Graduate Council Minutes
Monday, March 17, 2014 at 1pm
Graduate School Conference room
Present: Drs. Ontko, Sustich, Schmidt, Holman, Gilbert, Pan (Fowler), Hansen, Welsh, Srivatsan, Clifft, Drake, Bounds, Phillips (Green), McKay, McLean and Ms. Tejada and Mr, Keys

Approve minutes from February 26 meeting APPROVED

Dr. Thillainatarajan Sivakumaran, Dean of College of Education and Behavioral Science presentation

Engineering

- CE 5273 Advanced Soil Mechanics APPROVED
- CE 5393 Advanced Civil Engineering Materials APPROVED
- ENGR 6053 Sustainable Engineering and Development APPROVED
- ENGR 6163 Analysis and Design of Pavements APPROVED
- ENGR 6233 Advanced Foundation Engineering APPROVED

Science

- BIO 5444 Wildlife Population Modeling APPROVED

Program Faculty Qualification Standards

- Agriculture APPROVED
- Environmental Sciences APPROVED
- Molecular Biosciences APPROVED

Minutes of the Graduate Council February 26, 2014

Graduate Council Agenda
Wednesday, February 26, 2014 @ 1 pm
Graduate School Conference Room

Role and Scope of the Graduate Council:

The Graduate Council provides guidance and direction for the university's graduate programs. The Council considers and recommends graduate curriculum changes and new programs; policies on graduate admission, academic standards, and graduation requirements; policies on graduate faculty status; policies regarding graduate assistants; and policies on graduate stipends and assistantships and their distribution to programs. Membership on the Graduate Council consists of one tenured graduate faculty member from each college with graduate programs. Colleges with doctoral programs will have an additional faculty representative from the doctoral program(s). Two graduate students appointed by the Graduate Student Council will serve on the committee. The Graduate Dean and the Director of Assessment Services will serve on the Council as ex-officio, nonvoting members. This council reports to the VCAAR through the Dean of the Graduate School.

Call to Order

Meeting called to order by Dr. Andrew Sustich at 1:00 PM Motion Clifft; Second Schmidt - approved

Attendance

Members Present – Allyn Ontko, Andrew Sustich, Angela Schmidt, Juanjuan Li (proxy for Keys), Dalia Tejada, , Erik Gilbert, Gil Fowler, Greg Hansen, Josie Welsh, Malathi Srivatsan, Michele McGinnis, Rick Clifft, Bill Roe (proxy for Russ Jones), Shawn Drake, Steve Bounds, Tanja McKay, Tracy Finch, Will McLean

Members Absent – Ed Owen, Gil Fowler, Malathi Srivatsan

Minutes from the February 10 meeting _

Education and Behavioral Science

COUN 6123 Intro to Play Therapy Motion Clifft ; Second Schmidt – tabled unanimously

Psy & Coun Bulletin Change – Motion McLean; Second McKay – tabled for clarity unanimously

Psy & Coun editorial & course description changes – Motion Drake; Second Schmidt – tabled unanimously

Psy & Coun internship grade changes Motion McKay; Second Drake – tabled unanimously

Humanities and Social Sciences

ENG 5103 Intro to Contemporary Lit Theory deletion Motion Drake; Second Schmidt – approved unanimously
ENG 5711 Preceptorship in Writing Studies Motion Roe; Second Schmidt tabled unanimously
MA SOC Application & App deadline change - – Motion Clifft; Roe Second – Approved Unanimously
MA-Criminal Justice Application & App deadline change – Motion Clifft; Second

Nursing and Health Professions - Motion Roe; Second Schmidt

New Program-OTD Occupational Therapy Doctorate
OTD 625V Level II Fieldwork
OTD 720V Level II Fieldwork
OTD 726V Level III Fieldwork Doctoral Rotation
OTD 5012 History of Occupational Science
OTD 5023 Pathology & Disability
OTD 5034 Practice I Primary Care
OTD 5043 Technology I Skills Training
OTD 5073 Practice 2 Occupational Science
OTD 5083 Technology 2 Function
OTD 5092 Research I Occupational Science
OTD 5101 Level I Fieldwork Adults
OTD 5123 Practice 3 Pediatrics
OTD 5133 Technology 3 Environment
OTD 5142 Research 2 Descriptive Research
OTD 5151 Level I Fieldwork Pediatrics
OTD 6164 Practice 4 Aging Adults
OTD 6173 Technology 4 Electronic Communications
OTD 6182 Research 3 Experimental Research
OTD 6191 Level I Fieldwork Aging Adults
OTD 6203 Practice 5 Health & Wellness
OTD 6213 Technology 5 Informatics
OTD 6222 Research 4 Qualitative Research
OTD 6231 Level I Fieldwork Interprofessional Practice
OTD 6243 Professional Practice Seminar
OTD 7213 Practice 6 Population Health
OTD 7222 Research 5 Scholarship of Application
OTD 7232 Advocacy & Leadership
OTD 7242 Development and Assessment
OTD 7252 Health Care Delivery
OTD 7272 Capstone

Above – All Approved Unanimously

Graduate Faculty

Terry Spurlock-committee member for thesis – Motion Clifft; Second Roe – approved unanimously
Carolyn Ponce – Motion Clifft; Second Roe – approved unanimously

Graduate Faculty Standards

Business – Motion Roe; Second Clifft – approved unanimously
Communication Disorders – Motion Ontko; Second Green – tabled unanimously
College Student Personnel Services Motion McKay; Second Green – tabled unanimously
History
Master of Arts in Teaching-mid-level Motion Schmidt; Second Drake – tabled unanimously
Mid-Level – Motion Clifft; Second Ontko – tabled unanimously
Molecular Biosciences – Motion Ontko; Second Green – approved with changes - unanimously
Physical Therapy – Motion McKay; Second Schmidt – approved unanimously

Meeting Adjourned at 3pm.

Respectfully submitted,

Josie Welsh

Code # ENG 001

New/Special Course Proposal-Bulletin Change Transmittal Form

☐ **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

☒ **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

☒**New Course or** ☐ **Special Course (Check one box)**

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

	ENTER DATE...		ENTER DATE...
Department Curriculum Committee Chair		**COPE Chair (if applicable)**	
	ENTER DATE...		ENTER DATE...
Department Chair:		**General Education Committee Chair (If applicable)**	
	ENTER DATE...		ENTER DATE...
College Curriculum Committee Chair		**Undergraduate Curriculum Council Chair**	
	ENTER DATE...		ENTER DATE...
College Dean		**Graduate Curriculum Committee Chair**	
			ENTER DATE...
		Vice Chancellor for Academic Affairs	

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1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)
CE 5273

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).
Advanced Soil Mechanics

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.
Lecture

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?
Letter

5. Is this course dual listed (undergraduate/graduate)?
No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)
No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.
Advanced theories and concepts in the areas of subsurface exploration, soil mineralogy, compressibility of soil and rock, stress distribution and settlement, and shear strength of soil and rock.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).
a. Are there any prerequisites?
Undergraduate coursework in soil mechanics. The course is restricted to engineering graduate students.

b. Why?
The prerequisite course covers the fundamentals of soil mechanics, which is required to understand and apply the concepts and methods to be learned in the new course.

9. Course frequency (e.g. Fall, Spring, Summer). Not applicable to Graduate courses.
Fall

10. Contact Person (Name, Email Address, Phone Number)
Dr. Tom Parsons, ASU College of Engineering, P. O. Box 1740, State University, AR 72467 tparsons@astate.edu: (870) 972-2088
Dr. Ashraf Elsayed, ASU College of Engineering, P. O. Box 1740, State University, AR 72467, aelsayed@astate.edu, (870) 972-2088

11. Proposed Starting Term/Year
Fall 2014

12. Is this course in support of a new program? Yes/No
If yes, what program?
No

13. Does this course replace a course being deleted? Yes/No
If yes, what course?
No

Has this course number been used in the past? No
Submit Course Deletion Proposal-Bulletin Change Transmittal Form.

14. Does this course affect another program? No
If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.
Enter text...

15. Justification should include:
a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)
The course will provide students with in-depth understanding of soil mechanics and geotechnical engineering; both are

integral to engineers practicing in the area of geotechnical engineering. Students will apply knowledge gained in earlier coursework to complete the evaluation and write a comprehensive engineering report. Activities will help students gain practical experience.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

The course is consistent with the mission of the Master of Science in Engineering program within the College of Engineering. Program outcome 5 states that "graduates will have an advanced, cross-disciplinary understanding of engineering sciences, and an ability to relate physical concepts from multiple engineering disciplines." The curriculum is designed to give graduate students in-depth understanding and working knowledge of soil mechanics and geotechnical engineering and to prepare graduates for professional practice.

c. Student population served.

Engineering graduate students

d. Rationale for the level of the course (lower, upper, or graduate).

The course is intended for Master of Science in Engineering students within the College of Engineering. The curriculum requires the fundamental understanding of basic soil mechanics, which is covered in undergraduate courses. It is designed to give graduate students in-depth understanding and working knowledge of advanced solutions to complex soil-related construction problems and to prepare graduates for professional practice and for earning an advanced degree. The subject is particularly suited for students pursuing an emphasis in civil engineering.

