track from a Masters of Science in Natural Resources and Environmental Management to a Master of Environmental Management (MEM). This name change is consistent with the national Professional Science Masters initiative. No new resources are requested and a moderate increase in current course loads is anticipated.

1 "The Professional Science Master’s (PSM) is an innovative, new graduate degree designed to allow students to pursue advanced training in science or mathematics, while simultaneously developing workplace skills highly valued by employers. PSM programs consist of two years of academic training in an emerging or interdisciplinary area, along with a professional component that may include internships and “cross-training” in workplace skills, such as business, communications, and regulatory affairs. All have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities”, http://www.sciencemasters.com.
The Master of Environmental Management or MEM degree is currently being offered by Yale, Duke, Portland State, Salisbury University, University of New South Wales, Webster University, University of Queensland, the Freie University (Berlin), and others. Very similar professional master's degrees are being offered at many U.S. institutions, including Harvard (Sustainability & Environmental Management), University of Pennsylvania (Environmental Studies), UCSB (Environmental Science and Management), and the University of Rhode Island (Environmental Science and Management).

This simple name change will have two significant impacts. The first and most significant is that it will make our graduates more competitive, providing them with a degree title that describes their preparation and that is similar to those awarded by other institutions providing professional masters in environmental management. It will also distinguish them from students receiving a MS degree, generally the MS is considered to be a research degree. We anticipate that it will also facilitate future recruitment.

If this change is approved, NREM will then offer a BS, MS, and PhD in Natural Resources and Environmental Management and a Master of Environmental Management. The MS degree will no longer have the Plan B option. Most of the students in the proposed MEM degree track are expected to be self-funded.

Background
NREM is a relatively new department, formed by merging the Department of Agricultural and Resource Economics with part of the Agronomy and Soil Science Department. The first student graduated from NREM in 2004. Since then, the number of graduates has been increasing. Enrollment shows a similar pattern, increasing until 2010, and then being relatively constant. (Note that it is not feasible to separate the thesis from the professional masters as most students do not decide until the last part of their first year.)
Graduates have found jobs in Universities, government agencies, the private sector, and nonprofits. Anecdotally, graduates with professional science masters have been quite successful in finding jobs directly related to their training, often with the organization where they interned.
5. Need for the Program

a. Program Description - Proposed Master’s degree (MEM)²
The MEM is a course-driven professional degree and requires a total of 36 credits. Students are required to declare a concentration from one of four possible concentration areas (see below). Courses include the Primary MS Core (9 credits), research methods (3 credits), a minimum of 9 elective credits from the chosen concentration area, a minimum of 3 elective credits from each of the other three concentration areas, and a 6 credit capstone experience. The Capstone Experience requirement may be fulfilled in a number of ways, including but not limited to an internship, cooperative, or special field experience; an investigation of a special topic; and/or development of a research project.

MEM Concentration Areas (total 18 credits)
- *Environmental Policy & Economics* – prepares students for careers in resource and agricultural management, including planning, policy, impact analysis, and assessment, in both the public and private sectors.
- *Land & Water Resource Management* – prepares students for careers in water and land management in both the public and private sectors.
- *Geospatial Analysis & Modeling* – prepares students for careers using remote sensing for natural resource assessment and environmental modeling.

A detailed description of the concentration areas is provided in Attachment 2.

1) Student Learning Outcomes:
   a) Students demonstrate knowledge of social and ecological principles, and interdisciplinary aspects of natural resource and environmental management issues;
   b) Students can analyze and address natural resource and environmental management problems by using appropriate methods from social and/or natural science disciplines;

² Currently being offered as a plan B MS. See Department of Natural Resources and Environmental Management, *Graduate Student Guide*, April 2014.
c) Students communicate effectively, both orally and in writing, to diverse audiences including professionals, resource managers, local communities and policy makers;
d) Students can conduct a capstone project of professional quality to acquire practical experience by applying NREM knowledge; and
e) Students can function as professionals in their specialization area by demonstrating responsible and ethical conduct, effective collaboration, informed decision making, and life-long learning.

