MIS / HMGT 6374: Internet of Things

Class Information

Term	Spring 24: [Jan 16 – May 3]
Course Number	MIS 6374.001/HMGT 6374.001/OPRE 6324.001: Internet of Things
Class Meetings	Thursdays, 10:00 AM – 12:45 PM
Classroom	JSOM 11.305

Instructor Information

Instructor	Dr. Prakash Shrivastava
Office Phone	972-883-5901
Email	Prakash.shrivastava@utdallas.edu *Please include the course number and section number in all email correspondence. Please use your UTD e-mail system for any communication with the instructor/TA.*
Location and Office Hours (Online using Teams)	Office Location: JSOM 3.225 Office Hours (Online): Mon: 2:30 PM – 3:30 PM; Appointments are encouraged. Send me an e-mail 24 hours in advance to set up a remote session (in Teams). For questions related to Homework/Grading, please contact TA (below)
TA Information	TBD, e-mail: TBD@utdallas.edu; Phone: aaa-bbb-cccc TA Office Hours: TBD Note: The TA is your first contact for questions re Assignment / Grades.

Course Modality

Instructional Modality	Traditional Classroom /Laboratory (Face-to-Face, In-Class). No recordings
eLearning and Course Platforms	This course can be accessed using your UT Dallas NetID account on the eLearning website. Please see the course access and navigation section of the Getting Started with eLearning webpage for more information. To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage. The course will utilize the following platforms: • Announcements, written lecture materials, assignments and grades will be posted in the course's eLearning site. It is the students' responsibility to regularly check their UTD email accounts and the eLearning page for this course. • Microsoft TEAMS may be utilized for lectures and other live communications. • If any, recorded (and annotated) lectures and other communications will be available on Microsoft TEAMS, as well. Active links to TEAMS will be available in the eLearning web site. In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage. UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance: (1-866-588-3192), email request service, and an online chat service.

Asynchronous Learning	There is no provision for Asynchronous Learning. Lectures are not recorded. All students are expected to attend all classes during class hours.
Technical Requirements	Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Information

Course Description	MIS 6374 – Internet of Things (3 semester credit hours) The Internet of Things (IoT) is the key to digital transformation. By 2025, more than 25 billion devices in homes, factories, oil wells, hospitals, cities, and cars will be connected to the Internet. Companies are looking for students who are skilled in developing IoT solutions that connect devices, collect, store, and analyze device data. This course provides students with knowledge of IoT components and management of IoT ecosystems. First, students will gain an understanding of digital transformation and Industry 4.0. Next, students will learn about the components of IoT (Sensors, Communication Technology, Networks, Security, Cloud, and Data Analytics). Students will also be exposed to how companies implement solutions on an IoT platform (such as AWS, Azure, or Google). Finally, students will learn about the management of IoT ecosystems in the context of a few use cases (e.g., predictive maintenance, smart transportation, healthcare, or other). (3-0) Y
Course Objectives / Learning Outcomes	1. Acquire knowledge about Digital Transformation, Industry 4.0, and Digitalization of Business Processes 2. Become familiar with IoT Technology, Smart connected products, Reference Architecture, Standards and Protocols, Edge Computing, Digital Twins 3. Understand how IoT creates value and its impact on Business Models 4. Learn about IoT Platforms, how IoT is deployed in Products, Services and Business Operations / Supply Chain Management 5. Gain understanding about planning and implementation of IoT projects
Prerequisites	There are no pre-requisites for this class, although basic knowledge of cloud, cybersecurity, data analytics will be helpful.

Course Materials

Required Textbook(s) & Materials	**Books:** No textbook is required. **Coding:** No coding required **Required: 2 Case Studies. Purchase from the Harvard Business School Press** *(Cost: $9.90)* **Reference Material:** Available on Course Reserves ***Tools/Software:*** *AWS,* LucidChart, JMP Pro 17, Cumulocity IoT Platform, AHP *(Instructions to download and installation will be provided)*
Laptop Computer	Students are required to install tools listed above on their laptops.