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Week 1: Introduction / Subsurface Exploration

Week 2: Subsurface Exploration

Week 3: Soil Mineralogy

Week 4: Compressibility of Soil and Rock

Week 5: Time Rate of Consolidation

Week 6: Stress Distribution and Settlement Analysis

Week 7: Mohr Circle and Failure Theory

Week 8: Shear Strength of Soil and Rock

Week 9: Shear Strength of Soil and Rock

Week 10: Shear Strength of Soil and Rock

Week 11: Shear Strength of Soil and Rock

Week 12: Shear Strength of Soil and Rock

Week 13: Soil Liquefaction

Week 14: Soil Liquefaction

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)
One research paper, one group design project, one mid-term exam and a final exam

18. Special features (e.g. labs, exhibits, site visitations, etc.)
One visit to a construction site

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)
No

20. What is the primary intended learning goal for students enrolled in this course?
To prepare graduate students for engineering practice in the area of geotechnical engineering

21. Reading and writing requirements:
a. Name of book, author, edition, company and year
Required Textbook:
An Introduction to Geotechnical Engineering, 2nd Edition, 2010 by Robert D. Holtz, William D. Kovacs and Thomas C. Sheahan, Prentice Hall

Additional reference manual (available online)
FHWA Geotechnical Engineering Circular No. 5 – Evaluation of Soil and Rock Properties, FHWA-IF-02-034, 2002
b. Number of pages of reading required per week: 20-30
c. Number of pages of writing required over the course of the semester: 100

22. High-Impact Activities (Check all that apply)
- ☐ Collaborative assignments
- ☐ Research with a faculty member
- ☐ Diversity/Global learning experience
- ☐ Service learning or community learning
- ☐ Study abroad
- ☐ Internship
- ☐ Capstone or senior culminating experience
- ☐ Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

Outcome #1: (For example, what will students who meet this goal know or be able to do as a result of this course?)
Outcome # 1 The students will have the ability to identify, formulate, and solve complex problems in the area of soil engineering. The advanced knowledge acquired in the course will allow the student to analyze collected data and formulate a logical solution to solving soil-related engineering problems in practice.

Learning Activity: (For example, what instructional processes do you plan to use to help students reach this outcome?)
Learning Activity # 1: Students will investigate a construction site, identify soil-related problems, formulate this problem in using engineering background and mathematical expressions, then develop a solution to the identified problems and submit their solution in an engineering report.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)
Assessment Tool # 1: A report will be submitted by each student that contains a description and documentation of the work performed. The report contents will be assessed based on a set of rubrics and content requirements. The assessment of each student will be performed by the instructor.

(Repeat if needed for additional outcomes 2 and 3)

Outcome #2:

Enter text…

Learning Activity:

Enter text…

Assessment Tool:

Enter text…

Outcome #3:

Enter text…

Learning Activity:

Enter text…

Assessment Tool:

Enter text…

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

a. Global Awareness
   - ☒ Minimally
   - ☐ Indirectly
   - ☐ Directly

b. Thinking Critically
   - ☐ Minimally
   - ☐ Indirectly
   - ☒ Directly

c. Using Technology
   - ☐ Minimally
   - ☐ Indirectly
   - ☒ Directly

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2. Go to http://registrar.astate.edu/bulletin.htm and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.

4. Find the page(s) you wish to copy, click on the "select" button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on "copy".
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose "paste".
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

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COLLEGE OF ENGINEERING GRADUATE COURSE DESCRIPTIONS

CE 5223. Transportation Engineering Principles of highway survey and locations, geometric design, highway materials, pavement design, highway drainage, and pavement management. A highway design project is required. Prerequisites, C or better in CE 3223, CE 4203, CE 4251 and CE 4253. Dual listed as CE 4223.

CE 5233. Foundation Engineering Prediction of soil variation, soil investigations,
stress distribution and bearing capacity, dewatering analysis and procedures, and settlements. The design and analysis of retaining structures and lateral earth pressures, shallow foundations, pile foundations. Three foundation design projects are required. Prerequisite, C or better in CE 2202. Corequisite, CE 4253. Dual listed as CE 4233.

CE 5243. Reinforced Concrete Design Design of beams with bending, and shear stress, splicing design and deflection calculations, design columns. Prerequisites, C or better in CE 3213. Dual listed as CE 4243.

CE 5253. Soil Mechanics Physical properties of soils as used in design, specific gravity, grain size distribution, plasticity, shrinkage, permeability, compressibility, consolidation and shear strength. Foundation design for consolidation. Corequisites, ENGR 3473 and CE 4251. Dual listed as CE 4253.

CE 5263. Water and Waste Treatment Design of physical, chemical and biological unit processes for treatment of water, wastewater and sludges. Advanced wastewater treatment processes are presented. Student papers on selected waste treatment applications are required. Prerequisites, C or better in CE 3273. Dual listed as CE 4263.

CE 5273 Advanced Soil Mechanics Advanced theories and concepts in the areas of Subsurface exploration, soil mineralogy, compressibility of soil and rock, stress distribution and settlement, and shear strength of soil and rock. Prerequisites, Undergraduate coursework in soil mechanics.

CE 5283. Structural Steel Design of structural systems in steel.
Design of tension and compression members, beams with bending and axial stresses,
bolted and welded connections. Prerequisite, C or better in CE 3213. Dual listed as 4283.

CE 529V Special Topics in Civil Engineering Each special topic is selected on the basis of the needs of the graduate class.

EE 529V Special Topics in Electrical Engineering Each special topic is selected on the basis of the needs of the graduate class.

EE 5303. Engineering Field and Waves II Study of electromagnetic waves
in free space, dielectrics, and conductors, transmission lines, polarization, reflection, refraction, diffraction, waveguides, resonators, antennas, and radiation. Prerequisites, MATH 4403 and C or better in EE 3343. Dual listed as EE 4303.

EE 5313. Control Systems Analysis and design of linear feedback systems.
Transfer functions, state-space analysis, transient and steady state characterization, and stability determination. Closed loop analysis and design using root locus and frequency domain methods. Prerequisites, C or better in EE 3403. Corequisite, EE 3353. Dual listed as EE 4313.

EE 5323. Electrical Machinery Introduction to the analysis and design of
electromechanical energy conversion systems, magnetic circuit theory, general transformer
and machinery theory, and DC and AC motors and generators. Prerequisite, C or better in EE 3313 or ENGR 3473, and ENGR 3423. Dual listed as EE 4323.

EE 5333 Communications Theory Frequency spectra of time signals. Review.

Code # ENG 002

New/Special Course Proposal-Bulletin Change Transmittal Form

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x **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

xNew Course or ☐ Special Course (Check one box)

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

	ENTER DATE...		ENTER DATE...
Department Curriculum Committee Chair		**COPE Chair (if applicable)**	
	ENTER DATE...		ENTER DATE...
Department Chair:		**General Education Committee Chair (If applicable)**	
	ENTER DATE...		ENTER DATE...
College Curriculum Committee Chair		**Undergraduate Curriculum Council Chair**	
	ENTER DATE...		ENTER DATE...
College Dean		**Graduate Curriculum Committee Chair**	
			ENTER DATE...
		Vice Chancellor for Academic Affairs	

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1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)
CE 5293

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).
Advanced Civil Engineering Materials (Advanced CE Materials)

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.
Lecture and lab

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?
Standard letter

5. Is this course dual listed (undergraduate/graduate)?
No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)
No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.
Advanced topics in civil engineering materials, design and characterization of asphalt cement and asphalt concrete mixtures, design and characterization of Portland cement concrete, and application of composite materials to civil engineering projects..

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).
a. Are there any prerequisites?
Undergraduate coursework in civil engineering materials. Restricted to engineering graduate students .

b. Why?
The course requires students have background knowledge in basic paving and geotechnical materials.

9. Course frequency (e.g. Fall, Spring, Summer). Not applicable to Graduate courses.
Fall

10. Contact Person (Name, Email Address, Phone Number)
Zahid Hossain, mhossain@astate.edu, (870) 680 4299

11. Proposed Starting Term/Year
Fall 2014

12. Is this course in support of a new program? No
If yes, what program?

13. Does this course replace a course being deleted? No
If yes, what course?

Has this course number been used in the past? No
Submit Course Deletion Proposal-Bulletin Change Transmittal Form.

14. Does this course affect another program? No
If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.
Enter text...

15. Justification should include:
a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)
The proposed course will serve as an elective in the Master of Science in Engineering (MSEngr) program, which provides an educational experience focusing on the integration of research and technology development that allows graduates to be successful in deriving solutions to society's most challenging technical problems. Currently, there is no course in the College that covers asphalt materials and mix design procedures using Superpave and mechanistic approaches even though the

Arkansas Highway and Transportation Department (AHTD) follow these techniques. The proposed course will give MSEngr students with a civil engineering background a unique opportunity to learn these approaches and AHTD specifications.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

The proposed course is a fundamental course in the field of transportation engineering and it fits very well in fulfilling the mission established by the program. In particular, the proposed course will be highly effective for MSEngr students from civil engineering backgrounds because it will give them an opportunity to perform mix designs using mix design procedures for conditions prevailing in Arkansas. Further, students will be able to utilize knowledge learned from this course in their thesis work.

c. Student population served.

Engineering graduate students

d. Rationale for the level of the course (lower, upper, or graduate).

The nature of this course is applied engineering that consists of real-world design problems and solutions, critical thinking and innovation, which are not covered in undergraduate courses.

