



ECE60800 Computational Models and Methods

(Distance Learning Section 002) (3T2020)(CRN 26504)

Instructors

- Irith Pomeranz, *Electrical and Computer Engineering, Purdue University*
- MSEE234, 494-3357, pomeranz@purdue.edu
- Office Hours: Wednesday 3-5pm, Webex <https://purdue.webex.com/join/pomeranz>

Teaching Assistant

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Audience

This course is intended for Purdue Online MSECE Students, and Purdue ECE Graduate Students.

Meeting Time

There are no meetings for these sections.

Accessing Course Content

Students enrolled in the **distance learning** section of this course will access most course content on the edX platform. Students will need to follow the steps below to sign-up for an edX account.

To set up your free edX account:

- 1) Navigate to <https://courses.edx.org/register> .
- 2) Fill out form completely. **Be sure to use your Purdue email when creating the account.**
- 3) Click **Create Account**.
- 4) Look for the confirmation email from edX in your Purdue email inbox.

Students will be able to access course content when the course begins Monday, August 24, 8:00 AM ET (12:00 UTC).

Brightspace Page

TBD

Estimated Effort

- 6 - 7 hours/week
- 15 weeks total

Prerequisites

This course is designed for students who have an undergraduate degree in Electrical and Computer Engineering or Computer Science or related discipline.

Languages

- Content: English | Videos: English | Transcripts: English

Course Difficulty

- Advanced

Catalog Description

Computation models and techniques for the analysis of algorithm complexity. The design and complexity analysis of recursive and non-recursive algorithms for searching, sorting, set operations, graph algorithms, matrix multiplication, polynomial evaluation and FFT calculations. NP-complete problems.

3.000 Credit hours

Course Learning Outcomes

After completing this course, you will be able to:

- Analyze the computational complexity of algorithms for combinatorial problems.
- Design polynomial time algorithms for combinatorial problems when they exist.
- Identify NP-Hard combinatorial problems.
- Provide efficient non-optimal solutions to NP-Hard combinatorial problems

Required Text and Materials

- Cormen, Leiserson, Rivest and Stein, *Introduction to Algorithms*, 2nd or 3rd Edition, The MIT Press.
 - 3rd Edition: Read online or download book: Available within the [Purdue Library System](#).
 - 2nd Edition Users: A list of page changes is available on the *Textbook/Lecture Notes* tab of the course.
- Reference book: Garey and Johnson, *Computers and Intractability, A Guide to the Theory of NP-Completeness*, Freeman, 1979.

Course Structure

- All lectures are available immediately.
- Lecture Notes are provided as PDFs on the *Textbook/Lecture Notes* tab of the edX course and available at each lecture video.
- Weekly Practice Problems will correlate to reading assignments. *These problems have proven highly useful in preparation for graded assessments.*
- Weekly Practice Quizzes are provided as “knowledge checks”. Solutions to each quiz are included and should be used to verify the learner’s results.
- Weekly WebEx Office Hours with Professor Pomeranz will be available on Wednesdays 3:00 – 5:00 PM EDT (19:00 – 21:00 UTC)
 - Use the following link to join the meeting: <https://purdue.webex.com/join/pomeranz>.
 - It is not mandatory to call in.
 - Please use this time to ask any course related questions that are not resolved by the online forum.
 - For a one-on-one discussion please send an e-mail to pomeranz@purdue.edu

Grading Section

This course will be graded based on the following criteria:

Description	% of Final Grade
Proctored, Graded Assessments	100%

- Course grade will be based on thirteen (13) graded assessments.
- All graded assessments are mandatory and necessary for passing the course.
 - Contact the instructor if you absolutely cannot complete the quiz in the 4 days allowed.
 - Make-up quizzes will not be provided. Students will receive a zero (0) for missed quizzes.
- The plus/minus grading system will be used when assigning final grades.

Grading Policy

Letter Grades will be assigned based on the quiz average. When computing the average, all the quizzes have the same weight.

