Ogden College of Science and Engineering
Western Kentucky University
Office of the Dean
745-6371

REPORT TO THE GRADUATE COUNCIL COMMITTEE

DATE: September 26, 2014

FROM: Ogden College of Science and Engineering

The Ogden College of Science and Engineering submits the following items for consideration at the September meeting:

Consent	**Proposal to Delete a Course** AMS 505, Architectural Design Studio Contact Person: Greg Arbuckle, greg.arbuckle@wku.edu, 52403
Consent	**Proposal to Delete a Course** AMS 568, Ceramics and Plastics Contact Person: Greg Arbuckle, greg.arbuckle@wku.edu, 52403
Consent	**Proposal to Revise Course Catalog Listing** GEOS 510, Geoscience Research Topics Contact Person: David Keeling, david.keeling@wku.edu, 54555
Consent	**Proposal to Revise a Course Catalog Listing** GEOS 595, Geoscience Practicum Contact Person: David Keeling, david.keeling@wku.edu, 54555
Action	**Proposal to Create a New Course** GEOS 539, Seminar in Atmospheric Modeling Contact Person: Xingang Fan, xingang.fan@wku.edu, 559809
Action	Proposal to Revise a Program 072, Master of Science in Geoscience Contact Person: David Keeling, david.keeling@wku.edu, 54555

MINUTES – OCSE Graduate Curriculum Committee **April 25th, 2014**

Members Present: Dr. David Keeling, Dr. Martin Stone, Dr. Raja Dakshinamurthy, Dr. Daniel Jackson, Dr. Greg Arbuckle

Vladimir Dobrokhotov for Ivan Novikov, Dominic Lanphier for Ferhan Atici

Shane Palmquist sent his approval for all the proposals via email.

Cathleen Webb was given proxy vote for Sharon Mutter

Visitor: Keith Andrew

Dr. Cathleen Webb, Chair

OLD BUSINESS
Keeling/Arbuckle moved for approval of minutes from February 28th and March 28th, 2014. Motion approved.

NEW BUSINESS

Consent Agenda
Webb (as proxy)/Arbuckle moved for approval to bundle the consent items. Motion approved.
Keeling/Arbuckle moved to approve the bundled consent items. Motion approved.

Action Agenda
Martin/Arbuckle moved for approval of PHYS 425G with suggested amendments.
Arbuckle/Keeling moved for approval of PHYS 799 with suggested amendments.

MINUTES – OCSE Graduate Curriculum Committee **August 29th, 2014**

Cathleen Webb, Chair

This meeting was held via email.

OLD BUSINESS

There was no motion for approval of the minutes from the April 2014 24th meeting. Minutes will need to be approved at the September meeting.

NEW BUSINESS

Consent Agenda

Consent item PSYS 430G was moved forward without any discussion or changes.

Proposal Date:

Ogden College of Science and Engineering
Architecture and Manufacturing Sciences
Proposal to Delete a Course
(Consent Item)

Contact Person: Dr. Greg Arbuckle Email: greg.arbuckle@wku.edu Phone: 270-745-2403

1. **Identification of course:**
   - 1.1 Current course prefix (subject area) and number: AMS 505
   - 1.2 Course title: Architectural Design Studio

2. **Rationale for the course deletion:** This course has not been offered in 5 years. This course is not a requirement on any major. This is a "housekeeping" issue.

3. **Effect of course deletion on programs or other departments, if known:**

4. **Proposed term for implementation:** 2014-2015

5. **Dates of prior committee approvals:**

Architecture and Manufacturing Sciences Department	08-18-2014
Ogden Graduate Curriculum Committee	
Graduate Council	
University Senate	

Proposal Date: 08/18/2014

Ogden College of Science and Engineering
Architecture and Manufacturing Sciences
Proposal to Delete a Course
(Consent Item)

Contact Person: Dr. Greg Arbuckle Email: greg.arbuckle@wku.edu Phone: 270-745-2403

1. **Identification of course:**
   - 1.1 Current course prefix (subject area) and number: AMS 568
   - 1.2 Course title: Ceramics and Plastics

2. **Rationale for the course deletion:** This course has not been offered in 5 years. This course is not a requirement on any major. This is a "housekeeping" issue.

