



1-24-2002

## Graduate Council Minutes - January 24, 2002

Graduate Council

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## Graduate Council Minutes- January 24, 2002

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### MINUTES

January 24, 2002

#### Members Present

Albrecht, Blackwell, Bowers, Clement, K. Davis, W. Davis, DeGennaro, Frymier, Gaylord, George, Hamilton, Hammer, Harden, Lofaro, Mayhew, Morton, Moussa, Ohnesorg, Phillips, Rogge, Schroedl, Tompkins, Townsend, Upadhyaya.

The Graduate Council was called to order at 3:00 p.m. in the Board Room, 8th Floor Andy Holt Tower, by Dean Anne Mayhew.

#### 1. Minutes of the Preceding Meeting

The minutes of the December 6, 2001 Graduate Council meeting were approved as distributed.

#### 2. Committee Reports

##### · Academic Policy

Dr. Wayne Davis presented the report of the Academic Policy Committee from the January 10, 2002 meeting.

Graduate Council approved the following recommendations as presented by the Academic Policy Committee:

##### Final Examination For Thesis and Problems in Lieu of Thesis.

· Change the following statement on Page 21, 2nd column under Final Examination for Thesis and Problems in Lieu of Thesis,

“This examination *should* [DELETE- must] be scheduled through the *academic department* [DELETE-Office of Graduate Student Services ] at least *two* [DELETE-one] weeks prior to the examination.”

Effective Date: Spring 2002

##### Final Examination For Non-Thesis Students and Final Examination for Specialist in Education Students.

· Revise the statement on Page 21, 3rd column under Final Examination for Non-Thesis Students, and on Page 22, 2nd column under Final Examination for Specialist in Education Students, to read,

“This examination should be scheduled through the academic department at least two weeks prior to the exam.”

Effective Date: Spring 2002

The committee also recommended that a new section entitled Graduation be created and included in the Graduate

Catalog. The section would describe the procedures for submission of the graduation application form. This graduation application form will provide a checklist of graduation requirements.

Time Limit and Removal of Incomplete Grades, as described on page 18 of the Graduate Catalog:

“The instructor, in consultation with the student, decides the terms for the removal of the ‘I,’ including the time limit for removal. If the ‘I’ is not removed within one calendar year, the grade will be changed to an ‘F.’”

Effective Date: Fall 2002

· Appeals

There was no report.

· Credentials

The report on faculty applications to direct doctoral dissertations was presented during Closed Session.

· Curriculum

Dr. Paul Frymier (Chair) reviewed the curricular items as presented in the agenda. Council voted unanimously to approve the recommendations as reported in [Appendix](#).

· Graduate Deans Group

Dean Fred Tompkins gave the report from the Graduate Deans Group from their January 10, 2002 meeting. That group discussed graduate student recruitment, an important issue for the university. The group will continue to study this issue and will begin gathering information on the goals and strategies of each college and department.

· Graduate Student Association

Mr. Nathan Hammer, President of GSA, presented a report on the GSA ‘Love Your Libraries’ 5K Run and Fun Walk, which will be held on February 16, 2002. Funds from the event will be donated to the University Libraries to enhance the serials collection. He also reported on changes in the Graduate Student Travel Program, indicating that the Dean of Graduate Studies is working with the Dean of Students and GSA to improve the program and offer more funding.

· Professional Development

Dean Mayhew reported that funds were still available for proposals for professional development funds. She indicated that faculty summer salaries will not be awarded as part of this process.

3. Other Business

Dean Mayhew reported that the Graduate Student Services Office will move to 440 Communications Building, effective January 31, 2002.

She also noted that the Hooding Ceremony for doctoral degrees granted in Spring 2002 will be held in the Thompson-Boling Arena on Friday, May 10, 2002, at 7:00 p.m.

### CLOSED SESSION

Dr. Kathleen Davis (Chair) presented the report from the Credentials Committee. The following faculty members were recommended for initial approval to direct doctoral dissertation research:

Chris Dealwis	Biochemistry Cellular & Molecular Biology	Until tenure decision
Aileen Nonis	Instructional Technology, Curriculum & Evaluation	Until tenure decision
Gary W. Rogers	Animal Science	Until tenure decision
Michael Waugh	Instructional Technology, Curriculum & Evaluation	Until tenure decision

Graduate Council approved the report.

The next meeting of the Graduate Council will be held on Thursday, March 7, 2002, at 3:00 p.m. in the Board Room, 8th Floor, Andy Holt Tower. Agenda items are due by noon on February 13, 2002.

The Graduate Council was adjourned at 4:00 p.m.

Respectfully submitted,

Kay Reed, Secretary to the Council

## **APPENDIX GRADUATE COUNCIL 24 January 2002**

### **COLLEGE OF AGRICULTURAL SCIENCES AND NATURAL RESOURCES**

The College of Agricultural Sciences and Natural Resources, the Tennessee Agricultural Experiment Station, and UT Agricultural Extension Service have undergone major reorganization of units over the years.

- In 1964, the Experiment Station Departments of Entomology and Plant Pathology were combined and named the Department of Agricultural

Biology. In 1980 it was renamed the Department of Entomology and Plant Pathology.

- Also in 1964, the Department of Forestry was formed out of the Department of Horticulture.
- In 1972, the Institute of Agriculture underwent major reorganization resulting in the elimination of the Department of Animal Husbandry, Department of Dairying, Department of Poultry, Department of Horticulture, and Department of Agronomy. At the same time, the Department of Animal Science, Department of Ornamental Horticulture and Landscape Design, and Department of Plant and Soil Sciences were created. Also, the food processing activities of four departments -- Animal Husbandry, Dairying, Poultry, and Food Technology -- were combined to form the new Department of Food Science and Technology.
- In 1986, the agricultural education program was transferred from the College of Education to the College of Agriculture and combined with the Department of Agricultural Extension to become the new Department of Agricultural and Extension Education.
- **Effective July 1, 2001, the Departments of Agricultural and Biosystems Engineering, Ornamental Horticulture and Landscape Design, and Plant and Soil Sciences were reorganized into two departments: Biosystems Engineering and Environmental Science (BEES), and Plant Sciences and Landscape Systems (PSLS).** This reorganization was approved at the June 2001 UT Board of Trustees meeting.

Recent departmental restructuring was the first step in laying the groundwork to develop new research emphases as well as updated degree programs and strategies for increasing enrollment and retention of undergraduate and graduate students. The departmental restructuring was necessitated by evolution and changed directions of the different disciplines involved. With the reorganization of the three departments into two, course designations and curricula changes are necessitated due to reorganization of faculty.

The faculty will be discussing reorganization of the graduate programs in Ornamental Horticulture and Landscape Design and Plant and Soil Sciences during the 2001-2002 academic year. The soils faculty members in the former Department of Plant and Soil Sciences will continue to participate in and assist with the management of the graduate programs of their former department. The Plant and Soil Sciences Master and Doctoral Programs now become interdepartmental programs.

The changes in the department name, faculty list, program, and some courses are necessitated by the reorganization of the department (revised lists and introductory paragraphs have been provided to the

Graduate School). Changes listed below reflect changes resulting from reorganization (inserting text in the Department of Biosystems Engineering and Environmental Science indicating participation in the PSS graduate program listed under the Department of Plant Sciences and Landscape Systems) and the renaming and renumbering of 400-level courses offered for both graduate and undergraduate credit. Changes regarding the 500- and 600-level graduate courses of the former Plant and Soil Sciences Department, and revisions to the OHL and PSS graduate programs will be submitted at a later date.

## **ANIMAL SCIENCE**

Add:

**696 Seminar (1)** Advanced topics in animal science. Required of all first- and second-year Ph.D. students. May be repeated. Maximum 2 hrs.  
Sp

Revise description, repetition, and system of grading:

**596 Seminar (1)** Advanced topics in animal science. Required of all first- and second-year MS students. May be repeated. Maximum 2 hrs.  
Sp  
(Formerly S/NC or letter grade.)

Effective Fall 2002

## **BIOSYSTEMS ENGINEERING AND ENVIRONMENTAL SCIENCE (BEES)**

Insert the following as the second paragraph of the introduction to the department:

An interdepartmental graduate program in Plant and Soil Sciences is jointly offered by the Biosystems Engineering and Environmental Science Department and the Plant Sciences and Landscape Systems Department. This program offers the Master of Science and Doctor of Philosophy degrees. See the Department of Plant Sciences and Landscape Systems for major courses offered and a description of degree requirements. Subject to approval of the student's graduate committee and program faculty involved, some exceptions to the specific course requirements may be allowed. However, any exception must be consistent with the University requirements and the overall objectives of the degree program.

Revise degree requirements for the M.S. and Ph.D. degree programs with majors in Biosystems Engineering and Biosystems Engineering Technology to drop the reference to 504 and add 507 for the doctoral

program in the last column of page 51 and the first column of page 52. Catalog copy will read:

### **Biosystems Engineering**

Biosystems Engineering 507 (1), 505 (1), and other major subject courses

### **Biosystems Engineering Technology**

#### **Thesis Option:**

Biosystems Engineering Technology 507 (1), 505 (1), and other major subject courses

#### **Non-Thesis Option:**

Biosystems Engineering Technology 507 (1), 505 (1), and other major subject courses

### **THE DOCTORAL PROGRAM**

Seminar (507, 505 or equivalent courses)

Insert the following text regarding the Plant and Soil Sciences Master's program at the bottom of page 51, immediately following the non-thesis option for Biosystems Engineering Technology.

### **Plant and Soil Sciences**

The Environmental and Soil Sciences faculty in the Department of Biosystems Engineering and Environmental Science participate in the Plant and Soil Sciences Master's degree program offered jointly by the Department of Biosystems Engineering and Environmental Science and the Department of Plant Sciences and Landscape Systems.

Change heading at the top of page 52, column 1 to:

### **THE DOCTORAL PROGRAM**

### **Biosystems Engineering**

Remaining text on page 52 about the doctoral program is unchanged.

Copy the text presented on page 174 of the 2001-2002 Graduate Catalog, and insert at the end of the doctoral program in Biosystems Engineering description as it appears on page 52.

Revise program description to reflect changes in departments.

### **Plant and Soil Sciences**

The environmental and soil sciences faculty in the Department of

Biosystems Engineering and Environmental Science participate in the Plant and Soil Sciences doctoral program.

A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the major in one or more cognate areas. Major courses include those in: Plant and Soil Sciences, Environmental and Soil Sciences, Integrated Plant Systems and Ornamental Horticulture and Landscape Design.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and an cognate fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

See the Department of Plant Sciences and Landscape Systems for additional details and additional major courses offered.

