UNIVERSITY OF RHODE ISLAND
THE GRADUATE SCHOOL

To: Members of the 2009-2010 Graduate Council
From: Nasser Zawia, Interim Dean
Date: 10 February 2010
RE: Agenda for Meeting Number 444 of the Graduate Council to be held on Monday 15 March 2010 at 2:00 p.m. in the conference room of the Alumni Center

I. Call to Order

II. Approval of Minutes of Meeting Number 443 held on 22 February 2010

III. Announcements

A. Recent appointments to the Graduate Faculty (awarded Adjunct Faculty status)

♦ Richard Harnett, Adjunct Professor, Department of Electrical, Computer, and Biomedical Engineering
♦ Ashin Sarma, Adjunct Assistant Professor, Department of Electrical, Computer, and Biomedical Engineering
Ian Reyes, Assistant Professor, Department of Communication Studies
John Mottinger, Professor Emeritus, Department of Cell and Molecular Biology
William Kovacs, Professor Emeritus, Department of Civil and Environmental Engineering
Lisa Weyandt, Associate Professor, Department of Psychology
Kyle Kusz, Associate Professor, Department of Kinesiology
Silas Pinto, Adjunct Assistant Professor, Department of Psychology
Aftab Ahmed, Professor, Department of Biomedical and Pharmaceutical Sciences
Annette Grilli, Assistant Professor, Department of Ocean Engineering
Eugene Park, Research Professor, Department of Electrical, Chemical, and Biomedical Engineering
David Orwig, Adjunct Associate Professor, Department of Biological Sciences
♦ Moshen Badiey, Adjunct Professor, Department of Ocean Engineering
Tiffani Kisler, Assistant Professor, Department of Human Development and Family Services
♦ Brian Bronk, Adjunct Professor, Department of Chemistry
Robert Vanderslice, Adjunct Associate Professor, College of Nursing

B. Extension of deadline for nominations for the excellence in doctoral research awards

IV. Committees

A. New Program Committee
   Medical Physics – 5-year accelerated BS/MS program

B. Curriculum Committee
   (Curricular material is available at http://www.uri.edu/gsadmis/gradCourseProposals)

   New Courses:

   1) College of Engineering
      Department of Electrical, Computer, and Biomedical Engineering

      *ELE 470 Mobile Computing (3)
      Application of modern mobile computing platforms, user interface, software application development, hardware interface; view controllers; data interaction; application distribution. Pre: Basic course in C programming; basic course in microcomputers; at least junior standing; permission of instructor.

      *ELE 561 Physiological Modeling and Control (3)
      Principals of physiological modeling and control of linear and nonlinear systems, stability analysis, root locus, Bode plots, linearization. Pre: Graduate standing in electrical engineering or permission of instructor.

   2) College of Arts and Sciences
      Department of Physics

      *PHY 545 Nanotechnology in Imaging and Therapy (3)
      Nanomaterials: physical properties, application in drug delivery and diagnostics, nanodevices, nano-oncology. Pre: MTH 244

      *PHY 550 Introduction to Radiation Physics and Dosimetry (3)
      Basic principles of radiation physics: radioactivity, the physics of ionizing radiation, radiation dosimetry, imaging equipment, radiation therapy equipment and radiation detectors. Pre: PHY 210 or permission of instructor
*PHY 552 Radiobiology (3)
Basic principles of radiation biology: factors that modify radiation response; linear energy transfer; relative biological effectiveness; tissue radiosensitivity; time-dose and fractionation; radiobiological modeling. Pre: PHY 210 or permission of the instructor.

*PHY 555 Radiation Oncology (3)
Practical aspects of radiation oncology medical physics: operation of radiotherapy equipment and dose measuring devices; radiation beam measurement techniques; commissioning and quality assurance for clinical radiation equipment. Pre: PHY 550 and PHY 552

*PHY 565 Photomedicine (3)
Interaction of light with matter, use of light in the diagnosis and treatment of diseases, physical principles of optical imaging with biomedical applications, photodynamic therapy. Pre: PHY 322 and PHY 331 or permission of instructor

Additional Matters for Approval

- College of the Environment and Life Sciences

Proposal for the consolidation of two Ph.D. programs and four M.S. programs in the College of the Environment and Life Sciences

The College of the Environment and Life Sciences currently offers a broad portfolio of M.S. and Ph.D. programs. This proposal focuses on changes to two of the Ph.D. graduate programs, Biological Sciences and Environmental Sciences, and four of the M.S. graduate degree programs, Biological Sciences; Cell & Molecular Biology; Environmental Sciences; and Fisheries, Animal & Veterinary Science. We propose the following changes to these two Ph.D. and four M.S. degree programs:
- the two existing Ph.D. degree programs, Biological Sciences and Environmental Sciences, would be consolidated to form one interdisciplinary Ph.D. program in Biological & Environmental Sciences (BES-Ph.D.);
- the four existing M.S. degree programs, Biological Sciences; Cell & Molecular Biology; Environmental Sciences; and Fisheries, Animal & Veterinary Science, would be consolidated to form one interdisciplinary M.Sc. program in Biological & Environmental Sciences (BES-MSc);
- both the M.Sc. and Ph.D. Biological & Environmental Sciences (BES) graduate degree programs would have four interdisciplinary areas of specialization – Cell & Molecular Biology (CMB), Integrative & Evolutionary Biology (IEB), Ecology & Ecosystem Sciences (EES), and Environmental & Earth Sciences (EVES).

