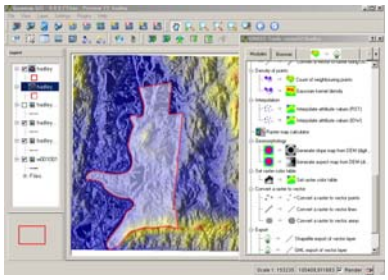
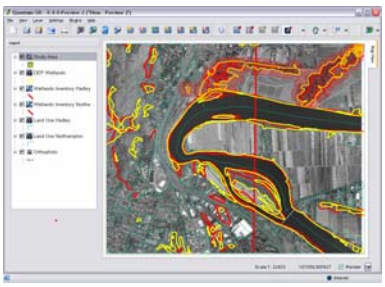
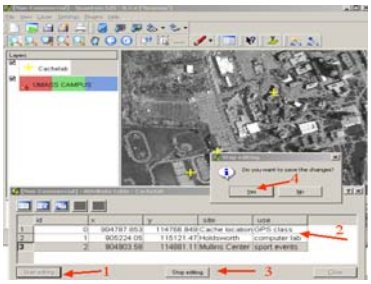
INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS
USING OPEN SOURCE SOFTWARE.

UMASS ON-LINE PUBP&A 697L, SPRING 2007

Introduction

The objective of this course is to introduce students to the construction, manipulation, display and analysis of spatial information using Free/Libre and Open Source Geographic Information Systems software (FOSS GIS).

The course is designed to be an introduction to these technologies. It is designed primarily for students interested in environmental management, public policy and administration, and nonprofit management, for GIS is becoming a critical tool in these fields (as well as others). In addition, given this is an online course, it is designed specifically to reach potential students in developing world contexts or nonprofit management, where the cost and accessibility of FOSS GIS may be particularly beneficial.

Let us make one statement clear up-front: We are not offering this course to necessarily to promote the use of open source software over proprietary software, or to send the message that open source software is better than commercial packages. It is our belief that the future of computing technology in organizations and society will not be separated along the lines of open source versus proprietary but rather will shake out along the lines of what software solutions meet end-user, cost and interoperability requirements.

But from a pedagogical standpoint, particularly in an on-line course environment where there is no available class computer teaching lab, there are some natural benefits toward the use of FOSS. By utilizing FOSS, students can download and utilize the software on their own computers legally without having to purchase software licenses. This is particularly helpful in situations where the student faces serious financial barriers. Four types of student situations stand out: (1) students working on a tight budget; (2) environmental managers or public administrators in developing world contexts; (3) public administrators in small towns; and (4) analysts in nonprofit organizations. In addition, by offering a course utilizing FOSS technologies, we are providing an opportunity where students can better understand what “open source” means, and better understand the (positive and negative) issues of cost, usability and interoperability that technology users face today and will continue to face in the future.

Through the online “lectures”, exercises, homeworks and semester-long project, students should leave the course with a fundamental understanding of foundational theory vital to doing GIS-related work. Students will also gain a working knowledge of Quantum GIS and the GRASS analysis “plug-in”. But perhaps more importantly, students who do the work will leave this course with foundational knowledge on how to do GIS work regardless of software.

(See back for tentative course outline).

Further questions?
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TENTATIVE COURSE OUTLINE

PART I: GIS FUNDAMENTALS

Week 1: Introduction
1.1 GIS Introduction (powerpoint online “lecture”)
1.2 Installing QGIS (exercise)
1.3 QGIS overview
Homework 1: Introduction to QGIS exercise

Week 2: GIS analysis overview and georeferencing
2.1 A condensed module on the history of geography (Lecture)
2.2 Overview of GIS analysis (Lecture)
2.2 Georeferencing concepts (Lecture)
Homework 2: Literature review of GIS in your area of interest

PART II: GIS INPUT METHODS

Week 3: GIS Input 1 - Internet data gathering
3.1 Overview of GIS input methods (short lecture)
3.2 Web GIS data resources: US and global (exercise)
3.3 An example of regional web resources: Massachusetts digital data (exercise)
Homework 3: Searching, downloading, and viewing GIS in QGIS

Week 4 : GIS Input method 2 – Georeferencing a scanned map and onscreen digitizing
4.1 Geo referencing with QGIS (exercise)
Homework 4: Geo referencing practice
4.3 On-screen digitizing in QGIS and adding attribute data (exercise)
Homework 5: On-screen digitizing practice

Week 5: GIS Input method 3 - Collecting and mapping Global Positioning Systems data
5.1 GPS Theory (lecture)
5.2 GPS “geocaching” exercise (optional, for people who have access to a GPS)
5.3 Mapping GPS points with QGIS and adding attribute data
Homework 6: Mapping GPS points and adding attribute data

PART III: GIS DATABASES

Weeks 6 and 7: Working with FOSS GIS Databases
Installing QGIS 0.8 preview with GRASS support in Windows
Manipulating attribute data with QGIS - exercise and Homework 7
Data Querying with QGIS and GRASS Plugin – exercise and Homework 8
Spatial and non-spatial data integration using an external database management system – exercise and Homework 9

PART IV: ANALYSIS

Weeks 8, 9 and 10: Analysis with QGIS and the GRASS Plug-in
Making Maps in QGIS – exercise and Homework 10
Analysis 1: GRASS Plugin basics – exercise and Homework 11
Analysis 2: Select by location queries/neighborhood analysis – exercise and Homework 12
Analysis 3: Vector analysis (buffer, overlay...) - exercise and Homework 13
Analysis 4: Raster analysis – exercise and Homework 14

Week 11: FOSS as a collaborative paradigm and contributing to FOSS projects
Week 12: Open standards
Week 13 Project “presentations”
Week 14 Project “presentations”