Department of Computer Science (New Campus)
University of Engineering & Technology, Lahore

Subject: **Graph Theory** (6th Semester, 2022 Session) **Total Marks: 10**

Due Date: **14-04-2025 (4:00 PM)** **Semester Project**

CLOs	Questions	Marks
1	**Instructions:** 1. **Plagiarism / copying will result in ZERO marks.** 2. You will work on the friendship graph of session 2022 graph. (The graph is uploaded as an adjacency list with name Friendship_Graph_2022.csv)	

Registration Number	**Node ID in the Graph**
2022-CD-CS-2	200
2022-R/2019-CS-679	19679
2022-R/2021-CS-609	21609
2021-CS-634	21634

3. You need to perform Social Network Analysis (SNA) on the given graph. You should explore and analyze the graphs using all the methods / techniques you have learned for SNA.
4. You need to write a report to explain the results of your analysis.
5. Your report should not exceed 11 pages including the title page. On the title page, you must mention your Name and Registration number.
6. You can use MS Word for writing the report and then convert it to a PDF file. The name of the PDF file should be your registration number in the format 2022CSxxx.

Perform SNA and include the measures such as:

Before starting SNA, REMOVE YOURSELF from the graph. After removing yourself, check if the graph is disconnected or not. If the graph is disconnected, then find its Largest Connected Component (LCC) and work on it. If remains connected, then work on the given graph.

	1. Average degree, average clustering coefficient, average path length, diameter, assortativity value, highest degree node, lowest degree node etc. of the graph. (you can make a table to present these measures.) 2. Distribution of degree, clustering coefficient and path length of nodes. 3. 4 types of centrality measures of all the nodes. (Degree, Closeness, Betweenness, EigenValues). In the report, present the results of top-10 nodes only. 4. Find Communities in the graph and show them in different colors in the graph. (You can use asyn_lpa_communities method of networkx to find communities.) 5. Check if the graph shows 'Small-World' properties?	