Rationale. Research-based graduate programs in CELS should be organized on the basis of research and outreach strengths, critical mass of faculty, and common goals of graduate student training. Consolidation of the four M.S. and two Ph.D. programs described above into one interdisciplinary M.Sc., and one interdisciplinary Ph.D. program in Biological & Environmental Sciences, will broaden student perspectives
while training them in their specific disciplines, allow students to be part of a larger community of scholars with similar scientific interests, and stimulate interdisciplinary research that generates new knowledge and funding opportunities. The proposed M.Sc. and Ph.D. programs in Biological & Environmental Sciences include faculty from a diverse set of departments in CELS including Biological Sciences; Cell and Molecular Biology; Fisheries, Animal and Veterinary Science; Geosciences; Natural Resources Science; Nutrition and Food Sciences; and Plant Sciences; as well as faculty from the Graduate School of Oceanography. As such, the BES programs provide an opportunity for faculty to move across the traditional departmental boundaries when conducting their research and training their students; provide more opportunities for interdisciplinary research and graduate programs; allow more flexibility in the administration of graduate education and research within CELS, thus allowing faculty to take advantage of emerging research areas and funding opportunities in a timely and effective manner; and allow faculty participating in a given undergraduate degree program to train graduate students and conduct research in other areas.

Requirements. The program requirements for the M.Sc. and Ph.D. programs in Biological & Environmental Sciences (BES) are based on the M.Sc. and Ph.D. requirements specified by the Graduate Manual and are intended to allow flexibility in the design of individual programs of studies and promote interdisciplinary interactions between the various areas of specialization.

Implementation. The effective date for implementation would be Fall 2010. Students currently enrolled in the existing programs and students entering these programs in the 2010-2011 academic year would be given the option of completing the existing programs or transferring to the Biological & Environmental Sciences M.Sc. and Ph.D. programs. No additional resources are required for the implementation of these programs and there will be no impact on library resources.

Catalog Description of the Graduate Degrees:
Master of Science (MSc) and Doctor of Philosophy (PhD) in Biological & Environmental Sciences (BES)
The MSc and PhD in Biological & Environmental Sciences (BES) are interdisciplinary, interdepartmental graduate degrees that involve faculty from a diverse set of departments in CELS including Biological Sciences; Cell & Molecular Biology; Fisheries, Animal & Veterinary Science; Geosciences; Natural Resources Science; Nutrition & Food Sciences; and Plant Sciences, as well as faculty from the Graduate School of Oceanography. Contact information and a list of faculty in each of these departments are provided below. Students accepted into the MSc and PhD degree programs in Biological & Environmental Sciences are organized into graduate specialization groups that include Cell and Molecular Biology (CMB), Integrative and Evolutionary Biology (IEB), Ecology and Ecosystem Sciences (EES), and Environmental and Earth Sciences (EVES). These graduates specialization groups are described in more detail below, along with the admissions and degree requirements for MSc and PhD students in Biological & Environmental Sciences. Prospective students are encouraged to contact individual faculty to learn more about graduate research opportunities.

Departments in CELS that train graduate students in Biological & Environmental Sciences

Biological Sciences  401.874.2373, http://www.uri.edu/cels/bio/
Faculty: Professor Goldsmith, chair; Associate Professor Wilga, director of graduate studies. Professors, Bengtson, Bullock, Fastovsky, Kass-Simon, Killingbeck, Koske, A. Roberts, and Webb; Associate Professors Katz, Irvine, Norris, Seibel, and Wilga; Assistant Professors Lane, Preisser, and Thornber; Adjunct Professors Carlton, Deacutis, Fogarty, Henry, Lauder, Sanford, and Schneider; Adjunct Associate Professors Bailey, Cromarty, Ewanchuk, Gemma, Orwig, T. Roberts, and Thursby; Adjunct Assistant Professor Raposa; Professors Emeritus Albert, Beckman, Bibb, Caroselli, Cobb, Costantino, Goertemiller, Goos, Hammen, Harlin, Hauke, Hyland, Lepper, and Twombly; Associate Professor Emeritus Krueger; Research Professors Heppner and Hill.

