UMass Global in partnership with Westcott Courses

Course content approved by University of Massachusetts Global.

Course Title:	Discrete Structures
Course Code:	MATU 251
Credits:	4
Credit Provider:	UMass Global
Proctored Final:	Yes

Textbook Requirement

No outside textbook is needed. Our Omega Math(TM) courses contain all the lessons, homework, solution manuals, quizzes, tests and the final. Our lessons start out with the easiest examples, and then move slowly to the more advanced problems. Between examples, there are interactive problems which make sure the student understands the concepts, as well as enables the student to store the information into long term memory.

Course Description

This course was designed for students in math and computer science. Logic is emphasized in this course, and topics include proof and theory (including inductive and deductive proofs), propositional and predicate logic, set theory, algorithms (including recursion), trees, relations and functions, counting and probability, and elements of the theory of directed and undirected graphs (including Dijkstra's shortest path algorithm). Additionally, an introduction to complexity of algorithms and recurrence relations are included. Upon completion, students will be able to solve real world problems and use appropriate models for analysis.

Discrete Structures is an Omega MathTM Course.

Prerequisite:

Calculus I with a grade of C or better, and a basic computer programming course. The course must be taken from a U.S. regionally accredited college within the last 10 years and received a C or better.

Approvals for this Course

none

Learning Outcomes

Upon successful completion of Discrete Structures, a student should be able to:

1. Effectively express themselves in a precise written form.
2. Demonstrate the ability to think critically and logically.
3. Students should be able to distinguish between a definition and a theorem, and apply them correctly.
4. Read, comprehend and construct mathematical arguments.
5. Construct standard proofs, using direct, contradiction, contrapositive, if and only if and inductive arguments.
6. Demonstrate the ability to integrate knowledge and ideas in a coherent and meaningful manner.
7. Represent discrete objects using the abstract mathematical structures such as sets, permutations, relations, functions, trees and graphs.
8. Demonstrate appropriate techniques for specific problems in graph theory, and be able to develop and apply algorithms to solve these problems.
9. Demonstrate competencies, and thought processes in the fundamental concepts of graph theory, set theory, and combinatorics, at a level necessary for more advanced mathematics courses.
10. Demonstrate real-world problem solving skills. Analyze the problem and break it into parts, recognize the concepts applicable to the parts, recognize the relationship between the parts, write the concepts in proper algebraic representations, solve the problem in symbols, interpret the final results.

Methods Of Evaluation

Homework quizzes 15%

Chapter tests 60%

Final Exam 25%

(You must get at least 60% on this final in order to pass the class with a C or better.)

Homework Quizzes: 15%

Homework assignments are essential in a mathematics course. It is not possible to master the course without a considerable amount of time being devoted to studying the concepts and solving problems. Each lesson contains a set of homework problems, and you are required to do all the odd problems for each section. Work out each problem, and then check the solution manual for a detailed solution. Do not continue to the next problem until you understand your mistake. Once you feel comfortable with the homework set, take the homework quiz for that section. The homework quizzes are revised problems from the homework sets. You may take each quiz twice, and the higher of the two scores is used to calculate your quiz grade. Once you take a quiz, figure out what you did wrong on the problems that you missed and then try the quiz again. It is important to figure what you did wrong before you push forward. If you figure out your errors at this step, you will be less likely to make the same error on the test or the final. The

struggle to figure out what you did wrong stores the mathematics into your long-term memory, and aids in building abstract thinking.

Chapter Tests: 60%

After you have completed a chapter, and understand everything in the lessons, homework sets and quizzes, take the chapter test. The chapter tests are revised problems from the quizzes. You may take each chapter test twice, and the higher of the two scores is used to calculate your chapter test grade. Once you take a chapter test, figure out what you did wrong on the problems that you missed and then try the chapter test again. It is important to figure what you did wrong before you push forward. If you figure out your errors at this step, you will be less likely to make the same error on the final.

Proctored Final: 25%

This course goes towards a 4-year degree; thus, it requires a proctored final.

