

Required Materials:

- Text: “An Introduction to Statistical Learning with Applications in R” (**1st Edition**) by James, Witten, Hastie, and Tibshirani. *There is a link on the class page where you can download a PDF copy of the text.*

Software: We will use the R statistical software. R can be downloaded onto your own computer (see the course webpage under ‘resources’) and is available on the computers in the Waterman computing center, labs in the Votey building, and some computers in the library.

Prerequisites: Stat 3210 or 5210.

Course description:

The class will consist of a mixture of lecture, in-class group work, discussion, and projects to highlight particular topics. It would be impossible, however, for these to encompass all of the material for the course. There will be material in the text for which you will be responsible that we will not cover explicitly in class. ***Reading the text ahead of class will be an ongoing assignment and you will submit pre-class notes.***

The course will cover material from the chapters listed below with additional topics as time allows.

Topic	Chapter
Multiple linear regression	3
Classification <ul style="list-style-type: none">- logistic regression- linear & quadratic discriminant analysis- naive bayes- k-nearest neighbors	4
Resampling methods <ul style="list-style-type: none">- cross-validation- bootstrap	5
Decision trees <ul style="list-style-type: none">- classification & regression trees- bagging, boosting, random forests	8
Principal components	10
Model selection & regularization <ul style="list-style-type: none">- subset selection- shrinkage methods (ridge regression & lasso)	6

Assignments & Policies:

Reading the text prior to class will be an ongoing homework assignment throughout the course. Homework assignments will be listed on the class webpage. **Late assignments will not be accepted.**

Be sure to preface the subject of any email related to the course with “STAT 3880:”, otherwise I may not see your email (e.g., STAT 3880: *your subject here*).

Cell phones must be off and away during class. They distract and disrupt those sitting around you

You are encouraged to work together in groups. You will find this especially helpful in learning to use the software. Solutions to homework assignments, however, must be written on your own. This will help to clarify your understanding of the material by ensuring that you have thought through the ideas for yourself. You must note the name(s) of any group partners on the top of any assignment that is a group effort.

Each assignment that you turn should be neat. Be sure to indicate the Assignment # (or name) at the top of the first page along with your name and to follow the directions for the assignment. ***Your grade will be determined in part based on following directions. This includes naming the files that you submit correctly.*** Your grade will be reduced if the work is messy or difficult to read.

Your final grade will be determined by your exams, quizzes, homework, and participation in class discussions according to the following scheme:

Homework & PCN*	15%	*PCN=Pre-Class Notes
ClassWork & Participation	15%	
Short Projects	20%	
Exams/Quizzes	30%	(3/6 and 4/17 +/- one week)
Final Project	20%	

Letter grades will be assigned using standard thresholds - a numerical score of 89% will translate into at least an A-, 79% will translate into at least a B-, 69% will translate into at least a C-, ...

Final: 08-MAY-2025 16:30 – 19:15 **ML SCI 107**

Learning Outcomes:

Upon completing the course, students will be able to: understand the strengths and weaknesses of several machine learning methods, the underlying statistical models, and how they relate to specific research questions; analyze data using these methods.

Recording of Class Sessions

If there is a need to have any remote class sessions, they will be recorded for you to refer back to. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class are agreeing to have their voices recorded.

OTHER REQUIRED SOFTWARE PLATFORMS

Brightspace

I will use Brightspace to post HW solutions and collect HW assignments. I do not plan to post messages or announcements via Brightspace.

Calculator (not an app on your phone)

You will need to bring a scientific calculator to class that has memory storage. We will be using it for classwork in almost every class. You cannot use your phone for computation during classwork or for exams. The only time you will be using your phone during class is to scan and submit daily classwork.

If I see you using your phone during class (other than for submitting classwork), I will ask you to put it away the first time. I will ask you to leave the second time. It is a distraction for you and those sitting near you.

ACADEMIC INTEGRITY

Offences against the **Code of Academic Integrity** are deemed serious and insult the integrity of the entire academic community. This policy addresses plagiarism, fabrication, collusion, and cheating. <https://www.uvm.edu/sites/default/files/UVM-Policies/policies/acadintegrity.pdf> (PDF link).

Any suspected violations of the code are taken very seriously and will be forwarded to the [Center for Student Conduct](#) for further intervention.