## **Biosystems Engineering**

Add for graduate credit:

**411 Mechanical Systems Engineering (3)** Fundamentals of power delivery systems and simple mechanisms; selection and design of mechanical, hydraulic, and tractive power transmission systems. Off-road vehicles and bioprocessing systems. Prereq: 431, Engineering Science 231 Dynamics, Engineering Science 321 Mechanics of Materials. 2 hrs and 1 lab. Sp

**421 Natural Resource Engineering (3)** Introduction to hydrologic cycle: movement of water and interaction with environment through such processes as erosion and contaminant transport. Impacts through estimation and measurement, and controlling impacts through engineering design. Specific designs: waterways, erosion and sediment control structures, waste management systems, irrigation systems, and hydrologic monitoring systems. Prereq: 321 Fluid Mechanics, Environmental and Soil Sciences 210 Introduction to Soil Science, Civil Engineering 390 Hydraulics or Engineering Science 341 Fluid Mechanics. 2 hrs and 1 lab. F

**431 Bioprocessing Engineering (3)** Application of basic engineering principles to processing and handling of biological materials: physical, chemical, biological properties; materials handling; material conversion operations; drying; heat processing; and bioprocessing. Prereq: 321 Biothermodynamics, Heat and Mass Transfer or equivalent. 2 hrs and 1 lab. F

**441 Life Systems Engineering (3)** Design of controlled environments to optimize conditions for organism growth and development: growth equations and population dynamics; plant growth systems; microbial growth systems; animal growth systems; biotechnological applications. Prereq: 321 Biothermodynamics, Heat and Mass Transfer, Mathematics 231 Differential Equations I. 2 hrs and 1 lab. Sp

Drop for graduate credit:

**403 Machine and Component Design (3)**

**423 Irrigation and Waste Management System Design (3)**

**430 Mobile Hydraulic Power System Design (3)**

**433 Bioprocess System Design and Analysis (3)**

Drop:

**504 Professional Development Seminar (1)** (Same as Biosystems Engineering Technology 504.)

Biosystems Engineering is primary subject.

**Biosystems Engineering Technology**

Add:

**574 Environmental Instrumentation and Monitoring (3)** Equipment and techniques commonly used to measure all aspects of hydrologic cycle: precipitation, runoff, streamflow, subsurface water movement. Sampling of all flows for contaminants. Design of monitoring systems. Analysis of data. Prereq: Environmental and Soil Sciences 324 Soil and Water Conservation, Statistics 201 Introduction to Statistics, Mathematics 152 Mathematics for the Life Sciences II, or consent of instructor. (Students cannot receive credit for both 474 Environmental Instrumentation and Monitoring and 574.) 2 hrs and 1 lab. Sp

Revise description and prerequisite:

**514 CAD Applications to Biosystems Engineering (3)** Computer Aided Drafting (CAD) applications in agriculture and environmental science. Essentials of CAD software to create drawings of components, systems, flow charts, and process diagrams. Applications in mechanical,

structural, and biosystems. 2D applications with limited exposure to 3D applications. Computer intensive course. Hands-on experience. Prereq: Computer proficiency and admission to graduate program. (Students cannot receive credit for both 414 CAD Applications to Biosystems Engineering and 514.) Two 2-hr labs. F

Drop:

**504 Professional Development Seminar (1)** (Same as Biosystems Engineering 504.)

Biosystems Engineering is primary subject.

## **Environmental and Soil Sciences**

Add new course prefix in Environmental and Soil Sciences (ESS) and designate course prefixes for 400-level soils courses below.

Revise course prefix and number:

**442 Soil Genesis and Classification (3)**

(Formerly: **Plant and Soil Sciences 412**)

Revise course prefix, number and prerequisites:

**434 Environmental Soil Chemistry (3)** Prereq: Soil science and organic chemistry or equivalent.

(Formerly: **Plant and Soil Sciences 413**)

Revise course prefix, number, title, description and prerequisites:

**481 Capstone in Environmental and Soil Sciences (3)** Integrative course in which students work individually and collaboratively to develop solutions for soil and water related environmental problems. Writing and oral communication emphasis course. Prereq: 434 and senior standing.

(Formerly: **Plant and Soil Sciences 414 Soil, Land Use and the Environment**)

**444 Environmental Soil Physics (3)** Basic understanding of soil physical properties and processes; practical experience in measurement and analysis of soil physical properties; methods of analysis related to agricultural, environmental, and engineering issues. Prereq: 210 Introduction to Soil Science and Physics 221 Elements of Physics or equivalent. 2 hrs and 1 lab. Sp

(Formerly: **Plant and Soil Sciences 415 Soil Hydrology**)

**462 Environmental Climatology (3)** Study of atmosphere as environment. Physical, chemical and biological factors affecting climates of various earth environments; meteorological process affecting biosystems. Climatic change and the human impact on the atmosphere,

consequences of climatic change and mitigation policies, microclimates and urban climates, atmospheric pollution, extreme events and ozone depletion. Design and operation of weather information systems; automated weather stations. Prereq: Agriculture and Natural Resources 290 Computer Applications to Problem Solving or equivalent.  
(Formerly: **Plant and Soil Sciences 432 Bioclimatology**)

Effective Fall 2002

## **FORESTRY, WILDLIFE AND FISHERIES**

### **Wildlife and Fisheries Science**

Add:

**546 Advanced Habitat Analysis (2)** Habitat analysis as tool to evaluate habitat use and predict occurrences of animal and plant species: principles and goals of modeling, habitat analysis theory, GIS and statistical techniques. Use of computer programs. Prereq: Forestry, Wildlife and Fisheries 410 or Geography 411 or consent of instructor. Sp, A

Revise course title and description:

**545 Advanced Population Analysis (2)** Detail characteristics, assumptions, goals, methods, and current technologies for fish and wildlife population analysis. Use of computers. Prereq: Animal Science 571 or Statistics 538 or consent of instructor. Sp, A  
(Formerly: **Population and Habitat Analysis**)

Effective Fall 2002

## **PLANT SCIENCES AND LANDSCAPE SYSTEMS (PSLS)**

Insert the following as the introductory paragraph to the department:

The Plant Sciences and Landscape Systems Department offers graduate programs leading to the Master of Science and the Doctor of Philosophy degrees with a major in Plant and Soil Sciences and a Master of Science degree with a major in Ornamental Horticulture and Landscape Design. Concentrations in the Plant and Soil Sciences programs include soil science, plant breeding and genetics, and crop physiology and ecology. Concentrations in the Ornamental Horticulture and Landscape Design program include landscape design, turfgrass, woody ornamentals, and public horticulture. Various interests may be emphasized in any of these commodity areas, including micropropagation, innovative production and maintenance systems, and molecular biology, genetics, histology and stress physiology of ornamentals.

Drop concentration in floriculture under the M.S. degree program with a major in Ornamental Horticulture and Landscape Design, and move requirements for the M.S. degree program with a major in Ornamental Horticulture and Landscape Design to the new department.

Revise degree requirements to reflect the new course changes.

## **Ornamental Horticulture and Landscape Design**

### **Degree Requirements**

2. Successful completion of 12 hours of coursework in Ornamental Horticulture and Landscape Design and Integrated Plant Systems at the graduate level (400 or above), exclusive of Ornamental Horticulture and Landscape Design 500, 502, and 503. Two of these hours must be 590. Six of these hours may be satisfied by Botany 412, 521, 522, Plant and Soil Sciences 532, Plant Sciences and Landscape Systems 471, Animal Science 571, Ecology and Evolutionary Biology 520, or Information Sciences 560, Human Resource Development 521, 522, 562, Art 481, or Geography 439.

Revise requirements in the Master of Science degree program with a major in Plant and Soil Sciences, as it appears on page 174, to reflect dropping PSS 509 (approved at June 21, 2001 Graduate Council meeting) and to clarify course numbers:

### **Thesis Option**

Six hours of Plant and Soil Sciences 500 Thesis are required. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required. At least 14 of these hours must be taken in courses numbered 501 and above. The student must take at least 12 of the 24 hours in Plant and Soil Sciences courses, excluding 500. The student's committee may require additional coursework beyond the 24 hours if the student's progress or background indicates a need or deficiency. All students pursuing the M.S. degree must take Plant and Soil Sciences 503 Seminar (1 hr) and 511 Soil-Plant Relations (3 hrs). The student must also present an exit seminar to the Department over the research project.

### **Non-Thesis Option**

In addition to three hours of Plant and Soil Sciences 593, a minimum of 30 hours of graduate coursework is required. At least 20 hours must be taken in courses 501 or above. The student must also take at least 12 of the 30 hours in Plant and Soil Sciences courses, excluding Thesis 500. The student's committee may require additional coursework beyond the 30 hours if the student's progress or background indicates a need or deficiency. All students must take Plant and Soil Sciences 503 Seminar (1 hr) and 511 Soil-Plant Relations (3 hrs).

Revise description of the doctoral program to reflect changes in departments.

## **Plant and Soil Sciences**

A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the major in one or more cognate areas. Major courses include those in: Plant and Soil Sciences, Environmental and Soil Sciences, Integrated Plant Systems and Ornamental Horticulture and Landscape Design.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and an cognate fields, direct the research, and recommend the dissertation for approval and acceptance by The Graduate School.

See the Department of Biosystems Engineering and Environmental Science for additional details and additional major courses offered.

## **Integrated Plant Systems**

Add new course prefix in Integrated Plant Systems (IPS) and designate course prefixes for 400-level courses below.

Revise course prefix:

### **433 Agricultural Pesticides (3)**

(Formerly: **Plant and Soil Sciences 433**)

### **440 Advanced Turfgrass Management (4)**

(Formerly: **Ornamental Horticulture and Landscape Design 440**)

Revise course prefix and prerequisites:

**431 Physiology and Ecology in Agroecosystems (3)** Prereq: Crop science. 2 hrs and 1 2-hr lab. F

(Formerly: **Plant and Soil Sciences 431**)

**434 Fruit and Vegetable Crops (3)** Prereq: 230 Introduction to Crop Science.

(Formerly: **Plant and Soil Sciences 434**)

**435 Field and Forage Crops (3)** Prereq: 230 Introduction to Crop Science.

(Formerly: **Plant and Soil Sciences 435**)

**453 Principles of Plant Breeding (3)** Prereq: Plant Sciences and Landscape Systems 471 and general genetics.

(Formerly: **Plant and Soil Sciences 453**)

### **Ornamental Horticulture and Landscape Design**

Revise course number and prerequisites:

**435 Public Garden Operations and Management (3)** Prereq: 326 Public Horticulture.

(Formerly: **528**)

Revise course number, description and prerequisites:

**427 Management and Administration of Public Horticulture Institutions (3)** Management of resources in non-profit institutions, support organizations and communities. Theoretical framework and institutional mission; strategic planning and programming; financial accounting and budgeting; development and fund raising; personnel policies; volunteer development; marketing and publicity; legal issues; relationships between staff and governing boards; the use of information technology in management and governance systems; and conservation/preservation roles in community development. Prereq: 326 Public Horticulture. F

(Formerly: **527**)

Revise prerequisites:

**410 Nursery Management and Production (3)** Prereq: 220 Basic Landscape Plants, 330 Plant Propagation, and Environmental and Soil Sciences 210 Introduction to Soil Science, or consent of instructor. 2 hrs and 1 lab. Sp

**429 Field Study of Public Horticulture Institutions (3)** Prereq: 326 Public Horticulture. Application and travel fee required. Sp

**450 Specialty Landscape Construction (3)** Prereq: 350 Basic Landscape Construction. F

**460 Professional Practices in Landscape Construction and Management (2)** Prereq: 350 Basic Landscape Construction or consent of instructor. F

**480 Advanced Landscape Design (3)** Prereq: 280 Fundamentals of Landscape Design and 380 Supplemental Landscape Design Graphics. 2

3-hr labs. Sp

**485 Computer Aided Landscape Design (3)** Prereq: 280 Fundamentals of Landscape Design, 380 Supplemental Landscape Design Graphics, Agriculture and Natural Resources 290 Computer Applications to Problem Solving. 2 3-hr labs. F, Sp

**494 Professional Horticultural Communications (3)** Prereq: Agriculture and Natural Resources 290 Computer Applications to Problem Solving and senior standing.