Students are responsible for proctoring fees.

We have an approved online proctor service that students can use if they have a web camera with their computer. This can be a laptop with a built in camera or a desktop with a web cam. This service charges $60 for group sessions and double for private sessions. A student can also be proctored at college testing center, Sylvan Learning Center, Prometric Testing center, or Pearson Vue Testing Center. No other options are available.

A valid driver's license or State ID must be shown at the testing center. An expired license or State ID will not be accepted. Use this link to help you find a college testing center or Sylvan Learning center near your home:

Proctored Final

The final exam is a comprehensive final covering all of the chapters of the course. Other than scratch paper, you may view the "Authorized Materials" list for the final exam for each class.

*Students must obtain a 60%

or better on the final exam in order to get a C or better in the class.

The 60% rule was set in place to protect the integrity of online education by requiring a display of competency in exchange for a grade. All schools which are regionally accredited adhere to online standards. Your college is accepting this course because it goes through a regionally accredited university, which tells your college that standards have been met. Your college will not accept a class from a school that is not regionally accredited, because they know the standards won't be met.

Assessment

A 90-100 A Clearly stands out as excellent performance and, exhibits mastery of learning outcomes.

B 80-89 B Grasps subject matter at a level considered to be good to very good, and exhibits partial mastery of learning outcomes.

C 70-79 C Demonstrates a satisfactory comprehension of the subject matter, and exhibits sufficient understanding and skills to progress in continued sequential learning.

D 60-69 D Quality and quantity of work is below average and exhibits only partial understanding and skills to progress in continued sequential learning.

F 0-59 F Quality and quantity of work is below average and not sufficient to progress.

Course Content Menu

Chapter 1 - Logic

Lessons	Homework	Quiz
1.1 - Nonlinear Inequalities	1.1	1.1
1.2 - Truth Tables & Propositions	1.2	1.2
1.3 - Logic Operators	1.3	1.3
1.4 - Quantifiers	1.4	1.4
1.5 - Nested Quantifiers	1.5	1.5
Chapter 1 Test (23 questions)		

Chapter 2 - Formal Proofs

Lessons	Homework	Quiz
2.1 - Truth Tables Proofs	2.1	2.1
2.2 - Direct Proof	2.2	2.2
2.3 - Proof by Contradiction	2.3	2.3
2.4 - Proof by Contrapositive	2.4	2.4
2.5 - If and only if Proof	2.5	2.5
2.6 - Mathematical Induction	2.6	2.6
Chapter 2 Test (9 questions)		

Chapter 3 - Sets and Relations

Lessons	Homework	Quiz
3.1 - Introduction to Sets	3.1	3.1
3.2 - Venn Diagrams	3.2	3.2
3.3 - Binary Relations	3.3	3.3

3.4 - Equivalence Relations	3.4	3.4
3.5 - Matrices of Relations	3.5	3.5
3.6 - Functions	3.6	3.6
3.7 - Sequences & Strings	3.7	3.7
Chapter 3 Test (28 questions)		

Chapter 4 - Algorithms

Lessons	**Homework**	**Quiz**
4.1 - Introduction to Algorithms	4.1	4.1
4.2 - The Euclidean Algorithm	4.2	4.2
4.3 - Recursive Algorithms	4.3	4.3
4.4 - Complexity of Algorithms	4.4	4.4
Chapter 4 Test (18 questions)		

Chapter 5 - Graph Theory

Lessons	**Homework**	**Quiz**
5.1 - Introduction to Graph Theory	5.1	5.1
5.2 - Paths and Cycles	5.2	5.2
5.3 - Hamiltonian Cycles	5.3	5.3
5.4 - Matrix Representations of Graphs	5.4	5.4
5.5 - Dijkstra's Algorithm	5.5	5.5
5.6 - Isomorphic Graphs	5.6	5.6
5.7 - Planar Graphs	5.7	5.7
Chapter 5 Test (27 questions)		

