# LIS 9701:
# Information Retrieval: Research and Practice
## Summer 2022

**INSTRUCTORS**
**Toluwase Asubiaro**
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*or by appointment* on Zoom

**1.0 COURSE TIMES**

**Classes: Synchronous** Online classes via Zoom, **Tuesdays, 1:30-3:30 pm**

**2.0 COURSE DESCRIPTION**

Introduction to the advanced principles and theory of information retrieval. In-depth analysis of how search engines work and how to explore and use various forms of Web data and information. Introduction to new areas of information retrieval, such as multimedia information retrieval.

**3.0 PRE-REQUISITE**

The pre-requisites for this course are MLIS 9002 and MLIS 9003. Unless you have either the requisites for this course or written special permission from the Dean to enrol in it, you will be removed from this course, and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary pre-requisites.

**3.1 ENROLLMENT RESTRICTIONS**

Enrollment in this course is restricted to graduate students in FIMS, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

## 4.0 LEARNING OUTCOMES

**Students who complete this course will be able to:**

| Course Learning Outcome: Student who complete this course will be able to: | MLIS Program-Level Learning Outcomes | What assignments provide evidence of learning outcomes? | How will instructors assess mastery of learning outcome? |
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| Develop an advanced understanding of the theory and principles of information retrieval | **MLIS Prog. Level outcome 6:** Navigate, evaluate and use multiple elements of a range of information environments, including those associated with data curation, information visualization, databases and information architectures.<br><br>**MLIS Prog. Level outcome 8:** Evaluate and demonstrate the effectiveness of user-centered information systems, services and resources for individual users and diverse communities in a networked global society within which information organizations and information professionals operate. | Written report assignments Participation | - Reports will be directed at both the theory and practice of information retrieval to require students to display an understanding of the basic definitions.<br>- Cited readings in the reports, together with active participation in the class will provide evidence that the student has learned to place the practical skills into a broader professional context. |
| Gain a deeper understanding of how search engines work | **MLIS Prog. Level outcome 4:** Discriminate among current and emerging information and communication technologies to judge effective management and use in constantly changing information workplaces.<br><br>**MLIS Prog. Level outcome 6:** Navigate, evaluate and use multiple elements of a range of information environments, including those associated with data curation, information visualization, databases and information architectures. | Written assignments attendance and participation | - Presence and participation during classes and presentations and completion of in-class assignments will provide evidence of exposure to the IR systems. |
| Explore the variety of Web search services | **MLIS Prog. Level outcome 6:** Navigate, evaluate and use multiple elements of a range of information environments, including those associated with data curation, information visualization, databases and information architectures. | Written report assignments Participation | - The written reports will be set in a contextual frame that requires the student to write for a particular community and audience. |

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| and Web data that are publicly available | **MLIS Prog. Level outcome 8:** Evaluate and demonstrate the effectiveness of user-centered information systems, services and resources for individual users and diverse communities in a networked global society within which information organizations and information professionals operate. | And class presentation | - Class presentations will emphasize those areas where the course content intersects with professional and lay information communities. |

**5.0 TEXTS**

There is no required textbook for the course. Readings will be assigned from a selection of books and articles on reserve on the OWL Course Website. Practical assignments (i.e., practica) can be done using the tools available online via the OWL site or the Graduate Library.

**6.0 ELECTRONIC RESOURCES**

**The OWL Course Website** will contain course materials such as this syllabus, select readings, and classroom handouts. The handouts will be posted prior to each lecture in the course of the term. Please visit the website before each lecture to **print the corresponding handout and bring it to class with you**. Students will **not** be able to modify these materials electronically.

**7.0 EVALUATION**

Evaluation of assignments is based on the *MLIS Guidelines to the Grade Range*, available on the Student section of the FIMS Intranet.

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| **2 Written Essays @ 20% each** | **40%** |
| **Final Paper** | **40%** |
| **Class presentation** | **15%** |
| **Participation** | **5%** |
| | **100%** |

Participation marks are awarded for substantive, constructive participation in class, including discussion, asking questions, making observations, etc.

