

**JOOUST**  
**UNIVERSITY EXAMINATIONS**  
**FIRST SEMESTER 2013/2014**  
**PSP 3314: APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEMS**  
**FOR PUBLIC HEALTH**

**STREAMS:**

**TIME: 2 HRS**

**DAY:**

**DATE:**

**INSTRUCTIONS**

Answer question **ONE** and any other **TWO** questions. **USE** sketch maps and diagrams wherever they serve to illustrate an answer.

1.
  - a) Define the following terms:
    - i. Spatial data
    - ii. Geo-coding
    - iii. Digital information
    - iv. Analogue
    - v. Digitization (10 Marks)
  - b) Briefly describe the benefits of deploying GIS in a public health setting (10 marks).
  - c) Briefly discuss the fundamental differences between raster and vector GIS data models (5 marks).
  - d) What must you consider when choosing which geographic unit to use? (5 marks).
2. You have been identified by the Ministry of Health, as a consultant to put in place a geographic information system to aid most of its operations.
  - i. What are some of the challenges you are likely to face in the initial stages of this process? (10 Marks)
  - ii. Describe on how you will go about the GIS implementation process (10 marks).
3. a) Describe the methods you can use to input data into a public health GIS database (10 marks).  
  
b) Briefly describe the common causes of error in a GIS database (10 marks).
4. Write short notes on the following:
  - a) Major methodological challenges that must be addresses when implementing a spatial analysis project in public health (5 marks).
  - b) Trends in application of GIS in public health in Africa (5 marks).
  - c) Kenya's health priorities (5 marks).
  - d) Why practioners should conceptualize their business needs (5 marks).
5. a) Describe the obstacles to GIS in public health in Kenya (10 Marks)  
  
b) Discuss the six step conceptual framework you can use to think about how to proceed with the spatial analysis of public health surveillance data (10 Marks).

**Course Title:** Application of Geographical Information Systems for Public Health

**Instructor:** Dr. John M. Mironga

**Course Number:** HPP 3314

**No. of Units:** 3

**Required Text:** *Introduction to Geographic Information Systems in Public Health* Alan Melnick, MD, MPH ISBN 13: 9780834218789 ISBN 10: 083421878X **Copyright:** 2002

*Additional readings will be provided by instructor*

**Course Description:**

This course introduces the concepts, methods, and applications of Geographic Information System (GIS) including spatial analysis in public health with a strong emphasis on hands-on experience in applying the concepts and methods. Through the practicals designed for this course, students will be exposed to some important GIS applications in public health including disease surveillance and control, disease risk estimation, health service planning, mapping disease, disease cluster detection, and analyzing environmental hazards at the city, regional, and international level. Upon successful completion of this course, students will be able to use GIS and spatial analysis methodologies for mapping and analysis of geographically referenced data in public health. They will be learning the fundamentals of GIS, methodologies for analysing spatial data, study design, spatial data issues, and interpretation of results of analyses for GIS applications in public health

**Course Objectives:**

Students should be able to:

1. Explain fundamental principles of Geographic Information Systems (GIS).
2. Identify sources of health related geographic data.
3. Recognize the limitations and appropriateness of various spatial data sources.
4. Process, analyze, and visualize urban-health related spatial data and information using commercially-available GIS (geographic information systems) software.
5. Select, process, and interpret spatial databases that can be used to model complex systems that are related to urban health problems.
6. Plan, conduct, and present a substantial research project that uses geographic data to address an urban health issue or problem.

**Course Evaluation Methods:**

*Mid semester 15%, Final 70%, Quizzes 10%, Lab assignments 20% Research Project 30%*

**Course Outline:**

Week Topics

Week 1 Introduction to Geographical Information Systems in Public Health

Week 2 Acquisition and Storage of Health Related Geographic Data

Week 3 GIS Fundamentals

Week 4 GIS Data Transformation: Making Maps

Week 5 Public Health GIS Applications: Environmental Health

Week 6 Public Health GIS Applications: Communicable Disease Prevention and Control

Week 7 Public Health GIS Applications: Injuries

Week 8 Public Health GIS Applications: Chronic Disease Prevention

Week 9 Public Health GIS Applications: Community Health Assessment and Planning

Week 10 GIS Hardware, Operating Systems, and Software

Week 11 The Future of GIS and The Role of Public Health Officials

Week 12 **Term Research Project Overview**

Week 13 **Term Research Project**

Week 14 **Term Research Project**

Week 15 **Term Research Project**

Week 16 **Final Exam and Research project due**