**Document N: Course and Program Development: IMPACT AND APPROVAL SIGNATURES**

See Course and Program Development Policy and Procedures (www.ubalt.edu/provost) for instructions.

**SCHOOL:**  
- LAW  
- MSB  
- CAS  
- CPA

**CONTACT NAME:** Thomas A. Darling  
**PHONE:** (410) 837-6195 / (410) 279-7253

**DEPARTMENT/DIVISION:** School of Public and Intl. Affairs, College of Public Affairs  
**DATE PREPARED:** 3/27/15

**PROPOSED SEMESTER OF IMPLEMENTATION:**  
- fall  
- spring  
**YEAR:** 2015

**TYPE OF ACTION:**  
- add (new)  
- deactivate  
- modify  
- other

**LEVEL OF ACTION:**  
- noncredit  
- undergraduate  
- graduate  
- other

**ACTION BEING REQUESTED** (select one category, either Course Actions or Program Actions):

- **COURSE ACTIONS**
  - Original Subject Code/Course Number: CRJU 725
  - Original Course Title: Fundamentals of Geographic Information Science and Systems

- **PROGRAM ACTIONS**
  - Original Program Title: 

Select one or multiple actions from one of the lists below (review the list of necessary documents and signatures):

- 1. Experimental Course
- 2. Course Title
- 3. Course Credits
- 4. Course Number
- 5. Course Level
- 6. Pre- and Co-Requisite
- 7. Course Description
- 8. New Course
- 9. Deactivate Course
- 10. Program Requirements
- 11a. Undergraduate Specialization (Fewer than 24 credits)
- 11b. Master’s Specialization (Fewer than 12 credits)
- 11c. Doctoral Specialization (Fewer than 18 credits)
- 12. Minor (add or delete)
- 13. Closed Site Program
- 14. Program Suspension
- 15. Program Reactivation
- 16a. Certificate Program (UG/G) exclusively within existing degree program
- 16b. Certificate Program (UG/G) outside of or across degree programs (12 or more credits)
- 17. Off-Campus Delivery of Existing Programs
- 18a. Undergraduate Concentration (24 or more credits)
- 18b. Master’s Concentration (12 or more credits)
- 18c. Doctoral Concentration (18 or more credits)
- 19. Program Title Change
- 20. Program Termination
- 21. New Degree Program
- 22. Other

**ADDITIONAL DOCUMENTATION** (check all appropriate boxes of documents included; review the list of necessary documents):

- summary proposal (O)  
- course definition document (P)  
- full five-page MHEC proposal (Q)
- financial tables (MHEC) (R)  
- other documents as may be required by MHEC/USM (S)  
- other (T)
### IMPACT REVIEW (review the list of necessary signatures):

<table>
<thead>
<tr>
<th>Impacted Entity</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>a. Library</td>
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<td>b. OTS</td>
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<td>c. University Relations</td>
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<td>d. Admissions</td>
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<td>e. Records</td>
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### APPROVAL SEQUENCE (review the list of necessary signatures):

<table>
<thead>
<tr>
<th>Approval Level</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Department/Division (Chair)</td>
<td>Debra L. Stanley</td>
<td>5/11/15</td>
</tr>
<tr>
<td>B. General Education (for No. 7, 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Final Faculty Review Body Within Each School (Chair)</td>
<td>N. R. Miller</td>
<td>5/4/15</td>
</tr>
<tr>
<td>D. Dean</td>
<td></td>
<td>5/11/15</td>
</tr>
<tr>
<td>E. University Faculty Senate (Chair)</td>
<td></td>
<td>5/11/15</td>
</tr>
<tr>
<td>F. University Council (Chair)</td>
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<tr>
<td>G. Provost and Senior Vice President for Academic Affairs</td>
<td>Curt A.</td>
<td>5/13/15</td>
</tr>
<tr>
<td>H. President</td>
<td></td>
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<tr>
<td>I. Board of Regents (notification only)</td>
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<tr>
<td>J. Board of Regents (approval)</td>
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<td>K. MHEC (notification only)</td>
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<td>L. MHEC (approval)</td>
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<tr>
<td>M. Middle States Association notification</td>
<td>Required only if the University's mission is changed by the action</td>
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</table>

1 University Council review (for recommendation to the president or back to the provost) shall be limited to curricular or academic policy issues that may potentially affect the University's mission and strategic planning, or have a significant impact on the generation or allocation of its financial resources.
**Document O: Course and Program Development: SUMMARY PROPOSAL**

See Course and Program Development Policy and Procedures (www.ubalt.edu/provost) for instructions.

