Schedule for INTR 6000M: Semester 1, Fall, 2024/25
Deep Learning for Human Mobility Analytics (MobiDL)

Lecturer: LIANG Yuxuan **Time&Loc:** Monday, 18:00-20:50 (Rm 202, E3)

Presentation & QA (×2) + **Reports** & **Project**: (40 + 60)%

	Date	Lecture/Tutorial Topics	Pre	Remarks
1	2 Sep	L1: Overview and Introduction		
2	9 Sep	L2: Tutorials on Deep Learning	✓	Introduce foundations in deep learning techniques, such as CNN, RNN, GNN, etc.
13	16 Sep	Transfer to **an online course for project discussion** (each team 20 mins) in **early November**. Details will be informed in late October.		Mid-Autumn Festival
3	23 Sep	L3: Spatio-Temporal Data Sensing and Management	✓	To form team (2 people)
4	30 Sep	L4: Cross-Domain Data Fusion and Multimodal Learning	✓	
5	14 Oct	L5: Location Embedding and Urban Region Profiling	✓	**Meeting 1**: Submit 1-page plan for project (by **14 Oct @ 23:59**)
6	21 Oct	L6: Learning Spatio-Temporal Trajectory Data	✓	
7	28 Oct	L7: Learning Spatio-Temporal Raster Data	✓	Submit Design Report (by **28 Oct @ 23:59**)
8	4 Nov	L8: Learning Spatio-Temporal Graph Data	✓	
9	11 Nov	L9: Advanced Topics in Human Mobility Analytics I	✓	Cover SSL and transfer learning **Meeting 2**: Finalize designs & applications
10	18 Nov	L10: Advanced Topics in Human Mobility Analytics II	✓	Cover PINNs, reinforcement learning, and adversarial training
11	25 Nov	L11: Large Language Models for Human Mobility Analytics	✓	
12	2 Dec	L12: Summary and Future Trends	✓	* Project presentation * Submit Systems Report & Codes (by **9 Dec @ 23:59**)

Presentation and QA (individual): **40%**

1) Each person is required to select 2 papers of different topics and make a **20-min** presentation each (15-min PRE + 5-min QA). The presentation should cover: objectives of paper, clear literature review, limitations, design/ implementation and results. Most importantly, it should cover the key innovations of paper, answer many of the "why" questions, and future work. The weightage of Presentation: **30%**
2) Each person is assigned 2~3 presentations to act as reviewer. You will need to pose 2-3 questions to each presenter. The questions should have good depth and help to uncover insight of paper. The weightage of question selection and process: **10%**

Reports + Project (individual and team): **60%**

Topic: **An Open Project on Deep Learning for Human Mobility Analytics**

Aim: To realize an advanced MobiDL project with content that is publishable with a bit more work. It should cover a new and innovative topic / technology / solution.

A) DESIGN REPORT: (deadline: 28 Oct @ 23:59)

To write a report on a chosen topic/ project. The report should include objective, issues, reviews, analysis of problem, innovations, solutions, and highlight possible limitations. It should also include preliminary design of system to be developed.

In particular, I am looking into 5 aspects of report during grading. (1) Motivation: I am looking for clear motivation of why the solution is needed and the main technological challenges. (2) Literature Review: It should paint a clear picture of current works, with details of their shortcomings, and ideally, with a taxonomy to categorize all existing works. (3) Design of methods and systems to tackle the problem. I am looking at how the design addresses the current limitations, and/or offer solution to new (important) problems. (4) Key contributions. (5) Amount of additional efforts needed towards a publishable research paper.

The report should not be more than 8 pages, in ACM 2-column format, excluding references. The weight of Design Report: **10%**

B) SYSTEM REPORT & DEMO:

To implement the system described in the above design report, with demo and testing.

1) Submit Final Report and Codes (by 9 Dec @ 23:59)

To submit the final report of not more than 8 pages. It should extend the design report, and incorporate the systems aspects of the application described in the previous report. It should include more details of systems design, implementation issues key innovative functions of the final system, with results, analysis and insights. You should also upload the codes to be used for demo. The weight of Final Paper: **30%**

2) Final presentation and Demo: To present in class to all, with lecturer grading (2 Dec @ 18:00-20:50). The weight of Presentation and Demo: **20%**