

CS 555

Boston University MET College 2025
Department of Computer Science

Foundations of Machine Learning (CS 555)



General Information

Time & Location: Mon, Wed 6 PM - 9:30 AM

Instructor: Avi Mohan (avimohan@bu.edu)

Office hours (tentative): CS 302 (1010 Commonwealth Ave.) by appointment.

Email subject line: [CS 555 Summer 2025] including square brackets.

Teaching Assistants: Rashanjot Kaur (rashan@bu.edu)

TA Office hours: TBD

Course Website Blackboard Learn: <https://learn.bu.edu>

Required Textbook:

[BBG20] Bruce, P., Bruce, A. and Gedeck, P., 2020. *Practical statistics for data scientists: 50+ essential concepts using R and Python*. O'Reilly Media.

Additional Material

1. [J24] James, Gareth, Daniela Witten, Trevor Hastie, Robert Tibshirani, and Jonathan Taylor. *An Introduction to Statistical Learning: With Applications in Python*. Springer Nature, 2024.
2. [J14] James, Gareth, Daniela Witten, Trevor Hastie, Robert Tibshirani, and Jonathan Taylor. *An Introduction to Statistical Learning: With Applications in R*. Springer Nature, 2024.
3. [EH21] Efron, Bradley. and Hastie, Trevor, 2021. *Computer age statistical inference, student edition: algorithms, evidence, and data science* (Vol. 6). Cambridge University Press.

Books about R programming

4. [LT19] Long, J.D. and Teetor, P., 2019. *R cookbook: proven recipes for data analysis, statistics, and graphics*. O'Reilly Media.
 Link: <https://rc2e.com/>
5. [BB22] Chang, W., 2018. *R graphics cookbook: practical recipes for visualizing data*. O'Reilly Media.
 Online version available for free at: <https://r-graphics.org/>

Prerequisites:

1. CS 544 or equivalent knowledge, or instructor’s consent. This course involves a fair amount of theory, and students will be expected to learn relevant R and Python libraries on their own. Classes will be dedicated to the explanation of theory and homework assignments to test theoretical understanding and Python implementation.

Grading (tentative):

- Class attendance and participation (10%)
- Homework (50%)
 - Students are allowed to collaborate on homeworks (see section on **grading policies** for more details).
 - [Teams of three or fewer](#). Please write the names of your collaborators on the front page of your homework submission.
- One mid-term and a final test (20% each)
 - Students are allowed to bring 1 A4 size sheet to both tests. Apart from that, the tests are **closed book**.
 - Collaborating with anyone on tests is strictly prohibited.

Grading Policies:

1. Late homework submissions will not be accepted.
3. It is forbidden to use any human resource or large language model outside of class (including web-based help services, outside tutors, ChatGPT, Google Bard etc.) in doing your homework.
4. Collaboration in solving homework assignments is acceptable. However:
 - a. Names of collaborator(s) must be provided on top of the submission.
 - b. Each student must provide detailed explanations of his/her solutions expressed in his/her own words. Students must be able to explain their solutions to the instructor, if requested.
 - c. Copying solutions from other students or other sources is strictly unacceptable. Plagiarized solutions will be heavily sanctioned.

Grading Scale:

The final grade, denoted by G, will be a number between 0 and 100. Relative grading will be used. In the worst case, this numerical grade will be converted into a letter grade using the following scale:

Numerical Grade	Letter Grade
$G \geq 90$	A
$85 \leq G < 90$	A-
$80 \leq G < 85$	B+
$75 \leq G < 80$	B
$70 \leq G < 75$	B-
$65 \leq G < 70$	C+
$60 \leq G < 65$	C
$55 \leq G < 60$	C-
$50 \leq G < 55$	D
$G < 50$	F

Laboratories and Homework:

1. Written homework will cover topics such as data science libraries, hypothesis testing, basic data analysis, regression and classification, etc.
2. Students are strongly encouraged to familiarize themselves with using Jupyter Notebooks and bring their machines to class. An introductory tutorial on installing the Anaconda navigator can be found on the Anaconda docs page ([Windows](#)) and ([Mac OS](#)).

Submitting Assignments:

1. All homework (except code) should be submitted via Blackboard as a **pdf file**.
2. To get full points, all uploaded code (.py or .ipynb files) must compile with **no modifications** and produce the desired output.
3. Perfunctory or insufficient commenting, vague variable, function, class names etc. will result in loss of points [if you're defining a function to add two numbers, using `def f1(n1, n2):` is bad nomenclature – the grader should be able to surmise what `f1` does from its name, so a better option would be `def add_float(feature_1, weights_2):`].
4. Students are encouraged to type their assignments. Scanned answers will be accepted only if they are of sufficiently high quality.
5. **After uploading an assignment on Blackboard, please remember to submit the assignment. Otherwise, your assignment will not be available to the grader.**

Academic Misconduct:

BU takes academic integrity *very seriously*. Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own. More information on BU's Academic Conduct Code, with examples, can be found at <https://www.bu.edu/academics/policies/academic-conduct-code/>

Computing Ethics:

BU lab and computing facilities must be used responsibly; misuse by even a few individuals has the potential to disrupt University business or the work of others. You are therefore required to exercise responsible, ethical behavior when using the University's computing facilities. More information on BU's policy on computing ethics, with examples, can be found at <https://www.bu.edu/dos/policies/lifebook/computing-ethics/>

Classroom Conduct:

- Attend class regularly and on time. If arriving late, use back door of classroom.
- **Actively participate**. If some materials require clarification or writing on blackboard is difficult to read, raise your hand.
- Use your laptop only to take notes or participate in class activities. Do not text or surf the Internet during class (students may be requested to leave or move to a back row if this happens).