Code of Student Conduct: <https://www.uvm.edu/policies/student/studentcode.pdf> (PDF link)

1. Faculty and students will attend all regularly scheduled classes, except for those occasions warranting an excused absence under the University Attendance Policy (e.g., religious, athletic, and medical).
2. Students and faculty will arrive prepared for class and on time, and will remain until the class is dismissed.
3. Faculty and students will treat all members of the learning community with respect.
4. Students and faculty will maintain an appropriate academic climate by refraining from all actions that disrupt the learning environment.

COVID-19 POLICY STATEMENTS

General statement regarding potential changes during the semester:

<http://catalogue.uvm.edu/>

The University of Vermont reserves the right to make changes in the course offerings, mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives.

Green and Gold Promise:

The [Green and Gold Promise](#) clearly articulates the expectations that UVM has for students, faculty, and staff to remain compliant with all COVID-19 recommendations from the federal CDC, the State of Vermont, and the City of Burlington.

The [Code of Student Conduct](#) outlines policies related to violations of the Green and Gold Promise. Sanctions for violations include fines, educational sanctions, parent notification, probation, and suspension.

Intellectual Property Statement/Prohibition on Sharing Academic Materials:

Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments (for example homework or a take-home examination). Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.

STUDENT LEARNING ACCOMMODATIONS

In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Student Accessibility Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Contact SAS: A170 Living/Learning Center: [802-656-7753](tel:802-656-7753) (phone link).

Contact Student Accessibility Services (SAS)

A170 Living/Learning Center

[802-656-7753](tel:802-656-7753) (phone link)

access@uvm.edu (email link)

https://www.uvm.edu/academicsuccess/student_accessibility_services

UVM's policy on disability certification and student support:

<https://www.uvm.edu/policies/student/disability.pdf> (PDF link)

HEALTH AND WELLBEING

The Center for Health & Wellbeing (CHWB) offers a wide range of services to support your mind, body, and soul while you're at UVM. The Student Health Services staff of board certified physicians, physician assistants, nurse practitioners, nurses, and dietitians work with patients and collaborate with other CHWB providers to ensure personalized and timely care to UVM students. Counseling & Psychiatry Services (CAPS) offers short-

term individual counseling, urgent needs counseling, group counseling, outreach and education, psychiatry, referrals, and consultation services.

Please visit their website at: <http://www.uvm.edu/~chwb/> to find out more.

At Living Well they believe that mental and physical health go hand in hand. They have a variety of programs that offer you the space to create a wellness practice that will support your goals and positive intentions. I highly recommend you to visit their LivingWell website at <http://www.uvm.edu/~chwb/livingwell/> and checkout the meditation and yoga videos.

Extensive research has shown the benefits of meditation towards the learning process.

http://www.huffingtonpost.com/2013/04/08/mindfulness-meditation-benefits-health_n_3016045.html

COUNSELING & PSYCHIATRY SERVICES (CAPS)

Phone: (802) 656-3340

If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at <https://www.uvm.edu/deanofstudents>.

Counseling and Psychiatry Services: <https://www.uvm.edu/health/CAPS>

RELIGIOUS HOLIDAY POLICY STATEMENT

Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the first week of classes. You will be permitted to make up work within a mutually agreed-upon time.

GRADING

Your grades will be posted on Bb. Please notify me if you find any mistakes.

For information on grading and GPA calculation, go to the Registrar's page on grading.

<https://www.uvm.edu/registrar/grades> .

GRADE APPEALS

If you would like to contest a grade, please follow the procedures outlined in this policy: <https://www.uvm.edu/policies/student/gradeappeals.pdf> (PDF link)

FERPA RIGHTS DISCLOSURE

The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974. <https://www.uvm.edu/policies/student/ferpa.pdf> (PDF link)

FINAL EXAM POLICY

The University final exam policy outlines expectations during final exams and explains timing and process of examination period. <https://www.uvm.edu/registrar/final-exams>

STATEMENT ON ALCOHOL AND CANNABIS IN THE ACADEMIC ENVIRONMENT

As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

TIPS FOR SUCCESS

- Checklist for success: <https://learn.uvm.edu/about/support-for-students/checklist-online-credit-courses/>

- Academic support for online courses: <https://www.uvm.edu/academicsuccess/online-learning-student-resources-remote-instruction>
- 30-minute webinar on online learning success (Mar 2020): https://www.youtube.com/watch?v=Xp_MYsqQyvE