The table below shows an estimate of the correspondence between quiz averages and letter grades. The final table will be adjusted to ensure that the letter grades take into consideration the difficulty of the quizzes.

average grade

>=8.75 A	>=6.50 C+
>=8.50 A-	>=5.50 C
>=8.25 B+	>=5.00 C-
>=7.25 B	>=4.50 D
>=7.00 B-	

Taking Graded Assessment in ECE608

- **Distance learning students** will access the weekly graded assessment in BrightSpace and submit their responses to Gradescope.
- Graded assessments will be proctored using Examity.
- For further information and instructions for Examity, see the *Taking Exams in ECE 608* section on BrightSpace.

Getting Help

- **Technical difficulties:** If you experience technical difficulties with the edX platform, contact edX Support using the [Contact Us](#) form in the Connect section at the bottom of your screen.

- **Course content issues:** If you experience any issues with course content, post your concern or question to the discussion forum.
- For immediate course content related issues, contact Prof. Pomeranz: pomeranz@purdue.edu
- **For general questions** about using the edX platform, we recommend viewing the [edX Demo course](#).
- **Other edX Resources**
 - [Technical Help](#)
 - [Learner Help Center](#)

Discussion Guidelines

- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Keep an “open-mind” and be willing to express even your minority opinion.
- Do not hesitate to ask for feedback.
- Be concise and to the point. Give other students the opportunity to join in the discussion.
- Think and edit before you push the “Post” button.

Academic Guidance in the Event a Student is Quarantined/Isolated

If you become quarantined or isolated at any point in time during the semester, in addition to support from the Protect Purdue Health Center, you will also have access to an Academic Case Manager who can provide you academic support during this time. Your Academic Case Manager can be reached at acmq@purdue.edu and will provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email. Arrangements will be based on your particular situation. The Office of the Dean of Students (odos@purdue.edu) is also available to support you should this situation occur.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either [emailing](#) or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

[The Purdue Honor Pledge](#)

“As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue”

Emergency-Related Issues

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Information about changes in this course will be posted in the course website as well as emailed to the student's address of registration. Students are asked to familiarize themselves with Campus Emergency procedures posted on the Purdue website.

CAPS Information

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack, <https://purdue.welltrack.com/>. Sign in and find information and tools at your fingertips, available to you at any time. If you need support and information about options and resources, please see the Office of the Dean of Students, <http://www.purdue.edu/odos>, for drop-in hours (M-F, 8am-5pm). If you are struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.

Accessibility Support

Purdue University and edX strive to make learning experiences as accessible as possible.

If you anticipate or experience physical or academic barriers based on disability:

- You are welcome to let your instructor know so that you can discuss options.
 - Instructor: Professor Irith Pomeranz at: pomeranz@purdue.edu
 - [edX Accessibility Policy](#)
 - [ProctorTrack Web Accessibility Policy](#)
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Purdue Student Accessibility Resources

- Purdue students are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.
 - [Purdue Disability Resource Center Website](#)
 - [Purdue Web Accessibility Policy](#)
 - [Purdue Equal Access Frequently Asked Questions \(FAQs\)](#)
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For accessibility concerns beyond this, the **Office of Institutional Equity** is responsible for ensuring Americans with Disability Act compliance, can be contacted with any accessibility concerns at:

- Phone: (765) 494-7253
- Email: equity@purdue.edu
- TTY: (765) 496-1343
- [Website](#)

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. [Link to Purdue's nondiscrimination policy statement.](#)

Academic Calendar

<https://www.purdue.edu/registrar/calendars/2020-21-Academic-Calendar.html>

Attendance Policy during COVID-19

Students should stay home and contact the Protect Purdue Health Center (496-INFO) if they feel ill, have any symptoms associated with COVID-19, or suspect they have been exposed to the virus. In the current context of COVID-19, in-person attendance will not be a factor in the final grades, but the student still needs to inform the instructor of any conflict that can be anticipated and will affect the ability to take an exam. Only the instructor can excuse a student from a course requirement or responsibility. When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency conflict, when advance notification to an instructor is not possible, the student should contact the instructor as soon as possible by email or phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases of bereavement, quarantine, or isolation, the student or the student's representative should contact the Office of the Dean of Students via phone at 765-494-1747 or e-mail odod@purdue.edu.

