

Academic Council Minutes

September 17, 2014

Midwestern State University

The Academic Council met Wednesday, September 17, 2014, in the Dillard College of Business Administration, Priddy Conference Room.

Voting members in attendance were:

Dr. Martin Camacho, Dean, Lamar D. Fain College of Fine Arts
Dr. Matthew Capps, Dean, West College of Education
Dr. Rodney Cate, Interim Dean, College of Science and Mathematics
Dr. Laura Fidelie, Faculty Senate Vice-Chair
Dr. Deborah Garrison, Associate Vice President for Academic Affairs and Dean of the Graduate School
Dr. James Johnston, Dean, Gunn College of Health Sciences and Human Services
Dr. Terry Patton, Dean, Dillard College of Business Administration
Dr. Sam Watson, Dean, Prothro-Yeager College of Humanities and Social Sciences
Ms. Roylyka Roache, Student Government Association Vice President

Other attendees:

Ms. Leah Hickman, Interim Director, Admissions
Ms. Darla English, Registrar
Dr. Clara Latham, University Librarian
Dr. Scott Meddaugh, Professor of Geosciences
Ms. Juliana Lehman-Felts, Coordinator, Honors Program
Mr. Newman Wong, Staff Senate Representative

Dr. Betty Hill Stewart, Provost and Vice President for Academic Affairs, presided and the meeting began at 2:05 p.m.

Approval of Minutes

Dr. Stewart called for a motion to approve the May 2014 and June 2014 minutes of the Academic Council. The June agenda had been previously approved electronically by a majority of the voting members of the Council. *Dr. Capps made a motion that the minutes be adopted; Dr. Johnston seconded and the motion was unanimously adopted. (closed)*

Old Business

There being no Old Business to discuss, the Council moved on to New Business.

New Business

1. Dr. Watson made a motion to adopt the following undergraduate course and catalog changes in Sociology. *Dr. Patton seconded; and the motion was adopted. (closed)*

Change of Course Description, effective Spring 2015

SOCL 3403. Social Psychology

Prerequisite: SOCL 1133

~~Description: For course description see psychology section. May be taken for either psychology or sociology credit, but not for both.~~

Description: An examination of the nature and causes of human social behavior. The core concerns of social psychology are the impact of individuals on the groups in which they participate and the impact of one group on another. Topics include theories in social psychology, socialization, self and identity, attitudes and attitude change, social perception, social influence, social communication and group processes.

Change in Course Prerequisite, effective Spring 2015

SOCL 3733. Juvenile Delinquency

Prerequisite: SOCL 1133. ~~Or consent of instructor. May also be taken for criminal justice credit.~~

2. Dr. Cate made a motion to adopt the following undergraduate course and catalog changes in Geosciences. *Dr. Fidelie seconded; and the motion was adopted. (closed)*

New Course Addition, effective Spring 2015

GEOS 4154. Natural Hazards and Disasters

Prerequisites: GEOS 3234 or GEOS 3434 or GEOS 4534 or the approval of the instructor

Description: This course will enable the student to 1) understand the scope and impact of natural hazards and disasters 2) recognize the difference between hazards and disasters and 3) understand how the expanding human footprint is leading to an increase in natural disasters. The laboratory sessions utilize geospatial technologies (Geographic information systems/GIS and remote sensing software) enabling students to develop mapping and modeling expertise and apply it to the study of diverse geological and atmospheric hazards including earthquakes, volcanoes, landslides, floods, storms, wildfires, and climate change.

Lecture and Lab

4 (3-2)

Course Objectives and/or additional information:

Students will learn to

- Recognize the nature of natural hazards including geologic hazards and atmospheric hazards
- Examine the factors that influence hazards
- Be aware of how hazardous conditions interact
- Understand the dangers and potential damage to life and property associated with hazards
- Examine the methods of forecasting or predicting hazards
- Apply geospatial technologies (remote sensing and GIS) to the analysis of natural hazards

New Course Additions, effective Fall 2015

GEOS 4013. Data Analysis for the Geological Sciences

Prerequisites: STATS 3573 or the approval of the instructor

Description: This course focuses on using univariate and multivariate statistics to address geologic problems, and interpreting and understanding data as presented in the scientific literature. Basic concepts

in elementary statistics (p-values, distributions, hypothesis testing) will be reviewed with a geologic viewpoint. Advanced topics will be applied to geologic examples, and include matrix algebra, eigenvectors, regression, non-parametric resampling, spatial analysis, ordination methods, and multidimensional scaling. Examples will be taken from various geoscience subfields, and students will apply their understanding to both original projects and previously published work. Analyses will be performed in the “R” software environment, designed for statistical applications.