**521 Flowering Physiology (1)** Prereq: Introductory plant physiology or equivalent. 3 hrs weekly for 5 weeks. Sp,A

**522 Stress Physiology (1)** Prereq: Introductory plant physiology or equivalent. 3 hrs weekly for 5 weeks. Sp,A

Drop for graduate credit:

**426 Public Horticulture (3)**

### **Plant and Soil Sciences**

Revise prerequisites:

**511 Soil-Plant Relationships (3)** Prereq: Environmental and Soil Sciences 434 or Integrated Plant Systems 431 or general plant physiology. 3 hrs and 1 rec. F,A

**512 Pedology (3)** Prereq: Environmental and Soil Sciences 442 or consent of instructor. 2 hrs and 1 lab. Sp,A

**513 Advanced Soil Chemistry (3)** Prereq: Environmental and Soil Sciences 434 or consent of instructor. Sp,A

**514 Advanced Soil Physics (3)** Prereq: Calculus III, Environmental and Soil Sciences 444, or consent of instructor. Sp,A.

**516 Soil Biology and Biochemistry (3)** Prereq: Soil science. 2 hrs and 1 3-hr lab. F,A

**532 Environmental Crop Physiology and Ecology (3)** Prereq: Integrated Plant Systems 431. 2 hrs and 1 lab. Sp,A

**551 Organismal Plant Genetics (3)** Prereq: General genetics, Plant Sciences and Landscape Systems 471 or equivalent, F,A

**553 Plant Breeding Technologies (3)** Prereq: Plant Sciences and Landscape Systems 471 and general genetics. Sp,A

**653 Advanced Plant Breeding (4)** Prereq: 571 and Integrated Plant Systems 453 or equivalent or consent of instructor. 3 hrs and 1 lab. Sp,A

### **Plant Sciences and Landscape Systems**

Add new course prefix in Plant Sciences and Landscape Systems (PSLS) and designate course prefixes for 400-level courses below.

Revise course prefix and prerequisites:

**471 Statistics for Biological Research (3)** Prereq: Calculus.  
(Formerly: **Plant and Soil Sciences 471**)

Effective Fall 2002

## **COLLEGE OF ARTS AND SCIENCES**

### **ART**

Revise statement for GRADUATE MINOR IN THE HISTORY OF ART on page 61 of the 2001-2002 Graduate Catalog, 2<sup>nd</sup> column, to state course requirements. Catalog copy will read:

A graduate minor in Art History may be arranged during the student's first semester of study with the consent of the student's area instructors, the Art History faculty and the Graduate School. Students must complete a minimum of 12 hours in Art History that is agreed upon by the Art History faculty after review of previous undergraduate coursework. A reading knowledge of French, German, or Italian is a prerequisite, *unless waived by the Art History faculty. Graduate School policy stipulates that a member from the minor unit must serve on the thesis committee.*

Effective Fall 2002

### **AUDIOLOGY AND SPEECH PATHOLOGY**

Add concentration in aural habilitation for the Master's degree program with majors in Audiology and in Speech Pathology on page 64 of the 2001-2002 Graduate Catalog. Add the following paragraph to the end of the program description immediately before THE DOCTORAL PROGRAM:

Graduate students in both Audiology and Speech Pathology may elect to pursue a concentration in the area of aural habilitation. Admission to the aural habilitation concentration is competitive and applications will be processed during the first year of graduate school. The concentration requires: (1) Three semesters of clinical practicum in treatment of children who have hearing-impairments, totaling a minimum of 130 clock hours, and (2) completion of 6 hours of graduate level courses in

language, audiology, and/or aural habilitation. Specific requirements are outlined in the Graduate Handbook for Audiology and Speech-Language Pathology, as well as on the Departmental website (<http://web.utk.edu/~aspweb/>).

Add for graduate credit:

**435 Introduction to Speech Sound Disorders (3)** Etiology, diagnosis, and treatment of articulatory and phonological disorders. Prereq: 300 Introduction to Communication Disorders, 305 Phonetics, or consent of instructor.

Add:

**558 Phonological Disorders (3)** Current theories and approaches to assessment and intervention for individuals with difficulty acquiring or using speech sound system of English. Prereq: 435 or equivalent or consent of instructor.

Revise title and prerequisite:

**473 Introduction to Audiologic Assessment (3)** Prereq: 303 Introduction to Hearing Science.  
(Formerly: **Audiology II**)

Revise prerequisite:

**431 Stuttering (3)** Prereq: 300 Introduction to Communication Disorders or consent of instructor.

**433 Observation of Clinical Practice (1)** Prereq: 320 Speech and Language Development or consent of instructor.

**440 Voice Disorders (3)** Prereq: 300 Introduction to Communication Disorders, 306 Anatomy and Physiology of Speech, or consent of instructor.

**494 Aural Habilitation/Rehabilitation of the Hearing Impaired (3)** Prereq: 305 Phonetics and 473 or equivalents or consent of instructor.

**504 Appraisal of Speech and Language Disorders (3)** Prereq: 300 Introduction to Communication Disorders, 305 Phonetics, and 433 or equivalents or consent of instructor.

**522 Seminar in Articulation and Phonological Processing Disorders (3)** Prereq: 435 or equivalent or consent of instructor.

**523 Seminar in Voice Disorders (3)** Prereq: 440 or consent of instructor.

**540 Structural Speech Disorders (3)** Prereq: 306 Anatomy and Physiology of Speech and 435.

**595 The Verbotonal System: Auditory/Speech Perception (3)**  
Prereq: 305 Phonetics, 473, and 494 or equivalents or consent of instructor.

**661 Advanced Seminar: Language Disorders in Children (3)**  
Prereq: 561 or consent of instructor.

Drop:

**565 School-Age Language Disorders (3)**

Effective Fall 2002

## **BIOCHEMISTRY AND CELLULAR AND MOLECULAR BIOLOGY**

Add and cross-list:

**612 Advanced Topics in Environmental Toxicology (1-3)** (Same as Ecology and Evolutionary Biology 612)  
Ecology and Evolutionary Biology is primary subject.

Revise credit hours:

**403 Advanced Genetics Laboratory (3)**  
(Formerly: **(2)**)

Drop:

**604 Current Topics in Environmental Toxicology (1)** (Same as Ecology and Evolutionary Biology 604)  
Ecology and Evolutionary Biology is primary subject.

Effective Fall 2002

## **BOTANY**

Revise name of concentration in taxonomy to systematics for the M.S. and Ph.D. degree programs with a major in Botany.

Add concentration in molecular biology for the M.S. and Ph.D. degree programs with a major in Botany.

Add for graduate credit and cross-list:

**419 Science as Method (3)** (Same as Ecology and Evolutionary Biology

419 and Philosophy 419.)

Ecology and Evolutionary Biology is the primary subject.

Effective Fall 2002

## **ECOLOGY AND EVOLUTIONARY BIOLOGY**

Add for graduate credit and cross-list:

**419 Science as Method (3)** Dynamic process of scientific discovery. Comparisons of science, nonscience, pseudoscience, successful and unsuccessful science. Ethics of scientific research, philosophical aspects of scientific enterprise, and implications for teaching and writing about science. Prereq: Introductory science or philosophy course, or consent of instructor. (Same as Botany 419 and Philosophy 419.) Ecology and Evolutionary Biology is primary subject.

Add:

**512 Foundations: Readings in Conservation Biology (2)** Readings and discussion of classic papers in field.

**514 Foundations: Readings in Mathematical and Computational Ecology (2)** Readings and discussion of classic papers in field.

**602 Advanced Topics in Ecological Process and Structure (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in ecological process and structure. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

**603 Advanced Topics in Evolutionary Biology (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in evolutionary biology. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

**606 Advanced Topics in Conservation Biology (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in conservation biology. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

**609 Advanced Topics in Comparative Animal Behavior (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in animal behavior. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

**610 Advanced Topics in Mathematical, Theoretical and Computational Ecology (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in mathematical, theoretical, and computational ecology. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

**611 Advanced Topics in Organismal Biology (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in organismal biology. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs.

Add and cross-list:

**546 Ethological Psychology (3)** (Same as Psychology 546.)  
Psychology is primary subject.

**612 Advanced Topics in Environmental Toxicology (1-3)** Exposure and in-depth training in contemporary topics and approaches important to advanced research in environmental toxicology. Consult departmental listing for offerings. May be repeated with consent of department. Maximum 9 hrs. (Same as Biochemistry and Cellular and Molecular Biology 612.)  
Ecology and Evolutionary Biology is primary subject.

Revise prerequisites:

**470 Aquatic Ecology (3)** Prereq: Chemistry 120-130 General Chemistry, Biology 250 General Ecology.

**484 Conservation Biology (3)** Prereq: Biology 240 General Genetics, 250 General Ecology.

Drop:

**505 Basic Concepts in Organic Evolution (3)**

**507 Basic Concepts in Ecology (3)**

**513 Foundations: Readings in Behavior (1-2)**

**601 Advanced Topics (1-3)**

**604 Current Topics in Environmental Toxicology (1)** (Same as Biochemistry and Cellular and Molecular Biology 604.)  
Ecology and Evolutionary Biology is primary subject.

Effective Fall 2002

## ENGLISH

Add a creative writing dissertation as an option to the traditional dissertation for the Ph.D. degree program with a major in English. On p. 105 of the 2001-2002 Graduate Catalog, 3<sup>rd</sup> column, 1<sup>st</sup> paragraph of text, add the following sentence at the end of the paragraph.

The Department also offers a creative writing dissertation option in the doctoral program.

Effective Fall 2002

## **GEOGRAPHY**

Revise description of Master's Program to state prerequisite requirements on page 115 of the 2001-2002 Graduate Catalog, 3<sup>rd</sup> column. Catalog copy will read:

The department offers the thesis and non-thesis options for the Master of Science. Both options require a minimum of 30 semester hours beyond the completion of a sound undergraduate major program. The M.S. program requires students to have background in quantitative methods equivalent to the course content of Geography 415, and some familiarity with key themes and approaches in both physical and human geography. At least two-thirds of the total hours in the degree program must be at or above the 500 level and must include 501 (at each offering during residency), 504, and 3 semester hours at the 600 level. In the thesis option, 6 hours must be Thesis 500. A final examination is required in both programs.

Revise description of doctoral program to state more explicitly the requirements for collateral fields. In the 2001-2002 Graduate Catalog, page 115, 3<sup>rd</sup> column, under THE DOCTORAL PROGRAM, 1<sup>st</sup> paragraph, revise the 5<sup>th</sup> and 6<sup>th</sup> sentences to read:

A minimum of 9 semester hours must be earned in collateral fields, with courses selected for their relevance to the special fields. Ph.D. students whose Master's level work was in a field other than geography and for whom the Master's area remains close to their Ph.D. specialty areas may petition to substitute geography units in courses outside of their specialty areas for up to 3 of the 9 required outside units. Competency in quantitative methods and basic human and physical geography is required.

Revise prerequisites:

### **411 Computer Mapping and Geographic Information Systems (3)**

Prereq: 310 Introduction to Cartography or consent of instructor. (Same as Information Management 431.)

Geography is primary subject.

**415 Quantitative Methods in Geography (3)** Prereq: Mathematics 115 Statistical Reasoning or Statistics 201 Introduction to Statistics or consent of instructor.

Delete prerequisites:

**421 Geography of Folk Societies (3)**

**423 Geography of American Popular Culture (3)**

**449 Geography of Transportation (3)**

Revise description and delete prerequisites:

**441 Urban Geography of the United States (3)** Concepts and theories concerning development and significance of systems of cities and internal morphology of cities in the United States. Writing emphasis course. (Same as Urban Studies 441.)  
Geography is primary subject.

