Course Description

Examines the basic concepts of computer hardware, systems software, networking, client/server architectures, cloud computing, distributed systems, and high-performance computing as applied to information rich domains. Technology and architectures will be discussed within the contexts of solving social issues, supporting science, and conducting business operations. Current computing topics such as web environments, IoT, security, management, and policy will also be reviewed.

Learning Outcomes

After successfully completing this course you will be able to:
- Articulate major hardware, software and networking concepts and components that comprise current digital information infrastructure;
- Evaluate hardware, software, and network solutions for organizational needs;
- Identify emerging threats to information security and develop effective approaches to addressing those threats;
- Construct an infrastructure and architecture proposal to solve a real-world problem related to solving social issues, supporting science, or conducting business operations;

Required Resources

Course website: **elms.umd.edu**

The Architecture of Computer Hardware, Systems Software, and Networking
Englander, Irv
Fifth edition (2014).
ISBN #978-1118322635

You need to purchase a physical "clicker." Visit the Students section of clickers.umd.edu for details. You may not use a phone app, and you will want some spare CR2032 batteries.

Donal Heidenblad
dheidenb@umd.edu

Class Meets
  Section 0101
  Tuesdays & Thursday
  3:30pm – 4:45pm
  CSI #1122
  Section 0103
  Tuesdays & Thursday
  12:30pm – 1:45pm
  TYD #1102
  Section 0104
  Tuesdays & Thursday
  9:30am – 10:45am
  HBK #0103

Office Hours
HBK #4111G
Mon & Fri   9:30-10:30am
and by appointment

Teaching Assistants
0101 & 0103
  Malcolm Moore
0104
  Utkarsh Dwivedi

Prerequisites
INST201 or INST301;
INST326 or CMSC131;
& INST327

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations

- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Expectations for Students

Each week will typically follow this pattern, with some exceptions:

Before class (preparation):
- Do assigned readings, working each example in the text
- Watch any assigned videos;
- Do any pre-class activities – these help you confirm that you understand the basic material or help you identify specific aspects that you have questions about. You don't have to get them all correct – just try them diligently so you are ready to talk about and work on them in class;
- Complete the worksheet (usually in ELMS). It helps you confirm you are prepared for class and identify any gaps or questions. I review these before class and use them to prepare for class.

In class:
- We will use a mix of lecture, discussion and lots of hands-on activities to help you apply the materials;
- We will make extensive use of paired and group work in class;
- Class is not a time for solo learning. As members of a learning community, we are mutually responsible to each other as learners. Each of us has to be fully engaged with each other in the activities. We have to be supportive of each other as we try to explain or demonstrate something new, as we inevitably make mistakes. We aren't successful unless everyone is learning.

After class (homework):
- There will be follow-up activities as homework to help you practice, reflect and extend your understandings. The final work product for these products must be your own.

Our time together in class is precious. To use it effectively, you must come to class on time and prepared. Being prepared for class means that you have:
1. Completed all the readings/videos;
2. Attempted all the pre-class activities;
3. Either successfully completed them or submitted your questions the night before class, so I have time to prepare and answer them in class.
4. Arrived 5 minutes before class starts; are in your seat. You have downloaded any notes or materials for the day from ELMS. Any paper assignments are ready to hand in. You are ready to take notes.

Activities & Learning Assessments

Reading Quizzes are short online quizzes that assess your understanding of the assigned readings. 12 are planned, but only 10 will be graded with the lowest 2 grades dropped. Each Reading Quiz is worth 20 points.

Learning Checks are daily "clicker" quizzes to identify areas where the class is having difficulty understanding the material. I understand that there will be some technical difficulties during the first week, that you may occasionally forget your clicker, or that you may miss class. Therefore, 21 learning checks are scheduled and only 16 will be graded.

Homework Assignments are individual work assignments. These assignments will focus on the practical application of the material. They may include either short answer essays or working with various technologies. Details will be posted on ELMS.

Exams will be comprehensive (covering all previous material), in person, and on paper.
There will be 2 **MidTerm Exams**. The better of the 2 exams will be worth 100 points and the lesser scoring exam will be worth 50 points.
The Final Exam will be in person during the time allocated to us by the registrar. Until the rooms are scheduled, the registrar has posted the standard exam schedule here:
http://www.registrar.umd.edu/current/registration/exam.html
Once the rooms are scheduled, the registrar posts the final exam schedule to https://testudo.umd.edu .

Team Project
The Team Project will have groups of 4-6 randomly assigned students. The teams will choose a topic and create a Team Project **Proposal (50pts)** that will allow the instructional team to provide feedback and ensure that the project is of a reasonable scope for the course. There will be 2 Team Project **Status Updates** (**2x50pts**) that will have requirements specified to address potential issues identified by the instructional team. The project will culminate in a **Presentation (50pts)** to the class and a final **Deliverable** (**100pts**). Team members will also be required to complete **Peer Assessments (20pts)** to make sure that all team members are sharing the work.

Course-Specific Policies

No computers, phones or tablet devices are permitted during our class meetings. I understand and have considered arguments for permitting laptop and tablet computers in the classroom. However, in my experience (and based on the research evidence) the reality is that they present an irresistible distraction and detract from the cooperative learning environment. Researchers have found that these distractions do in fact interfere with learning and active participation. For that reason, the use of computers and phones will not be permitted during class meetings (except when required for ADS accommodations). If a computer is needed to accomplish a class objective for the day I will provide it or give you advanced notice to bring one with you.