Lecture

3(3-0)

Course Objectives and/or additional information:

Students will develop skills that allow them to

- Understand, interpret, and discuss statistical data from primary journal sources.
- Apply an assortment of techniques to geologic problems, understanding the assumptions and requirements of different statistical tests.
- Identify different types of data and how they should be treated separately statistically
- Learn a software environment that can be used to perform analyses with the data from student thesis projects
- Apply logical and critical thinking to collecting, managing, and transforming research data

GEOS 4243. Geochemistry

Prerequisites: CHEM 1243 or CHEM 1253, GEOS 3534 and STATS 3573 or the approval of the instructor

Description: This course covers thermodynamics and kinetics as applied to earth systems, over a range of conditions relevant to the Earth’s interior and its surface, with emphasis on the hydrosphere and lithosphere. The course examines speciation and phase stability in aqueous solutions, and pressure-temperature-composition relationships as applied to diagenesis, hydrothermal systems, metamorphism, and magmatism. Students will learn to use the software package Geochemist’s Workbench (GWB) to assist in constructing and understanding phase diagrams and reaction modeling.

Lecture and Lab

3 (3-1)

Course Objectives and/or additional information:

Students of geochemistry will learn

- The behavior and interaction of the naturally-occurring elements and significant compounds
- The compositional parameters of Earth systems on planetary, regional, and local scales
- The limits and drivers of natural chemical systems
- Specific topical examples of geochemical investigations

3. Dr. Garrison made a motion to adopt the proposal to implement a Master of Science Degree with a Major in Geosciences. *Dr. Patton seconded; and the motion was adopted. (closed)*

Summary: Implement a Master of Science degree with a major in Geosciences at Midwestern State University with two pathways for completion:

1. Five year path leading to a combined Bachelor of Science/Master of Science with a Major in Geosciences
2. A two-year, traditional Master of Science with a Major in Geosciences for those with a Bachelor of Science degree in geology or related fields. Note that students with Bachelor of Science degrees in fields other than geology may be admitted once course deficiencies are removed.

Master of Science minimum degree requirements for both pathways are identical – 31 graduate credit hours and a Master of Science thesis of appropriate length and depth documenting original research.

Rationale for a Master of Science Degree with a Major in Geosciences

Many geoscience majors enter the oil and gas industry. All of the major oil and gas companies such as Chevron, Shell, BP, and ExxonMobil require new hire geologists to have a Master of Science or Doctorate degree. The same holds true for the majority of large and medium size independent oil and gas companies. The smaller independent oil and gas companies will hire graduates with Bachelor of Arts or Bachelor of Science degrees as geological technicians, but generally not as geologists. The annual salary difference between the geologist and geological technician positions is currently \$40-50K. Given the current robust hiring in the oil and gas industry and projections

that this trend will continue for at least the next 5-10 years or more¹, the time seems appropriate to initiate a graduate degree with a major in Geosciences at Midwestern State University.

A five-year path leading to a combined Bachelor of Science/ Master of Science Degree with a Major in Geosciences offers an expense and time savings and should be very attractive to current and future undergraduates. The combined degree path will differentiate Midwestern State University from other area and Texas schools.² It is anticipated that in the initial years of the combined degree path that 2-4 undergraduate students per year would be eligible to apply. This number would likely rise to 4-6 as the combined degree path becomes better known and the total number of geology majors correspondingly increases.

Access to a two-year, traditional path towards a Master of Science Degree with a Major in Geosciences will appeal to those currently employed in the area as geological technicians that want to advance their careers. This path may be structured to facilitate full time employed students to participate by offering classes late in the afternoon or early evening. Based on conversations with recent geology graduates and local oil and gas industry management, there is likely a significant number of recent Bachelor of Science graduates who want to advance their careers. It is anticipated that this pool could supply 3-4 qualified applicants per year to the two-year, traditional Master of Science degree. As the local area pool shrinks it is anticipated that MSU will attract students from outside of the immediate area so that admissions to the two year pathway will likely grow to 4-6 or more per year. Table 1 summarizes projected estimated growth for the two Master of Science degree pathways as well as total geoscience graduate students.

Academic Year	Estimated Annual 5 Year Combined BS/MS Path Student Admissions	Estimated Annual 2 Year Traditional MS Path Student Admissions	Estimated Annual Total MS Student Admissions	Estimated Total MS Students Supervised Annually
2016	3	2	5	5
2017	3	2	5	10
2018	3	4	7	12
2019	4	4	8	15
2020	4	4	8	16
2021	4	4	8	16
2022	5	5	10	18
2023	5	5	10	20
2024	5	5	10	20

¹ Industry hiring currently is driven by increasing demand for oil and gas worldwide and the retirement of staff hired prior to the late 1980s (the end of the last price “boom”). Normal hiring is not expected for the next 5-10 years due to the retirement “peak” (also known as the “great career change”) <http://www.stantonchaseonleadership.com>.

The Bureau Labor Statistics estimated that demand driven job growth between 2010 and 2020 for the geoscientist profession at 21 percent with the caveat that oil and gas price fluctuations may affect employment in that sector. This compares with an overall average of 14 percent for the U.S. economy (<http://work.chron.com/pay-scale-oil-gas-geology-jobs-10067.html>). The higher than average demand reflects two factors – surging industry efforts to develop unconventional shale oil and gas worldwide and industry demographics with the majority of current employees hired in the 1970s and 1980s now starting to retire.

