Michigan Technological University

Course Syllabus

UN 5550 - Introduction to Data Science
Spring 2023

Course Identification

Course Number:	UN 5550
Course Name:	Introduction to Data Science
Course Location:	Rekhi 113
Class Times:	Tuesday and Thursday: 8:00-9:00AM, Lab: Tu 9-10AM
Prerequisites:	Programming proficiency, undergraduate mathematical/statistical knowledge, some database experience

Instructor Information

Instructor:	Suresh Pokharel
Office Location:	Rekhi 321
E-mail:	sureshp@mtu.edu(include UN5550 in
Office Hours:	subject) TBD

Covid-19 Information

General covid-19 information and policy information can be found at `https://www.mtu.edu/flex/`. Questions you may have to this particular class can be found here, with up-to-date information on Canvas.

- **What do I do if I have a positive covid-19 test?**
  Do not come to class. Inform me so we can discuss keeping up with course requirements and assignments.
- **What do I do if I feel sick? have covid-19 symptoms? been in close contact with a person who tested positive?**
  Do not come to class. I encourage you to get tested. Inform me so we can discuss keeping up with course requirements and assignments.
- **What do I do if I am in quarantine?**
  Do not come to class. Inform me so we can discuss keeping up with course requirements and assignments.
- **How do I keep up with class if I am isolated/quarantined?**
  I plan to record lectures and post them on Canvas and make recordings from prior years available if needed.

Course Description

Introduces concepts and skills fundamental to Data Science including: getting data, data wrangling, exploratory data analysis, basic statistics, data visualization, data modeling, and learning. The course introduces data science from different perspectives: computer science, mathematics, business, engineering, and more.

Course Resources

Course Web-site	Canvas – `http://mtu.instructure.edu` Canvas will host all course materials.
Course Text	*Introduction to Data Science: A Python Approach to Concepts, Techniques and Applications*, by L. Igual and S. Segui The textbook is available in the campus library as an e-book for free. `https://col-mtu.primo.exlibrisgroup.com/permalink/01COL_MTU/13nj5id/alma999180694304769`

Course Learning Objectives

Upon successful completion of this course, students will be able to

- Discuss broad perspectives about data science, and how it affects the world around us
- Awareness of tools available to data scientists
- Proficiency using Python and it's packages for data science applications
- Proficiency presenting findings using Jupyter notebooks
- Proficiency in data management: getting data, cleaning data, dealing with missing data, dimension reduction, exploratory analysis
- Appreciation for machine learning: regression, classification and clustering

Topic Coverage

A tentative list of topics to be covered are listed below. A more detailed schedule will be available on Canvas and will be updated to reflect the pace of the class.

- Introduction to Python / Python packages
- Exploratory / Descriptive Statistics
- Inferential Statistics
- Data Processing: Getting Data
- Regular Expressions
- Relational Algebra + SQL
- Unsupervised Learning
- Supervised Learning
- Regression Analysis
- Dimensionality Reduction
- Additional Topics

Grading Scheme

Grading Policy

Scores will be kept in Canvas. Grades will be calculated as a percentage of points received weighted for each part of the course:

Course Component	Perc.
Projects	70%
Lab Exercises	20%
Class Participation, Quizzes, Discussion	10%

Grade Changes

Project assignments should be graded and returned to you within about 7-10 days. Any request for regrades should be made in writing (e-mail or through a Canvas message is fine) to the instructor within one week of returning the material. No grade changes will be made after that point except in the case of an arithmetic error in summing points or the grade was recorded incorrectly in the grade book.

Grading System

Your final score will determine your letter grade.

