



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

SCHOOL OF
INFORMATION SCIENCES

INSC 486 – Data Analytics

COURSE INFORMATION

INSC 486, Spring, 2021, 3 Credit Hours

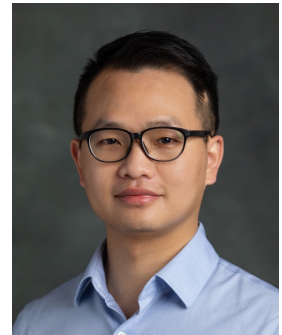
Course Mode: On-campus

Place: AAB-325

Days and Time: TR, 11:30AM-12:45PM

Faculty Contact Information

- Jiangen He, Ph.D., Assistant Professor
- He/His/Him
- Email: jiangen@utk.edu
- Personal Website: <http://www.jiangehe.com>
- Office hours:
 - Tuesday and Thursday 1:00 pm to 2:30 pm
 - Office: currently unavailable
 - Zoom link: <https://tennessee.zoom.us/j/2152859270>



SIS Office Information

- 450 Communications Bldg.
- 1345 Circle Park Drive
- Knoxville, TN 37996-0341
- SIS Office: 865.974.2148
- Fax (SIS): 865.974.4667

Catalog Description

Concepts, techniques, and tools of data analytics. Collecting, extracting and transforming data. Mining data to discover hidden patterns and knowledge. Investigating application of data analytics in various information environments.

Student Learning Outcomes

Students who complete this course will be able to

- Demonstrate a sophisticated understanding of the principles of data-analytic thinking.
- Use version-control systems and the Jupyter Notebook environment.
- Use flexible tools (NumPy and pandas) to load, clean, transform, merge, and reshape data.
- Conduct data analytics using quantitative methods for various types of data and make appropriate and powerful connections between quantitative analysis and real-world problems.
- Know the exact scopes and possible limitations of each method; and show capability of using data analytics skills to provide constructive guidance in decision making.
- Interpret results of data analytics correctly with detailed and useful information.
- Write an insightful and well-organized report for a real-world case study, including thoughtful and convincing details.

Course Design

- Course materials will be delivered on Canvas, including reading materials, slides, etc.
- Submit assignments on **GitHub**. Do not email them to the instructor.
- For technical issues, contact the OIT HelpDesk via phone (865) 974-9900 or online at <http://help.utk.edu/>

Required Text(s)

All readings will be provided by the instructor.

Recommended Readings:

- Provost, F., & Fawcett, T. (2013). *Data Science for Business: What you need to know about data mining and data-analytic thinking*. " O'Reilly Media, Inc."
- Downey, A. (2014). *Think stats: exploratory data analysis*. " O'Reilly Media, Inc."
<https://greenteapress.com/wp/think-stats-2e/> (Free book)
- McKinney, W. (2018). *Python for data analysis: Data wrangling with Pandas, NumPy, and IPython*. " O'Reilly Media, Inc."

COVID-19 Related Information

Students are required to wear face masks at all times and maintain social distancing (6 feet between individuals in traditional classrooms, or, in instructional laboratories and similar settings, only a few minutes in closer proximity when absolutely necessary to achieve learning objectives). Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher than normal temperature will be excused from class and should stay at home.

Instructors have the right to ask those who are not complying with these requirements to leave class in the interest of everyone's health and safety. In the event that a student refuses to comply with these requirements, the instructor has the right to cancel class.

Additionally, following other simple practices will promote good health in and out of the classroom, such as frequent and thorough hand washing, wiping down desks and seats with disinfectant wipes whenever possible, not sharing personal items such as pens and cell phones, and avoiding crowded hallways and other enclosed spaces.

The Volunteer Creed reminds us that we bear the torch in order to give light to others. As Volunteers, we commit to caring for one another and for the members of the communities in which we live, work, and learn. This semester, the University asks that we all demonstrate the Volunteer spirit by following these and other health guidelines and requirements.

COMMUNICATION

Email

I am required to communicate with you through your UTK email address. If you prefer to use another address, consult the [OIT Helpdesk \(Links to an external site.\)](#) to obtain directions for forwarding your UTK email to your preferred address if you do not wish to check both accounts.

Instructor Availability

I am available during weekdays via email. To ensure a quick response, start your message subject line with INSC486. I will reply to your email as soon as I can. I am also happy to speak with you in my office or via zoom during office hours.

COMPUTING REQUIREMENTS AND RESOURCES

Requirements

- You must have adequate computing skills, including but not limited to the use of word processing, Web browsers, e-mail, listservs, and Canvas software.
- You must have a GitHub account and learn how to submit your assignments using Git.
- You must obtain a UT email account. In addition, you must have the PowerPoint Reader or the regular PowerPoint software installed on your computer to download the lecture notes from Canvas.

