LSC Use Only Proposal No:	UWUCC Use Only Proposal No: 12-82e.
LSC Action-Date:	UWUCC Action-Date: AP-2/19/13 Senate Action Date: App-3/26/13

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person(s) Brian Okey	Email Address bokey@iup.edu
Proposing Department/Unit Geography & Regional Planning	Phone 357-2250

Check all appropriate lines and complete all information. Use a separate cover sheet for each course proposal and/or program proposal.

1. Course Proposals (check all that apply)

- ☐ New Course
- ☐ Course Prefix Change
- ☐ Course Deletion
- ☑ Course Revision
- ☑ Course Number and/or Title Change
- ☐ Catalog Description Change

Current course prefix, number and full title: GEOG 335 Geography of Energy

Proposed course prefix, number and full title, if changing: GEOG 435/535 Geography of Energy

2. Liberal Studies Course Designations, as appropriate

This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)

- ☐ Learning Skills
- ☐ Knowledge Area
- ☐ Global and Multicultural Awareness
- ☐ Writing Across the Curriculum (W Course)
- ☐ Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)
  - ☐ Global Citizenship
  - ☐ Information Literacy
  - ☐ Oral Communication
  - ☐ Quantitative Reasoning
  - ☐ Scientific Literacy
  - ☐ Technological Literacy

3. Other Designations, as appropriate

- ☐ Honors College Course
- ☐ Other: (e.g. Women's Studies, Pan African)

4. Program Proposals

- ☐ Catalog Description Change
- ☐ Program Revision
- ☐ Program Title Change
- ☐ New Track
- ☐ New Degree Program
- ☐ New Minor Program
- ☐ Liberal Studies Requirement Changes
- ☐ Other

Current program name: _____

Proposed program name, if changing: _____

5. Approvals	Signature	Date
Department Curriculum Committee Chair(s)		1/28/13
Department Chairperson(s)		1/28/13
College Curriculum Committee Chair		2/6/13
College Dean		2/6/13
Director of Liberal Studies (as needed)		
Director of Honors College (as needed)		
Provost (as needed)		
Additional signature (with title) as appropriate		
UWUCC Co-Chairs	Gail Stehrust	2/21/13

Received
FEB 8 2013
Liberal Studies

Liberal Studies
FEB 21 2013
Received

Sent to grad school 2/22/13

GEOG 435/535 Geography of Energy
Syllabus of Record

I. Catalog Description:

GEOG 435/535 Geography of Energy **3 class hours**
0 lab hours

Prerequisites: None **3 credits**
(3c-0l-3cr)

Covers patterns and problems of energy production and consumption in human societies. Descriptions of what, where, and how much are combined with issues such as technological change, conservation, allocation, environment impacts, and economic development. Specific topics global history and trends of energy development, pricing systems, types of energy, locations of production areas, and the energy status of the United States.

TEXTBOOKS AND READINGS:

Feder, Deborah. "A Regionally Based Energy End-Use Strategy: Case Studies from Centre County, Pennsylvania." *The Professional Geographer* 56 (2004): 185-200.

Klare, Michael T. *Rising Powers, Shrinking Planet: The New Geopolitics of Energy.* New York: Metropolitan Books 2008.

Lerner, Eric J. "What's Wrong with the Electric Grid?" *The Industrial Physicist.* October/November (2003): 8-13.

Myers, Norman and Spoolman, Scott E. *Environmental Issues & Solutions: A Modular Approach.* Chapters 5, 6, 7, 11, 12, and 13. Belmont, CA: Brooks/Cole 2014.

Reece, Erik. "Death of a Mountain: Radical Strip Mining and the Leveling of Appalachia." *Harper's Magazine.* April (2005): 41-60.

Sutton, Alan. "The Three Gorges Project on the Yangtze River in China." *Geography* 89 (2004): 111-126.

Yergin, D. *The Quest: Energy, Security, and the Remaking of the Modern World.* New York: The Penguin Press 2011.

II. Course Outcomes:

By the end of the semester the students will be able to:

1. Contrast regional and global patterns of availability, production, and consumption of critical energy resources.
2. Examine inconsistencies in supply and demand related to energy resources, and assess the role of market forces in shaping this pattern.
3. Argue relative costs and benefits arising from environmental and social impacts associated with extraction and utilization of major energy sources.
4. Critically appraise the strengths and weaknesses of various conventional and alternative energy sources.

Additionally, graduate students will be able to:

1. Assemble theories underlying processes of resource extraction and regulatory policy relevant to energy.
2. Appraise these theories in reviewing specific case studies involving energy production and/or consumption.

III. Attendance Policy:

All students are expected to attend class, consistent with University policies. Lectures generally complement, rather than duplicate, material found in the readings. Students are responsible for all material presented regardless of absences.

