COMP 5118F/4900 H (Fall, 2025)

Trends in Big Data Management

Instructor: Ahmed El-Roby

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Office Location: HP 5433

Best Ways to be in Touch: in class, or via email

Class Location: Please check Carleton Central for the room location.

Lecture Times: Tuesday, 11:35 AM - 2:25 PM

Course Website: https://people.scs.carleton.ca/~ahmedelroby/COMP5118_F25/

Graduate courses only:

- Brightspace access for University of Ottawa Students; please see information here: https://gradstudents.carleton.ca/faculty-of-graduate-and-postdoctoral-affairs-access-to-brightspace/
- University of Ottawa Students who need access to SCS IT resources such, as OpenStack and Nextcloud, must submit a request to SCS Tech Support SCS.Tech.Support@cunet.carleton.ca. The request must be sent from their @cmail.carleton.ca email address and the email should say which resource is required and for which course (including section).

Important dates and deadlines can be found here: Dates, Deadlines, and Regulations—Registrar's Office, including class suspension for fall, winter breaks, and statutory holidays.

Course Calendar Description

In-depth study of recent research articles in the field of data management, with focus on data integration, Internet of Things, large scale data management, recommendation systems, text processing, and question answering. Students will work on a term-long project.

Prerequisite(s): COMP 3005 for students registering in COMP 4900H.

Learning Material(s) and Other Course/Lab-Related Resources

No textbooks are needed in the course.

Ancillary fees associated with this course, e.g., textbooks, course packs, lab manuals, field work, online resources or links required for the course along with their associated cost (if applicable). Estimated costs can be acquired based on current bookstore offerings, Amazon, etc.

Learning Material	Options for Purchasing *(e.g., Bookstore, Used, etc.)*	Approximate Cost
Scientific Papers	Publicly available	0$

Students are not required to purchase textbooks or other learning materials for this course.

Topics Covered and Learning Outcomes

- Knowledge Graphs
- Geospatial Data
- LLM-Applications
- Time Series
- Healthcare Analytics
- Natural Language to SQL
- Data Cleaning
- Data Lakes
- Efficiency
- Entity Alignment

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

1. Critically analyze recent research papers from top data management conferences and journals (e.g., SIGMOD, VLDB, CIDR, ICDE, etc.), evaluating the novelty, methodology, and significance of each contribution.

2. Identify emerging trends and key challenges in big data systems, including topics such as cloud-native databases, data lakes, query optimization, and ML-integrated data management.

3. Compare and contrast different system designs and techniques proposed in the literature, articulating their trade-offs and applicability in various contexts.

4. Present and defend technical content from recent papers in a clear and structured manner, both orally and in writing.

5. Review research papers, providing constructive feedback through structured peer-review exercises.

6. Design and conduct a research-oriented course project that explores, replicates, or extends a recent paper in the field of data management.

7. Apply rigorous scientific reasoning to assess the validity of experimental results and claims presented in contemporary data management literature.

Assessment Scheme

Grade Breakdown

COMPONENT	GRADE VALUE	DATE
Project	45 %	December 8
Presentations	20 %	TBD
Paper Reviews	20 %	Weekly
Class Participation	15 %	Weekly

Late and Missed Work Policies

Late Work

No late submissions are accepted.

Missed Work

Only the top 80% of the paper reviews will count towards the final grade. Therefore, short-term missed work due to personal circumstances is tolerated.

The final project must be submitted. Late submissions are only accepted in special cases, and must be approved by the instructor. Please refer to academic considerations form and longer-term accommodation.

School of Computer Science Laptop Requirement (only applies to on-campus courses)

Every student that has been enrolled in a 1000-level (i.e., first year) course offered is required to have a laptop. This includes COMP1001, COMP1005, and COMP1006. For more information, please visit https://carleton.ca/scs/scs-laptop-requirement/ and then review the requirements at https://carleton.ca/scs/scs-laptop-requirement/laptop-specs/.

Undergraduate Academic Advisors (only for UG course)

The Undergraduate Advisors for the School of Computer Science are available in Room 5302HP; or by email at scs.ug.advisor@cunet.carleton.ca. The undergraduate advisors can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisors will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

Graduate Academic Advisors (only for Grad course)

The Graduate Advisors for the School of Computer Science are available in Room 5302 HP; or by email at grad.scs@carleton.ca. The graduate advisors can assist with understanding your academic audit and the remaining courses required to meet graduation requirements.

SCS Computer Laboratory

Students taking a COMP course can access the SCS computer labs. The lab schedule and location can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/. All SCS computer lab and technical support information can be found at: https://carleton.ca/scs/tech-support/. Technical support staff may be contacted in-person or virtually, see this page for details: https://carleton.ca/scs/tech-support/contact-it-support/.

Mental Health and Wellness

The Carleton Wellness Website is a wonderful resource link to include in the course outline for students.

Academic Accommodations and Regulations

Academic Accommodation

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The accommodation request processes are outlined on the Academic Accommodations website (https://students.carleton.ca/course-outline/).

Chat GPT/Generative AI Usage

- **AI use in this course:** Students may use AI tools for basic word processing and formatting functions, including:
- Grammar and spell checking (e.g., Grammarly, Microsoft Word Editor).
- Basic formatting and design suggestions (e.g., Microsoft Word's formatting tools, PowerPoint Design editor).

Documenting AI use: It is not necessary to document the use of AI for the permitted purposes listed above. If you have questions about a specific use of AI that isn't listed above, please consult your instructor.

Why have I adopted this policy? This policy ensures that student voices and ideas are prioritized and authentically represented, maintaining the integrity of the work produced by students while allowing basic support to enhance clarity, correctness, layout, and flow of ideas. The goal of adopting a limited use of AI is to help students develop foundational skills in writing and critical thinking by practicing substantive content creation without relying on AI support.

Academic Integrity

Misconduct in scholarly activity will not be tolerated and will result in consequences as outlined in Carleton University's Academic Integrity Policy. A list of standard sanctions in the Faculty of Science can be found here.

Additional details about this process can be found on the Faculty of Science Academic Integrity website.

Students are expected to familiarize themselves with and abide by Carleton University's Academic Integrity Policy.

> If you are unsure of the expectations regarding academic Integrity (how to use and cite references, if unauthorized collaboration with lab- or classmates is permitted (and, if so, to what degree), then you must ASK your instructor. Sharing assignment or quiz specifications or posting them online (to sites like Chegg, CourseHero, OneClass, etc.) is ALWAYS considered academic misconduct. You are NEVER permitted to post, share, or upload course materials without explicit permission from your instructor. Academic integrity offences are reported to the office of the Dean of Science. Information, process and penalties for such offences can be found on the ODS webpage: https://science.carleton.ca/students/academic-integrity/.

Student Rights & Responsibilities

Students are expected to act responsibly and engage respectfully with other students and members of the Carleton and the broader community. See the 7 Rights and Responsibilities Policy for details regarding the expectations of non-academic behaviour of students. Those who participate with another student in the commission of an infraction of this Policy will also be held liable for their actions.

Student Concerns

If you have any concerns regarding this course, your first point of contact is me. Please email me or visit during my student hours, and I will do my best to address your concerns. If I cannot resolve the issue, the next point of contact is the School of Computer Science at studentconcerns@scs.carleton.ca. If the concern remains unresolved, the final point of contact is the Office of the Dean of Science at ODScience@carleton.ca. Please follow this order of contact.

Note: You can also bring your concerns to Ombuds services.