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Week 1 Introduction
Week 2 Asphalt Cement Superpave Test Methods
Week 3 Asphalt Concrete Mix Design
Week 4 Characterization of Asphalt Concrete Material
Week 5 Characterization of Asphalt Concrete Material (Continued)
Week 6 Portland Cement
Week 7 Portland Cement Concrete Mix Design
Week 8 Mid-term
Week 9 High Performance Portland cement Concrete
Week 10 Characterization of Portland cement Concrete
Week 11 Base Materials
Week 12 Composite Material
Week 13 Sustainable and green paving materials, green construction technologies
Week 14 Class research project presentation and deliverables
Week 15 Final Exam

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Homework assignments, projects, mid-term, and final exam

Homework	25%
Mid-term Exam	20%
Project	25%
Final exam	25%
Class Participation	5%

18. Special features (e.g. labs, exhibits, site visitations, etc.)

Labs and field trips to local paving industries

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)

No

20. What is the primary intended learning goal for students enrolled in this course?

Students will understand the characteristics and properties of asphalt concrete, Portland cement concrete, and polymers used in the highway infrastructure. The course is divided in four sections. In the first section, the classical methods plus newly developed methods used for asphalt concrete will be discussed. In the second section, students will be exposed to Portland cement concrete and high performance concrete. In the third section, students will be exposed to the base materials used in the highway infrastructure. In the last section, polymers and plastics used will be discussed. Advanced topics in asphalts such as warm mix asphalt (WMA), reclaimed asphalt pavement (RAP), and recycled asphalt shingles (RAS) will be discussed. In particular, the Superpave test methods and mix design procedures will be discussed in this class. Specifications of the Arkansas Highway Transportation Department (AHTD) will be followed in laboratory assignments. A semester long design project will be assigned.

21. Reading and writing requirements:
a. Name of book, author, edition, company and year
Text Book:

1. Brown, Kandhal, Roberts, Kim, Lee and Kennedy, "Hot Mix Asphalt Materials, Mixture Design and Construction," Third Edition, NAPA Research and Education Foundation (2009).
2. SP Shah and SH Ahmad (Eds), "High Performance Concrete: Properties and Applications," McGraw Hill (1994), ISBN-10: 0070569746

Reference Materials:

1. AASHTO Guide for Design of Pavement Structures 1993 + Supplement (Vol 1), Amer Assn of State Hwy (1993), ISBN 10: 1560510552.
2. R.B. McGennis, S. Shuler, H.U. Bahia, "Background of SUPERPAVE Asphalt Binder Test Methods," Asphalt Institute, Lexington Kentucky, 1994.
3. R.B. McGennis, R.M. Anderson, T.W. Kennedy, M. Solaimanian, "Background of SUPERPAVE Asphalt Mixture Design and Analysis," Asphalt Institute, Kentucky, 1995.
4. E. Riande, R Diaz-Calleja, MG Prolongo, RM Masegosa, and C Salom, Marcel Dekker, Inc. "Polymer Viscoelasticity Stress and Strain in Practice," CRC Press, First Edition (1999), ISBN-10: 0824779045
5. Handouts on selected topics and articles on sustainable design of pavement materials and technologies

b. Number of pages of reading required per week: 20-30
c. Number of pages of writing required over the course of the semester: 40-60

22. High-Impact Activities (Check all that apply)

- x Collaborative assignments
- x Research with a faculty member
- ☐ Diversity/Global learning experience
- ☐ Service learning or community learning
- ☐ Study abroad
- ☐ Internship
- ☐ Capstone or senior culminating experience
- ☐ Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

Outcome #1: (For example, what will students who meet this goal know or be able to do as a result of this course?)
Students will have an ability to design and conduct experiments for characterizing paving materials.

Learning Activity: (For example, what instructional processes do you plan to use to help students reach this outcome?)

One class session will be designed to cover the basics of experimental design. Students will be asked to design an experiment for evaluating asphalt binder in accordance with the Superpave (Superior Performing Asphalt Pavement) test protocols to achieve specific requirements set by the American State Highway and Transportation Officials (AASHTO).

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?) Students will submit a technical proposal that covers the steps and procedures taken in the experimental design of characterizing asphalt binders through Superpave test protocols. The instructor of this course will perform the assessment for each student.

(Repeat if needed for additional outcomes 2 and 3)
Outcome #2:

Learning Activity:

Assessment Tool:

Outcome #3:
;

Learning Activity:

Assessment Tool:

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

a. Global Awareness
☐ Minimally
x Indirectly
☐ Directly

b. Thinking Critically
☐ Minimally
☐ Indirectly
x Directly

c. Using Technology
☐ Minimally
☐ Indirectly
x Directly

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COLLEGE OF ENGINEERING GRADUATE COURSE DESCRIPTIONS

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CE 5233. Foundation Engineering Prediction of soil variation, soil investigations,
stress distribution and bearing capacity, dewatering analysis and procedures, and settlements. The design and analysis of retaining structures and lateral earth pressures, shallow foundations, pile foundations. Three foundation design projects are required. Prerequisite, C or better in CE 2202. Corequisite, CE 4253. Dual listed as CE 4233.

CE 5243. Reinforced Concrete Design Design of beams with bending, and shear stress, splicing design and deflection calculations, design columns. Prerequisites, C or better in CE 3213. Dual listed as CE 4243.

CE 5253. Soil Mechanics Physical properties of soils as used in design, specific gravity, grain size distribution, plasticity, shrinkage, permeability, compressibility, consolidation and shear strength. Foundation design for consolidation. Corequisites, ENGR 3473 and CE 4251. Dual listed as CE 4253.

CE 5263. Water and Waste Treatment Design of physical, chemical and biological unit processes for treatment of water, wastewater and sludges. Advanced wastewater treatment processes are presented. Student papers on selected waste treatment applications are required. Prerequisites, C or better in CE 3273. Dual listed as CE 4263.

CE 5283. Structural Steel Design Design of structural systems in steel.
Design of tension and compression members, beams with bending and axial stresses,
bolted and welded connections. Prerequisite, C or better in CE 3213. Dual listed as 4283.

CE 5293. **Advanced Civil Engineering Materials** Advanced topics in civil engineering materials, design and characterization of asphalt cement and asphalt concrete mixtures, design and characterization of Portland cement concrete, and application of composite materials to civil engineering projects. Prerequisite: Undergraduate coursework in civil engineering materials.

CE 529V Special Topics in Civil Engineering Each special topic is selected on the basis of the needs of the graduate class.

Code # ENG 004

New/Special Course Proposal-Bulletin Change Transmittal Form

☐ **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

x **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

x**New Course or** ☐ **Special Course (Check one box)**

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

	ENTER DATE...		ENTER DATE...
Department Curriculum Committee Chair		**COPE Chair (if applicable)**	
	ENTER DATE...		ENTER DATE...
Department Chair:		**General Education Committee Chair (If applicable)**	
	ENTER DATE...		ENTER DATE...
College Curriculum Committee Chair		**Undergraduate Curriculum Council Chair**	
	ENTER DATE...		ENTER DATE...
College Dean		**Graduate Curriculum Committee Chair**	
			ENTER DATE...
		Vice Chancellor for Academic Affairs	

---

1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)
ENGR 6053

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).
Sustainable Engineering and Development (Sustainable Engineering)

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.
Lecture only

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?
Standard letter

5. Is this course dual listed (undergraduate/graduate)?
No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)
No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.
Introduction to sustainability; risk and life-cycle frameworks for sustainability; guiding principles of engineering; green and sustainable materials; design for sustainability; sustainable engineering best practices; a sustainable design project will be required..

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).
a. Are there any prerequisites?
Graduate standing

b. Why?
Students will need to use fundamental knowledge in engineering and science to understand the topics covered in course.

9. Course frequency (e.g. Fall, Spring, Summer). Not applicable to Graduate courses.
Enter text...

10. Contact Person (Name, Email Address, Phone Number)
Dr. Zahid Hossain, mhossain@astate.edu, (870) 680 4299

11. Proposed Starting Term/Year
Fall 2014

12. Is this course in support of a new program? Yes/No
If yes, what program?
No

13. Does this course replace a course being deleted? Yes/No
If yes, what course?
No

Has this course number been used in the past? No
Submit Course Deletion Proposal-Bulletin Change Transmittal Form.

14. Does this course affect another program? No
If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.
Enter text...

15. Justification should include:
a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)
i) The proposed course will contribute to the CE major of the Master of Science in Engineering (MSEngr) program, which provides an educational experience focusing on the integration of research and technology development that allows graduates to be successful in deriving solutions to society's most challenging technical problems.

ii) The MSEngr, MEM and BS programs in the College currently do not have a course that covers the broad topics of sustainability from engineering perspectives. The course aims to provide strong foundation of sustainability in engineering design, products and processes to ASU students, and better prepared them for professional careers where they can apply the sustainability concepts.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

i) The proposed course will help in fulfilling a major goal of the College of Engineering and Center for Efficient Use of Resources (CESUR) that states to engage graduate students and faculty members in "*R/D works on efficiency improvement and sustainability of energy resources through partnerships with government, regional industries and universities*."

ii) The proposed course is an essential course in the field of sustainability in which students will have an opportunity to learn, analyze, and design sustainable aspects of engineering principles and methodologies through lectures, self-reading, and term projects. Other than engineering, students from other disciples such as Environmental Science and Agriculture are expected to enroll and get benefits of this course.

c. Student population served.

