# Every Boilermaker Engineer Codes: 101 Entry-Level Programming in Python

Fall 2021

## Course Information

- Course Name: EBEC: 101 – Entry-Level Programming in Python

- Credit hours: 0 (this course will not appear on your transcript)

- Course webpages:

    - Brightspace: https://purdue.brightspace.com/d2l/home/401876
    - Campuswire: https://campuswire.com/c/G442E6951/feed

- Prerequisites: Intermediate Algebra

## Learning Outcomes

Upon successful completion of this course the student should be able to:

- Identify high-level language programming concepts

- Implement computational solutions to engineering problems

- Apply data analysis techniques including reading, writing, and plotting data

- Produce high-quality technical plots

- Design programs using structured programming

- Implement object-oriented programming techniques

# Course Description

This course uses Python to introduce fundamental procedural and object-oriented programming concepts. Amongst the many topics covered are such diverse elements as variables, data structures (lists, tuples, dictionaries, and sets), file handling, decision structures, loops, functions and modules, as well as classes and objects, data attributes, and methods.[1].

# Sections

In-person sections meet once each week (except for university holidays).

| Section | Where | When |
|---------|-------|------|
| 1 | HIKS G980D | Mondays, 1:30 – 2:50 PM |
| 2 | HIKS G980D | Mondays, 3:00 – 4:20 PM |
| 3 | WALC B058 | Thursdays, 3:30 – 4:50 PM |
| 4 | WALC B058 | Thursdays, 5:00 – 6:20 PM |
| 5 | WALC B058 | Thursdays, 6:30 – 7:50 PM |
| 6 | Remote Only | Asynchronous |

# Teaching Team Contact Information

| Sections | Name | Email |
|----------|------|-------|
| 1–6 | Prof. John Cole | jhcole@purdue.edu |
| 1, 3 | Mark Bogdanov | bogdanov@purdue.edu |
| 2, 4, 5 | Thirawat Bureetes | tbureete@purdue.edu |
| 5 | Stephanie Close | closes@purdue.edu |
| 1 | Deep Gada | dgada@purdue.edu |
| 1, 3, 4, 5 | Advait Jawaji | ajawaji@purdue.edu |
| 1, 2, 5 | Darren Lie | lied@purdue.edu |
| 2, 3 | Yue Lin | lin1000@purdue.edu |
| 3, 4 | Carly Mendenhall | cmenden@purdue.edu |
| 2, 3, 4, 5 | Aletea Vanveldhuisen | avanveld@purdue.edu |
| 4 | Minjun Zhang | zhan3624@purdue.edu |

Each section of this course is served by a teaching team that includes one instructor and 4 to 5 Peer Teachers (usually undergraduate teaching assistants). See

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[1]and nice red uniforms

**Contact Info** in the **Start Here** module for more contact information. For answers to administrative questions, contact your instructor.

## Course Format

This course utilizes a flipped classroom model. Lecture videos will be available to view before class. Class sessions will begin with instructor lead discussion, announcements, and Q&A. Then you will use in-class time to work on weekly programming exercises. The instructional team will be available during class to help with understanding course topics and assignments. See the course schedule for details on meeting days, times, and topics.

## How to Succeed in this Course

If you want to be a successful student:

- Be self-motivated and self-disciplined.

- Be willing to seek help if problems arise.

- Be willing and able to commit to 4 to 15 hours per week per course.

- Be able to communicate through writing.

- Be able to meet the minimum requirements for the course.

- Accept critical thinking and decision making as part of the learning process.

In contrast, here are some common behaviors that lead to failing the course.

- Not completing the reading assignments.

- Waiting until the due date to begin programming exercises.

- Forgetting about deadlines.

- Ignoring course communications.

- Lacking familiarity with the grade book and syllabus.

## Learning Resources, Technology, & Texts

Access to the following resources is required to complete this course.

