

**MTH 1017-Discrete Mathematics**  
**Course Outline and Syllabus**  
**Fall 2008**

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**OBJECTIVES**

To develop analytical skills used to solve problems concerning the speed and logical structure of computer software, computer hardware, and computer networks. Topics covered are logic, functions, proofs, induction, combinatorial counting, network graphs, trees, combinatorial games, and discrete optimization.

**PREREQUISITES**

Discrete Mathematics is intended for Mathematics and Computer Science majors.  
The prerequisite is Precalculus (Math 1014) or the equivalent.

**TEXTS**

Required: *Discrete Mathematics and its Applications* 6th Edition, K. Rosen, McGraw Hill

Optional: *Students Solution Guide*, K. Rosen, Sixth Edition, McGraw Hill.

Lecture Notes, available on Prof. Rispoli's faculty webpage.

[www.dowling.edu/faculty/Rispoli/](http://www.dowling.edu/faculty/Rispoli/)

**RECOMMENDED READING AND REFERENCES**

1. *How To Read and Do Proofs* Second Edition, D. Solow, Wiley
2. *Discrete Mathematics*, Schaum's Outline by S. Lipschutz and L. Lipson, McGraw Hill
3. *Discrete Mathematics With Applications*, S. Epp, Wiley.

**GRADES**

Grades will be completely determined based on the following.

Two Semester Exams worth 25% each of final course grade

Comprehensive Final Exam worth 35% of final course grade

Graded Homework Assignments and Projects worth 15% of final grade

Make-up exams will not be given.

No other factors such as needing the course to graduate will be considered.

Students may discuss homework assignments with each other, but it is expected that students will construct their own solutions. Students who hand in identical solutions will not be given credit for the assignment.

**OFFICE HOURS and EXTRA HELP**

Mondays and Wednesdays 9:30 AM – 10:00 AM, Mondays 2:00 PM - 3:00 PM, Mondays and Wednesdays 5:30 PM – 6:00 PM, Tuesdays 10:00-11:00 AM, and by appointment. Extra help is also available in the Academic Services Room 209 RC. These tutors do an excellent job.

## CLASSROOM ETIQUETTE

All cell phones should be turned off. Students will lose one point off of their final grade each time a cell phone ring is heard.

Students should go to the bathroom before or after class. Do not interrupt the entire class unnecessarily!

Cheating on exams will **NOT** be tolerated. Procedures outlined in catalog will be strictly enforced.

## MTH 1017- DISCRETE MATH SYLLABUS

<u>LECTURE /TOPIC</u>	<u>TEXT SECTIONS</u>	<u>EXERCISES</u>
<b>Logic and Functions</b>		
1. Logic and Prop. Equivalences	1.1 and 1.2	16/1-15 odd,16,17,19,23,24,27,31,33 28/1-10,13, 15,17,21,23,25,31
2. Predicates and Quantifiers	1.3 and 1.4	46/1-11,13-21 odd, 25,31,33,34,35,36,39 58/1,3,5,7,9,10,15,23,25,26,27,28,29
3. Introduction to Proofs	1.5 and 1.6	72/1,3,5 85/1-11,13,15,17,18,26,27,29
4. Proof Methods and Strategy	1.7	102/1,2,6,9
5. Review of Homework from Chapter 1		
<b>Basic Structures</b>		
6. Sets and Functions	2.1 and 2.2 2.3	Read Only 146/1,3,5,7,9,10,11,12,13,16,17,19,23,25
7. Sequences and Sums	2.4	160/1,3,5,7,9,13,15

## Algorithms, Integers and Matrices

8. Algorithms	3.1	177/1,3,5,7,13,16,21
9. Growth of Functions and Complexity	3.2 and 3.3	191/1,3,7,15,19,20,21 199/2,3,4,7,8
10. Integers and Modular Arithmetic	3.4	208/1,5,7,8,9,10,11,16, 17,19,24, 26,31,32
11. Primes	3.5	217/1,3,5,11,20,21
12. Matrices and Matrix Algorithms	3.8	254/1-5,10,15,19,20,24,25
13. Review of Homework from Chapter 3		

## Induction and Recursion

14. Induction	4.1 and 4.2	279/3,4,5,7,9,10,11,16,20,21,22,23,28,31,33 291/3,5,7
15. Recursion	4.3	308/1,2,3,5,7,12,13,18,23,25

## Combinatorial Counting

16. Mult., Add., and Pigeonhole Principle	5.1 and 5.2	344/1-29 odd 353/1,2,5,7,11,14,23,26,27,28
17. Permut'ns, Combinations and Bin. Th.	5.3 and 5.4	360/1-9,11,12,15,19,20,23,25,26,27,31,33 369/1-6
18. Generalized Permut'ns and Comb'ns and Discrete Probability	5.5 and 6.1	379/1,3,5,7,9,14,15,21,31,32,33 398/1,3,5,7,9,11,13,25,27,31,35
19. Review of Homework from Chapter 4 & 5		

## Graphs and Trees

20. Introduction to Graphs	9.1 and 9.2	595/1,3,4,5,7,22, 608/1-11,15,20,21-26
21. Representing Graphs, Isomorphism	9.3	618/1,2,9,10,12,34 - 44

22. Connectivity, Euler and Ham. Circuits	9.4 and 9.5	629/1,3,4,5, 643/1-7,13,15,26,28,30-36
23. Shortest Path Problems	9.6	655/2,3,4,5,7,25,26
24. Introduction & Application of Trees	10.1 and 10.2	693/1,2,3,16,17 708/1,3,6,7,9
25. Minimal Spanning Tree Algorithms	10.4 and 10.5	734/2,3,7,8,9 742/1,2,3,4,5,7,11