

CS5333.002.16F Discrete Structures
Fall 2016
Syllabus (Final Version)

Course Information

Course Number/Section: CS5333.002.16F
Course Title: Discrete Structures
Term: Fall 2016
Days & Times: Monday & Friday: 10:00am – 11:15am & Make up time slots
Location: JSOM 2.115

Professor Contact Information

Professor: Dr. Yvo G. Desmedt
Office Phone: (972) 883-4536
Email Address: Yvo.Desmedt@UTDallas.edu (**not efficient: see further**)
Office Location: ECS 4.411
Office Hours: Friday 2:30pm – 3:30pm

TA Contact Information

TA: TBA
Email Address: TBA

Other information, such as office hours and office location of the TA has been provided to the students.

Course Prerequisites

Prerequisite: CS/SE 3345 or equivalent.

Course Description

Discrete Structures (3 semester hours) Mathematical foundations of computer science. Logic, sets, relations, graphs and algebraic structures. Combinatorics and metrics for performance evaluation of algorithms. (3-0) S

Course Goals and Objectives

While programming is the foundation of computation, discrete structures is the tool that makes computer science a science. The goal of this course is to introduce students to discrete structures.

Learning objectives include:

- ability to use Boolean Algebra and set theory
- ability to apply basic combinatorics
- the understanding of logic behind proofs and capability of making them
- the ability to apply basic properties of relations
- ability to understand and apply properties of graphs in computer science

Required Textbooks and Materials

Discrete Mathematics and Its Applications, by Kenneth H. Rosen, McGraw Hill, Seventh edition

Suggested Course Material

Introduction to Discrete Mathematics, by R. McEliece, R. Ash and C. Ash, Random House, New York

Grading Policy

The grade depends on the understanding of the material covered in class and on the correctness and the details given in answers to questions on exams and homeworks.

homeworks:	2%
first midterm:	24%
second midterm:	24%
final exam (cumulative):	50%

The exact dates of the midterms will be announced well before the exam. The final exam is given during the 2 hours and 45 minutes slot indicated in the final exam schedule of the university (to be announced). **Students should avoid booking any flights before knowing the final exam date.**

Course & Instructor Policies

Class attendance: Students are strongly encouraged to attend class. Since the material is very mathematical students are strongly encouraged to do this. Besides the textbook, personal notes and other references are used during the class presentations. This implies that students have yet another benefit to attend classes.

Although there is a significant overlap with Rosen's book and the course, most material will be presented in a didactic way, different from Rosen's book. Students who regularly attend class may do better on the exam.

Students do *not* need to inform the instructor they will miss class. A student missing a class is strongly encouraged to ask for the notes of 2 students who did attend that class.

Homeworks:

- **assignments:** Homework will usually be assigned by the instructor using e-mail. UTD has recently moved to Microsoft's Outlook, resulting in several complains from students. Microsoft states:

Email messages in your Microsoft Outlook 2010 Inbox and other mail folders can be organized by date and arranged by Conversation. When Conversations is turned on, messages that share the same subject appear as Conversations that can be viewed expanded or collapsed. You can quickly review and act on messages or complete Conversations.

To turn this off (and get the by date option), see:

<https://support.office.com/en-us/article/View-email-messages-by-conversation-0eeec76c-f59b-4834-98e6-05cfdfa9fb07>

The instructor strongly recommends students to use the date option.

- **returning homework:** Students need to return homework *on paper* by the start of class the day the homework is due. Students who miss this class, are encouraged to ask some other student to bring the homework to class.
- **Late work policy:** Students who return their homework too late will be penalized as follows:
 - If a student is late, but turns his/her answer in before the start of the next class the student's grade will be multiplied with 0.9.
 - If a student waits longer, then the student receives no credit! His/her answer will be corrected.

Academic Calendar

Some classes will be moved.

