EECS3101: Design and Analysis of Algorithms

Section E – Fall 2025

Last Updated: September 3, 2025

Subject to Changes until: Tuesday, September 16

Course Syllabus

1 COURSE POLICIES

To ensure a smooth, fair, and effective in-person delivery of this course:

1. **Team Work Encouraged for Labs/Assignments**: You will receive **full** marks as long as submission attempts are made by the corresponding submission deadlines.

   Your submitted labs/assignments, though awarded **full** marks automatically, will still be graded and given detailed feedback (i.e., compilation and testing results). **The grading results and feedback are intended to exemplify how the actual programming tests will be graded.** Therefore, it would be your best interest in submitting work representing your **true** and **best** attempt.

   The rationales of this policy are that: **1)** you can **rest assured that you will not lose any marks from labs (as long as you submit them by the deadlines)**; and **2) you can just focus on the learning by seeking help from colleagues, TAs, and Jackie without worrying about violating the academic honesty policy**.

   Please do not abuse this policy: **you are still 100% responsible for acquiring the intended understandings and skills from these labs**. Be advised that **later scheduled (written and programming) tests will be based on these labs**, so if you chose **not** to learn the materials responsibly (e.g., relying much on your colleagues, submitting incomplete work and only intending to look at solutions when they are made available), you risk **poor performance** in subsequent tests and the exam.

2. **No Team Work Allowed for Scheduled Tests**: All **written & programming tests** are to be completed **individually** (i.e., **team work is forbidden**).

   When a scheduled test takes place between different lab sessions, until all test sessions conclude, it is considered a **a violation of academic integrity** if you communicate in any way, shape, or form with others about the test(s) already given.

3. **Plagiarism**: When submitting each of your **written tests** and **programming tests**, you claim that it is **solely** your work. It is considered as **a violation of academic integrity** if you copy or share **any** parts of your work (e.g., code, notes) during **any** stage of your development. The instructor and TAs may examine all submissions, and suspicious ones will be reported *immediately* to Lassonde as *a breach of academic integrity*. **We do not tolerate academic dishonesty**.

4. **MEETING LAB/TEST DEADLINES**: **Stringent deadlines** are imposed on all scheduled **written tests** (to be completed and submitted via eClass), as well as scheduled **programming tests** and **labs** (to be submitted via the *web submit* to the EECS server). An in-person **exam** will be scheduled by the registrar office to take place during the **exam period**. It is your responsibility for meeting all deadlines.

5. **LATE ENROLMENT**: Students who are not yet officially registered should assume an eventual successful enrolment into the course and are responsible for: **1)** contacting the section instructor **within Week 1** for course information (e.g., lecture materials, lab assignments access and deadlines); and **2)** attending lectures, submitting lab assignments, and taking scheduled tests in time.

   No lab deadline extensions or deferred tests will be accommodated.

2 Instructor

- Chen-Wei (Jackie) Wang
  - Contact: jackie@eecs.yorku.ca (`https://www.eecs.yorku.ca/~jackie/`)

    Jackie believes that **in-person** communication is the *most effective* for attending to your questions/concerns related course materials and grading. When you receive slow or no responses to your email inquiries, it is most likely an indication that Jackie is happy to help you during his **in-person** office hours and/or appointments.

  - Office Hours:
    - 18:00 – 19:00, Mondays & Wednesdays (**in-person**)
    - by appointments (Zoom or In-Person)

    Campus Office: Lassonde Building, Room 2043 [19, D5 in the Keele campus]
    Virtual Office: `https://yorku.zoom.us/my/jackie.loves.oxford`

3 Venues

- In-Class Lectures
  - 16:00 – 17:30, Mondays & Wednedsays
    LSB 103 (Life Science Building) [C4/90 on the Keele Campus]
- Tutorial
  - 16:00 – 17:30, Fridays
    LSB 106 (Life Science Building) [C4/90 on the Keele Campus]

4 Prerequisites

- **General Prerequisites**: A cumulative grade point average (GPA) of 4.50 or better over all previously completed Major EECS courses. The GPA computation excludes all EECS courses that have a second digit 5, or are Co-Op/PEP courses.
- LE/EECS 2101 3.00 or LE/EECS 2011 3.00; SC/MATH 1090 3.00; SC/MATH 1310 3.00. Course credit exclusion: LE/SC CSE 3101 3.00; LE/DIGT 2102 8.00.