Cell and Molecular Biology 401.874.2201, http://cels.uri.edu/cmb
Faculty: Professor Sperry, chair; Professor Nelson director of graduate studies. Professors Chandlee, Cohen, Hufnagel, Kausch, Paquette, and Sun; Associate Professor Martin; Assistant Professors Howlett and Jenkins; Research Professors A. de Groot, L. de Groot, and Spero; Research Assistant Professor Moise; Professors Emeritus Laux and Mottinger.

Faculty: Professor Bengtson, chair; Professor Gomez-Chiarri, director of graduate studies. Professors Bradley, Costa-Pierce, DeAlteris, Mallilo, Rhodes, and Rice; Assistant Professors Peterson and Sartini; Adjunct Professors Hoey, Klein-MacPhee, Musick, Serra, and Smolowitz; Adjunct Associate Professors Colwill and Hare; Adjunct Assistant Professors Brumbaugh, Castro, Dudzinski, Gleason, Hancock, Leavitt, Rheault, Petersson, Schwartz, and Wetherbee; Professor Emeritus Chang and Recksiek.

Geosciences 401.874.2265, http://uri.edu/cels/geo
Faculty: Associate Professor Veeger, chair; Associate Professor Boving, director of graduate studies. Professor and State Geologist Boothroyd; Professors Cain and Fastovsky; Assistant Professor Savage; Adjunct Professors Burks, Fischer, and Spiegelman.

Natural Resources Science 401.874.2495, http://www.nrs.uri.edu
Faculty: Professor Paton, chair; Professor Golet, director of graduate studies. Professors Amador, August, Forrester, Gold, Husband, McWilliams, Stolt, and Wang; Assistant Professors F. Meyerson and L. Meyerson; Adjunct Professors Lashomb, Paul, Perez, and Rockwell; Adjunct Associate Professors Abedon, Cerrato, Gorres, Groffman, Jarecki, Nowicki, and O’Connell; Adjunct Assistant Professors Bergondo, Buffum, Dabek, Daehler, Eisenbies, Eldridge, Farnsworth, Gayaldo, Hollister, Kellogg, McKinney, Milstead, Mitchell, Peters, Rubenstein, Saltonstall, Steele, and Tefft.

Faculty: Professor English, chair; Professor Greene, director of graduate studies. Professors Fey-Yensan, Lee, and Patnoad; Associate Professors Gerber and Melanson; Assistant Professor Lofgren; Adjunct Professor Sebelia; Adjunct Associate Professor Pivarnik.

Faculty: Professor Maynard, interim chair; Professor Mather, director of graduate studies. Professors Alm, Casagrande, LeBrun, Ruemmele, and Sullivan; Associate
Professors Englander and Mitkowski; Assistant Professor Brown; Professors Emeriti Beckman, Hull, and Jackson; Professor in Residence Ginsberg; Adjunct Assistant Professor Gettman.

**Graduate Specialization Groups**

**Cell and Molecular Biology (CMB):** this graduate research group focuses on the molecular basis of life offering solid foundations in biochemistry, microbiology, and molecular genetics with an emphasis on interdisciplinary training. Faculty research interests are diverse and include the molecular basis of microbial colonization and virulence; the biochemistry of cellular signaling; the molecular origins of cancer; the development of vaccines against infectious disease; the roles of microbial consortia in the marine environment; comparative and evolutionary genomics; the control of gene expression by endogenous and environmental signals; the genetics of marine organisms; the molecular biology and genetic modification of plants; agricultural biotechnology; and developmental gene regulation.

**Integrative and Evolutionary Biology (IEB):** this graduate group focuses on the diversity of form and function of organisms from evolutionary and physiological perspectives, as well as the application of these approaches to health, agriculture, and the environment. Faculty research interests are diverse and include animal science (including reproduction, nutrition, management and health), aquaculture (including ecology, physiology, nutrition and health), cellular and behavioral neurobiology (including sensory biology and neuroethology), evolutionary biology, genomics (comparative, evolutionary and marine), morphology and development (including functional morphology, biomechanics and evolutionary developmental biology), paleontology, physiology and pathology (including environmental, stress, reproductive and comparative physiology, endocrinology, aquatic pathology), plant biology, and human health.

**Ecology and Ecosystem Sciences (EES):** this graduate research group focuses on patterns and processes within and among populations, communities, and ecosystems. Faculty research interests are diverse and include ecological studies across the spectrum of biological organization (molecular, organismal, population, community, ecosystem, and landscapes) that focus on the intra- and interspecific interactions of microbes, algae, plants, insects, invertebrates and vertebrates that inhabit a variety of terrestrial, coastal, freshwater, and marine ecosystems. Much of this research addresses important environmental issues with implications for public policy such as the ecology of endangered species and habitats, the biological control of algal blooms, invertebrate pests, parasites and disease, anthropogenic nutrient enrichment and bioremediation, ecohydrology of coastal wetlands, landscape change, climate change, invasive species, fisheries, and habitat restoration.