I expect you to make the responsible and respectful decision to refrain from using your cellphone in class. If you have critical communication to attend to, please excuse yourself and return when you are ready. For more information about the science behind the policy watch: youtu.be/WwPaw3Fx5Hk

Turnitin
For this course, some of your assignments will be collected via Turnitin on our course ELMS page. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit
Turnitin Originality Checker for Students

Get Some Help!

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit tutoring.umd.edu to learn more about the wide range of campus resources available to you. In particular, everyone can use some help sharpen their communication skills (and improving their grade) by visiting ter.ps/writing and schedule an appointment with the campus Writing Center. You should also know there are a wide range of resources to support you with whatever you might need (see go.umd.edu/assistance), and if you just need someone to talk to, visit counseling.umd.edu or one of the many other resources on campus.

Most services free because you have already paid for it, and **everyone needs help**… all you have to do is ask for it.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit go.umd.edu/basic-needs for information about resources the campus offers you and let me know if I can help in any way.

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all of your fellow Terps.

Grades

Grades are not given, but earned. Your grade is determined by your performance on the learning assessments in the course and is assigned individually (not curved). If earning a particular grade is important to you, please speak with me at the beginning of the semester so that I can offer some helpful suggestions for achieving your goal.

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet in my office.

I am happy to discuss any of your grades with you, and if I have made a mistake, I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

Late Work

I do not accept late work unless I have approved it by prior arrangement. If you have to miss a deadline, you should inform me as soon as possible, indicating the reason and when you propose to submit your work. The general policy is that late work – when accepted - will be deducted 10% of its total grade per calendar day, starting on the same day it is due. If you have a legitimate reason, such as a major medical or family emergency, I may agree to an extension or makeup work, which I will grade at the end of the semester. Documentation of the emergency (e.g. a doctor's letter) may be required.

Learning Assessments	#	Points Each	Category Total	Category Weight
Reading Quizzes (RQ): pre-class reading quizzes submitted on ELMS	10	20	200	20%
Learning Checks (LC): in-class "clicker" quizzes	21	5	80	8%
Homework Assignments (HW): short individual assignments	5	40	200	20%
Exams (EX): formal assessments of learning	3	100/50	250	25%
Team Project (TP): team-based project	4	Varies	270	27%
		Total Points:	**1000**	

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same this as making the cut (89.99 ≠ 90.00). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs								
+	97.00%	+	87.00%	+	77.00%	+	67.00%	
A	93.00%	B	83.00%	C	73.00%	D	63.00%	F	<60.0%
–	90.00%	–	80.00%	–	70.00%	–	60.00%	

Course Schedule

This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

RQ = Worksheet submitted online by **8:00am** that day   **LC** = Learning Check during class meeting
HW = Individual Homework   **TP** = Team Project

DUE BEFORE CLASS			DURING OUR CLASS MEETING	DUE AFTER CLASS
Tue	08/27	**-**	**Course overview and getting started**	
Thu	08/29	**RQ01**	**Computers and Systems** Read: Englander, Chapter 1	
Tue	09/03	**RQ02**	**Concepts and Architecture** Read: Englander, Chapter 2 **LC01**	
Thu	09/05		**LC02**	**HW01**
Tue	09/10	**RQ03**	**Storing Data** Read: Englander, Chapters 3 & 4 **LC03**	
Thu	09/12		**LC04**	
Tue	09/17	**RQ04**	**Computer Design and Hardware** Read: Englander, Chapters 6 & 7 **LC05**	
Thu	09/19		**LC06**	**HW02**
Tue	09/24	**RQ05**	**IO and Peripherals** Read: Englander, Chapters 9 & 10 **LC07**	
Thu	09/26		**LC08**	
Tue	10/01	**RQ06**	**Modern Computer Systems** Read: Englander, Chapters 11 **LC09**	
Thu	10/03		**LC10**	**HW03**
Tue	10/08		**Exam Review**	
Thu	10/10	**--**	**MidTerm Exam #1**	
Tue	10/15	**RQ07**	**Networking** **LC11**	
Thu	10/17		**LC12**	
Tue	10/22	**RQ08**	**TCP/IP and other Protocols** **LC13**	**TP - Proposal**

Thu	10/24		LC14	HW04
Tue	10/29		**Exam Review**	
Thu	10/31	--	# MidTerm Exam #2	
Tue	11/05	**RQ09**	**Cloud Computing & Virtualization** **LC15**	
Thu	11/07		**LC16**	**TP – Status 01**
Tue	11/12	**RQ10**	**Security & Privacy** **LC17**	
Thu	11/14		**LC18**	**TP – Status 02**
Tue	11/19	**RQ11**	**Internet of Things & Pervasive Computing** **LC19**	
Thu	11/21		**LC20**	**HW05**
Tue	11/26	**RQ12**	**Smart Cities** **LC21**	
Thu	11/28		**Thanksgiving Break**	
Tue	12/03		**Team Project Presentations**	
Thu	12/05		**Team Project Presentations & Exam Prep**	**TP - Final Delivery**
Final Exam Schedule		**The schedule for finals will be posted by the registrar on Testudo:** https://app.testudo.umd.edu/soc/exam/search?courseId=INST346&sectionId=&termId=201908 **Until then, this is the standard exam schedule:** http://www.registrar.umd.edu/current/registration/exam.html		