3. **Effect of course deletion on programs or other departments, if known:**

4. **Proposed term for implementation:** 2014-2015

5. **Dates of prior committee approvals:**

Architecture and Manufacturing Sciences Department	08/18/2014
OCSE Curriculum Committee	
Graduate Council	
University Senate	

Proposal Date: August 1, 2014

Ogden College of Science and Engineering
Department of Geography and Geology
Proposal to Revise Course Catalog Listing
(Consent Item)

Contact Person: David Keeling, david.keeling@wku.edu, 5-4555

1. **Identification of course:**
   1.1 Course prefix (subject area) and number: GEOS 510
   1.2 Course title: Geoscience Research Topics

2. **Current course catalog listing:** Supervised independent research in applied or basic geoscience topics.

3. **Proposed course catalog listing:** Supervised independent research in applied or basic geoscience topics. A maximum of 6 hours can be applied to the program with advisor permission.

4. **Rationale for revision of the course catalog listing:** Clarifies how many hours can be applied to the program.

5. **Proposed term for implementation:** Fall 2015

6. **Dates of prior committee approvals:**

Department of Geography and Geology	**8/20/2014**
Ogden College Graduate Committee	
Graduate Council	
University Senate	

Proposal Date: August 1, 2014

Ogden College of Science and Engineering
Department of Geography and Geology
Proposal to Revise Course Catalog Listing
(Consent Item)

Contact Person: David Keeling, david.keeling@wku.edu, 5-4555

1. **Identification of course:**
   1.1 Course prefix (subject area) and number: GEOS 595
   1.2 Course title: Geoscience Practicum

2. **Current course catalog listing:** Prerequisites: GEOS 500 and 520. Supervised geoscience practicum experience in a cooperating government or private agency, business, or community

3. **Proposed course catalog listing:** Prerequisites: GEOS 500 and 520. Supervised geoscience practicum experience in a cooperating government or private agency, business, or community. A maximum of 6 hours can be applied to the program with advisor permission.

4. **Rationale for revision of the course catalog listing:** Clarifies how many hours can be applied to the program.

5. **Proposed term for implementation: Fall** 2015

6. **Dates of prior committee approvals:**

Department of Geography and Geology	**8/20/2014**
Ogden College Graduate Committee	
Graduate Council	
University Senate	

Proposal Date: 08/19/2014

Ogden College of Science and Engineering
Department of Geography and Geology
Proposal to Create a New Course
(Action Item)

Contact Person: Xingang Fan (Xingang.fan@wku.edu), 745-5980

1. Identification of proposed course:

1.1 **Course prefix (subject area) and number:** GEOS 539
1.2 **Course title:** Seminar in Atmospheric Modeling
1.3 **Abbreviated course title:** Seminar Atmospheric Modeling
1.4 **Credit hours:** 3.0
1.5 **Schedule type:** Lecture
1.6 **Prerequisites:** CS 245 (Fortran), METR 324 (Weather Analysis/Forecasting)
1.7 **Catalog course listing (description):** An introduction to numerical weather and climate modeling techniques and models, with focus on modeling fundamentals, including dynamics, physical parameterizations, grids and resolutions, model structures and components. Includes hands-on experience with designing numerical experiments, configuring and running model simulations, post-processing model outputs, and visualization.

2. Rationale:

2.1 **Reason for developing the proposed course:** This course was offered once in Spring 2011 as a temporary course. We will offer this for graduate students beginning in Spring 2015. Atmospheric modeling has been a powerful tool and played a dominant role in modern weather and climate predictions. Most of the operational weather and climate predictions, and advanced atmospheric science studies, including ocean and other climate system components, rely heavily on the utilization of numerical modeling. By offering this course, students will learn the basics of numerical modeling and become familiar with the numerical modeling processes and their products.

