



### Course Goals/Student Learning Outcomes and Alignment with the General Education Goals

MATH150 meets the Quantitative Reasoning requirement through the following goal alignment. Further when not used as the QR requirement, this course meets the Logic, Language, and Semiotics requirement through activities and requirements that require students to: (1) use logic and mathematical information to draw reasonable conclusions and (2) use the symbols and language of mathematics to communicate about problems and present solutions.

Course Goals/SLO	Touchstone Program Goals	University Level Competencies
Develop basic skills in set theory, logic, combinatorics, probability, and statistics.	2.1 Solve mathematical problems of the type necessary for living in today's and tomorrow's world. 2.4 Understand the concept and application of quantitative relationships. 2.2 Make valid inferences from data. 2.3 Understand that quantitative analysis is important to almost every endeavor of humankind. 3.1 Identify sound and unsound reasoning. 3.2 Analyze and use a variety of information gathering techniques	<p><b>Competency 1</b>  <b>Winthrop graduates think critically and solve problems.</b>                      Winthrop University graduates reason logically, evaluate and use evidence, and solve problems. They seek out and assess relevant information from multiple viewpoints to form well-reasoned conclusions. Winthrop graduates consider the full context and consequences of their decisions and continually reexamine their own critical thinking process, including the strengths and weaknesses of their arguments.</p> <p><b>Competency 3</b>  <b>Winthrop graduates understand the interconnected nature of the world and the time in which they live.</b>                      Winthrop University graduates comprehend the historical, social, and global contexts of their disciplines and their lives. They also recognize how their chosen area of study is inextricably linked to other fields. Winthrop graduates collaborate with members of diverse academic, professional, and cultural communities as informed and engaged citizens.</p>
Use concepts in set theory, logic, combinatorics, probability, and statistics to demonstrate reasoning through solving problems.		
Use the notion of sets to analyze survey data and count responses of different types.		
Analyze data using descriptive statistics.		
Use formal logic to analyze complicated arguments carefully and discover whether they are valid.		
Use concepts within combinatorics and probability for the analysis of risk in various settings.		

For purposes of departmental and touchstone program assessment of student learning in this course, performance on sections of the final exam may be tabulated for all students. Individual tests and course grades may also be used as an indication of progress toward the above goals.

**Final Exam Policies:** The following rules will be enforced at the final exam session:

- The only materials that may be brought to the testing area are: a calculator, writing utensils, and your ID.
- Paper for work will be provided.
- Students may not wear a hat with a rim during the test.
- Students may **not** bring a book bag, purse, etc. to their seat for the exam. (Bags can be left at the back of the room **AT YOUR OWN RISK.**)
- Students caught with any electronic device other than a calculator will be removed from the exam area and will receive a zero on the final exam. (Note if you have some educational, health, or physical reason for an electronic device you must work with your professor before the testing period.)
- All students must have their Winthrop student ID card and Winthrop ID number with them when they submit their exam.

### Attendance Policy

The University attendance policy is stated in the current catalog (<http://www.winthrop.edu/recandreg/default.aspx?id=7380>). Attendance at all scheduled class meetings is strongly encouraged. Your number of absences will not be counted, and will not be used directly to determine your grade. However, attendance is mandatory for those class sessions that include a test. If no prior arrangements are made with the instructor, a zero will be recorded for a test not taken due to absence.