2) Justification: The program currently exists as Plan B of the Master of Science in Natural Resources and Environmental Management. The program has been relatively popular in recent years. We are typically receiving about 50 applications a year to the MS program and admitting about 20. At least half typically end up in the professional master's (Plan B) program. The proposed name change is designed to make graduates more competitive in the market place by better describing their degree and distinguishing them from students trained to do research and/or preparing to apply to a doctoral program. We also anticipate that it will attract more students to the program.

3) Impact: The campus impact will be essentially neutral inasmuch as the program already exists. It will continue to have a positive impact on the State as there is an increasing demand for environmental management in both the private and public sectors (City, State, and Federal).

4) Workforce Needs: There continues to be a demand for environmental and agro-ecology managers. This is evidenced by the placement of recent graduates in both the public and private sectors.

5) First, the program already exists, so it should be part of the current mission and strategic plan. However, a professional master's should provide an even better fit when it comes to considering the expressed local, national, and international needs. In particular:

a) Goal 1: Transformative Teaching and Learning Environment. By its very definition, a professional master's is experiential learning.
b) Goal 3: An Engaged University. Internships, practica, mentoring, and service learning are essential components of this degree, as well partnerships with community organizations. Again, these are key components of a professional master's and are required in the proposed degree.
c) Goal 4: Facilitating Excellence: One of the basic goals of the program is to train students to implement sustainable management practices in the use of energy, water, land, and other resources.

6. Planning:
   a. No planning activities are anticipated, the degree is already functioning under the Plan B rubric. A proposal for the new degree will be submitted once the ATP is approved.
   b. No significant new resources will be required – any additional costs can be covered within the existing budget. A list of current faculty is attached. Current enrollment in the non-thesis master’s program of 26 students is expected to increase.
   c. Five-Year Business Plan:

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<th>YEAR</th>
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<th>FY 18-19</th>
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<td>TOTAL Revenue</td>
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<td>309,120</td>
<td>331,200</td>
<td>364,320</td>
<td>386,400</td>
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</table>

\(^a\) Rate based on AY 2014 resident tuition. Currently about 25% of the NREM MS students pay non-resident resident tuition.

7. Impact on current courses or programs: None or not significant.

8. The program will be offered using existing courses at UH Mānoa.
9. The existing department resulted by combining parts of the Agronomy and Soils Sciences department with the Agricultural and Resource Economics Department. The new department, Natural Resources and Environmental Management combines both disciplines (an agricultural science and a social science) in an interdisciplinary program that focuses on agricultural, resource, and environmental issues. Renaming the non-thesis master's degree will not change this.
ATP for Master’s in Environmental Management

APPROVED / DISAPPROVED

Maria Gallo
Dean Marie Gallo, CTAHR

6/2/14 Date

APPROVED / DISAPPROVED

Krystyna Aune
Dean Krystyna Aune, Graduate Division

5/4/14 Date

APPROVED / DISAPPROVED

Reed Dasenbrock, Campus Chief Academic Officer
Comments:

9/6/14 Date

APPROVED / DISAPPROVED

Robert Bley-Vroman, Interim Chancellor
Comments:

R Bley-Vroman

6/9/12/14 Date

Council of Chief Academic Officers (Systemwide Consultation):
Comments:

Print Name Signature Date
Attachment 1 - Faculty

C. Chan-Halbrendt, PhD — International agricultural development and environmental economics  
L. J. Cox, PhD — Community economic development  
S. E. Crow, PhD — Soil ecology and biogeochemistry  
C. I. Evensen, PhD — Natural resource management, environmental quality  
J. B. Friday, PhD — Tropical forestry/agroforestry extension  
P. V. Garrod, PhD — Marketing and production economics  
T. W. Idol, PhD — Tropical forestry/agroforestry  
J. J. K. Leary, PhD — Invasive species control  
C. Lepczyk, PhD — Ecosystem management, wildlife ecology, landscape ecology  
P. S. Leung, PhD — Aquaculture and fisheries economics, systems modeling  
C. Litton, PhD — Terrestrial ecosystem ecology, biogeochemistry  
T. Miura, PhD — Geospatial analysis, remote sensing  
K. L. Oleson, PhD — Ecosystem service valuation, environmental ethics, policy analysis  
J. F. Yanagida, PhD — Production economics, price analysis, international trade