The demand for geoscientists in the oil and gas industry is also reflected in a recent CNN article based on data from PayScale.com showing that the #2 and #7 top paying jobs in the US were petroleum geologist (median \$183,000) and geophysicist (median \$132,000), respectively. <http://money.cnn.com/gallery/pf/jobs/2013/11/13/top-paying-jobs/2.html>

From the American Geosciences Institute (<http://www.agiweb.org/workforce/faqs/#3.3>) “For instance, energy industry employment of geologists declined during the late 1980s and early 1990s. But now with stable oil prices, advanced technology, and changes in the global economy, there is increased hiring in the petroleum industry. Over the near term there will be a shortage of qualified people.”

² Institutions that offer five-year combined Bachelor of Science/Master of Science degrees are limited but include Montana Tech, New Mexico Institute of Mining and Technology, Indiana University – Purdue (Indianapolis), LSU, SUNY – Buffalo, University of Miami (marine geology), Colorado School of Mines (environmental geochemistry), Montclair State (aquatic and coastal sciences), Case western (environmental geology)

2025	5	5	10	20
2026	5	5	10	20
2027	6	6	12	22
2028	6	6	12	24
2029	6	6	12	24

There is very strong interest and community financial support to develop a graduate program in the Geosciences at Midwestern State University.

Summary Description of the Five Year Path Leading to a Combined Bachelor of Science/Master of Science Degree with a Major in Geosciences

The combined Bachelor of Science/Master of Science Degree with a Major in Geosciences allows academically focused students to earn both the Bachelor of Science and the Master of Science Degree with a Major in Geosciences in 5 years of full time study. Students who meet the combined degree path entrance requirements may apply for admission to the Graduate School for the combined Bachelor of Science/Master of Science Degree with a Major in Geosciences by the end of their junior year. Entrance requirements will include GPA (overall and required geoscience courses), progress towards Bachelor of Science degree, GRE scores, and letters of recommendation.

Those students accepted into the combined degree path will start work to meet the Master of Science coursework and Master of Science thesis requirements in their fourth year of study. The Bachelor of Science degree “portion” will include 120 credit hours as per the University Undergraduate Bulletin and the Master of Science Degree “portion” will consist of 31 credits of which up to six credit hours may be for Master of Science thesis research and 19 credit hours must be approved graduate level (4000/5000/6000) courses including the Geoscience Graduate Seminar. Participation in the Geoscience Graduate Seminar (one credit hour per semester) is required. The allowed maximum for graduate credit from approved 3000/4000 level courses is 6 credit hours. Note that students are limited to four graduate credits for the Geoscience Graduate Seminar as they pursue their degree. The Master of Science thesis must be of an appropriate length and depth detailing original research in an applicable subject area. The Master of Science thesis must be publically presented and “defended” before the Graduate Advisory Committee. It is anticipated that there would be several primary focus areas for graduate study. Based on current faculty areas of expertise, these foci include:

1. Petroleum geology
2. Igneous and metamorphic petrology
3. Sedimentology, stratigraphy, and paleontology
4. Environmental geosciences

Students who are admitted to the combined degree path in the Geosciences may opt out in their fourth year and receive the Bachelor of Science degree provided that all requirements for the Bachelor of Science degree in the Geosciences have been satisfactorily completed. It is estimated that the five year path to the Bachelor of Science/Master of Science Degree with a Major in Geosciences will reduce the overall cost to the student.

Summary of a Traditional Two-Year Master of Science Degree with a Major in Geosciences

The “traditional two-year” Master of Science degree with a major in Geosciences will require 31 graduate credits of which at least 19 credits must be approved graduate level (4000/5000/6000) courses. Six credit hours are allocated to Master of Science thesis research. Participation in the Geoscience Graduate Seminar (one credit hour per semester) is required each semester. Note that students are limited to four graduate credits for the Geoscience Graduate Seminar as they pursue their degree. The allowed maximum for graduate credit from approved 3000/4000 level courses is 6 credit hours. The student must also complete a Master of Science thesis of appropriate length and depth detailing their original research in an applicable subject area. The student will be required to make a public presentation summarizing the original research and results as well as defend the thesis before the Graduate Advisory Committee. Admission requirements to the traditional, two-year Master of Science with a Major in the Geosciences include three letters of recommendation and satisfactory GPA and GRE scores. Graduate tuition rates will apply to students in the traditional, two-year Master of Science graduate degree path in the Geosciences.

Resource Allocation

At least one additional faculty will be needed to enable an increased number of 4000/5000/6000 level courses as well as provide adequate supervision of the anticipated number of graduate students. The maximum number of graduate students that could be adequately supervised and mentored by a full time faculty member is 2-4, depending on the specialty and focus of the research. An additional faculty member will be needed to provide graduate student supervision and additional courses in their focus areas. The additional faculty will be needed in the first two years of the graduate program. A second faculty member may be needed within four years, particularly if growth exceeds projections shown previously in Table 1.

The four current faculty members provide 4000 level courses in petroleum geology, groundwater hydrology, sedimentology, stratigraphy, and economic geology. The four current faculty members could provide additional 4000/5000/6000 level courses in a variety of areas including geochemistry and geochemical modeling, petroleum reservoir modeling, advanced igneous and metamorphic petrology, carbonate and clastic depositional systems, oil and gas play analysis, geographic information systems (GIS) for geologists, isotope geochemistry, well logging and advanced formation evaluation, geodynamics, advanced structural geology and tectonics, geology of metallic ore deposits, and advanced data analysis for geologists. It is anticipated that 6-8 new graduate level courses by existing faculty will be needed in the first two years of the program. In addition, 1-2 graduate level courses will need to be developed by each new faculty in the early years of the graduate program. Possible new courses by existing faculty are listed in Appendix 1. Most likely, the additional faculty would have a focus on hydrology, surface geological processes, and/or geophysics.

