CSE 5307

**Programming Languages**

Spring 2016

**Instructor:** Steve Morgan.

**Office Number:** Room 651, Engineering Research Building (ERB 651).

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**Faculty Profile:** <https://www.UTA.edu/profiles/> Stephen Morgan.

**Office Hours:** 1 – 3 PM, MoWeFr**.**

**Section Information:** CSE 5307-001.

**Time and Place of Class Meetings:** 9-9:50 AM MoWeFr, Geoscience Hall Room 104 (GS 104) on first day and all exam days; i.e., 1/20, 3/7, 3/9, 3/11, 5/2, 5/4, 5/11. Meet in ERB 125 on all other class days.

**Graduate Teaching Assistant** (GTA): Mayur Ambulkar, mayur.ambulkar@mavs.uta.edu, available by appointment only.

**Description of Course Content:** Principles and paradigms of programming languages, including their abstract machines, descriptions, foundations, environments, memory management, control structures and abstractions, and data structures and abstractions. Three paradigms will be studied in detail: object oriented (C++ and Java), functional (LISP and Scheme) and logic programming (Prolog and rule-based expert systems).

**Student Learning Outcomes:** Traditionally experienced programmers who knew more than 13 programming languages could learn another quickly. The authors of this course’s textbook claim that novices can learn any programming language quickly, if they learn the common elements of all languages from this text. Before each class, each student team will study a PowerPoint “lecture” at home and assess their understanding with a multiple-choice quiz. The closely supervised in-class lab exercise will *apply* what the students learned, by “passing the knowledge through their fingers.” Each two-person (pair programming) team will earn grades together in both pre-class quizzes and in-class exercises. (Midterm and final exams must be completed individually.) Daily teamwork and individual exams model real working conditions in the engineering profession.

**Required Textbooks and Other Course Materials:** Gabrbrielli & Martini’s *Programming Languages*, London, Springer, 2010.

**Descriptions of major assignments and examinations:** After every class, the next lecture and its quiz can be downloaded from the CSE5307 directory at <http://Ranger.UTA.edu/~morgan>. Every student’s answers for that quiz are entered in the left column of an Excel spreadsheet, which is emailed to cse5307gta@gmail.com prior to 5 PM on the day before the next class. Every team’s solution for the in-class exercise is emailed to cse5307gta@gmail.combefore 9:50 AM on the day it is assigned.

**Attendance:** The University of Texas at Arlington does not require taking attendance. Rather, each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of these sections, I expect every student to attend every class. Each in-class lab assignment is so complex that two students working together can get an A, but one student working alone probably would earn no more than a C.

**Grading**: The course grade will be the simple average of the midterm (25%) and final exam (25%) grades, with the averages of all 39 quiz (25%) and all 37 in-class lab assignment (25%) grades.

**Make-up Exams**: Every missed quiz or in-class exercise will automatically receive a low C (70%), and it cannot be made up. Exams can be made up without a grade penalty, if the student was ill on the exam day and can provide a doctor’s excuse for the absence. An unexcused absence on exam day will result in a high F (59%) on the exam.

**Grade Grievances**: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. (See <http://catalog.uta.edu/academicregulations/grades/#graduatetext>.)

**Drop Policy:** Students may drop or swap (concurrently add and drop) classes through MyMav self-service throughout the 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 he/she does 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 a 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).** 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)** [www.uta.edu/disability](http://www.uta.edu/disability) or calling 817-272-3364.

**Counseling and Psychological Services, (CAPS)** [www.uta.edu/caps/](http://www.uta.edu/caps/) or calling 817-272-3671.

Only those students who have officially documented a need for an accommodation will have their request honored. 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) or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:** *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://www.uta.edu/hr/eos/index.php)*. For information regarding Title IX, visit* [www.uta.edu/titleIX](http://www.uta.edu/titleIX).

**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 as they see fit in their courses, including (but not limited to) 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.

On the first class day, every student will sign a Confidentiality Agreement, which enables each team to freely share quiz and in-class exercise information with each other but not with other teams. This agreement models a non-disclosure agreement between two engineering companies, which enables limited sharing of trade secrets for the purpose of collaborating on a project, but specifically denies sharing trade secrets with competitors. The instructor will make every effort to prevent all cheating. And he urges the honest victims of cheating to describe how the cheating was done, so that it can be prevented in the future.

**Lab Safety Training:**  **Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities.** Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

**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 their inboxes 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>.

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as “lecture,” “seminar” or “laboratory” are invited 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 enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

**Final Review Week:** 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. 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. How best to exit the building will be explained on day one.

**Student Support Services**: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 [www.uta.edu/resources](http://www.uta.edu/resources).

