15-41a
UWUCC: AP 9/1/15
Senate: APP 10/6/15

Template A

New Course Proposal Template

Steps to the approval process:

1. Complete the applicable template(s) and email them to the departmental or program curriculum committee chair.
2. The curriculum chair emails the proposal to the curriculum committee, then to the department/program faculty for a vote and finally to the department/program chair.
3. The department/program chair emails the proposal to curriculum-approval@iup.edu; this email will also serve as an electronic signature.
4. Curriculum committee staff will log the proposal, forward it to the appropriate dean's office(s) for review within 14 days and post it on the X Drive for review by all IUP faculty and administrators. Following the dean's review the proposal goes to the UWUCC/UWGC and the Senate.
5. Questions? Email curriculum-approval@iup.edu.

Contact Person:	John Benhart, Jr.	Email Address:	jbenhart@iup.edu
Proposing Depart/Unit:	Geography & Regional Planning	Phone:	7243572250

Course Prefix/Number	*See the Registrar's list of Unavailable course numbers at http://www.iup.edu/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=129323.* GEOG 109
Course Title	Geographic Information Science and Systems for Energy Applications
Dual/Cross Listed	*Dual Listed – Courses listed at two levels, such as undergraduate and graduate, masters and doctoral, etc. Cross Listed – Course has more than one prefix such as GEOG/ROPL 233.* ☐ Yes ☒ No If yes with: Click here to enter text.
Number of Credits	(UG) Class Hours - 3 (UG) Lab Hours - Click here to enter text. Credits - 3
Prerequisite(s)	none
Corequisite(s)	*This means that another course must be taken in the same semester as the proposed course* Click here to enter text.
Additional Information (Check all that apply. Note: Additional documentation will be required)	☐ Liberal Studies (please also complete Template C) ☐ Teacher Education (Is it Step 1 a prerequisite or is it part of the Professional Education Sequence If so please also complete Template D) ☒ Distance Education (Please also complete Template E)
Recommended Class Size (optional) (provide justification)	Are you recommending a class size: ☒ Yes ☐ No Number: 25 or less If yes: (check one of the following reasons and provide a narrative explanation) ☒ Pedagogical ☐ Physical limitation of classroom ☐ Accreditation body standards/recommendations ☐ Other Explanation *(required)*: The nature of this class will make it challenging to keep up with instructing the students in new complex topics and computer applications, and evaluating individual GIS-based assignments. Having taught this course for over twenty years, we have found that one instructor can effectively interact with a maximum of around twenty five students.
Catalog Description	*Guidelines: Do not include pre/co-requisite information here. The registrar prefers a concise description of course content, beginning with an active verb.*

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	Provides students with knowledge of the theoretical basis of Geographic Information Systems (GIS) and geospatial technologies and their application for the energy sectors. Covers the specifics of selected GIS and database software packages. Develops skills to conceptualize energy-related GIS applications, use GIS software packages, manipulate and query geographic data to solve problems, perform simple spatial analysis, and understand how to utilize GIS for energy-related analyses.
Student Learning Outcomes *(These should be measurable, appropriate to the course level, and phrased in terms of student achievement, not instructional or content outcomes)* *If dual listed, indicate additional learning objectives for the higher level course.*	1) Understand the geographic dimensions of energy-related phenomena and human-environment interaction 2) Explain what geographic information systems are and how they work 3) Describe how geospatial technologies (geographic information systems (GIS), global positioning systems (GPS), and remote sensing are presently being used in the energy industries, by regulatory agencies, and energy professionals 4) Understand maps as models of the earth, and spatial data derived from maps; the concepts of mapping datums, two and three-dimensional coordinate systems, map projections, map scale, horizontal accuracy, and metadata 5) Identify and explain how the capabilities of GISs enable the visualization and analysis of energy resources and related phenomena 5) Demonstrate application of industry-standard GIS software to derive information from databases, and address energy-related problems with spatial dimensions
Brief Course Outline: *Give an outline of sufficient detail to communicate the course content to faculty across campus. It is not necessary to include specific readings, calendar, or assignments.*	*Introduction to course*. Discussion of texts, computer facilities, how things are going to done. *What is a Geographic Information System (GIS)? Why is GIS useful for Energy Applications and spatial analysis? Base energy applications and examples.* *A typology of Energy GIS Applications. Standard Energy Geospatial Datasets.* *Map Projections and Coordinate Systems*: Map Scale and Projections. Geographic coordinate systems. Characteristics of geographic information. Metadata. *GIS Data Structures - Vector Data Model:* Geometric Objects. Topology. Higher level objects. *GIS Data Structures - Vector Data Model, Raster Data Model:* Geometric Objects. *Issues in the Integration of Geospatial Field Data with GIS for environmental applications.* Topology. Higher level objects. Types of Raster Data. Integration of Raster and Vector Data. Discussion of GIS functionality. *Vector, Raster Data Input*: Existing spatial data (reading and understanding metadata), Data input methods: digitizing, scanning, Global Positioning System (GPS), image and remote sensing data. *Visualization of phenomena on the earth's surface; Data Display and Cartography. Making Maps with GIS*: Map elements, types of maps, map design. *Introduction to ArcGIS and ArcView 10*: Adding data, working with layers, data frames, and map files *Learning ArcGIS 10 continued: Visualization of phenomena on the earth's surface; Data Display and Cartography. Attribute Data Input and Management:* Database management, relational database management systems (RDBMS). *Data Exploration.* Attribute Data Query, Spatial Data Query. Understanding RDBMS structure, relational join and relate operations, database (attribute) queries. *Identifying distributions of energy-related phenomena on the earth's surface: Query and Visualization. Learning ArcGIS 10 continued: Attribute Data Input and Management:* Database management, relational database management systems (RDBMS). *Data Exploration.* Attribute Data Query, Spatial Data Query.