### Tentative Course Schedule

Date		Section	Topic	Key Ideas
W	8/22	M 3.1	Statements and Quantifiers	<ul style="list-style-type: none"> <li>Statements: Compound; Conditionals; Connections to symbolic notation; Connectives; Contrapositives; Converses; Disjunctions &amp; conjunctions; Equivalence; Inverses; Negations; Qualifiers; Tautology</li> <li>Notation: <math>\wedge</math>, <math>\vee</math>, <math>\leftrightarrow</math>, <math>\sim</math>, <math>\rightarrow</math>, <math>\equiv</math></li> <li>DeMorgan's Laws</li> <li>Argument Analysis using Truth tables and Euler Diagrams</li> </ul>
M	8/27	M 3.2	Truth Tables and Equivalent Statements	
W	8/29	M 3.3 & 3.4	The Conditional & More on the Conditional	
M	9/3	M 3.5	Analyzing Arguments with Euler Diagrams	
W	9/5	M 3.6	Analyzing Arguments with Truth Tables	
M	9/10		Review	
W	9/12		<b>Test 1</b>	
M	9/17	8.1	Sets	<ul style="list-style-type: none"> <li>Sets: notation, elements, subsets, complements, unions, intersections</li> <li>Venn Diagrams: construct diagrams, solve word problems, apply addition rule for counting</li> <li>Probability: definition of probability, sample spaces, events, addition rule, complement rule, odds, relative frequencies, product rule, dependence, independence</li> <li>Probability Cont.: understanding relationship btwn conditional probabilities</li> </ul>
W	9/19	8.2	Applications of Venn Diagrams	
M	9/24	8.3	Introduction to Probability	
W	9/26	8.4	Basic Concepts of Probability "The Drunkard's Walk" Chapter 2	
M	10/1	8.5	Conditional Probability / Independent Events "The Drunkard's Walk" Chapters 3 & 4	
W	10/3	8.6	Bayes Formula "The Drunkard's Walk" Chapter 6	
M	10/8		Review	
W	10/10		<b>Test 2</b>	
W	10/17	9.1	Probability Distributions and Expected Value	<ul style="list-style-type: none"> <li>Probability: weighted averages using probability distributions, random variables, histograms</li> <li>Counting: advanced counting problems, application to computation of probabilities, probability associated with binomial distributions, Bernoulli trials, expected value</li> </ul>
M	10/22	9.2	Multiplication Principle, Permutations, Combinations	
W	10/24	9.3	Applications of Counting	
M	10/29	9.4	Binomial Probability "The Drunkard's Walk" Chapter 5	
W	10/31		Review	
M	11/5		<b>Test 3</b>	
W	11/7	10.1	Distributions "The Drunkard's Walk" Chapter 7	<ul style="list-style-type: none"> <li>histogram, frequency polygon, stem-and-leaf plots, summation notation, mean, median, mode, range, variances, standard deviations, continuous distributions, skew, normal curves, area, z-scores, quartiles</li> <li>relationship between normal and binomial distributions</li> </ul>
M	11/12	10.2	Measures of Central Tendency	
W	11/14	10.3	Measures of Variation "The Drunkard's Walk" Chapter 8	
M	11/19	10.4	Normal Distributions and Boxplots "The Drunkard's Walk" Chapter 9	
M	11/26		Review	
W	11/28		<b>Test 4</b>	
M	12/3		Extra Day for review	

**SU Deadline:** T 9/4

**Course Withdraw Date:** F 10/19

**Fall Break:** F 10/12 to M 10/15

**Final Exam:** W 12/5 3:00 pm (location TBA)

**Make-up exam for documented final exam conflict:** Saturday 12/8 11:30 am (location TBA)

# MATH 150

## Introductory Discrete Mathematics

### Suggested Homework Problems

Text: *Mathematics for Winthrop University*, Custom edition for Winthrop University, Pearson Custom Publishing, 2010.

Section	Homework
3.1 <sup>(1)</sup>	23 - 35 (odd), 49 - 63(odd), 75
3.2	1 - 29 (odd), 45 - 71 (odd)
3.3	11 - 19 (odd), 33 - 73 (odd), 81 - 89 (odd)
3.4	1 - 9 (odd), 19 - 33 (odd), 41
3.5	1 - 19 (odd), 25,27,29,31
3.6	13 - 35 (odd)
Chapter 3 Review	Test: 1 - 17 (odd), 25,27,29
8.1	1 - 25 (odd), 29 - 47 (odd), 51 - 65 (odd)
8.2	1 - 27 (odd), 31 - 43 (odd)
8.3	3 - 9 (odd), 13 - 39 (odd)
8.4	1 - 39 (odd), 45 - 61 (odd), 65 - 69 (odd)
8.5	1, 3, 5, 15 - 31 (odd), 43 - 57 (odd), 61
8.6	7 - 35 (odd)
Chapter 8 Review	Exercises: 1, 3, 5, 7, 11, 13 - 35 (odd), 39, 55 - 69(odd), 73, 75, 77 Additional Probability Exercises: 1 - 21 (odd), 25
9.1	1, 5, 9, 11, 13, 15, 19 - 39 (odd), 45
9.2	1 - 19 (odd), 25 - 33 (odd), 39 - 49 (odd), 53, 55, 57, 59, 63
9.3	1 - 11 (odd), 25 - 37 (odd)
9.4	1 - 15 (odd), 19 - 41 (odd)
Chapter 9 Review	1 - 19 (odd), 27, 29, 33, 35, 37
10.1	1 - 19 (odd)
10.2	1 - 19 (odd), 23-31 (odd)
10.3 <sup>(2)</sup>	3 - 13 (odd) , 23, 25, 27, 29, 33, 34, 35
10.4	5 - 19 (odd), 23 - 49 (odd), 55, 57, 59, 61
Chapter 10 Review	3, 5, 7, 11, 13, 21, 23, 27, 29, 32, 35, 39, 40, 41, 42, 45

(1): Supplementary Chapter 3, Introduction to Logic

(2): See Appendix B, pages 953 - 954