Classroom Guidance Regarding Protect Purdue

The [Protect Purdue Plan](#), which includes the [Protect Purdue Pledge](#), is campus policy and as such all members of the Purdue community must comply with the required health and safety guidelines. Required behaviors in this class include: staying home and contacting the Protect Purdue Health Center (496-INFO) if you feel ill or know you have been exposed to the virus, wearing a mask [in classrooms and campus building](#), at all times (e.g., no eating/drinking in the classroom), disinfecting desk/workspace prior to and after use, maintaining proper social distancing with peers and instructors (including when entering/exiting classrooms), refraining from moving furniture, avoiding shared use of personal items, maintaining robust hygiene (e.g., handwashing, disposal of tissues) prior to, during and after class, and following all safety directions from the instructor.

Students who are not engaging in these behaviors (e.g., wearing a mask) will be offered the opportunity to comply. If non-compliance continues, possible results include instructors asking the student to leave class and instructors dismissing the whole class. Students who do not comply with the required health behaviors are violating the University

Code of Conduct and will be reported to the Dean of Students Office with sanctions ranging from educational requirements to dismissal from the university.

Any student who has substantial reason to believe that another person in a campus room (e.g., classroom) is threatening the safety of others by not complying (e.g., not wearing a mask) may leave the room without consequence. The student is encouraged to report the behavior to and discuss next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#).

Related Considerations:

1. *A listing of recommended safe practices for the specific class or laboratory setting (other PPE or safety behavior) can be found at the links below.*
 - [Overarching SOP for Classrooms, Instructional Laboratories, and Experiential Courses](#)
2. *References Supporting Protect Purdue Compliance:*
 - Office of the Dean of Students [Protect Purdue Compliance Plan: Ask, Offer, Leave, Report](#)
 - Office of the Dean of Students [Managing Classroom Behavior and Expectations](#)

ECE608: Computational Models and Methods
Course Schedule: August 24 – December 5, 2020

	Video Lectures	Reading	Tasks	Graded Assessments
Week 1 August 24 – August 30	L1.1 What This Course is About L1.2 Introduction – Algorithms L1.3 Introduction – Analyzing Algorithms L1.4 Mathematical Foundations I	Ch. 1 Ch. 2 Ch. 3 Ch. 3	Watch all video lectures Read chapter assignments Complete Practice Problem 1 Complete Practice Quiz 1	Distance learning students will access weekly quizzes in BrightSpace and submit to Gradescope within 24 hours of the time the quiz becomes available. Quizzes are proctored using Examity.
Week 2 August 31 - September 6	L1.5 Mathematical Foundations II L2.1 Summations and Recurrences - Summations L2.2 Summations and Recurrences – Recurrences	Ch.3 App. A, Ch.4 Ch. 4	Watch all video lectures Read chapter assignments Complete Practice Problem 2 Complete Practice Quiz 2	Graded Assessment 1 & Graded Assessment 2 Available: Thursday, Sept 3, 12:30 PM ET
Week 3 September 7 – September 13	L3.1 Probabilistic Analysis and Randomized Algorithms L3.2 Sets, Etc.- Sets L3.3 Set, Etc. – Relations L3.4 Sets, Etc. Graphs I	Ch. 5 App. B App. B App. B	Watch all video lectures Read chapter assignments Complete Practice Problem 3 Complete Practice Quiz 3	Graded Assessment 3 Available: Thursday, Sept 10, 12:30PM ET
Week 4 September 14 – September 20	L3.5 Sets, Etc. – Graphs II L3.6 Sets, Etc. – Trees	App. B App. B	Watch all video lectures Read chapter assignments Complete Practice Problem 4 Complete Practice Quiz 4	Graded Assessment 4 Available: Thursday, Sept 17, 12:30 PM ET
Week 5 September 21 – September 27	L4.1 Sorting – Heapsort L4.2 Sorting – Quicksort L4.3 Sorting – Sorting in Linear Time	Ch. 6 Ch. 7 Ch. 8	Watch all video lectures Read chapter assignments Complete Practice Problem 5 Complete Practice Quiz 5	Graded Assessment 5 Available: Thursday, Sept 24, 12:30 PM ET