**SCHOOL:**  
Law  
MSB  
CAS  
CPA

**CONTACT NAME:** Thomas A. Darling  
**PHONE:** (410) 837-6195 / (410) 279-7253

**DEPARTMENT/DIVISION:** School of Public and Intl. Affairs, College of Public Affairs  
**DATE PREPARED:** 3/27/15

**PROPOSED SEMESTER OF IMPLEMENTATION:**  
Fall  
Spring  
**YEAR:** 2015

**ACTION BEING REQUESTED** (select one category, either Course Actions or Program Actions):

- **COURSE ACTIONS**
  - Original Subject Code/Course Number: CRJU 725
  - Original Course Title: Fundamentals of Geographic Information Science and Systems

**PROGRAM ACTIONS**

- Original Program Title: 

Select one or multiple actions from one of the lists below (review the list of necessary documents and signatures):

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For changes to existing courses:

<table>
<thead>
<tr>
<th>OLD TITLE</th>
<th>SUBJECT CODE/COURSE NO.</th>
<th>CREDITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW TITLE</td>
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Summer 2010
Applicable across a vast array of disciplines, geographic information science and systems (technology) offer a compelling and powerful approach and tool for visualizing, organizing, exploring, analyzing, and understanding "place and space" relationships in the world and at work.

The purpose of the course is to introduce students to the principles and applications of basic geographic information science and systems (GIS). The principles presented in the readings and lectures are designed to provide the basic knowledge needed to understand and interpret maps and geographical information and use GIS software effectively and correctly. Principles to be covered include: map projections, spatial representation, visualization, and spatial analysis. Assignments are designed to familiarize students with ESRI's Arc-GIS software and ground the more theoretical readings and lectures in practical applications.

As part of the (typically on-line) course, students learn how to:
(i) interpret maps and geographic information and to use it to better understand their world and their work and to communicate that understanding with others; and,
(ii) use the most widely-used GIS computer program – ESRI's ArcGIS – to create maps that effectively communicate and explore the location of, and analyze relationships between, people, places, things, and events.

Broadly, the six (6) course modules cover:
1. Introduction to GIS Analysis and the Software
2. Mapping Where Things Are and Map Design Fundamentals
3. Mapping the Most and the Least
4. Mapping Density
5. Finding What's Inside An Area and Nearby
6. Mapping Change

In addition to readings and lectures, each module includes self-based tutorials where students learn how to create maps and analysis using ESRI's ArcGIS. The tutorials are supported by instructor screen shows discussing not only the tutorials but related theory, concepts, and applications. Students can complete the tutorials using their own computers (software included with the text) or by using the application on a UB server.

SET FORTH THE RATIONALE FOR THIS PROPOSAL:
Geographic thinking and map making are important skills in a variety of the fields/domains covered in many of the graduate programs within the College of Public Affairs. This course (cross-listed in each of CPA's three constituent schools) covers mapping and geographic analytical techniques useful across the various professional domains. The course will typically be offered on-line to encourage multi-disciplinary participation.
1. **DATE PREPARED**

March 27, 2015

2. **PREPARED BY**

Thomas A. Darling, Ph.D.

3. **DEPARTMENT/DIVISION**

School of Public and International Affairs, College of Public Affairs

4. **COURSE NUMBER(S) with SUBJECT CODE(S)**

CRJU 725

5. **COURSE TITLE**

Fundamentals of Geographic Information Science and Systems

6. **CREDIT HOURS**

3

7. **CATALOG DESCRIPTION**

Provides students with foundational knowledge in both geographic information science and systems that will allow them to better understand and think critically about the role of "place and space" and to engage in the routine use of basic GIS technology in their studies and workplace. Students will learn to use ESRI’s ArcGIS to create maps and analyze geo-data and relationships, and to present their results to others.