Cooperating NREM Graduate Faculty  
K. Burnett, PhD (UHERO) — Invasive species assessment and management  
J. DeFrank, PhD (TPSS) — Herbicide management  
A. El-Kadi, PhD (G&G/CEE) — Groundwater hydrology  
T. Giambelluca, PhD (GEOG) — Climatology, hydrology  
M. Habte, PhD (TPSS) — Soil ecology, microbiology  
N. V. Hue, PhD (TPSS) — Organic cycling  
Q. Li, PhD (MBBE) — Environmental chemistry  
T. Radovich, PhD (TPSS) — Organic and Sustainable farming  
C. Ray, PhD (CEE) — Groundwater hydrology and chemistry  
H. Valenzuela, PhD (TPSS) — Vegetation physiology and management

Affiliate NREM Graduate Faculty  
G. Bruland, PhD (Principia College) — Soil and water conservation  
K. Chaston (NOAA) — Coral and coastal management  
D. Drigot (US Army Corp of Engineers) — Natural resource management  
J. Fox, PhD (East-West Center) — Social forestry  
C. Giardina, PhD (IPIF · USDA-FS) — Forest Ecology  
S. A. Gray, PhD — Social-Ecological Modeling, Collaborative Resource Management  
S. Hess (USGS-BRD) — Wildlife ecology and management  
Y. Li, PhD (UH Hilo) — Forest ecosystem management  
R. Mackenzie, PhD (USDA Forest Service) — Aquatic ecology  
D. Meason, PhD (Scion, New Zealand) — Forest ecosystem analysis and modeling  
M. Pan, PhD (NOAA Fisheries) — Fishery economics  
S. Pooley, PhD (NMFS) — Marine resource economics
M. Robotham, PhD (USDA)—Conservation technology
C. Smith (USDA)—Soil genesis, survey and classification
M. Walker, PhD (Univ. of Nevada, Reno)—Water quality, microbiology
Attachment 2 – Proposed Master’s degree (MEM)\textsuperscript{3}

The MEM is a course-driven professional degree and requires a total of 36 credits. Students are required to declare a concentration from one of four possible concentration areas (see below). Courses include the Primary MS Core (9 credits), research methods (3 credits), a minimum of 9 elective credits from the chosen concentration area, a minimum of 3 elective credits from each of the other three concentration areas, and a 6 credit capstone experience. Of the 18 elective credits required:
(i) at least 12 credits must be NREM courses; and
(ii) a maximum of 6 credits of upper-division undergraduate course credits (400-level) are allowed.

**Primary Core (9 credits)**
- NREM 600 Evaluation of Natural Resources Management (3)
- NREM 601 Economic Analysis of Natural Resource Management (3)
- NREM 605 Research Skills (2)
- NREM 701 Research Seminar in NREM (1)

**Research Methods (3 credits)**
- Course in graduate research methods (3)

**MEM Concentration Areas (total 18 credits)**
MEM students will select a concentration area from the 4 listed below. Each student is required to take a minimum of 9 credits from their selected concentration area, and 3 credits from each of the other areas. The following list is not comprehensive, and substitutions will be considered at any time by petitioning the NREM Graduate Committee via the student’s faculty advisor.