Chapter 6 - Trees

Lessons	**Homework**	**Quiz**
6.1 - Introduction to Trees	6.1	6.1
6.2 - Depth First Search Algorithm	6.2	6.2
6.3 - Breadth First Search Algorithm	6.3	6.3
6.4 - Minimal Spanning Trees	6.4	6.4
Chapter 6 Test (7 questions)		

Chapter 7 - Recurrence Relations and Finite-State Machines

Lessons	Homework	Quiz
7.1 - Introduction to Recurrence Relations	7.1	7.1
7.2 - Solving Recurrence Relations	7.2	7.2
7.3 - Introduction to Finite-State Machines	7.3	7.3
Chapter 7 Test (8 questions)		

Chapter 8 - Counting and Probability

Lessons	Homework	Quiz
8.1 - Counting	8.1	8.1
8.2 - Permutations and Combinations	8.2	8.2
8.3 - Finite Basic Probabilities	8.3	8.3
8.4 - Basic Laws of Probability	8.4	8.4
Chapter 8 Test (22 questions)		
Discrete Structures Final Exam		

Course Content Menu

This course is online and your participation at home is imperative. A minimum of 8 - 10 hours per week of study time is required for covering all of the online material to achieve a passing grade. You must set up a regular study schedule. You have five months of access to your online account with a thirty-day extension at the end if needed. If you do not complete the course within this time line, you will need to enroll in a second term.

Schedule

Below is the suggested time table to follow to stay on a 17 week schedule for the course. The following schedule is the minimum number of sections that need to be completed each week if you would like to finish in a regular semester time frame. You do not have to adhere to this schedule. You have five months of access plus a 30 day extension at the end if needed. You can finish the course as soon as you are able, with a minimum coursework time of at least four weeks.

Week	Complete Sections
1	1.1 - 1.3
2	1.4 - 1.5
3	2.1 - 2.2
4	2.3 - 2.4

5	2.5 - 2.6
6	3.1 - 3.2
7	3.3 - 3.5
8	3.6 - 3.7
9	4.1 - 4.3
10	4.4 - 5.1
11	5.2 - 5.4
12	5.5 - 5.6
13	5.7 - 6.1
14	6.2 - 6.4
15	7.1 - 7.3
16	8.1 - 8.2
17	8.3 - 8.4
Final Exam	

Code of Conduct:

It is the student's responsibility and duty to read the information below and become acquainted with all provisions of what constitutes academic misconduct involving cheating and plagiarism. Students are required to read each statement below, and the given repercussion. There are no exceptions to these policies, and the pretext of not reading each part will not be deemed as a reasonable excuse to contest the policies.

Code of Ethics:

Regulations and rules are necessary to implement for classroom as well as online course behavior. Students are expected to practice honesty, integrity and respect at all times. It is the student's responsibility and duty to become acquainted with all provisions of the code below and what constitutes misconduct.

Respectful communications:

When contacting Westcott Courses, you agree to be considerate and respectful. Communications from a student which are considered by our staff to be rude, insulting, disrespectful, harassing, or bullying via telephone, email, or otherwise will be considered a disrespectful communication and will result in a formal warning.

We reserve the right to refuse service. If we receive multiple disrespectful communications from person(s) representing the student, or the student themselves, the student will be excluded from taking future courses at Westcott Courses.

Grading information and proctored final policies:

The grading rules are put in place to protect the integrity of online education by stopping grade inflation, which is done by demanding a display of competency in exchange for a grade. By agreeing to the terms of service agreement, you agree to read the 'Grading' Policy from within your account, and the 'Proctored Final Information' page, if applicable. You have 24 hours after your first log-in to notify us if you do not agree to the grading policy and proctored final policy (if applicable) outlined in the pages inside of your account, otherwise it is assumed that you agree with the policies. There are no exceptions to these policies, and the pretext of not reading the pages will not be deemed as a reasonable excuse to contest the policies.

The definition of academic cheating is an act of dishonesty in order to obtain a higher grade in the course, and to gain an advantage over other students in the course.