Appropriate funding of graduate students (tuition reduction; support as TAs/GAs) will also need to be established through endowments and grants.

Additional Comments Regarding the Five Year Path to a Combined Bachelor of Science / Master of Science Degree with a Major in Geosciences³

The combined degree path allows students to earn both the Bachelor of Science and the Master of Science Degrees with a Major in Geosciences degrees within 5 years of study. Students that plan to complete the combined degree must apply for admission to the Graduate School and the Combined Bachelor of Science/Master of Science Degree with a major in the Geosciences by the end of their junior year. The combined degree path is academically challenging and students interested in this option are advised to review both the admission and the degree requirements well before the end of their junior year.

During the first three years, students who plan to complete the combined degree follow normal course scheduling. Those students who intend to complete the combined degree path will be strongly encouraged to take additional appropriate upper level classes (e.g. 3000/4000 level) as early as possible in their academic career as well as appropriate undergraduate research and/or independent study opportunities during their junior year. It is anticipated that undergraduate research and/or independent study may lead to or be included as a portion of their future Master of Science thesis.

Students must apply for admission for the combined degree before the end of their junior year. Application deadlines will be included in the University Calendar. Students accepted into the combined degree path will be notified prior to the beginning of their senior year. Simultaneously, the student's Master of Science Advising Committee will be appointed.

During the senior year, the student will continue to follow normal course scheduling. An emphasis will be placed on completing additional upper level and graduate level coursework as appropriate. During the senior year, the student will start work on a thesis designed to meet the requirements of a Master of Science thesis as described below. Students who are admitted for the combined degree may opt out in their fourth year and receive the Bachelor of Science degree provided, of course, that all requirements for the Bachelor of Science degree have been completed. During the student's fifth year, the student will take additional courses fulfilling the departmental Master of Science degree requirements and complete the Master of Science thesis including a public presentation and defend the Master of Science thesis before an appropriate Graduate Advisory Committee.

Admission Requirements

³ This description is based on the five year Combined Bachelor of Science/Master of Science Degree Program as offered by Penn State.

Students who wish to complete the combined degree must apply for admission to the Graduate School and the Combined Bachelor of Science/Master of Science Degree with a Major in Geosciences at the by the end of their junior year. Three letters of recommendation by faculty members for admission to graduate studies are required. One of these letters may be from faculty outside of the geosciences. Students must complete all required academic core courses prior to admission to the combined degree path. Students should have a satisfactory overall GPA of at least 3.00 and satisfactory scores on the GRE (e.g. Verbal \geq 150; Quantitative \geq 155)⁴. Students not meeting these requirements may be admitted on a conditional basis.

All applications are reviewed by the Admissions Committee of the Combined Bachelor of Science/Master of Science Degree with a Major in Geosciences by the AVPAA and Dean of the Billie Doris McAda Graduate School.

General Combined Bachelor of Science / Master of Science Degree with a Major in Geosciences Requirements

1. Bachelor of Science Degree Portion - 120 Credits as per the University Undergraduate Bulletin
2. Master of Science Degree Portion – 31 Credits of which up to 6 may be thesis research and 19 credits must be approved 4000/5000/6000 graduate level courses. The Graduate Seminar (1 credit hour per semester) is required. The allowed maximum for graduate credit from approved 3000/4000 level courses is 6 credit hours.

Master of Science Thesis Requirements for the Combined Bachelor of Science / Master of Science Degree with a Major in Geosciences

Original research in an applicable subject area and documented by a thesis of appropriate length and depth. The student will be required to make a public presentation summarizing the original research and results as well as defend the thesis before an appropriate Graduate Advisory Committee

Conflicts and/or Gaps with Existing Graduate School Policies and Processes

It is expected that additional refinement, perhaps significant refinement of this graduate degree description and specifics in particular, will be needed to align the proposed five year path to a Combined Bachelor of Science/Master of Science Degree with a Major in Geosciences with MSU Graduate School policies and procedures.

Appendix 1 – Existing and Possible New Courses for Graduate Degree in the Geosciences

Existing Courses⁵

- Petroleum Geology (4034)
- Applied Petroleum Geology (4134)
- Groundwater Hydrology (4233)
- Sedimentology and Stratigraphy (4534)
- Economic Geology (4533)

Proposed and Potential New Courses (4000/5000/6000) by current faculty. Short descriptions of each course are in Appendix 2. CIFs are attached for the courses that will most likely be available at graduate degree start up. Asterisks mark those with attached CIFs.