- Brightspace: The course Brightspace page will host the lecture videos, programming exercises and quizzes. A new module will be unlocked each week.

- Campuswire: Course communications, Q&A, and discussions will take place on Campuswire. Add team@campuswiremail.com to your email safelist to make sure important notifications aren't sent to Spam.

- MS Teams: Microsoft Teams will be used to host virtual office hours. Please use your university provided account when joining office hours. You can use access code uahux0x, or this link to join the team.

- Gradescope: Programming exercises will be submitted for grading via Gradescope.

- A personal computer on which you can install software is required.

- Software: Specific installation instructions will be provided.

    - Python 3.8 or newer
    - Atom 1.50 or newer
    - A screenshot utility capable of producing .png images of your screen. The default tool on most systems should work.

- Textbook: Digital access is available FREE from Purdue libraries.

    - *Python Crash Course: a Hands-On, Project-Based Introduction to Programming*, by Eric Matthes
    - Publisher: No Starch Press; 2nd Edition (May, 2019)
    - ISBN-10: 1-59327-928-0
    - ISBN-13: 9781593279288

## Course Logistics

You are encouraged to "mentally enroll" in this course as if it occurred on Monday mornings. In other words, our weeks will run from Monday to Sunday. Each new module, including lecture slides, lecture videos, exercises, and quizzes, will be released on Monday mornings so that when you log in on Monday, you can begin the new week.

### Due Dates

Due dates for all assignments are listed on the course Brightspace page.

- All assignments are due by 10:00 PM EST on the due date listed in the course schedule. This is typically 15 days after being assigned.

- Submissions completed within a 2 hours grace period after the due date will be accepted with 25% penalty.

In general, after the grace period has passed, assignments will not be considered for grading. Each assignment, and all the material necessary to complete it, will be issued at least two weeks prior its due date. As such, emergencies occurring within 1 week prior to the due date are not sufficient to justify an extension. To avoid unnecessary stress, please do not wait until the last minute to complete assignments.

### Virtual Office Hours

Regular virtual office hours are a synchronous live sessions (through MS Teams) to discuss questions related to weekly readings and/or assignments. To connect to a live office hour session, use this link or join the team using code uahux0x. The schedule for virtual office hours will be posted on Brightspace and Campuswire. If requested, virtual one-on-one meetings can by scheduled by appointment.

### Response Times

You can expect responses as follows:

- Campuswire posts: within 24 hours, historical average is less than 1 hour.

- Email: within 3 days

- Assignment grades: within 1 week after due date.

## Grading Scale

Your final grade in this class reflects the sum of your achievement throughout the semester. You will accumulate points in each of the categories described in the assignments portion above, with each assignment graded according to a rubric. At the end of the semester, your final grade will be calculated by adding the percentage of points earned in each category according to that category's percentage weight described above. A certificate of achievement issued by the College of Engineering will be delivered by email to those who achieve a final grade of 70% or higher. Certificates are hosted in perpetuity at engineering.purdue.edu, and may be printed or linked to directly in your resume or on social media.

- Pass: 70% or higher

- Fail: less than 70%

## Assignments and Points

- Homework (50%) - weekly programming exercises (3 to 6 each week)

- Quiz (25%) - weekly multiple choice conceptual quizzes

- Final Project (25%) - a 2 part multi-week programming project

## Netiquette (Network Etiquette)

Your instructor and fellow students wish to foster a welcoming and rewarding online learning environment. As such, you are encouraged to comment, question, or critique an idea, but you must not attack an individual. Our differences, some of which are outlined in the University's nondiscrimination statement, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working together, we can build a polite and respectful learning community. As guidelines in this effort, please abide by the following netiquette rules:

- Be sensitive and reflective of what others are saying. Take a moment to think and edit before you click the post (enter/reply) button.

- Ask for help or feedback when needed, and be willing to express even your minority opinion.

- Give other students the opportunity to join in the discussion (i.e. don't dominate any discussion).

- Present ideas without using offensive language.