To maintain academic standards, students are expected to practice honesty, integrity and respect at all times. Students who violate the policies of cheating, plagiarizing, or other academic misconduct will result in following actions.

1) Cheating in any way on the final exam results in an F on the final and an F in the class.

This includes, but is not limited to any form of collaboration, use of unauthorized materials, receiving or providing unpermitted assistance on the exam, using outside digital assistance such as a cell phone, tablet, ETC. to communicate with others or access outside websites, having someone else take the exam for you, taking an exam for another student, failing to stop working on the exam when the time is up.

Final exams are secure tests and the intellectual property of Westcott Courses. Taking screen shots of a digital final or copying a paper test is stealing our intellectual property and cheating. It is equivalent to stealing a copy of the final exam off an instructor's desk. When one student obtains the questions on a final, it means that other students who don't have the questions on the final are at a disadvantage. Once a final exam has been compromised it is no longer secure, and the exam is unfair for those who have not performed an act of dishonesty to gain the advantage.

Each of the infractions above represents a result of performing an act of dishonesty in order to obtain a higher grade in the course, and to gain an advantage over other students in the course. The result of any of the above offenses is an F in the course. Students who violate the above policy may retake the course after a first offense; however, a second offense will result in expulsion and students will no longer be able to take other courses at Westcott Courses.

Students are responsible for clicking on the "Proctored Final Information" link (which is on student's Main Menu), and reviewing the list of Authorized Materials for each course's final exam. Since each course is different, the "Authorized Materials" for each final is different. For example, some courses permit notes, while others do not.

2) Plagiarism: All of the following are considered plagiarism, and will result in a zero on the plagiarized assignment, and there are no opportunities to redo the assignment.

Merriam-Webster defines plagiarism as "the act of using another person's words or ideas without giving credit to that person"

Plagiarism includes, but is not limited to:

* having somebody else write your assignment for you

* turning in an assignment that contains work that is not your own

* changing words in phrases, sentences and/or blocks of text without giving credit to the source (paraphrase)

* copying ideas, phrases, sentences or entire blocks of text without giving credit to the source

* not crediting the correct source by providing incorrect information

Plagiarism is an act of fraud, and can usually be avoided by using quotation marks and citing the source of the material. Instructors apply plagiarism software to find assignments that contain plagiarized material. Again, assignments that contain one of the above infractions will receive a zero on the assignment and the student will not have the opportunity to redo the assignment.

It is important to note that saving all your assignments to the end of the course, and then turning in multiple assignments that have been plagiarized will result in zeros on all of those assignments. This may mean that you no long have enough points in the course to pass the class. Thus, turning in assignments one at a time and waiting for instructor feedback in-between is important for learning and making sure that you maximize your possible points.

If you have questions, please read more information about plagiarism at plagiarism.org, or ask your instructor.

Other Examples of Academic Misconduct:

1) Other forms of cheating include altering an exam and submitting it for regarding, providing false excuses to postpone due dates, fabricating data or references, claiming that Westcott Courses lost your test and/or quiz scores, sending emails to Westcott claiming you did not know what you were doing was cheating.

2) Unauthorized collaboration - working with others on graded course work without specific permission of the instructor, including homework assignments, programs, quizzes and tests.

3) Copying Westcott Courses content and posting it on the internet. This includes assignments, quizzes, and tests.

By signing up for a course, you are legally signing a contract that states that the person who is named taking this course is the actual individual doing the course work and all examinations. You also agree that for courses that require proctored testing, that your final will be taken at a college testing center, a Sylvan Learning center, or at home using the online proctor. Also, the individual signed up for this course will be the one taking the test. Failure to do so will be considered a breach of Westcott Courses policies.

Important Notes:

This syllabus is subject to change and / or revision during the academic year. Students with documented learning disabilities should notify our office upon enrollment, as well as make sure we let the testing center know extended time is permitted. Valid documentation involves educational testing and a diagnosis from a college, licensed clinical psychologist or psychiatrist.