**Environmental and Earth Sciences (EVES):** This graduate research group focuses on the history, function and condition of Earth’s environments from local to global scales. Faculty research interests encompass all aspects of the natural sciences including geology, biogeochemistry, hydrology, soil science, assessment of biodiversity, microbial ecology and global change. Most of this research uses combinations of geospatial data technologies, computer modeling, state-of-the-art analytical instruments and field investigations to advance our knowledge of Earth processes and the management of water resources, shorelines, wetlands, and
terrestrial landscapes to sustain healthy environments and to rehabilitate and restore damaged environments.

**Admission and Program Requirements Master of Science in Biological & Environmental Sciences (MSc in BES)**

*Admission Requirements*: Graduate Record Examination general test and a bachelor’s degree in a biological or physical science, natural resources science, math, engineering or other appropriate discipline. Applicants with course deficiencies may be required to take additional undergraduate courses for no program credit, and to demonstrate, by their performance in such course work or through a qualifying exam, basic knowledge of the subject matter in the area(s) of deficiency.

*Program requirements*: a minimum of 30 credits beyond the bachelor’s degree. This includes a minimum of 6 and a maximum of 9 thesis credits (599 courses), a minimum of 18 credits of formal course work, and a maximum of 6 credits in special problems and directed studies courses.

**Doctor of Philosophy in Biological & Environmental Sciences (PhD in BES)**

*Admission Requirements*: Graduate Record Examination general test and a bachelor’s degree in a biological or physical science, natural resources science, math, engineering or other appropriate discipline. Applicants with course deficiencies may be required to take additional undergraduate courses for no program credit.

*Program requirements*: a minimum of 72 credits of graduate study beyond the bachelor's degree (a master’s degree may count for up to 30 credits). At least 42 credits must be taken at University of Rhode Island. Required coursework and dissertation credits depend on the preparation and study plan of the individual student. All degree candidates are required to prepare a program of study in consultation with their major professor and doctoral committee. Written and oral comprehensive examinations and a defense of dissertation are required. A qualifying examination will be required for students who are admitted without a master’s degree and may be required for students whose prior degrees are outside of the proposed Ph.D. field of study.

*Indicates an item that was tabled from a previous meeting

- College of the Environment and Life Sciences (see PDF file version of full proposal on the March proposal web file)

*Consolidation of the Marine Affairs two Master’s degree programs*

The Department of Marine Affairs is submitting for your approval a change in our graduate program. This change is the result of an ongoing program review by the department. By a unanimous vote, the Department of Marine Affairs approved the attached proposed changes, which will consolidate our two existing Master degree programs into a single degree program.

**Proposal**: MAF currently offers two Master degree programs, the Master of Arts degree in Marine Affairs (MAF MA) and the Master of Marine Affairs (MAF MMA). The current proposal calls for the consolidation of these degree programs into one program, a Master of Arts in Marine Affairs (MA), and the establishment of two “tracks” within that program. One track represents the existing MAF MA program with the only
change being the creation of a non-thesis option in that track. This track is designed for individuals who have recently been awarded a Bachelor’s degree. The second track incorporates the degree requirements of the current MAF MMA program and is specifically designed for individuals with prior relevant work experience or a more extensive educational background. To enter this track, a student must satisfy one of the following conditions: possession of a graduate degree in a related area, possession of a Bachelor’s degree and five years of relevant professional experience, completion of one year at Roger Williams University Law School, or completion of the comprehensive examination in the Oceanography doctoral program. The two tracks share a common core curriculum and overall requirements, but do differ in the level of preparation and background of entering students, which in turn is reflected in the total number of credits required for each track.

**Rationale:** The Office of Higher Education has proposed consolidating degree programs. This proposal will consolidate degree programs that have the same core curriculum. The main difference between the two existing degrees is that MMA students have fewer course requirements because they are given course credit for prior relevant graduate work or if they have five years of work experience in a maritime area. To get a reduced credit load, a prospective student must have completed a graduate degree in a related field or have completed his or her comprehensive exam in the Oceanography doctoral program or his or her first year at Roger Williams Law School. MMA students take a total of 30 credits while MA students take 45 credits. The other difference is that MMA students take a comprehensive exam and complete a major paper while the MA students complete a thesis. This proposal, however, includes adding an option that allows MA students to take the comprehensive exam and complete a major paper instead of completing a thesis. This change will bring our graduate degree into line with our peer programs around the country. The addition of the non-thesis option will also eliminate this difference between the MMA and MA, leaving the course credit given for other relevant graduate work or work experience as the only difference between the two programs. Because the prior graduate work or work experience are proper substitutes for the additional coursework, there is no reason to distinguish between the degrees and, therefore, awarding a single degree with alternative tracks makes sense. Having two separate degrees is unnecessary and unnecessarily confusing for prospective students. Moreover, a single degree would be easier and more efficient to administer at the departmental, college and university levels.