**8.0 ASSIGNMENTS**

Assignments are to be **uploaded to OWL before the beginning of the class (at 5:30 p.m.)** on the indicated date.

**9.0 FINAL PROJECT**

Your project will consist of independent research **on an** IR topic in a research area of your choice. You may find some of the recommended research areas interesting. I have also identified and listed some scientific publications in the recommended research areas. You can decide to work alone on your final project or work with at most two other members of the class. Since the class will run for about 13-14 weeks, you are expected to choose a study you will finish with 10 to 11 weeks. Remember you must factor in writing the methodology, data collection and analysis and manuscript development.

Your final project will consist of **four (4) steps**: an introductory submission/proposal (5% of the grade), a mid term presentation of your research in progress (5%), a final presentation of your research (15%) and the final submission (30%). The proposal is expected to be one to two pages long with a short introduction/background to your study, a methodology, expected outcomes, timeline, and bibliography. The introduction may contain the importance or justification for your study. The methodology should provide details of data collection and analysis steps. I may request for a meeting

with the group or individual that submit a proposal if I think the proposal is not doable within 10-11 weeks. The mid-term research-in-progress presentation is expected to involve every member of research groups. The presentation will take 15 minutes and another 15 minutes for Q and A. Every member of the class is expected to contribute to other group or individual's presentation.

### 9.1 Recommended Research Areas

- Issues in the IR of a language, group of languages, media types (textual, images, picture, music), IR types (social media, scholarly, news etc) etc.
- IR systems, sources or resources evaluation.
    - Scholarly information sources such as Scopus, Web of Science, MEDLINE
    - health information sources such as WHO, CDC websites
    - news sources such as Google news, YouTube and
    - e-commerce sources such as Amazon can also be evaluated.
- Proposal of new IR methods or algorithm
- Equity or Equality, Privacy, Bias, Transparency in IR: Sources of biases in Information retrieval of documents for minorities, low-resource languages etc. For instance, you can evaluate how government policies/capitalism have improved IR of the languages of the indigenous people. Other related topics.
- IR Systems development
- Users information behaviour: Information seeking behaviour, evaluation of information literacy skills of information users (e.g. investigating the ability of academics/graduate students or undergraduates to evaluate the credibility of COVID-19 information), online information behaviour
- And other related IR topics: studies in this category may not belong to any of the above categories, they must be relevant to IR.

### 9.2 Example of studies/Journals/Conferences

**9.2.1 Conferences:** https://trec.nist.gov/
Cross-Language Evaluation Forum (CLEF). https://link.springer.com/conference/clef

**9.2.2 Journals:** Language Resources and Evaluation (https://www.springer.com/journal/10579)
Language Resources and Evaluation Journal: http://www.elra.info/en/dissemination/jlre-language-resources-and-evaluation-journal/
Journal: Information retrieval journal

**9.2.3 Scientific Publications**

Abdollahi, B., & Nasraoui, O. (2018). Transparency in Fair Machine Learning: The Case of Explainable Recommender Systems. In J. Zhou & F. Chen (Eds.), *Human and Machine Learning* (pp. 21–35). Springer International Publishing. https://doi.org/10.1007/978-3-319-90403-0_2

Abul-Fottouh, D., Song, M. Y., & Gruzd, A. (2020). Examining algorithmic biases in YouTube's recommendations of vaccine videos. *International Journal of Medical Informatics*, *140*, 104175. https://doi.org/10.1016/j.ijmedinf.2020.104175

Ajiferuke, I., Goodfellow, J., & Opesade, A. (2015). Characteristics and Effectiveness of Tags in Public Library Online Public Access Catalogues/Les caractéristiques et l'efficacité des balises dans les catalogues publics en ligne des bibliothèques publiques. *Canadian Journal of Information and Library Science*, *39*(3–4), 258–278.

Asubiaro, T. V. (2014). Effects of Diacritics on Web Search Engines' Performance for Retrieval of Yoruba Documents. *Journal of Library and Information Studies*, *12*(1), 1–19.