- GEOS 4013 Data Analysis for the Geological Sciences (undergraduate course - presented by College)*
- GEOS 4243 Geochemistry* (undergraduate course - presented by College)
- GEOS 5033 Geographic Information Systems (GIS) for Geosciences*
- GEOS 5082 Special Graduate Topics in Geosciences*
- GEOS 5113 Geostatistics and Petroleum Reservoir Modeling*
- GEOS 5123 Advanced Formation Evaluation*
- GEOS 5133 Petroleum Play Analysis*
- GEOS 5323 Clastic Depositional Systems and Stratigraphy*
- GEOS 5313 Carbonate Depositional Systems and Stratigraphy*
- GEOS 5433 Advanced Structural Geology and Geodynamics*
- GEOS 6001 Graduate Seminar in Geosciences*

⁴ These GRE scores correspond roughly to the 60th percentile based on the GRE 2014-2014 report.

⁵ Does not include 3000 level courses in the current catalog that could be approved for graduate credit.

- GEOS 6983 Thesis I*
- GEOS 6993 Thesis II*
- Advanced Igneous/Metamorphic Petrology
- Evolutionary Paleobiology Isotope Geochemistry
- Metallic Ore Deposits
- Regional/North American Geology
- Techniques of Analytical Geochemistry
- Volcanology

Appendix 2 – Proposed and Potential New 4000/5000/6000 Course Descriptions (* indicates CIF)

GEOS 4013 Data Analysis for the Geological Sciences*

This course focuses on using univariate and multivariate statistics to address geologic problems, and interpreting and understanding data as presented in the scientific literature. Basic concepts in elementary statistics (p-values, distributions, hypothesis testing) will be reviewed with a geologic viewpoint. Advanced topics will be applied to geologic examples, and include matrix algebra, eigenvectors, regression, non-parametric resampling, spatial analysis, ordination methods, and multidimensional scaling. Examples will be taken from various geoscience subfields, and students will apply their understanding to both original projects and previously published work. Analyses will be performed in the “R” software environment, designed for statistical applications.

Prerequisites: STATS 3573 or the approval of the instructor

3 (3-0)

GEOS 4154 Natural Hazards and Disasters

This course will enable the student to 1) understand the scope and impact of natural hazards and disasters 2) recognize the difference between hazards and disasters and 3) understand how the expanding human footprint is leading to an increase in natural disasters. The laboratory sessions utilize geospatial technologies (Geographic information systems/GIS and remote sensing software) enabling students to develop mapping and modeling expertise and apply it to the study of diverse geological and atmospheric hazards including earthquakes, volcanoes, landslides, floods, storms, wildfires, and climate change.

4 (3-2)

GEOS 4143 Volcanology

This class covers the nature of volcanic processes and products, including eruptive styles, edifices, and structures, modern and ancient. The course includes analysis of the products of igneous, volcanoclastic, and hydrothermal activity. In addition to the general nature of volcanism, the class examines the evolution of specific eruptive centers and volcanic fields, with an emphasis on modern techniques of evaluation, assessment, and eruption risk.

3 (3-0)

Prerequisites: GEOS 3234 or the approval of the instructor

GEOS 4243 Geochemistry*

This course covers thermodynamics and kinetics as applied to earth systems, over a range of conditions relevant to the Earth’s interior and its surface, with emphasis on the hydrosphere and lithosphere. The course examines speciation and phase stability in aqueous solutions, and pressure-temperature-composition relationships as applied to diagenesis, hydrothermal systems, metamorphism, and magmatism. Students will learn to use the software package Geochemist’s Workbench (GWB) to assist in constructing and understanding phase diagrams and reaction modeling.

Prerequisites: CHEM 1243 or CHEM1253, GEOS 3534 and STATS 3573 or the approval of the instructor

3 (3-1)

GEOS 4253 Isotope Geochemistry

This course is an overview of the geologic use of isotopic systems. It covers geochronology using radioactive decay series, including U-Th-Pb, Sm-Nd, K-Ar, Re-Os, and Lu-Hf, U-series disequilibrium, fallout isotopes such as ¹³⁷Cs, and cosmogenic isotopes such as ¹⁰Be, ²⁶Al, ¹⁴C and ³⁶Cl. The course covers radiogenic and stable isotopes as applied to the evolution of the crust and mantle, stable isotopes (e.g. sulfur, carbon, hydrogen, oxygen) as applied to geothermometry, ore petrogenesis, paleontology, and the global climate system.

3 (3-0)

Prerequisites: CHEM 1243 or CHEM1253 or approval of the instructor

GEOS 4413 Regional/North American Geology

This course is an examination of the assembly of Texas and North America over time, beginning with the developments of the Granite-Rhyolite Terrane and Texas Cratons, Grenville deformation and the formation of Rodinia, formation of the southern Iapetus ocean and associated rifting, early Paleozoic marine deposition and sequential western (Antler, Nevadan, Klamath, Sonoma) and eastern (Taconic, Acadian), closure of the Iapetus ocean and associated orogenies (Alleghenian, Ouchita-Marathon, Ancestral Rocky), late Paleozoic sedimentation, Mesozoic epeiric marine incursion, Paleogene orogenic and gulf sedimentation, magmatic, and hydrothermal, and Neogene lithospheric tension, subduction, and hot-spot magmatism and deformation. The course will examine regional and narrow datasets and literature covering the events that shaped the modern continent.

