

EECS4302: COMPILERS AND INTERPRETERS

Section A – Fall 2026

SUBJECT TO CHANGES UNTIL: WEDNESDAY, SEP 23

LAST UPDATED: SEP 9

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1 COURSE POLICIES

1. Labs/Assignments

You will receive **full** marks as long as successful submissions are made by the corresponding **submission deadlines**, which are enforced **strictly**.

Relevant assignments or labs are designed to prepare you for the workflow and skills assessed in the subsequent programming tests. Therefore, it is in your best interest to practise the same **export and submission process** that you will later be expected to complete independently during programming tests, and to submit work that:

- complies with all instructions; and
- represents your **true** and **best** attempt.

These labs/assignments are intentionally designed as **low-stakes learning activities**. As long as you submit successfully by the deadline, you can **focus on learning without worrying about losing marks** while seeking appropriate help from classmates, TAs, Jackie, online resources, and/or Generative AI tools. Specifically, Generative AI may serve as a **supplementary learning resource**, but **not as a substitute for your own intellectual effort**. Using AI to clarify concepts, explore alternative explanations, identify gaps in understanding, or support practice can be valuable. However, you should **not simply ask AI to generate a complete solution or technical artifact for you (e.g., a program, model, specification, or proof)**. Instead, use it, where appropriate, to help you move **one small step forward at a time**. For example, by clarifying an error message, asking you questions about your reasoning, or helping you identify where your understanding may be incomplete.

However, **the responsibility for learning remains entirely yours**. Assistance may help you complete a lab or assignment, but it does **not** replace the need to understand and practise the underlying concepts and skills.

You are expected to inspect, trace, test, modify, and debug your own work. Depending on the course and activity, this may involve stepping through program execution, inspecting variable states, setting breakpoints, and testing edge cases; or examining specifications, models, invariants, refinement steps, proof obligations, failed proofs, and other tool-generated feedback. **These are essential learning experiences for developing the independent reasoning, problem-solving, verification, and debugging skills expected of a competent software professional.** **These are not steps that can be bypassed if you want to develop the independent ability to determine whether a technical artifact is correct, explain why it is correct, and diagnose why it fails when it is not.**

Be advised that the **subsequent programming tests, written tests, and final examination** will assess whether you can demonstrate the corresponding learning outcomes **independently**, without access to any assistance. Accordingly, **relying excessively on external help during labs/assignments without developing your own understanding creates a substantial risk of poor performance on later assessments.**

Use support freely to learn from labs/assignments. Be prepared to demonstrate the learning independently in scheduled assessments.

2. **ASSIGNMENT/TEST DEADLINES**

Stringent deadlines are imposed on all scheduled in-person **written tests**, scheduled in-person **programming tests**, and **labs/assignments** (to be submitted remotely via the *web submit* to the EECS server).

An in-person, written **exam** will be scheduled by the Registrar's office to take place during the **exam period**.

It is your **sole** responsibility to meet all these deadlines.

3. **Test Dates and Locations**

For each test, it is your **sole** responsibility for ensuring that you are available to take the test (during the chosen lecture, tutorial, or lab time of your **enrolled section**).

The exact time and location of each test will be announced at least one week prior to each test.

4. **No Teamwork Allowed for Scheduled Tests**

All **written & programming tests** are to be completed **individually**.

When a scheduled test takes place between different sections, 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.

5. **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.**

6. **Missed Tests**

All programming and written tests are scheduled assessments of **specific course learning outcomes**. In particular, programming tests assess a student's *independent ability* to read specifications, design, construct, and validate correct software artifacts, and test/debug under controlled conditions. Students are expected to write **all tests as scheduled**.

Do not miss a test in order to obtain additional preparation time. The safest and most reliable way to succeed in the course is to **keep up with its pace and complete every assessment as scheduled**. A missed test creates additional academic uncertainty, and academic consideration should not be viewed as a risk-free alternative sitting or an opportunity for extra preparation.

It is your sole responsibility to initiate communication with Jackie promptly.

If you cannot write a test:

- Contact Jackie **no later than the end of the test day**, and explain specifically why you could not write the test as scheduled.
- Supporting documentation is required to **justify any delayed communication**.
- Approval is at Jackie's discretion and is **not automatic**. A late, incomplete, unclear, inconsistent, or inadequately supported request **may be denied**; in that case, the missed test may receive a grade of zero.

- It is the student’s responsibility to provide documentation that is complete, authentic, verifiable, specific to the relevant test period, and sufficient to establish the functional impact of the circumstances.
 - **Merely** reporting that you were ill, stressed, tired, experiencing symptoms, or taking medication does **not** necessarily establish inability to write the test.
 - Jackie will **not** contact physicians, clinics, employers, relatives, or other third parties to obtain missing information on your behalf.

