Oakland University- winter 2018

School of Engineering and Computer Science
Department of Computer Science and Engineering

CSI-2470-14440.201810-Intro to Computer Networks
Meeting Time: Jan 04, - Apr 24, 2018 3:30 – 5:17 PM | Engineering Center | Room 554

Professor Contact Information: **Dr. Hany Othman:** Cell phone: 248-687-9454 **Fax:** (248) 370-4625
Oakland email: othman@oakland.edu (please put CSI-2470 in the subject line)
Personal email: Drhanyothman@gmail.com (please put CSI-2470 in the subject line)
Office Hours: Available hours: anytime! You can expect an answer within 24-48 hours, but I strive to answer your questions ASAP. Please ask questions, email, or call/text 248-687-9454. I am available to assist all of you. I look forward to meeting each of you and working together throughout the semester!
The academic calendar https://oakland.edu/registrar/important-dates/

Jan 03-2018	Classes begin 7:30 a.m.
Feb 17-2018	Winter recess begins 10 p.m.
Feb 26-2018	Classes resume 7:30 a.m.
April 17-2018	Classes end 10 p.m.
April. 18-2018	Study day
April. 25 2018	Final exams end at 10 p.m.
April. 30	Grades due 10 a.m.

Professor Information

Introduction: Dr. Othman is a technology professional with years of experience in a variety of Information Technology and management positions for companies such as Comcast, EDS, CompUSA, Access Technologies, Integrated Information System, and Open IP Technologies. Dr. Othman has managed activities including brand- and image-building, marketing, merchandising, e-commerce and event management - which consisted of public and corporate relations events. Dr. Othman holds a Bachelor of Science degree in Business/E-Business, a Master's Degree of Science in "Information Resource Management", Doctorate in Computer Science- Digital System Security (Dissertation Topic- "Performance and acceptance of biometrics as an anti-cheating tool in an online test setting"), and Microsoft Certified System Engineer.

Course Description:

An introduction to fundamental concepts for design and analyses of computer networks. Topics covered include the physical layer, network protocols, Local Area Networks, Internet, wireless and mobile networks, network security, and socket programming. (Formerly CIT 247 and CSE 247) Prerequisite(s): high level programming course or (CIT 230 or CSE 230 or CSI 2300).

Textbook: COMPUTER NETWORKING- By KUROSE **Optional**

Software Requirements: Testout Network Pro Required

Software Required: Please go to https://shop.testout.com/Products.aspx and enter (**14-380TA**) in the "Price Code" box and click "Continue". Select the course title that you need TestOut Network Pro 18-Month License ISBN: 978-1-935080-43-5and click "Add to Cart". One key point we require before we can validate the order, your school name must match exactly the way we have it in our system, which is "**Oakland University**." Two, a teacher name must be included "**Hany Othman**". During the checkout process a default is set to grant immediate online access. An email with download instructions which will be provided as soon as your order has been finalized. Please follow this link http://wwwnew.testout.com/docs/tutorials/student-tutorials/tutorial-getting-started-student-accounts-not-activated-by-teachers.pdf for instructions on creating your LabSim account and enrolling in your class at the school.

General Education Learning Outcomes:

Formal Reasoning: FR1. Knowledge of one or more formal reasoning systems such as computer programming, mathematics, statistics, linguistics or logic
FR2. Application of formal reasoning to read, understand, model and solve problems across a variety of applications
Cross-Cutting Capacities: EC1. Critical thinking

Course Procedures

This course will be presented on campus and online using the Modular Object-Oriented Dynamic Learning Environment (Moodle) and TestOut.com. We will follow selected portions of the course textbook quite closely. Weekly study assignments will be given which will outline the tasks that need to be completed that week. Supplemental course materials and Forum discussions will be used to tie the course material together. Since this is a hands-on course, you will be expected to spend a considerable amount of time each week reviewing the course materials and completing the designated tasks.

Course Regulations:

Late Policies: This course covers a lot of material and late assignments will seriously impact your ability to learn the next section of the course. Assignments are due at 11:55pm (EST) the due date. Late submission will be penalized 10% per day, up to 7 days. After that the assignments will not be accepted (no exceptions).
Cooperation and Cheating: Feel free to discuss homework and projects with other members of the class, myself. However, do not look at or copy another student's solution to a homework or project. I am not concerned with how you come to understand the problem and how to solve it, but once you have the background necessary to solve it, you must provide your own solution. Exchanging homework or project solutions is cheating and will be reported to the University, and you will lose credit for the course. Cheating will not be tolerated. A student found cheating on an exam will receive an automatic grade of 0 on the exam, and likely will fail the course as well. All students must be aware of the contents of Academic Conduct Regulations (http://www2.oakland.edu/deanofstudents/handbook/acr.cfm).