Graduate students from Engineering, Environmental Science, Agriculture and Technology programs

d. Rationale for the level of the course (lower, upper, or graduate).

The nature of this course is applied engineering that consists of real-world design problems and solutions, critical thinking and innovation toward developing sustainable technologies and infrastructures. Basic science and engineering knowledge is required and graduate students from aforementioned disciples are expected to have the required academic background..

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Week 1 Introduction of sustainability concepts; Roles of engineers in developing sustainable society
Week 2 Humanity and Technology; Master equation of sustainability; Models for population growth;
Week 3 Natural resources availability; course project assignment.
Week 4 Definitions, principles and indicators of sustainability; Quantification of sustainability
Week 5 Links between industrial activities and sustainability issues
Week 6 Evaluation of important criteria for sustainable development
Week 7 Mid-term exam; Evaluation of important criteria for sustainable development (Continued)
Week 8 Concepts of green engineering; Process/product design; Pollution prevention
Week 9 Concepts of green engineering; Process/product design; Pollution prevention (Continued)
Week 10 Design for environment and sustainability: Building and infrastructure
Week 11 Design for environment and sustainability: Building and infrastructure (Continued)
Week 12 Sustainable design and life cycle assessment
Week 13 Sustainable engineering in Government and Society
Week 14 Class research project presentation and deliverables
Week 15 Final Exam (Comprehensive)

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Homework assignments, projects, mid-term, and final exam

Homework	25%
Mid-term Exam	20%
Project	20%
Final exam	30%
Class Participation	5%

18. Special features (e.g. labs, exhibits, site visitations, etc.)

No

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)
No

20. What is the primary intended learning goal for students enrolled in this course?
The students completing this course will learn the principles, indicators, and general concept of sustainability. Students are expected to be able to understand the local, regional, and global impacts of unsustainable designs, products, and processes. Student will be able to apply the sustainability concepts in engineering.

21. Reading and writing requirements:
a. Name of book, author, edition, company and year
Text Book:

1. T. E. Graedel and B. R. Allenby, "Industrial Ecology and Sustainable Engineering," Prentice Hall (2010), ISBN-10: 0136008062.

Supporting Materials:

1. Jorge A. Vanegas (Ed.), "Sustainable Engineering Practice-An Introduction," American Society of Civil Engineers (2004), ISBN: 9780784407509
2. W. Wimmer, and Joanne Kauffman (Eds.), "Handbook of Sustainable Engineering," Springer (2013), ISBN: 978-1-4020-8938-1 (Print) 978-1-4020-8939-8 (Online)
3. Daniel A. Vallero and Chris Brasier, "The Science of Sustainability and Green Engineering," Wiley-Blackwell (2008), ISBN: 978-0-470-13062-9.
4. Handouts of selected topics and articles on sustainable design of pavement materials and technologies

b. Number of pages of reading required per week: 40
c. Number of pages of writing required over the course of the semester: 60

22. High-Impact Activities (Check all that apply)

- x Collaborative assignments
- x Research with a faculty member
- ☐ Diversity/Global learning experience
- ☐ Service learning or community learning
- ☐ Study abroad
- ☐ Internship
- ☐ Capstone or senior culminating experience
- ☐ Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

Outcome #1: (For example, what will students who meet this goal know or be able to do as a result of this course?)
Students will understand the roles of engineers in developing a sustainable society, the influence of sustainable engineering on society, and the impacts of engineering designs.

Learning Activity: (For example, what instructional processes do you plan to use to help students reach this outcome?)
Students will be assigned a term project to assess sustainability of an existing entity or system (e.g., rural town, urban town, transportation system, water quality) and provide realistic sustainable solutions considering their social, economic, and environmental impacts. Students will conduct a literature review, a survey, and then formulate the problems and provide realistic solution along with their impacts on the society and environment. Students will submit their written reports and give oral presentation in the class room.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?) Students' term papers and oral presentations summarizing their findings of the project will be evaluated to assess this outcome. The assessment of each student in the class will be performed by the instructor of this course.

(Repeat if needed for additional outcomes 2 and 3)
Outcome #2:
.

Learning Activity:

Assessment Tool:
The term project report will be evaluated to assess this outcome

Outcome #3:
.;

Learning Activity:

Assessment Tool:

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

a. Global Awareness
☐ Minimally
x Indirectly
x Directly

b. Thinking Critically
☐ Minimally
☐ Indirectly
x Directly

c. Using Technology
☐ Minimally
☐ Indirectly
x Directly

From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.

To copy from the bulletin:

1. Minimize this form.

2. Go to http://registrar.astate.edu/bulletin.htm and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the "select" button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on "copy".
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose "paste".
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

Pg. 167 of 2013-14 Graduate Bulletin

ENGR 6043 Applied Probability and Estimation Application of probability to the analysis of engineering systems with inherent randomness to achieve efficient use of information in engineering analysis. Topics include random variables, statistics, probability density functions, noise, nonrandom parameter estimation, bounds, Bayesian estimation, detection, and filters. Prerequisite: ENGR 6023 Advanced Engineering Math

ENGR 6053 Sustainable Engineering and Development Introduction to sustainability; risk and life-cycle frameworks for sustainability; guiding principles of engineering; green and sustainable materials; design for sustainability; sustainable engineering best practices; a sustainable design project will be required. Prerequisites: Graduate standing or instructor's permission

ENGR 6113. Materials Science and Engineering Principle concepts and advanced studies in materials science and engineering for graduate level students. Fundamental topics such as material properties in microstructures and modern solid state physics and quantum mechanics are introduced.

ENGR 6123. Engineering Optimization Formulation and modeling aspects of engineering problems using various optimization techniques to seek optimum value and design under specific requirements. Set-up numerical formulations and algorithms, introduction of design of experimental methods, and application to practical engineering problems included.

ENGR 6133 Engineering Electrodynamics Dynamic theory of material interactions with electricity, magnetism, and light based on conservation of energy and momentum. Examples include modern applications of optical manipulation such as optical tweezers and optical binding of matter. Prerequisite: ENGR 6023 Advanced Engineering Math and an undergraduate course in electromagnetics.

ENGR 6143 Advanced Heat and Mass Transfer Conservation laws, steady/unsteady conduction, mass diffusion, exact/numerical solutions of PDE, FDM, Fourier/Laplace transform in heat transfer, convection, heat transfer in Couette/Poiseuille/Falkner-Skan flows, heat transfer in laminar/turbulent boundary layer, natural convection and radiation. Prerequisite: Undergraduate coursework in fluid mechanics and heat transfer.

ENGR 6153 Advanced Fluid Mechanics Principal concepts and advanced topics in fluid mechanics including vector analysis, kinematics, control volume theorem, continuity, momentum, Navier-Stokes, Euler and Bernoulli equations, potential flow, circulation, vorticity, similarity, boundary layers approximation and turbulence. Prerequisite: Undergraduate course in fluid mechanics.

ENGR 629V Special Topics in Engineering Each special topic is selected on the basis of the needs of the graduate class.

ENGR 689V Thesis

ME 5503. Fluid and Thermal Energy Systems Analysis and design of components, systems, and processes using the fundamentals presented in Thermodynamics,

Fluid Mechanics, and Heat Transfer. Corequisite, ME 4553. Prerequisites, C or better in ENGR 3473 and ENGR 3443. Dual listed as ME 4503.

ME 5523. Introduction to Finite Element Analysis Theory and application

of energy concepts and structural mechanics required for the development of finite element methods are presented. Applications to beams, trusses, torsion, etc. are presented. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4523.

ME 5543. Machine Design Analysis and design of mechanical system components

using theoretical and empirical concepts coupled with computational modeling and numerical analysis. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4543.

ME 5553. Heat Transfer Application of theories of heat transfer by conduction,

Revised 3/08/13

Code # ENG 005

New/Special Course Proposal-Bulletin Change Transmittal Form

☐ **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

x **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

x**New Course or** ☐ **Special Course (Check one box)**

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

	ENTER DATE...		ENTER DATE...
Department Curriculum Committee Chair		**COPE Chair (if applicable)**	
	ENTER DATE...		ENTER DATE...
Department Chair:		**General Education Committee Chair (If applicable)**	
	ENTER DATE...		ENTER DATE...
College Curriculum Committee Chair		**Undergraduate Curriculum Council Chair**	
	ENTER DATE...		ENTER DATE...
College Dean		**Graduate Curriculum Committee Chair**	
			ENTER DATE...
		Vice Chancellor for Academic Affairs	

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1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)
ENGR 6163

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).
Analysis and Design of Pavements (Analysis/Design of Pavements

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.
Lecture

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?
Standard letter

5. Is this course dual listed (undergraduate/graduate)?
No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)
No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.
Stress and strain analyses of flexible and rigid pavements; designs of pavements using empirical and mechanistic approaches; reliability, material characterization, traffic data, and local calibration of mechanistic design of pavements; and sustainable materials and technologies.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).
a. Are there any prerequisites?
Undergraduate coursework in civil engineering materials and transportation engineering; restricted to engineering graduate students.

b. Why?
The course requires students have background knowledge in both asphalt and Portland cement concrete (PCC) materials, and geotechnical engineering

9. Course frequency (e.g. Fall, Spring, Summer). Not applicable to Graduate courses.
Spring

10. Contact Person (Name, Email Address, Phone Number)
Zahid Hossain, mhossain@astate.edu, (870) 680 4299

11. Proposed Starting Term/Year
Spring 2015

12. Is this course in support of a new program? No
If yes, what program?

13. Does this course replace a course being deleted? No
If yes, what course?

Has this course number been used in the past? No
Submit Course Deletion Proposal-Bulletin Change Transmittal Form.