Letter Grade	Score	Grade points	Rating
A	>93%	4.0	Excellent
AB	[88% – 93%)	3.5	Very Good
B	[83% – 88%)	3.0	Good
BC	[78% – 83%)	2.5	Above Average
C	[73% – 78%)	2.0	Average
CD	[68% – 73%)	1.5	Below average
D	[60% – 68%)	1.0	Inferior
F	<60%	0.0	Failure
I	Incomplete; used when a student is unable to complete a segment of the course because of circumstances beyond the student's control.		
X	Conditional, with no grade points per credit; given only when the student is at fault in failing to complete a minor segment of a course, but in the judgment of the instructor does not need to repeat the course. It must be made up by the close of the next semester or the grade becomes a failure (F). A (X) grade is included in the grade point average calculation as a (F) grade.		

Graded Course Components

Class Participation, Quizzes, Discussion

This is a graduate level class where class discussion is expected. Part of your grade includes attendance and participation. Quizzes and discussions may be given to assess your understanding of the topics.

Project Assignments

There will be ∼6-7 project assignments to be completed throughout the semester.

- Each student is expected to create and turn-in their own solution by 11:59pm on the due date listed.
- Assignments should be completed in the file format requested in the assignment description.
- Use of any sources other than the textbook, slides, and resources posted on Canvas should be acknowledged.
- Your work should be neat, legible, formatted well, and follow examples given in class.
- It is your responsibility to ensure the correct assignment/version is uploaded in the correct file format. Late penalties will apply until this is done.

Late Policy
All late submissions will receive a grade of zero with the following exceptions:

- Each student has **8 Project Assignment late days** to be used in the semester.
  - For any given assignment, you can use a maximum of 2 late days.
  - Each late day used allows an assignment to be turned in a day late without penalty. For example, an assignment due Monday may be turned in on Wednesday, using 2 late days, or an assignment due on Friday may be turned in on Saturday, using 1 late day.
  - After using all your late days, submissions will receive a grade of zero.
- Technology issues unless they are campus or city-wide are not to be used as an excuse for late work.
- Excused absences planned and known in advance, should have projects submitted ahead of time.

The policy is set to account for routine illness, travel, or assignments due in other courses. No other late assignments will be accepted unless a prior arrangement is made with me or I receive an excuse from the Dean of Students office.

Lab Exercises

There will be Lab exercises assigned about 1 per week. The lab exercises will contain additional reading paired with code examples where students can gain practical knowledge and application.

- The Lab exercises will be due by 11:59pm on the due date listed and must be submitted in the format specified.

- You will be working in pairs (or groups of three) for the lab exercises.
- It is your responsibility to ensure the correct assignment/version is uploaded in the correct file format. Late penalties will apply until this is done.
- Lab exercises are low stakes assignments, where the lowest 2 scores will be dropped.

Late Policy
All late lab submissions will receive a 2% reduction in score for each hour late.

Collaboration and Cheating

Adapted from CMU's Center for Teaching Excellence & Educational Innovation
Project Assignments:
Students are encouraged to work together to understand the material of this course, but not produce project assignment solutions.

Here are some examples of acceptable collaboration:

- Clarifying ambiguities or vague points in class handouts, textbooks, or lectures.
- Discussing or explaining the general class material.
- Providing assistance with Python, in using the system facilities, or with editing, debugging, and Python tools.
- Discussing the code that we give out on the assignment.
- Discussing the assignment questions to better understand them.
- Getting help from anyone concerning programming issues which are clearly more general than the specific assignment (e.g., what does a particular error message mean?).

Examples of unacceptable collaboration and academic misconduct are:

- Copying (program or assignment) files from another person or source, including retyping their files, changing variable names, copying code without explicit citation from previously published works (except the textbook), etc.
- Allowing someone else to copy your code or written assignment, either in draft or final form.
- Writing, using, or submitting a program that attempts to alter or erase grading information or otherwise compromise security.
- Looking at someone else's files containing draft solutions, even if the file permissions are incorrectly set to allow it.
- Receiving help from students who have taken the course in previous years.
- Lying to course staff.
- Reviewing any course materials (or software) from previous years.

Collaboration must stop short of copying answers.

Assignment submissions will be checked using software to detect cheating. Any violations will be reported to the Dean of Students and Office of Student Affairs.