**Implementation:** Students currently enrolled in the existing programs and those entering in fall 2010 will be given the option of completing the current programs or transferring to the proposed MAF MA program. No additional resources are required for implementation of the proposed changes and there should be no impact on the library.

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**2009-2010 catalog**

**Master of Arts (M.A.)**

*Admission requirements:* GRE and bachelor’s degree in related science or social science.
For international students, minimum TOEFL scores on the iBT as follows: Reading, 20, Writing 22, Listening 17, and Speaking 17 (total of 213 CBT or 550 PBT). Full-time applicants are admitted for the fall semester only.

Program requirements: thesis and MAF 482, 502, 577, 651; MAF 511 or appropriate oceanography substitute; EEC 514 or appropriate resource economics substitute; plus a minimum of 21 elective credits for a total of 45 credits.

Master of Marine Affairs (M.M.A.)
Admission requirements: (1) Individuals with a prior graduate degree or five years of equivalent experience in marine areas, or (2) law students in good standing who have completed one year of full-time study at Roger Williams University School of Law, or (3) students who have successfully completed the comprehensive examinations in the oceanography doctoral program may apply through the Graduate School. For international students, minimum paper TOEFL scores on the iBT as follows: Reading 20, Writing 22, Listening 17, and Speaking 17 (total of 213 CBT or 550 PBT). GREs are not required for admission to this program.

Program requirements: nonthesis program; EEC 514; MAF 577, 589, 651, 511 or appropriate oceanography substitute; plus 15 elective credits for a total of 30 credits; written comprehensive examination. Roger Williams School of Law students may transfer in up to six credits from that curriculum to meet the requirements of the M.M.A. degree. Students in the oceanography doctoral program may count up to six credits of courses taken for that degree toward the M.M.A. degree.

Language proposed for the 2010-2011 catalog

MARINE AFFAIRS
MA, PhD
401.874.2596

Faculty: (no change from current catalog p 149)

Specializations (No change from current catalog p 149)

Master of Arts (MA)
Admissions requirements: Applicants with a recent Bachelor’s degree are to provide GRE scores, transcripts, two or more letters of recommendation, and a personal statement. To earn the MA degree they are to complete a total of 45 credits of academic work. Applicants who have met any of the following conditions: holding a Master’s degree in a related field, having a Bachelor’s degree and five years of relevant professional experience, having successfully completed one year at Roger Williams University Law School, or having completed the comprehensive examination in the oceanography doctoral program may apply to the MA program by providing transcripts, two or more letters of recommendation, and a personal statement. Such students will be required to complete a total of 30 credits of academic work. For international students, minimum TOEFL scores on the iBT as follows: Reading, 20, Writing 22, Listening 17, and speaking 17 (total of 213 CBT or 550 PBT).

Program requirements: All students complete the following courses:
MAF 511 Ocean Uses and Marine Science (or appropriate oceanography substitute)
MAF 577 International Ocean Law
MAF 651 Marine Affairs Seminar
EEC 514 Economics of Marine Resources (or appropriate economics substitute)
In addition students requiring 45 credits for graduation complete MAF 482 Quantitative
Methods and MAF 502 Research Methods, a thesis or major paper, and additional courses that qualify for graduate credit including a minimum of four MAF classes. Students requiring 45 credits who elect to do a major paper (MAF 589) will also complete the written comprehensive exam. In addition, students requiring 30 credits for graduation complete a major paper, five additional Marine Affairs courses that qualify for graduate credit, and a written comprehensive exam. Roger Williams School of Law students may transfer up to six credits from that curriculum to meet the requirements of this degree. Students in the GSO oceanography doctoral program may count up to six credits of courses taken for that degree toward the Marine Affairs degree.

**Doctor of Philosophy** (as per current catalog p 149-150)

- College of Engineering

  **A Proposal for a Common Ph.D. in Engineering**

**A. GENERAL INFORMATION**

1. **Name of institution**
   University of Rhode Island

2. **Name of administrative unit**
   - College of Engineering
     - Department of Ocean Engineering (OCE)
     - Department of Civil and Environmental Engineering (CVE)
     - Department of Chemical Engineering (CHE)

3. **Title of proposed organizational unit**
   The organizational unit title is not being changed. A change from the existing College of Engineering Ph.D. degree titles to a common Ph.D. degree title is proposed as follows:

   - **Existing**
     - Doctor of Philosophy in Ocean Engineering
     - Doctor of Philosophy in Civil and Environmental Engineering
     - Doctor of Philosophy in Chemical Engineering
   - **Proposed**
     - Doctor of Philosophy in Engineering with Concentration in(program, subplan, etc.)