14. Does this course affect another program? No
If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.
Enter text...

15. Justification should include:
a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)
The proposed course will serve as a technical elective in the Master of Science in Engineering (MSEngr) program, which provides an educational experience focusing on the integration of research and technology development that allows graduates

to be successful in deriving solutions to society's most challenging technical problems. The proposed course will provide technical elective options to students with civil engineering emphasis.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

The proposed course is an advanced course in the field of transportation engineering and it fits very well in fulfilling the mission established by the program. In particular, the proposed course will be highly effective for MSEngr students with a civil engineering background because it will give them an opportunity to perform structural analysis and design of pavement structures. Students will use different software tools to analyze pavement structures. Further, students will be able to utilize the knowledge learned from this course in their thesis work.

c. Student population served.

Engineering graduate students

d. Rationale for the level of the course (lower, upper, or graduate).

The nature of this course is applied engineering that consists of real-world design problems and solutions, critical thinking and innovation. Students will be using cutting-edge software tools to analyze and design pavement structures. Basic science and engineering knowledge is required and graduate students from aforementioned disciples are expected to have the required academic background.

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Week 1 Introduction to pavement design: empirical versus mechanistic designs	Huang Chap.1
Week 2 Flexible analytical models	Huang Chap.2
Week 3 Flexible analysis: KENLAYER software; Research project assignment	Huang Chap.3
Week 4 Stresses and Deflection in rigid Pavements	Huang Chap. 4
Week 5 Rigid Pavement design: KENPAVES Software	Huang Chap. 5
Week 6 Traffic analysis for highway pavements Pavement distresses	Huang Chap. 6
Week 7 Material Characterization, Pavement Performance	Huang Chap. 7 & 9
Week 8 Mid-term (Chaps 1 through 7)	
Week 9 Introduction to M-EPDG: history, reliability and design approach	AASHTO M-EPDG Ch. 1
Week 10 Input study of the ME-PDG method	AASHTO M-EPDG Ch. 2-3
Week 11 Distress transfer functions, distress models and IRI	LCG Chap. 1-2
Week 12 Sustainable paving material, design and technologies	Research articles and Handouts
Week 13 Economic analysis of alternative pavement designs	Papagiannakis, and E. A. Masad; Ch. 14
Week 14 Class research project presentation and deliverables	
Week 15 Final Exam	Comprehensive

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Homework assignments, projects, mid-term, and final exam

Homework	25%
Mid-term Exam	20%
Project	25%
Final exam	30%

18. Special features (e.g. labs, exhibits, site visitations, etc.)

No

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)

No

20. What is the primary intended learning goal for students enrolled in this course?

Students will understand the analysis and design of highway pavements, including both flexible and rigid types, with emphasis on the AHTD design methods.

21. Reading and writing requirements:
a. Name of book, author, edition, company and year
Text Book:
1.Yang H. Huang, "Pavement Analysis and Design", 2nd Edition, Pearson Education, Inc., Pearson Prentice Hall Company, 2003, ISBN-10: 0131424734.

Supporting Materials:
1. A. T. Papagiannakis, and E. A. Masad, "Pavement Design and Materials," First Edition, John Wiley & Sons, Inc., 2008. ISBN-10: 0471214612
2. "Mechanistic-Empirical Pavement Design Guide," A Manual of Practice, Publication Code: MEPDG-1, American Association of State Highway and Transportation Officials (AASHTO), July 2008, ISBN:978-1-56051-432-7.
3. "Local Calibration of the Mechanistic-Empirical Pavement Design Guide", A Manual of Practice, Interim Edition, Publication Code: LCG-1, American Association of State Highway and Transportation Officials (AASHTO), November 2010, ISBN: 978-1-56051-449-7.
4. Handouts on selected topics and articles on sustainable design of pavement materials and technologies

b. Number of pages of reading required per week: 40
c. Number of pages of writing required over the course of the semester: 60

22. High-Impact Activities (Check all that apply)
- x Collaborative assignments
- x Research with a faculty member
- ☐ Diversity/Global learning experience
- ☐ Service learning or community learning
- ☐ Study abroad
- ☐ Internship
- ☐ Capstone or senior culminating experience
- ☐ Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

Outcome #1: (For example, what will students who meet this goal know or be able to do as a result of this course?)
Students will be able to perform structural design (thickness) of rigid and flexible pavements in accordance with agency specifications and guidelines.

Learning Activity: (For example, what instructional processes do you plan to use to help students reach this outcome?)
The student will use a mechanistic-based pavement analysis and design software tool to enter design input parameters (load, traffic, materials properties, etc.) to estimate stresses, strains, and thicknesses of different pavement layers by meeting agencies' design criteria. One class will be dedicated to theoretical background on the mechanistic design approach and one class will be used to provide hands-on training on Mechanistic Empirical Pavement Design Guide (MEPDG) software.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)
This outcome will be assessed using a unique homework assignment. Students will gather input data and agency guidelines and analyze a typical flexible pavement section using the MEPDG software and discuss the results. The assessment of each student in the class will be performed by the instructor of this course.

(Repeat if needed for additional outcomes 2 and 3)
Outcome #2:

Learning Activity:
.

Assessment Tool:

Outcome #3:
;

Learning Activity:

Assessment Tool:

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

a. Global Awareness
☐ Minimally
x Indirectly
☐ Directly

b. Thinking Critically
☐ Minimally
☐ Indirectly
x Directly

c. Using Technology
☐ Minimally
☐ Indirectly
x Directly

From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.

To copy from the bulletin:

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2. Go to http://registrar.astate.edu/bulletin.htm and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the "select" button and highlight the pages you want to copy.
5. Right-click on the highlighted area.

6. Click on “copy”.
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose “paste”.
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

Pg. 167 of 2013-2014 Graduate Bulletin

ENGR 6043 Applied Probability and Estimation Application of probability to the analysis of engineering systems with inherent randomness to achieve efficient use of information in engineering analysis. Topics include random variables, statistics, probability density functions, noise, nonrandom parameter estimation, bounds, Bayesian estimation, detection, and filters. Prerequisite: ENGR 6023 Advanced Engineering Math

ENGR 6113. Materials Science and Engineering Principle concepts and advanced studies in materials science and engineering for graduate level students. Fundamental topics such as material properties in microstructures and modern solid state physics and quantum mechanics are introduced.

ENGR 6123. Engineering Optimization Formulation and modeling aspects of engineering problems using various optimization techniques to seek optimum value and design under specific requirements. Set-up numerical formulations and algorithms, introduction of design of experimental methods, and application to practical engineering problems included.

ENGR 6133 Engineering Electrodynamics Dynamic theory of material interactions with electricity, magnetism, and light based on conservation of energy and momentum. Examples include modern applications of optical manipulation such as optical tweezers and optical binding of matter. Prerequisite: ENGR 6023 Advanced Engineering Math and an undergraduate course in electromagnetics.

ENGR 6143 Advanced Heat and Mass Transfer Conservation laws, steady/unsteady conduction, mass diffusion, exact/numerical solutions of PDE, FDM, Fourier/Laplace transform in heat transfer, convection, heat transfer in Couette/Poiseuille/Falkner-Skan flows, heat transfer in laminar/turbulent boundary layer, natural convection and radiation. Prerequisite: Undergraduate coursework in fluid mechanics and heat transfer.

ENGR 6153 Advanced Fluid Mechanics Principal concepts and advanced topics in fluid mechanics including vector analysis, kinematics, control volume theorem, continuity, momentum, Navier-Stokes, Euler and Bernoulli equations, potential flow, circulation, vorticity, similarity, boundary layers approximation and turbulence. Prerequisite: Undergraduate course in fluid mechanics.

ENGR 6163 Analysis and Design of Pavements Stress and strain analyses of flexible and rigid pavements; designs of pavements using empirical and mechanistic approaches; reliability, material characterization, traffic data, and local calibration of mechanistic design of pavements; and sustainable materials and technologies. Prerequisite: Undergraduate coursework in civil engineering materials and transportation engineering.

ENGR 629V Special Topics in Engineering Each special topic is selected on the basis of the needs of the graduate class.

ENGR 689V Thesis

components, systems, and processes using the fundamentals presented in Thermodynamics,
Fluid Mechanics, and Heat Transfer. Corequisite, ME 4553. Prerequisites, C or better in ENGR 3473 and ENGR 3443. Dual listed as ME 4503.

ME 5523. Introduction to Finite Element Analysis Theory and application
of energy concepts and structural mechanics required for the development of finite element methods are presented. Applications to beams, trusses, torsion, etc. are presented. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4523.

ME 5543. Machine Design Analysis and design of mechanical system components
using theoretical and empirical concepts coupled with computational modeling and numerical analysis. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4543.

ME 5553. Heat Transfer Application of theories of heat transfer by conduction,.

