Syllabus
Advanced Topics in Information Science
(INSC 702)

1.	Course Information

Course# & Title: INSC 702: Advanced Topics in Information Science

Semester: Fall 2022

Meetings: Monday, Nov 28 – Friday, Dec 2, 2022
                                   4:00 am – 12:00 pm (Local Ethiopian Time)

                                   VARNERO CR8302

2.	Faculty Information

Instructor: Shimelis Assefa, Ph.D. (Associate Professor)

Contact Information: P. +251-911-340814 Email: Shimelis.Assefa@du.edu

Office Hours: By appointment.
                                   https://calendly.com/sassefa/schedule-meeting

3.	Course Description

The following descriptions are from JIT curriculum document.

Course Objective:
The general objective of the course is to introduce students to current developments in
Information Science field.

Course description:
The motivation for this course lies in the interest in providing a broad viewpoint on
Information Science by surveying recent developments, major results, and hot topics in
today's leading-edge research in Information Science.

The course will cover topics such as: E-Governance, Digital Innovation, E-business
(Ecommerce), Virtual organizations, ICT for (communication, education & health),
Information Policy, Scholarly communications and writing, E-publishing, Internet of
things, Social impacts of Technology, Cyberspace and etc.

My expanded description: going by the title of the course – i.e. – advanced topics in
information science – given that students enrolled in this course need to understand

current and emerging topics in information science as they start the dissertation journey – and given that this is a block system where so much content is condensed in a week schedule, my approach will be to present and discuss core information science topics, to the extent possible. And these topics include first and foremost understanding the domain of information science from information theory to informatics and to knowledge structure. Following that, we discuss critical area sin information science such as information retrieval, search engines; natural language processing; data science, artificial intelligence, machine learning, deep learning; and the social impacts of technology that includes digital innovation, e-governance, social informatics, and urban informatics.

4.	**Course Materials**

Recommended Book:

There is no required textbook for this course. I will compile relevant materials – from core Information Science and Computer Science fields.

For information science specific topics, the following books that I donated to JU Library will be helpful:

- Lester, J., & Koehler, W. C. (2007). Fundamentals of Information Studies: Understanding information and its environment. 2nd ed. New York: Neal-Schuman.
- Raber, D. (2003). The problem of Information: An introduction to information science. Lanham, MD: The Scarecrow Press.
- Meadow, C.T. (2006). Messages, meanings, and symbols: The communication of information. Lanham, MD: The Scarecrow Press.

I will share compiled pdf documents and web-based resources online so you can easily download and access them.

A few relevant selected Journals, web-based texts and materials that I encourage you to continuously look at include:

Journals (only selected):

- Information Sciences
- Journal of the Association for Information Science and Technology
- Journal of Machine Learning Research
- Computational Linguistics
- Communications in Computer Information Science
- Journal of the Association for Information Science and Technology
- Lecture notes in Computer Science
- Lecture notes in Artificial Intelligence

Web-based resources (only selected):

- Cornell Information Science Department Research
  https://infosci.cornell.edu/research
- University of Colorado Boulder Information Science Research Labs
  https://www.colorado.edu/cmci/infoscience/labs
- Modern Information Retrieval http://grupoweb.upf.edu/mir2ed/home.php
- Apache Solr https://solr.apache.org/resources.html
- Data Science in a Box https://datasciencebox.org/
- NLTK (Natural Language Toolkit) - http://text-processing.com/
- KDnuggets
  - Topics on Data Science - https://www.kdnuggets.com/tag/data-science
  - Topics on AI - https://www.kdnuggets.com/tag/artificial-intelligence
- Dive into Deep Learning - https://d2l.ai/

5.   Learning Outcomes

By the end of this course students will be able to:

a) Review and determine the landscape of the field of information science.
b) Identify key issues in information science research.
c) Discuss current and emerging topics in computer and information science research
d) Critique the role of information, data, and technology for solving social problems

6.   Course Contents

- 11/28, Day 1: Scanning the field of Information Science
  - The landscape of Information science.
  - Informatics and Information science.
  - Information Problems.
  - Information Theory.
  - Bibliometrics, Scientometrics, Informetric, Webometrics, Altmetrics
- 11/29, Day 2: Information Retrieval, IR
  - Introduction to IR
  - IR Models
  - Text Classification.
  - Indexing and Searching.
  - Quick Intro to Apache Lucene/Solr.
  - Case Studies.
- 11/30, Day 3: Language and Information
  - Introduction to Natural Language Processing, NLP.
  - Key Applications.
  - NLP Tools
  - Case Studies

- 12/1, Day 4: Data Science
    - How to get started with Data Science
    - Artificial Intelligence
    - Machine Learning
    - Deep Learning
    - Case Studies
- 12/2, Day 5: Social Impacts of Technology
    - E-governance.
    - Digital Innovation – in fintech, agriculture, healthcare.
    - Social Informatics.
    - Urban Informatics.
    - Case Studies.
    - Wrap-up, Summary