IV. Course Outline:

Week 1
- Basic Concepts
  1. properties of energy
  2. natural resources and market systems

Week 2
- National Perspectives
  1. consumption trends
  2. federal authorities and agencies

Week 3
- Global Perspectives
  1. resource competition
  2. evolving source areas

Week 4
- The U.S. Electric Grid
  1. structure, properties and physical limitations
  2. effects of deregulation
  3. smart grid development

Week 5
- Review of Conventional Thermal and Electric Sources: Coal
  1. impacts, economic considerations, and regulation
     a. deep and surface mining
     b. air quality

Week 6
- Review of Conventional Thermal and Electric Sources: Natural Gas
  1. conventional and shale gas trends and issues
     a. environmental and social impacts
     b. policy responses
     c. shifting global markets and suppliers

Week 7
- Review of Conventional Thermal and Electric Sources: Hydroelectric Dams

1. management and regulatory issues
    a. environmental and social impacts
    b. federal policy, agencies, and relicensing
    d. dams and international development strategies

Midterm Exam

Week 8

Review of Conventional Thermal and Electric Sources: Nuclear

1. impacts, risks, and international dimensions
    a. nuclear fuel cycle, waste issues
    b. federal role in nuclear industry
    d. hazards and weapons proliferation

Week 9

Wind Energy as an Alternative Source of Electricity

1. siting and regional potential
2. environmental and social concerns
3. state and federal incentives

Week 10

The Global Dependence on Petroleum

1. historic trends and "peak oil"
2. U.S. regulatory and foreign policies
3. emerging unconventional sources

Week 11

Alternatives to Petroleum as a Transportation Fuel

1. biofuels
2. hydrogen fuel cells

Week 12

Emerging Alternatives for Local and Regional Sustainability

1. solar
2. geothermal

Week 13

Emerging Alternatives for Local and Regional Sustainability (cont.)

1. coastal and river-based hydrokinetic approaches
2. waste-to-energy approaches

Week 14

The Importance of Energy Conservation

1. fuel efficiency standards
2. green building
3. waste reduction

Final Exam (2 hours)

Undergraduate Evaluation:

Students are evaluated on the following assignments:

Class Exercises (approx. 10)	100 points
Midterm Exam	80 points
Paper Topic Exploration	20 points
Research Paper	100 points
Final Exam	100 points
TOTAL:	400 points

The final grade of the course is based on the following scale:

A	360 + points
B	320-359 points
C	280-319 points
D	240-279 points
F	0-239 points

Class Exercises are written answers to discussion questions based on reading assignments, or responses to web, video or other media content presented in class. Exams consist of a variety of question formats—multiple choice, short answer, and essay. Exam questions are derived from lectures, reading assignments, and handouts. The research paper requires students to present an overview of an energy issue, exemplified with a case study and synthesized from peer-reviewed articles and other source material. Prior to the research paper, students complete a topic exploration describing the scope, questions, and a sample of sources to be used in the development of the paper; this is a requirement for approval of research paper topics by the instructor.

Graduate Evaluation

Graduate students are expected to complete all class exercises and are assigned an additional paper. Graduate research papers carry higher expectations in terms of the application of theory and incorporation of scholarly literature. One of the research papers will provide the basis for a presentation to the class. Graduate students are given one (final) exam covering the entire course.

Class Exercises (approx. 10)	100 points
Research Paper 1	100 points
Research Paper 2	100 points
Class presentation	30 points
Final Exam	120 points
TOTAL:	450 points

The final grade of the course is based on the following scale:

A	405 + points
B	360-404 points
C	315-359 points
F	0-314 points

V. Bibliography

America's Energy Future Panel on Electricity from Renewable Resources. *Electricity from Renewable Resources: Status, Prospects, and Impediments.* Washington, D.C.: The National Academies Press 2010.

Chesapeake Bay Commission and the Commonwealth of Pennsylvania. *Next Generation Biofuels:Taking the Policy Lead for the Nation.* Annapolis MD: Chesapeake Bay Commission 2008.

Committee on America's Energy Future. *America's Energy Future: Technology and Transformation.* Summary Edition. Washington, D.C.: The National Academies Press 2009.

Easton, Thomas A. *Taking Sides: Clashing Views in Energy and Society.* Second Edition. New York: McGraw Hill 2012.

Homer-Dixon, Thomas. *The Upside of Down.* Washington, D.C.: Island Press 2006.

National Research Council. *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use.* Washington, D.C.: The National Academies Press 2010

Pasqualetti, Martin J., Gipe, Paul, and Righter, Robert W. (eds.). *Wind Power in View: Energy Landscapes in a Crowded World.* San Diego: Academic Press 2002.

Squassoni, Sharon. *The U.S. Nuclear Industry: Current Staus and Prospects under the Obama Administration.* Nuclear Energy Futures Paper No. 7. Waterloo, Ontario: Centre for International Governance Innovation 2009.

Turner, Chris. *The Geography of Hope: A Tour of the World We Need.* Random House Canada 2007.

Waples, David A. *The Natural Gas Industry in Appalachia.* Jefferson, N.C.: McFarland & Company, Inc. 2005.

Zimmerer, Karl S. (ed.) "Geographies of Energy. Special Issue." *Annals of the Association of American Geographers* 101 (2011): 705-980.

