



**The University of Texas at El Paso**

**COURSE NUMBER AND TITLE: ECE 5390 Internet of Things Systems**

**COURSE DESCRIPTION/COURSE OVERVIEW:** Major breakthroughs in the field of electronics, embedded systems and wireless communications have led to the emergence of the Internet of Things (IoT). In this course you will learn about how IoT systems work, their core components and their usage in real-world applications. In this course, the current state of the art in communication, networking and data collection technologies for different IoT applications will be introduced through a series of lectures, working assignments and project. This course focuses to develop a deep understanding of IoT technologies from the level of fundamentals to applications. Throughout the course, participants will be exposed to many exciting open problems in the field. The lessons are primarily aimed at beginners in this field and hence all the topics are covered in detail, as the course progresses more advanced topics would be discussed. These topics should prove useful to those who are new to this subject, and those with some experience.

**COURSE TOPICS:** This course covers in depth the following key focus areas:

- 1 - Introduction to Internet of Things, Fundamentals
- 2 - Current trends in IoT
- 3 - IoT Architecture
- 4 - IoT Communication and Protocols
- 5 - IoT Interoperability
- 6 - IoT Applications, Use cases and Design
- 7 - IoT Hardware
- 8 - Role of Cloud and Fog Computing in IoT
- 9 - Security and Privacy in IoT
- 10 - Practical Constraints and Future of IoT, Data Analytics

**COURSE PRE-REQUISITES:** The course is aimed at beginners, background in micro controllers and mathematics is required

**COURSE TIME:** 1:30 pm to 2:50 pm (Face-to-face)

**GENERAL INFORMATION**

Dr. Sai Mounika Errapotu

Office Location: Dept of Electrical and Computer Engineering, A-309

Email: serrapotu@utep.edu

Drop-in Hours: Mon Wed 10 to 11:30 am (In-person or MS teams)

**CREDIT ALLOCATION: 3**



**TEXTBOOKS:** (not mandatory)

We will not use a dedicated text. The course will be based on lecture content and supplementary materials provided in the class

**Reference Textbooks:**

Internet of Things Architectures, Protocols and Standards by Simone Cirani, Gianluigi Ferrari, Marco Picone and Luca Veltri

ISBN-13: 978-119359678

Design of Secure IoT Systems: A Practical Approach Across Industries, 1st Edition by Sumeet Arora, Ramachandra Gambheer and Meenakshi Vohra

ISBN-13: 978-1260463095

**COURSE OBJECTIVES:**

1. Describe what IoT is and how it works today?
2. Recognize the factors that contributed to the emergence of IoT and interoperability
3. Learn about IoT applications and specifications
4. Understand IoT protocols for communication
5. Learn about IoT design
6. Secure the elements of an IoT device and secure IoT communication
7. Learn about cloud interactions in IoT environment

**GRADING POLICY AND STRUCTURE**

Time Stamps LMS

- Attendance, participation, and all LMS (Blackboard LMS) postings are counted in Mountain Time (MST). The time stamps in the computer represent MST, regardless of your actual time zone.

Attendance

- Attendance will be considered from scheduled and surprise in-class quizzes.

Assignments

- Assignments are due by **11:59pm (MST)** on the date specified. Assignments **will not be accepted after the due date**. This is done in fairness to those students who turn in their assignments on time. The only exception is with extenuating circumstances or events that have been discussed with the instructor PRIOR to the deadline.



## Quizzes

- Quizzes will be available for a specific timeframe. There will be **1 attempt** for each quiz for the quizzes posted in blackboard. Only some quizzes have 2 attempts. For quizzes with 2 attempts, the grading criteria varies. Late quizzes will not be accepted. If you would like specific feedback based on your quiz responses, please contact the instructor for an appointment to review your quiz or contact during office hours.

In the case of emergencies when you are prevented from logging on, please contact the Course Faculty as soon as possible by phone and/or email. If you know you will be out of town or otherwise prevented from submitting assignments on the due date, make every effort to turn them in early. Anytime you feel that you are falling behind in the course, it is best to contact the Course Faculty immediately to discuss your situation. In regards to dropping the course with a “W”, it is the **student’s responsibility** to make arrangements with the UTEP Registrar and drop by the “withdrawal date” located on UTEP Registrar website.

## Project

- This course constitutes of a final project. You will be working on the project in the second half of the semester. The project grade comprises of the **project idea submission and project review reports (1 and 2)**. Submissions will not be accepted after due date. This is done in fairness to those students who do timely reviews and turn in their reports on time. The only exception is with extenuating circumstances or events that have been discussed with the instructor PRIOR to the deadline.

## GRADING SCALE:

### Weightage:

5%	Attendance
15%	Quizzes/Class Activities
25%	Assignments/Paper Review Reports
20%	Mid Exam
35%	Final Project (Project Idea, Project Reviews, Final Paper+Presentation+Demo)

### Grading scale:

90 - 100	= A
80 – 89	= B
75 – 79	= C
60 – 74	= D
< 60	= F

**Assignments, Discussion Boards, Project Reports and Quizzes are always due on Sunday 11:59 pm (MST) \*total 100 points\***



## Expectations of the Class

### What should you expect from me as the Lead Faculty?

- I will provide you clear instructions on class expectations
- I will check my **email** at least once a day and will get back to you within 24 hours. For quicker response please reach out to me through **MS teams**.
- I will keep you informed about your graded progress in the class at all times and will make time to discuss your needs.
- I will leave myself open to suggestions about improvement of the class and class related activities.
- I will do all I can to ensure your learning and success in this class.
- If the course modality needs to be adjusted then the class will be notified. If any other changes in the course are to be implemented, I will ensure that the class is notified via announcements in a timely manner.