3 (3-0)

Prerequisites: GEOS 3234 and 3434 or the approval of the instructor

GEOS 5033 GIS for Geosciences*

This course focuses on developing spatial analysis skills using ArcGIS software and online analysis tools. Students will learn to access and download data, integrate, analyze, and model data, create new data sets, and make maps and presentations. The course will comprise case studies and laboratory activities with diverse applications including delineation of watershed boundaries; assessing susceptibility of ground water to point- and nonpoint-source pollution; investigating global patterns and trends in natural hazard/disaster; monitoring land cover change and its potential impacts; applying topographic maps to study geomorphology; exploring patterns and types of plate boundaries; and working with geological, structural, and geophysical data with applications for geologic mapping and resource exploration.

3 (2-2)

GEOS 5082 Special Topics in Geosciences*

Review and discussion of current scientific literature and research related to a topic in the geosciences. Student will synthesize knowledge on the subject and present their findings. Discussions focus on the hypotheses, methodology, and approach of previous work, and how to apply that to the student's current thesis research.

2 (May be repeated once with consent of graduate coordinator)

GEOS 5113 Geostatistics and Petroleum Reservoir Modeling*

This course focuses on the theory and application of geostatistics and closely allied methodologies (e.g. Multiple Point Statistics or MPS) used to interpret and model oil and gas reservoirs, aquifers, and metallic ore deposits. Specific topics include kriging, sequential Gaussian simulation, sequential indicator simulation, object-based methods such as multiple point statistics, uncertainty assessment, and the use of experimental design-based workflows to build low, mid, and high case reservoir models for probabilistic assessment of recovery. The course will cover theory as well as case history examples. Students will also learn to build sophisticated reservoir models using spreadsheet and industry standard software with synthetic and actual reservoir data for both small and large petroleum reservoirs.

Prerequisites: GEOS 4534 and GEOS 4034 or the approval of the instructor

3 (3-1)

GEOS 5123 Advanced Formation Evaluation*

This course will focus on petroleum and natural gas reservoir formation evaluation. The course topics include coring, "regular" core analysis, "special" core (SCAL) analysis, integrated core and well log-based analysis of formation resistivity, saturation, porosity, and lithology, advanced well logging and interpretation including the use of nuclear magnetic resonance (NMR) for fluid and permeability characterization, formation micro-imaging (FMI) for thin bed, stratigraphic, and structural (e.g. fracture) analysis, and spectral gamma ray logging for lithology and stratigraphy. Other topics include cased-hole logging, "dynamic" reservoir data acquisition and interpretation (e.g. via spinner/flowmeter logs, temperature logs), mercury injection capillary pressure (MICP) data acquisition and interpretation, the emerging field of CT image-based characterization of reservoir rocks and pore networks particularly for carbonate and shale reservoirs. Numerous case histories from a variety of reservoirs and reservoir development stages will be used throughout the course.

Prerequisites: GEOS 4534 and GEOS 4034 or the approval of the instructor

3 (3-1)

GEOS 5133 Petroleum Play Analysis*

This course concerns petroleum and natural gas play analysis, with a focus on how an organic-rich source rock can combine, over time, with a series of other elements to produce an economic accumulation of petroleum. The course topics include the definition of play elements, which include source, maturation, reservoir, migration, seal, trap, and timing. Additional foci include structural styles and their controls on plays, basin classification and depositional systems and their relationship to play controls, and play analysis methods. Readings will focus on case histories of global play analyses. Laboratory exercises will include seismic and well log interpretation, stratigraphic and structural analysis, and integration of data sets.

Prerequisites: GEOS 4534 and GEOS 4034 or the approval of the instructor

3 (2-2)

GEOS 5213 Techniques of Analytical Geochemistry

An overview of modern analytical techniques for assessing earth materials, underscoring energy and mass spectrometric and diffraction methods used in bulk and micro-volume characterization. The course will utilize field tools for aqueous geochemistry, laser-ablation and electron beam microanalysis, and/or dissolution absorption spectrometry. It will cover principles of dissolution electrochemistry, energy and particle sources, X-ray, electron, and neutron diffraction, ion-, electron-, X-ray-, and laser-sample interactions, accelerator techniques including XANES, Rutherford back-scattering, cathodoluminescence and fluoresce detection and spectrometry, and particle mass discrimination. The course will examine and construct analyses based on datasets from prominent techniques.

3 (1-4)

Prerequisites: Geochemistry (GEOS 4243) or the approval of the instructor

GEOS 5233 Advanced Igneous/Metamorphic Petrology

The course examines modern petrological techniques for evaluating igneous and metamorphic systems and delves into a nuanced understanding of their products. The course reviews prominent geothermobarometric and other mineralogical assemblages, and it explores modeling techniques for evaluating phase stability and mass transfer during alteration, metamorphism, and magmatism. The course will also review laboratory and field techniques for evaluating high-temperature earth systems. The course will cover readings on current igneous and metamorphic investigations, and evaluate in each in light of plate tectonic theory and a global geochemical framework. The course will utilize computer modeling and petrographic analysis of sample sets.