SUMMARY OF PROPOSED REVISIONS

1. Change from 300 to 400 level.
2. Make course dual 400/500 level.

JUSTIFICATION/RATIONALE FOR REVISION

The College of Business has requested that this course be part of a new Masters Certificate in Energy being prepared. Furthermore, this expands opportunities for students in the Masters program in Geography.

GEOG 335 Geography of Energy
Old Syllabus of Record

I. Catalog Description:

GEOG 335 Geography of Energy — **3 class hours**
0 lab hours
Prerequisites: None — **3 credits**
(3c-0l-3cr)

Covers patterns and problems of energy production and consumption in human societies. Descriptions of what, where, and how much are combined with issues such as technological change, conservation, allocation, environment impacts, and economic development. Specific topics global history and trends of energy development, pricing systems, types of energy, locations of production areas, and the energy status of the United States.

OBJECTIVES: Students should know the geography of production and consumption of the world's most critical strategic resources. Students will learn locations of energy consumption and production, and the nature of their spatial mismatch. Issues will be examined through exercises that teach techniques commonly used in scholarly analysis. Students will also practice evaluation of numbers and terms frequently used in media coverage of energy issues. Graduate students will also learn to prepare a professional-caliber annotated bibliography. They will use the two most important indexes to scholarly literature in the discipline, Current Geographical Publications and Geographical Abstracts, or the electronic equivalents.

TEXTBOOKS AND READINGS:

Cutter, Susan L.; Renwick, Hilary Lambert; and Renwick, William H. Exploitation, Conservation, Preservation: A Geographical Perspective on Natural Resource Use 2nd Ed. Chapters 1, 2, and 16. New York: John Wiley & Sons, 1991. (purchased at ProPacket)

Goldemberg, Jose. Energy, Environment, and Development. Center for Resource Economics series. Covelo, California: Island Press, 1997.

Journal Articles (available in library on reserve):

Brothers, Timothy S. "Surface-Mine Grasslands." Geographical Review 80 (1990) 3: 209-225.

Elmes, Gregory. "The Changing Geography of Electric Energy in the United States." Geography 81 (1996) 4: 347-360.

Zeigler, D.J.; Johnson, J.H.; and Brunn, S.D. "Evacuation From a Nuclear Technological Disaster." Geographical Review 71 (1981) 1: 1-16.

II. Course Outline:

Week 1	Reading Assignment
A. Introduction to Resources	CR & R ch. 1
1. definition	
2. population and energy	

Week 2

A. Global Energy Trends — CR & R pp. 350-354
   1. Industrial revolution — Goode's Atlas
   2. Globalization
   3. Consumption Patterns
   4. Production Patterns

Week 3

A. Pricing and Allocation — CR & R ch. 2
   1. labor theory of value
   2. cost plus pricing
   3. supply and demand
   4. cost-benefit analysis
   5. ideological hybrids

Week 4

A. Energy and Development — Goldemberg ch. 2,3,6
   1. consumption
   2. energy intensity
   3. mapping exercise
   4. scenarios and trends

Week 5

A. Case: Geography of Electricity — Elmes 1996

Exam One

Week 6

A. Oil and Natural Gas — CR & R pp. 354-358
   1. geology and exploration
   2. location of reserves
   3. major producing regions
   4. distribution and trade

Week 7

A. Classroom presentations

Week 8 — CR & R pp. 358-365

A. Coal and Synfuels
   1. geology and exploration
   2. location of reserves
   3. major producing regions
   4. distribution and trade

Week 9

A. Case: Surface mine reclamation — Brothers 1990

Exam Two

Week 10

A. Hydroelectricity — CR & R pp. 370-373
   1. hydrology
   2. technology
   3. major producing regions

BOOK REPORTS DUE

Week 11

A. Nuclear & Alternatives — CR & R pp. 365-369, 373-377
   1. economy and risk
   2. plant location
   3. fuel and waste sites
   4. geothermal, solar, wind

Week 12 Case: Nuclear accident — Zeigler et al. 1981

Week 13

A. U.S. Energy Profile — DOE Monthly
   1. imports
   2. consumption & production trends
   3. strategy & policy

Week 14

A. Energy and the Environment — Goldemberg Chps. 4 & 5

EXAM THREE – Final examination period.

Evaluation:

Students are evaluated on the following assignments:

Exam One	100 points
Exam Two	100 points
Book report	100 points
Exam Three	100 points
TOTAL:	400 points

The final grade of the course is based on the following scale:

A	360 + points
B	320-359 points
C	280-319 points
D	240-279 points
F	0-239 points

Exam questions are from lectures, reading assignments, and handouts. Each exam covers approximately one-third of the course and consists of a variety of question formats—true/false, multiple choice, short answer, and essay. The book report assignment will be explained in a separate handout. Graduate students will select one of the lecture topics and prepare an annotated bibliography from the scholarly literature. The bibliography is worth 100 points, or 20% of their course grade.