Grading Policy

Grading Policy	This course will feature a mix of activities and assignments. The instructor will provide detailed instructions as well as the grading criteria for each assignment and exam. It's your responsibility to keep track of any changes in the dates / times for assignments/ exams - announced in the class. Your final grade will be based on the total score of the following: (Exams are closed book and will require use of Analytics Tools. You are allowed to bring 1-page cheat sheet). 1. Quizzes: 25% (5 quizzes; 5% each) 2. Assignments: 35% (3 Individual: 5% each, 2 Group: 7.5% each, 1 Group: 5%) 3. Group Project (20%) [Proposal: 3%, Report: 12%, Presentation/Video: 5%] 4. Exam (15%) 5. Attendance/Punctuality: (3%) 6. IoT Event Participation: (2%) **Note: (1) Please review submission instructions carefully; two separate submissions may be needed: (i) normal submission (ii) Turnitin. Do not use Safari to submit your Turnitin assignment. Turnitin is a 2-step process: Upload your file and click on 'Confirm'. Make sure you get email confirmation.** Use Google Chrome for uploading assignments.

Final Grading Scale: Grades are NOT negotiable. (No inquiries will be entertained.)

Letter Grade	Final Point Total
A	>=93.00 - 100
A-	>= 90.00 - 92
B+	>= 88.00 - 89
B	>= 83.00 - 87
B-	>= 80.00 - 82
C+	>= 78.00 - 79
C	>= 73.00 - 77
F	0 – 72

Course and Instructor Policies

Class Participation / Attendance	**ATTENDANCE IS REQUIRED. Attendance will be taken.** Students are expected to actively participate in the discussion of readings, contribute to the learning experience of the class, and meaningfully contribute to all work. **You must be present in the class to take the "in-class" quizzes. There will be no make-up quizzes.**
Exams and Proctoring	All exams are scheduled well in advance. If you miss an exam, you will be given a zero! There is no makeup. **If you have a legitimate, non-academic reason for missing an exam, you must provide verifiable documentation at least 24 hours BEFORE the day of the exam.** If you contact me AFTER the exam, it is considered missing the exam. Points will be deducted if you arrive late to the exam. You must take the exam within 15 minutes of the scheduled start time. To maintain required academic integrity of this course, examinations may require the use of a widely used proctoring service, for online assessment proctoring, using the UTD testing center, and/or in-class exam proctoring.
Lockdown Browser / Hoolock	I may require use of Lockdown browser / HONORLOCK. I will provide more information before the Exam.
eLearning	eLearning will be used for class content (e.g., class slides and assignment descriptions) and the recording of grades. Slides will be posted before class is held. Class