If academic consideration is approved:

- The form of consideration will be determined by Jackie. It may include a makeup test, an alternative assessment, re-weighting where academically appropriate, or another arrangement consistent with the course learning outcomes.
- A makeup is **not a student-selected second sitting**. Its date, time, location, format, and mode will be determined by Jackie. Work, travel, convenience, preparation preferences, and personal scheduling conflicts may **not** be accommodated.
- When a makeup test is scheduled, it will be the **only instructor-arranged makeup opportunity**. You are expected to prioritize attending it. If it is missed, no further instructor-arranged sitting, re-weighting, or alternative assessment should be assumed.
- The makeup or alternative assessment will assess the **same learning outcomes**, but may use substantially different questions, starter code, examples, structure, format, implementation details, or mark distribution. It may also require relevant cumulative prerequisite material covered up to the date of the original test.
- **Any adjustment applied to the regular test will not automatically apply to the makeup or alternative assessment.**

Once a student has commenced a test and received access to its questions, the test will be graded as submitted. Leaving a test early does not automatically create entitlement to another attempt, despite any claim that exceptional circumstances made the student unable to continue.

7. **University-Registered Accommodation**

Visit Jackie’s in-person office hour by the end of Week 2 (**Friday, September 18**).

For each programming or written test, you will write it on an EECS lab machine, set up with the appropriate accommodation. Accordingly:

- cancel bookings of all tests with the alternate exam centre;
- keep your booking of the final exam; and
- discuss with Jackie to confirm the arrangement.

8. **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, labs/assignments access and deadlines); and **2)** attending lectures, submitting labs/assignments, and taking scheduled tests on time.

No requests for lab/assignment deadline extensions or deferred tests due to late enrolment 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* way to address your questions or concerns about course materials and grading. If you receive a delayed response, or no response, to an email inquiry, it is most likely an indication that Jackie would be happy to help you during his **in-person** office hours and/or appointments.

- In-Person Office Hours:
 - * 2 PM to 3 PM on Mondays and Thursdays
- By appointment: Zoom possible, but primarily 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

16:00 – 17:20, Tuesdays & Thursdays

LSB 101 (Life Science Building)

[C4/90 on the Keele Campus]

– **Mode of Lecture Delivery**

- Lectures/tutorials are scheduled and expected to take place **in person** by default.
- You are expected to attend the scheduled in-person lectures/tutorials and are responsible for **all** materials, examples, announcements, and activities covered during those sessions.
- A scheduled lecture/tutorial **may** be moved online or replaced by equivalent online learning materials. Such circumstances may include, but are not limited to, extreme weather, campus closures or disruptions, instructor-related circumstances, technical or room-related issues, or other exceptional situations where an online arrangement is appropriate to preserve **instructional continuity**.
- When a lecture/tutorial is moved online, Jackie will make an announcement in advance whenever possible. The online arrangement may include a synchronous Zoom session or pre-recorded lecture videos, annotated notes, and other learning materials.
- These occasional online arrangements do **not** change the default in-person nature of the course. They are intended to preserve continuity of learning when an in-person session cannot reasonably proceed as scheduled.

Note: Because Jackie teaches EECS3342 **immediately afterward in a different location**, each in-person lecture may conclude approximately **5 to 10 minutes early** to allow sufficient transition/travel time. Any corresponding reduction in in-person instructional time will be compensated through appropriate **asynchronous materials** so that the intended course learning outcomes are fully covered.

4 ECLASS SITE

<https://eclass.yorku.ca/course/view.php?id=158606>

5 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#EECS4302_F26
 - **Lecture digests** will also be posted on the lectures page (look for the **compass icon**). They are designed as **study roadmaps** to help you identify:
 - * the main ideas, examples, and demonstrations from each lecture;
 - * common pitfalls and misconceptions;
 - * what you should be able to do after the lecture; and
 - * what to revisit and practise in the slides, annotated iPad notes, assigned exercises, and example code.
 - The digests are meant to *complement, not replace*, attending lectures, watching recordings, reviewing the posted materials, and doing your own active practice. Their purpose is to help you **organize your review and identify what to revisit**, not to do the learning for you.
 - You do **not** need to study every part of every digest at once. If time is limited, focus first on the sections most useful for your current review, then return to the remaining material later. **Selective use is still much better than not using the digests at all.**
 - If something in a digest seems unclear, technically doubtful, or inconsistent with what you remember from class, return to the corresponding lecture materials or ask me for clarification. The underlying lectures, notes, exercises, and examples remain the primary course materials.
- If you wish to review OOP in Java, consider the study materials for:
 - EECS1022 (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:
 - TITLE: Engineering a Compiler
AUTHOR: Keith D. Cooper & Linda Torczon
PUBLISHER: Morgan Kaufmann Publishers Inc.
EDITION: Second Edition (2012)
ISBN: 978-0-12-088478-0
 - Classic Text (the “dragon” book):
TITLE: Compilers: Principles, Techniques, and Tools
AUTHOR: Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffery D. Ullman
PUBLISHER: Addison-Wesley Longman Publishing Co., Inc.
EDITION: Second Edition (2006)
ISBN: 978-0-321-48681-3