**443 Rural Geography of the United States (3)** Geographical appraisal of rural areas of the United States, including small towns and urban fringes. Problems and potentials of rural America. Writing emphasis course.

Effective Fall 2002

## **GEOLOGICAL SCIENCES**

Revise list of courses required for the Master's program to offer additional selections. On p. 117 of the 20012002 Graduate Catalog, 2<sup>nd</sup> Column, under the MASTER'S PROGRAM heading, revise # 3 to read:

3. Sixteen hours of geology courses, with at least 14 hours at the 500 or 600 level, including at least one course from any three of the following five groups:

Group 1: 410, 460, 475, 480, 530, 563, 565, 568.

Group 2: 420, 421, 450, 545, 546, 550, 556, 557.

Group 3: 470, 570, 572, 575, 576.

Group 4: 401, 455, 485, 510, 521, 535, 585, 586.

Group 5: Any 400- or 500-level courses with graduate credit from related departments (allied sciences, mathematics, and engineering), selected with approval of the advisor.

Revise prerequisites for the doctoral program. On p. 117 of the 20012002 Graduate Catalog, 2<sup>nd</sup> Column, under the DOCTORAL PROGRAM heading, revise first paragraph to read:

The prerequisite for the Ph.D. program, in addition to that for the M.S.

program, is either a Master's degree in Geology, or a Bachelor's degree plus completion of 24 hours of graded coursework with at least one course from any three of the groups listed in #3 above. These courses may be taken while completing other course requirements.

Effective Fall 2002

## HISTORY

Revise description of doctoral program to drop required hours outside the department. In the 2001-2002 Graduate Catalog, page 122, 1<sup>st</sup> column, under THE DOCTORAL PROGRAM, Residence and Coursework, delete #2, revise remaining numbers and revise #8 to read:

8. Complete 24 hours of graduate coursework (21 hours graded A-F) at UT beyond that required for the M.A. Up to 6 hours may be taken outside of the department.

Revise title in Group III on page 122 in the 2001-2002 Graduate Catalog, 2<sup>nd</sup> column, under Doctoral Fields, to read:

Group III (Examined Teaching Field):

World History

Western Civilization

U.S. Civilization

Revise title and description:

**511 Teaching World History (3)** Methodology, conceptualization, historiography, text-book selection and syllabus construction to prepare students to teach courses in world history.  
(Formerly: Teaching World Civilization)

Drop for graduate credit:

**415 Western Economic Thought Since the 18<sup>th</sup> Century (3)** (Same as Economics 415.)  
History is primary subject.

Effective Fall 2002

## INTERDISCIPLINARY PROGRAMS

### Legal Studies

Drop for graduate credit:

**424 Psychology and Law (3)** (Same as Psychology 424.)

Psychology is primary subject.

## **Urban Studies**

Revise description and delete prerequisites:

**441 Urban Geography of the United States (3)** (Same as Geography 441.)

Geography is primary subject.

Effective Fall 2002

## **MATHEMATICS**

Add for graduate credit:

**403 Mathematical Methods for Engineers and Scientists (3)** Matrix computations, numerical methods, partial differential equations, Sturm-Liouville Theory and special functions used in engineering and science. Does not satisfy major requirements for a B.S. or M.S. in mathematics. Prereq: 231 Differential Equations I, 241 Calculus III, and familiarity with operating system and programming language.

Effective Fall 2002

## **MUSIC**

### **Music Ensemble**

Add a general statement directly under Music Ensemble in the 2001-2002 Graduate Catalog, page 160, 3<sup>rd</sup> column to read:

Prerequisite: By audition or consent of instructor.

### **Music History**

Revise title:

**585 Topics in Music of the Americas (3)**  
(Formerly: **Topics in North American Music**)

### **Music Keyboard**

Add for graduate credit:

**480 Teaching Class Piano (3)** Historical survey and evaluation of teaching materials and methodology for college and/or adult beginning piano classes, with collateral teaching experience. Prereq: Consent of instructor.

**490-491 Internship (2,2)** Opportunity for pedagogy students to gain experience in teaching beginning students under supervision of experienced instructors. Weekly discussion seminars.

Add:

**560 Organ Literature Seminar (3)** Topics vary. May be repeated. Maximum 6 hrs.

Effective Fall 2002

## PHILOSOPHY

Revise the doctoral program to increase total course hours from 27 to 33. In the 2001-2002 Graduate Catalog, page 170, 3<sup>rd</sup> column, under THE DOCTORAL PROGRAM, the first paragraph will read:

Students must hold an M.A. with a major in Philosophy or an equivalent degree when entering the Ph.D. program. Thirty-three hours of coursework beyond the M.A. are required, of which 6 hours will be in courses numbered above 600. See the Philosophy Department Graduate Student Handbook for specific course requirements.

Add for graduate credit and cross-list:

**419 Science as Method (3)** (Same as Ecology and Evolutionary Biology 419 and Botany 419.) Ecology and Evolutionary Biology is primary subject.

Effective Fall 2002

## PHYSICS

Revise names of concentrations for the M.S. and Ph.D. degree programs with a major in Physics from atomic and low temperature physics to atomic, molecular, optical and low temperature physics, from molecular spectroscopy to mathematical and computational physics, and from nuclear physics to nuclear and relativistic heavy ion physics. Revise list of opportunities for study at UTSI. In the 2001-2002 Graduate Catalog, page 172, 1<sup>st</sup> column, 1<sup>st</sup> and 2<sup>nd</sup> text paragraphs will read:

Graduate programs leading to the Master of Science and Doctor of Philosophy are offered in a number of concentration areas: astrophysics; atomic, molecular, optical and low temperature physics; biophysics; chemical physics; condensed matter and surface physics; elementary particle physics; geophysics (Master's only); health physics (Master's only); mathematical and computational physics; nuclear and relativistic heavy ion physics; and theoretical physics.

Departmental graduate programs leading to the M.S. and Ph.D. are also available at The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in laser applications, quantum and applied optics, laser spectroscopy, fluid physics, medical physics, computational physics, and theoretical physics. For additional information, contact the department head.

Revise statement on admission requirements to encourage applicants to submit scores from the GRE and to rename examination given at beginning of first term. In the 2000-2001 Graduate Catalog, page 172, under ADMISSION REQUIREMENTS, 3<sup>rd</sup> paragraph will read:

In addition to meeting the graduate schools minimum requirements, applicants are strongly encouraged to submit scores from the Graduate Record Examination (general and subject).

All first-year graduate students are required, for advising purposes only, to take a diagnostic examination in undergraduate physics during the fall semester registration period.

Revise the M.S. degree program with a major in Physics to include two new courses as options for required course selections and to add a project option along with the thesis and non-thesis options. In the 2001-2002 Graduate Catalog, page 172, 2<sup>nd</sup> column, THE MASTER'S PROGRAM description will read:

### **Thesis Option**

The course requirements include 24 semester hours of physics courses, of which at least 12 hours are taken from Physics 511-12 or 513-14, 521-22, 531-32, 541-42, or 571-72. Each candidate must present an acceptable thesis, 6 hours of 500, and pass an oral examination on course material and thesis.

The department offers an M.S. thesis program with a concentration in geophysics. Program requirements are: 12 hours from Physics 513-14, 531-32, 541-42, 571-72; a minimum of 12 additional hours in geology, geophysics, and/or physics, as approved by the student's committee; and the presentation of an acceptable thesis, 6 hours of Physics 500, and the passing of an oral examination on course material and thesis.

### **Project Option**

The course requirements include a minimum of 30 semester hours of graduate credit in courses composed of Physics 506, 511-12; 6 hours from Physics 593, 594 for a Project in Lieu of Thesis; 9 hours from general physics: 411-12, 421, 431-32, 461-62, 507, 508, 521-522, 531-32, 541-42, 555, 571-72 (at least 3 hours above the 500 level); and 6 hours from a single minor field outside of the physics department, such as computer science, mathematics, engineering, chemistry, biology,

education, business, or law.

The candidate must pass an oral examination on course material and on the Project representing the culmination of an original research project completed by the student. A written report must be approved and accepted by the Physics Graduate Committee and the Department Head. An electronic version of the written report must also be submitted to the permanent electronic archive of the Physics Department available to the Internet.

### **Non-Thesis Option**

Students seeking the non-thesis option must apply to the department's graduate committee for permission to enroll under this program. The requirements are the satisfactory completion of 30 semester hours of coursework composed of 18 hours from Physics 511-12 or 513-14, 521-22, 531-32, 541-42, and 571-72; 6 hours in a minor field; and 6 hours from other courses numbered above 400 (preferably of advanced laboratory nature.) At least 20 hours must be taken at the 500-level or above. In addition, the candidate must pass a written examination administered by his/her committee.

Revise the Ph.D. degree program with a major in Physics to update course requirements and clarify requirements and examinations. In the 2001-2002 Graduate Catalog, page 172, 2<sup>nd</sup> column, THE DOCTORAL PROGRAM description will read:

All students are expected to take the graduate core curriculum in physics consisting of the following courses: Physics 521-22, 531, 541, 551, and 571. Students concentrating in chemical physics may substitute Chemistry 572 for Physics 551, and should complete at least 6 semester hours from Chemistry 570, 571, 670. Students must take a minimum of 15 hours of 600-level courses, with 6 of these hours in their concentration area. Physics 601-02 are normally required of students concentrating in atomic physics; Physics 621-22 of students in nuclear physics; Physics 626-27 of students in elementary particle physics (and/or Physics 613-14 for students concentrating in theoretical physics); and Physics 671-72 of students in condensed matter and surface physics.

To be admitted to Ph.D. candidacy students must: a) fulfill all general requirements by the Graduate School, b) pass the qualifying examination, c) have at least a 3.0 GPA on the graduate core curriculum in physics, d) form a doctoral committee and e) pass the comprehensive examination.

The qualifying examination is designed to test the student's general knowledge of the fundamentals of physics. The performance needed to pass this examination corresponds to a mature command of the material typically included in the undergraduate physics major curriculum. The qualifying examination should be passed after the student's first year of

study. Based on the student's performance on a) the qualifying examinations, b) the coursework, c) the GRE scores and d) optional research participation, the faculty will decide if the student will be allowed to continue in the Ph.D. program.

Students are required to find a research advisor and form a doctoral committee before the end of the second year of study. This committee is responsible for advising the student and monitoring his/her progress toward the doctoral degree.

The comprehensive examination is designed to test the student on a) specific knowledge and skills in the areas essential to the student's research program, b) capability to successfully complete the doctoral dissertation and c) general knowledge of the graduate core curriculum. The most essential component of this examination is the presentation and defense of an original research proposal. The comprehensive examination must be passed before the end of the third year of study. It contains both a written and an oral component and is conducted by the student's doctoral committee and an additional faculty member appointed by the department head.

The dissertation topic will be chosen with reference to one of the fields in which research facilities can be made available either at The University of Tennessee laboratories in Knoxville; The University of Tennessee Space Institute at Tullahoma, Tennessee; the Oak Ridge National Laboratory, Oak Ridge, Tennessee; or at other research facilities used by the University faculty.

## **Astronomy**

Revise prerequisite:

**411 Astrophysics (3)** Prereq: Physics 136 Introduction to Physics for Physical Science and Mathematics Majors, or 138 Honors Fundamentals of Physics for Physics Majors, or 222 Elements of Physics, or 232 Fundamentals of Physics: Wave Motion, Optics, and Modern Physics, and consent of instructor.

