Plan 673: Information Systems for Disaster Management and Humanitarian Assistance
Syllabus Spring 2016
Friday 9:00 AM – 11:45 AM

This course provides core concepts, tools and skills necessary for disaster management and humanitarian assistance. Along with demonstrating analytical capability of GIS for planning, risk and vulnerability assessment, this course introduces students to different tools required in this field. It assumes that students have some experiences with GIS and basic statistics as well as an interest in the topics of disaster management. The course is composed of a lecture and discussion period based on readings provided by the instructor focused on various subject matters related to the data collection, analysis and interpretation for disaster management, as well as a lab period for hands on experience in using GIS, HAZUS-MH, ComMIT, CAMEO, SLOSH and damage assessment tools. The course will primarily focus on natural disasters, but may require students to read and discuss materials that are not specific to natural disasters rather broader coverages of planning and decision making for disaster management and humanitarian assistance.

Instructor's Office Hours and Contact Information
Karl E. Kim
Department of Urban and Regional Planning, Saunders Hall Rm. 107J
Tel: 808 956 6865
Email: karlk@hawaii.edu
Office hours: By appointment

Co-instructors
Eric Yamashita
Associate Director for Training Technology and Innovation
National Disaster Preparedness Training Center
Tel: 808 956 0602
Email: ericyama@hawaii.edu
Office hours: by appointment

Jiwnath Ghimire
Department of Urban and Regional Planning, Saunders Hall Rm. 113
Tel: 808 956 3738
Email: jiwnath@hawaii.edu
Office hours: M, W, R, F 8:30 am – 11:45 am and by appointment.

Reference Books
Paperback: 794 pages
Tools used in this course

ArcGIS 10.2.2 - Geographic Information System. This software is installed on each PC machine in the Department of Urban and Regional Planning GISLAB (Saunders Hall Room 110). There are 24 PC based machines available, and each student is encouraged to use the same machine throughout the semester since data for this class are stored locally on each machine. Student version of ArcGIS (one-year education use only) software will be provided free of cost to those students who plan to install the ArcGIS 10.2.2 software in her/his PC based machine, make sure that your pc meets the following minimum requirements:

HARDWARE:
- CPU speed 2.2 Ghz dual core or higher
- Memory 2 GB or higher
- Disk space minimum 2.4GB with another 500MB for swap space
- Video adapter with 24 bit graphic accelerator capability and at least 128 MB of video memory

SOFTWARE:
- Minimum running on Windows XP (Professional or Home Edition) SP3 for 32-bit, or SP2 for 64-bit
- .NET Framework 3.5 SP1, which must be installed before installing ArcGIS
- Microsoft Internet Explorer 7.0 or 8.0 for installation process

Detailed information on system requirements can be found at: http://resources.arcgis.com/en/help/system-requirements/10.2/index.html

While it is possible to run ArcGIS on Intel based Mac system using “BootCamp” method, the result is often not very satisfactory. Refer to the following article for details if you intend to install ArcGIS on Mac: http://blogs.esri.com/esri/gisedcom/2007/09/05/arcgis-on-a-mac/

Other software that will be included in this class are HAZUS-MH, Sea Lake Overland Surges from Hurricanes (SLOSH), Community Model Interface for Tsunami (ComMIT), and Computer-Aided Management of Emergency Operation (CAMEO). Hazus-MH is an add-in module for ArcGIS. It provides a nationally applicable standardized methodology and models for estimating potential losses from earthquakes, floods, and hurricanes. Except ArcGIS, other software can be downloaded free of cost. Links are:
- HAZUS-MH: https://www.fema.gov/hazus-software
- SLOSH: http://www.nhc.noaa.gov/surge/slosh.php
- ComMIT: http://nctr.pmel.noaa.gov/ComMIT/

Prerequisite
Basic knowledge of GIS is preferred for this class. Consent will be given based on student’s exposure to other GIS courses or learning, or working experience using GIS.

Course Requirements
Students are encouraged to actively participate in class discussions, which will cover reading materials on disaster related issues. Students will need to submit a 1-page single spaced reflection paper for that week’s readings. The reflection paper should concisely preview, synthesize, and critique the readings. A PAPER COPY is due at the start of the class session.

Students are required to complete lab assignments. Each assignment will have a clear deadline. The assignments are designed to enhanced students’ skills that they receive during the lab exercise. It is important for students to submit the lab exercise on time, since the assignment will be discussed during the lecture session. Each student should submit her/his own work. Copying other’s work is not acceptable.