3 (2-2)

Prerequisites: Geochemistry (GEOS 4243) or the approval of the instructor

GEOS 5313 Carbonate Depositional Systems and Stratigraphy*

This course covers all aspects of marine carbonate depositional systems and stratigraphy. The course will discuss characteristics of geologic and modern systems across a range of environments (shorelines, tidal flats, reefs, open shelf, deep basin etc.). Students will develop an understanding of sequence stratigraphy, identifying cycles, and the various features of the carbonate factory. Other topics include: diagenetic fabrics, ramp profiles, bioherm and reef formation, and carbonate petrology. Lecture will be supplemented by applied learning with thin sections, core, and hand samples. Concepts will be reinforced with advanced readings and discussion of carbonate-related topics including major carbonate petroleum reservoirs.

Prerequisites: GEOS 4534 or the approval of the instructor

3 (2-2)

GEOS 5323 Clastic Depositional Systems and Stratigraphy*

This course covers all aspects of terrestrial and marine siliciclastic depositional systems and stratigraphy. The course will discuss characteristics of geologic and modern systems across a range of environments (deltas, lakes, shorelines, barrier islands, alluvial and submarine fans, turbidite systems etc.). Students will develop an understanding of clastic sequence stratigraphy, identifying cycles, and the mechanisms responsible for deep-water sedimentation. Other topics include: paleoclimate reconstruction, gravity flow processes, water-rock interactions, subsurface applications, and siliciclastic petrology. Lecture will be supplemented by applied learning with thin sections, core, and hand samples. Concepts will be reinforced with advanced readings and discussion of topics related to siliciclastic depositional systems including major siliciclastic petroleum reservoirs.

Prerequisites: GEOS 4534 or the approval of the instructor
3 (2-2)

GEOS 5433 Advanced Structural Geology and Geodynamics*

The course will evaluate deformation processes and features in the crust and mantle, with an emphasis on structural regimes in the upper lithosphere. The course will evaluate stress regimes in reference to plate tectonic theory, and provides an overview of the application of continuum physics to deformation and related processes. These will be applied to lithospheric and asthenospheric deformation driven by geologic tension, compression, and shearing as exemplified by modern and ancient rifts, tectonic basins, orogenies, subduction arcs, transforms, and crustal slumps. Students will explore examples through collection and analysis of structural measurements, geospatial and geophysical data, and computer modeling.

3 (3-1)

Prerequisites: GEOS 3234 and 3434 or the approval of the instructor

GEOS 5533 Metallic Ore Deposits

This course focuses on the formation and evaluation of the major classes of metallic ore deposits (e.g. gold, silver, copper, zinc, lead, uranium, and iron) as well as the tools used to interpret the depositional processes and conditions. Specific modules will focus on metal transport and depositional processes that produce ore deposits in igneous, metamorphic, hydrothermal, and non-hydrothermal settings. The use of fluid inclusion studies, stable and radiogenic isotope studies, and geochemical studies to interpret primary deposits and secondary/supergene deposits will be integrated throughout this case history-based course in metallic ore deposits. The course will also cover the impact of changes over time to the composition of the mantle, crust, atmosphere, and oceans of the Earth on metallic ore deposition from the Precambrian to the present.

Prerequisites: GEOS 4533 or the approval of the instructor

3 (3-1)

GEOS 5613 Evolutionary Paleobiology

This course applies quantitative statistical methods to the study of evolutionary biology in the fossil record. The acquisition, processing, and analysis of paleontological data will be stressed throughout, demonstrating the types of problems that can be addressed with information from fossils. Topics include the quantitative study of shape (geometric morphometrics), phylogenetic analysis, diversity analysis, survivorship curves, biogeographic models, time-series analysis, and biostratigraphy (graphic correlation). Laboratory work will use the "PAST" statistical package.

Prerequisites: GEOS 3534 and STATS 3573 or the approval of the instructor

3 (2-2)

GEOS 6001 Graduate Seminar in Geosciences*

The Graduate Seminar in the geosciences will cover selected topics within the field of geosciences.

1 (May be repeated for credit; see below)

Graduate Seminar is offered each semester and must be taken at least four times prior to awarding either the combined Bachelor of Science/ Master of Science Degree with Major in Geosciences or the two-year Master of Science Degree with a Major in Geosciences.

GEOS 6983 Thesis I*

Students register for this course as soon as their thesis proposal has been approved by the Graduate Advisory Committee. The following semester they will register for GEOS 6993 Graduate Thesis II; they will continue to register for that course until completion of their degree. A combined total of 6 hours "graduate thesis" credit will be awarded towards the degree.

3

Prerequisite: Graduate Advisory Committee Approval of student's thesis proposal.

GEOS 6993 Thesis II*

Students register for this course the semester following GEOS 6983 Graduate Thesis I; they will continue to register for this course until completion of their degree. A total of 6 hours "graduate thesis" credits will be awarded towards the degree.