7.   Methods of Assessment

Class meets daily form Monday, 11/28 to 12/2, 2022. Course materials including readings and assignments will be shared online via GitHub, https://sgassefa.github.io/

Points Possible:

Assignments	Weight (percentage)	Points
Assignment 1: Scoping Review	30%	100
Assignment 2: Use Case	30%	100
Assignment 3: Research Thesis	40%	100
Total	100%	600

Evaluation: Grades will be based on points accumulated and converted to 100 percentiles. Letter grades will be awarded according to the Jimma University scale

8.   Descriptions of Assignments

Because we are adopting a block system, we cover so much material in just one week. I am sure you may feel overwhelmed by the expansive content covered in this course. I think it is a good strategy if you take time in the afternoon to review assigned materials for each day/topic before coming to class, just a quick scan. After the face-to-face meeting is over, you can go through the materials in detail.

Assignments are also due after the in-person meeting is concluded on December 2, 2022.

During class meetings, I sincerely encourage you to actively participate by asking questions and helping answer questions, as well as engaging with me and fellow classmates.

Assignment 1. Scoping Reviews on Key Information Science Research, 30%, Due December 24, 2022, 11:59pm (midnight Ethiopian time).

The description of "Scoping Reviews" is extracted form this guide - https://libguides.lib.umanitoba.ca/reviewtypes/scoping

However, the goal is using key research in information science field, your task is to complete a 'scoping review'. Make sure to read the guide referenced by the link above to understand the difference between critical review, literature reviews, systematic reviews, and scoping reviews.

To determine 'key research in information science,' consider the topics and research areas we discussed in this course or areas that you identify in your own exploration. For example, you could focus on – information retrieval research (broad, make it specific, e.g., language model), text summarization in NLP, innovation systems research, information use research, etc.

To complete the 'Scoping Review', use the following steps:

1. **Identify** – What is/are the research question(s) - what domain needs to be explored?
2. **Find** – locate relevant studies - electronic databases, reference lists, websites, conference proceedings, clinical trials, etc.
3. **Select** – Choose studies that are relevant to the question(s) – use predetermined inclusion/exclusion criteria.
4. **Extract/chart** – organize the data from relevant studies selected.
5. **Collate** – Summarize and report the results.

Assignment 2. Data Science Use Case, 30%, Due January 15, 2023, 11:59pm (midnight Ethiopian time)

Data science use case can be described briefly as a real-world task or problem that will be solved using data, computational methods including frameworks, algorithms, and models.

The goal of this assignment is to identify a data science use case and describe in detail the overall approaches followed in solving the issue at hand. Today, there are multiple data science use case studies that report the data, script, codes, algorithm, and the result and/or the performance of the algorithm in publicly accessible websites. For example, papers with code - https://paperswithcode.com/ - publishes state of the art (SOTA) current and emerging data science/machine learning algorithms – including datasets, codes, methods, etc.

Your task is not to work on or complete a use case yourself. Rather, it is to identify an existing and completed use case (just one) and write a report/review from the research question to the datasets, tools, methods, analysis, codes, platforms, and results.

Consider data science use cases in major domains such as – healthcare, agriculture, transportation, education, education, etc. and take a narrow focus in one domain area. For example, if you consider healthcare as a domain – you could narrow the use case in drug discovery, patient data analysis, medical image analysis, etc.

Assignment 3. Information Science Research Thesis, 40%, Due February 12, 2023, 11:59pm (midnight Ethiopian time).

So as part of your admission process, you submitted a 'Concept Note," where you briefly described your research area that you might be interested to complete for your dissertation. That could still be the case, or you may change or fine-tune the area and definitely the problem statement and the research questions as you progress through the coursework – because you get more insights into the specifics of your investigation.

Regardless, whatever topic and/or research questions you would end up working in, the goal of the assignment is to expand your concept note type of document and make it a 'Research Thesis'. In the research topic you explore your topic area a little in depth, you review relevant resources, and fine tune your research questions. Remember this is not a full-blown proposal – but the research thesis paves the way for the full proposal.

In the research thesis, you clearly articulate the research problem and determine key research questions. Also, you review relevant literature (core ones) not extensive literature review. So, the "Research Thesis" is a preliminary draft before the actual proposal. In short, the research thesis is an account of how you (as a researcher) in your own way think about and analyze the topic, together with potential answers to your proposed research questions. It is a working document from which you build further. Consider to have the following in the research thesis:

- Title: brief and one that succinctly summarizes your research
- Abstract – about 150 words
- Introduction & Background – where you introduce your research. Start with a powerful statement that captures your line of thesis or argument.
- Literature Review – brief – one that critically provides context to your research
- Method – broad approaches – without actually providing a complete account of the research design
- References

Please adopt standard citation format – APA, or, MLA, with APA preferred.