Basch, C. H., Hillyer, G. C., Zagnit, E. A., & Basch, C. E. (2020). YouTube coverage of COVID-19 vaccine development: Implications for awareness and uptake. *Human Vaccines & Immunotherapeutics*, *16*(11), 2582–2585. https://doi.org/10.1080/21645515.2020.1790280

Ledwich, M., & Zaitsev, A. (2020). Algorithmic extremism: Examining YouTube's rabbit hole of radicalization. *First Monday*. https://doi.org/10.5210/fm.v25i3.10419

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics*, *106*(1), 213–228. https://doi.org/10.1007/s11192-015-1765-5

Nzomo, P., Rubin, V. L., & Ajiferuke, I. (2012). *Multi-lingual information access tools: User survey*. 530–532.

Pant, S., Deshmukh, A., Murugiah, K., Kumar, G., Sachdeva, R., & Mehta, J. L. (2012). Assessing the Credibility of the "YouTube Approach" to Health Information on Acute Myocardial Infarction. *Clinical Cardiology*, *35*(5), 281–285. https://doi.org/10.1002/clc.21981

Rahimi, R., Shakery, A., & King, I. (2015). Multilingual information retrieval in the language modeling framework. *Information Retrieval Journal*, *18*(3), 246–281. https://doi.org/10.1007/s10791-015-9255-1

Ramos, J., & Eickhoff, C. (2019). *Explainability in Transparent Information Retrieval Systems*. 10.

Zhang, Y., & Chen, X. (2020). Explainable Recommendation: A Survey and New Perspectives. *Foundations and Trends® in Information Retrieval*, *14*(1), 1–101. https://doi.org/10.1561/1500000066

Zuccon G. (2016) Understandability Biased Evaluation for Information Retrieval. In: Ferro N. et al. (eds) Advances in Information Retrieval. ECIR 2016. Lecture Notes in Computer Science, vol 9626. Springer, Cham. https://doi.org/10.1007/978-3-319-30671-1_21

**Data collection Method**

Systematic Review
Survey
Text analysis-automatic and manual
System analysis/evaluation
Interview
etc

**COURSE OUTLINE**

| Lecture | Date | Assignments Due | Topics/Readings |
|---|---|---|---|
| **1** | May 10 | **Synchronous** | Introduction to the course. Information retrieval system components; analysis and representation.<br>**Required Readings**.<br>chapter 1 Chowdhury, G.G. (2010). **Introduction to modern information retrieval**. 3rd ed. New York: Neal-Schuman Publishers, Inc. |
| **2** | May 17 | Submission of a proposal on your project/presentation by 9am January 20 | Information Retrieval Algorithms. Knowledge Representations Models<br>**Readings:**<br>https://nlp.stanford.edu/IR-book/html/htmledition/the-term-vocabulary-and-postings-lists-1.html<br>https://nlp.stanford.edu/IR-book/html/htmledition/scoring-term-weighting-and-the-vector-space-model-1.html<br>https://nlp.stanford.edu/IR-book/html/htmledition/probabilistic-information-retrieval-1.html<br>https://nlp.stanford.edu/IR-book/html/htmledition/language-models-for-information-retrieval-1.html<br>https://nlp.stanford.edu/IR-book/html/htmledition/vector-space-classification-1.html |
| **3** | May 24 | Guest Lecturer | How Search Engines work- crawling, query matching and result ranking. Searching search engines.<br>Chapters 1 and 2 Markey, K. (2019). **Online searching: a guide to finding quality information efficiently and effectively**. 2nd edition. Lanham: Rowman & Littlefield.<br>OR<br>Chapters 1 and 2 Markey, K. (2015). **Online searching: a guide to finding quality information efficiently and effectively**. 2nd edition. Lanham: Rowman & Littlefield<br>http://orion.lcg.ufrj.br/Dr.Dobbs/books/book5/chap14.htm |
| **4** | May 31<br>First assignment | Guest Lecturer: | Searching research databases. Information retrieval for evidence-based research (systematic reviews)<br>**Readings**<br>Spencer, A. J., & Eldredge, J. D. (2018). Roles for librarians in systematic reviews: a scoping review. *Journal of the Medical Library Association: JMLA*, *106*(1), 46. |

