CE 6300: Advanced Geotechnical Modelling
Spring 2014

Instructor(s): Xinbao Yu, Ph.D., P.E., Assistant Professor

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Office Hours: Monday and Wednesday, 1-3pm; other time by appointment

Section Information: CE 6300 - 001 (27999)

Time and Place of Class Meetings: MoWe 10:00AM-11:20AM, ERB 131; MoWe 11:00 AM - 12:20 PM, CE computer lab (for coding and ABAQUS).

Description of Course Content: This course covers two numerical simulation methods: discrete element method (DEM) and finite element method (FEM). The four basic elements in DEM: initialization, search, contact models, velocity and displacement calculations will be introduced. This course will use FORTRAN as the coding language. A basic Fortran code will be provided. Students will learn how to make modifications to the basic code for their own applications. A term project will be required that consists of a numerical experiment.

Fundamentals of FEM will be introduced including: basic elements, formulation methods, coordinate transformation, and boundary conditions. CAM clay model will be introduced and implemented in ABAQUS as a class exercise. Usage of ABAQUS will be introduced. Applications of FEM including pile soil interaction and simple beam simulation.

Student Learning Outcomes: Students are expected to have a basic understanding of finite difference method and finite element method. Apply the numerical modelling methods to solve science and engineering problems.

Required Textbooks and Other Course Materials: Class notes and handouts will be provided. Recommended Reference Textbooks:

Descriptions of major assignments and examinations: This course will be evaluated mainly on class projects. Two to three class projects, one on DEM and one or two on FEM, will be assigned. A few homework assignments will also be given.

Attendance: Class attendance and punctuality are required. Five percent of weighted total grade will be counted from attendance.

Other Requirements: DOS or UNIX like Fortran Compiler is installed in the front row of the CE computer lab. The students are asked to work on the code to modify it for the class project assignment. This course requires a programming language (FORTRAN, C, or MATLAB), constitutive modeling, computational geomechanics, and Numerical analyses as requisites; or consent of the instructor.
ABAQUS will be used for the FEM assignments. The students are required to install student version of ABAQUS on their own laptops.

**Grading:** The final grade consists of projects, homework assignments, and attendance. Insert a detailed description of grading policies, including how the final grade will be calculated. The weighted total final grade will be calculated as the arithmetic average of all assigned projects (80%), homework (15% each), and class attendance (5%). Final Grading Scale: A: 90-100, B: 80-89, C: 70-79, D: 60-69, F: 59 or less.

**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/).

**Americans with Disabilities Act:** The University of Texas at 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). 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 that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. 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 or by calling the Office for Students with Disabilities at (817) 272-3364.

**Academic Integrity:** Students enrolled in this course 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.

**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.

**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](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” shall be 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 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](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, which is located [insert a description of the nearest exit/emergency 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 handicapped individuals.

**Syllabus Change Policy:** This syllabus is subject to change with advance notice.

**Librarian to Contact:** Sylvia George-Williams, Science and Technology Library, sylvia@uta.edu, (817)2727519.

Additional information specific to your College, School, Departmental, or Program may also be included in the syllabus. Check with your academic unit’s leadership for details.

**Course Schedule.** [Required]

- Library Home Page: [http://www.uta.edu/library](http://www.uta.edu/library)
- Subject Guides: [http://libguides.uta.edu](http://libguides.uta.edu)
- Course Reserves: [http://pulse.uta.edu/vwebv/enterCourseReserve.do](http://pulse.uta.edu/vwebv/enterCourseReserve.do)
- Library Catalog: [http://discover.uta.edu/](http://discover.uta.edu/)
- E-Journals: [http://liblink.uta.edu/UTAlink/az](http://liblink.uta.edu/UTAlink/az)
- Connecting from Off-Campus: [http://libguides.uta.edu/offcampus](http://libguides.uta.edu/offcampus)
- Ask A Librarian: [http://ask.uta.edu](http://ask.uta.edu)

The following URL houses a page where we have gathered many commonly used resources needed by students in online courses: [http://www.uta.edu/library/services/distance.php](http://www.uta.edu/library/services/distance.php)