

## **Computational Thinking**

<b><u>INSTRUCTOR</u></b>	Mojtaba Hosseini, PhD, Assistant Professor <a href="mailto:mojtaba-hosseini@uiowa.edu">mojtaba-hosseini@uiowa.edu</a> , (949) 558-4502 W318 PBB
<b><u>OFFICE HOURS</u></b>	10:30 AM – Noon, T Th, via Zoom <a href="https://uiowa.zoom.us/j/3405351224?omn=92950847312">https://uiowa.zoom.us/j/3405351224?omn=92950847312</a>
<b><u>CLASS MEETING TIMES</u></b>	Section A: M W 11:30 AM – 12:20 PM S207 PBB Section B: M W 12:30 PM – 01:20 PM S107 PBB
<b><u>COURSE SITE</u></b>	To access the course site, log into <a href="https://icon.uiowa.edu/index.shtml">Iowa Courses Online (ICON)</a> <a href="https://icon.uiowa.edu/index.shtml">https://icon.uiowa.edu/index.shtml</a> using your Hawk ID and password. MindTap from Cengage will also be used and accessed via ICON.
<b><u>TEACHING ASSISTANT</u></b>	Omar Amin <a href="mailto:omar-amin@uiowa.edu">omar-amin@uiowa.edu</a>
<b><u>OFFICE HOURS</u></b>	5-6 PM, M W, via Zoom <a href="https://uiowa.zoom.us/j/2439494700?omn=96282344331">https://uiowa.zoom.us/j/2439494700?omn=96282344331</a>
<b><u>ACADEMIC COURSE HOME</u></b>	Tippie College of Business, Business Analytics Department Kang Zhao, PhD, Professor, DEO <a href="mailto:kang-zhao@uiowa.edu">kang-zhao@uiowa.edu</a> , (319) 335-3831

## **Program Goals**

The Tippie College of Business Undergraduate Program has learning goals that drive decisions about curriculum and assignments within courses.

#1: Graduates will use analytical, creative and collaborative approaches to solving complex, ambiguous problems.

#2: Graduates will demonstrate effective written, spoken, and visual communication.

#3: Graduates will obtain global awareness and understanding.

#4: Graduates will demonstrate ethical reasoning.

#5: Graduates will obtain professional preparation.

## **Course Overview and Goals**

Computer programming or coding are considered must-have job skills for many professionals. Programming is a way of thinking about problems and solving them with the use of computers, by learning how to give the computer step-by-step instructions. In this class, we learn to solve problems through programs written in Python. Python is one of the most popular programming languages today. This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions. Specifically, the class will cover: Python Environment, Variables and Operations, Branching & Iteration, Guess and Check/Approximation, Ranges, Lists, Dictionaries, and Functions. Additionally, the course discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques. Students will problem solve, explore real-world software development challenges, and create practical and contemporary applications that accomplish web scraping, simulation, visualization, statistics, image processing, and text analysis. This course has five objectives:

#1: Competency with programming principles and algorithmic thinking.

#2: Competency with Python programming language including error handling.

#3: Competency with Object-oriented programming principles.

#4: Competency with ranges, lists, and dictionaries.

#5: Competency with basic plotting and data visualization.

## **Media/System Requirements**

Technical requirements for completing this class include:

- Student-provided personal computer with reliable Internet access.
- For lecture, students are strongly encouraged to bring a Windows or Mac laptop each time we meet. Laptops will become an essential tool for you to participate in class and complete your assignments.

- For the first few weeks of class, we will have laptop carts brought into class if you do not have one. Depending on demand, we will continue to bring a few STEAD laptops into class to be used. You will have access to the lab computers in the Thursday discussion sections.
- If you need assistive technologies that has different computer and technology requirements, then you will be responsible for making those arrangements. Please check with Student Disability Services: (<https://sds.studentlife.uiowa.edu>) to determine the requirements for specific technologies and for assistance if necessary.
- **When AI is prohibited**. This course assumes that work submitted by students—all process work, drafts, low-stakes writing, final versions, and all other submissions—will be generated by the students themselves, working individually or in groups. This means that the following would be considered violations of academic integrity: a student has another person/entity do the writing of any substantive portion of an assignment for them, which includes hiring a person or a company to write code and/or other assignments, research-based or otherwise, and using artificial intelligence affordances like ChatGPT.

