EECS3342: System Specification and Refinement

Section E – Fall 2025

Grading Scheme Subject to Changes until: Tuesday, September 16, 2025

Last Updated: September 3, 2025

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 **not** be graded. Instead, you are expected to compare your submitted answers to the posted solution sets, and to ask questions in time to clarify doubts. 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 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 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 2030 3.00 or LE/EECS 1030 3.00
- LE/EECS 2011 3.00
- SC/MATH 1090 3.00

3 Instructors

- 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`

4 Venues

- In-Class Lectures
  - 17:30 – 19:00, Tuesdays & Thursdays
    LSB 105 (Life Science Building) [C4/90 on the Keele Campus Map]
- Scheduled Labs
  - Lab 01/02: 13:30 – 14:30, Wednesdays
    LAS 1002/1002B (Lassonde Building) [D5/19 on the Keele Campus Map]
  - Lab 03/04: 14:30 – 15:30, Wednesdays
    LAS 1002/1002B (Lassonde Building) [D5/19 on the Keele Campus Map]

5 eClass Site

– A single site for Section E: https://eclass.yorku.ca/course/view.php?id=141716

6 Study Materials

– The main study materials will be made available on the lectures page:
https://www.eecs.yorku.ca/~jackie/teaching/lectures/index.html#EECS3342_F25

– *Modeling in Event-B* (2010), Cambridge University Press (http://www.event-b.org/)
by Jean-Raymond Abrial

> By agreement with the author, a draft of the book is available for the private use of EECS students at York, and through a valid PPY username/password on the course eClass site. This book draft is copyrighted by the author and may not be distributed in any manner. By logging in and downloading this book draft, you agree to abide by all the copyright conditions. Note that there are errors and typos in the notes. The final text may be purchased by students.

7 Available Help Resources

– Jackie's office hours [regular; request appointments if needed]
– Scheduled lab sessions [attend any of them to ask TA and/or Jackie questions]
– TA office hours [on demand via Zoom; see eClass for TA's contact info]

8 Course Description

This course provides students with an understanding of how to use mathematics (set theory and predicate logic) to specify and design correct computer systems whether the systems are sequential, concurrent or embedded. The course stresses both the underlying theory as well as the ability to use industrial strength tools that can be applied in practice.

User requirements are formalized via an abstract mathematical model that is amenable to formal reasoning long before any programming activity is undertaken (e.g. as done in Event-B, Z and VDM). Successive models are like blueprints in traditional engineering disciplines and their mathematical nature allows us to reason about and predict their safety properties.

9 Course Learning Outcomes (CLOs)

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

CLO1 Document requirements organizing them into appropriate categories such as environmental constraints versus functional properties (safety and progress).

CLO2 Construct high level, abstract mathematical models of a system (consisting of both the system and its environment) amenable to formal reasoning.

CLO3 Apply set theory and predicate logic to express functional and safety properties from the requirements as events, guards, system variants and invariants of a state-event model.

CLO4 Use models to reason about and predict their safety and progress properties.

CLO5 Plan and construct a sequence of refinements from abstract high-level specifications to implemented code.

CLO6 Prove that a concrete system refines an abstract model.

CLO7 Apply the method to a variety of systems such as sequential, concurrent and embedded systems.

CLO8 Use practical tools for constructing and reasoning about the models.

CLO9 Use Hoare Logic and Dijkstra weakest precondition calculus to derive correct designs.

10 Grading Scheme

		Subtotal
5 Labs (1% each)	5%	20%
"Programming" Tests	15%	
Written Test 1	15%	80%
Written Test 2	15%	
Exam (Cumulative)	50%	

11 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.

12 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 $\frac{150}{200} \times 60 + \frac{2}{3} \times 40 \approx 71.7$).

13 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:
  - In-Class Lectures [3 hours]
    Optional: Schedule Labs, Office Hours
- "Out-of-Class" Hours:
  - Completing labs/assignments, Studying for Lectures/Tests [6 to 10.5 hours]
- Given that this is a ***foundational course***, it is **not unreasonable** that you find yourself needing more time to digest the materials and build the skills.

  The harder you work in this course, the easier you may find in subsequent years.

14 Missed Tests

If you missed a scheduled test with a valid reason, you are required to prepare the necessary documents and visit the instructor's office **within two days** after the scheduled test time. We will discuss the alternatives, depending on your situation.

15 Accommodation

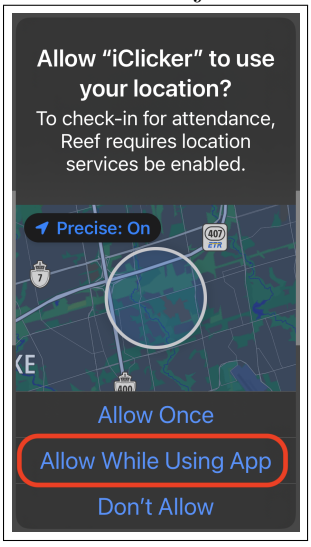
If you are registered with the office of student accessibility services, you are required to visit the instructor's office hour **within the first two weeks** of the semester.

- We will discuss how to best accommodate your need, e.g., test duration.
- The setup required by the in-lab tests is hard to be satisfied by alt centre.
- Instead, we will accommodate your need by having you take tests in an EECS lab.
- If agreed, we will need you to inform the office of this and cancel your test bookings.
- Only the final exam, a written assessemnt, should be written in the alt centre.

16 Attendance of Classes: Encouraged & Rewarding

- 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**":
      `EECS3342-E (F25) - Sys. Specification & Refinement`
    - "**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.