Code # ENG 003

New/Special Course Proposal-Bulletin Change Transmittal Form

☐ **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

☒ **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

☒New Course or ☐ Special Course (Check one box)

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

	ENTER DATE...		ENTER DATE...
Department Curriculum Committee Chair		**COPE Chair (if applicable)**	
	ENTER DATE...		ENTER DATE...
Department Chair:		**General Education Committee Chair (If applicable)**	
	ENTER DATE...		ENTER DATE...
College Curriculum Committee Chair		**Undergraduate Curriculum Council Chair**	
	ENTER DATE...		ENTER DATE...
College Dean		**Graduate Curriculum Committee Chair**	
			ENTER DATE...
		Vice Chancellor for Academic Affairs	

---

1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)
ENGR 6233

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).
Advanced Foundation Engineering (Adv Foundation Engineering)

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.
Lecture

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?
Letter

5. Is this course dual listed (undergraduate/graduate)?
No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)
No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.
Advanced theories and concepts in the areas of shallow foundations, deep foundations, foundations on problematic soils, reinforced earth slopes and mechanically stabilized earth retaining walls.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).
a. Are there any prerequisites?
Undergraduate Coursework in Soil Mechanics and Foundation Engineering; Restricted to engineering graduate students.

b. Why?
The prerequisite courses cover the fundamentals of soil mechanics and foundation engineering, which is required to understand and apply the concepts and methods to be learned in the course.

9. Course frequency (e.g. Fall, Spring, Summer). Not applicable to Graduate courses.
Spring

10. Contact Person (Name, Email Address, Phone Number)
Dr. Tom Parsons, ASU College of Engineering, P. O. Box 1740, State University, AR 72467 tparsons@astate.edu: (870) 972-2088
Dr. Ashraf Elsayed, ASU College of Engineering, P. O. Box 1740, State University, AR 72467, aelsayed@astate.edu, (870) 972-2088

11. Proposed Starting Term/Year
Spring 2015

12. Is this course in support of a new program? No
If yes, what program?

13. Does this course replace a course being deleted? No
If yes, what course?

Has this course number been used in the past? No
Submit Course Deletion Proposal-Bulletin Change Transmittal Form.

14. Does this course affect another program? No
If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.
Enter text...

15. Justification should include:
a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)
The course will provide students with in-depth understanding of various types of foundations typically used in engineering

practice which is integral to engineers practicing in the area of geotechnical engineering. Students will apply knowledge gained in earlier coursework to complete the evaluation and write a comprehensive engineering report. Activities will help students gain practical experience.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.
The course is consistent with the mission of the current MSEngr program the College of Engineering. The curriculum is designed to give graduate students in-depth understanding and working knowledge of foundation engineering and to prepare graduates for professional practice.

c. Student population served.
Engineering graduate students

d. Rationale for the level of the course (lower, upper, or graduate).
The course is consistent with the mission of the current MSEngr program in the College of Engineering. The curriculum requires the fundamental understanding of basic soil mechanics and foundation engineering, which are covered in undergraduate courses. It is designed to give graduate students in-depth understanding and working knowledge of advanced foundation engineering solutions to complex construction problems and to prepare graduates for professional practice. The subject is particularly suited for students pursuing an emphasis in civil engineering.

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)
A general outline of course activities is given below.

Week 1: Introduction / Subsurface Exploration

Week 2: Subsurface Exploration

Week 3: Shear Strength of soil and rock

Week 4: Shallow Foundations

Week 5: Foundations on Expansive Soil

Week 6: Foundation on Collapsible Soil

Week 7: Deep Foundations – Driven Piles

Week 8: Dynamic Evaluation of Driven Pile Capacity

Week 9: Auger-cast Piles

Week 10: Drilled Shafts

Week 11: Lateral Load Analysis of Deep Foundations

Week 12: Mechanically Stabilized Earth (MSE) Walls

Week 13: MSE Wall

Week 14: MSE Walls

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)
One research paper, one group design project, one mid-term exam and a final exam

18. Special features (e.g. labs, exhibits, site visitations, etc.)
One visit to a construction site

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)
No

20. What is the primary intended learning goal for students enrolled in this course?
To prepare graduate students for engineering practice in the area of geotechnical engineering

21. Reading and writing requirements:
a. Name of book, author, edition, company and year
Required textbook:
Foundation Design Principles and Practices, 2nd Edition, 2000 by Donald P. Caduto, Prentice Hall

Additional Reference Manuals (available online):
FHWA Geotechnical Engineering Circular No. 5 – Evaluation of Soil and Rock Properties, FHWA-IF-02-034, 2002
FHWA Geotechnical Engineering Circular No. 10 – Drilled Shafts: Construction Procedures and LRFD Design Methods, FHWA-NHI-10-016, 2010
FHWA Geotechnical Engineering Circular No. 11 – Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Earth Slopes, FHWA-NHI-10-24, 2010
FHWA Geotechnical Engineering Circular No. 8 – Design and Construction of Continuous Flight Auger Piles, FHWA-HIF-07-039, 2007
b. Number of pages of reading required per week: 20-30
c. Number of pages of writing required over the course of the semester: 100

22. High-Impact Activities (Check all that apply)
- ☐ Collaborative assignments
- ☐ Research with a faculty member
- ☐ Diversity/Global learning experience
- ☐ Service learning or community learning
- ☐ Study abroad
- ☐ Internship
- ☐ Capstone or senior culminating experience
- ☐ Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

Outcome #1: (For example, what will students who meet this goal know or be able to do as a result of this course?)
Outcome # 1: The students will have the ability to identify, formulate, and solve complex problems in the area of foundation engineering. The advanced knowledge acquired in the course will allow the student to analyze collected data and formulate a logical solution to solving foundation engineering problems.

Learning Activity: (For example, what instructional processes do you plan to use to help students reach this outcome?)
Learning Activity # 1: Students will investigate a construction site, identify soil-related problems, formulate this problem using engineering background and mathematical expressions, then develop a solution to the identified problems and submit their solution in an engineering report.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)
Assessment Tool # 1: A report will be submitted by each student that contains a description and documentation of the work performed. The report contents will be assessed based on a set of rubrics and content requirements. The assessment of each student will be performed by the instructor.

(Repeat if needed for additional outcomes 2 and 3)
Outcome #2:
Enter text…

Learning Activity:
Enter text…

Assessment Tool:
Enter text…

Outcome #3:
Enter text…

Learning Activity:
Enter text…

Assessment Tool:
Enter text…

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

a. Global Awareness
   - ☒ Minimally
   - ☐ Indirectly
   - ☐ Directly

b. Thinking Critically
   - ☐ Minimally
   - ☐ Indirectly
   - ☒ Directly

c. Using Technology
   - ☐ Minimally
   - ☐ Indirectly
   - ☒ Directly

From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.

To copy from the bulletin:

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2. Go to http://registrar.astate.edu/bulletin.htm and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the "select" button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on "copy".
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose "paste".
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

Pg. 167 of 2013-14 Graduate Bulletin

ENGR 6043 Applied Probability and Estimation Application of probability to the analysis of engineering systems with inherent randomness to achieve efficient use of information in engineering analysis. Topics include random variables, statistics, probability density functions, noise, nonrandom parameter estimation, bounds, Bayesian estimation, detection, and filters. Prerequisite: ENGR 6023 Advanced Engineering Math

ENGR 6113. Materials Science and Engineering Principle concepts and advanced studies in materials science and engineering for graduate level students. Fundamental topics such as material properties in microstructures and modern solid state physics and quantum mechanics are introduced.

ENGR 6123. Engineering Optimization Formulation and modeling aspects of engineering problems using various optimization techniques to seek optimum value and design under specific requirements. Set-up numerical formulations and algorithms, introduction of design of experimental methods, and application to practical engineering problems included.

ENGR 6133 Engineering Electrodynamics Dynamic theory of material interactions with electricity, magnetism, and light based on conservation of energy and momentum. Examples include modern applications of optical manipulation such as optical tweezers and optical binding of matter. Prerequisite: ENGR 6023 Advanced Engineering Math and an undergraduate course in electromagnetics.

ENGR 6143 Advanced Heat and Mass Transfer Conservation laws, steady/unsteady conduction, mass diffusion, exact/numerical solutions of PDE, FDM, Fourier/Laplace transform in heat transfer, convection, heat transfer in Couette/Poiseuille/Falkner-Skan flows, heat transfer in laminar/turbulent boundary layer, natural convection and radiation. Prerequisite: Undergraduate coursework in fluid mechanics and heat transfer.

ENGR 6153 Advanced Fluid Mechanics Principal concepts and advanced topics in fluid mechanics including vector analysis, kinematics, control volume theorem, continuity, momentum, Navier-Stokes, Euler and Bernoulli equations, potential flow, circulation, vorticity, similarity, boundary layers approximation and turbulence. Prerequisite: Undergraduate course in fluid mechanics.

ENGR 6233 Advanced Foundation Engineering advanced theories and concepts in the areas of shallow foundations, deep foundations, foundations on problematic soils, reinforced earth slopes and mechanically stabilized earth retaining walls. Prerequisites, Undergraduate coursework in Soil Mechanics and Foundation Engineering.)

ENGR 629V Special Topics in Engineering Each special topic is selected on the basis of the needs of the graduate class.

ENGR 689V Thesis

ME 5503. Fluid and Thermal Energy Systems Analysis and design of components, systems, and processes using the fundamentals presented in Thermodynamics,

Fluid Mechanics, and Heat Transfer. Corequisite, ME 4553. Prerequisites, C or better in ENGR 3473 and ENGR 3443. Dual listed as ME 4503.

ME 5523. Introduction to Finite Element Analysis Theory and application

of energy concepts and structural mechanics required for the development of finite element methods are presented. Applications to beams, trusses, torsion, etc. are presented. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4523.

