CSL7390 Social Network Analysis
Assignment 4

Note: Refrain from using pre-written code or solutions from the internet, including AI language models (like LLMs), to compose your queries. Ensure that your submissions are entirely your own work, and avoid copying or sharing code with your classmates. The evaluation process will include a plagiarism check.

Please submit one zip file (named as <roll no.>.zip), which will consist of two files 1) the full code in Python script (convert the notebook into Python file) and 2) A report that will explain the theory and output. Late submissions are allowed. However, the marks you obtain will be calculated based on buffer days remaining. If you have a positive number of buffer days remaining, there will be no penalty for a late submission. Otherwise, a 50% penalty will be imposed on the corresponding submission. You can use the networkx python library for the assignment.

Task 1- Use the following data set as an undirected temporal network: [link]. Find all the communities in each graph created by taking a time interval of one month.

a. Use a modularity-based algorithm for detecting communities. (may use lib functions)
b. Use the Girvan-Newman algorithm for detecting communities. (may use lib functions)
c. Use a label propagation algorithm for detecting communities. (may use lib functions)
d. Use the Louvain algorithm for detecting communities. (may use lib functions)
e. Use normalized mutual information (NMI) to compare the three (b,c,d) algorithms for each time interval. For ground truth, use communities identified by the modularity-based community detection algorithm.