5 eClass Site

https://eclass.yorku.ca/course/view.php?id=141518

6 Study Materials

- There will be no textbooks for this course. Study your instructor's lecture materials:
  - The lectures page:
    https://www.eecs.yorku.ca/~jackie/teaching/lectures/index.html#EECS3101_F25
- If you wish to review OOP in Java, consider the study materials for:
  - EECS2030 (Introductory OOP):
    https://www.eecs.yorku.ca/~jackie/teaching/lectures/index.html#EECS1022_W21
  - EECS2030 (Advanced OOP):
    https://www.eecs.yorku.ca/~jackie/teaching/lectures/index.html#EECS2030_F21
  - EECS2011 (Data Structures):
    https://www.eecs.yorku.ca/~jackie/teaching/lectures/index.html#EECS2011_W22
- Here are some optional reference textbooks:
  - Data Structures and Algorithms in Java, 6th Edition (2014), Wiley
    Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser
  - Introduction to Algorithms, 4th Edition (2022), The MIT Press
    Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein
  - Algorithms, 4th Edition (2011), Addison-Wesley Professional
    Robert Sedgewick, Kevin Wayne [https://algs4.cs.princeton.edu/home/]
  - Algorithm Design (2005), Pearson
    Jon Kleinberg, Eva Tardos

7 Course Description

This course is intended to teach students the fundamental techniques in the design of algorithms and the analysis of their computational complexity. Each of these techniques is applied to a number of widely used and practical problems.

At the end of this course, a student will be able to:

- choose algorithms appropriate for many common computational problems;
- exploit constraints and structure to design efficient algorithms; and
- select appropriate tradeoffs for speed and space.

Weekly three-hour lectures and 1.5-hour scheduled mandatory tutorials.

Topics covered may include:

- a review of fundamental data structures,
- asymptotic notation,
- solving recurrences,
- sorting and order statistics,
- divide-and-conquer approaches,
- dynamic programming,
- greedy method,
- divide-and-conquer algorithms,
- amoritization approaches,
- graph algorithms, and
- the theory of NP-completeness.

8 Course Learning Outcomes (CLOs)

Upon completion of the course, students are expected to be able to:

CLO1 Choose an appropriate algorithm to solve a given computational problem, and justify that choice.

CLO2 Design new algorithms using a variety of techniques (recursion, greedy algorithm, dynamic programming, backtracking).

CLO3 Prove correctness of an algorithm using pre- and post-conditions and loop invariants.

CLO4 Prove bounds on the running time of an algorithm.

CLO5 Apply standard graph algorithms to a variety of problems.

9 Grading Scheme

2 Assignments (2.5% each)	5%
Test 1	20%
Test 2	25%
Final Exam	50%

10 Final Exam: Cumulative & Substantial

- Your final exam will be ***cumulative***: it will cover **all** study materials.
  - It will be an opportunity for you to **continually** *synthesize* topics that are connected.
- Therefore, your final exam will be the **most substantial** grading component.
  - It assesses how competently you can apply the learned concepts and skills.
  - The best preparation is to constantly review and reflect on the covered topics.

11 Mapping Raw Marks to Letter Grades

- For each grading unit, you will receive a **raw mark score** (not necessarily out of 100).
- The **weighted sum** of all grading units will be mapped to its letter grade.
  - Check the common **Grades and Grading Schemes**.
  - e.g., Say there are only two grading units: Exam (60%) and Lab1 (40%). Receiving 150 marks (out of 200) for Exam and 2 marks (out of 3) for Lab1 leads to a letter grade B (based on the weighted sum $\frac{150}{200} \times 60 + \frac{2}{3} \times 40 \approx 71.7$).

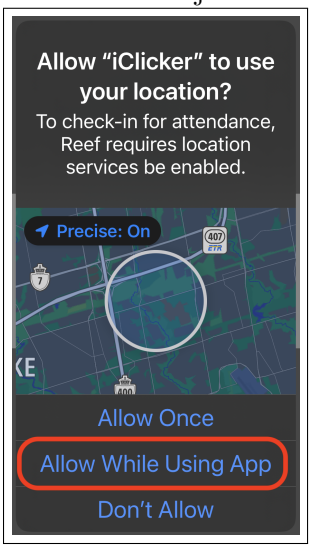
12 Expected Weekly Workload

- Lassonde's recommendation is 3 – 4.5 hours per credit: *9 – 13.5 hours* for a 3.00 course.
- "In-Class" Hours:
  - Weekly Lectures [≈ 3 hours]
    Optional: Office Hours
- "Out-of-Class" Hours:
  - Completing Assignments, Studying for Lectures/Tests [6 to 10.5 hours]
- You may find yourself needing more time to digest the materials and build the skills. The harder you work, the easier you may find in your future career endeavours.

