### Course Approval Form

**Action Requested:**
- [X] Create new course
- [ ] Inactivate existing course

**Course Level:**
- [X] Graduate

**College/School:**
- COE

**Department:**
- AOES

**Submitted by:**
- Linda Hinnov

**Ext:**
- Email: lindahinnov@gmail.com

**Effective Term:**
- [X] Fall
  - Year: 2016

**Title:**
- Current: Geology of Energy Resources
- New: Geology of Energy Resources

**Credits:**
- [X] Fixed
- [ ] Variable
- [ ] 3 or
- [ ] to

**Repeat Status:**
- [X] Not Repeatable (NR)
- [ ] Repeatable within degree (RD)
- [ ] Repeatable within term (RT)

**Grade Mode:**
- [X] Regular (A, B, C, etc.)
- [ ] Special (A, B, C, etc. +IP)

**Schedule Type:**
- [X] Lecture (LEC)
- [ ] Lab (LAB)
- [ ] Recitation (RCT)
- [ ] Internship (INT)

**Prerequisite(s):**
- GEOL 101 or GEOL 102, and completion of all Mason Core Natural Science requirements, or permission of instructor.

**Corequisite(s):**

**Restrictions Enforced by System:**
- Major, College, Degree, Program, etc. (include code)

**Catalog Copy for NEW Courses Only**

**Description** (No more than 60 words, use verb phrases and present tense)

Survey of global non-renewable and renewable energy resources. Topics include petroleum, natural gas, coal, nuclear, geothermal, solar, wind, and hydro power, and biofuels. Course discusses global production, usage, impacts and future prospects of these resources, and data capture, analysis and modeling of finite resources.

**Notes** (List additional information for the course)

**Indicate number of contact hours:**
- Hours of Lecture or Seminar per week: 3

**When Offered:**
- [X] Fall
- [ ] Summer
- [ ] Spring

**Approval Signatures**

**For Graduate Courses Only**

**Graduate Council Member**

**Provost Office**

**Graduate Council Approval Date**

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*Note: The form contains instructions and fields for submitting a new course proposal, including options for title, credits, repeat status, and prerequisites, along with spaces for department approval, college/school approval, and equivalent courses.*
Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC’s reference. Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

Course Number and Title: **GEOL 521 Geology of Energy Resources**

Date of Departmental Approval:

- **Reason for the New Course:**

This is a graduate course to be cross-listed with GEOL 321 Geology of Energy Resources. The topic is of interest to graduate students as well as undergraduates.

- **Relationship to Existing Programs:**

The Master of Arts in Interdisciplinary Studies (MAIS) is being modified so that its Energy track will have a requirement that is satisfied either by GEOL 521 or by a PHYS 581.

- **Relationship to Existing Courses:**

GEOL 521 Geology of Energy Resources will be co-taught with GEOL 321 Geology of Energy Resources; graduate students will additionally complete an independent project on a topic that is pre-approved by the instructor. PHYS 581 Topics in Renewable Energy covers some of the same resource issues but with a greater emphasis on the physics of energy generation and with more physics prerequisites than many MAIS students have taken.

- **Semester of Initial Offering:** Fall 2016

- **Proposed Instructors:** Linda Hinnov

- **Syllabus:** See next page.
GEOL 321/GEOL 521
GEOLOGY OF ENERGY RESOURCES

Survey of global non-renewable and renewable energy resources. Topics include petroleum, natural gas, coal, nuclear, geothermal, solar, wind, and hydro power, and biofuels. Course discusses global production, usage, impacts and future prospects of these resources, and data capture, analysis and modeling of finite resources. (3 credits).

Instructor: Linda Hinnov, Dept. AOES, email: lhinnov@gmu.edu
Meetings: Tuesdays, 15.00-17.45, Exploratory 1005.
Materials: Online resources, review and research articles.
Requirements: All students: Five assignments, mid-term and final exams. GEOL 521 students additionally complete an independent project.
Grading: Assignments, exams and (for GEOL 521) independent projects are individually scaled to 100 points.

Syllabus:

DATE LECTURE

Week 1 Energy in Society
Week 2 Petroleum
Week 3 Natural Gas
Week 4 Coal
Week 5 Peak Oil (or Any Limited Resource)
Week 6 Nuclear Power
Week 7 Geothermal Power
Week 8 Wind Power
Week 9 Solar Power
Week 10 Hydro Power
Week 11 Biofuels
Week 12 Disasters
Week 13 Energy and the Environment
Week 14 Energy Resources Solutions

Student learning objectives:

Knowledge and Understanding
• Gain knowledge about energy, energy resources and their geological origins
• Gain knowledge about global production, delivery and consumption of energy resources
• Understand the advantages, disadvantages, and limitations of non-renewable and renewable resources
• Understand the intersection of energy and the environment

Analytical Skills and Abilities
• Develop the ability to access reliable information about energy resources.
• Develop skills for solving quantitative problems about energy resources.

Professional Development
• Communicate effectively about the geological distribution, size, and intensity of energy resources.
• Be informed on the energy mix portfolios of major nations of the world.
• Advise public and private-interest groups on issues relating to energy resources.