	Understanding RDBMS structure, relational join and relate operations, database (attribute) queries. *Processing Geospatial Data and Reporting by Administrative and Units (Using PADEP Data to Visualize and Analyze Production patterns) . Attribute Data Input and Management:* Database management, relational database management systems (RDBMS). *Data Exploration.* Attribute Data Query, Spatial Data Query. *Learning ArcGIS 10 continued:* Understanding RDBMS structure, relational join and link operations, database (attribute) queries. *Simple Site Identification Applications and Techniques (Identifying Potential Carbon Traps). Learning ArcGIS 10 continued*: Database Operations (Attribute data classification and computation) and Spatial Data Query (Feature Selection by Spatial Relationship). *Vector Data Analysis.* *Simple Site Identification Applications and Techniques. Vector Data Analysis (Utilizing multiple spatial criteria to identify production units).* Describing attribute and spatial data statistically, Spatial analysis, GIS and Spatial Analysis.

Rationale for Proposal

Why is this course being proposed?	As part of a multi-disciplinary Shale Gas Certificate in cooperation with Geoscience and Safety Sciences departments.
How does it fit into the departmental curriculum? (Check all that apply)	☐ Major Requirement ☐ Minor Requirement ☐ Core Requirement (*Interdisciplinary core - e.g Business/Education*) ☐ Required Elective ☐ Liberal Studies ☐ Open Elective ☒ Other - As part of a multi-disciplinary Shale Gas Certificate in cooperation with Geoscience and Safety Sciences departments.
Is a similar class offered in other departments?	☐ Yes Please provide comment: Click here to enter text. ☒ No
Does it serve the college/university above and beyond the role it serves in the department?	☒ Yes Please provide comment: As part of a multi-disciplinary Shale Gas Certificate in cooperation with Geoscience and Safety Sciences departments. ☐ No
Who is the target audience for the course?	☐ Course Designed for Majors (☐ Required ☐ Not Required) ☐ Course Designed for Minor ☒ Departmental Elective ☐ Restricted to Majors/Minors ☒ Open to Any Student ☐ Liberal Studies ☒ Other - Designed, in part, for professionals already working in the energy industries.
Implications for other departments	A. What are the implications for other departments (*For example: overlap of content with other disciplines, requirements for other programs*)? This course is to be part of a six course sequence in the proposed Shale Gas Certificate (two courses each from Geography & Regional Planning, Geosciences, and Safety Sciences..

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	B. How have you addressed this with other department(s) involved? What was the outcome of that attempt? (Attach documents as appropriate) These proposals are being sent to the chairs of Geosciences and Safety Sciences, for their review.
Are the resources adequate (i.e. faculty, space, equipment, laboratory supplies, library materials, travel funds, etc.)?	☒ Yes ☐ No Please provide comment: Click here to enter text.

For Dean's Review

- Are resources available/sufficient for this course? ☐ Yes ☐ No ☐ NA
- Is the proposal congruent with college mission? ☐ Yes ☐ No ☐ NA
- Has the proposer attempted to resolve potential conflicts with other academic units? ☐ Yes ☐ No ☐ NA

Comments: Click here to enter text.