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| **5** | June 7<br>First assignment due | **Synchronous** | Transparency, bias and privacy. Quality vs Equity<br>**Readings**:<br>Rubin, V.L., Burkell, J., Cornwell, S.E., Asubiaro, T., Chen, Y., Potts, D., and Brogly, C. (2020) AI Opaqueness: What Makes AI Systems More Transparent? (Panel), in the CAIS/ACSI2020 An Open Virtual Conference: Diverging Trajectories in Information Science, the 48th Annual Conference of the Canadian Association for Information Science Conference/l'Association canadienne des sciences de l'information. |
| **6** | June 14<br>Second assignment | | Evaluation of information retrieval systems.<br>**Readings:**<br>https://nlp.stanford.edu/IR-book/html/htmledition/evaluation-in-information-retrieval-1.html |
| **7** | June 21<br>Second assignment due | **Synchronous** | Mid-term presentations with feedback from the class and course instructor |
| | June 28 | June 27-July 1 **No classes** | |
| **8** | July 5 | | Multilingual information Retrieval<br>**Readings:**<br>Peters, C., Braschler, M., & Clough, P. (2012). *Multilingual Information Retrieval: From Research To Practice*. Springer-Verlag. https://doi.org/10.1007/978-3-642-23008-0<br>Rahimi, R., Shakery, A., & King, I. (2015). Multilingual information retrieval in the language modeling framework. *Information Retrieval Journal*, *18*(3), 246–281. https://doi.org/10.1007/s10791-015-9255-1<br>Stiller, J., Gäde, M., & Petras, V. (2013). Multilingual Access to Digital Libraries: The Europeana Use Case. In Information-Wissenschaft & Praxis, 64(2-3):86-95.<br>Nzomo, P., Ajiferuke, I., Vaughan, L. & McKenzie, P. (2016). Multilingual Information Retrieval & Use: Perceptions and Practices Amongst Bi/Multilingual Academic Users, *The Journal of Academic Librarianship.*<br>He, D., & Wang, J. (2009). Cross-language information retrieval. Information retrieval: Searching for the 21st century (pp. 233-253): John Wiley & Sons, Ltd |
| 9 | July 12 | **Guest speaker: Oluwole Martins Badmus,**<br>PhD Candidate, Western University | Social Media Information Retrieval, recommender systems<br>Gorrab, A., Kboubi, F., & Ghézala, H. (2017). Social Information Retrieval and Recommendation: State- of-the-art and future research. *Revue Africaine de La Recherche En Informatique et Mathématiques Appliquées, INRIA, 27*(Special issue CARI 2016), 17. |

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| 10 | July 19 | | Image and Video (multimedia) Information Retrieval<br>Music Information Retrieval<br>**Readings:**<br>Yoon, J. (2011). Searching images in daily life. **Library & Information Science Research**, 33(4), 269-275.<br>Enser, P. (2008). The evolution of visual information retrieval. **Journal of Information Science**, 34(4), 531-546.<br>Chapter 16: Chowdhury, G.G. (2010). **Introduction to modern information retrieval**. 3rd ed. New York: Neal-Schuman Publishers, Inc |
| **11** | July 26 | **Synchronous** | Bibliometric-enhanced Information Retrieval, Web link analysis<br>Chapter 21: Chowdhury, G.G. (2010). **Introduction to modern information retrieval**. 3rd ed. New York: Neal-Schuman Publishers, Inc.<br>Bar-Ilan, J., John, M., Koopman, R., Wang, S., Mayr, P., Scharnhorst, A., & Wolfram, D. (2016). Bibliometrics and information retrieval: Creating knowledge through research synergies. *Proceedings of the Association for Information Science and Technology*, *53*(1), 1–4. https://doi.org/10.1002/pra2.2016.14505301023<br>Mayr, P., Scharnhorst, A., Larsen, B., Schaer, P., & Mutschke, P. (2014). Bibliometric-Enhanced Information Retrieval. In M. de Rijke, T. Kenter, A. P. de Vries, C. Zhai, F. de Jong, K. Radinsky, & K. Hofmann (Eds.), *Advances in Information Retrieval* (pp. 798–801). Springer International Publishing. https://doi.org/10.1007/978-3-319-06028-6_99 |
| **12** | August 2 | **Synchronous** | Final Presentations |
| **13** | August 9 | **Synchronous**<br>**Submission of Final Paper due by 3:00 pm** | Final Presentations |

