

**DE LA SALLE UNIVERSITY - MANILA**  
**Mathematics Department**  
**SYLLABUS**

**COURSE CODE/TITLE** : GRAPTHE (Graph Theory)  
**COURSE CREDIT** : 3 units  
**TYPE OF COURSE** : Major Course for Science Students  
**FACULTY** : \_\_\_\_\_  
**TERM/TIME/ROOM** : \_\_\_\_\_

**COURSE DESCRIPTION** : An introductory course in graph theoretic concepts which include connectivity, trees, traversability, factorizations, planarity, colorability. Applications in operations research and computer sciences as well as open problems are also discussed.

**COURSE OBJECTIVES** :

1. To make students aware that graphs are mathematical models for some real-life situations.
2. To give the students a knowledge of basic concepts which will enable them to appreciate both the theory and the applications of graph theory.
3. To demonstrate to the students that many problems – theoretical or real life-, can be analyzed and solved using graphs.
4. To develop the skill of translating problems to graph-theoretic problems and interpreting the solution in terms of the real situation.

**VALUE AIMS** :

1. To develop the skill of solving graph-theoretic problems using known results and basic concepts in graph theory.
2. To encourage interaction and cooperation among students through problem sets assigned to students.
3. To develop the ability to perform independent analysis and reasoning.

**REFERENCES** : Chartrand, G., *Graphs as Mathematical Models*, Prindle, Weber & Schmidt, Inc., 1977

Harary, F., *Graph Theory*, Addison-Wesley, 1961

**TEACHING METHODS AND STRATEGIES:**

1. Lecture
2. Recitation
3. Individual Seatwork on Problem Solving
4. Cooperative or Group Learning

**ASSESSMENT / EVALUATION:**

Quizzes and Long Exams	70%
Final Exam	30%
Passing Grade	60%

**GRADING SCALE:**

95-100	4.0
89-94	3.5
83-88	3.0
78-82	2.5
72-77	2.0
66-71	1.5
60-65	1.0
Below 60	0.0

COURSE OUTLINE		TIME ALLOTMENT
<b>1.</b>	<b>DIGRAPHS</b>	<b>9 HRS</b>
	1.1 Directional Concepts and Converse Concepts	
	1.2 Digraph Invariants	
	1.3 Walk, Path and Circuit	
	1.4 Adjacency Matrix	
	1.5 Isomorphism and Automorphism	
<b>2.</b>	<b>MULTIDIGRAPHS</b>	<b>6 HRS</b>
	2.1 Converse of a Digraph / Multidigraph	
	2.2 Directional Duality Principle	
	2.3 Independent Set, Absorbent Set, Kernel	
	<b>QUIZ 1</b>	
<b>3.</b>	<b>UNDIRECTED GRAPHS</b>	<b>12 HRS</b>
	3.1 Simple Graph, Multigraph	
	3.2 Walk, Path and Cycle	
	3.3 Connected Graph, Components of a Graph	
	3.4 Regular Graphs, Platonic Solids	
	3.5 Adjacency Matrix	
	3.6 Complement	
	3.7 Isomorphism and Automorphism	
	<b>QUIZ 2</b>	
<b>4.</b>	<b>SUBGRAPHS</b>	<b>3 HRS</b>
	4.1 Proper Subgraph	
	4.2 Induced Subgraph	
	4.3 Spanning Subgraph	
<b>5.</b>	<b>SOME CLASSES OF GRAPHS</b>	<b>9 HRS</b>
	5.1 Tree	
	5.2 Complete Graph, Complete Bipartite Graph	
	5.3 Path, Cycle, Wheel	
	5.4 Hamiltonian Graphs	
	5.5 Eulerian Graphs	
	<b>QUIZ 3</b>	
<b>6.</b>	<b>SOME GRAPH INVARIANTS</b>	<b>3 HRS</b>
	6.1 Independence Number	
	6.2 Dominance Number	
	6.3 Chromatic Number	

**FINAL EXAMINATION**