## **Physics**

Add:

**503 Physics Colloquium (1)** Lectures and discussion on current research topics. Continuous registration required for current graduate students. May be repeated. Maximum 6 hrs. S/NC only. E

**513 Problems in Theoretical Physics I (3)** Fundamentals of physics: classical mechanics (Newtonian mechanics, Lagrangian and Hamiltonian dynamics) and electrostatics and magnetostatics.

**514 Problems in Theoretical Physics II (3)** Fundamentals of physics: electrodynamics, relativity, and quantum mechanics.

Revise title, description and prerequisite:

**601-602 Atomic Physics (3,3)** 601—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 602—Advanced problems for students specializing in field. (Formerly: **Advanced Atomic Physics**)

**621-622 Nuclear Physics (3,3)** 621—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 622—Advanced problems intended for students specializing in the field. (Formerly: **Nuclear Structure**)

**642 Advanced Topics in Modern Physics (3)** Advanced theoretical or experimental topics not covered in other courses. May be repeated with consent of department. Maximum 9 hrs. (Formerly: **Advanced Topics in Quantum Theory**)

Revise description and prerequisite:

**511-512 Theoretical Physics (3,3)** Concepts and applications in applied physics. Topics: one-body, two-body and rigid body dynamics, ideal fluid, small oscillations and waves, elements of special relativity, electrostatic and magneto-static problems, EM waves, duality and quantization, absorption and emission, statistical ensemble and thermal equilibrium, and other modern applications of current interest, in areas of quantum chemistry, biophysics, optics, spectroscopy, and astrophysics. Recommended background: Familiarity with computational methods.

**521-522 Quantum Mechanics (3,3)** Fundamental principles of quantum mechanics, angular momentum, electron spin, particles in electric and magnetic fields, perturbation theory, variational methods, scattering theory; second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation. Application of quantum mechanics to problems of atomic, molecular, nuclear, and solid state physics. Prereq for 522: 521

**531 Classical Mechanics (3)** Variational formulation, Lagrange's and Hamilton's equations, constraints, canonical transformations, Hamilton-Jacobi theory and action-angle variables.

**541-542 Electromagnetic Theory (3,3)** 541—Review of electrostatics, magnetostatics, and quasi-static problems; Maxwell's field equations and their solutions in dielectric and conducting media; electrodynamics and relativity, retarded potentials and gauge transformations, radiation produced by accelerating charges. 542—Advanced treatment of

Electrodynamics, collisions between charged particles, bremsstrahlung, multipole fields. Topics may vary according to interest of students and instructor. Prereq or coreq for 541: 571. Prereq for 542: 541.

**611 Advanced Quantum Mechanics and Field Theory (3)** Survey of problems and methods. Topics of current interest. Intended for all graduate students.

**613-614 Quantum Field Theory (3,3)** Modern formulation of quantum field theory and its applications: perturbative methods, renormalization, gauge theories (QED, the standard model, GUTs and their supersymmetric extensions), string theory and quantum gravity.

**626-627 Elementary Particle Physics (3,3)** 626—Survey of elementary particle physics: experimental methods, conservation laws, invariance principles, and models of interactions. Intended for all graduate students. 627—Advanced topics intended for students specializing in field: quark models, electroweak interactions and unification of elementary forces.

**671-672 Advanced Solid State Physics (3,3)** 671—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 672—Advanced problems intended for students specializing in field.

Revise description:

**532 Advanced Classical Mechanics (3)** Advanced topics in classical mechanics, KAM theorem and Hamiltonian chaos, dissipative chaos. Topics may vary according to interest of students and instructor. Prereq: 531.

Drop:

**574 Group Theory for Physicists (3)**

**641 Advanced Topics in Classical Theory (3)**

Effective Fall 2002

## **POLITICAL SCIENCE**

Revise the M.P.A. degree program with a major in Public Administration to indicate the desired minimum GRE score. In the 2001-2002 Graduate Catalog, page 176, 1<sup>st</sup> column, revise the last sentence of the 2<sup>nd</sup> paragraph to read:

In addition, a composite score of 1100 on the verbal and quantitative parts of the GRE is desired.

Revise the M.P.A. degree program with a major in Public Administration to update the required courses. In the 2001-2002 Graduate Catalog, page 176, 1<sup>st</sup> column, 4<sup>th</sup> paragraph, revise 1 (a) to read:

a. General perspectives (9 hours) - 550 Public Administration; 552 Organization Theory; and any one of the following: 442 Administrative Law; 539 State and Local Government; 540 Public Law; 548 Public Policy Process; 558 The Politics of Administration; or 566 Ethics, Values, and Morality in Public Administration.

Revise the Dual J.D.-M.P.A. degree program with a major in Public Administration to update the required courses. In the 2001-2002 Graduate Catalog, page 176, 2<sup>nd</sup> column, under DUAL J.D.-M.P.A. PROGRAM, Curriculum subheading, 1<sup>st</sup> paragraph, next to last sentence, revise to read:

All candidates for the dual degree must successfully complete Administrative Law (Law 821).

Add for graduate credit:

**451 Ethnic Conflict in Foreign Countries (3)** Examination of political and violent conflict among ethnic and national groups and challenges these conflicts pose for democratic and democratizing states.

Effective Fall 2002

## **PSYCHOLOGY**

Revise total number of hours from 30 to 32 for the master's program with a major in Psychology. In the 2001-2002 Graduate Catalog, page 178, 2<sup>nd</sup> column, under Program Requirements, revise to read:

All students must complete 32 semester hours of graduate level courses in psychology. These hours must include 515, 521-22, or Statistics 531-32 or an equivalent sequence; 565 or 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses; plus additional graduate level hours to reach the 32-hour requirement. Students must earn a grade of B or better in all courses that are to count toward the 32-hour total. Students must also propose, conduct and successfully defend an original piece of research in the form of a master's thesis.

Revise the doctoral program with a major in Psychology, concentration in experimental psychology, to correct the course numbers for statistics. In the 2001-2002 Graduate Catalog, page 178, revise to read:

1. Twelve hours of statistics and research (521-22 or Statistics 531-32 or

equivalent and 6 additional hours in research methods or design).

Revise the doctoral program with a major in Psychology, concentration in clinical psychology, to delete the non-clinical course requirement, remove the duplicate requirement, and correct the course numbers for statistics. In the 2001-2002 Graduate Catalog, page 179, revise to read:

4. i. Analysis of Variance for Social Sciences (521) and Multiple Regression for Social Sciences (522);

Delete:

5. Satisfactory completion of a one-year clinical internship at a site approved by the program (Same as #8.)

7. Satisfactory completion of at least 3 additional graduate-level courses in non-clinical topics in psychology.

Add:

**521 Analysis of Variance for Social Sciences (3)** Analysis of variance and statistical theory: application within social science framework. Contrasts among means, trend analysis, analysis of covariance, analysis of factorial designs, and multivariate approaches to analysis of within subjects data.

**522 Multiple Regression for Social Sciences (3)** Complexities of regression analyses and theory: application within social science framework. Bivariate correlation and regression, multiple regression, analysis of variable sets, interactions among continuous predictors, reducing co-linearity between main effects and application of multiple regression to testing procedures of mediation and moderation.

Revise to add cross-listing:

**546 Ethological Psychology (3)** (Same as Ecology and Evolutionary Biology 546.)  
Psychology is primary subject.

Revise to delete cross-listing:

**424 Psychology and Law (3)** (Same as Legal Studies 424.)  
Psychology is primary subject.

Revise prerequisite:

**526 General Vertebrate Neuroanatomy (3)** Prereq: 461 or equivalent and consent of instructor.

Effective Fall 2002

## **THEATRE**

Revise credit hours:

**547 Painting and Dyeing for the Theatre (3)**  
(Formerly: **(2)**)

Revise description:

**401 Principles of Theatrical Design (3)** Visual and structural relationships in theatrical design.

Delete prerequisite:

**425 Selected Musical Theatre Techniques (2)**

Effective Fall 2002

## **COLLEGE OF BUSINESS ADMINISTRATION**

### **BUSINESS ADMINISTRATION**

#### **Business Administration**

Revise course number, title, credit hours and description:

**521-22-23-24 Business Core for Master of Accountancy I, II, III, IV (3,3,3,3)** Information and management tools for use in value-added decision-making. Active, team learning exercises to demonstrate best practice approaches. Assessment and delivery of customer value, corporate and financial strategy, financial statement analysis, supply chain issues, lean manufacturing, legal issues and other topics. Sequence culminates in business simulation. Prereq: Admission to M.Acc. program. (Formerly: **502-03 Business Core for Master of Accountancy I, II (3-6, 3-6)**)

#### **Information Management**

Revise prerequisite:

**431 Computer Mapping and Geographic Information Systems (3)**  
(Same as Geography 411.)  
Geography 411 is primary subject.

Effective Fall 2002

## **ECONOMICS**

Drop for graduate credit:

## **415 Western Economic Thought Since the 18<sup>th</sup> Century (3)** (Same as History 415.)

History is primary subject.

Effective Fall 2002

## **FINANCE**

Revise MBA concentration requirements to reflect changes in courses. Catalog copy will read:

Minimum course requirements are three courses: 511 plus two from the following: 512, 525, 532, 581, and 599 (Torch Fund only).

Revise course number, title, description and prerequisite:

### **525 Investment Analysis and Portfolio Management (3)**

Investment process, portfolio applications. Asset allocation decision in global setting; organization and functioning of financial markets; equity and bond valuation; asset valuation models; equity and bond portfolio management; options, forwards and futures contracts; evaluation of portfolio performance; and review of alternative economies and emerging markets. Prereq: 511 and Business Administration 511, 512, 513, and 514, or consent of instructor.

(Formerly: **522 Portfolio Analysis and Management**)

Revise course title, description and prerequisite:

### **511 Strategic Management for Creation of Financial Value (3)**

Strategic issues in corporate finance, investments, and capital markets: how firms can employ financial strategies to create value. Use of derivatives, risk management, real options, fixed income securities, venture capital, initial public offerings and financial restructuring. Prereq: Business Administration 511, 512, and 513, or consent of instructor.

(Formerly: **Issues in Finance**)

Revise prerequisite:

**512 Problems in Financial Management (3)** Prereq: 511 and Business Administration 511, 512, 513, and 514, or consent of instructor.

**532 Commercial and Investment Banking (3)** Prereq: 511 and Business Administration 511, 512, 513, and 514, or consent of instructor.

**551 Financial Management of a New Enterprise (3)** Prereq: 511 and Business Administration 511, 512, 513, and 514, or consent of instructor.

**581 Real Estate Investment and Finance (3)** Prereq: 511 and Business Administration 511, 512, 513, and 514, or consent of instructor.

Drop:

## **510 Contemporary Concepts and Methods in Finance (6)**

Effective Fall 2002

### **MANAGEMENT**

Revise description:

**541 Operations Management (3)** Techniques applicable to design of systems in operations planning and control in manufacturing and service industries. Modeling real-world systems through problem definition, supporting data structure design, model design, solution, implementation, and maintenance.

Revise prerequisite:

**540 Logistics and Operations Management (3)** Prereq: Business Administration 511, 512, and 513 or consent of instructor. (Same as Logistics and Transportation 510.) Management is primary subject.