Note: Late submission without prior approval will attract a penalty of 5% per day for a maximum of three days.

**Important Information (Excerpts from Graduate Student Handbook):**

**Plagiarism:** Students must write their essays and assignments in their own words. Whenever students take an idea or a passage of text from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

**Grading System:** Graduate Programs submit grades as numerical marks according to the following scale:
80% and above (A) 70-79% inclusive (B) 60-69% inclusive (C) Less than 60%:- Fail (F)
For more information on class attendance, plagiarism, and grading system, kindly read the Graduate Student Handbook or visit: http://intra.fims.uwo.ca/students/handbooks/mlis/index.htm

**Health and Wellness Services**

Students who are in emotional/mental distress should refer to Mental Wellbeing http://www.uwo.ca/health/mental-wellbeing/ for a complete list of options about how to obtain help.

**Student Accessibility Services**

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are encouraged to register with Student Accessibility Services, a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both SAS and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.
For more information, see http://www.sdc.uwo.ca/ssd/

**Virtual Office Hours**

By appointment

**BIBLIOGRAPHY**

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# Expectations for Written Assignments

**1) Your written assignments vary in length. The final paper is 15 pages maximum (single-spaced).** References/Bibliography should be given on the final page. Use 1-inch margins and one of standard 12-pt fonts (e.g., Times New Roman or Calibri).

2) Identify course, date, and your name and mailbox number at the top of your assignment. Do not attach a cover page.
3) Pay attention to paragraphing, sentence structure, and punctuation as these may be considered in the marking.
4) The style should be that appropriate to a report, the gist easily and quickly ascertained (e.g., each part of the paper should be labelled with an appropriate section heading to aid the flow and presentation of ideas).
5) Citations should conform to one of the major style guides, e.g., MLA, APA, Chicago, etc. Citations are required whenever you borrow someone else's ideas or comments either through direct quotation or by paraphrasing.
6) The bibliography or reference list should show evidence of 1-2 readings beyond those that have been assigned. All citations and sources of reading should be listed in Reference List/Bibliography.
7) Writing should be non-sexist and bias-free.
8) You may use first person.
9) If you include appendices, make sure to number them and refer to them in the text.
10) Assignments should be professional in form and content. At a minimum, this includes
Word-processing

Legible font with suitably dark impression

Correct grammar and spelling (at a minimum, use the spell-checker)

Proper indentation and spacing

Adequate section headings

Citations and references, as above

**PROFESSIONAL PRESENTATION IS NOT GRADED. HOWEVER, ASSIGNMENTS THAT ARE NOT PRESENTED IN A PROFESSIONAL MANNER WILL BE RETURNED TO THE STUDENT UNMARKED.**
11) You must avoid plagiarism with great care. Please take note of the FIMS policy on plagiarism and make sure you credit ideas and sources meticulously.

# Class Policies

**Attendance:**
Students are expected to attend every Thursday's zoom class that is specified as synchronous in the course, listen to asynchronous videos and to read the required readings beforehand. Students who need to miss a Thursday zoom class for whatever reason should inform me beforehand if possible. Students who miss more than 2 classes may be required to compensate with extra work.

**Late Penalties:**
Late assignments will be penalized at a rate of 5 % per day, unless an extension has been negotiated beforehand. Extensions for medical reasons must be accompanied by the appropriate documentation.