Hawassa University
Wondo Genet College of Forestry and Natural Resources/ Department of Geographic Information Science
2024/2025 Academic Year, Semester II
Geospatial data Management (GISc 3115)

Course outline/plan

Instructor: Kedyalew Sahle (Lecturer), Office Nr 59, kefyalewsahle.k@gmail.com, 0916835940
ECTS: 5 (2 hours lecture and 3 hours practical)
Course description- This course explores the current geographic information (GI) situation at various levels, emphasizing GIS partnerships and collaboration. It covers Spatial Data Infrastructure (SDI), including its history, advantages, and application. The course delves into metadata, its uses, and standards, and examines the impact of globalization, politics, and extreme events on GIS. It also addresses legal, economic, and ethical aspects of geographic information. By integrating previous knowledge and preparing for advanced topics, students will develop technical, analytical, collaborative, and ethical skills essential for effective geospatial information management.

Course objective: Students completing this subject should:

- ✓ Explain the information situation in the country at different level (local to national)
- ✓ Explain the limiting factors in information exchange
- ✓ Create metadata
- ✓ Participate in Infrastructures (SDI) establishment/maintenance of Initiate and organize establishment of SDI
- ✓ Use current Information Technology to improve the accessibility of information/data
- ✓ The importance of political support for GIS
- ✓ The role of extreme events as business drivers

Schedule (5ECTS course: a course with 2 hrs theory and 3 hours practical**)**

Week	Topics to be covered	Major teaching-learning activities & Assessment of learning
1 and 2	**1. Overview to Information Situation** ✓ Current geographic information situation at different levels: Local administration, project level, Regional administration level, ✓ Need for SDI ✓ Components of SDI	4 hours theory
	Assignment 1: Consider the case of local level administration such as Town or District that you know to discuss the following issues: What institutions exist in the administration area requiring any type of geographic information? What are the major types of geographic information that they need for their activities. Which institutions can be potentially responsible as collector/provider of information? Which institutions can be groped as user? What are the potential sources of the geographic data? Practical: 1.1 Design a standard for a database that will be used by different institutions of the same administration area 1.2 Apply the designed database (enter data to the database for part of the administration using different approaches)	6 hours - review (WWW based) - Practical (1.1 and 1.2)

3	**2. Spatial Data Infrastructure** ✓ What is SDI, History, ✓ Advantage of SDI, ✓ Levels/types of SDI, ✓ Factors leading to Application of SDI ✓ SDI Stakeholders, Experiences in applying (success of SDI)	4 hours theory
	Assignment (practical) 2: Use internet or documents (provided by the instructor) to evaluate different types of SDI available worldwide. Discuss the principles, the components and stake holders of each of the SDI. Argue their experiences (positive and negative in applying SDI). **Practical 2: Using data from different sources** ✓ **Refering to practical 1.1 and 1.2**	6 hours review (WWW based) and group work
FIRST EXAMINATION (Test I)		
4 and 5	**3. Metadata** ✓ Definition, Uses of metadata, ✓ Components/aspects of metadata, ✓ Objectives of metadata (does and doesn't), ✓ Implementation decisions, Standards	2 hours theory
	Demonstration: ✓ Metadata of imagery ✓ Metadata of vector dataset ✓ Create metadata using ArcGIS catalogue and QGIS **Assignment (practical) 3.1:** Download an imager covering one district in Ethiopia (Landsat 8 or 9) and preprocess the image (stacking and clipping), vector data from WWW covering the whole part of Ethiopia. **Assignment (practical) 3.2:** Create a metadata for two types of data (1) thematic data with geographic coordinate system (preferably national level - Ethiopia level); (2) local level data with projected coordinate system; (3) imagery/aerial photograph. The instructor can provide the students the sample data or they can use their own data. Remark: Due to internet connection problem – use evenings or morning hours for downloading image	7 hours practical
6	**4. System Architecture** ✓ System Architecture for SDI ✓ Interoperability ✓ Interoperability and standards ✓ Client Server Architecture	**2 hours Theory**
	Practical: Evaluate a database (given by the instructor) ✓ Interoperability ✓ The database architecture ✓ Propose standards to improve the Interoperability	**3 hours practical**

7	**5. Spatial Data Quality** ✓ Data Quality Information (DQI) ✓ Accuracy, Precision, Bias ✓ Error Modeling	**2 hours theory**
Second EXAMINATION (Test 2)		
	Practical: Review the standards defined for urban and rural cadaster in Ethiopia ✓ Data Quality Information (DQI) ✓ Accuracy ✓ Possible Errors	**3 hours practical**
8	**6. Data Modeling for SDI** ✓ Data Modeling ✓ Abstraction of Real World ✓ Types of abstraction ✓ Problems of information sharing (Heterogeneities) ✓ Distributed database concept	**2 hours theory**
	Practical: Problems identification in data sharing ✓ Data Quality Information (DQI)	**3 hours practical**
9 and 10	**7. GIS Internet Services and SDI Technologies** ✓ System Architecture ✓ Available Services ✓ Technologies that support internet GIS services ✓ Commercial tools for internet GIS	**2 hours theory**
	Practical: Review the system architecture of a given GIS Service (developed by the instructor)	**3 hours practical**
11	**8. Globalization, politics, and GIS** ✓ Global databases, ✓ Global partnerships for standards, ✓ GIS and Extreme events: SDI and terrorism, ✓ GIS contribution in extreme events (Risk assessment, Preparedness, Mitigation, Response, Recovery)	**2 hours theory**
	Practical: ✓ Search of spatial and non-spatial dataset that are covering Ethiopia and East Africa ✓ Produce report about the data that are available in WWW ✓ Download and preprocess selected data (minimum 2: 1 vector and 1 raster)	**3 hours practical**
12	**9. Aspects of Geographic Information** ✓ Legal aspects, ✓ Economic aspects, ✓ Geospatial information as property, ✓ Dissemination of geospatial information, Ethical aspects	**2 hours theory**
	Assignment (group work) 4: Identifying the role of GIS in extreme cases taking events that happened locally, national level or globally (e.g. forest fire, flooding, drought)	**3 hours practical (search in WWW)**

Third EXAMINATION (Practical Exam)
Fourth EXAMINATION (Final Exam)

Methods of assessment

Continuous assessment:

- tests/quiz = 20%
- practical activities – (evaluated individual on computer) = 10%
- assignment = 10%

Practical exam = 10%
Final examinations = 50%