13 ATTENDANCE OF CLASSES

- There are 23 upcoming in-class lectures in total (2 classes × 12 weeks − first class).
- Attending classes (in-time & focused) is an **indispensable** part of your learning.
- Despite it being your responsibility, Jackie would encourage you to attend classes:
  - Attendance will be taken **randomly** (via iClicker).
    ⇒ Attendance will be checked somewhere between every class and every other class.
    In a class where attendance is taken, **one or more checks** may be conducted: your attendance of that class will **not** count if you miss any of the checks.
    For example, if you wait for the first check to occur and choose to leave right afterwards, your attendance will not count as you may miss the subsequent check(s).
    That is, your attendance for a class will count **only if** you complete **all** checks.
  - Each attendance check will be conducted briefly (e.g., for a few minutes) at some time between **5 minutes** after class starts and **5 minutes** before class ends.
  - **No** makeup attendance will be considered if you missed a check because you, e.g.,
    * arrived late
    * left early
    * did not pay attention or was absent when the attendance check took place
  - Please **always** have the iClicker launched on your computer or mobile device:
    * There will be a sign-up sheet to accommodate the **(extremely) rare** occurrences of failed check-ins.
      You will be accommodated to sign on a sheet for **a maximum of 2 classes**.
      ⇒ You are **solely** responsible for resolving any technical issues that caused you to fail checking in via the installed iClicker.
      e.g., see: `https://mhe.my.site.com/iclicker/s/article/How-to-Troubleshoot-Your-Connection-to-the-iClicker-Student-App`
  - Attendance is **not** part of the grading scheme.
    * **No** fixed bonus percentage is awarded.
    * Your attendance record will be used as a reference point.
    * At the end of the semester, if your raw mark (out of 100) is not close (i.e., > 0.5 mark away) to the cutoff of the next letter grade, Jackie **may** exercise discretion in determining your final grade, considering factors such as:
      · performance on the final exam;
      · attendance record; and
      · other evidence of consistent effort and engagement.
    * This discretionary consideration may **not** guarantee any adjustment to the final letter grade.
  - The discretionary scheme does **not** consider **any** excuses for missed attendance checks, **even** legitimate ones (such as illness or family emergency).
    * This is because attendance is **not** a graded component of the course.
    * Rather, it serves only as a broad indicator of presence and engagement.
    * If individual exceptions were granted, the attendance record would no longer serve its purpose as a fair and consistent measure across all students.

- Because attendance is **not** part of the formal grading scheme, a missed class for any reason does **not** have any negative impact upon your grade.
- Instead, attendance is used only as **one** of several possible reference points in borderline cases where discretion is applied (e.g., when a studentâĂŹs raw mark is close to, but not quite at, the cutoff for the next letter grade).
- In other words, missing classes will **not** "cost" you marks, but consistent attendance may strengthen the case for a positive discretionary decision at the end of the semester.
  Therefore:
  * once the attendance-taking window expired, **no** late responses will be accepted;
  * **no** reasons will be considered for missing attendance checks.
- Jackie reserves the right to **cancel** your bonus if, e.g.:
  * you just wait to be taken attendance and leave the class shortly after;
  * you attend classes but cause distractions (e.g., talking, using devices for irrelevant activities) to Jackie and/or to other students.
- What should I do to set up the iClicker for attendance checks?
  * Refer to this starter guide (to install iClicker on your mobile device):
    `https://lthelp.yorku.ca/polling-students/iclicker-student-app-quick-start-guide`
    When creating an iClicker account, be sure to supply your **student number** and **...@my.yorku.ca** email (you are responsible for **not** receiving the bonus if an invalid student number or email is supplied).
  * Ignore the first section "**For Courses using eClass integration**".
  * Follow these sections:
    - "**For Courses not using eClass integration**"
    - "**Add Your Instructor iClicker Course**":
      `EECS3101-E (F'25) - Algorithms`
    - "**Respond to Polls**"
  * When launching iClicker, it is critical that you allow iClicker to use your location; otherwise you will not be able to join the course and take attendance.



14 Semester Calendar

Figure 1 summarizes the schedule of required work items:

- Each (programming or written) test will take place during the scheduled lecture time.
- Specific details for each (programming or written) test will be announced in advance.

