Ugandan Christian University
Faculty of Engineering, Design, and Technology
Department of Computing and Technology
Advent 2025

DSC3314: Scientific Report, Writing, and Publishing.

Course Description

This course covers the principles and practices of scientific writing, reporting, and publishing. Students will learn to communicate scientific information to diverse audiences effectively.

Course Objectives

- Understand the principles of scientific writing and reporting, and their role in data science
- Develop skills in writing scientific papers, reports, and abstracts
- Learn to evaluate scientific literature critically
- Prepare manuscripts for academic journals and conferences
- Communicate findings through reports, abstracts, and presentations
- Understand and navigate the publishing process, including peer review and ethical considerations

Course Outline

Week 1: Introduction to Scientific Writing

1. Overview of scientific writing and reporting
2. Purpose and scope of scientific writing in data science
3. Types of scientific documents: reports, papers, theses, abstracts
4. Writing for different audiences (peers, academic, industry, policy)
5. Principles of scientific writing
6. Common challenges

Week 2-3: Structure of Scientific Papers

1. Structure of a scientific paper (IMRAD): Introduction, Methods, Results, and Discussion
2. Writing for different sections (introduction, methods, results, discussion)
3. Title, abstract, and keywords: crafting for visibility
4. Common pitfalls and how to avoid them
5. Style and tone in scientific writing

Week 4-5: Literature Review and Referencing

1. Conducting a literature review
2. Search strategies (Google Scholar, IEEE Xplore, PubMed, Scopus, African Journals Online, etc.)

3. Citation styles (APA, IEEE, etc.)
4. Using reference managers (Zotero, Mendeley, EndNote)
5. Critical Evaluation of Scientific Literature- Reading and evaluating scientific papers
6. Identifying biases and flaws
7. Synthesising information from multiple sources
8. Blind Peer Review

Week 6: Writing Methodology

1. Describing data sources, tools, and techniques
2. Reporting datasets: sources, characteristics, preprocessing steps
3. Explaining algorithms/models: clarity for both technical and non-technical readers
4. Reporting performance metrics (accuracy, precision, recall, F1, RMSE, etc.)
5. Reproducibility and open science - datasets, models, evaluation metrics (GitHub, data/code sharing, Jupyter notebooks, FAIR principles)

Week 7-8: Results, Discussion, and Conclusion

1. Presenting results with clarity: tables, figures, and statistical reporting - Best practices in data visualisation and figure design
2. Avoiding data misrepresentation
3. Interpreting results in context
4. Linking findings to existing literature
5. Writing effective conclusions and recommendations

Week 9: Publishing Scientific Research

1. Overview of the publishing process
2. Types of scientific publications (journals, conferences, workshops, datasets, preprints)
3. Choosing where to publish (impact factors, open access, predatory journals warning signs) & Understanding journal metrics and impact factors
4. Writing cover letters and responding to reviewers
5. Conference abstracts and poster presentations
6. Authorship responsibilities and ethics
7. Understanding the peer review process
8. Giving and receiving constructive feedback
9. Revising manuscripts for resubmission

Week 10: Ethics and Integrity in Scientific Publishing, and Online Research Identity

1. Plagiarism, data fabrication, and authorship responsibilities and ethics
2. Open access vs. traditional publishing
3. Navigating predatory journals

Week 11: Presenting and Communicating Research

1. Writing abstracts and summaries

2. Data storytelling and visualisation principles
3. Preparing posters and presentation slides
4. Science communication for non-technical stakeholders (policy briefs, blogs, infographics)
5. Oral presentation skills for defending or pitching research
6. Using social media for scientific communication