1. **Course number and name**
   CMP 213 - Discrete Structures

2. **Credits and contact hours**
   3 credit hours, 3 contact hours

3. **Instructor's or course coordinator's name:**
   Dr. Khaled El-Fakih

4. **Textbook, title, author, and year**
   R. Johnsonbaugh. *Discrete Mathematics*. 7th edition, Pearson New International Edition, Prentice Hall, 2014.

5. **Specific course information**
   a. **Brief description of content of the course (catalog description)**
      (Equivalent to MTH 213). Covers propositional and predicate calculus, sets, major classes of functions and related algorithms, asymptotic analysis of functions, principle of mathematical induction, proof techniques, recursive definitions, counting, relations, graphs and trees.

   b. **Prerequisites or co-requisites**
      Prerequisites: MTH 103 (Calculus I)

   c. **Indicate whether a required, elective, or selected elective course in the program**
      Required

6. **Specific goals for the course**
   a. **Specific outcomes of instruction**
      This course requires the student to demonstrate the following:
      1. Understand basic set theory and relations
      2. Work with functions including one-to-one and onto functions.
      3. Understand asymptotic analysis of functions (big-O notation, etc …)
      4. Construct and validate proofs using different methods such as induction and contradiction.
      5. Apply basic principles of counting
      6. Understand ordered sets and lattices
      7. Understand basic graph theory and work with basic graph algorithms
      8. Understand and work with trees

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

This course contributes in a significant way to the accomplishment of the following program outcomes:

Program outcome	Emphasis in this course
(a) an ability to apply knowledge of computing and mathematics appropriate to the discipline	●
(b) an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution	○
(c) an ability to design, implement, and evaluate a computer-based system, process, component or program to meet desired needs	
(d) an ability to function effectively on teams to accomplish a common goal	
(e) an understanding of professional, ethical, legal, security and social issues and responsibilities	
(f) an ability to communicate effectively with a range of audiences	
(g) an ability to analyze the local and global impact of computing on individuals, organizations, and society	
(h) recognition of the need for and an ability to engage in continuing professional development	
(i) an ability to use current techniques, skills, and tools necessary for computing practice	
(j) an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices	
(k) an ability to apply design and development principles in the construction of software systems of varying complexity	

Emphasis: ● High; ◑ Medium; ○ Low; Blank – Nothing Specific Expected

7. Brief list of topics to be covered
- i. Set theory
- ii. Relations
- iii. Functions
- iv. Asymptotic notation
- v. First-order logic
- vi. Quantified logic
- vii. Proofs
- viii. Principles of Counting
- ix. Induction and recursion
- x. Graph theory
- xi. Trees