Drop:

## **542 Operations Management II (3)**

Effective Fall 2002

### **MARKETING, LOGISTICS AND TRANSPORTATION**

#### **Logistics and Transportation**

Revise course number and prerequisite:

**546 Logistics and Supply Chain Strategy (3)** Prereq: 510 and Business Administration 511, 512, 513, and 514.  
(Formerly: **506**)

**547 Global Logistics and Supply Chain Management (3)** Prereq: 510 and Business Administration 511, 512, 513, and 514.  
(Formerly: **507**)

**549 Logistics and Supply Chain Analytical Techniques (3)** Prereq: 510 and Business Administration 511, 512, 513, and 514.  
(Formerly: **509**)

Revise prerequisite:

**510 Logistics and Operations Management (3)** (Same as Management 540.)

Management is primary subject.

Drop:

**504 Logistics and Supply Chain Operations (3)****508 Executive-in-Residence Seminar in Logistics and Transportation Strategy (3)****Marketing**

Revise course number, title, description and prerequisite:

**530 MBA Marketing Concentration (6)** Product management: Complex, interdisciplinary nature of product development and product management. Strategic issues during product life cycle, from idea conception to product development to commercialization to eventual product dismissal. Integrated communications: Strategies and tactics associated with communicating value to customers. One-to-one marketing approaches, role of personal selling in communication mix, and advertising and promotions management. Global marketing management: Cross-national forces that enable firms to design and maintain competitive marketing and supply chain networks across multiple geographic locations. Prereq: 520 and Business Administration 511, 512, 513, and 514.

(Formerly: **511 Marketing Concentration I**)

Revise prerequisite:

**520 Marketing and Customer Value (3)** Prereq: Business Administration 511, 512, and 513 or consent of instructor.

Drop:

**507 Global Marketing (3)****512 MBA Marketing Concentration II (3)****513 Marketing Forecasting (3)**

Effective Fall 2002

**STATISTICS**

Revise statement on the Business Administration doctoral concentration in statistics to clarify required courses. Catalog copy will read:

Minimum course requirements are: 592, 662, 663, 664, 691, and two

courses chosen from 666, 673, 674, 679.

Add:

**600 Doctoral Research and Dissertation (3-15)** P/NP only. E

**674 Advanced Data Mining (3)** Interacting roles of statistical learning and data mining. Statistical data structures, measurement, visualization and exploration. Multidimensional scaling, classification methods, decision trees, neural networks, association rules and market basket analysis. Cluster analysis. Bayesian clustering, evaluation and selection of models and information criterion. Boosting and bagging. Support vector machines, optimization, search methods, and algorithms. Prereq: 564, 579 or equivalent, and knowledge of programming language, or consent of instructor.

**693 Independent Study (1-6)** Directed research on subject of mutual interest to student and faculty member. May be repeated. Maximum 6 hrs.

Revise course title and description:

**567 Analysis of Lifetime Data (3)** Statistical analysis of life data. Methods of analysis for complete and censored data. Life data regression. Analysis of accelerated life tests. Prereq: 563 or Mathematics 425. F (Formerly: **Applied Reliability**)

Effective Fall 2002

## COLLEGE OF COMMUNICATIONS

### JOURNALISM AND PUBLIC RELATIONS

#### Journalism

Revise course title and description:

**520 Political Communications (3)** Relationships among mass media, public relations and government and their roles in democratic society. Governmental public relations, political campaigns, military, executive, legislative and judicial branches of government, special interest groups and public access to government information. (Same as Public Relations 520.) F

(Formerly: **Press-Government Relations**)

Journalism is primary subject.

#### Public Relations

Revise course title and description:

**520 Political Communications (3)** (Same as Public Relations 520.)  
(Formerly: **Press-Government Relations**)

Journalism is primary subject.

Effective Fall 2002

## COLLEGE OF EDUCATION

### EDUCATION

Revise footnote related to the GRE on page 13 of the 2001-2002 Graduate Catalog to require the GRE of all students but allow waivers for non-native English speakers. Footnote will read:

<sup>d</sup>May be waived for non-native English speaking applicants. Contact program area for specific requirement.

Revise program description on page 22 of the 2001-2002 Graduate Catalog to delete residency requirements for students seeking the Ed.S. degree.

### Counseling

Revise description of mental health counseling concentration on page 95 of the 2001-2002 Graduate Catalog to clarify requirements. Catalog copy will read:

"...requires completion of 60 hours of coursework including supervised practicum and internship experiences working with clients."

Effective Fall 2002

## Instructional Technology, Curriculum and Evaluation

Add:

**578 Web Design (3)** Design and development of instructional web sites using basic design principles and visual web editor software. Prereq: 575. Sp

Revise title:

**674 Designing and Implementing Personnel Assessments (3)**  
(Formerly: **Designing and Implementing Personnel**)

Revise credit hours and repetition:

**678 Seminar in Instructional Technology(1)** Readings and discussions based on current literature, research, theories and practices

in instructional technology. Prereq: Consent of instructor. May be repeated. Maximum 3 hrs. F.

(Formerly: **(1-3)**)

Revise description, prereq/coreq:

### **575 The Internet: Implications for Teaching and Learning (3)**

Investigation of Internet, its origin and historical development. Hands-on use of Internet. Relevant issues regarding legal and ethical issues, evaluation, responsible use, proprietary rights. F

Drop:

### **577 Introduction to Data Processing in Curriculum and Instruction (3)**

Effective Fall 2002

## **THEORY AND PRACTICE IN TEACHER EDUCATION**

### **Art Education**

Revise title and description:

### **540 Use and Construction of Instructional Materials for Teaching Art (3)**

Examination and construction of curriculum and instructional aids related to teaching strategies in art education.

(Formerly: **Instructional Materials and Production Related to the Teaching of Art**)

### **Math Education**

Add:

**550 Mathematics Assessment (3)** Processes for assessing, making curricular and instructional decisions based upon and reporting student achievement. Interpretation and use of existing assessment data. Methods of assessment: traditional tests, performance tasks, portfolios, exhibitions. Prereq: 581 or equivalent.

### **622 Research Trends in Mathematics Teacher Education (3)**

Analysis of current research trends in mathematics teacher education and impact of such research on development of teachers both preservice and inservice. Prereq: Minimum 9 hrs of 500-level Math Ed courses.

Revise title, prereq, and description:

### **522 Programs and Materials in School Mathematics (3)**

Examination, development and use of materials for creating an active learning environment for learning mathematics for all ages. Prereq: 485,

530, 543, or equivalent. Su  
(Formerly: **Programs and Materials in Elementary School Mathematics**)

**581 Mathematics Curriculum (3)** Past, present and future issues influencing mathematics curriculum in schools, elementary through college. Teacher's role in curriculum development and implementation. Rationales for curriculum decisions. Prereq: 485, Elementary Education 505, or equivalent.  
(Formerly: **Seminar in Mathematics Education**)

Drop:

**582 Teaching Enrichment Mathematics in Middle and Junior High School (3)**

**586 Teaching Probability and Statistics (3)**

**Reading Education**

Add:

**540 Teaching the Struggling Adolescent Reader (3)** Methods of teaching middle and high school students who do not have sufficient reading skill to successfully engage in required reading. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor.

Revise course prefix:

**461 Developing Reading Skills in Content Fields (3)** Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Middle school and high school. E  
(Formerly: **English Education 461**)

Revise course prefix and description:

**533 Reading in Community College: Research and Theory (3)** Analysis of components of effective community college reading programs. Attention to research bases. Prereq: Course in reading education or consent of instructor. Su  
(Formerly: **English Education 533**)

**605 Organizing and Administering Reading Programs (3)** Diagnosing and teaching children having developmental and corrective reading needs in the regular classroom. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp  
(Formerly: **English Education 605**)

Revise credit hours, description, and repetition:

**554 Developmental Reading Practicum (3)** Diagnosing and teaching children having developmental and corrective reading needs in regular classroom. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp  
(Formerly: **(2)**)

### **Theory and Practice in Teacher Education**

Add:

**620 Research in Literacy, Language, and ESL Education (3)** Recent trends and historical traditions in language and literacy research: analysis of nature of research methods used, questions asked and topics studied. Prereq: Admission to doctoral program or consent of instructor.

Revise title, description, system of grading, repetition:

**517 Trends and Issues in Education (3)** Examination of contemporary trends and issues in education.  
(Formerly: **Seminar in Theory and Practice in Teacher Education**)

Revise title, description, prereq/coreq:

**617 Trends and Issues in Teacher Education—An Interdisciplinary Perspective (3)** Current trends and issues in field of teacher education: elementary education, mathematics education, science education and social science education. Prereq: Admission to doctoral program or consent of instructor. Sp  
(Formerly: **Trends and Issues in Curriculum and Instruction—An Interdisciplinary Perspective**)

Effective Fall 2002

## **COLLEGE OF ENGINEERING**

### **CHEMICAL ENGINEERING**

Revise cross list:

**507 Application of Linear Algebra in Engineering Systems (3)**  
(Same as Electrical and Computer Engineering 507, Materials Science and Engineering 507, and Mechanical Engineering 507.)  
Chemical Engineering is primary subject.

Effective Fall 2002

### **Civil and Environmental Engineering**

Revise required number of Environmental Engineering courses from 12 to

15 for the M.S. degree program with a major in Environmental Engineering. No change in total hours required for the program. Catalog copy will read:

The major shall include 6 hours of thesis and a minimum of 15 semester hours of approved environmental engineering coursework.

## **Civil Engineering**

Add:

### **533 Advanced Laboratory and Insitu Testing of Soil (3)**

Instruments for measurement of electrical signals, static and dynamic transducers, data acquisition and control, insitu measurement of stress, pore pressure, deformation, load deformation behavior (seismic methods, static methods), advanced laboratory shear strength and compressibility testing. Prereq: 330 Introduction to Soil Behavior. 2 hrs and 1 lab.

**631 Soil Dynamics (3)** Introductory and advanced topics: vibrations of elementary systems, foundations subjected to repeated and impulse loading, wave propagation theory and applications, and site response to dynamic loading. Prereq: 435 Foundation Engineering.

Effective Fall 2002

## **ELECTRICAL AND COMPUTER ENGINEERING**

Add for graduate credit:

**415 Automatic Control Systems (4)** Automatic control systems for physical systems with linear models. Steady-state error analysis, stability, root locus, Nyquist theory, and Bode plots. Prereq: 316 Signals and Systems II.

**416 Computer Control Systems (4)** Computer controlled systems using state variables and z-transform model representations with sampling theory and its effect on digital control design. Design of digital controllers in both state space and frequency domain. Level 2 design projects. Prereq: 316 Signals and Systems II.

**446 Electromagnetic Compatibility (3)** Principles and practices to avoid interference among and within electrical devices. Parameters and coupling for dipole, biconical, and log-periodic antennas. High frequency effects in circuit elements. Radiated and conducted emissions and susceptibility. Crosstalk, shielding, electrostatic discharge, and EMC regulations. Level 1 design projects that require laboratory work. Prereq: 316 Signals and Systems II, 341 Fields, 342 Communications.

**453 Computer Network Design (3)** Principles of computer networking

and software design of network protocol: internet and TCP/IP protocol suite. Level 1 design projects that require laboratory work. Prereq: 206 Electrical Engineering Computations.