Day	Topic	Material
8/22	Syllabus, Introduction & Propositional Logic	pp. 1–15
8/26	Propositional Equivalences	pp. 25–35
8/29	Sets, Relations, Functions & Predicates	pp. 115–126, pp. 573–575, pp. 138–140, pp. 36–47
9/02	Nested Quantifiers, Rules of Inference & Proofs	pp. 57–60, pp. 63, pp. 69–74, pp. 81–85
9/09	Proofs	pp. 86–88, pp. 92–97, pp. 99, pp. 102, pp. 106–107
9/12	Sets, Set Operations & Boolean Algebra	pp. 115–125, pp. 127–135, p. 817, pp. 139–151
9/16	Functions & Inverse Relation	pp. 139–151 & p. 582
9/19	Sequences and Summations	pp. 156–159 & 163–166
9/23	Cardinality of Sets & Matrices	pp. 170–173, pp. 178–183
9/26	Algorithms & The Growth of Functions	pp. 191–201 & 204–216
9/30	Complexity of Algorithms	pp. 218–229
10/03	Mathematical Induction	pp. 311–323
10/07	Mathematical Induction, Strong Induction, Recursive Definitions	pp. 323–324, pp. 333–335, pp. 345–350
10/10	Generalized Induction	pp. 356–357 and Notes
10/14	Generalized Induction & Recursive Algorithms	pp. 356–357, pp. 360–370
10/17	Basics of Counting	pp. 386–394
10/21	Pigeonhole Principle & Permutations and Combinations	pp. 399–404, pp. 407–413
10/24	Midterm 1	
10/31	Binomial Coefficients and Identities	pp. 415–420
(*)11/02	Generalized Permutations and Combinations	pp. 423–431
11/04	Relations and Their Properties, n -ary Relations & Representing Relations	pp. 573–581, pp. 583–584, pp. 591–596
11/07	Closures of Relations & Equivalence Relations	pp. 597–602 & pp. 608–614
(*)11/09	Partial Orderings & Lattices & Graphs	pp. 618–627, 641–644 & 651–654
11/11	Special Graphs, Operations, Representations, Connectivity	pp. 654–658, p. 661, pp. 663–664, 668–673, 678–686
11/14	Midterm 2	
11/28	Special Paths, Planar Graphs, Euler’s Formula, Graph Coloring & Recurrence Relations	693–694, p. 698, pp. 707–709, pp. 720–721, & pp. 727–728 & pp. 514–518
12/02	Recurrence Relations & Generating Functions	pp. 514–518, 521, 537–538, 542, 546–548
12/05	Inclusion-Exclusion, Applications & Review	p. 556 & pp. 561–563

Table 1: (*) Indicates that this is a makeup class due to the absence of the instructor on another time slot.

Recommendations

Related to:

Homeworks: students are strongly encouraged to make as many homeworks as possible. **Warning:** Students copying other students homeworks will be ill prepared for the midterms and for the final. To avoid this, students should make their own homework. This will also allow the TA to figure out the progress (or lack) being made by the student.

The material seeming easy: for many students who are familiar with the concepts introduced during the first classes, this class seems easy. Unfortunately, this is very misleading. The instructor expects the students to understand the material in depth. Proofs are a very important part of this course.

Students having the aforementioned impression often end up with a low grade.

Final Exam: Questions on the final exam will be much more difficult than on the midterms. The instructor will clearly indicate what type of questions students can expect on the final exam.

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3, and in Title V, Rules on Student Services and Activities of the university's Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use

Due to massive spam Email is no longer an efficient way to communicate. Therefore, students are *discouraged* to e-mail the instructor. Better ways to communicate with the instructor, are: immediately after class (when available) and during office hours.

Due to the massive spam, students sending e-mail should not expect an immediate reply. A reply may be given in class, or by e-mail typically *several days to a week* after the student sent his/her e-mail.

Moreover, email raises some issues concerning security and the identity of each individual in an email exchange. **The instructor considers email from students *only if it originates from a UTD student account*.** E-mail sent from Gmail, Hotmail, etc., will likely bounce. UTD furnishes each student with a free email account that is to be used in all communication with university personnel.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's Handbook of Operating Procedures.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called *the respondent*). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.

Disability Services

The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.

The contact information for the Office of Disability Services is:

The University of Texas at Dallas, SU 22

PO Box 830688

Richardson, Texas 75083-0688

(972) 883-2098 (voice or TTY)

Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.

It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated. The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment. If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.