**Writing Center.** **:** The Writing Center, 411 Central Library, offers individual 40-minute sessions to review assignments, *Quick Hits* (5- to 10-minute quick answers to questions), and workshops on grammar and specific writing projects. Visit [https://uta.mywconline.com/](https://owa.uta.edu/owa/luket%40exchange.uta.edu/redir.aspx?C=jqplelmmw0KcvkWv1pRv_rHS8ofUUtFIXl_CWZTLffEmCPyZf3x4ncUbBmD9p3gSPROCbhSJj7U.&URL=https%3a%2f%2futa.mywconline.com%2f" \t "_blank) to register and make appointments. For hours, information about the writing workshops we offer, scheduling a classroom visit and descriptions of the services we offer undergraduates, graduate students, and faculty members, please visit our website at [www.uta.edu/owl/](http://www.uta.edu/owl/).

**Tentative Course Schedule**

(per [House Bill 2504](http://www.legis.state.tx.us/tlodocs/81R/billtext/html/HB02504F.HTM))

We 1/20 First class day—Administration; i.e., teaming, syllabus, lab safety, exits.

Fr 1/22 §1-1.2.1 Abstract Machines. Q1, L1

Mo 1/25 §1.2.2-1.4 Programming Language. Q2, L2

We 1/27 §2-2.2 Grammar & Syntax. Q3, L3

Fr 1/29 §2.3-2.8 Semantics & Compilers. Q4, L4

Mo 2/1 Chapter 3 Foundations. Q5, L5

We 2/3 §4-4.2.3 Names & Environment. Q6, L6

Fr 2/5 §4.3-4.4 Scope Rules. Q7, L7

Mo 2/8 §5-5.4.1 Memory Management. Q8, L8

We 2/10 §5.4.2-5.6 More Scope Rules. Q9, L9

Fr 2/12 §6-6.2.1 Control Structure. Q10, L10

Mo 2/15 §6.2.2-6.3.1 Commands. Q11, L 11

We 2/17 §6.3.2-6.4 Structured Programming. Q12, L12

Fr 2/19 §6.5-6.6 Recursion. Q13, L13

Mo 2/22 §7-7.1.2 Subprograms. Q14, L14

We 2/24 §7.2-7.22 Higher Order Functions. Q15, L15

Fr 2/26 §7.3-7.4 Exceptions. Q16, L16

Mo 2/29 §8-8.3.10 Types. Q17, L17

We 3/2 §8.4-8.4.7 Composite Types. Q18, L18

Fr 3/4 §8.5-8.7.4. Equivalence & Polymorphism. Q19, L19

Mo 3/7 Practice Midterm Exam. Q20

We 3/9 In-Class Peer Grading.

Fr 3/11 Midterm exam.

Mo-Fr 3/14-18 \*\*\*\*\* Spring Break \*\*\*\*\*

Mo 3/21 §8.8-8.12 Tying Loose Ends. Q21, L20

We 3/23 Chapter 9 Data Abstraction. Q22, L21

Fr 3/25 §10-10.2.3 Object Oriented Paradigm. Q23, L22

Mo 3/28 §10.2.4-10.2.6 Inheritance. Q24, L24

We 3/30 §10.3-10.3.3 Implementation. Q25, L24

Fr 4/1 §10.3.4-10.4.2 Polymorphism & Generics. Q26, L25

Mo 4/4 §10.4.3-10.5 Implementation. Q27, L26

We 4/6 §11-11.2.3 Functional Paradigm. Q28, L27

Fr 4/8 §11.2.4-11.3.6 Functional Programming. Q29, L28

Mo 4/11 §11.4-11.7 Implementation. Q30, L29

We 4/13 §12-12.3.2 Logic Programming Paradigm. Q31, L30

Fr 4/15 §12.3.3-12.4.3 Unification. Q32, L31

Mo 4/18 §12.4.4-12.5.2 Extensions. Q33, L32

We 4/20 §12.5.3-12.7 Constraints & Perspective. Q34, L33

Fr 4/22 §13-13.4 Pre-1980 Languages. Q35, L34

Mo 4/25 §13.5-13.7 Post-1980 Languages. Q36, L35

We 4/27 Slack Day Q37, L36

Fr 4/29 Slack Day Q38, L37

Mo 5/2 Practice Final Exam. Q39

We 5/4 In-Class Peer Grading.

Fr 5/6 Student survey, critique, suggestions.

We 5/11 CSE 5307-001 Final Exam, 8-10:30 AM in Geoscience Hall Room 104 (GS 104).

Note: As instructor of this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. I shall do my best to advise students of changes in a timely manner. –Stephen M. Morgan.

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.

For non-emergencies, contact the UTA Police Department at 817-272-3381.