



**DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
INDUSTRIAL ENGINEERING PROGRAM, BSC.**

Course Syllabus

1. Course number and name

ME 337 Discrete Math

2. Credits and contact hours

(3+0) 3 credit hours, 3 contact hours

3. Course type

In PEson Learning Course (3+0)

4. Instructor's or course coordinator's name

Dr. Fadwa Dababneh

5. Textbook information

Elements of Distcrete Mathematics – Liu and Mohapatra, McGraw Hill Publications

Discrete Mathematical Structures – B. Kolman, R.C. Busby, and S.C. Ross, PHI Publications

Other supplemental materials

- Grötschel, Martin. (1992). Discrete Mathematics in Manufacturing.
- Instructor's Notes

6. Specific course information

a. Catalog description

Mathematical logic, proof techniques, especially mathematical induction, set theory, functions, and relations, procedures, recursion, and operation counts, recurrence relations, analysis of algorithms, counting methods, permutations and combinations, graphs and trees.

b. Prerequisites or co-requisites

Prerequisite: IE 330 operation research 1

c. The course is:

Required in the Industrial Engineering program.

7. Specific goals for the course

a. Course outcomes:

After completion of the course, students are expected to be able to:



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1. construct mathematical arguments using logical connectives and quantifiers and verify the correctness of an argument using propositional and predicate logic and truth tables.
2. demonstrate the ability to solve problems using counting techniques and combinatorial in the context of discrete probability.
3. solve problems involving recurrence relations and generating functions.
4. perform operations on discrete structures such as sets, functions, relations and sequence

b. The following student outcomes are addressed by the course:

SO-(a) an ability to apply knowledge of mathematics, science, and engineering.

SO-(e) an ability to identify, formulate, and solve engineering problems.

8. Learning Outcomes and their Alignment with Program Educational Objective (PEO's), Methods of Delivery, and Assessment Methods:

Learning Outcomes	Program PEOs	Method of Delivery	Assessment Method
Course Outcomes			
CO-(1): construct mathematical arguments using logical connectives and quantifiers and verify the correctness of an argument using propositional and predicate logic and truth tables.	-	Lectures (Example and Problems)	Exam
CO-(2): demonstrate the ability to solve problems using counting techniques and combinatorial in the context of discrete probability.	-	Lectures (Example and Problems)	Assignment
CO-(3): solve problems involving recurrence relations and generating functions.	-	Lectures (Example and Problems)	Assignment
CO-(4): perform operations on discrete structures such as sets, functions, relations and sequence		Lectures (Example and Problems)	Exam
Student Outcomes			
SO-(a) an ability to apply knowledge of mathematics, science, and engineering.		Lectures (Example and Problems)	Exam



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O-(e) an ability to identify, formulate, and solve engineering problems.		Lectures (Example and Problems)	Exam
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9. Weekly Teaching Plan

Week	Lecture	Topic	Method of Delivery
1	Lec_1	Course introduction and syllabus	Lecture
1	Lec_2	Discrete Math applications in Engineering	Lecture
1	Lec_3	Discrete Math applications in Engineering	Lecture
2	Lec_4	Set Theory (Combination of sets, Multisets and Ordered Pairs)	Lecture
2	Lec_5	Set Theory (Combination of sets, Multisets and Ordered Pairs)	Lecture
2	Lec_6	Set Theory (Combination of sets, Multisets and Ordered Pairs)	Lecture
3	Lec_7	Set Theory (Proofs of general identities)	Lecture
3	Lec_8	Set Theory (Proofs of general identities)	Lecture
3	Lec_9	Set Theory (Proofs of general identities)	Lecture
4	Lec_10	Set Theory (Functions)	Lecture
4	Lec_11	Set Theory (Functions)	Lecture
4	Lec_12	Set Theory (Functions)	Lecture
5	Lec_13	Set Theory (Introduction to Induction)	Lecture
5	Lec_14	Set Theory (Introduction to Induction)	Lecture
5	Lec_15	Set Theory (Introduction to Induction)	Lecture
6	Lec_16	Algebraic Structures (Groups, Subgroups, and order)	Lecture
6	Lec_17	Algebraic Structures (Groups, Subgroups, and order)	Lecture
6	Lec_18	Algebraic Structures (Groups, Subgroups, and order)	Lecture
7	Lec_19	Partial order sets (Definition)	Lecture
7	Lec_20	Partial order sets (Definition)	Lecture
7	Lec_21	Partial order sets (Definition)	Lecture
8	Lec_22	Partial order sets (Lattices)	Lecture
8	Lec_23	Partial order sets (Lattices)	Lecture
8	Lec_24	Partial order sets (Lattices)	Lecture



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9	Lec_25	Partial order sets (Boolean algebra)	Lecture
9	Lec_26	Partial order sets (Boolean algebra)	Lecture
9	Lec_27	Partial order sets (Boolean algebra)	Lecture
10	Lec_28	Propositional Logic (Proposition, well-formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition)	Lecture
10	Lec_29	Propositional Logic (Proposition, well-formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition)	Lecture
10	Lec_30	Propositional Logic (Proposition, well-formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition)	Lecture
11	Lec_31	Propositional Logic (Theory of Inference Predicate Logic)	Lecture
11	Lec_32	Propositional Logic (Theory of Inference Predicate Logic)	Lecture
11	Lec_33	Propositional Logic (Theory of Inference Predicate Logic)	Lecture
12	Lec_34	Trees (Binary Tree)	Lecture
12	Lec_35	Trees (Binary Tree)	Lecture
12	Lec_36	Trees (Binary Tree)	Lecture
13	Lec_37	Trees (Graphs Definition and terminology, Representation of graphs)	Lecture
13	Lec_38	Trees (Recurrence Relation & Generating function)	Lecture
13	Lec_39	Trees (Recurrence Relation & Generating function)	Lecture
14	Lec_40	Trees (Recurrence Relation & Generating function)	Lecture
14	Lec_41	Trees (Combinatory)	Lecture
14	Lec_42	Trees (Combinatory)	Lecture
15	Lec_43	Trees (Combinatory)	Lecture
15	Lec_44	Trees (Combinatory)	Lecture
15	Lec_45	Review	Lecture

1. Grade Distribution:

Assessment	Grade	Week No.
First Exam	20%	5 th Week
Second Exam	20%	10 th Week
-Assignments (Reports /Quizzes/ Seminar / Tutorials/ Home works)	10%	1-16 th Week
- Final Examination	50%	16 th Week



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Note: Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.