ME 5543. Machine Design Analysis and design of mechanical system components

using theoretical and empirical concepts coupled with computational modeling and numerical analysis. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4543.

ME 5553. Heat Transfer Application of theories of heat transfer by conduction.

Revised 3/08/13

Code # Enter text...

New/Special Course Proposal-Bulletin Change Transmittal Form

☐ **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

☒ **Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

☒**New Course or** ☐ **Special Course (Check one box)**

Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.

	ENTER DATE...		ENTER DATE...
Department Curriculum Committee Chair		**COPE Chair (if applicable)**	
	ENTER DATE...		ENTER DATE...
Department Chair:		**General Education Committee Chair (If applicable)**	
	ENTER DATE...		ENTER DATE...
College Curriculum Committee Chair		**Undergraduate Curriculum Council Chair**	
	ENTER DATE...		ENTER DATE...
College Dean		**Graduate Curriculum Committee Chair**	
			ENTER DATE...
		Vice Chancellor for Academic Affairs	

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1. Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)
BIO 5444

2. Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).
Wildlife Population Modeling

3. Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.
This course will be lecture and lab

4. What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?
Standard letter

5. Is this course dual listed (undergraduate/graduate)?
No

6. Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)
No

7. Brief course description (40 words or fewer) as it should appear in the bulletin.
Introduction to population models, techniques to estimate demographic parameters (e.g., survival, breeding success). Statistical background recommended. Fall of even years.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).
a. Are there any prerequisites?
No pre-requisite although a statistical background such as Biological Data Analysis is recommended..

b. Why?
Even though techniques involving statistics will be explained, it might be more difficult for a student with no statistical background to understand the explanations and therefore the techniques.

9. Course frequency (e.g. Fall, Spring, Summer). Not applicable to Graduate courses.
Fall Even

10. Contact Person (Name, Email Address, Phone Number)
Dr. Virginie Rolland, Department of Biological Sciences, LSE 314, vrolland@astate.edu, 972-3194

11. Proposed Starting Term/Year
Fall 2014

12. Is this course in support of a new program? No
If yes, what program?
….

13. Does this course replace a course being deleted? No
If yes, what course?
Enter text…

Has this course number been used in the past? No
Submit Course Deletion Proposal-Bulletin Change Transmittal Form.

14. Does this course affect another program? No
If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.
Enter text…

15. Justification should include:
a. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)
This course should give students in biology a better understanding of population dynamics and its wide use in wildlife conservation and management, and in life history theory.

At the end of the course, students will specifically have (1) a thorough understanding of various population models used in ecology, (2) the tools to estimate a variety of demographic parameters such as breeding success or survival probability using different types of data (telemetry, capture-mark-recapture, and (3) basic knowledge about matrices and matrix algebra as it applies to matrix population models. Additionally, students will become more familiar with two free programs (R, MARK) that are commonly used in wildlife population ecology.

b. How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.
By combining mathematics/statistics with population ecology, this course fits with the emphasis placed on interdisciplinary instruction in the Department of Biological Sciences. More and more models with more and more complexity (for more accuracy and robustness) are developed in ecology. This course will thus get students exposed and better prepared to current and future challenges in ecology..

c. Student population served.
This course will serve graduate students in the Biology and Environmental Science programs.

d. Rationale for the level of the course (lower, upper, or graduate).
This course involves statistics and requires a general understanding in ecology. We will also be using computer programs. The combination of these 3 aspects could be overwhelming to undergraduate students..

16. Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)
Unit I: Introduction to population dynamics

Week 1: Introduction

Week 2: Unstructured populations

Week 3: Structure populations

Unit II: Structure population models

Week 4: Life tables

Week 5: Life cycles

Week 6: Matrix algebra I

Week 7: Matrix algebra II

Week 8: Leslie matrix models

Unit III: Parameter estimation

Week 9: Nesting parameters I

Week 10: Nesting parameters II

Week 11: Survival probabilities I (from telemetry)

Week 12: Survival probabilities II (from Capture-Mark-Recapture)

Week 13: Transition probabilities

Week 14: Overview of applications

17. Course requirements (e.g. research papers, projects, interviews, tests, etc.)
Students will have homework assignments every week in the form of computer exercises to apply their new knowledge to real biological examples. Students will be encouraged to work together to complete these assignments. Additionally, students will be required to produce a paper on a species of their choosing. This paper will include a literature review on if/how populations have been modeled, suggestions on how to improve previous models based on new knowledge acquired in class, and a proposed relevant life cycle (and associated matrix) for their selected species. Finally, their knowledge and understanding will be evaluated based on quizzes and two exams..

18. Special features (e.g. labs, exhibits, site visitations, etc.)
No

19. Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)
Because this course includes computer exercises, a computer lab will be needed. No additional faculty will be required to teach this course

20. What is the primary intended learning goal for students enrolled in this course?
To estimate demographic parameters and integrate these estimates into population dynamic models.

21. Reading and writing requirements:
a. Name of book, author, edition, company and year
Williams, Nichols and Conroy (2002) "Analysis and Management of Animal Populations". Further reading will be provided as handouts.
b. Number of pages of reading required per week: 10
c. Number of pages of writing required over the course of the semester: 10

22. High-Impact Activities (Check all that apply)
- ☒ Collaborative assignments
- ☒ Research with a faculty member
- ☒ Diversity/Global learning experience
- ☐ Service learning or community learning
- ☐ Study abroad
- ☐ Internship
- ☐ Capstone or senior culminating experience
- ☐ Other Explain: Enter text...

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

Outcome #1: (For example, what will students who meet this goal know or be able to do as a result of this course?)
Distinguish among various models of population dynamics used in ecology.

Learning Activity: (For example, what instructional processes do you plan to use to help students reach this outcome?)
Reading

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)
Key questions embedded in traditional exams

(Repeat if needed for additional outcomes 2 and 3)
Outcome #2:
Produce an accurate estimate of demographic parameters by identifying and applying appropriate methods.

Learning Activity:
Lab activities, mostly on computers

Assessment Tool:
Case study homework assignment

Outcome #3:
Evaluate modeling strategies presented in the relevant literature and demonstrate competency creating life cycles and/or matrix population models.

Learning Activity:
Culminating paper

Assessment Tool:
An outline that will be graded via a simplified rubric for literature review, and a culminating paper that will be graded via a customized rubric to take into account the progress made since the outline

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

a. Global Awareness
   - ☐ Minimally
   - ☒ Indirectly
   - ☐ Directly

b. Thinking Critically
   - ☐ Minimally
   - ☐ Indirectly
   - ☒ Directly

c. Using Technology
   - ☐ Minimally
   - ☐ Indirectly
   - ☒ Directly

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10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

From p276 of the graduate bulletin in which courses are out of order. Inserted the proposed course in one of the possible places.

ing the genetic structure of populations. There will be an emphasis on problem solving applying statistical tools. Intended for graduate students entering th he disciplines of preprofessional, conservation, agriculture, and wildlife and fisheries sciences. Prerequisites: BIO 3013, BIO 3011

BIO 5103 Virology The structure, function, and classification of viruses, and their impact on modern society and the biological world. Lecture three hours per week. Prerequisites: BIOL 2103 or BIO 3013 or BIO 4104 or BIO 4133.

BIO 5111 Laboratory for Immunology Study of classical and current immunology techniques such as ELISA, immune-electrophoresis and Western Blot analysis. Laboratory 3 hours per week.

BIO 5113 Immunology Study of the human immune system. Topics include innate and acquired immunity, complement fixation and disorders of the immune system. Lecture 3 hours per week.

BIO 5322 Biology of Marine Mammals Laboratory Hands on experience on the classification, anatomy, and behavior of marine mammals. Concurrent enrollment in BIO 5323. Special Course fees may apply. Permission of instructor required.

BIO 5323 Biology of Marine Mammals This course analyses the biology of marine mammals based on their adaptations to the aquatic environment from evolutionary, anatomical, physiological, and ecological perspectives. Prerequisites will be at least two of the following courses: BIO 3322, BIO 3013, BIO 3033, and permission of the instructor.

BIO 5333 Marine Biology Overview of the diverse discipline of marine biology. Emphasis on life history but will incorporate aspects of chemistry, microbiology, and ecology of marine systems. Also included: marine fisheries, conservation biology, aquaculture, pharmacology, resource management, and public policy.

BIO 5444 Wildlife Population Modeling Introduction to population models, techniques to estimate demographic parameters (e.g., survival, breeding success). Statistical background recommended.

BIO 5123 Cell Signaling This course will provide an understanding of key concepts about cellular signaling mechanisms, and major signaling pathways identified to date about the methods used to study these pathways. Three hours per week during spring semester. Prerequisite: Cell biology course(s)s or permission of the instructor.

BIO 5143 Pharmacology The study of drugs and their mechanisms of action at the system, cellular, and molecular levels. Prerequisites: BIO 2223 or BIO 3233, BIOL 4104, and CHEM 4243.

BIO 5353 Field Techniques for Marine Mammals Field experience in describing and analyzing marine behavior of dolphins and other marine mammals. Prerequisite: Permission of instructor.

BIO 5601 Laboratory for Limnology Two hours per week. To be taken concurrently with BIO 5603. (course fee, $20).