6 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/EECS2001 3.00; LE/EECS2011 3.00

7 COURSE DESCRIPTION

This course covers principles and design techniques for compilers and interpreters, purpose and design of domain-specific languages (DSLs), compiler organization, compiler writing tools, scanning, parsing, semantic analysis, code generation, and if time permitted, run-time storage organization, memory management, and optimization.

This course is a hands-on introduction to the design and construction of compilers and interpreters. The main purpose is to have students acquire the techniques of defining their own languages and implementing tools to suit their own needs. At the end of the course, students will understand the architecture of compilers and interpreters, their major components, how the components interact, and the algorithms and tools that can be used to construct the components.

Students will be assigned a semester-long project divided into phases: e.g., designing the grammar of a domain-specific language, using tools to generate its scanners and parsers, and applying suitable software design patterns (e.g., composite, visitor) to build abstract syntax trees (ASTs) of input programs and to perform semantic operations (e.g., evaluation, type checking, code generations). Generated programs may take different forms: e.g., C code, database schemas/procedures, theorems/functions to a proof assistant, specification language to a model checker.

8 COURSE LEARNING OUTCOMES (CLOs)

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

- CLO1** Compare and contrast General-Purpose Languages (GPLs) and Domain-Specific Languages (DSLs).
- CLO2** Apply the theoretical understanding of, and use the relevant tools to generate, a lexical scanner.
- CLO3** Apply the theoretical understanding of, and use the relevant tools to generate, a grammatical parser.
- CLO4** Construct an abstract syntax tree & perform semantic operations on it.
- CLO5** Communicate the design and implementation of a DSL and its associated tools.

9 GRADING SCHEME

3 Assignments (2% each)	6%
Project	24%
Programming Test	10%
Written Test	10%
Final Exam	50%

10 COURSE EXPECTATIONS & LEARNING PHILOSOPHY

This course is taught with a particular emphasis on foundational reasoning, individual mastery, and professional standards. Students are expected to read the following open letter **carefully and early**, which explains how learning, assessment, and grading are approached in this course:

<https://www.eecs.yorku.ca/~wangcw/teaching/lectures/2026/F/Letter-from-Jackie-Fall-2026.pdf>

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.
 - Refer to the University’s 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 $\frac{150}{200} \times 60 + \frac{2}{3} \times 40 \approx 71.7$).

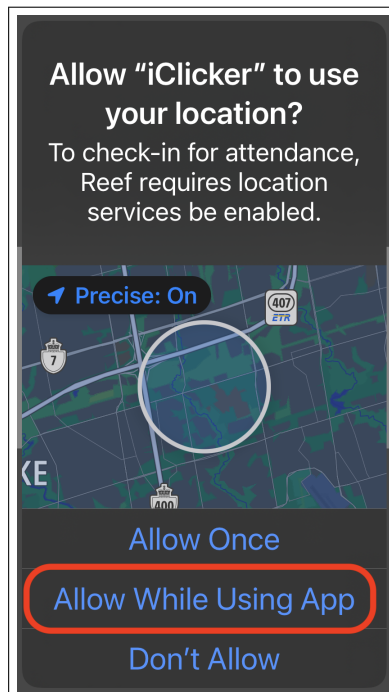
13 EXPECTED WEEKLY WORKLOAD

- 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: Office Hours, Problem Solving Sessions
- “Out-of-Class” Hours:
 - Completing 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 subsequent years and job interviews.