Participant and Facilitator Expectations

Participants are enrolled into this course as a student participant role. There are quizzes and assignments throughout the course with specific due dates.

Course participants are expected to:

- Ensure that their computer is compatible with Moodle.
- Login 3-5 times a week; daily login is highly recommended.
- Login into Moodle weekly to complete all assignments by their deadline
- Read and respond to emails within 3 days
- Participate in a thoughtful manner
    - Respect rules of netiquette: Respect your peers and their privacy, use constructive criticism, and Refrain from engaging in inflammatory comments.

Course Professor will: meet with students within 3 days of requesting an appointment, and log into the course 3-5 times per week.

Advice for doing well in this course:

- As with any course you must be disciplined with your studies. You are in control of your study plan. Many students fall behind (or fail the course) because they haven't set up a weekly study plan. I recommend that at the beginning of every week you review the material and schedule so that you can see what will be expected of you for that next week. Then, choose days that work with your schedule that you can set aside each week to work on the assignments – stick to this and you likely won't miss assignments or fall behind in the course.
- Review the assignments when they are initially assigned (even if you don't have time to work on them right then). This way you can plan out your week and get your questions answered early.
- Don't wait until the last minute to work on an assignment at home. Make sure you have all the necessary installations completed well before, so you have time to get issues fixed should they arise.

Inform your instructor of any accommodations needed:

Please email the instructor if you have a documented disability and verification document from the Student Disability Services. www.oakland.edu/dss

Program Outcomes: Program outcomes are a set of skills that assure the achievement of the program educational objectives and are necessary for professional engineering practice. Before graduating, SECS students will demonstrate their skills in the following key areas:
a) An ability to apply knowledge of computing and mathematics appropriate to the discipline;
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;
d) An ability to function effectively on teams to accomplish a common goal;
e) An understanding of professional, ethical, legal, security, and social issues and responsibilities;
f) An ability to communicate effectively with a range of audiences;
g) An ability to analyze the local and global impact of computing on individuals, organizations and society;
h) Recognition of the need for, and an ability to engage in, continuing professional development;
i) An ability to use current techniques, skills, and tools necessary for computing practice;
j) An ability to use and apply current technical concepts and practices in the core information technologies.
k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems.
l) An ability to effectively integrate IT-based solutions into the user environment.
m) An understanding of best practices and standards and their application.
n) An ability to assist in the creation of an effective project plan.

Grading: The final grade will be based upon the following weights:	
Items	**Percentage**
Final Project	15%
Homework: Test OUT (Lab Simulations & Practice Questions)	45%
4 Exams	40%

GRADING SCALE:

Considered "A" s	**Considered "B" s**	**Considered "C" s**	**Considered "D" s**
4.0 100. % - 98.60	3.5 90.59 – 88.60	2.9 79.59 – 78.60	1.9 69.59 – 68.60
3.9 98.59 – 96.60	3.4 88.59 – 86.60	2.8 78.59 – 77.60	1.8 68.59 – 67.60
3.8 96.59 – 94.60	3.3 86.59 – 84.60	2.7 77.59 – 76.60	1.7 67.59 – 66.60
3.7 94.59 – 92.60	3.2 84.59 – 82.60	2.6 76.59 – 75.60	1.6 66.59 – 65.60
3.6 92.59 – 90.60	3.1 82.59 – 80.60	2.5 75.59 – 74.60	1.5 65.59 – 64.60
	3.0 80.59 – 79.60	2.4 74.59 – 73.60	1.4 64.59 – 63.60
		2.3 73.59 – 72.60	1.3 63.59 – 62.60
		2.2 72.59 – 71.60	1.2 62.59 – 61.60
		2.1 71.59 – 70.60	1.1 61.59 – 60.60
		2.0 70.59 – 69.60	1.0 60.59 – 59.60

Tentative Class Schedule

Lecture topics and homework assignments are subject to continuous change according to students 'learning process at the discretion of the instructor.

Weeks	Assignments/Exams
Week 1 **01-04**	Course Intro, read your Syllabus, and order your Testout Network Pro.
Week 2 **01-9**	CH 0.0, and 1.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Week 3 **01- 16**	CH 2.0, and 3.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Week 4 **01-23**	CH 4.0 (Lab Simulations & Practice Exams) **25 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Week 5 **01-30**	**Exam 1 Chapter 1-4 100 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Week 6 **02-06**	CH 5.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Week 7 **02-13**	CH 6.0 and CH 7.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Winter recess **02-17**	**Winter recess begins 10 p.m. 02-17. Classes resume 7:30 a.m. 02-26**
Week 8 **02-27**	CH 8.0 (Lab Simulations & Practice Exams) **25 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day
Week 9 **03-06**	**Exam 2 Chapter 5-8 100 Points**
Week 10 **03-13**	CH 9.0 and CH 10.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day **Final Project Presentation**
Week 11 **03-20**	CH 11.0 and CH 12.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day **Final Project Presentation**
Week 12 **03-27**	**Exam 3 Chapter 9-12 100 Points** **Final Project Presentation**
Week 13 **04-03**	CH 13.0 and CH 14.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day **Final Project Presentation**
Week 14 **04-10**	CH 15.0 and CH 16.0 (Lab Simulations & Practice Exams) **50 Points** Tuesday Lecture Day, Thursday Hands on Simulations Day **Final Project Presentation**
Week 15 **04-17** **04-18** **04-19-04-24**	**Final Project Due** **Classes end 10 p.m.** **Study Day** **Final Exam CH 13-16 100 Points**