**Environmental Policy & Economics (18 courses, 9 NREM)**
- GEOG 413 Resource Management
- NREM 420 Community and Natural Resource Management
- NREM/ECON/TPSS 429 Spreadsheet Modeling for Business and Economic Analysis
- NREM 611 Resource and Environmental Policy

\textsuperscript{3} Currently being offered as a plan B MS. See Department of Natural Resources and Environmental Management, Graduate Student Guide, April 2014.
• PLAN 620 Environmental Policies and Programs
• GEOG 621 Coastal Management and Planning
• GEOG 622 Environmental Impact Assessment
• PLAN 625 Environmental Planning
• NREM 627 Applied Microeconomic Analysis
• PLAN 628 Urban Environmental Problems
• NREM 637 Resource Economics
• GEOG/PLAN 637 Environment and Development
• PLAN 640 Land Use Policies and Programs
• NREM 658 Advanced Environmental Benefit-Cost Analysis
• NREM 671 International Agricultural Systems
• PLAN 671 Disaster Management: Understanding the Nature of Hazards
• NREM 691 Valuing Nature
• NREM 691 Collaborative Natural Resource Management

Land & Water Resource Management (14 courses, 7 NREM)
• ZOOL 410 Corals and Coral Reefs
• GEOG 423 Human Dimensions of the Coastal Ocean
• BOT/ZOOL 450 Natural History of Hawaiian Islands
• HWST 457 ʻĀina Mauliola: Hawaiian Ecosystems
• NREM 461 Soil and Water Conservation
• NREM 463 Irrigation and Water Management
• NREM 467 Natural Resource Conservation Planning
• LWEV 588 Legal Aspects of Water Resources and Control
• NREM 612 Predicting & Controlling Degradation in Human-Dominated Ecosystems
• GEOG 618 Human Environment Systems
• HWST 650 Hawaiian Geography and Resource Management
• NREM 660 Hydrologic Processes in Soils
• NREM 662 Watershed Hydrology
• NREM 665 Coastal and Wetland Ecology and Management

Applied Terrestrial Ecology (12 courses, 7 NREM)
• BOT 444 Ethnoecology and Conservation
• NREM 450 Wildlife Ecology & Management
• NREM 480 Applied Forest Ecology
• TPSS 481 Weed Science
• TPSS 604 Advanced Soil Microbiology
• BOT 651 Invasion Biology
• BOT 661 Hawaiian Vascular Plants
• NREM 680 Ecosystem Ecology
• NREM 682 Restoration Ecology
• NREM 685 Landscape Ecology
• NREM/BOT/ZOOL 690 Conservation Biology
• NREM 691 Forest Nutrition and Biogeochemistry

**Geospatial Analysis & Modeling (8 courses, 3 NREM)**
• GEOG 470 Remote Sensing
• GEOG 472 Field Mapping
• NREM 477 GIS for Resource Managers
• NREM 664 Small Watershed Modeling
• NREM 677 Remote Sensing of the Environment
• TPSS/GEOG 680 Geospatial Analysis of Natural Resource Data
• PLAN 673 Information Systems for Disaster Management and Humanitarian Assistance
• ZOOL 750 Topics in Conservation Biology

**MEM Capstone Experience (6 credits)**

A capstone experience is required for all MEM students. The capstone experience consists of:

1. NREM 695 (1 cr) Capstone Preparation, to be taken when the student is preparing their proposal;
2. NREM 696 (3 cr) Capstone Experience and
3. NREM 699 (2 cr) Directed Research (register with faculty advisor); to be taken when the student has completed their capstone experience and is writing up their final document.

All capstone experiences require approval from the Plan B Capstone Panel, which consists of the faculty advisor, the NREM 695 course instructor, and an at-large Panel member.

The Capstone Experience requirement may be fulfilled in a number of ways, based on each individual student’s interests. In as much, it will vary from student to student, but typical capstone experiences will involve:

1. an internship, cooperative, or special field experience;
2. an investigation of a special topic; and/or
3. development of a project, directed readings/study, or a research project. Each student is expected to take the primary role in identifying and organizing their capstone experience.

In meeting this requirement, it will be important for students to demonstrate that they are getting an “integrative” experience in natural resources and environmental management. Each student will be required to give a public proposal and defense
presentation, and provide a written proposal and final document on their capstone experience, both of which will be evaluated\textsuperscript{4} by the Plan B Capstone Panel.

\textsuperscript{4} Past and current Plan B students (the professional science masters) had or have internships in the public, private, and non-profit sectors. For a significant number of the past graduates, the internship has led directly to a professional placement in the same organization.