The University of Texas at Tyler
Department of Electrical and Computer Engineering

CMPE 3301: Foundations of Computer Engineering (Required)

Syllabus

Catalogue Description :

Foundational topics in Computer Engineering: Circuit design using Computer Aided Design (CAD) tools; Printed Circuit Boards (PCB) Basics: Schematics, Board Layout, Verification, Bus; Single Board Computer: Command line programming, Linux fundamentals, Virtual Machines, Networking Basics, Web design; Introduction to 3D printing. Three hours of lecture each week.

Prerequisites: COSC 2336 Data Structures and Algorithms, Pre- or Co-requisites: EENG 3302 Digital Systems Design, EENG 3306 Electronic Circuits Analysis I

Credits: (3 hours lecture, 0 laboratory hours per week)

Text(s): Study material provided by instructor, Autodesk Fusion360, EAGLE PCB design software, Raspberry Pi board.

Additional Material: TBD

Course Coordinator: Fatemeh Kalantari, Assistant Professor, Electrical Engineering

Topics Covered: (paragraph of topics separated by semicolons)

Introduction to Computer Aided Design (CAD); Design flow for circuit modeling, PCB and 3D modeling; Circuit schematics using CAD (Eagle and Tinker CAD); PCB design using Eagle; Example circuits and PCBs.; Testing and verification of PCB design; Intro to Single Board Computers and Microcontrollers; Raspberry Pi setup using CLI.; Linux scripting; Linux scripting – Administration; Virtual Machine setup; Automation using Linux scripting; Web/user interface design; 3D Modeling using Fusion 360

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes[1]: By the end of this course students will be able to:

1. Analyze the design flow for circuit modeling using CAD tools. [1, 3, 5]
2. Design circuit schematics using Eagle software. [3, 5]
3. Analyze the errors in board layouts using DRC and ERC checks. [1, 3, 5]
4. Create Gerber files for the printed circuit boards. [3, 5]
5. Configure a single board computer using Command line interface (CLI) programming. [4, 5]
6. Analyze the steps involved in automation using Linux scripting. [1, 4, 5]
7. Design and implement web/user interface for data analytics. [3, 4, 5]

8. Configure virtual machines using single board computers. [3, 5]
9. Analyze the steps involved in 3D modeling and printing using Fusion360. [3, 5]

[1]*Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Student Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics [3]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. [2, 7]
3. an ability to communicate effectively with a range of audiences. [1]
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. [8]
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions [4, 6]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [5, 9]

[2]*Numbers in brackets refer to course objective(s) that address the Student Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:		hours
Engineering Sciences and Design:	3	hours
General Education Component:		hours

Prepared By:	Prabha Sundaravadivel	Date:	4 January 2023
Updated By:	Fatemeh Kalantari	Date:	18 August 2024
	Fatemeh Kalantari		22 August 2025