Technical Support

The [Office of Information Technology \(OIT\) \(Links to an external site.\)](#) provides training classes in using varied technologies for students at no charge (advance registration is required).

Software

- GitHub account for GitHub Classroom
- Google account for Colab

COURSE ATTENDANCE AND PARTICIPATION POLICIES

Learner Expectations

- Be prepared for all classes
- Be respectful of others
- Actively contribute to the learning activities in class
- Abide by the UT Honor Code

Instructor Expectations

At UT, it is our collective responsibility to improve the state of teaching and learning. During the semester, you may be requested to assess aspects of this course either during class or at the completion of the class. You are encouraged to respond to these various forms of assessment as a means of continuing to improve the quality of the UT learning experience.

Attendance and Participation

The course schedule below lists which class sessions you should complete at your convenience during each week. It is essential that you keep up by attending the sessions in the proper week so that you can complete assignments and exams as scheduled. Canvas provides statistics about whether or not a student has “attended” a recorded class session, which allows me to “take roll” just as I would in a traditional class.

Inclement Weather

The chancellor (or appointed representative) may officially close or suspend selected activities of the university because of extreme weather conditions. When a decision to close is made, it applies to all classes (whether on-campus or online). The information is distributed to the campus community, shared with local media, and posted on the University homepage at <http://utk.edu>.

ADDITIONAL POLICIES AND POINTS OF INFORMATION

Disability Services

Any student who feels they may need an accommodation based on the impact of a disability should contact [Student Disability Services](#) in Dunford Hall at 865-974-6087, or by video relay at 865-622-6566, to coordinate reasonable academic accommodations.

University Civility Statement

Civility is genuine respect and regard for others: politeness, consideration, tact, good manners, graciousness, cordiality, affability, amiability, and courteousness. Civility enhances academic freedom and integrity and is a prerequisite to the free exchange of ideas and knowledge in the learning community. Our community consists of students, faculty, staff, alumni, and campus visitors. Community members affect each other’s well-being and have a shared interest in creating and sustaining an environment where all community members and their points of view are valued and respected. Affirming the value of each member of the university community, the campus asks that all its members adhere to the principles of civility and community adopted by the campus. For more information, see the [UT Principles of Civility and Community](#).

CCI Diversity Statement

The College of Communication and Information recognizes that a college diverse in its people, curricula, scholarship, research, and creative activities expands opportunities for intellectual inquiry and engagement, helps students develop critical thinking skills, and prepares students for social and civic responsibilities. All members of the College benefit from diversity and the quality of learning, research, scholarship, and creative activities is enhanced by a climate of inclusion, understanding, and appreciation of differences and the full range of human experience. As a result, the College is committed to diversity and equal opportunity and it recognizes that it must represent the diversity

inherent in American society. The College is acutely aware that diversity and fairness are foundations that unite the College's faculty, staff, students, and the larger communication and information community.

Instructor Status as a Title IX Mandatory Reporter

University of Tennessee faculty are committed to supporting our students and upholding gender equity laws as outlined by Title IX. Please be aware that if you choose to confide in a faculty member regarding an issue of sexual misconduct, dating violence, or stalking, we are obligated to inform the University's Title IX Coordinator, who can assist you in connecting with all possible resources both on- and off-campus. If you would like to speak with someone confidentially, the Student Counseling Center (865-974-2196) and the Student Health Center (865-974-3135) are both confidential resources. For additional resources and information, visit titleix.utk.edu.

ASSIGNMENTS, ASSESSMENTS, AND EVALUATIONS

Academic Integrity

Students should be familiar with the [Hilltopics Student Handbook](#), and comply with all academic policies. This includes the University of Tennessee Honor Statement and the Academic Integrity Policy.

The Honor Statement reads: *“An essential feature of the University of Tennessee, Knoxville is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. ‘As a student of the university, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity.’”* For more information, see the Honor Statement on the Academic Policies and Procedures page of the current [catalog](#) for student and faculty responsibilities.

The Academic Integrity policy reads: *“Study, preparation and presentation should involve at all times the student's own work, unless it has been clearly specified that work is to be a team effort. Academic honesty requires that the student present his or her own work in all academic projects, including tests, papers, homework, and class presentation. When incorporating the work of other scholars and writers into a project, the student must accurately cite the source of that work.”* For additional information, see the [Student Code of Conduct](#).

Plagiarism

Plagiarism in any of its forms is intolerable, and attention to matters of documentation in all written work is expected and required. Inadvertence, alleged lack of understanding, or avowed ignorance of the various types of plagiarism are not acceptable excuses.

Specific examples of plagiarism are:

1. Copying without proper documentation (quotation marks and a citation) written or spoken words, phrases, or sentences from any source.
2. Summarizing without proper documentation (usually a citation) ideas from another source (unless such information is recognized as common knowledge).