14 ATTENDANCE OF CLASSES

- There are 20+ scheduled in-person lectures in total: see the semester calendar for the scheduled in-person sessions. If the course structure includes scheduled in-person tutorials, the same attendance and engagement expectations apply equally to those sessions.
- Attending in-person sessions (on time & with focus) is **necessary** for your learning.
- While attendance is **your responsibility**, Jackie strongly encourages you to attend **all** in-person sessions.
- Attendance is **not** a graded component of the course.
 - Missing classes will **not** “cost” you marks.
 - **No** fixed bonus percentage is awarded.
 - It serves only as a **coarse indicator of presence**.
 - Your **attendance record** is used only as **one** of several possible **reference points** in borderline cases where *discretion* is considered (e.g., when a student’s raw mark is close to, but not quite at, the cutoff for the next letter grade).
 - **Consistent attendance may strengthen the case for a positive discretionary decision at the end of the semester.**
 - * At the end of the semester, your attendance record may be considered as **one** of several reference points when Jackie exercises discretion in determining the final grade. This may include borderline cases, and, in exceptional circumstances, may also include cases where the raw mark is more than 0.5 mark away from the cutoff for the next letter grade.
 - * This *discretionary* consideration does **not**:
 - guarantee any adjustment to the final letter grade; and
 - involve adjudicating individual excuses, e.g., illness, family emergency.
 - Jackie reserves the right to **invalidate** your attendance records if, e.g.:
 - * you wait only for attendance to be taken 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.
- Attendance will be checked **randomly** (via iClicker):
 - Each 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.
 - * **In a class where attendance is taken, one or more checks may be conducted: your attendance for it will count only if all checks are completed.**
 - * For example, if you wait for the first check to occur and leave right afterwards, your attendance will not count as you may miss the subsequent check(s).
 - **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 mobile phone or computer (Chrome or Safari web browsers recommended):

- * To accommodate the **(extremely) rare** occurrences of a failed check-in, you must approach Jackie **at the end of the same class**.
 - 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>
 - You will be accommodated for **a maximum of 2 classes**.
- 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** being considered for attendance if the student number or email is misplaced or misspelt).
 - Ignore the first section “**For Courses using eClass integration**”.
 - Follow these sections:
 - * “**For Courses not using eClass integration**”
 - * “**Add Your Instructor iClicker Course**”:
 Search “EECS4302-A (F’26) - Compilers & Interpreters”
 - * “**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.



15 IN-PERSON SESSION PROTOCOL

- Jackie’s goal is simple: **protect a focused, respectful classroom.**
- Attending a class is different from attending something that you simply have to attend.
- Lectures are recorded, and slides, annotated notes, lecture digests, and other course materials are available outside the classroom. **If you choose to attend, Jackie assumes that you find being there genuinely valuable for your learning.**
- You do not need to attend merely for the sake of being physically present. But if you do attend, please **be present** by following the rules below to keep the classroom a respectful and focused space for learning.
 - **Avoid side conversations during lecture** — regardless of how quietly you believe you are speaking, side conversations disrupt Jackie’s focus and the class.
 - **Mobile phones are to be put away at all times**, except when instructed to complete an iClicker attendance check.
 - **Headphones are to be put away at all times.**
 - **Laptops are to be used only for course-related purposes.**
 - Using a laptop, tablet, phone, or other device for **unrelated activities** — including, but not limited to,
 - * completing labs or assignments not currently being discussed,
 - * working on material for another course,
 - * watching videos, gaming, messaging, browsing unrelated websites, or using social media —
 is **distracting and disrespectful to the learning environment and to your fellow students who are trying to focus.**
 - If you need to use a device for an urgent personal matter, please step outside the classroom quietly and return when you are ready to focus on the session.
- When these rules are **not** followed, it **distracts** Jackie and your classmates.
 - Jackie will not monitor every student continuously; however, he may intervene when behaviour is disruptive or inconsistent with the expectations stated above.
 - When you are approached, do not argue that “*others were doing the same thing*” or “*I was not doing other things on my laptop*” — **Jackie will address the situation based on his reasonable assessment of the disruption in the moment. That decision is not open to debate during class time.**
 - **This section of the syllabus counts as a general warning.** In some cases, Jackie may give an individual reminder, but he may also directly ask a student to **leave without a further warning.**
 - Refusing to leave only wastes the time of your fellow students who come to focus and learn; if that happens, Jackie may involve **campus security** as a last resort to maintain a safe and focused learning environment.
- Students who choose to come to class deserve a **focused learning environment**. The value of attending in person is precisely the opportunity to be **present, engaged, and focused**, and Jackie’s goal is to protect that opportunity.

16 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.

