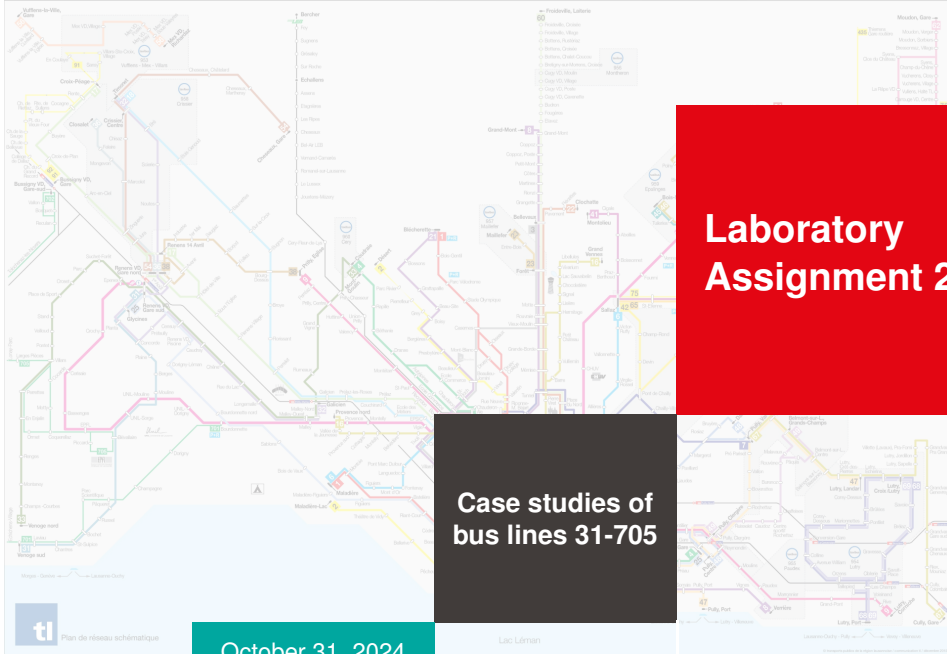


EPFL

LUTS

■ School of
Architecture,
Civil and
Environmental
Engineering



October 31, 2024

Case studies of
bus lines 31-705

Laboratory
Assignment 2

Main objectives

- Decomposition of a real bus cycle into its different components (driving / boarding and alighting / waiting)
- Optimization of the bus cycle time

Data to collect:

- Arrival and departure times at each bus stop;
- Boarding/alighting duration at each bus stop;
- Number of passengers boarding and alighting at each bus stop;
- Lost time:
 - Waiting time to respect timetable;
 - Waiting time for other reasons (e.g.: traffic disturbance);

Example: bus_705_stops.xlsx

Bus line: 705						
Stops	Time		Passengers		Lost time	
	Arrival	Departure	Boarding	Alighting	Duration	Reason
Direction: EPFL Piccard						
Lonay, parc						
Lonay, église						
Lonay, Carouge						
Lonay, collège sud						
Lonay, gare						
Préverenges, Capellan						
Préverenges, village						
Denges, Pierraz-Mur						

...

Print from Moodle beforehand

4



Bus lines (to be confirmed)

BUS	DEP. TIME	STOP	DIRECTION
705	16h08	Piccard	Lonay
31	16h19	Pâqueret	Venoge Sud
705	16h23	Piccard	Lonay
31	16h34	Pâqueret	Venoge Sud
705	16h38	Piccard	Lonay
31	16h39	Pâqueret	Venoge Sud

Data collection instructions

Distribution of tasks:

- All students of a group will board a bus following the schedule provided on the week of the midterm exam;
- The students will travel an entire round trip of the designated line (start and end at the same stop);
- Passenger counting: **3 students** should position close to the doors (one student per bus door) and count the number of passengers boarding and exiting the bus (count separately the entrances and exits);
- Time keeping (precision to 1 second): **2 students** should record the:
 - Arriving time at each stop;
 - Time spent at each stop;
 - Extra time;

Important notes

- If the bus does not stop at a certain stop:
 - Mark the time the bus passed at that stop;
 - Set the stop time as 0 at that stop;
- Notes on the data:
 - Time keeping activities should have precision **in the order of seconds**;
 - Students involved in the data collection should not be counted as passengers;
- When first boarding the bus:
 - Groups boarding outside the terminus: count the number of passengers inside the bus as boarding passengers in the previous stop;
 - Groups boarding at the terminus: count the number of passengers as boarding;
 - For ease of data collection, do not count the number of alighting passengers at the bus stop;

Frequent question: Lost time

Lost time is the extra time the bus spends at a bus stop besides the time required for passengers to board and alight.

Examples: the bus is ready to depart but

- it has to wait for the traffic lights to turn green;
- it is waiting for other passing vehicles on the road;
- it has to wait for a queue of vehicles on another lane;
- the driver decides to hold and reopen the doors for a running passenger;
- ...