2.2 **Projected enrollment in the proposed course:** 3-5 graduate students. Estimate is based on the number of undergraduate meteorology majors and graduate students, as well as a two-year rotation plan. It is also possible that some Geography (Land-Weather-Climate concentration) majors who are interested in learning atmospheric modeling will enroll.

2.3 **Relationship of the proposed course to courses offered in the department:** We have an undergraduate course (METR 439) that parallels this proposed course, and we aim to incorporate this course into our new Meteorology JUMP program. Thus, basic meteorology knowledge will be needed, which is provided by the existing foundational coursework.

2.4 **Relationship of the proposed course to courses offered in other academic units:** No other courses covering this material are offered at WKU. However, it will need the basic computing programming skills that are offered by CS 245 Fortran.

2.5 **Relationship of the proposed course to courses offered in other institutions:** A brief review of other institutions indicates that this course is offered in many meteorology programs, including *University of Washington* – ATM 380 Weather and Climate Prediction, *Colorado State University* – ATS 604 Atmospheric Modeling, *University of California Los Angles* – 180 Numerical methods in Atmospheric Science, 212B,C – Numerical modeling of atmosphere I,II, *University of Illinois* – ATMS 421 Earth system modeling, *Valparaiso University* – MET 430/530 Numerical weather prediction, *North Carolina State University* – MEA 400 Earth systems simulation modeling, *Ohio State University* – AS 629 Climate system modeling: Basics and applications.

3. Description of proposed course

3.1 **Course Objectives:** students will:

a. Learn the basic concepts of atmospheric modeling, including basic equation set, differentiate methods, physical parameterizations, grids and resolutions, initial and boundary conditions, and model integration.
b. Develop skills in configuring and carrying out model experiments, analyzing model outputs, and visualization, within a UNIX/Linux computing environment.
c. Employ their knowledge in understanding, interpreting, and utilizing operational numerical prediction products.
d. Develop basics skills in conducting atmospheric research by using models.

3.2 **Course content outline:**

a. Introduction of atmospheric modeling, basic UNIX/Linux operating system, and basic Fortran programming
b. Model basics: Equations, differentiate schemes, grids and resolutions
c. Model structure and components
d. A state-of-the-art weather model: Weather Research and Forecasting (WRF) model
e. Input: Initial and boundary conditions
f. Running model simulations
g. Output: post-processing, analysis, and visualization

3.3 **Student expectations and requirements:** Participation in class lectures and discussions, completion of laboratory assignments, class research project and writing, assessment on the basic concepts of numerical modeling.

3.4 **Tentative texts and course materials:**

Required text:

a. Numerical Weather and Climate Prediction, by Thomas T. Warner, Cambridge University Press, 2011.

Recommended Readings:

a. A First course in atmospheric numerical modeling, by A. DeCaria and G. Van Knowe. Sundog publishing, 2014.
b. A Climate Modelling Primer, 3rd Edition, by K. McGuffie, Wiley, 2005
c. Atmospheric modeling, data assimilation, and predictability, by Eugenia Kalnay, New York : Cambridge University Press, c2003.
d. Fundamentals of Atmospheric Modeling, 2nd Edition, by Mark Z. Jacobson, Cambridge, 2005
e. Mesoscale Meteorological Modeling, 2nd Edition, by Roger. A. Pielke Sr., Academic Press, 2002

4. **Resources:**
   - **4.1** **Library resources**: N/A
   - **4.2** **Computer resources:** The Linux cluster (32-CPU) in our Climate Research Lab is the main computing facility. Students may use Meteorology Lab computers, Climate Research Lab computers, or their own computers to access (remote logon) the cluster and carry out the course work. The newly built WKU supercomputing facility also is a potential resource.

5. **Budget implications:**
   - **5.1** **Proposed method of staffing:** Existing faculty will teach this course, with TA support when enrollment is more than 10.
   - **5.2** **Special equipment needed:** None.
   - **5.3** **Expendable materials needed:** None.
   - **5.4** **Laboratory supplies needed:** None.

