

ELE 635 Communication Systems

Laboratory Information

General Information

- All lab sessions will be held in the *Communications Laboratory* located in room ENG 311.
- No food or drinks are allowed in all departmental laboratories at any time.
- Students can only attend the lab sections they have registered in.
- All information on ELE 635 labs, experiments, software packages are accessible from the ELE 635 course page on BlackBoard accessible through [my.ryerson](#) portal. Once you are on the ELE 635 course page select the **Laboratory** menu item.
- All users of departmental computing facilities should read and become familiar with the Network User Guide. The Network User Guide provides answers to common questions, collected over several years, that many new and experienced users may have. The guide is available online at www.ee.ryerson.ca/guides/user/

Laboratory Regulations

The following set of regulations are guidelines for completing the experiments in an efficient and productive way. Adherence to these set of guidelines will allow you to achieve a complete learning experience from working on the experiments.

Experiments

- In *ELE 635 Communication Systems* course you will work on four experiments:
 1. Spectral analysis;
 2. Amplitude Modulation (AM);
 3. Frequency Modulation (FM);
 4. AM and FM receiver implementations using *Software Defined Radio*.
- The **Laboratory** menu item on the ELE 635 course page on BlackBoard provides links to individual experiments. Through these links you can access the experiment document (e.g. lab1_F2015.pdf), information on the completion deadlines, any applicable set-up and MATLAB/SIMULINK file(s) that you may need for the experiment. Each experiment document presents objectives, prelab assignments, experiment procedures and discussion questions.
- You will work in groups of no more than two. Please inform the membership of your lab group to your lab instructor before the end of Week 2 lab session.

Lab setup/equipment

- The setup in the *Communications Laboratory* includes equipment and software that you may not have used before. Becoming familiar with their basic as well as advanced functionalities are essential for efficient, productive and informative lab sessions.
- While your lab instructors will briefly introduce each new equipment and software to get you started, it will be your responsibility to learn more about the equipment and software. For example, the Agilent DSO-X 2002A digital storage oscilloscope is the main bench top instrument you will use for time- and frequency-domain display and analysis of the signals generated during the experiments. You should familiarize yourself with its controls, learn its key features, set-up procedures, spectrum analyzer functions and how to capture images of displayed waveforms. In many cases there are extensive on-line help facilities. If available, complete *user manuals* (or links to them) are posted on BlackBoard.

Before coming to the lab

- Read the experiment document.
- Complete all prelab tasks: read the assigned section(s) from the course reference text/notes and solve all prelab problems. In all experiments, prelab problems are closely linked to experiment steps. Thus, they provide valuable insight and information on what you expect to observe in the experiment.

In the lab

- During the scheduled lab hours your lab instructor will introduce the experiment, explain its objectives, answer any questions you may have about the experiment. At the completion of the each experiment your instructor may also ask questions on how you performed the experiment steps, collected data as well as on the contents of the report you submitted.
- Any student who is absent from the *Communications Laboratory* for an extended duration without the permission of the lab instructor will be marked absent. In case there is a valid reason to leave the laboratory, students must first consult the lab instructor and receive permission.
- At the beginning of each lab session, all students must submit to their lab instructor: (i) answers to **prelab assignment questions**, (ii) answers to **discussion questions** from the previous experiment. **Students must individually answer all prelab assignment and discussion questions.**
- All students are requested to show the experiment measurements/results to their lab instructors before leaving the laboratory. This consultation is essential to receive credit for the lab sessions.

- At the end of each lab session, students are kindly requested to return the measuring devices, equipment and cables to their proper places.

Assessment

Laboratory grade will be based on student performance in experiments (25% of the course grade) and assessment of a formal laboratory report (5% of the course grade).

For each experiment

- Marks are based on attendance, correctness of answers to prelab assignment questions and discussion questions, participation, and successful completion of the experiment.

Report

- Each group will submit one formal report.
- The report will be based on the work completed in one of the five experiments assigned at random from the experiment list by the lab instructor.
- All reports will be assessed not only on their technical/academic merit, but also on the communication skills exhibited through the report.
- All reports must include the standard cover page signed by all students in the group. Submissions without the cover pages will not be accepted. A copy of the cover page is available from the **Laboratory** menu item on the ELE 635 course page on BlackBoard.
- The report will accurately represent the findings of the student for that particular experiment.
- Reports include answers to the assignment problems and discussion questions stated in the assignment document. Answers may include numerical results, plots generated by MATLAB, code segments and/or other information as appropriate.
- Refer to the *Formal Laboratory Report Preparation Guidelines* document for additional information on how to prepare and structure the report.

Time Allowed to Complete Formal Lab Report

- You will have **two weeks** to complete your formal report. For example, if you are assigned to write a report on the experiment you just finished, then as you come to the lab two weeks later, you must submit your completed formal report to your lab instructor. In the case of the last experiment, your lab instructor will let you know where and how to submit the report. **Late submission will not be accepted and will receive the mark ZERO.**