After data collection

After the data collection, please transcribe your data into the provided excel spreadsheet. Rename the file as `groupX_busXX_XXhXX_stopname.xlsx` and upload your file on Moodle **by 23:59 on November 8** (one submission per group).

We will merge the data from all groups into a single file which will be used by all groups on the assignment.

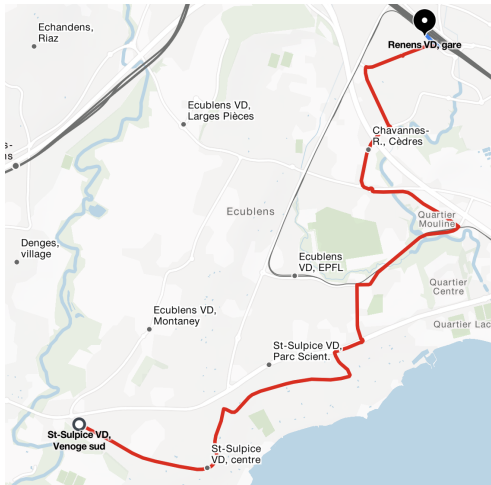
The data collection is part of the final grade on the assignment. Therefore, data fabrication WILL NOT BE TOLERATED.

Output of the laboratory assignment

- Estimation of the travel time variability for buses.
- Estimation of correlation between waiting time and number of embarking and alighting at each stop and with the travel time.
- Estimation of correlations between events occurring at different stops.
- Estimation of potential improvements if buses did not have “round” cycle times.
- Other potential improvements of the service for people from and to EPFL.



Information on the studied lines for the assignment



Bus line 31

Boarding stop: St-Sulpice VD, Pâqueret

Directions:

- St. Sulpice, Venoge sud and
- Renens, gare sud



Bus line 705

Boarding stop: Ecublens VD, EPFL Piccard

Directions:

■ Lonay, parc

■ Ecublens VD, EPFL Piccard

Summary

- Each group will be assigned to a specific itinerary and task:
 - Bus line
 - Departing stop
 - Exact departure time
- Students will take their tickets from the TAs before getting on the bus
- Chronometers are needed (you can use your cell phones)
- Print the data collection forms (bus_XXX_stops.xlsx) to help you take notes
- Upload excel on Moodle before Friday, Nov. 8 at 23:59

Answer the following survey by **Sunday, November 3, 2024**:

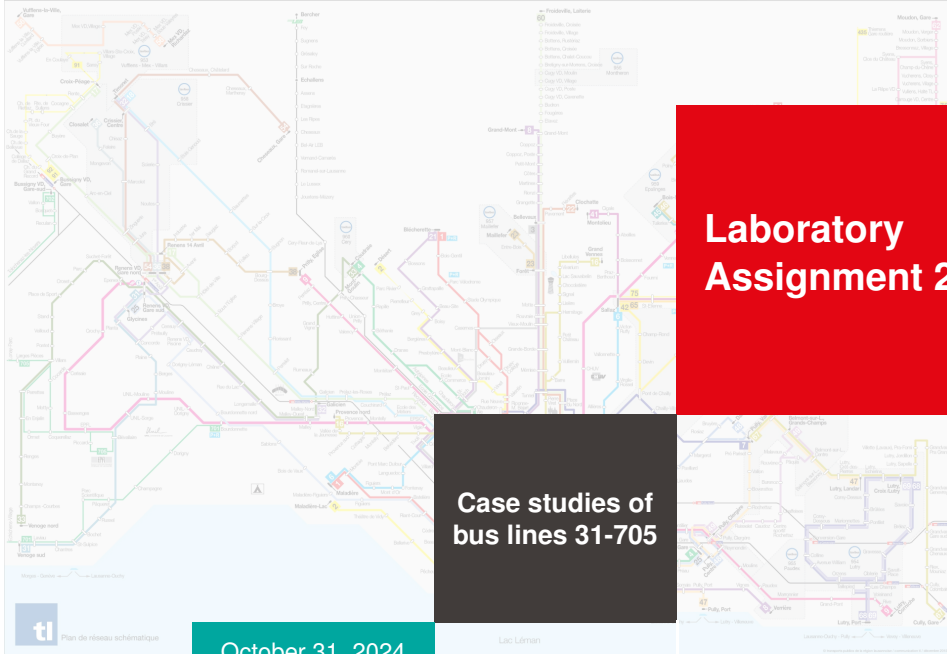
[Google Form link here](#)

- Here, you will specify if you have any Mobilis subscriptions and the zones covered, so that we can assign the groups and distribute bus tickets on the day of data collection.

EPFL

LUTS

■ School of
Architecture,
Civil and
Environmental
Engineering



Laboratory Assignment 2

Case studies of
bus lines 31-705