4. **Intended date of change**
   Initiation date: Fall 2009

5. **Intended location of organizational unit**
   - College of Engineering
     - CVE - Bliss Hall
     - OCE - Sheets Building
     - CHE - Crawford Hall
6. Description of institutional review and approval process
Departments
College
CAC/Graduate Council
Faculty Senate
President of the University

Approval Date
April 2, 2009  Signature attached
April 7, 2009  Signature attached

7. Summary description of the proposed organizational change
This document proposes a name change for the Ph.D. degrees in three departments in the College of Engineering to a common "Doctor of Philosophy in Engineering" degree as indicated in Item 3 above and described in Item B1 below.

8. Signature of the President

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Robert L. Carothers

9. Statement either that no new or additional resources are required or that compensatory reduction or reallocation of resources will take place if needed.
No new or additional resources will be required.

10. Person to contact during the review
Raymond M. Wright
Interim Dean
874-2186
wright@egr.uri.edu

11. Signed agreements for any cooperative arrangements made with other institutions/agencies or private companies in support of the program.
N/A

B. RATIONALE: There should be a demonstrable purpose and documented need for the proposed organizational change.

1. Explain why the organizational change is being proposed.
The faculty of the Departments of Civil and Environmental Engineering (CVE), Ocean Engineering (OCE), and Chemical Engineering (CHE) enthusiastically support the formation of a common Ph.D. in Engineering, with a degree title of "Doctor of Philosophy in Engineering". The consolidation of the three Ph.D. programs in CVE, OCE, and CHE will build on the existing synergies between the three departments in both curricula and research, forming a strong basis to enhance our Doctoral program.
The primary objectives of the common Ph.D. in Engineering are: a) to create interdisciplinary learning and discovery across different engineering disciplines, and b) to sustain vibrant research programs in high visibility, cutting edge research areas of national and international significance such as alternative energy, environmental water quality, advanced engineering materials, transportation, and mitigation of natural and man-made hazards. The common Ph.D. in Engineering was unanimously approved by the College of Engineering faculty during the April 7, 2009 faculty meeting.

This new common Ph.D. in Engineering will also serve as an umbrella for other existing programs within the College and also for future programs in new emerging research focus areas that cross traditional departmental boundaries, and even College boundaries. This new initiative provides the College of Engineering with an excellent opportunity to strengthen and expand graduate education and research within the College, something we are clearly very enthused about.

In addition, the new common Ph.D. in Engineering will provide the infrastructure for attracting new and broader extramural funding from large interdisciplinary programs such as those available through the National Science Foundation (IGERT - Integrative Graduate Education and Research Traineeship), the Department of Homeland Security (DHS) (Center of Excellence in Explosives Mitigation, Characterization and Detection which currently is in place at URI), Department of Defense (DOD), and other similar sources that sponsor graduate level research.

The existing Ph.D. programs from the three departments (CVE, OCE and CHE) when viewed together, combine for a total of 23 Doctoral candidates that are currently enrolled. This critical mass will be able to meet the graduation targets of the Office of Higher Education under the common Ph.D. in Engineering we are seeking. We anticipate having 10 to 13 new students enrolled in the common Ph.D. in Engineering, with 2 or 3 entering the CVE track, 4 or 5 in the OCE track, and 4 or 5 in the CHE track for the Fall 2009 semester. Additionally, we expect this trend to continue as interdisciplinary collaborative research activities continue to develop and expand in the College.

**Synergies of the New Common Ph.D. in Engineering**

The common Ph.D. in Engineering will build upon existing synergies between the three departments (CVE, OCE, and CHE). The goal is to improve both the efficiency and quality of the curricula and sponsored research activities. Degree candidates in the common Ph.D. in Engineering will be encouraged to take more interdisciplinary courses as we convert courses with broad appeal from the individual department course listings (OCE, CVE, CHE) to common College of Engineering level course listings (EGR). Courses that have already been identified as potential candidates for new EGR status are listed below. In several cases, these courses already exist as cross-listed courses between two departments, which highlights their interdisciplinary nature. In addition, other courses are being considered for the future.

- Introduction to Data Collection Systems (OCE 560)
• Advanced Corrosion (CBE/OCE 534)
• Advanced Materials Engineering (CBE/OCE537)
• Process Engineering for Pollution Prevention (CRE 576)
• Numerical Methods (CVE 596)
• Finite Element Analysis (CVE 551)
• Seabed Geotechnics (OCE/CVE 582)
• Advanced Foundation Engineering (CVE/OCE 583)
• Experimental Geomechanics (CVE/OCE 581)
• Ceramic Engineering (CRE 532)
• Bionanotechnology (CBE 550)

The common Ph.D. in Engineering will provide synergy in focus areas of research across the three departments, the College, and other URI Colleges. These focus areas include alternate energy, environmental water quality, hazard mitigation, and transportation materials. There is already considerable expertise in these areas that cuts across individual departments and Colleges. The common Ph.D. in Engineering will facilitate coordinated efforts to expand extramural funding in these and other high visibility, cutting edge research areas of national and international significance.

