

CSE 5301: Data Analysis & Modeling Techniques
Fall 2020

Instructor: [Vamsikrishna Gopikrishna](#)

Section Information: CSE 5301 002; CSE 5301 901

Email Address: vamsikrishna.gopikrishna@uta.edu [**NOTE:** All email regarding the course **must** contain [CSE5301-002](#), [CSE5301-901](#) at the beginning of the subject line **and** must be sent to the above email address or through canvas messaging or they **may not** be answered]

Office Hours:

- **Office Location:** Due to the COVID-19 pandemic In-person office hours will not be held. Office hours are going to be online through Microsoft TEAMS. The link to the meeting will be in the announcements section on Canvas.
- **Time:** Tuesday, Thursday – 3:30 PM to 5:00 PM
- If you cannot meet me during this time, you can also message me through TEAMS.

Time and Place of Class Meetings:

- **Location:** Due to the COVID-19 pandemic in-person lectures will not be held. Classes will be held online through Canvas conferences. Please go to the conferences tab of the courses canvas page to access the lecture.
- **Exam Location:** Section 002 and 003 will have 2 in-person exams and 1 online exam. In-person exam location will be provided in class. Section 901 will have all exams online.
- **Time:**
 - **CSE 5301 002, CSE 5301 901:** Tuesday, Thursday – 5:30 PM to 6:50 PM

Web Page: <http://crystal.uta.edu/~gopikrishnav/classes/2020/fall/5301/>. Too Long? Just go to <http://crystal.uta.edu/~gopikrishnav/> and follow the links

Description of Course Content:

The objective of this course is to provide students the basic data analysis and modeling concepts and methodologies using probability theory. Basic statistics concepts and probability concepts will be covered. Fundamental data analysis and hypothesis techniques will be covered. Further data modeling methodologies such as Hidden Markov Models and Bayesian networks will be introduced.

Student Learning Outcomes:

Students successfully completing this course will have gained a solid understanding of probabilistic data modeling, interpretation, and analysis and thus have formed an important basis solve practical statistics and data analysis related problems arising in broad computer science and engineering, and daily life

Required Textbooks and Other Course Materials: Probability and Statistics for Computer Scientists (2nd Edition) by Michael Baron, Chapman and Chapman and Hall/CRC (ISBN: 978-1-4398-7590-2). Note that if you choose to use an earlier edition, it is your responsibility to identify any differences in the editions

<p>Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381.</p>
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Descriptions of major assignments and examinations:

There will be several homework assignments in this course. Some assignments may have programming tasks. The solution to programming tasks can be programmed in base versions of C, C++, Java, Python2 or Python3 only. All homework submissions must be submitted via [Canvas](#). No other method of submission accepted. If you find yourself in an emergency and cannot deliver homework on time, immediately inform the instructor. Also, while working with other persons on non-graded example problems from the textbook is a good way to help you develop your understanding and insight into the techniques of problem solving, homework solutions must be your work only. Violations of this will not be tolerated and result in severe penalties for all parties involved, in strict compliance to official UTA policy.

Late submission policy: The points each assignment graded out of will be provided as part of its description. Assignments submitted late will be automatically penalized, at a rate of **5% of max points per hour late**. **Note that for some assignments, Late submissions may not be accepted** (will be announced in class). The submission due time (and the time the link will be available till) will be shown in canvas. Exceptions will only be made for documented emergencies, in strict adherence to UTA policy. Computer/Network crashes, Submission of Incomplete files, Submission of Incorrect Files, Submitting at Incorrect Link are **NOT** acceptable excuses for late submissions. **No exceptions will be made**. To avoid problems with such crashes and last-minute problems, students are encouraged to submit as early as possible. They are also advised to ensure that their file was uploaded correctly before submitting it. You can always revise your submission till the deadline. If you are unable to work on/submit an assignment due to a valid documented reason (illness, critical family emergencies, military service obligations, observance of major religious holidays, and certain university service commitments) one makeup assignment may be provided that will be due during finals week.

There are three exams. Each will cover all material covered in the class until that point (weighted towards material not covered in previous exams). The exams are closed book. You will need a scientific calculator (non-graphing, non-programmable) for doing calculations. Formula sheets will be provided for the exam (will be provided beforehand in class for review) You are also allowed 2 pages of notes (These notes will have to be submitted along with your exam). No other material allowed. **Presence of any material that is not allowed will be considered cheating and penalized as such.** No exam scores will be dropped. **Exams 1 and 2** will be held on campus as **in-person exams**. Students will be required to wear a face covering and follow the classroom use procedures outlined by the university (available on the course webpage and on canvas) to be allowed to take their exam. Failure to follow the procedures will result in the student being asked to leave and being given a score of 0 for the exam. **Exam 3** will be held **online** through canvas using the Lockdown browser (with Respondus Monitor). **You will need a computer and a webcam to take the online exam** (a Laptop with integrated webcam will also work). **For the online only section, all exams will be online.**

Absence from exams may be excused, with appropriate documentation, for illness, critical family emergencies, military service obligations, observance of major religious holidays, and certain university service commitments. Requests for excused absence, and documentation for such absences, must be provided as soon as possible. If the exam is disrupted due to a service outage screenshots/ photographic evidence must be provided ASAP. In case of excused absence or outage, a makeup exam will be setup and conducted by the instructor. **Even if the reason for an absence/non-attendance is valid, a request for an excused absence/re-attempt will be rejected if provided later than the day of the exam.** The dates for all the exams are subject to change. Any changes will be announced in class atleast a week in advance. Students are expected to be available till the last day of finals week. No accommodations will be made if the student will miss an exam due to being unavailable before the last day of finals week.