- Avoid using abbreviations, acronyms, vernacular and/or slang language. This could lead to misinterpretation.

- Avoid using all caps. It is the equivalent of screaming.

- Avoid outbursts of extreme emotion or opinion (i.e. don't flame).

- Be forgiving. Anyone can make a mistake.

# Course Schedule

| Unit | Topics | Assignments |
| --- | --- | --- |
| 1 | **Introduction to Python:** installing Python, interactive mode, script mode, installing Atom, operators, variables, types, input and output. | Syllabus Quiz, HW 1.1-1.3, Quiz 1 |
| 2 | **Boolean Logic and Decision Structures:** if, if-else, and if-elif-else statements; nested decision structures, AND, OR, NOT logical operators. | HW 2.1-2.5, Quiz 2 |
| 3 | **Repetition Structures:** while loop, for loop; loop structure application such as counters, accumulators, running totals, average, sentinels, and techniques for writing input validation. | HW 3.1-3.4, Quiz 3 |
| 4 | **Functions:** how to call common library functions, how to define and call users' own functions, passing arguments to functions. | HW 4.1-4.5, Quiz 4 |
| 5 | **Turtle Graphics and Review:** drawing graphics and review. | HW 5.1-5.4, Quiz 5 |
| 6 | **Modularization Techniques:** how to import modules and how to create your own modules to organize code. | HW 6.1-6.4, Quiz 6 |
| 7 | **Sequences (mostly Lists and Tuples):** using lists for array-like (one and two-dimensional) operations, such as storing objects in a list, iterating over a list, searching for items in a list. | HW 7.1-7.4, Quiz 7 |
| 8 | **Strings and File IO:** string manipulation, reading data from an input file and writing date to an output file. | HW 8.1-8.6, Quiz 8 |
| 9 | **Dictionaries and Sets:** using dictionaries for table-like data manipulation and set operations including union, intersection, difference, and symmetric difference. | HW 9.1-9.4, Quiz 9 |
| 10 | **Plotting:** Installing matplotlib, plotting line graphs, bar charts, and pie charts. | HW 10.1-10.4, Quiz 10 |
| 11 | **Object-Oriented Programming (OOP):** fundamental concepts of classes and objects such as data attributes, methods, and inheritance. | HW 11.1-11.5, Quiz 11, Final Project |
| 12 | **Concluding Topics:** various additional topics | |

## Attendance Policy

Attendance is not strictly required. However, if space has been reserved for you in an in-person class session, please attend and make use of the help available. To avoid disruption, please arrive on time and prepared to work on the programming exercises. Preparation normally includes completing the assigned reading and watching the topic videos.

If you are sneezing, coughing or potentially contagious – **do not attend class**. Instead stay home and contact the Protect Purdue Health Center (496-INFO).

## Academic Integrity

You are a member of the Purdue community — a community that values integrity. You are expected to be familiar with and to abide by the university policies and procedures. Academic integrity is critically important and is as essential in virtual learning as in traditional classrooms. Your experience in this course depends on the effort you put into the class. Plagiarism and cheating degrade the skills you will develop that will help you succeed.

You are also expected to take and abide by 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.*

Academic dishonesty is defined by Purdue as "cheating, plagiarism, or knowingly furnishing false information to the University." Academic dishonesty includes, but is not limited to the following:

- Collaborating with others, either in-person or online, during a quiz or exam

- Submitting homework obtained from another student

- Allowing someone else to do the work and then submitting it under your own name

- Helping someone else commit academic dishonesty, such as giving them homework to copy or allowing them to cheat from your test paper

- Copying word for word or lifting phrases or special terms from a source or reference without proper attribution (plagiarism)

- Allowing someone else to access your Purdue computer accounts or computer files

- Turning in an exam, quiz, or assignment that has been purchased from a commercial research firm or obtained from the Internet

While discussing homework exercises is encouraged in this course, especially through the provided course discussion tools, all work submitted for this course

should represent your own personal effort and knowledge. Do not copy code, in whole or in part, from other sources. Quizzes are considered open-book and open-notes, you may use slides, videos, notes, reference material and/or test and run Python code while taking a quiz but they must be taken without assistance from other people. Individuals are encouraged to alert university officials to potential breaches of academic integrity by either emailing integrity@purdue.edu 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.