Revise course title and description:

**452 Design of Digital Systems and Computers (4)** Considerations for design and application of digital systems and computers: embedded systems concepts and design, CPU issues, interrupt structures, and I/O channels. Level 3 projects that require laboratory work. Prereq: 451. (Formerly: **Organization and Design of Digital Systems and Computers**)

Revise course title, description and prerequisite:

**451 Computer Systems Architecture (3)** Architecture and design of microcomputer systems with microprocessors or microcontrollers. Instruction set architectures, software interfaces, processor structures, memory hierarchy, interfacing. Level 1 design projects that require laboratory work. Prereq: 355 Computing System Fundamentals. (Formerly: **Microprocessors and Microcontrollers in Electrical Engineering**)

**472 Introduction to Digital Image Processing (4)** Mathematical foundations and practical techniques for digital manipulation of images: image enhancement, restoration, compression, segmentation, and color image processing. Level 2 design projects. Prereq: 316 Signals and Systems II, non-majors require consent of instructor. (Formerly: **Digital Image Processing**)

Revise course credit hours, description, and prerequisite:

**443 Antennas and Propagation (3)** Introduction to antenna theory: fundamental antenna concepts and parameters (directivity, gain, patterns, etc.) and signal propagation. Theory and design of linear and loop antennas, arrays, and other simple antennas. Level 1 design projects. Prereq: 316 Signals and Systems II, 341 Fields, 342 Communications. (Formerly: **(4)**)

Revise cross list:

**507 Application of Linear Algebra in Engineering Systems (3)** (Same as Chemical Engineering 507, Materials Science and Engineering 507, and Mechanical Engineering 507.) Chemical Engineering is primary subject.

Revise description and prerequisite:

**441 Digital Communication (3)** Quantization and pulse code modulation. Binary and M-ary signaling, spectra of line codes, link budget analysis, binary communication in presence of noise, matched filtering and equalization, bandpass digital transmission, introduction to multiple access techniques. Level 1 design projects. Prereq: 342 Communications.

**471 Introduction to Pattern Recognition (3)** Statistical decision theory, adaptive classifiers, and supervised and unsupervised learning. Application of techniques in areas of current interest: face recognition, speech processing, remote sensing, data mining and bioinformatics. Level 1 design projects. Prereq: 316 Signals and Systems II, non-majors require consent of instructor.

**481 Power Electronics (3)** Principles and characteristics of power semiconductor devices, single-phase and polyphase phase controlled converters, converter control, ac voltage controller. Level 1 design projects and laboratory work. Prereq: 316 Signals and Systems II, 325 Electric Energy System Components, 332 Electronic Circuits.

**491 Special Topics (3)** Basic design and current practice. May not be repeated to satisfy senior requirements for graduation. Prereq: Completion of all junior Electrical and Computer Engineering courses or consent of instructor. Level 1 or 2 design projects that may require laboratory work.

**495 Senior Seminar (1)** Current topics. Prereq: Completion of all junior Electrical and Computer Engineering courses or consent of instructor. S/NC or letter grade.

Revise prerequisites:

**400 Senior Design (5)** Prereq: 316 Signals and Systems II, 325 Electric Energy System Components, 332 Electronic Circuits, 342 Communications, 355 Computing System Fundamentals.

**421 Electric Energy Systems (3)** Prereq: 316 Signals and Systems II, 325 Electric Energy System Components.

**423 Electric Machines (3)** Prereq: 316 Signals and Systems II, 325 Electric Energy System Components.

**431 Operational Amplifier Circuits (3)** Prereq: 316 Signals and Systems II, 332 Electronic Circuits, 342 Communications.

Drop for graduate credit:

**411 Digital Signal Processing and Filter Design (3)**

**412 Linear Control Systems Design (4)**

Effective Fall 2002

## **MATERIALS SCIENCE AND ENGINEERING**

Add and cross list:

### **507 Application of Linear Algebra in Engineering Systems (3)**

(Same as Chemical Engineering 507, Electrical and Computer Engineering 507, and Mechanical Engineering 507.)

Chemical Engineering is primary subject.

Revise to drop cross-listing:

**429 Introduction to Ceramic Matrix Composites (3)** Delete (Same as Engineering Science 429.)

Materials Science and Engineering is primary subject.

**472 Fundamental Principles of Composite Materials (3)** Delete (Same as Engineering Science 426.)

Materials Science and Engineering is primary subject.

Drop for graduate credit:

**475 Fracture-Safe Design (3)** (Same as Engineering Science 423.)

Engineering Science is primary subject.

Drop:

**529 Diffusion in Solids (3)**

**530 Phase Transformations in Metallic Materials (3)**

Effective Fall 2002

## **MECHANICAL, AEROSPACE, AND BIOMEDICAL ENGINEERING**

### **Aerospace Engineering**

Add for graduate credit:

### **494-95 Selected Topics in Aerospace Engineering (1-4,1-4)**

Problems and topics related to developments and practice in aerospace engineering. Prereq: Consent of instructor. E

Revise description:

**429 Aerospace System Design (4)** Synthesis and design of complete aerospace system. Participation in team design effort: formal

presentations and design report. Prereq: 422, 425, 426. Sp

## **Biomedical Engineering**

Add for graduate credit:

**435 Bioinstrumentation (3)** Nature of biomedical signals, transducers, signal processing, noise, telemetry and display devices. Prereq: 300 Engineering Physiology, Electrical and Computer Engineering 301 Circuits and Electro Mechanical Components.

**475 Design of Artificial Internal Organs (3)** Design, development and evaluation of artificial internal organs; analysis of transport processes in therapeutic devices for design optimization; current research and development needs. Ethical considerations. Prereq: Aerospace Engineering 341, Mathematics 231 Differential Equations.

**494-95 Special Project in Biomedical Engineering (1-3,1-3)** Problems related to recent developments and practice. May be repeated. Maximum 6 hrs. Prereq: Junior or senior standing, consent of instructor.

Add and cross list:

**571 Biomechanics of Hard and Soft Tissue (3)** (Same as Engineering Science 571.)  
Engineering Science is primary subject.

**572 Biomedical Fluid Mechanics (3)** (Same as Engineering Science 572.)  
Engineering Science is primary subject.

Revise description and prerequisite:

**408 Cell and Tissue Engineering (3)** Culture of mammalian cells. Effects of mechanical forces on cells. Tissue engineering of cardiovascular and orthopedic tissues. Prereq: 310 Biomechanics, Biology 140 Organization and Function of the Cell.

**430 Biomedical Engineering Laboratory (3)** Experience with unique problems associated with making measurements and interpreting data in living systems; experiments: mechanical testing of biological materials, imaging and physiological measurements. Prereq: 310 Biomechanics, 346 Design of Experiments or consent of instructor.

Revise prerequisite:

**473 Applied Biomechanics (3)** Prereq: Mechanical Engineering 321 Mechanics of Materials. Coreq: 310 Biomechanics, Materials Science and Engineering 474.

## Mechanical Engineering

Add for graduate credit:

**452 Computational Mechanics (3)** Integration of fundamental physical laws, mathematical methods and computational techniques necessary to develop engineering analysis and design capabilities. Finite element method. Prereq: 321 Mechanics of Materials, Aerospace Engineering 341 Fluid Mechanics. F

Revise description and prerequisite:

**451 Systems and Controls (3)** Analytical models of physical systems; comprised of combinations of mechanical, fluid, electrical, and thermal systems. Analysis and design of feedback control systems using transient and frequency response techniques, stability analysis, sampled data systems. Prereq: 345 Instrumentation and Measurement, Electrical and Computer Engineering 301 Circuits and Electro Mechanical Components. F,Sp

Revise cross list:

**507 Application of Linear Algebra in Engineering Systems (3)** (Same as Chemical Engineering 507, Electrical and Computer Engineering 507, and Materials Science and Engineering 507.)  
Chemical Engineering is primary subject.

## Engineering Science

Revise to add cross list:

**571 Biomechanics of Hard and Soft Tissue (3)** (Same as Biomedical Engineering 571.)  
Engineering Science is primary subject.

**572 Biomedical Fluid Mechanics (3)** (Same as Biomedical Engineering 572.)  
Engineering Science is primary subject.

Drop for graduate credit:

**423 Fracture-Safe Design (3)** (Same as Materials Science and Engineering 475.)  
Engineering Science is primary subject.

**426 Fundamental Principles of Composite Materials (3)** (Same as Materials Science and Engineering 472.)  
Engineering Science is primary subject.

**429 Introduction to Ceramic Matrix Composites (3)** (Same as

Materials Science and Engineering 429.)  
Engineering Science is primary subject.

### **442 Fluid Mechanics II (3)**

### **465 Dynamic Data Acquisition (3)**

### **475 Design of Artificial Internal Organs (3)**

### **494-95 Special Engineering Science Topics (1-3,1-3)**

Revise statement on graduate credit for undergraduate courses. Catalog copy will read:

Students majoring in Mechanical Engineering or Aerospace Engineering may not normally use more than one 400-level engineering course to meet their advanced degree requirements. Undergraduate courses that are required for the bachelor's degree in Mechanical Engineering may not be taken for graduate credit by graduate students in Mechanical Engineering. Undergraduate courses that are required for the bachelor's degree in Aerospace Engineering may not be taken for graduate credit by graduate students in Aerospace Engineering. For students majoring in Engineering Science, 400-level courses in engineering may be used for graduate credit at the discretion of the advising committee. However, at least two-thirds of minimum required credit hours in a master's degree program must be at or above the 500-level. With the approval of the student's major department, a student whose major is outside the Department of Mechanical, Aerospace, and Biomedical Engineering may take senior (400-level) courses in the department for graduate credit. Such students should consult with instructors regarding prerequisites for undergraduate courses.

Effective Fall 2002

## **NUCLEAR ENGINEERING**

Revise text and requirements for the M.S. and Ph.D. degree programs with a major in Nuclear Engineering to specify courses for those without a degree in nuclear engineering for admission purposes; to add course sequences as options for the M.S. program; to add a third option to thesis and engineering practice requiring 3 hours of Engineering Practice and 6 additional hours of coursework; to clarify requirements for all options; to drop the foreign language requirements for the doctoral program; and to add other areas as background for admission. Catalog copy will read:

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering program focusing on fission energy or

fusion energy, or a radiological engineering concentration, which prepares students for careers in the radiation safety field (health physics). Both programs are designed for graduates of accredited undergraduate programs in engineering, physics, chemistry, biology, or mathematics.

All entering students must have, as a minimum, competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with an introductory course in nuclear engineering. If such competencies do not exist, the student must take appropriate courses for undergraduate credit. In addition, students without a B.S. degree in nuclear engineering, or the equivalent, must take 431 (Radiation Protection) and 470 (Nuclear Reactor Theory I), both of which may be taken for graduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines. More detailed information about the Department of Nuclear Engineering is available on the web at <http://www.engr.utk.edu/nuclear/>.

## **THE MASTER'S PROGRAM**

A graduate program leading to the Master of Science degree is available to graduates of recognized undergraduate curricula as described above. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

The minimum requirements for the M.S. degree in nuclear engineering are:

1. A major consisting of 12 semester hours of graduate courses in nuclear engineering which must include at least one of the following sequences: 511, 512; 521, 522; 551, 552; 571, 572; 581, 582.
2. A minor consisting of 6 semester hours of elective courses in mathematics, statistics or computer science.
3. Six semester hours in either nuclear engineering or a related field.
4. One of the following three options for a culminating experience:
  - a. A thesis project (6 hours of 500).
  - b. Two to four engineering practice projects (6 hours of 598).
  - c. One engineering practice project (3 hours of 598) plus 6 hours of additional nuclear engineering coursework.

Thus, options (a) and (b) result in a minimum total of 30 hours and option (c) results in a minimum total of 33 hours. The determination of which option a student may undertake is made by the student's graduate committee and is based on the student's personal interests, academic background, and work experience, as well as the nature of projects

currently available in the department.