3. Borrowing facts, statistics, graphs, pictorial representations, or phrases without acknowledging the source (unless such information is recognized as common knowledge).
4. Collaborating on a graded assignment without the instructor's approval.
5. Submitting work, either in whole or in part, created by a professional service and used without attribution (e.g., paper, speech, bibliography, or photograph).

Students who may be unsure of the nature of plagiarism should consult the instructor or a guide for writing research reports. Resources are available through the University Libraries, including a [Citing Sources guide](#).

Infractions of academic integrity are penalized according to the severity of the infraction but may include a course grade of "F."

Assignments

This table provides a brief summary of assignment by name, due date, point value, and percentage of final grade. A brief description of each assignment follows the table.

Assignment	Point Value	Percentage of Final Grade	Due Date
Assignment 1	100	10%	Feb 5
Assignment 2	100	10%	Feb 19
Assignment 3	100	10%	March 5
Assignment 4	100	10%	March 19
Assignment 5	100	10%	April 2
Assignment 6	100	10%	April 16
Final Project Presentation	50	5%	April 27 & 29
Final Project Report	150	15%	May 7
Mini Labs and Attendance	200	20%	
TOTAL	1000	100%	

Preparing Assignments

Specific instructions on how to prepare assignments will be given at the time they are assigned.

Submitting Assignments

Unless otherwise specified, all assignments should be submit on GitHub. A assignment invitation URL will be posted along with assignment instruction on Canvas. A detailed submission instruction will be include in the instruction of Assignment 1.

Grading Scale

Semester grades will be assigned according to the following scale:

A	93-100	Superior performance (4 quality points)
A-	90-92.99	Intermediate superior performance (3.7 quality points)
B+	88-89.99	Very good performance (3.3 quality points)
B	83-87.99	Good performance (3.0 quality points)
B-	80-82.99	Intermediate good performance (2.7 quality points)
C+	78-79.99	Fair performance (2.3 quality points)
C	73-77.99	Satisfactory performance (2.0 quality points)
C -	70-72.99	Unsatisfactory performance (1.7 quality points)
D+	68-69.99	Unsatisfactory performance (1.3 quality points)
D	63-67.99	Unsatisfactory performance (1.0 quality points)
D -	60-62.99	Unsatisfactory performance (0.7 quality points)
F	0-59.99	Failure performance (0.0 quality points)
S		Satisfactory; only assigned for C or better work when a course is taken on an S/NC grading basis. Carries no point value.
NC		No Credit; indicates a failure to complete a course satisfactorily, and is only assigned for C- or worse work when a course is taken on a S/NC grading basis. Carries no point value.
I		Under extraordinary circumstances and at the discretion of the instructor, the grade of I (Incomplete) may be awarded to students who have satisfactorily completed a substantial portion of the course but cannot complete the course for reasons beyond their control. An I carries no quality points. If the I grade is not removed within one calendar year or upon graduation, it shall be changed to an F and count as a failure in the computation of the grade point average.
W		Indicates student has officially withdrawn from the course or the university. Carries no point value.

Incompletes

Based on adopted University of Tennessee-Knoxville policy, a grade of *I* (Incomplete) is reserved for emergencies that prevent the student from completing the course on time. Incompletes are granted only under "the most unusual of circumstances" and solely at the discretion of the instructor. Plan your semester's course of study carefully to insure sufficient time to complete the required work. For students who simply "disappear" without contacting the instructor and without completing the required form, an "F" is submitted.

COURSE EVALUATION

You will be invited by email to evaluate the course at the end of the term via TNVoice. Please participate in this valuable process. I also invite your comments throughout the course and read all comments, suggestions, and recommendations.

DISCLAIMER

The instructor reserves the right to revise, alter or amend this syllabus as necessary. Students will be notified in writing / email of any such changes.

COURSE OUTLINE

Week	Date	Topic	Assignment Due
1	Jan 21	Introduction to Data Analytics, Python Basics, IPython, and Jupyter Notebooks	
2	Jan 26, 28	NumPy Basics	
3	Feb 2, 4	Pandas, Data Loading, and Storage	Assignment 1 Due
4	Feb 9, 11	Data Cleaning and Preparation	
5	Feb 16, 18	Data Wrangling	Assignment 2 Due
6	Feb 23, 25	Data Aggregation and Group Operations	
7	Mar 2, 4	Introduction to a Statistical Approach	Assignment 3 Due
8	Mar 9, 11	Relationship between Variables and Hypothesis Testing	
9	Mar 16, 18	Regression	Assignment 4 Due
10	Mar 23, 25	Time Series Analysis	
11	Mar 30, Apr 1	Introduction to Machine Learning	Assignment 5 Due
12	Apr 6, 8	Supervised Machine Learning - 1	
13	Apr 14, 15	Evaluation	Assignment 6 Due
14	Apr 20, 22	Supervised Machine Learning - 2	
15	Apr 27, 29	Final Project Presentation	
16	May 4-7	Final Week	Final Project Report