## Textbook/Materials

Fundamentals of Python: First Programs, 3<sup>rd</sup> ed., Kenneth A. Lambert, ISBN 9780357881064 e-book with Cengage© MindTap (Required).

- Visit <https://startstrong.cengage.com/MindTap-canvas-ia-no/> for step-by-step registration instructions on how to access your Cengage\* class materials.
- Cengage.com is the most affordable place to buy Cengage eTextbooks and online learning platforms. Ensure you are purchasing a certified version of your course materials. Learn more at [cengagegroup.com/piracy](https://cengagegroup.com/piracy).
- Need help? Chat with a support representative at [support.cengage.com](https://support.cengage.com) or visit [techcheck.cengage.com](https://techcheck.cengage.com) to see if Cengage is experiencing technical difficulties.

\*Beware of sites selling discounted codes; they are likely unauthorized sellers who have acquired access codes illegally and may pose a risk to your personal information.

You may want to consider purchasing a Cengage Unlimited plan for this class, which provides access to all your Cengage materials for one price. Learn more by visiting [cengage.com/unlimited](https://cengage.com/unlimited)

## Course Work

Students will login to the course site on ICON to access the course materials. For details of the course assignments and activities, see the "Course Work" section of this syllabus. Students are expected to visit the course site regularly:

- To access Cengage© MindTap system and course information.
- To read course announcements, material, and assignments.
- To attend all classes.
- To upload class exercises and assignments.
- To complete exams.
- To monitor scores on ICON Gradebook.

### ICON Direct ~ Cengage MindTap:

I will be teaching this class with electronic content called MindTap from Cengage. MindTap is used extensively in this course, as e-book readings, coding assignments, and exams. By using MindTap via ICON Direct, students have access to the correct material the first day of class, and students pay less for it because of the group discount. You may opt out of this content, but the consequences of doing so will significantly impact your outcome in this course.

## Grading Criteria

Final course grades will be based on the student's performance on the following items.

Activity	Points	Percent
<b>MindTap Practice Exercises</b>	150	15%
<b>Lecture/Lab Participation</b>	100	10%
<b>Group Assignments</b>	150	15%
<b>Lab Quizzes</b>	200	20%
<b>Midterm Exam</b>	150	15%
<b>Final Exam</b>	250	25%
<b>Total Points:</b>	1000	100%:

Final course grades will be assigned based on points earned but will be largely consistent with the recommended grade distribution for a required course in the undergraduate program: 30% As, 40% Bs, 25% Cs, and 5% Ds. When appropriate, +/- designations will be used.

### **MindTap Practice Exercises (15%):**

Our e-book textbook—Kenneth Lambert's *"Fundamentals of Python: First Programs"*—is part of a system called MindTap from Cengage Corporation. This system includes a Sandbox for coding and code assessment. For each unit small coding exercises will be assigned. MindTap will retain the score of your highest submission for each assigned problem in its Gradebook. You can submit a problem as many times as you want to improve your score until the due date passes. MindTap will send grades to the ICON Gradebook. Coding problems will vary in point value. This tool enables quick feedback and helps tremendously to learn how to program, as it enables opportunity for practice and feedback. These are individual assignments. A 20% deduction is applied up to one day after the due date, but after one day, the assignment is not accepted and a zero is scored for no submitted work.

### **Group Assignments (15%):**

Students will work in groups of three to complete four coding assignments with the Spyder Integrated Development Environment (IDE). This is different from MindTap Sandbox, which runs in the cloud. We will cover how to use both Anaconda and Spyder in lab class. Anaconda is a configuration manager tool, while Spyder is a tool used for application development. Student groups must be formed within the same lab section. Students can choose their own partner or ask the TA to place you with a group. These assignments will be hand graded by the TA. An IDE, instead of a Sandbox, is normally used to write code on a client computer to create robust solutions to real-world problems. Each of these assignments will address different situations that require different Python techniques. This will give students broader experience in solving problems with Python code. The assignments will vary in size and point value.