Approximate Time for the Course

The total time for the LabSim for Network Pro course is approximately **68 hours and 14 minutes**. Time is calculated by adding the approximate time for each section which is calculated using the following elements:

- Video/demo times
- Approximate time to read the text lesson (the length of each text lesson is taken into consideration but between 5-15 minutes each text lesson)
- Simulations (5 minutes assigned per simulation)
- Questions (1 minute per question)

Additionally, there are approximately another **26 hours and 44 minutes** of Practice Test material at the end of the course.

The breakdown for this course is as follows:

Module	Sections	Time	Videos	Labs	Tex	Exam
0.0 Introduction						
	0.1 Using the Simulator	29	19	10	0	0
	Total	**0:29**	**0:19**	**0:10**	**0:0**	**0:00**
1.1 Networking Basics						
	1.1 Networking Overview	34	24	0	9	3
	1.2 Network Topologies	26	7	0	7	12
	1.3 The OSI Model	40	14	0	11	15
	1.4 Network Signaling	21	13	0	5	3
	1.5 Network Protocols	42	25	0	5	12
	1.6 Numbering Systems	14	9	0	2	3
	Total	**2:57**	**1:32**	**0:00**	**0:3**	**0:48**
2.0 Cables and Connectors						
	2.1 Twisted Pair	23	6	5	5	7
	2.2 Coaxial	20	5	5	4	6
	2.3 Fiber Optic	27	8	5	5	9
	2.4 Wiring Implementation	62	23	10	15	14
	2.5 Troubleshooting Network Media	60	32	0	20	8
	Total	**3:12**	**1:14**	**0:25**	**0:4**	**0:44**
3.0 Networking Devices						
	3.1 Network Adapters	34	9	10	5	10
	3.2 Network Devices	30	10	10	5	5
	3.3 Internetwork Devices	21	6	5	5	5
	Total	**1:25**	**0:25**	**0:25**	**0:1**	**0:20**

Module	Sections	Time	Videos	Labs	Tex	Exam
4.0 Ethernet						
	4.1 Ethernet	19	10	0	5	4
	4.2 Ethernet Specifications	34	9	5	6	14
	4.3 Connecting Network Devices	33	9	5	8	11
	4.4 Troubleshooting Physical	57	13	25	7	12
	Total	**2:22**	**0:41**	**0:35**	**0:2**	**0:41**
5.0 IP Configuration						
	5.1 IP Addressing	75	31	10	20	14
	5.2 Alternate IP Addressing	23	10	5	5	3
	5.3 DHCP Server Configuration	56	18	25	5	8
	5.4 DHCP Relay	28	10	10	5	3
	5.5 DNS Name Resolution	71	32	30	6	3
	5.6 IP version 6	74	41	5	25	3
	5.7 Multicast	22	6	0	10	6
	5.8 Troubleshooting IP Configuration	55	20	25	5	5
	5.9 Troubleshooting IP Communications	62	32	5	10	15
	5.10 Troubleshooting Name Resolution	27	15	0	5	7
	Total	**8:13**	**3:35**	**1:55**	**1:3**	**1:07**
6.0 Switch Management						
	6.1 Switch Access	47	24	5	15	3
	6.2 Switch IP Configuration	22	4	10	5	3
	6.3 Switch Interface Configuration	40	16	5	15	4
	6.4 Virtual LANs	43	12	10	10	11
	6.5 Trunking	59	18	15	20	6
	6.6 Spanning Tree Protocol	71	22	15	20	14
	6.7 Switch Troubleshooting	38	15	0	10	13
	Total	**5:20**	**1:51**	**1:00**	**1:3**	**0:54**
7.0 Routing						
	7.1 Routing Basics	20	10	0	5	5
	7.2 Routing Protocols	71	31	10	15	15
	7.3 Network Address Translation	47	29	0	7	11
	7.4 Routing Optimization	38	22	0	10	6
	7.5 Routing Troubleshooting	53	21	10	10	12
	Total	**3:49**	**1:53**	**0:20**	**0:4**	**0:49**
8.0 Firewalls						
	8.1 Firewalls	53	20	5	15	13
	8.2 Security Appliances	21	11	5	2	3
	8.3 Firewall Design and Implementation	80	45	10	10	15
	Total	**2:34**	**1:16**	**0:20**	**0:2**	**0:31**

