

**CSE 5301 – 002: Data Analysis & Modeling Techniques**  
Fall 2018

**Instructor:** [Vamsikrishna Gopikrishna](#)

**Office Number:** [ERB 553](#) (If I am not here then I am usually in [ERB 128](#))

**Email Address** [All email regarding the course must contain **CSE5301-002** at the beginning of the subject line]: [vamsikrishna.gopikrishna@uta.edu](mailto:vamsikrishna.gopikrishna@uta.edu)

**Faculty Information:**

- Website: <https://omega.uta.edu/~gopikrishnav/>
- Profile: <https://mentis.uta.edu/explore/profile/vamsikrishna-gopikrishna>

**Office Hours:**

- **Time:** Tuesday, Thursday :10:30 AM – 12:00 PM
- If you cannot meet during these times, email me and we can try and set up meeting times

**Section Information:** CSE 2315-003

**Time and Place of Class Meetings:**

- **Location:** [NH 109](#)
- **Time:** Tuesday, Thursday – 5:30 PM to 6:50 PM

**Web Page:** <http://omega.uta.edu/~gopikrishnav/classes/2018/fall/5301/>.

**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 statics 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's your responsibility to identify any differences in the editions.

**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 the language of your choice but **must** compile and run on the ACS machine omega (All students will have an account on

<p><b>Emergency Phone Numbers:</b> In case of an on-campus emergency, call the UT Arlington Police Department at <b>817-272-3003</b> (non-campus phone), <b>2-3003</b> (campus phone). You may also dial <b>911</b>. Non-emergency number <b>817-272-3381</b>.</p>
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the ACS machine omega). All homework submissions must be submitted via [Blackboard](#). If you find yourself in an emergency situation 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.

There are three exams. Each will cover 1/3<sup>rd</sup> of the course material. No exam scores will be dropped. **No make-up exams will be offered.** 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. Car or transportation problems will **NOT** be considered a legitimate reason to miss an exam. Requests for excused absence, and documentation for such absences, must be provided as soon as possible. **Even if the reason for an absence is valid, a request for an excused absence will be rejected if provided unjustifiably late.**

**Attendance:** Students are expected to but not required to attend all classes and meetings. Any material that the student missed will not be covered again in class. If the student is unable to attend a class due to personal reasons, it is the student's responsibility to use the textbook to learn the content and to meet with either the Instructor or the TA to clarify any doubts.

#### **Grading Policy:**

All assignments are graded out of 100 points. Assignments submitted late will be penalized, at a rate of **2 penalty points per hour**. The submission time will be the time shown on the Blackboard submission system. **Any assignment submitted more than 12 hours late will receive no credit.** Exceptions will only be made for documented emergencies, in strict adherence to UTA policy. Computer/network crashes are NOT an acceptable excuse for late submissions. To avoid problems with such crashes and last-minute problems, students are encouraged to submit early. You can always revise your submission till the deadline.

You will be assigned a final numeric score based on your performance in both your assignments and your exams. The amount each of these contribute to your average is given by the following rubric.

<b>Material</b>	<b>Contribution</b>
Homework Assignments	25 %
Exam 1	25 %
Exam 2	25 %
Exam 3	25 %

Your average numeric score is then converted to a letter grade according to this rubric

<b>Numerical Score</b>	<b>Grade</b>
>= 85	A
>= 70	B
>= 55	C
>= 40	D
Otherwise	F

These percentages and cutoffs are tentative and may be changed based on the distribution of scores and the degree of difficulty of the assignments and exams.

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.**

**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](http://www.uta.edu/disability).

**Counseling and Psychological Services (CAPS)** [www.uta.edu/caps/](http://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](http://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](http://www.uta.edu/titleIX) or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or [titleix@uta.edu](mailto:titleix@uta.edu)*

**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:

- First Offence: You will be given a score of -50 points for that assignment and an academic dishonesty report will be filed
- Second Offence: You will be given a score of -50 points for every assignment in the course (current, previous and future) and an academic dishonesty report will be filed.

If you are caught colluding or copying in the exams:

- First Offence: You will be given a score of -100 points for that exam and an academic dishonesty report will be filed
- Second Offence: You will be given a F in the course and an academic dishonesty report will be filed

**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>.

**Final Review Week:** for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**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](mailto:resources@uta.edu), or view the information at <http://www.uta.edu/studentsuccess/success-programs/programs/resource-hotline.php>

**The IDEAS Center** (2<sup>nd</sup> 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](http://www.uta.edu/IDEAS), or call (817) 272-6593

**Course Schedule (Tentative):**

Week	Date	Topic	Chapter
1	8/23/2018	Introduction	
2	8/28/2018	RV, Probability, CDF, PDF, Statistics	2
	8/30/2018	Joint Distributions, Conditional Distributions	3.1, 3.2, 3.3, 4.1
3	9/4/2018	Probability and Statistics in Vector space, Linear combination of RVS	
	9/6/2018	Chebyshev's Inequality, Central Limit Theorem	
4	9/11/2018	Families of Discrete Distributions	3.3, 4.3
	9/13/2018	Families of Discrete Distributions (contd.)	3.4
5	9/18/2018	Families of Continuous Distributions	
	9/20/2018	Families of Continuous Distributions (contd.)	4.2
6	9/25/2018	Parameter Estimation	8.2
	9/27/2018	Graphical Statistics, Exam 1 Review	8.3
7	10/2/2018	<b>EXAM 1</b>	
	10/4/2018	Methods of Moments, Methods of Maximum Likelihood Estimation	9.1
8	10/9/2018	Bayesian Inference	10.4
	10/11/2018	Simulation of Random Variables	5.1, 5.2
9	10/16/2018	Monte Carlo Methods	5.3
	10/18/2018	Stochastic Process	6.1, 6.2
10	10/23/2018	Markov Process	6.2
	10/25/2018	Stochastic Process	6.3, 6.4
11	10/30/2018	Confidence Intervals	9.2, 9.3
	11/1/2018	Hypothesis Test, Exam 2 Review	9.4
12	11/6/2018	<b>EXAM 2</b>	
	11/8/2018	Hypothesis Test	9.4
13	11/13/2018	Hypothesis Test	
	11/15/2018	Inference about variance	
14	11/20/2018	Chi-square Test	
	11/22/2018	<b>THANKSGIVING HOLIDAY</b>	
15	11/27/2018	Hidden Markov Models	
	11/29/2018	HMM	
16	12/4/2018	HMM, Exam 3 Review	
	12/6/2018	<b>EXAM 3</b>	

This schedule is tentative and subject to change at instructor's discretion (This includes topics covered and the number of assignments). Changes will be announced in class and posted in the schedule on the course page. The instructor reserves the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.