### **Exams (40%):**

There will be two individual exams, one during the semester and one during finals week. The exams predominantly will cover the first and second half of the term. However, the material builds upon itself, so the second exam will include material from the first half of the semester. The first exam will be taken during a lab session (Thursday), and you will have the entire lab time. The second exam will be taken during the assigned final time during finals week. Any electronic or in-person communicating with other people during an exam or violation of any exam rule will be considered a violation of Tippie's Honor Policy, and the student will be given a zero on the exam and the violation reported according to policies. More information on exam format will be provided prior to the exam in class.

### **Lab Quizzes (20%):**

There will be 4-5 lab quizzes where students complete small programming assignments. These are closed book, closed notes and will be completed during lab class. They will consist of a small scenario where the student individually must solve it in 30 minutes.

### **Lab/Lecture Participation (10%):**

There will be questions in the lectures using Socrative. Students will need a web-enabled device to respond. Students should come to lecture prepared on the readings and material to participate. Some questions students will get credit by simply participating, while others to get credit one must get the correct answer. Lecture participation is worth 5% of final course grade.

Attendance is required at lab class. The Teaching Assistant (TA) will take attendance at the beginning of every period. Lab class attendance is worth 5% of the final course grade.

Excused absences will be based on university policies. All attempts should be made to communicate with the TA prior to class about an absence. Final decision on whether an absence is excused will be determined by the Professor, especially if notification comes after a class session is missed.

### **How to Get Help:**

This course has one instructor and one teaching assistant (TA). In general, students should contact the TA for assistance with coding and the Professor for everything else. However, during office hours the Professor will help with coding. Both the TA and Professor have three hours of weekly office hours via Zoom. See Home->Course Information->Instructors on ICON for times and respective zoom links. It is best to come to office hours for individual coding help, as we can better see your screen and help. We will check email during the week and respond within 24 hours. We will check email less often on the weekend and respond within 48 hours (about 2 days).

### **Tutoring:**

Tippie and the University offers tutoring and other resources to help you succeed in this and your other courses. For more information, please visit <https://tippie.uiowa.edu/current-students/undergraduates/academics/advising/academic-support-and-tutoring>.

## Course-Specific Policies and Guidelines

As a registered student in a course through The University of Iowa Tippie College of Business, you are responsible for the course policies posted below.

**Communications:** Primary communication occurs in person during class, but students are expected to also regularly check email and ICON Announcements for Professor and TA communication. Students are responsible for all official correspondence sent through their University of Iowa email address. Students can expect to receive responses to email inquiries within 24-48 hours. Privacy considerations, such as federal law, may apply when using an address other than the standard University e-mail address. Students are encouraged to visit office hours for one-on-one communication.

**Exams:** Students are expected to take the exams at the regularly scheduled times, unless permission has been granted by the instructor at least 2 weeks in advance in writing. All exams are INDIVIDUAL WORK and collaboration on exams is not permitted under any circumstance. All exams are CLOSED BOOK. Use of any materials during the exam is strictly prohibited and will be grounds for a grade of zero on the exam.

**Attendance:** Attendance in all class sessions is expected. However, unforeseen conflicts due occasionally arise. Students are expected to give adequate advance notice of an excused absence, make up the missed work and make every effort to avoid a class conflict. To ensure legitimacy, students may be asked to provide documentation upon request. Short-term illnesses will also be considered as excused absences; however, students are asked to let me know prior to or even the day of the absence why they are not in class. A plan for managing longer-term absences should be discussed with me to determine whether successful completion of the course is possible.

**Late Work:** Because I regard this class as I would any job responsibility, I hold you to strict standards of timeliness and ethics. In this regard, late work is unprofessional and will be penalized. Late assignments are accepted for only 24 hours and a 20% late penalty will be applied. If students have an excused absence, according to Tippie's policies, then students should appropriately communicate and make special arrangements with the TA or Professor.