A thesis project requires the student to conduct independent, in-depth research. An engineering practice project is similar to a thesis project but smaller in scope, and can be research, design, product development, special operations, or a critical review of published literature in a specific technical area. The student must submit a brief written proposal for each project undertaken, either thesis or engineering practice, which must be approved by the student's graduate committee. The final report for an engineering practice project is normally prepared in thesis format (i.e., according to the *UT Knoxville Guide to the Preparation of Theses and Dissertations*); however, another formal report format may be used if approved by the student's graduate committee. The student must also register for the appropriate number of hours of either 500 or 598, as specified by the student's major professor, during each semester that work is performed on a thesis or engineering practice project. Finally, the student must pass an oral examination on all work presented for the degree—all coursework and all projects.

The M.S. degree in nuclear engineering program is also available to distance students via selected courses that are delivered synchronously over the web to the student's computer. More detailed information about this distance program is located at <http://www.anywhere.tennessee.edu/ne/default.htm>.

## **THE DOCTORAL PROGRAM**

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy degree must have a Bachelor of Science or Master of Science from a recognized university with a major in engineering, physics, chemistry, biology, or mathematics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, chemistry, physics, and nuclear engineering.

Specific requirements for the Ph.D. in nuclear engineering include:

1. A minimum of 48 semester hours beyond the bachelor's degree, exclusive of credit for the M.S. thesis or nuclear engineering practice.
2. A minimum of 24 semester hours in doctoral research, Nuclear Engineering 600.
3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 semester hours of 600-level courses. These are exclusive of thesis or dissertation credit.
4. A minimum of 12 semester hours in mathematics, computer science,

or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.

5. A minimum of 6 semester hours in courses numbered 500 or above from a department other than nuclear engineering. The choice depends on the student's overall program and should expand his/her knowledge in a given field.

The first part of the comprehensive examination is prepared by the nuclear engineering faculty and consists of 12 hours of written examination that is administered over a three-day period. All past written examinations are filed in the library, and students are encouraged to review them. Students are invited to take the written examination after completing approximately 30 semester hours of graduate coursework. A student who fails the written examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. Registration for 600 is not permitted until the written examination is passed. The second part of the comprehensive examination is completed with the successful oral defense of a written dissertation proposal.

A candidate must successfully defend, in an oral examination, all work presented for the degree—all coursework and the dissertation.

### **CERTIFICATE IN MAINTENANCE AND RELIABILITY ENGINEERING**

The College of Engineering offers a certificate program in maintenance and reliability engineering. The program is designed primarily for part-time students in that all of the courses are available through distance education (see <http://www.anywhere.tennessee.edu/ne/default.htm>).

The 12-credit certificate is earned by completing 483 and 484, which are cross-listed among all participating departments in the College of Engineering, plus two elective courses selected from a list of courses provided by the participating departments. Currently, the available elective courses are Industrial Engineering 516 and 591, Mechanical Engineering 534 and 599, and Nuclear Engineering 579 and 585. The selection of elective courses is determined through an advising conference with each individual student, and is based on the student's personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate School.

### **CERTIFICATE IN NUCLEAR CRITICALITY SAFETY**

The Department of Nuclear Engineering offers a certificate program in nuclear criticality safety. The program is designed primarily for part-time students in that all of the courses are available through distance education (see <http://www.anywhere.tennessee.edu/ne/default.htm>).

The 12-credit certificate is earned by completing 421, 543, and 582 plus one of the following three courses: 470, 571, or 581. The selection of one of the latter three courses is determined through an advising conference with each individual student, and is based on the student's personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate School. Students without a nuclear engineering background must take 301 (Fundamentals of Nuclear and Radiological Engineering) prior to beginning the graduate coursework described above.

## **GRADUATE CREDIT FOR UNDERGRADUATE COURSES**

400-level courses in nuclear engineering may be used for graduate credit. However, at least two-thirds of the minimum required hours in the M.S. program must be taken in courses numbered 500 or above.

Effective Fall 2002

## **COLLEGE OF HUMAN ECOLOGY**

### **CONSUMER AND INDUSTRY SERVICES MANAGEMENT**

Revise the M.S. degree program with a major in Textiles, Retailing and Consumer Sciences, concentration in retail and consumer sciences, thesis and non-thesis options, to accommodate the services management core. Increase the total hours for the thesis option from 34 to 37. Catalog copy will read:

<b>Retail and Consumer Sciences (Thesis)</b>	
Services Management: Retail and Consumer Sciences 541, 538, Hotel and Restaurant Administration 532, Recreation and Tourism Management 510	12
Research Methods: Retail and Consumer Sciences 562	3
Statistics 531, 537 or equivalents	6
Research Seminar: Retail and Consumer Sciences 590	1
Cognate Area	6
Elective	3
Thesis	6
<b>Total</b>	<b>37</b>

<b>Retail and Consumer Sciences (Non-Thesis)</b>	
Services Management: Retail and Consumer Sciences 541, 538,	

Hotel and Restaurant Administration 532, Recreation and Tourism Management 510	12
Research Methods: Retail and Consumer Sciences 562	3
Statistics 531, 537 or equivalents	3
Research Seminar: Retail and Consumer Sciences 590	1
Cognate Area	6
Electives	9
Professional Paper/Project: Retail and Consumer Sciences 501	3
Total	37

Revise the M.S. degree program with a major in Recreation, Tourism and Hospitality Management, concentration in hospitality management, thesis and non-thesis options, to accommodate the services management core. Increase the total hours for the thesis option from 34 to 37. Catalog copy will read:

<b>Hospitality Management (Thesis)</b>	
Services Management: Retail and Consumer Sciences 541, 538, Hotel and Restaurant Administration 532, 537, Recreation and Tourism Management 510	13
Research Methods: Retail and Consumer Sciences 562	3
Statistics	3
Cognate Area	6
Hotel and Restaurant Administration Elective	6
Thesis	6
Total	37

<b>Hospitality Management (Non-Thesis)</b>	
Services Management: Retail and Consumer Sciences 541, 538, Hotel and Restaurant Administration 532, 537, Recreation and Tourism Management 510	13
Research Methods: Retail and Consumer Sciences 562	3
Statistics	3
Cognate Area	6
Hotel and Restaurant Administration 535	3
Hotel and Restaurant Administration Elective	6
Elective	3

Add a certificate program in services management. Catalog copy will read:

### **CERTIFICATE IN SERVICES MANAGEMENT**

The Department of Consumer and Industry Services Management offers a certificate program in services management for students seeking continuing education and career advancement opportunities in the services industry.

The 12-credit hour certificate is available by completing the following courses: Retail and Consumer Sciences 541, 538, Hotel and Restaurant Administration 532, and Recreation and Tourism Management 510.

#### **Hotel And Restaurant Administration**

Revise course title and description:

#### **532 Human Resource Management in Services Industry (3)**

Analysis of significant organizational processes and practices in management of human resources within consumer product and service industry.

(Formerly: **Advanced Human Resource Management**)

Drop:

#### **533 Advanced Food Production and Delivery System Management (3)**

#### **544 Experimental Study of Quantity Food Production (3)**

#### **Recreation And Tourism Management**

Revise course title and description:

**510 Trends and Issues in Services Management (3)** Examination of current and emerging trends and issues in consumer product and services industry. Implications of trends and their managerial and strategic applications in services management.

(Formerly: **Perspectives and Trends in Leisure Services**)

#### **Retail And Consumer Sciences**

Add:

**538 Consumer Product and Service Development (3)** Critical analysis of consumer product and service development process in services industry. Strategies for developing consumer products, services,

programs, and service processes from conception to implementation and evaluation.

Revise course title and description:

**541 Consumer Analysis in Services Management (3)** Analysis of consumer behavior in consumer products and services industry. Development of knowledge to positively impact services marketing organizations through marketing, environmental and product/services strategies based upon consumer behavior knowledge. Investigations of qualitative and quantitative methodologies to conduct elementary consumer research.

(Formerly: **Retail Consumer Analysis**)

Drop:

**550 Consumer Economics and Market Choices (3)**

**560 Elderly and the Marketplace (3)**

Effective Fall 2002

## **HUMAN RESOURCE DEVELOPMENT**

Remove term designation from all courses.

Add:

**606 Qualitative Research in Human Resource Development (3)**

Theory and application of qualitative approaches to social science and human resource development research. Ethnographic methods to obtain in-depth information about behaviors and beliefs of people in natural settings. Use of methods: structured interviews using heuristic elicitation methodology, participant/observation and case studies. Prereq: Admission to doctoral program.

Revise course title and description:

**601 Theory and Practice in Training and Development (3)** Theory and application of research related to training and development, transfer of learning, designing effective learning situations, and creation of corporate learning environments. Conceptualization and critical analysis of pertinent empirical research and theories related to training and development in field of human resource development. Prereq: Admission to doctoral program.

(Formerly: **Curriculum Planning in Human Resource Development**)

Revise prerequisite:

**610 Research Development in Human Resource Development (3)**

Prereq: Admission to doctoral program, 6 hrs of advanced statistics courses and consent of instructor.

Effective Fall 2002

**COLLEGE OF LAW****LAW**

Revise the Dual J.D.-M.P.A. degree program with a major in Law to update the required courses. In the 2001-2002 Graduate Catalog, under DUAL J.D.-M.P.A. PROGRAM, Curriculum subheading, 1<sup>st</sup> paragraph, next to last sentence, revise to read:

All candidates for the dual degree must successfully complete Administrative Law (Law 821).

Effective Fall 2002

**COLLEGE OF NURSING****NURSING**

Add certificate program in nurse anesthesia. Catalog copy will read:

**POST-MASTER'S CERTIFICATE IN NURSE ANESTHESIA**

The College of Nursing offers a post-master's certificate program for nurses who possess a master's degree in nursing and desire to become Nurse Anesthetists. In addition to the general requirements for admission to the Graduate School and the College of Nursing, the following are required of all nurse anesthesia certificate applicants:

1. One year of critical care experience with adult clients.
2. Certification in Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS).
3. A personal interview.

Course requirements are 506, 516, 517, 518, 521, 522, 523 of nurse anesthesia didactic content, plus additional hours as determined by the college and 54 hours of nurse anesthesia clinical practice courses, 544, 545, 546, 547, 548, 549, 583. The total hours will vary depending on the student's academic record, clinical experience and objectives. Although students must complete a minimum of 12 credits, typically. students who have completed a master's degree in nursing within the preceding five years will complete 64-70 hours of course credit.

Effective Fall 2002

## **FOR INFORMATIONAL PURPOSES**

The Ph.D. degree program with a major in Natural Resources was approved by THEC at the December 2001 meeting.

Effective Fall 2002

The Au.D. degree program with a major in Audiology was approved by THEC at the December 2001 meeting.

Effective Fall 2003

## **NON-STANDARD FORMAT COURSE**

### **INSTRUCTIONAL TECHNOLOGY, CURRICULUM AND EVALUATION**

#### **595 Special Topics (1-3)**

Internet Mediated Collaborative Learning—To explore uses of the Internet to support collaborative learning activities. Offered on four Saturdays, January 12 & 19, March 9 and May 4, for 3 hours credit. Requires 45 contact hours.

Effective Spring 2002

### **MATHEMATICS**

#### **504 Discrete Mathematics for Teachers (3)**

Interactive course offered over the Internet, via the online@ut system, plus video conferencing each week. Offered full-term for 3 hours credit. Requires 45 contact hours.

Effective Spring 2002

All backup materials are available in 201 Student Services Building.