

# Applications of Discrete Structures

COT3100 Section 08A9

**Class:** Online | Asynchronous

**Academic Term:** Spring 2021

## **Instructor:**

Prof. Entezari

Contact by direct messaging in Canvas

Office Hours: MWF 12 – 1pm (EST) via Zoom

## **Teaching Assistant:**

Issac Wang (contact via Canvas)

## **Course Description**

Covers the mathematics of discrete events; i.e., events that involve distinct elements, finite structures of distinct elements or finite sampled versions of continuous phenomena (such as movement). (M) 3 credit hours

The course provides a mathematical training for computer scientists to solve problems of discrete (rather than continuous) nature. Discrete mathematics is fundamental to many branches in computer science: digital computers operate in discrete steps and data is represented in discrete form (i.e., bits). Concepts and terminology learned in discrete mathematics are useful in studying many fields of computer science, such as algorithms, programming languages, cryptography, as well as software development. These concepts are also employed in other disciplines such as operations research and finance.

## **Course Pre-Requisites / Co-Requisites**

Prereq: (MAC 2311 or MAC 3472 with a minimum grade of C) and (COP 3502 or equivalent with a minimum grade of C); Coreq: COP 3504 or COP 3503.

## **Course Objectives**

The purpose of this course is to introduce students to the mathematical techniques required to solve discrete problems with digital computers. Included within the topics of discussion will be: propositional logic, algorithms, time complexity, mathematical reasoning, relations, and trees. Weekly discussion sessions, homework exercises, and problem solving enable you to practice and learn the techniques discussed.

**NOTE:** Due to the nature and complexity of this field of study, the course will be time consuming and requires serious dedication on the part of each student. Be careful not to fall behind, success in this course requires consistent effort and practice.

## **Relation to Program Outcomes (ABET):**

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare,	Medium

as well as global, cultural, social, environmental, and economic factors	
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

### **Required Textbooks and Software**

- *Discrete Mathematics and Its Applications* by Kenneth Rosen, McGraw-Hill Higher Education, 8th Edition (2018).

The textbook comes with McGraw-Hill Connect. Purchasing through the steps provided in MGH\_Connect.pdf will link directly to Canvas.

### **Course Schedule**

Dates	Week	Topics	Readings
Jan 11, 13, 15	1	Logic	1.1-1.3
Jan 20, 22	2	Predicates, Inference	1.4-1.6
Jan 25, 27, 29	3	Proofs, Review	1.7-1.8
Feb 1, 3, 5	4	Exam 1, Sets	2.1-2.2
Feb 8, 10, 12	5	Functions, Sequences	2.3-2.5
Feb 15, 17, 19	6	Algorithms, Review	3.1-3.3
Feb 22, 24, 26	7	Exam 2, Number Theory	4.1-4.3
Mar 1, 3, 5	8	Induction	5.1-5.2
Mar 8, 10, 12	9	Recursion	5.3-5.4
Mar 15, 17, 19	10	Counting	6.1-6.2
Mar 22, 26	11	Counting, Review	6.3-6.4
Mar 29, 31 Apr 2	12	Exam 3, Probability	7.1
Apr 5, 7, 9	13	Probability	7.2-7.3
Apr 12, 14, 16	14	Graphs	10.1-10.5
Apr 19, 21	15	Review, Exam 4 April 21	

Exam Dates: Jan 30-Feb 2, Feb 20-23, Mar 27-30, April 19-21

### ***Online Course Recording***

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

### **Class Expectations, and Make-Up Policy**

Homeworks, Reading Exercises, and Reflection may not be turned in late.

Exams are conducted via ProctorU. You **must** make an appointment in advance for your exam time.

Makeup exams may be requested with a university-approved excuse given in advance. Excused absences must be consistent with university policies in the undergraduate catalog and require appropriate documentation (see <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>).

Grades on any assignment may be discussed with instructor via email or in office hours up to seven days after the grade was released.

### ***Evaluation of Grades***

<b>Assignment</b>	<b>Percentage of Final Grade</b>
Exams (4)	50%
Homeworks (12)	35%
Reading Exercises (12)	10%
Reflection	5%
	100%

### ***Grading Policy***

<b>Percent</b>	<b>Grade</b>	<b>Grade Points</b>
93.0 - 100	A	4.00
90.0 - 92.9	A-	3.67
87.0 - 89.9	B+	3.33
83.0 - 86.9	B	3.00
80.0 - 82.9	B-	2.67
76.0 - 79.9	C+	2.33
73.0 - 76.9	C	2.00
70.0 - 72.9	C-	1.67
66.0 - 69.9	D+	1.33
63.0 - 66.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### ***Students Requiring Accommodations***

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

## **Campus Resources:**

### Health and Wellness

#### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

#### **Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

#### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

### Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** <https://care.dso.ufl.edu>.

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.