Your exercise submissions will be checked for academic dishonesty. This check will be performed manually and via automated code similarity tools. Students found to be submitting academically dishonest work forfeit their eligibility for a certificate upon completion of the course and may be reported to the Office of the Dean of Students.

**Note:** If you get caught, you may not be notified until the end of the semester.

## 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. Purdue's nondiscrimination policy can be found at https://www.purdue.edu/purdue/ea_eou_statement.php.

## Accessibility

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please discuss options with your instructor. You are also encouraged to contact the Disability Resource Center (contact information below). If you are eligible for academic accommodations because you have a documented disability that will affect your work in this class and/or at an exam, please schedule an online appointment with your instructor as soon as possible to discuss your needs. Prior to the meeting, provide your "Letter of Accommodation" that you obtained from the Disability Resource Center (DRC: drc@purdue.edu or 765-494-1247)so that your instructor and the IST can make proper accommodations for you.

# Emergency Preparation

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 calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted on the course website (Brightspace) or can be obtained by contacting the instructors or TA's via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

Purdue University has an Integrated Emergency Management Plan (IEMP). This plan includes procedures, processes, and plans for responding to an emergency. Visit the https://www.purdue.edu/ehps/emergency_preparedness/ for more information.

When on campus, it is also important to be familiar with the emergency response procedures for your location. Procedures specific to this course's classrooms are below:

**Note:** In any situation, follow instructions from emergency response personnel (police, fire department, etc.) when they are present.

### Emergency

For *any* emergency, call 911 (fire, medical emergency, etc.).

### Fire Alarm or Evacuation

Gather all critical personal belongings and exit the building using the stairs. When exiting the building, do not use the elevator. Once outside the building, stay clear of all emergency vehicles and personnel.

- HIKS G980D: Proceed up the stairs and out of the building. Meet in the emergency assembly area on the south east corner of Hicks on the paved walkway, which is the Union Building side. In case of inclement weather, meet inside the Union on the ground floor on the west side off Starbucks Cafe in the general seating area.

- WALC B058: Proceed up the stairs and exit the building through the northwest doorway. Meet at the southeast corner of the Potter Engineering Center (POTR). In case of inclement weather, meet inside the lounge inside the southeast corner or Potter Engineering Center (POTR).

### Shelter in Place

Could occur due to tornado, accidental release of toxic chemicals, shots fired on campus, etc. Use all communication means available to find out more details about the emergency. Remain in place until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.

**Tornado**

Stay in the classroom. Position yourself away from glass. Be prepared to kneel facing a wall and cover your head.

**Hazardous Materials (HAZMAT) Release**

Remain in or find an unaffected office or work area and close windows and doors.

**Active threat such as a shooting**

Seek a safe location, preferably a room without windows. Lock the door or secure it with barriers.

## Other Situations

The course of action will depend upon the situation.

# Mental Health Statement

- **If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed**, try WellTrack. 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 for drop-in hours (M-F, 8 am- 5 pm).

- **If you're 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 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.

- **If you find yourself struggling to find a healthy balance between academics, social life, stress, etc.** sign up for free one-on-one virtual or in-person sessions with a Purdue Wellness Coach at RecWell. Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at evans240@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, properly wearing a mask in classrooms and campus buildings, at all times (e.g., mask covers nose and mouth, no eating/drinking in the classroom), disinfecting desk/workspace prior to and after use, maintaining appropriate 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.

## Guidance for Quarantine/Isolation

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 or Campuswire. We will make arrangements based on your particular situation. The Office of the Dean of Students is also available to support you should this situation occur.

## Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students from 8:00–5:00, Monday through Friday.

## Material Copyrights

Course materials (lectures, slides, exercises, videos, etc.) are copyrighted or derivatives of copyrighted materials and shall not be sold, bartered, or posted on sites such as Course Hero, Chegg, Quizlet, YouTube, Facebook or other media sources or websites, in whole or in part, without express permission from your instructor.

## Usage of Recordings

Course recordings are made available for students and should only be used for reviewing the content of the class. Course recordings may not be shared in whole or in part outside of this course and shall not be uploaded to any external sites. During remote instruction, to facilitate engagement and interaction, the instructor may at times ask students to turn on their cameras. Any student not wishing to be recorded is not required to turn on their camera. The student is encouraged to reach out to their instructor with any concerns.

## Violent Behavior Policy

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promotes educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity

## Course Evaluation

As we prepare to offer this course in the future, your feedback will be used to guide our efforts at improvement. During the last two weeks of the course, you will be provided with an opportunity to evaluate this course, your instructor, and the teaching assistants. You will receive an email from Qualtrics with a link to the online evaluation survey. It should take less than 10 minutes, and your responses will be collected anonymously. You will have up to two weeks to complete this evaluation. Your participation is greatly appreciated, and your feedback is vital to improving education at Purdue University.

# Disclaimer

All policies stated herein are subject to change at the instructors discretion. If any changes are made, you will be notified through a course announcement.

Table 1: Fall 2021 Course Schedule

| Week Start Day | Days M | T | W | T | F | Exercises Start 12 AM Mon | Due 10 PM Mon | Quizzes Start 12 AM Mon | Due 10 PM Mon | Topics |
|---|---|---|---|---|---|---|---|---|---|---|
| Aug 30 | ▮ | | | ▮ | | 1.1 - 1.3 | | Q0, Q1 | | Introduction to Python |
| Sept 6 | Labor Day | | | | | 2.1 - 2.5 | | Q2 | Q0 | Boolean Logic and Decision Structures |
| Sept 13 | ▮ | | | ▮ | | 3.1 - 3.4 | 1.1 - 1.3 | Q3 | Q1 | Repetition Structures |
| Sept 20 | | | | | | 4.1 - 4.5 | 2.1 - 2.5 | Q4 | Q2 | Functions |
| Sept 27 | ▮ | | | ▮ | | 5.1 - 5.4 | 3.1 - 3.4 | Q5 | Q3 | Turtle Graphics and Review |
| Oct 4 | | | | | | 6.1 - 6.4 | 4.1 - 4.5 | Q6 | Q4 | Modularization Techniques |
| Oct 11 | Oct Break | | | ▮ | | 7.1 - 7.4 | 5.1 - 5.4 | Q7 | Q5 | Sequences |
| Oct 18 | ▮ | | | | | 8.1 - 8.6 | 6.1 - 6.4 | Q8 | Q6 | Strings and File IO |
| Oct 25 | ▮ | | | ▮ | | 9.1 - 9.4 | 7.1 - 7.4 | Q9 | Q7 | Dictionaries and Sets |
| Nov 1 | | | | | | 10.4 - 10.4 | 8.1 - 8.6 | Q10 | Q8 | Plotting |
| Nov 8 | ▮ | | | ▮ | | 11.1 - 11.5 | 9.1 - 9.4 | Q11 | Q9 | Object-Oriented Programming 1 |
| Nov 15 | | | | | | 12.1 - 12.2 | 10.4 - 10.4 | | Q10 | Concluding Topics |
| Nov 22 | ▮ | | Thanksgiving | | | | 11.1 - 11.5 | | Q11 | |
| Nov 29 | | | | ▮ | | | | | | |
| Dec 6 | Dead Week | | | | | | 12.1 - 12.2 | | | |
| Dec 13 | Finals Week | | | | | | | | | |