BIO 5603 Limnology Physicochemical conditions of fresh water, and their effects on aquatic life; plankton analysis and bottom fauna studies. Lecture three hours per week. Prerequisites: BIO 1301, 1303; CHEM 1023, CHEM 1021.

BIO 5023 History of Biological Ideas This course analyzes the history of biological ideas such as evolution, heredity, spontaneous generation, and molecular biology, aimed a t a better understanding not only of historical background of current research but also on how science proceeds. Prerequisites will be at least two of the following courses: BIO 3023,

Guidelines for Departmental and Program Graduate Faculty Qualification Standards
College of Agriculture and Technology (CoAT)

February 2014

This document outlines the qualification standards for graduate faculty in the College of Agriculture and Technology. Regular member and temporary member status appointments may be made, based on qualifications and the needs of the college.

A. Regular Member

1. Qualifications

A Regular Member of the Graduate Faculty must be a full-time faculty member with a terminal degree. A Doctor of Philosophy (Ph.D.) or Doctor of Education (Ed.D.) is considered an appropriate terminal degree in the College of Agriculture and Technology. Appropriate disciplines include all areas within agricultural science, technology, agricultural engineering, career and technical education and agricultural education. Specialized degrees in other related sciences or engineering may also be appropriate.

In exceptional cases, unique experience, specialized training, and professional competence may substitute for a terminal degree only upon review and approval of the college graduate committee. Regular Members must have documented evidence of an appropriate level of scholarly activity and continued participation in graduate education at the course, committee and program levels.

Exceptional circumstances where a faculty member or adjunct faculty member would not hold a terminal degree in an agriculturally related field include professionals of great expertise where that expertise is not available within the college. This includes, but is not limited to, law, advanced technology training, high level management experience in agricultural business, or extensive scientific research experience.

For appointment as a Regular Member of the College Graduate Faculty, the applicant should provide evidence of continuing and/or recent scholarly activity within the past six years, which may include the publication of original research or pedagogical results in scientific or educational journals as an author or co-author, publication of books or chapters in books, presentations to learned forums, extension of scholarly information to broad audiences in the discipline, creative publication or workshops within the discipline context, etc. as approved by the CoAT graduate committee. Applicants not meeting this criterion may apply for appointment as a Temporary Graduate Faculty Member, which has a term of three years, as a means to develop such evidence.

2. Appointment requirements and procedure

Applicant must meet the degree requirements of the college (Section A.1.) Application must include evidence of professional activities related to graduate education (such as research, publication, membership in professional organizations, participation in regional and national meetings, and/or excellence in teaching or research, depending on the appointment of the faculty member) and the

applicant must meet the qualification standards of the college. An appointment is recommended by the College Graduate Faculty Committee and approved by the University Graduate Council. Appointment is for a six-year term at which time the faculty member may reapply. Upon hire as a pre-tenure or tenured faculty member possessing a terminal degree in an appropriate discipline, an initial Graduate Faculty appointment will be made for a six-year term. Upon promotion to associate or full professor, a Graduate Faculty appointment will be made or an existing appointment will be reset to a new term of six years. Application to become a Regular Graduate Faculty member requires a letter from the faculty member requesting review by the graduate committee. A current curriculum vita of the applicant's professional and scholarly activity should accompany the letter.

3. Privileges and responsibilities

A Regular Member may teach graduate courses at any level, serve on the Graduate Council, direct research, and serve on thesis and dissertation committees for students pursuing masters, specialist and doctoral degrees.

B. Temporary Member

1. Qualifications

An individual with a terminal degree or documented knowledge and equivalent experience shall be eligible for appointment to the Graduate Faculty as a Temporary Member to teach specific courses and/or serve on committees over a specified time period.

2. Appointment requirements and procedure

Application is through, or nomination is by the College Graduate Committee. Recommendations must include specific qualifications as related to the course(s) to be taught or graduate student committee membership**.** An appointment is approved by the Graduate Dean for a specified time period. At the end of the specified time period, a Temporary Member of the Graduate Faculty may reapply.

Temporary Graduate Faculty status will be for three years.

3. Privileges and responsibilities

A Temporary Member may teach graduate level courses at the masters, specialist and doctoral levels and serve on student committees. A Temporary Member appointment is only valid for the time frame specified and for the course(s) or activities approved on the application.

02/05/2014

Environmental Sciences Graduate Program

Graduate Faculty Qualification Standards

A. Regular Member 1. Qualifications

No faculty are considered full-time faculty of the Environmental Sciences (EVS) Graduate Program. Faculty who participate in the program have teaching and/or research appointments in various departments from the College of Sciences and Mathematics, the College of Agriculture and Technology, College of Business, College of Education and Behavioral Science, College of Engineering, and the College of Humanities and Social Sciences. Individual faculty who teach courses and/or are Research Advisors in the EVS Graduate Program hold a doctorate in an appropriate field. They must have regular graduate faculty status already through their respective departments and colleges. EVS program makes sure that faculty members who routinely teach the core courses of EVS program are regular members or obtain regular membership at A-State with a graduate faculty group. Before a faculty member teaches for the EVS Program, approval for such teaching must be made through the EVS Program Director.

2. Appointment requirements and procedure

Faculty who are Research Advisors must be active in their profession. They must include evidence of research, publication, membership in professional organizations, participation in regional and national meetings, and the applicant must meet the qualification standards of their department.

The EVS Graduate Program will use the Handbook's six year term for a regular member.

3. Privileges and responsibilities

A Regular Member may teach EVS graduate courses, and with the approval of the EVS Program Director and the Dean of the Graduate School, a Regular Member may chair practicum, thesis, and dissertation committees for students pursuing an EVS MS (Practicum track), MS (Thesis Track) and doctoral degrees.

B. Temporary Member

1. Qualifications

An individual with a terminal degree or documented knowledge and equivalent experience shall be eligible for appointment to the graduate faculty as a Temporary Member to serve on committees. It is preferred that individuals hold a doctorate in an appropriate field such as, (but not limited to) Environmental Sciences, Ecology, Chemistry, Physics, Engineering, Zoology, Soil Science, Crop Science, Environmental Economics, Geography, and Public Policy. However, in special circumstances, individuals who have extensive professional experience that will benefit the graduate students in EVS may be recommended for temporary appointment to the Graduate Faculty even if they do not hold a doctoral degree.

2. Appointment requirements and procedure

Individuals requesting Temporary status must provide a C.V. to the Program Director. The application will then be approved through the EVS Program Committee. The Program Director will then send the application to the Graduate School for final approval. Recommendations must include specific qualifications as related to committee membership**.** A final appointment is approved by the Graduate

Dean for a specified time period. At the end of the specified time period, a Temporary Member of the Graduate Faculty may reapply.

3. Privileges and responsibilities

A Temporary Member may serve on graduate student committees and graduate status is valid for three years.

02/10/2014

Molecular Biosciences Graduate Program

Graduate Faculty Qualification Standards

A. Regular Member 1. Qualifications

Molecular Biosciences (MBS) Graduate Program is an interdisciplinary program drawing in faculty from multiple departments and hence at present has no faculty of its own. Currently faculty who participate in the program have teaching and/or research appointments in various departments from the College of Sciences and Mathematics, the College of Agriculture and Technology, College of Business, and College of Education and Behavioral Science. Individual faculty who teach courses and/or are Research Advisors in the MBS Graduate Program hold a doctorate in an appropriate field They must have regular graduate faculty status already through their respective departments and colleges. MBS program makes sure that faculty members who routinely teach the core courses of MBS program are regular members or obtain regular membership at A-State with a graduate faculty group through their respective departments. Before a faculty member teaches for the MBS Program, approval for such teaching must be made through the MBS Program Director.

2. Appointment requirements and procedure

Faculty who are Research Advisors or teach core courses in MBS must be active in their profession. They must include evidence of research, publication, membership in professional organizations, participation in regional and national meetings, and the applicant must meet the qualification standards of their department.

The MBS Graduate Program will use the six year term for a regular member.

3. Privileges and responsibilities

A Regular Member may teach MBS graduate courses, and with the approval of the MBS Program Director and the Dean of the Graduate School, a Regular Member may chair thesis, and dissertation committees for students pursuing an MBS MS (thesis) and doctoral degrees (dissertation).

B. Temporary Member

1. Qualifications

An individual with a terminal degree or documented knowledge and equivalent experience shall be eligible for appointment to the graduate faculty as a Temporary Member to serve on committees. It is preferred that individuals hold a doctorate in an appropriate field such as, (but not limited to) Biology, Biotechnology, Molecular Biology, Physiology, Neuroscience, Immunology, Plant Physiology, Protein Chemistry, Chemistry, Physics, Zoology, Soil Science, Crop Science, Animal Science and areas of Business Management. However, in special circumstances (for instance to teach technique course), individuals who have extensive professional experience that will benefit the graduate students in MBS may be recommended for temporary appointment to the Graduate Faculty even if they do not hold a doctoral degree.

2. Appointment requirements and procedure

Individuals requesting Temporary status must provide a C.V. to the Program Director. The application will then be approved through the MBS Program Committee. The Program Director will then send the application to the Graduate School for final approval. Recommendations must include specific qualifications as related to membership**.** A final appointment is approved by the Graduate Dean for a specified time period. At the end of the specified time period, a Temporary Member of the Graduate Faculty may reapply.

3. Privileges and responsibilities

A Temporary Member may serve on graduate student committees, teach special technique courses and graduate status is valid for three years.