Getting Assistance:
If you have questions on the course, I ask you to consider the following options:

- Stop by the instructor's office hours
- Email the instructor a clear and detailed question
- Schedule a meeting with the instructor
- Post a general question to the discussion page (note, your question should be something like, "I don't understand concept X" or "Within problem Y we need to use the definition of Z, can you help explain this again". Questions should not be "how do I solve problem X" and "what's the answer to problem Y")

Academic Misconduct:
Academic misconduct in any form will not be tolerated. **Evidence of misconduct will result in zero credit for the assignment, drop in one final course grade, and notification with the Office of Academic and Community Conduct.** Further evidence will result in immediate failure of the course and again reporting of the misconduct to the University.

For more details on academic integrity, please review the Academic Integrity Policy of Michigan Tech `http://www.admin.mtu.edu/usenate/policies/p109-1.htm`.

Course Policies

The instructor will conduct this class in an atmosphere of mutual respect. We are all members of an academic community where it is our shared responsibility to cultivate a climate where all students/individuals are valued and where both they and their ideas are treated with respect. You should expect that if your conduct during class seriously disrupts the atmosphere of mutual respect expected in this class, you would not be permitted to participate further.

We live in a connected, fast-paced world. As a result, many of us are expected to be reachable at virtually any time. I strongly advise you to abstain from using your cellphones during class for texting and interacting on social media. If you need to use a cell phone during class, even to text, please step out into the hall.

The course will be run in a computer lab, and we will make use of the computers in most class periods. However, when not you not expected to be working directly, e.g., when new topics are presented, please refrain from using the computer other than to take notes. Class time is not a time for you to work on other course's assignments, play a game, surf the web, or be disruptful to your fellow students. In summary, be respectful to your classmates and instructor.

University Policies

Academic Integrity
Academic regulations and procedures are governed by University policy. Academic misconduct cases will be handled in accordance the University's policies.
`http://www.mtu.edu/conduct/integrity-center/students/`
`https://www.mtu.edu/senate/policies-procedures/list-policies/109.1/`

Assessment Statement
Student work products (exams, essays, projects, etc.) may be used for purposes of university, program, or course assessment. All work used for assessment purposes will not include any individual student identification.
https://www.mtu.edu/senate/policies-procedures/list-policies/312.1/

Disability Services
If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see me as soon as possible so that we can make appropriate arrangements.

Any student requiring accommodations due to a documented disability must provide the instructor of the course notification of needed accommodations no later than five business days prior to the use of the accommodations. In situations where fewer than five days' notice is given, the instructor is encouraged, but not obligated, to provide accommodations. The instructor will determine, in consultation with the Testing Center in the Jackson Center for Teaching and Learning, whether these accommodations can be met.
https://www.mtu.edu/success/disability/

Institutional Equity and Inclusion:
The Office of Institutional Equity has asked that you be made aware of the following:

Michigan Technological University complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990.

Michigan Tech has a policy of affording equal opportunity to all of its employees, students, applicants for employment, and applicants for admission without regard to race, religion, color, national origin, age, sex, sexual orientation, gender identity, height, weight, genetic information, or marital status, disabled veteran status, veteran status, or disability. http://www.mtu.edu/equity/

Mental Health
Michigan Tech 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 support, services are available. For help or to find additional resources, contact Counseling Services at 906-487-2538 or visit the Counseling Services website, http://www.mtu.edu/counseling.

Veterans / Military
Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, disabilities) are welcomed and encouraged to communicate these, in advance if possible, to their instructor(s).
https://www.mtu.edu/registrar/students/veterans/

Equal Opportunity, Discrimination, or Harassment Statement
https://www.mtu.edu/bot/governance/policies/chapter5/sections/5.01-5.05.html
For other concerns about discrimination, you may contact your advisor, Chair/Dean of your academic unit, Dean of Students Office at 487-2212 or The Office of Institutional Equity at 487-3310.