3

Prerequisite: GEOS 6983

Additional Information

- Dr. Stewart opened the meeting by acknowledging the passing of Dr. Dick King, Associate Professor of History. Dr. King passed away on Monday evening after a year-long battle with cancer. He served MSU for several years and will be missed by his colleagues and the community as a whole.
- Dr. Stewart welcomed Ms. Roylyka Roache, the new Student Government Association Vice President. Ms. Roache will serve as a voting member of the Academic Council for the 2014-2015 academic year.
- Dr. Watson announced that Dr. King's funeral would be on Friday, September 19, and details will be listed in the local newspaper.
- Dr. Garrison reported that the Internal Faculty Grant Program was active and the deadline to apply is October 3.
- Dr. Garrison announced that the Billie Doris McAda Graduate School will host their Open House on October 7, 5:30 p.m., in DCOBA, rooms 189 and 101.
- Ms. Hickman reported that the Mustangs Rally (campus assembly) is being moved to the Wellness Center due to growth of the rally. The next Mustangs Rally is on November 8 and they have received several reservations.
- Ms. Hickman said they are also receiving reservations for the Discover MSU program. Valerie Martinez has been working with the colleges on the details and you can contact Leah or Valerie for more information. Additional information is on the web.
 - Friday, October 4, 2014, at the Lamar D. Fain College of Fine Arts
 - Friday, November 7, 2014, at the Robert D. & Carol Gunn College of Health Sciences and Human Services
 - Friday, February 6, 2015, at the Prothro-Yeager College of Humanities and Social Sciences
 - Friday, February 13, 2015, at the College of Science and Mathematics
 - Friday, February 27, 2015, at the Dillard College of Business Administration
 - Friday, March 6, 2015, at the Gordon T. & Ellen West College of Education
- Dr. Latham announced that Dr. Todd Giles, Assistant Professor of English, is presenting "Books are Better for Banning and Burning than Page Turning" during Banned Books Week on September 25. Admission is free and the talk will begin at 5 p.m.
- Mr. Wong reported that the Annual Kick-Off Reception for the 2014 State Employee Charitable Campaign (SECC) is on Wednesday, September 24, at 9 a.m. in Wichita I&II. A continental breakfast will be served and guest speakers are Dr. Betty Stewart and Dr. Terry Patton.
- Dr. Fidelie announced that the Faculty Senate is creating a Faculty Tuition Incentive Program where faculty who wish to continue their education can apply for and possibly receive some monetary compensation.
- Dr. Patton announced that Brigadier General Scott Kindsvater, the Commander of the 82nd Training Wing at Sheppard Air Force Base, is this fall's Executive in Residence at the Dillard College. He will be a guest lecturer on Tuesday, October 7, at 11 a.m. in D101.

- Dr. Camacho reported that the Juanita Harvey Art Gallery will feature the work of Scott Frish, Printmaker, and the works of 3 MSU seniors, beginning this Friday. The Opening Reception is at 6 p.m. in the Art Gallery.
- Dr. Camacho noted that there were good, positive remarks in the press about last Tuesday's Art Camp and a nice article on the 1978 Grand Opening of the Fine Arts Center.
- Ms. Roache thanked everyone for welcoming her and she is excited to serve a member of the Academic Council.

Adjournment

There being no other business, the meeting was adjourned at 2:34 p.m.

Respectfully submitted,

Deb Schulte, Assistant to the Provost

9/18/14

The following items were submitted to the voting members of the Academic Council for an electronic vote on Thursday, September 18, 2014. The items were approved for adoption.

1. Which core to use? (*Information item – no vote required*)

The FAQ page for advisors on the MSU Website includes the Power Point used at the core meeting Dr. Stewart held last spring. One slide refers to students who are eligible to continue with the “old” (prior to fall 2014 core). The reference to enrolled in any institution, is a paraphrase. The legislation refers to students who attended any *Texas public institution that offers an undergraduate academic degree program* prior to fall 2014 being eligible to continue with the old core. (It is restricted to having attended a Texas public institution.) Which core will be used is determined by which catalog is used for the degree plan. If students choose the fall 2014 catalog, they are in the new core. Some advisors have had questions about this. (MSU requires that a student have 12 hours earned in the two year period covered by an active catalog in order to choose that catalog. Currently the active previous catalogs are: 2008-10, 2010-12 and 2012-14.)

There was a statement in the new core language which said: “Any student who first enrolls in an institution of higher education following high school graduation in fall 2014 or later shall be subject to the current Texas Core Curriculum requirements.” We asked the CB for clarification whether a student who had been a dual credit or concurrently enrolled student while in high school could choose one of the older cores, and the CB said no, that if Fall 2014 is first enrollment after high school, they must be in the new 2014 core.

Additionally, since legislation now refers to students who attended *any Texas public institution that offers an undergraduate academic degree program*, then we must align the catalog statement which currently refers to students who transfer from Texas public community colleges (previous catalog on page 51), to refer to any students transferring from any Texas public institution of higher education. (Not just restricted to community colleges.) We will update the language in the new catalog to reflect this.

2. Undergraduate Catalog Changes

Page 90 of the 2012-2014 Undergraduate Catalog:

9. Have a minimum total credits of 120 semester hours. Developmental courses are excluded from the 120 hours. Only two physical activities courses will be counted for the 120 hour requirement **regardless of whether fulfilling a previous core requirement or electives.**

Page 90 of the 2012-2014 Undergraduate Catalog:

13. Demonstrate computer literacy by earning credit for a proficiency test or in CMPS 1013, 1023, 1033, 1044, EDUC 1023, or MIS 2003, **if graduating under a catalog prior to the 2014-2016 catalog.**