### What Faculty expect of their Students:

- At the beginning of each course, students should review the syllabus and other introductory items located in the **“Week One - Getting Started”** folder.
- Students will be expected to complete a **mock assignment and syllabus quiz** on blackboard shell in the first week of class.
- All students are to **review the rules of etiquette/netiquette and follow in their interaction** with fellow students and faculty.
- Students are expected to strictly follow the deadlines for quizzes and assignments. Please contact the instructor immediately in case of queries or concerns. If office hours collide with your schedule, email the instructor to schedule alternate time to clarify your queries.

## COURSE POLICIES:

### Academic Regulations:

Review in UT El Paso Student Handbook the following policies: *Religious Observance, Ethical and Responsible Use of Social Media, Policy on Academic Integrity, Progression Policy, and Statement on Disability.*

**Attendance:** Students are expected to attend the class, log-in on blackboard and check the weekly modules course shell on blackboard (at minimum) **every week** to keep up. Email messages are sent to your **UTEP email address, messages through MS teams** so you will want to check your UTEP email and teams messages everyday as well.

### Blackboard:

- Students are required to subscribe to and access the course Blackboard site. Blackboard is the main source of communication between faculty and students. Students are encouraged to access this site daily. Course syllabus, topical outline of scheduled lectures, and assigned readings are posted on this site. Grades of assignments will be made available **ONLY** through this site.



### **Communication:**

- Communication is the responsibility of both students and faculty. The faculty will keep students informed of progress in theory. Students with questions or concerns should first contact faculty member.
- **Office Hours (In-person and online), UTEP Email, MS Teams Messages** are major mediums for interaction. Please feel free to contact the instructor to schedule meetings outside office hours if online office hours collide with your schedule.

### **Policy on Scholastic Dishonesty:**

- Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the College of Engineering and/or university. Scholastic dishonesty includes but is not limited to reproducing test or quiz materials from memory, copy/paste or Xerox, cheating, plagiarism, collusion, the submission for credit or any work or materials that are attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22.
- Since scholastic dishonesty harms the individual, all students, and the integrity of the College of Engineering and the university, policies on scholastic dishonesty will be strictly enforced. See detailed procedure in the Handbook of Operating Procedures (HOP) available in the Office of the Dean of Students.

### **Policy relating to Disability / Pregnancy/ CASS:**

- Instructor will provide support and help in better understanding the course content, inform the instructor PRIOR to the start of course or during first week of classes to request for additional needs and succeed in the class.
- **Disability:** In Section 504 of the Vocational Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, if a student needs an accommodation then the Office of Disabled Student Services located at UTEP need to be contacted. If you have a condition, which may affect your ability to perform successfully in this course, you are encouraged to discuss this in confidence with the instructor and/or the director of the Disabled Student Services. Written guidelines r/t accommodations from CASS must be submitted to the course manager PRIOR to the start of the course. If you have a disability and need classroom accommodations, please contact CASS at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass). *CASS' Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities.*
- **Pregnancy:** It is the responsibility of the student to inform the instructor of pregnancy



limitations. Written guidelines r/t accommodations from The Center for Accommodations and Support Services (CASS) must be submitted to the course manager PRIOR to the start of the course.

### **Professional Behavior:**

- Students are expected to behave professionally *at all times* with faculty, peers, preceptors, and clients **and** in any setting in which the student is a representative of UTEP. Bullying, verbal abuse, insubordination, or personal attacks will not be tolerated in any form. Any behavior deemed inappropriate by faculty and/or preceptors will result in faculty conference(s), and completion of a Student Opting for Success (SOS) plan that addresses the student's areas of needed improvement. Possible activities available to assist the student in attaining the SOS objectives include stress and/or anger management counseling sessions. Inappropriate behaviors may result in an administrative withdrawal from the course and/or dismissal from the program.

### **Retention: Students Opting for Success (SOS):**

- When a student is not progressing in the course as expected, or is not successful on an examination, they will be required to meet with the instructor to discuss strategies for success as outline on the SOS form. The SOS plan will identify recommendations for improving the student's success potential and will specify time lines for completion of these recommendations. The SOS form (with all recommendations completed and all signatures in place) must be submitted to the course manager by due date. *Students who are not successful in the course should be aware that non-compliance with SOS recommendations jeopardizes eligibility for the opportunity to repeat the course in the subsequent semester.* See respective Blackboard home page for SOS form.

### **Netiquette**

"Netiquette" stands for "Internet Etiquette", and refers to the set of practices developed over the years to make the Internet experience pleasant for everyone. Please review some of the **Netiquette** rules.

- At this point in the course, it is also important to share a word of caution, so we can become wiser about interpersonal distance learning communications. As you may know, when communicating electronically, many of the feelings or impressions that are transmitted via body language in face-to-face communications are lost. Consequently, interpreting emotions and innuendoes is far more difficult. Only what is written, or drawn, carries the message. Often excitement can easily be misinterpreted as anger or an insult. It is important that everyone keep this in mind when communicating electronically. Words in print may appear harmless; however, they can emotionally injure the person reading them. More information can be found at <http://www.albion.com/netiquette>.

### **[Other BB Learn Student Resources](#)**

### **Technical Assistance**



This **class** is hosted by UT El Paso. If you have computer, Blackboard problems, or any other kind of technical questions, please contact the UTEP Help Desk via email at [helpdesk@utep.edu](mailto:helpdesk@utep.edu) or by phone at (915) 747-5257. The HELP desk hours are: Mon-Fri 7:00am - 8:00pm (Mountain Time), Sat 9:00am - 1:00pm (Mountain Time), Sun CLOSED.

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