**Inclement Weather/Class Cancellation:** Although it is our intent to offer every class at its assigned time, on rare occasions there are weather or other emergency events that require that alternative arrangements be made for class delivery. If that happens, please stay alert for an email from me indicating how the class will be handled. This may include: 1) Cancelling the class completely – all reading and work that was due is expected to be completed and turned in on time through ICON; 2); Holding an online version of the class (i.e., via Zoom)– you will receive an email invitation to join the session remotely from a computer with an internet connection – headphones are recommended; 3) using recorded videos and



presenting other materials to you through ICON so we can cover the course materials asynchronously.

**Class Recording Policy:** Some of the sessions in this course may be recorded or live streamed. Such recordings/streaming will only be available to students registered for this class. These recordings are the intellectual property of the faculty, and they may not be shared or reproduced without the explicit, written consent of the faculty member. Further, students may not share these sessions with those not in the class or upload them to any other online environment. Doing so would be a breach of the Code of Student Conduct, and, in some cases, a violation of the Federal Education Rights and Privacy Act (FERPA).

## **Collegiate and University Policies and Guidelines**

The administrative home of this course is the Tippie College of Business, which governs academic matters relating to the course such as the add/drop deadlines, the second-grade-only option, issues concerning academic misconduct, and how credits are applied for various graduation requirements. Different colleges might have different policies.

The Tippie College of Business is committed to providing students with a diverse, inclusive, and equitable environment in which to pursue their education. In addition, Students at Tippie adhere to an honor code that emphasizes the importance of honesty and integrity. Student concerns about this class or your performance in it can be discussed with the instructor or the Associate Dean for Undergraduate Programs. More details about these and other policies are available on the Tippie [website](#).

The University of Iowa is committed to the protection of freedom of speech and the principles of academic and artistic freedom, to accommodating students with disabilities, and to accommodating absences due to religious holidays. In addition, students are expected to comply with the University's Code of Student Life. The University is also committed to non-discrimination and prohibits all forms of sexual harassment, sexual misconduct, and related retaliation. The University also provides resources for student mental health as well as for the basic needs and support of students. More information about these and other policies can be found on the [Provost's Office's website](#).

## **Course Calendar**

This course is organized within the structure of scheduled course work. You must manage your time effectively to complete the course work according to the specified due dates.