	announcements (e.g., change in assignment dates) will be sent to the student email on record in eLearning. It is the students' responsibility to regularly check eLearning and their UTD email accounts.
Communications and Instructor Response Policy	For questions related to the course material, assignments. quizzes, exams, scores, and grades, please use class sessions, office hours, and discussion forums. For other matters, send an E-mail using UTD email system for incoming and outgoing messages. (Using your personal email address is STRONGLY discouraged, due to security and spam blocking concerns). The instructor will respond to student inquiries through email within 48 business hours (excluding holidays and weekends). Students should adhere to business professional style of communication and must use their UTD email for correspondence.
Assignments	Descriptions of assignments will be posted as they are assigned. All assignments will be submitted via eLearning. **I do *NOT* accept assignments via email.** If you submit an incorrect assignment or need to resubmit your assignment in eLearning, you will be allowed to resubmit if it is before the due date. Send an email to the TA at least 12 hours prior to the due date and I will clear your submission. Upon doing so, you will be able to resubmit. Written (essay) assignments must adhere to the APA style guide of formatting, citing, and referencing.
Clarifications regarding Assignments	Assignment-specific grading criteria will be posted on eLearning. These instructions will also be discussed in the class. You are encouraged to ask questions, raise issues, and make observations about assignments. If you still have questions, post them on the discussion board. It is entirely your responsibility to make sure that you understand all instructions. Seek all clarifications at least 48 hours before the due date. You will lose points if you seek clarifications in the 48-hour window.
Assignment Grading	Please be advised that if you have a question or issue with your assignment grade, contact the TA **within "one week"** of grade posting. **Your entire assignment is subject to re-review (re-grading)** which may or may not result in additional points. **No inquiries regarding grades will be entertained after one week from the date of grade posting.** General grading criteria can be found in eLearning. Assignment-specific grading criteria will be included with the assignment instructions. You will lose points for not following instructions.
Late Work	All assignments are due on the specified date. Please give yourself sufficient time to upload assignments on the eLearning Portal/Turnitin. You would not be able to submit/upload if the due date is passed. You will be graded only on what is submitted on the portal. **I do not accept late assignments** unless prior arrangements have been made with the instructor in which case a penalty of 20% per day (including weekends) will be assessed. **Only one such exemption is allowed in the entire semester. Why?** Deadlines in the professional world are not a moving target. Missed deadlines affect product delivery, professional reputation, and revenue. Please plan accordingly. For these reasons, late work or incomplete work is not acceptable in this course EXCEPT in the most extreme and unlikely circumstances (see below) – in which case, e-mail the evidence of extreme circumstances to me/TA at least 24 hours prior to the due date (Penalty will apply). Inquiries related to late submissions will not be entertained.
Exceptions for Late Work due to Server Unavailability or other Technical Difficulties	Exceptions: The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.
Extra Credit	There is no extra credit.
Final Course Letter Grades	Final course letter grades are based solely on your performance on the graded assignments, exams, projects, and/or attendance. ***No bonus points, curves, extra credit,***

	or additional assignments are offered. Do not assume that final grades will be rounded to the nearest whole number.
Classroom Conduct	I strongly encourage class discussion, questions, and enthusiasm about the course material. Please engage in class discussions. I do ask that you are respectful during class, be respective to your peers who are part of the learning environment. This means no talking to other during class presentations, silence your cell phone, don't take calls in class.
Student Code of Conduct	For information related to "Student Code of Conduct", please go the website: https://conduct.utdallas.edu/
Academic Integrity (Follow the Student Code of Conduct: https://conduct.utdallas.edu/**)**	DO NOT CHEAT and DO NOT PLAGIARIZE. All homework and exams are to be individual efforts. You are not to collaborate with other students, or to discuss homework or assignments with other students prior to submission. Copying homework, assignments, or exams, in whole or in part, from other students or from assignments from previous semesters will be an act of academic dishonesty. All work should demonstrate the same professional and ethical standards expected of you in the workplace, including proofreading and editing carefully all work you submit in class. Professionalism and personal responsibility mean that you use appropriate source citations so that you avoid violations of copyright and academic honesty, even if those violations are inadvertent. The University is committed to academic excellence and expects academic honesty from all members of the University community. Academic honesty includes adherence to guidelines established by the instructor for both individual and group work. **It prohibits representing the work of others to be one's own (plagiarism); receiving unauthorized aid on an assignment (cheating); and using similar papers or other work products to fulfill the obligations of different classes without the instructor's permission.** Any student engaged in academic dishonesty will be subject to disciplinary action. All cases of academic dishonesty will be reported directly to Judicial Affairs. My recommendation for acts of academic dishonesty will be an **F in the course**. The importance of academic honesty and my recommended sanctions are emphasized during class, in emails, and on exams and assignments.
Discussion Board	Students are encouraged to use discussion boards to post questions / comments.
University Policies & Procedures	For information regarding general University policies and procedures, please go to http://go.utdallas.edu/syllabus-policies. These policies include the following: ▪ Technical Support ▪ Field Trip Policies, Off-Campus Instruction and Course Activities ▪ Student Conduct and Discipline ▪ Academic Integrity ▪ Copyright Notice ▪ Email Use ▪ Withdrawal from Class ▪ Student Grievance Procedures ▪ Incomplete Grade Policy ▪ Disability Services ▪ Religious Holy Days ▪ Avoiding Plagiarism ▪ Title IX ▪ Campus Carry

