SYLLABUS
CprE 530 / CprE 430

Advanced Protocols and Network Security

Spring 2019

Note:

The spring semester is a replay of the lectures from the fall semester. Please contact the instructor for any questions that come up during the course. As far as due dates for the assignments, they all have a date and a length. Go by the length of time. I will have no hard deadlines for any assignments or tests. You need to be **finished with the course by May 3.** Everything is available as of today, so you can go at your own pace through the course (You can go faster than the schedule if you want)

Instructor:

Doug Jacobson
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Slack channel: ISU-IAC-530.slack.com   (use your ISU email address to sign in)

Course web site:
> We use canvas for course notes, slides, homework, and assignment submission.
> www.dougj.net/530 has additional material

Text:

Introduction to Network Security, Douglas W. Jacobson
Publisher: Chapman & Hall/CRC; 1st edition (November 18, 2008)
ISBN-10: 1584885432, **ISBN-13:** 978-1584885436

Prerequisites:

Knowledge of basic computer concepts, operating systems, and virtualization.

Course Objective:

Detailed examination of networking standards, protocols, and their implementation. TCP/IP protocol suite, network application protocols, IP routing, network security issues. Emphasis on laboratory experiments.

Course Requirements and Grading Policy:

Cpr E 430:
Examinations:	Two midterms (75 min)	60%
Projects:	Homework and labs	40%

Cpr E 530:
Examinations:	Two midterms (75 min)	60%
Projects:	Homework, labs, research paper	40%

In accordance with University policy, +/- grading will be used

Course Learning Objectives:

Upon completing this course a student will:

- ·   Understand the relationship between network layers, network services and functions.
- ·   Understand the function of each of the layers in the TCP/IP protocol suite.
- ·   Be able to describe the TCP/IP network protocols and the effect of an open network protocol on security
- ·   Be able to snoop traffic from a network and decode the data
- ·   Be able to understand the effect of EM and the goals of TEMPEST and TEMPEST policies
- ·   Be able to write programs the use the TCP/IP socket level interface.
- ·   Understand the tradeoffs used in the design of the network protocols
- ·   Be able to setup routing table for IP
- ·   Be able to describe the functions of the packets used in each of the upper layers
- ·   Be able to describe the function of each of the packets in the most common TCP/IP applications

Major Topics:

- ·   Introduction
- ·   Data link Layer
- ·   Network Layer
- ·   Transport Layer
- ·   Sockets
- ·   Application Layer
- ·   System Issues
- ·   IPng
- ·   other networks

Method of Instruction:

The course is taught using lectures which are also video taped to the off campus students. The course also has a laboratory component. Student taking the 530 version of the course will be required to write a research paper.

In a field of cutting-edge technological engineering students will be required to be creators of knowledge and inventors of processes, not simply users of information. This requirement will make students move beyond being knowledgeable about the content and into the higher realms of analyzing situations, designing systems, and evaluating results. To accomplish these cognitive goals, the emphasis in the classroom will be on the student. Student-centered classrooms will enhance student learning by helping them understand the content on the basis of real-world experiences, engaging them in interactive learning situations, and providing problem-based projects from which they will learn.

Off-Campus Students:

You are required to have a proctor to take your exams. Please read over the Proctored Testing for Students (http://www.eol.iastate.edu/proctored-testing-guidelines-for-students/). You must have your potential proctor fill out the following form to be approved: http://www.testing.las.iastate.edu/oc-proctor/application. **If you intend to take the exam in the Gilman Hall Testing Center on the Iowa State campus** you need to schedule the time to take the exam. Students should use the link below to register a time to take their http://isutestcenters.appointy.com/.

Academic Dishonesty

The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office.

http://www.studentconduct.dso.iastate.edu/academic-misconduct/armfacultystaff

Disability Accommodation

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact (instructor name) to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with (instructor name), you will need to obtain a SAAR form with recommendations for accommodations from the Student Disability Resources (https://www.sdr.dso.iastate.edu/) , located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu . Retroactive requests for accommodations will not be honored.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

CprE 530

Tentative Schedule

Spring 2019

Class	Day	Date	Topic	Chapter
1	Tue	15-Jan	Introduction	1
2	Thr	17-Jan	Protocols	1,2
3	Tue	22-Jan	The Internet	3
4	Thr	24-Jan	Security Taxonomy	3,4
5	Tue	29-Jan	Security Taxonomy	4
6	Thr	31-Jan	Physical Layer	5
7	Tue	5-Feb	Physical Layer	5
8	Thr	7-Feb	Physical Layer	5
9	Tue	12-Feb	Network Layer	6
10	Thr	14-Feb	Network Layer	6
11	Tue	19-Feb	Network Layer	6
12	Thr	21-Feb	Network Layer	6
13	Tue	26-Feb	Transport Layer	7
14	Thr	28-Feb	Transport Layer	7
15	Tue	5-Mar	Transport Layer	7
16	Thr	7-Mar	**Test 1**	
17	Tue	12-Mar	Application layer	8
18	Thr	14-Mar	Application layer	8
19	Tue	19-Mar	Break	
20	Thr	21-Mar	Break	
21	Tue	26-Mar	Email	9
22	Thr	28-Mar	Email	9
23	Tue	2-Apr	Email	9
24	Thr	4-Apr	Web	10
25	Tue	9-Apr	**No Class**	10
26	Thr	11-Apr	Web	10
		16-Apr	Remote access	11
		18-Apr	Remote access	11
27	Tue	23-Apr	System Wide Solutions	12
28	Thr	25-Apr	System Wide Solutions	12
29	Tue	30-Apr	System Wide Solutions	12
30	Thr	2-May	**Test 2**	
		3-May	**Must be done with course**	