Project proposal is considered as a substitute for the mid-term exam. The project is an individual task. Project proposal should be submitted by the week-9 (3.11.2016). Proposal should be 2-3 pages long (8.5” x 11”), typed using 12 point Times New Romans font or equivalent, in 1.5 line spacing format, and use 1 inch margins. It should cover background, research question(s) that would be answered, tools in GIS that would be used, expected outputs and some references. Students are encouraged to discuss the project closely with instructors.

Each student is expected to do a poster presentation towards the end of the course. The presentation should include a brief explanation on the research question(s), method and GIS techniques, findings, and conclusions. Use of tables and maps are preferable in explaining findings. Poster will be printed on Arch D size paper (24” x 36”).

Beside presentation, each student is also required to submit a final report describing the background, literature review, research question(s), GIS and other techniques used to answer the question(s), findings, and conclusions. GIS methodology and products (i.e. maps) should be used as the main tool in answering the research question(s). Final report should be no more than 16 pages long (8.5” x 11”) but not less than 10 pages, typed using 12 point Times New Romans font or equivalent, in 1.5 line spacing format, and use 1 inch margins.

Helpful tools for writing can be found @ University of Hawai‘i Writing Program: http://manoa.hawaii.edu/mwp/resources. For Citations: (APA or MLA Style): http://www.lib.ncsu.edu/citationbuilder/
It is each student's responsibility to learn about plagiarism and how to avoid it. The following definition of plagiarism comes from The University of Hawaii System wide Student Conduct Code (page 9):

*The term “plagiarism” includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgement. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.*

For the entire Student Conduct Code, see: http://studentaffairs.manoa.hawaii.edu/downloads/conduct_code/UHM_Student_Conduct_Code.pdf

**Grading Policy**

Grade for this course is determined by several factors:

- Reflection Papers: 15%
- Lab assignments: 45%
- Final Project:
  - Project Proposal: 5%
  - Presentation: 10%
  - Final report: 25%

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>97-100 points</td>
<td>A+</td>
<td>77-79.9 points</td>
<td>C+</td>
</tr>
<tr>
<td>94-96.9 points</td>
<td>A</td>
<td>74-76.9 points</td>
<td>C</td>
</tr>
<tr>
<td>90-93.9 points</td>
<td>A-</td>
<td>70-73.9 points</td>
<td>C-</td>
</tr>
<tr>
<td>87-89.9 points</td>
<td>B+</td>
<td>67-69.9 points</td>
<td>D+</td>
</tr>
<tr>
<td>84-86.9 points</td>
<td>B</td>
<td>64-66.9 points</td>
<td>D</td>
</tr>
<tr>
<td>80-83.9 points</td>
<td>B-</td>
<td>60-63.9 points</td>
<td>D</td>
</tr>
<tr>
<td><strong>Less than 60 points</strong></td>
<td></td>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

Students are expected to turn in assignments on time. Any late submission will be penalized by an accumulation of 20% per 12 hours from the deadline up to a maximum penalty of 100%. Student who misses project proposal or presentation, or final report will automatically receive a failing grade for the course.

**Course Evaluations**

The Department of Urban and Regional Planning is committed to the continual improvement of the quality of its course offerings. Toward the end of the semester, you will be informed that the eCAFE system is available to you to complete your course evaluation. We encourage you to submit your evaluations by logging in to http://www.hawaii.edu/ecafe/.
Schedule

Week 1 (01/15/16)
Introduction and course overview

Lab 1 (January 15): Lab Management & mapping basics.

Learning objectives:
- Assign and change projections in ArcGIS.

Readings:

Week 2 (01/22/16)
Field mapping and use of UAV for data collection

HARD COPY reflection on readings is due on 01/22/16 before starting of the class.

Lab 2 (January 22): Exploring different sources of geographic data (GPS, UAV, and online mapping and data acquisition).

Learning objectives:
- Learn about geographic data collection techniques – GPS, field surveys, and others.
- Learn basics of operation of UAV.
- Acquire data from GPS, UAV and other field survey instruments.
- Use online explorers (Google Earth, online maps) for data generation.

Readings:


**Week 3 (01/29/16)**
Basic spatial analysis using ArcGIS

**HARD COPY reflection on readings is due on 01/29/16 before starting of the class.**

**Lab 3 (January 29):** Basic spatial analysis and mapping using ArcGIS

Learning objectives:
- Georeference aerial imagery.
- Conduct basic spatial analysis (extracting, joining, calculating, etc.).
- Manipulate attribute table.
- Use basic cartography to produce maps.

