

## Programming for Electrical Engineers II

EEL 4930 Section XXXX

**Class Periods:** T 8-9, R 9 AND 134

**Location:** Classroom location

**Academic Term:** Spring 2020

### **Instructor:**

Name: Sandip Ray

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Office Phone Number: +1 (352) 392-1605

Office Hours: TBD BEN 323

### **Teaching Assistant/Peer Mentor/Supervised Teaching Student:**

Please contact through the Canvas website

- Name, email address, office location, office hours
- Name, email address, office location, office hours

### **Course Description**

3 credits- Programming has become an essential component of virtually every aspect of Engineering. However, writing efficient program requires understanding of the underlying foundations, including implementation, manipulation, and analysis of structured data, understanding how algorithms are built on top of such data, and approaches and trade-offs involved between program performance and resource constraints. This course covers the underlying foundations of programming specifically targeted towards Electrical Engineers. It will cover implementation and use of data structures for use in solving programming problems, including queues, trees, tables and graphs. Algorithm development including recursive techniques will be discussed, and several algorithmic techniques (e.g., greedy, dynamic programming, branch and bound) will be presented. The course will include several excursions illustrating the use of these techniques on a variety of Electrical Engineering domains.

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

EEL 3834 Programming for Electrical and Computer Engineers, or equivalent proficiency in programming

### **Course Objectives**

Upon completion of the course, students will:

- Have grasp of fundamentals of data structures and algorithms, e.g., lists, queues, stacks, divide-and-conquer, dynamic programming, etc.
- Be able to assess the impact of data structures and algorithms on program performance
- Have hands-on experience on implementing some of the important data structures and algorithms
- Have experience on the role of various specific data structures in various applications from Electrical Engineering

### **Materials and Supply Fees**

None

### **Professional Component (ABET):**

This course consists of 3 credits of Engineering Science;

### **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 engineering problems by applying principles of engineering, science, and mathematics.	High

2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	High
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Medium
4. An ability to communicate effectively with a range of audiences	Medium
5. 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.	Low
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	High
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	Medium

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

### **Textbooks and Software**

- Mark Allen Weiss: Data Structures and Algorithms in C++ 4<sup>th</sup> Edition, Addison-Wesley (Required)
- Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed. Fundamentals of Data Structures in C, 2<sup>nd</sup> Edition, W. H. Freeman (Recommended)
- Cormen, Leiserson, Rivest, Stein: Introduction to Algorithms 3rd Edition, MIT Press (Optional)

### **Course Schedule (Tentative)**

The course will include theoretical material on data structures and algorithms and excursions that enable the students to dive deeper into specific application areas. Each excursion will be due two weeks after it has been discussed/presented in class, and will involve implementing algorithms involved in the target domain.

Week	Content	Note
1	Course Overview, Introduction to Time Complexity, Basic Data Structures	
2	Sorting Algorithms, Recursion	HW1 Out
3	Stacks, Queues, and Linear Lists	HW1 In
4	Binary Trees	
5	Excursion 1: Circuit Analysis	HW2 Out
6	Matrices	HW2 In
7	Graph and Graph Algorithms	
8	In-class Exam 1	
9	Excursion 2: Embedded Systems	HW3 Out
10	Greedy Algorithms	HW3 In
11	Dynamic Programming	
12	Excursion 3: EDA	HW4 Out
13	Hashing and Compression	HW4 In
14	Search Trees	
15	Branch and Bound	
16	Make-up: Additional Topics	

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

- Excused absences must be consistent with university policies in the graduate catalog (<http://gradcatalog.ufl.edu/content.php?catoid=11&navoid=2486#attendance>) and require appropriate documentation.
- The class is interactive. Feel free to interrupt and ask relevant questions. However, questions not directly related to the topic under discussion or requiring elaborate answers may be relegated to office hours.
- Cell phones may not be used as calculators. Cell phones must be turned off at all times including exams and lectures.
- The communication functions including text messaging on all devices must be turned off during exams.
- Students are not allowed to sell or distribute notes provided for this class.
- All late assignments receive zero credits no matter what the reason. This means students must plan to finish their work before deadline to avoid delays due to “technical difficulties”. Online assignments (on Canvas) will timeout at the deadline and cannot be made up. Canvas gets very busy around common due times, such as midnight, so all assignments will be due at 4 AM for this reason. Emailed assignment will have an arrival timestamp. All emails received after the deadline will be considered late submission.
- The instructor reserves the right to interpret the class policies if confusions occur.

## ***Evaluation of Grades***

<b>Assignment</b>	<b>Total Points</b>
Homework	25%
In-class Exams	20%
Excursions:	30%
Comprehensive Final	25%
<b>TOTAL</b>	<b>100%</b>

## ***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
77.0 – 79.9	C+	2.33
73.0 – 76.9	C	2.00
70.0 – 72.9	C-	1.67
67.0 – 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

The class is not curved. If everyone does well, everyone can get an A.

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 requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure 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.a.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.a.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>.