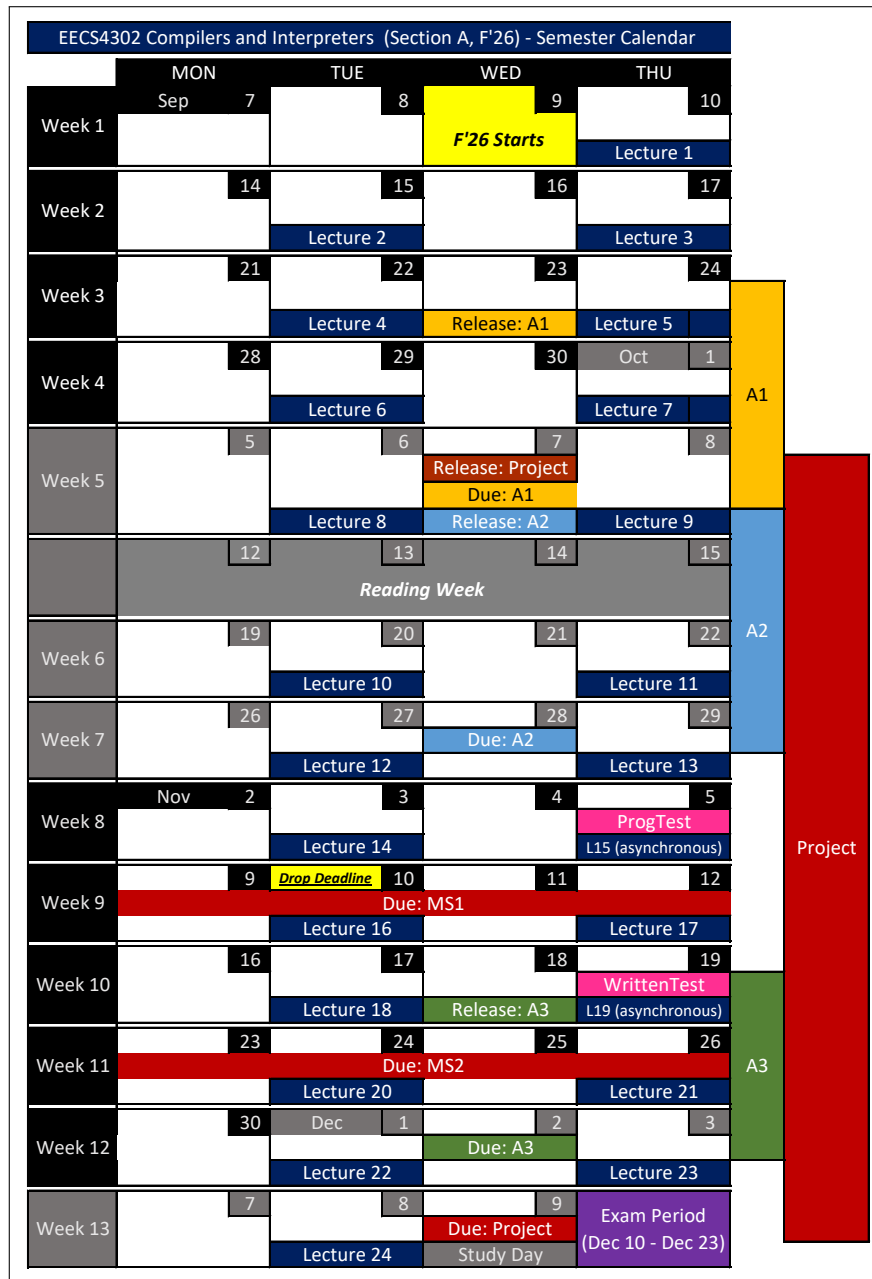


Figure 1: EECS4302-A F26 Semester Calendar – Expected Work Items

17 COVERAGE OF TESTS

Tentatively, referencing the semester calendar in Figure 1 (p13):

- Programming Test covers A2 and the ANTLR4 tutorial (to be assigned before the reading week).
- Written Test covers Lectures 1 – 17

Exact coverage will be specified in the corresponding **test guide** released closer to each test.

18 WEEKLY SCHEDULE

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

	Monday	Tuesday	Wednesday	Thursday
8:30				
9:00				
9:30				
10:00				
10:30				
11:00				
11:30				
12:00				
12:30				
13:00				
13:30				
14:00	In-Person Office Hours			In-Person Office Hours
14:30				
15:00				
15:30				
16:00		EECS4302 A Lecture (LSB 101)		EECS4302 A Lecture (LSB 101)
16:30				
17:00				
17:30				

19 (TENTATIVE) TOPICS TO BE COVERED

- Overview of Compilation
- Lexical Analysis (Scanners)
- Syntax Analysis (Parsers)
- Use of a Parser Generator (ANTLR)
- OOP Design Patterns: Composite & Visitor
- Context-Sensitive Analysis
- Intermediate Representation
- Optimization