

## COURSE PROJECT

The course project can be done individually or in two-person teams. The decision as to team membership must be worked out before the project proposal is submitted on September 23<sup>rd</sup>.

This document provides general suggestions for the course project and project due dates. Students are free to submit any reasonable proposal, but the course project should be interesting and one the students can undertake. The following lists suggested project types:

1. An actual implementation and performance analysis using the TelosB sensors. This involves a real Wireless Sensor Network (WSN) and performance measurements.
2. A simulation study of a WSN that runs using Contiki and the associated protocol stack. This simulation project would use the publically available Cooja simulator.
3. An empirical network performance study where the students use existing tools to measure and evaluate some aspect of network performance on a LAN or on the Internet. **Given the emphasis of the course, I strongly encourage a measurement project that involves wireless LANs or WSNs.**
4. A simulation study that is an extensive analysis of some aspect of computer networks. The **ns-2 simulator** has been used extensively by the WPI CC Research group. The newer **ns-3 simulator** can simulate either cellular networks (e.g. 4G LTE) or MANETs. CS grad students have used the OMNET++ simulator to study WLANs.
5. A mathematical treatment of a specific problem in computer networks. This can be a continuation of an algorithm or an analysis of a network performance problem discussed in the literature. For this type of project to be acceptable the final report must demonstrate that the students have a very thorough understanding of a specific research problem and have not simply extracted the results from a paper. This type of project could be done within the context of encryption or network security research.
6. To build and exercise a computer program which simulates some aspect of computer networks. **Prior knowledge of simulation techniques is required** for this type of project. Building a specialized simulator only makes sense when no currently available simulators are adequate to characterize the network of interest.
7. An in-depth research paper/term paper on some aspect of computer networks **NOT** covered in detail in this course. This is the least technical choice in that no programming or building of hardware is required. The paper could be of a survey nature with an extensive literature search or it can be an in-depth probe into a specific issue in computer networks.

Other types of network projects are possible but all proposals must be approved by October 4<sup>th</sup>.

## Project Due Dates

### Proposal

**Due: September 23, 2014**

Each project team should meet with me prior to this due date to discuss potential project ideas. Each group must submit a project proposal electronically. The proposal includes: an explanation of the project including: expected outcomes, a description of the work to be done, resources needed to do the project, and a discussion of the value of the project relative to the research focus areas and to the objectives of this course.

The proposal is either accepted or returned for revision, but it is not a graded assignment.

### Progress Report or Design Report

**Due: November 11, 2014**

This report clearly states the current status of your project. If the project involves building something (e.g. software, hardware or conducting experimental data collection), the progress report is a **complete design report**. If the project involves algorithm analysis or an in-depth investigation of some aspect of computer networks, this progress report must include a clear discussion of the problem, include the current state of your analysis or investigation. The progress report must include your **completed bibliography (properly formatted)**. The expected length of this report is between 10 and 20 pages (not counting pages with figures or diagrams).

This report will receive a letter grade based on all the standard criteria of a professional technical report (i.e., technical organization, grammar, writing style, typos/misspellings and content will **ALL** be considered). pseudo-code is **unacceptable** in a design report. Professional technical prose is expected. The penalty for late submissions is the lowering of the grade one + or – level per week late (e.g., If a team turns this report in one week late on November 18<sup>th</sup> and it deserves a B+ letter grade, then the late penalty would mean the report would receive a B grade.

Note: This report can easily be the basis for the final report. The key is to demonstrate that a sufficient amount of work has been done at this point.

### Project Presentation

**Due: December 10, 2014**

Each team must give a PowerPoint presentation of their project. More details on the expected time length for these presentations will be provided once we know the final class size.

### Final Project and Report

**Due: December 19, 2014 at 4 p.m.**

The final report should be a well-presented technical report discussing your project. If your project is primarily a programming effort, you should explain how the program works, give specific sample runs and analyze the results using appropriate graphs and tables. You must

turn in a electronic copy of your program which must conform to standard commenting expectations. **The analysis of results is the most important component of the final report.**

The final report may include parts of your progress report. The written report should be 15 to 30 pages in length. You **must** turn in your graded progress report with your final report. If the group feels a live demo would help explain the project, then a live demo should be scheduled on or before December 19<sup>th</sup>.