Attendance: Students are expected to attend all online lectures. Attendance in the online lectures will be part of your final grade. Any material that the student missed will not be covered again in class. At

random points during the lectures, I will conduct in class polls. The scores of these polls will be used as part of your final grade. Absence from classes may be excused, with appropriate documentation, for illness, critical family emergencies, military service obligations, observance of major religious holidays, and certain university service commitments. (Students in the online only sections have any absences automatically excused, though attendance is still recommended). Documentation regarding any reasons for absence must be provided to the instructor by the end of the week of the missed lecture. If the student is unable to attend a class due to approved or personal reasons, it is the student's responsibility to use the slides/videos posted online or the lecture archives on canvas and the textbook to learn the content and to contact either the Instructor or the TA to clarify any doubts.

Grading Policy:

You will be assigned a numerical score based on your performance in your assignments and in your exams.

Material	Contribution to Final score
Assignments	30%
Exam 1	15%
Exam 2	20%
Exam 3	25%
Attendance	5%
In Class Polls	5%

This numeric score is converted to a letter grade according to the following rubric.

Numerical Score	Grade
≥ 85	A
$\geq 70 \ \& \ < 85$	B
$\geq 55 \ \& \ < 70$	C
$\geq 40 \ \& \ < 55$	D
Otherwise	F

Students are expected to keep track of their performance throughout the semester and seek guidance from available sources (including the instructor) if their performance drops below satisfactory levels. **No makeup exams or assignments will be provided for the purpose of bumping up your grade under any circumstances.**

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of

university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>. More information is available in the following library tutorials <http://libguides.uta.edu/copyright/plagiarism> and <http://library.uta.edu/plagiarism/>

If you are caught colluding or copying in the assignments (or exams):

- **First Offense:** *You will be given a score of -50 points for that assignment (or exam) and an academic dishonesty report will be filed*
- **Second Offense:** *You will be given a grade of F for the course and another academic dishonesty report will be filed.*

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a **letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** <http://www.uta.edu/disability/> or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability. If you are a student who would have taken your exam in the **ARC** center, additional time will be provided during your exam (Please inform the instructor the week before the exam).

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information*

regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, marked by the exit signs. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services for Undergraduate students: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](#), [major-based learning centers](#), developmental education, [advising and mentoring](#), personal counseling, and [federally funded programs](#). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/studentsuccess/success-programs/programs/resource-hotline.php>

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

The IDEAS Center (2nd Floor of Central Library) offers **FREE tutoring** to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in, or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593

Course Schedule (Tentative):

Date	L. No.	Topic	Chapter
08/27/2020	1	Introduction	
09/01/2020	2	RV, Probability, CDF, PDF, Statistics	2
09/03/2020	3	Joint Distributions, Conditional Distributions, Bayesian Networks	3.1, 3.2, 3.3, 4.1
09/08/2020	4	Probability and Statistics in Vector space, Linear combination of RVS	
09/10/2020	5	Information Theory	
09/15/2020	6	Families of Discrete/Continuous Distributions	3.4,4.2
09/17/2020	7	Chebyshev's Inequality, Central Limit Theorem	3.3, 4.3
09/22/2020	8	Statistics, Parameter Estimation	8.1, 8.2
09/24/2020		Exam 1 Review Session	
09/29/2020		EXAM 1	
10/01/2020	9	Graphical Statistics	8.3
10/06/2020	10	Methods of Moments, Methods of Maximum Likelihood Estimation	9.1
10/08/2020	11	Confidence Intervals	9.2, 9.3
10/13/2020	12	Confidence Intervals (contd.)	
10/15/2020	13	Hypothesis Testing	9.4
10/20/2020	14	Hypothesis Testing (Contd.)	
10/22/2020	15	Inference about Variances	9.5
10/27/2020	16	Bayesian Inference	10.4
10/29/2020		Exam 2 Review Session	
11/03/2020		EXAM 2	
11/05/2020	17	Simulation of Random Variables	5.1, 5.2
11/10/2020	18	Monte Carlo Methods	5.3
11/12/2020	19	Stochastic Processes, Markov Processes	6.1, 6.2
11/17/2020	20	Counting Processes	6.3, 6.4
11/19/2020	21	Queuing Systems	7.1, 7.2, 7.3
11/24/2020	22	M/M/1 Queuing Systems	7.4
11/26/2020		Thanksgiving - NO CLASS	
12/01/2020	23	Multi-server Queuing Systems	7.5
12/03/2020	24	Hidden Markov Models	
12/08/2020		Exam 3 Review Session	
12/10/2020		EXAM 3	

This schedule is tentative and subject to change at instructor's discretion. Changes will be announced in class. The instructor reserves the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. EXAM 3 date and time is subject to change by the University (**Tentative** dates and times available here: <https://www.uta.edu/records/calendars/final-exams.php>). Students should be prepared to be available till the end of Finals Week.