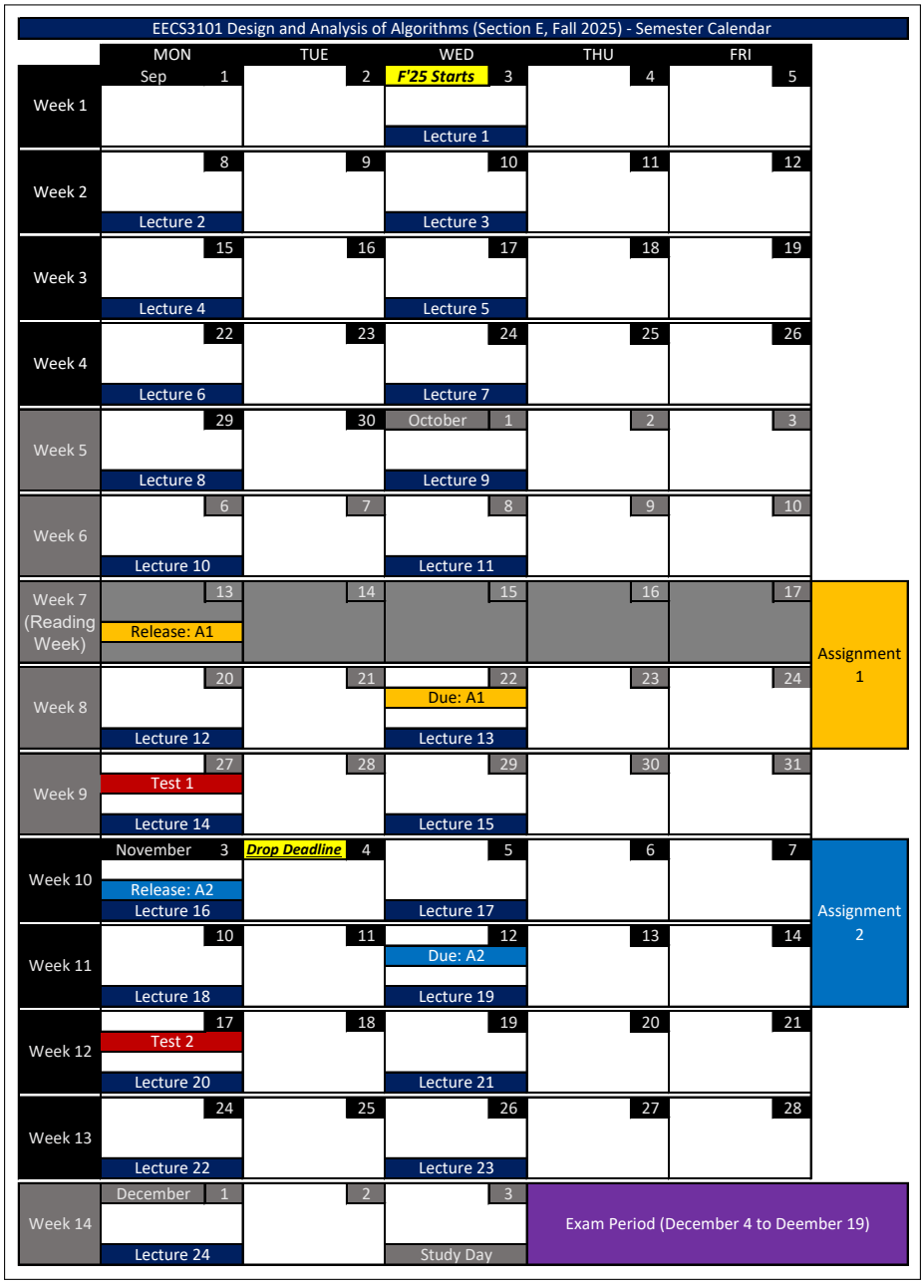


Figure 1: EECS3101-E F25 Semester Calendar – Expected Work Items

15 Weekly Schedule

In the time table below, each cell denotes a 30-minutes interval.

- Cell 8:30 denotes the interval starting at 8:30 and ending at 9:00.
- For example, the in-person office hours (on Mondays and Wednesdays) occupies 2 cells indicates that it lasts for 1 hour (starting at 18:00 and ending at 19:00).

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00					
8:30					
9:00					
9:30					
10:00					
10:30					
11:00					
11:30					
12:00					
12:30					
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16:00	EECS3101 E Lecture LSB 103		EECS3101 E Lecture LSB 103		EECS3101 E Tutorial LSB 106
16:30					
17:00					
17:30					
18:00	Office Hour (In-Person)		Office Hour (In-Person)		
18:30					
19:00					