C. INSTITUTIONAL ROLE: The organizational change should be clearly related to the published role and mission of the institution and be compatible with the organizational structure of the institution

1. Explain how the organizational change is consistent with published role and mission of institution and how it is related to institutional planning.

The common PhD in Engineering is consistent with the role and mission of the institution. In the recent vision statement of the University a prominent distinctive strengths identified is engineering and the physical sciences. There is a strong desire at the institution to combine programs and faculty to increase the program's strength of and also to provide greater opportunities for degree candidates at the Doctoral level. The approach proposed herein will accomplish this.

D. INTERINSTITUTIONAL CONSIDERATIONS: The organizational change should be consistent with all policies of the Board of Governors pertaining to the coordination and collaboration between public institutions of higher education.

1. Estimate the projected impact of the organizational change on the other public higher education institutions in Rhode Island (e.g., loss of students or revenues), provide a specific rationale of the assumptions make in the projections, and indicate the manner in which the other public institutions were consulted in developing the projections.

There will be no specific impact on other institutions of higher education.

2. Describe any cooperative arrangements with other institutions relative to the organizational unit. (Signed copies of any agreements pertaining to the use of faculty, library, equipment, and facilities should be attached.)
There are no cooperative arrangements with other institutions.

**E. EVALUATION:** Criteria which can be used in the future to evaluate the success of the organizational change should be proposed.

1. **Describe the process and the criteria by which the organizational change will be monitored and periodically evaluated.**

   The Doctor of Philosophy in Engineering degree will be reviewed by the College of Engineering, the Department of Civil and Environmental Engineering (CVE), Ocean Engineering (OCE), and Chemical Engineering (CHE) and the BGHE on a regular basis. Evaluation criteria include but are not limited to:
   
   a) Student enrollment,
   b) Students graduating from program,
   c) Effectiveness in attracting sponsored research,
   d) Increased synergies between College of Engineering programs,
   e) Increased synergies between the College of Engineering and other URI Colleges, and
   f) Other assessment/evaluation metrics that are needed as the program develops and prospers.

- **College of Engineering**

  **A Proposal for a New Doctoral Program in New Department of Mechanical, Industrial & Systems Engineering**

  **Overview**

  At the end of the last academic year, the departments of Mechanical Engineering & Applied Mechanics (MCE) and Industrial & Systems Engineering (ISE) merged to form a new single department Mechanical, Industrial & Systems Engineering (MCISE). As part of this merger, we now wish to have the two individual doctoral programs that previously existed in each department combined into a single PhD program with two appropriate tracks. Each track would represent the areas of research in each of the two original groups. We feel that this new doctoral structure will create more synergy and allow additional opportunities for joint multidisciplinary research and educational activities. The goal will be to create a program with more research, students and completions than the simple sum of the previous individual parts. The initial overall structure of the new combined department will maintain the existing pairs of bachelor's and master's degree programs, and at the current time we wish to only make changes in the doctoral programs. A graphic of this structure is shown below. Future plans may explore other degree program combinations.

  This document then specifically requests the following two actions, which must be done jointly.

  1. Drop the two existing doctoral programs in Mechanical Engineering and Industrial and Systems Engineering.
2. Create a new doctoral program in *Mechanical, Industrial, and Systems Engineering* with the two tracks: *Mechanical Engineering*, and *Industrial and Systems Engineering*.

**Doctoral Admission and Degree Requirements of the New Program**

Listed below are the admission and degree requirements of the two new doctoral tracks. It should be pointed out that most of these requirements are the same as those of the previously existing PhD programs.

**Admission Requirements - Mechanical Engineering Track**

Applicants are normally expected to have a previous master's degree in a closely related engineering field. A direct PhD program is also available for exceptional students with only a bachelor's degree or superior master's candidates. GRE and TOEFL are required only of international applicants except under a previous specific university partnership agreement. TOEFL is waived for applicants with a previous degree from institutions using English as the primary language of instruction.

**Admission Requirements - Industrial and Systems Engineering Track**

M.S. degree in engineering, mathematics, physics, chemistry, computer science, or management science. Applicants may be required to take courses that are prerequisites to specific courses required for completion of the program. Prerequisite course credits would not be counted as program credits. Although a person with a bachelor's degree may be admitted, this program is designed principally for people who have a master's degree. GRE required for graduates of non-U.S. universities except under specific university partnership agreement.