Course Weekly Schedule, Assignments, and Due Date: *This is a **tentative** class schedule. Instructor reserves the right to make changes to the content and schedule. Changes, if any, will be announced in the class as well as posted on eLearning portal. It is the student's responsibility to keep track of them.*

WEEK (Date)	Topics / Lecture	Assignments	Due
1 A (18 Jan 24)	Introductions, Syllabus, RoadMap, Tools	Assignment – 1: Data Science for Business; 2Hrs (5%)	1 Feb 24
1 B (18 Jan 24)	Introduction to IoT and Market Opportunities		
2 A (25 Jan 24)	Digital Transformation and Industry 4.0;	Assignment – 2 (Group): Samsung: The Internet of Things (7.5%)	8 Feb 24
2 B (25 Jan 24)	Supply Chain, Strategy and Technology. IoT Use Cases in Industry and Scenarios.		
3 A (1 Feb 24)	Operations Technology and Systems.	Assignment – 3: Analyzing IoT Data in Python; 4Hrs (5%)	15 Feb 24
3 B (1 Feb 24)	Sensors, Actuators and Smart Objects		
4 A (8 Feb 24)	IoT Network Communication – Connecting IoT Devices. **Quiz – 1 (5%)**		
4 B (8 Feb 24)	IoT Management Protocols	Group Project Proposal – Building Intelligent Products and Services (3%)	29 Feb 24
5 A (15 Feb 24)	Information Technology: Cloud, IT Network and Mobile		
5 B (15 Feb 24)	Information Technology: External Systems		
6 A (22 Feb 24)	IT/OT Integration. Cyber Security / IoT Security **Quiz – 2 (5%)**		
6 B (22 Feb 24)	IoT Platforms: Cumulocity, AWS IoT, PTC/Thingworx	Assignment – 4: AWS Concepts 2Hrs (5%)	7 Mar 24
7 A (29 Feb 24)	Data Analytics_ AI, ML, Forecasting, Predictive, Prescriptive Quality Control & SPC; Overall Equipment Efficiency		
7 B (29 Feb 24)	Data Analytics: Batch and Real-Time; Complex Event Processing, Time Series, Regression		
8 A (7 Mar 24)	Digital Twin / Software-Defined Product Digital Twin Examples		
8 B (7 Mar 24)	IoT Reference Architecture **Quiz – 3 (5%)**	Assignment – 5 (Group): Smart Products (5%)	21 Mar 24
9 A (14 Mar 24)	Spring Break. No Classes		
9 B (14 Mar 24)	Spring Break. No Classes		
10 A (21 Mar 24)	IoT Impact on Business		
10 B (21 Mar 24)	Business Models		
11 A (28 Mar 24)	Revenue Models		
11 B (28 Mar 24)	IoT Requirements		
12 A (4 Apr 24)	Design Thinking		
12 B (4 Apr 24)	IoT Ecosystems	Assignment – 6 (Group): Xiaomi - Designing an Ecosystem for the "Internet of Things" (7.5%)	11 Apr 24

13 A (11 Apr 24)	Managing IoT Projects and Metrics **Quiz – 5 (5%)**		
13 B (11 Apr 24)	Business Processes		
14A (18 Apr 24)	Guest Lecture	Project Report (12%) & Video Presentations (5%)	18 Apr 24
14 B (18 Apr 24)	Course Review / Wrap-up		
15 (25 Apr 24)	**Group Project Presentations – 1, 2**		
16 (2 May 24)	Exam		