17 SEMESTER CALENDAR

Figure 1 summarizes the schedule of required work items:

- Attend the scheduled in-class lectures.
- All tests take place during the lab sessions you are enrolled in:
  - Specific details for each test (e.g., coverage, start time, duration) will be announced in advance.
  - If no test is scheduled, lab attendance is optional: TAs and/or Jackie will be there to answer your questions related to lab exercises and/or other course materials.
  - When a lab exercise is not allocated any scheduled lab session, please seek help via:
    - Jackie's office hours
    - TA's on-demand Zoom sessions [details sent in due course]

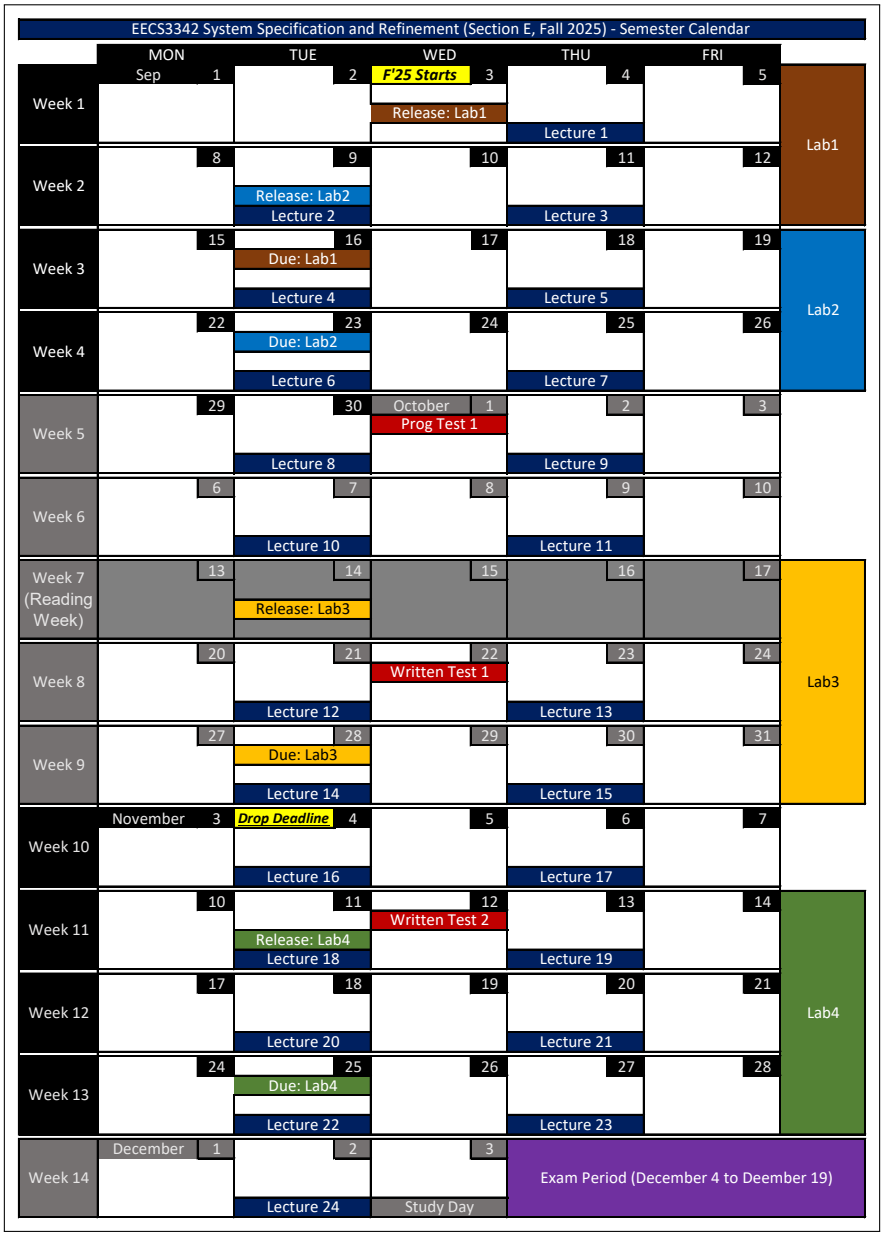


Figure 1: EECS3342-E F25 Semester Calendar – Expected Work Items

18 Coverage of Tests

Tentatively, referencing the semester calendar in Figure 1 (p11):

- "Programming" Test covers Lab1 and Lab2
- Written Test 1 covers Lectures 1 – 11
- Written Test 2 covers Lectures 12 – 17 (plus some earlier lectures)

19 Weekly Schedule

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

- Cell 10:00 denotes the interval starting at 10:00 and ending at 10:30.
- For example, office hours (on Mondays and Wednesdays) start at 18:00 and end 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					
13:00					
13:30			EECS3342 LAB 1/2 (LAS1002/b)		
14:00					
14:30			EECS3342 LAB 3/4 (LAS1002/b)		
15:00					
15:30					
16:00					
16:30					
17:00					
17:30		EECS3342 E Lecture LSB 105		EECS3342 E Lecture LSB 105	
18:00	Office Hour (In-Person)		Office Hour (In-Person)		
18:30					
19:00					

20 (Tentative) Lecture Topics

Whereas the pace will be adjusted according to the class dynamics, the following topics are planned to be covered:

- Review on Math (Predicates, Sets, Relations)
- Reactive Systems: Bridge Controller
- Distributed Systems: FTP Protocol