**Readings:**

**Week 4 (02/05/16)**
Use of census data in disaster management

**HARD COPY reflection on readings is due on 02/05/16 before starting of the class.**

**Lab 4 (February 5):** Census data analysis at level 1 (block groups) and level 2 (tracts) for Waikiki/Downtown Honolulu
Learning objectives:
- Understand the use Census and other socio-economic data for risk and vulnerability assessment.
- Use Census data and ArcGIS to find exposure to hazards and threats.
- Identify differences between level 1 and level 2 analyses.

Readings:

Week 5 (02/12/16)
Risk & exposure analysis using Hazus MH

HARD COPY reflection on readings is due on 02/12/16 before starting of the class.

Lab 5 (February 12): HAZUS-MH 3.0

Learning objectives:
- An overview of the capabilities of Hazus-MH, FEMA’s loss estimation tool for earthquake, flood, and hurricane wind hazards using ESRI virtual campus training: Getting Started with HAZUS MH:
  http://training.esri.com/gateway/index.cfm?fa=catalog.webCourseDetail&courseid=2451
- Create deterministic scenario (Hurricane INIKI through Ewa) – RVA of Waikiki

Readings:


HAZUS-MH Manuals (References)


**Week 6 (02/19/16)**
Sea level rise and storm impact analysis

**HARD COPY reflection on readings is due on 02/19/16 before starting of the class.**

**Lab 6 (February 19):** Building disaster intensity map combining SLR and storm surge.

Learning objectives:
- Generate storm surge results using SLOSH.
- Conduct sea level rise modelling using DEM/LIDAR.
- Identify hurricane surge/impact level.
- Create hazard intensity map.

**Readings:**


**Week 7 (02/26/16)**
Hazard intensity mapping

**HARD COPY reflection on readings is due on 02/26/16 before starting of the class.**

**Lab 7 (February 26):** Hazard intensity mapping for Waikiki

Learning objectives:
- Prepare different hazards maps (SLR, storm surge, flooding, and hurricane) for Waikiki.
- Calculate the intensity of hazards (individual and combined).

**Readings:**

**Week 8 (03/04/2016) & Week 9 (03/11/2016)**
Risk and vulnerability assessment

**HARD COPY reflection on readings of both weeks is due on 03/04/16 before starting of the class.**

**Lab 8 (March 4):** Risk and vulnerability assessment (RVA) for Waikiki

Learning objectives:
- Compile data from multiple sources including Census.
- Run vulnerability and risk assessment at different levels (Tract, block group) under different hazard scenarios (Single and multiple) for Waikiki
Readings:

Week 10 (03/18/16)
Damage assessment tools

HARD COPY reflection on readings is due on 03/18/16 before starting of the class.
Final Project Proposal due

Lab 9 (March 18): Damage assessment tools (NDPTC damage assessment course: Module 4- Damage Assessment tools)

Learning objectives:
- Understand basics of damage assessment
- Use five tools (Paper based, Ushahidi, MERCI, VizOps, Crisis Track) for damage assessment.

(Guest Lecture)

Readings:
Week 11 (04/01/16)
Plan for and respond to chemical emergencies, threat zone estimates for various types of chemical hazards and risk and vulnerability assessment for volcanic disaster.

HARD COPY reflection on readings is due on 04/01/16 before starting of the class.

Lab 10 (April 1): Vulnerability and exposure of road networks, houses and other facilities to volcano in Big Island.

Learning objectives:
- Demonstration of CAMEO software suite to plan for and respond to chemical emergencies.
- Demonstration of ALOHA software to generate threat zone estimates for various types of hazards.
- Lava vulnerability and risk analysis.

Readings:

Week 12 (04/08/16)
Tsunami risk assessment using ComMIT

HARD COPY reflection on readings is due on 04/08/16 before starting of the class.

Lab 11 (April 8): Japan Tsunami modelling using comMIT

Learning objectives and lab assignment:
- Conduct tsunami modelling around Fukushima NPP area using ComMIT
- Integrate results of ComMIT with ArcGIS.
- Run exposure analysis.
Readings:

WEEK 13 (04/15/16), WEEK 14 (04/22/16), WEEK 15 (04/29/16)
Work on Individual Project

WEEK 16 (05/06/16)
Final Presentation - Poster

WEEK 17 (05/13/16)
Final Paper Submission