Week	Module	To Do
<b>Week 1:</b> <b>1/17 – 1/21</b>	Module 1: Introduction	<ul style="list-style-type: none"> <li>• <a href="https://uiowa.instructure.com/courses/224031/modules/items/7157367">Set up MindTap</a> [https://uiowa.instructure.com/courses/224031/modules/items/7157367]</li> <li>• Start Unit 1 Activities in MindTap – due 1/30 by 11:59 PM</li> </ul>
<b>Week 2:</b> <b>1/22 – 1/28</b>	Module 1: Introduction	<ul style="list-style-type: none"> <li>• Complete Unit 1 Activities in MindTap – 1/30 by 11:59 PM</li> <li>• Begin Unit 2 Activities in MindTap – due 2/6 by 11:59 PM</li> </ul>
<b>Week 3:</b> <b>1/29 – 2/4</b>	Module 2: Data Types & Expressions	<ul style="list-style-type: none"> <li>• Continue Unit 2 Activities in MindTap – due 2/6 by 11:59 PM</li> </ul>
<b>Week 4:</b> <b>2/5 – 2/11</b>	Module 3: Loops and Selection Statements	<ul style="list-style-type: none"> <li>• Complete Unit 2 Activities in MindTap – due 2/6 by 11:59 PM</li> <li>• Lab Quiz #1 in Lab (2/8) over first 2 modules</li> <li>• Start Unit 3 Activities in MindTap – due 2/20 by 11:59 PM</li> </ul>
<b>Week 5:</b> <b>2/12 – 2/18</b>	Module 3: Loops and Selection Statements	<ul style="list-style-type: none"> <li>• Continue Unit 3 Activities in MindTap – due 2/20 by 11:59 PM</li> <li>• Finalize Groups and Start Group Assignment 1 – due 3/7 by 11:59 PM</li> </ul>
<b>Week 6:</b> <b>2/19 – 2/25</b>	Module 4: Strings and Text Files	<ul style="list-style-type: none"> <li>• Complete Unit 3 Activities in MindTap – due 2/20 by 11:59 PM</li> <li>• Start Unit 4 Activities in MindTap – due 3/5 by 11:59 PM</li> <li>• Lab Quiz #2 in Lab (2/22) over Module 3</li> </ul>
<b>Week 7:</b> <b>2/26 – 3/3</b>	Module 5: Lists, Dictionaries, and Other Collection Types	<ul style="list-style-type: none"> <li>• Continue Unit 4 Activities in MindTap – due 3/5 by 11:59 PM</li> <li>• Midterm Exam in Lab (2/29) over Modules 1-4</li> </ul>
<b>Week 8:</b> <b>3/4 – 3/10</b>	Module 5: Lists, Dictionaries, and Other Collection Types	<ul style="list-style-type: none"> <li>• Complete Unit 4 Activities in MindTap – due 3/5 by 11:59 PM</li> <li>• Start Unit 5 Activities in MindTap - due 3/18 by 11:59 PM</li> <li>• Complete Group Assignment 1 – due 3/7 by 11:59 PM</li> </ul>
<b>Spring Break</b>	<b>Spring Break: No Class all week</b>	<ul style="list-style-type: none"> <li>• <b>Nothing Due</b></li> </ul>
<b>Week 9:</b> <b>3/18 – 3/24</b>	Module 6: Design with Functions	<ul style="list-style-type: none"> <li>• Complete Unit 5 Activities in MindTap - due 3/18 by 11:59 PM</li> <li>• Start Unit 6 Activities in MindTap – due 4/1 by 11:59 PM</li> <li>• Lab Quiz #3 in Lab (3/21) over Module 5</li> </ul>

Week	Module	To Do
<b>Week 10: 3/25 – 3/31</b>	Module 7: Data Processing with Pandas	<ul style="list-style-type: none"> <li>Continue Unit 6 Activities in MindTap – due 4/1 by 11:59 PM</li> <li>Start Group Assignment 2 – due 4/8 by 11:59 PM</li> </ul>
<b>Week 11: 4/1 – 4/7</b>	Module 7: Data Processing with Pandas	<ul style="list-style-type: none"> <li>Complete Unit 6 Activities in MindTap – due 4/1 by 11:59 PM</li> <li>Lab Quiz #4 in Lab (4/4) over Module 6</li> </ul>
<b>Week 12: 4/8 – 4/14</b>	Module 8: Data Visualization with Matplotlib	<ul style="list-style-type: none"> <li>Complete Group Assignment 2 – due 4/8 by 11:59 PM</li> </ul>
<b>Week 13: 4/15 – 4/21</b>	Module 9: Scientific Computing with NumPy	<ul style="list-style-type: none"> <li>Start Group Assignment 3 – due 4/29 by 11:59 PM</li> </ul>
<b>Week 14: 4/22 – 4/28</b>	Module 10 (Unit 9 in MindTap): Design with Classes	<ul style="list-style-type: none"> <li>Start Unit 9 Activities in MindTap – due 5/1 by 11:59 PM</li> <li>Lab Quiz #5 in Lab (4/25) over Modules 7,8,9</li> </ul>
<b>Week 15: 4/29 – 5/4</b>	Wrap up	<ul style="list-style-type: none"> <li>Complete Group Assignment 3 – due 4/29 by 11:59 PM</li> <li>Complete Unit 9 Activities in MindTap – due 5/1 by 11:59 PM</li> </ul>
<b>Finals Week</b>	Final Exam room and time (TBD)	<ul style="list-style-type: none"> <li>Final Exam</li> </ul>