**Doctoral Degree Requirements (42 Credits with previous MS Degree)**

**Course Work Requirements**

A minimum of 24 credit hours of course work beyond the Master's degree (exclusive of graduate seminar for mechanical engineering students) are required. Three credits of course work must be taken outside of the student's area of specialization, and approval of this course lies with the student's doctoral committee. Mathematics or computer science courses are normally not considered as outside of any student's area of specialization. All full-time mechanical engineering students are required to register and attend the Graduate Seminar courses, MCE 501/502 each semester of residency. Additional course work may also be required as a result of the candidacy review (see below). A minimum of 18 credits of doctoral dissertation are to be taken under MCE/ISE 699.

**Candidacy Review**

All students pursuing a Ph.D. shall undergo a *doctoral candidacy review* after they have completed their first year of full-time study or 9-12 credits of course work for those in a part-time program. The purpose of this review is to determine the candidate's initial progress toward the doctorate. Such a first-year review is to be conducted jointly by the department's Graduate Committee and the student's advisor, and will evaluate both the student's coursework and any beginning research activity. Coursework will be evaluated through review of the candidate's transcripts and
instructor comments. Research activity shall be evaluated through a prepared statement from the candidate and from advisor and/or other faculty input.

Results of the review shall indicate one of the following:

Suitable Progress - qualifying the candidate to continue doctoral studies to complete coursework and pursue the comprehensive examination.

Marginal Progress - suggesting that the candidate needs additional program work to strengthen areas of perceived weakness. The review committee will provide specific details on such additional work.

Unsuitable Progress - indicating unlikely potential for degree completion and recommendation that the candidate be dropped from the doctoral program. The Department Graduate Studies Director shall be responsible to organize, schedule and chair the review meeting and to report the results to the student and Graduate School. Normally the candidate will not be required to attend or participate at the meeting.

Doctoral Committee
A doctoral committee must be established for each Ph.D. candidate. This committee consists of at least three faculty members (including the major professor), and one member must be from another department. This committee should be selected after the first semester of full-time course work (or after 6-9 credits of part-time study), and will supervise the candidate's entire program of study.

Comprehensive Examination
All Ph.D. candidates must take and pass a comprehensive examination normally taken either during their final semester of course work or during the semester following. The examination shall consist of the following two parts:

Written Part
The written portion of the comprehensive exam shall consist of the development of a detailed research proposal dealing with the student's anticipated dissertation work. This written document shall address new work to be done and will consist of the following sections:

2. Formulation of the Proposed Study.
3. Preliminary Analysis or Designs Related to the Research.
4. Required Facilities.
5. New and Original Contributions to Be Made.

The student will be expected to independently produce a well-written document which clearly demonstrates their ability to do research. The preparation of this document shall be conducted over a fixed time period (normally about one month) established by the major professor. This proposal should be submitted to an evaluation committee composed of the student's doctoral committee plus one extra member selected by the student's advisor. This written comprehensive examination committee shall review the proposal, and based upon this review, the doctoral committee shall determine whether the proposal is acceptable. The student's major professor shall be responsible to distribute the proposal, collect the review results and forward the final result to the
Graduate School. Note that this document is not the same as the thesis proposal required by the Graduate School.

Oral Part
The oral part of the comprehensive examination shall be given only upon successful completion of the written portion. The student should take the oral portion soon after completing the written exam (normally within four weeks). The oral exam shall be approximately two hours in length. The candidate will first be expected to give a brief (20 minute) presentation of their proposed doctoral research. This will be followed by questions from the examining committee dealing with the proposed research and prior course work. The oral examining committee shall be constructed following the University Graduate Student Manual-Section 7.57.1.2.

Dissertation Research Requirements
A dissertation is required for all Ph.D. candidates. A minimum of 18 credit hours under MCE/ISE 699 are accepted for the dissertation research program. However, additional credits may also be taken appropriate to any remaining research to be completed. The number of credit hours given each semester is variable and is determined in consultation with the major professor. A thesis/dissertation proposal must be prepared, which outlines the proposed research, and this should be done at the beginning of the research activity. The proposal should be approved by the major professor and the doctoral committee before submittal to the graduate school. A written dissertation document and a formal dissertation defense is required. Details concerning the dissertation proposal and preparation may be found at the Graduate School's web site.

Direct Ph.D. Program
Students with exceptional records holding only a bachelor's degree can apply for a direct doctoral program. Superior Masters candidates can also apply for the direct Ph.D., and for such students approval into the program will automatically include successful completion of the doctoral candidacy review as outlined previously. The requirements for this program are essentially the same as for a regular Ph.D., except that the master's thesis requirement is waived. A minimum of 72 credits are required that would include 45-48 credits of course work. Twelve of these credits may be at the 400 level. The remaining 24 - 27 credits would then be taken as doctoral dissertation under MCE/ISE 699.

*Indicates an item that was tabled from a previous meeting

V. New Business

A. Review policy of deleting graduate courses not offered for two years and not scheduled for the third year.

VI. Old Business
VII. Adjournment