Computational Meteorology I

Meteorology 227 – Fall 2021

Class meetings: MWF, 9:55 – 10:45 am, 4202 Student Innovation Center (SICTR)

Instructor: Dave Flory
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Office hours: By appointment.

Student Learning Outcomes

- Become familiar with computers and their use in meteorology through self-created software.
- Develop problem-solving skills in a structured language.
- Acquire tools in FORTRAN to solve problems and write code capable of accomplishing a goal.
- Acquire tools in Python to solve problems and write code capable of accomplishing a goal.
- Learn and use a simple program design using a step-by-step approach to develop efficient, modular code.

Texts

- Required: *Introduction to FORTRAN 90*, Nyhoff, Larry, and Leestma, Sanford, Prentice-Hall, Inc., 1999. ISBN-13: 978-0130131461.
- There will not be a Python text. We will use online resources to save you money.

Web Site: http://www.meteor.iastate.edu/classes/mt227

LMS: Canvas (http://canvas.iastate.edu)

Grading

- Exams (4): 15% each (60% total)
- Programs/Quizzes/Worksheets: 40%

Computing Facilities

- All students in this course will be given access to the meteorology computer systems. Students will use Linux based systems to build and compile their FORTRAN programs and web browsers to write and interpret their python code.
- Students will use the GNU FORTRAN compiler to compile their FORTRAN programs. Students interested in using a different compiler and/or editor for the course do so at their own risk.

Course Topics

- Quick introduction to computers and Linux.
- Algorithm development and structured programming approach.
- Programming in FORTRAN 90 to include the following:
    - Data types, expressions, assignment statements, I/O
    - Relational operators, logical operators, conditional statements, and selective execution.
    - Repetitive execution.
    - Functions, modules, and subroutines.
    - Arrays.
    - File Processing.
- Programming in Python to include the following:
    - Data types, arrays, operators, regular expressions
    - Program control
    - File processing
    - Modules and functions
    - Classes
    - Plotting

Assignments

- Worksheets/Exercises: Given out in lecture and usually due the next class period. These are unannounced; therefore, attendance is important.
- Programs: There will be approximately ten programs assigned in this course. The length of time given to accomplish each will depend upon the complexity of the program.
- **Late Penalty:** Programs are due during the beginning of the class meeting on the day the programs are due. A program will be considered late if it is turned in during the lecture or at the end of class. There is **NO LATE TURN-IN POLICY!** If you are not done, turn in what you have done for partial credit.

COVID-19

- Face Masks Encouraged: Because of the continuing COVID-19 pandemic, all students are encouraged—but not required—to wear face masks, consistent with current recommendations from the Centers for Disease Control and Prevention. Further information on the proper use of face masks is available at: https://www.cdc.gov/coronavirus/2019-ncov/your-health/effective-masks.html
    - For more information about this statement, view the memo from August 10, 2021.

- Vaccinations Encouraged: All students are encouraged to receive a vaccination against COVID-19. Multiple locations are available on campus for free, convenient vaccination. Further information is available at: https://web.iastate.edu/safety/updates/covid19/vaccinations Vaccinations may also be obtained from health care providers and pharmacies.

- Physical Distancing Encouraged for Unvaccinated Individuals: Classrooms and other campus spaces are operating at normal capacities, and physical distancing by faculty, staff, students,

and visitors to campus is not required. However, unvaccinated individuals are encouraged to continue to physically distance themselves from others when possible.

Academic Dishonesty

- The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.
- **All programs are to be coded and authored by you.** Discussion between classmates and the instructor are learning tools, but the program, and code should be written by each individual. Collaboration on programs will be considered academic dishonesty.
- If an incident of academic honesty is suspected, the students in question will meet with the instructor to examine the evidence. If academic dishonesty is still suspected, the grade will be divided between those in collusion. The second suspicion of cheating will result in the student being reported to the Dean of Students.
- Academic dishonesty on tests will not receive a warning and will be reported immediately.

Free Expression

Iowa State University supports and upholds the First Amendment protection of freedom of speech and the principle of academic freedom in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Classroom Disruption

At the discretion of the instructor, disruptive conduct includes a single serious incident or persistent conduct that unreasonably interrupts, impedes, obstructs, and/or interferes with the educational process. Disruptive conduct may be physical and/or expressive in nature and may occur in person or in a virtual setting. Examples of disruptive conduct may include, but are not limited to, the following: speaking without being recognized, interrupting, or talking over others; **arrival to class late or leaving early without instructor permission; the use of technology, such as cell phones, computers, or other devices, without instructor permission, particularly in uses unrelated to course content**; creation of loud or distracting noises either carelessly or with intent to disrupt; eating, **sleeping**, or carrying out other personal activities in class that are unrelated to course content without instructor permission; non-protected malicious or harassing or bullying speech or actions directed at instructors or students, such as personal insults, *ad hominem* attacks, name-calling, other abusive or ridiculing comments, or threats; gratuitous use of cursing/expletives or other speech that is not relevant to class discussion; inappropriate physical contact or threats of inappropriate physical contact directed at instructors or students; refusal to comply with instructor's request for appropriate conduct.

Accessibility Statement

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations

will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at www.sas.dso.iastate.edu, by contacting SAS staff by email at accessibility@iastate.edu, or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

Prep Week

This class follows the Iowa State University Prep Week policy as noted in section 10.6.4 of the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook .

Discrimination and Harassment

Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, gender identity, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 3410 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, Hotline 515-294-1222, email eooffice@iastate.edu.

Religious Accommodation

Iowa State University welcomes diversity of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request the reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor may also seek assistance from the Dean of Students Office at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.

Contact Information for Academic Issues

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.