8. **PREREQUISITES**

None

9. **COURSE PURPOSE**

The course will serve as an elective for several graduate programs in the College of Public Affairs, including the MPA, Criminal Justice, Health Systems Management, Global Affairs and Human Security, Human Services Administration, and Nonprofit Management and Social Entrepreneurship programs.

10. **GENERAL EDUCATION AREA**

NA

Summer 2010
11. COURSE TYPE/COMPONENT (clinical, continuance, discussion, field studies, independent study, laboratory, lecture, practicum, research, seminar, supervision, thesis research, tutorial or workshop; this must match PeopleSoft 9.0 coding, so check with your dean’s office if you are unsure of the correct entry)

Lecture

12. FACULTY QUALIFIED TO TEACH COURSE

Thomas A. Darling

Several other faculty members have expressed a desire to learn the materials necessary to offer the course.

13. CONTENT OUTLINE

I. Introduction to GIS Analysis and the Software
   a. Understanding geographic features and attributes
   b. Program set-up and access
   c. Working with and labeling map features and layers
   d. Working with feature attribute

II. Mapping Where Things Are and Map Design Fundamentals
   a. Deciding what to map
   b. Basic types of maps (choropleth maps and point maps)
   c. Data preparation
   d. Making the map
   e. Analyzing geographic patterns

III. Mapping the Most and the Least
   a. Understanding quantities
   b. Deciding what to map
   c. Linking data to features using attribute tables
   d. Making the map
   e. Looking for patterns

IV. Mapping Density
   a. Two approaches to the visual display of density
   b. Vector maps and raster maps
   c. Creating a density surface
   d. Creating centroid coordinates
   e. Building, modifying, aggregating, and joining feature attribute tables
   f. Mapping density for defined areas
   g. Understanding different definitions of density

V. Finding What’s Inside An Area
   a. Structuring your problem statement
   b. Alternative ways of finding what’s inside
   c. Drawing and selecting areas and features
   d. Overlaying areas and features
   e. Processing raster map layers

VI. Finding What’s Nearby
   a. Structuring your problem statement
   b. Alternative ways of finding what’s nearby
   c. Buffers and proximity analysis
   d. Alternative distance/proximity measures (straight-line and network)
   e. Apportioning data across noncoterminous polygons
   f. Calculating average values/costs over a geographic surface

VII. Mapping Change
   a. Measuring and mapping change
   b. Structuring your problem statement
   c. Alternative ways of mapping change
   d. Creating a time series
   e. Creating a tracking map
14. LEARNING GOALS

Students completing this class will have a greater understanding of maps; the skills needed to manipulate spatially-oriented data in the map format; and, the ability to prepare maps and analyze geographic data to support decision making in professional organizations. Knowledge and skills acquired will include:

1) fundamental cartographic knowledge of map projections, coordinate systems, cartographic representation, and the types of GIS data, including raster and vector data;
2) creating spatial data from non-spatial data (tables) and the ability to link GIS coded data layers using basic cartographic concepts;
3) generating multi-frame maps and managing, editing, and manipulating map elements;
4) using GIS operators to perform a number of different kinds of analyses; and,
5) the ability to prepare and explain geographic maps and analysis that support professional decision making.

15. ASSESSMENT STRATEGIES

Two general categories of student learning will be assessed —
(i) technical map-making competence, and,
(ii) analytical and presentation competence.

The course has six (6) assignments; each includes creating a map; analyzing a geographical question; and preparing a memorandum describing the map and the analysis to a decision maker. Technical competence and presentation competence will be assessed in alternating course offerings in the following manner. One of the last three assignments will be selected (the most suitable for assessment purposes) and student submissions will be evaluated for (i) technical (map making) competence, or, (ii) analytical and presentation competence and map aesthetics through learning-objective based rubrics modified for the specific assignment assessed.

16. SUGGESTED TEXT(S) and MATERIALS (e.g. textbooks, equipment, software, etc., that students must purchase)


17. SPECIAL GRADING OPTIONS (if applicable)

Pass/Fail

18. SUGGESTED CLASS SIZE

25 (max. 30 per software license)

19. LAB FEES (if applicable)

None