Module Sections	Time	Videos	Labs	Text	Exams
9.0 Network Customization					
9.1 Network-Based Storage	56	36	10	5	7
9.2 Voice over IP (VoIP)	48	11	10	15	12
9.3 Virtualization	24	13	0	7	4
9.4 Virtual Networking	41	17	0	15	9
9.5 Cloud Computing	25	12	0	7	5
9.6 SCADA Systems	20	6	0	7	7
Total	**3:34**	**1:35**	**0:20**	**0:56**	**0:44**
10.0 Wireless Networking					
10.1 Wireless Concepts	39	16	0	20	3
10.2 Wireless Standards	53	30	0	10	13
10.3 Wireless Configuration	46	21	15	6	4
10.4 Wireless Network Design	66	27	10	20	9
10.5 Wireless Network Implementation	35	16	5	10	4
10.6 Wireless Security	83	38	5	25	15
10.7 Wireless Troubleshooting	75	30	20	10	15
Total	**6:37**	**2:58**	**0:55**	**1:41**	**1:03**
11.0 Wide Area Networks (WANs)					
11.1 WAN Concepts	54	27	0	15	12
11.2 WAN Connections	33	10	5	10	8
11.3 Internet Connectivity	53	22	5	10	16
11.4 Remote Access	63	40	0	10	13
11.5 WAN Troubleshooting	36	17	0	5	14
Total	**3:59**	**1:56**	**0:10**	**0:50**	**1:03**
12.0 Network Policies and Procedures					
12.1 Network Design, Documentation	68	28	0	25	15
12.2 Safety	44	15	0	20	9
12.3 Risk Management	45	6	0	25	14
12.4 Security Policies and Assessments	62	27	0	20	15
Total	**3:39**	**1:16**	**0**	**1:30**	**0:53**
13.0 Network Security					
13.1 Physical Security	51	11	5	20	15
13.2 Social Engineering	55	23	5	15	12
13.3 Network Vulnerabilities and	73	29	0	30	14
13.4 Network Vulnerabilities and	60	27	0	25	8
13.5 Authentication	64	24	0	25	15
13.6 Secure Protocols	25	13	0	5	7
13.7 Remote Access Security	48	16	10	10	12
13.8 Troubleshooting Network Security	41	21	0	15	5
Total	**6:57**	**2:44**	**0:20**	**2:25**	**1:28**

Module Sections	Time	Videos	Labs	Text	Exams
14.0 Network Hardening					
14.1 Detection and Prevention	66	21	10	20	15
14.2 Penetration Testing	43	21	0	15	7
14.3 Network Hardening	87	45	5	25	12
14.4 Incident Response and Basic	83	44	0	25	14
Total	**4:39**	**2:11**	**0:15**	**1:25**	**0:48**
15.0 Network Management					
15.1 Update Management	38	24	0	10	4
15.2 Data Protection	51	17	10	20	4
15.3 Remote Management	37	18	5	10	4
15.4 Mobile Device Management	65	31	5	15	14
15.5 Data Center Management	84	44	0	25	15
15.6 Monitoring	72	42	0	15	15
15.7 Log File Management	22	9	0	10	3
15.8 Network Management with SNMP	18	8	0	5	5
Total	**6:27**	**3:13**	**0:20**	**1:50**	**1:04**
16.0 Network Optimization					
16.1 Optimization	75	30	5	25	15
16.2 Troubleshooting Methodology	46	16	0	20	10
Total	**2:01**	**0:46**	**0:05**	**0:45**	**0:25**
Total Course Time	**68:14**				

Practice Exams

Network Pro Practice Exam	Number of Questions	Time
Domain 1: Cables and Connectors	8	40
Domain 2: Networking Devices	7	35
Domain 3: Ethernet	7	35
Domain 4: IP Configuration	13	65
Domain 5: Wireless Networking	4	20
Domain 6: Networking Security	3	15
Domain 7: Network Management	2	10
Network Pro Certification Practice	40	200
Total	**84**	**7:00**

Network+ Practice Exams	Number of Questions	Time
Domain 1: Network Concepts	370	6:10
Domain 2: Network Installation and	177	2:57
Domain 3: Network Media and	265	4:25
Domain 4: Network Management	120	2:00
Domain 5: Network Security	162	2:42
Network+ Certification Practice Exam	90	1:30
Total	**1184**	**19:44**
Total Practice Exam Time		**26:44**

***This syllabus is subject to change at the discretion of the instructor**. ***(End of Syllabus)*