<p>Week 6 September 28 – October 4</p>	<p>L4.4 Sorting – Medians and Order Statistics L5.1 Data Structures – Linked Lists L5.2 Data Structures – Binary Search Trees, Hash Tables</p>	<p>Ch. 9 Ch. 10 Ch.12, Ch.11</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 6 Complete Practice Quiz 6</p>	<p>Graded Assessment 6 Available: Thursday, Oct 1, 12:30 PM ET</p>
<p>Week 7 October 5 – October 11</p>	<p>L6.1 Elementary Graph Algorithms (BFS) L6.2 Elementary Graph Algorithms (DFS)</p>	<p>Ch. 22 Ch. 22</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 7 Complete Practice Quiz 7</p>	<p>Graded Assessment 7 Available: Thursday, Oct 8, 12:30 PM ET</p>
<p>Week 8 October 12 – October 18</p>	<p>L6.3 Elementary Graph Algorithms (DFS and Applications) L6.4 Elementary Graph Algorithms (DFS and Strongly-Connected Components)</p>	<p>Ch. 22 Ch. 22</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 8 Complete Practice Quiz 8</p>	<p>Graded Assessment 8 Available: Thursday, Oct 15, 12:30 PM ET</p>
<p>Week 9 October 19 – October 25</p>	<p>L7.1 Minimum Spanning Trees L7.2 Minimum Spanning Trees and Greedy Algorithms</p>	<p>Ch. 23 Ch. 16</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 9 Complete Practice Quiz 9</p>	<p>Graded Assessment 9 Available: Thursday, Oct 22, 12:30 PM ET</p>
<p>Week 10 October 26 – November 1</p>	<p>L8.1 Single-Source Shortest Paths I L8.2 Single-Source Shortest Paths II L8.3 Shortest Paths and Dynamic Programming</p>	<p>Ch. 24 Ch. 24 Ch.15, Ch.25</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 10 Complete Practice Quiz 10</p>	<p>Graded Assessment 10 Available: Thursday, Oct 29, 12:30 PM ET Daylight Savings Time Ends: Nov 1, 2:00 AM ET; Turn clocks backward 1 hour</p>

<p style="text-align: center;">Week 11 November 2 – November 8</p>	<p>L9.1 The Theory of NP–Completeness-Definitions I L9.2 The Theory of NP–Completeness-Definitions II</p>	<p>Ch. 34 Ch. 34</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 11 Complete Practice Quiz 11</p>	<p>Graded Assessment 11 Available: Thursday, Nov 5, 12:30 PM ET</p>
<p style="text-align: center;">Week 12 November 9 – November 15</p>	<p>L9.3 The Theory of NP–Completeness-Definitions III and 3-SAT L9.4 The Theory of NP–Completeness-3DM</p>	<p>Ch. 34 Ch. 34</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 12 Complete Practice Quiz 12</p>	<p>Graded Assessment 12 Available: Thursday, Nov 12, 12:30 PM ET</p>
<p style="text-align: center;">Week 13 November 16 – November 22</p>	<p>L9.5 The Theory of NP–Completeness-VC, IS, CLIQUE L9.6 The Theory of NP–Completeness-HP, FVS, FES</p>	<p>Ch. 34 Ch. 34</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 13 Complete Practice Quiz 13</p>	<p>Graded Assessment 13 Available: Thursday, Nov 19, 12:30 PM ET</p>
<p style="text-align: center;">Week 14 November 23 – November 29</p>	<p>Purdue University observes the Thanksgiving Day Holiday. There will be no lectures or assessments assigned during this week.</p>		<p>Enjoy the break!</p>	<p>No Graded Assessment</p>
<p style="text-align: center;">Week 15 November 30 – December 5</p>	<p>L10.1 Maximum Flow I L10.2 Maximum Flow II L10.3 Maximum flow III</p>	<p>Ch. 26 Ch. 26</p>	<p>Watch all video lectures Read chapter assignments Complete Practice Problem 15 Complete Practice Quiz 15</p>	<p>No Graded Assessment Course Closes: December 5, 11:59 PM ET (12/6, 04:59 UTC)</p>