6. **Proposed term for implementation:** Spring 2015

7. **Dates of review/approvals:**

Department of Geography and Geology	08/20/2014
OCSE Graduate Committee	
Graduate Council	
University Senate	

Ogden College of Science and Engineering
Department of Geography and Geology
Proposal to Revise a Program
(Action item)

Contact Person: David Keeling e-mail: david.keeling@wku.edu Phone: 5-4555

1. **Identification of program**
   - 1.1 Program Reference Number: 072
   - 1.2 Current Program Title: Master of Science in Geoscience
   - 1.3 Credit hours: 30 hours

2. **Identification of the proposed program changes:**
   - Revise Program to specify admission requirements.

3. **Detailed program description:**

Current Program	Proposed Program
MS Geoscience Thesis Program (30 hours)	MS Geoscience Thesis Program (30 hours)
	Admission Requirements: * GRE score, with a minimum 3.5 score on the GRE Analytical Writing component, and a 3.0 overall undergraduate GPA. * Minimum of 18 hours of science courses at the undergraduate level, preferably in the geosciences. * A one-page statement of research interests. * Written evidence of an agreement from a graduate faculty member in the Department of Geography and Geology willing to supervise the proposed research project. ** Passing grade (C or higher) in an introductory GIS course (GEOG 316/317) and in Spatial Data Analysis (GEOG 391) at the undergraduate level - students can take these courses as preparatory courses if they have not previously taken these courses. If taken as a graduate student, a grade of "B" or better is required.

Program Core 17-18 hours		Program Core 17-18 hours	
GEOS 500 Geoscience Research	4	GEOS 500 Geoscience Research	4
GEOS 520 Geoscience Data	4	GEOS 520 Geoscience Data	4
Students choose one of the following methods courses based on their Research Concentration:	3-4	Students choose one of the following methods courses based on their Research Concentration:	3-4
Physical:		Physical:	
GEOS 502 Field Research	4	GEOS 502 Field Research	4
Geographic Information Science:		Geographic Information Science:	
GEOS 523 Urban GIS Apps	4	GEOS 523 Urban GIS Apps	4
Cultural:		Cultural:	
GEOS 530 Cultural	4	GEOS 530 Cultural	4
Environment:		Environment:	
GEOS 587 Law and Policy	3	GEOS 587 Law and Policy	3
Climate:		Climate:	
GEOS 555 Global Change	3	GEOS 555 Global Change	3
GEOS 599 Research Thesis	6	GEOS 599 Research Thesis	6
Concentration Electives** 12-13 hours		Concentration Electives** 12-13 hours	
At least 12 hours of graduate coursework in the specified Research Concentration approved by the thesis director and selected from the following electives:		At least 12 hours of graduate coursework in the specified Research Concentration approved by the thesis director and selected from the following electives:	
CONCENTRATION		CONCENTRATION	
Physical Science:		Physical Science:	
GEOS 510 Research Topics	3	GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	4	GEOS 515 Remote Sensing	4
GEOS 521 Geomorphology	3	GEOS 521 Geomorphology	3
GEOS 559 Hydrological Fluid	3	GEOS 559 Hydrological Fluid	3
GEOS 566 Karst Geoscience	3	GEOS 566 Karst Geoscience	3
GEOS 595 Geoscience Practicum	3	GEOS 595 Geoscience Practicum	3
GEOG 427G Water Resources	3	GEOG 427G Water Resources	3
GEOG 428G Applied Groundwater	3	GEOG 428G Applied Groundwater	3
GEOL 4xxG Any Geology course	3	GEOL 4xxG Any Geology course	3
CONCENTRATION		CONCENTRATION	
Cultural Science:		Cultural Science:	
GEOS 501 Geoscience Development	3	GEOS 501 Geoscience Development	3
GEOS 507 Concepts/Skills for Teach	3	GEOS 507 Concepts/Skills for Teach	3
GEOS 510 Research Topics	3	GEOS 510 Research Topics	3
GEOS 525 Political Geography	3	GEOS 525 Political Geography	3
GEOS 534 Historic Preservation	3	GEOS 534 Historic Preservation	3
GEOS 540 Regional Geography	3	GEOS 540 Regional Geography	3
GEOS 550 Economic Geography	3	GEOS 550 Economic Geography	3
GEOS 580 Urban Geography	3	GEOS 580 Urban Geography	3
GEOS 585 Population Geography	3	GEOS 585 Population Geography	3

GEOS 595 Geoscience Practicum	3	GEOS 595 Geoscience Practicum	3
GEOG 451G Geography Kentucky	3	GEOG 451G Geography Kentucky	3
CONCENTRATION		CONCENTRATION	
Geographical Information Science:		Geographical Information Science:	
GEOS 510 Research Topics	3	GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	4	GEOS 515 Remote Sensing	4
GEOS 517 Spatial Databases	3	GEOS 517 Spatial Databases	3
GEOS 577 Special Topics GIS	3	GEOS 577 Special Topics GIS	3
GEOS 584 Advanced Planning	3	GEOS 584 Advanced Planning	3
GEOS 590 Experimental Design	3	GEOS 590 Experimental Design	3
GEOS 595 Geoscience Practicum	3	GEOS 595 Geoscience Practicum	3
GEOG 417G GIS Analysis	3	GEOG 417G GIS Analysis	3
GEOG 419G GIS Programming	3	GEOG 419G GIS Programming	3
CONCENTRATION		CONCENTRATION	
Environmental Science:		Environmental Science:	
GEOS 505 Biogeography	3	GEOS 505 Biogeography	3
GEOS 506 Environment Seminar	3	GEOS 506 Environment Seminar	3
GEOS 510 Research Topics	3	GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	4	GEOS 515 Remote Sensing	4
GEOS 543 Env Science Concepts	3	GEOS 543 Env Science Concepts	3
GEOS 544 Environmental Ethics	3	GEOS 544 Environmental Ethics	3
GEOS 571 Quality of Life	3	GEOS 571 Quality of Life	3
GEOS 595 Geoscience Practicum	3	GEOS 595 Geoscience Practicum	3
GEOG 474G Environment Planning	3	GEOG 474G Environment Planning	3
GEOL 415G Environmental Geology	3	GEOL 415G Environmental Geology	3
CONCENTRATION		CONCENTRATION	
Climate Science:		Climate Science:	
GEOS 510 Research Topics	3	GEOS 510 Research Topics	3
GEOS 515 Remote Sensing	4	GEOS 515 Remote Sensing	4
GEOS 522 Physical Climatology	3	GEOS 522 Physical Climatology	3
GEOS 533 Synoptic Meteorology	3	GEOS 533 Synoptic Meteorology	3
GEOS 535 Dynamic Meteorology II	3	GEOS 535 Dynamic Meteorology II	3
GEOS 537 Mesoscale Meteorology	3	GEOS 537 Mesoscale Meteorology	3
GEOS 538 Physical Meteorology	3	GEOS 538 Physical Meteorology	3
GEOS 539 Atmospheric Modeling	3	GEOS 539 Atmospheric Modeling	3
GEOS 595 Geoscience Practicum	3	GEOS 595 Geoscience Practicum	3
GEOG 424G Weather Analysis	3	GEOG 424G Weather Analysis	3
**A maximum of six hours of advisor-approved electives that are consistent with the student's Research Concentration interests may be selected from other departments or from other Geoscience concentrations		** A maximum of six hours of advisor-approved electives that are consistent with the student's Research Concentration interests may be selected from other departments or from other Geoscience concentrations	
PROGRAM TOTAL 30 hours		PROGRAM TOTAL 30 hours	

4. **Rationale for the proposed program changes:**
   - The Department has been advised by the Graduate School to incorporate specific admission requirements into the program description.

5. Proposed term for implementation and special provisions:

- Term: Fall 2015

6. Dates of Prior committee approvals:

Geography and Geology Graduate Committee	8/20/2014
OCSE Graduate Curriculum Committee	
Graduate Council	
University Senate	

Attachment: **Program Inventory Form**