

COURSE OUTLINE

NEW YORK CITY COLLEGE OF TECHNOLOGY The City University of New York

DEPARTMENT: Electrical and Telecommunications Engineering Technology

SUBJECT CODE: TCET 4182

TITLE: Telecommunications Capstone Project I

COURSE DESCRIPTION First part of a two-semester senior design course sequence that introduces programming of embedded systems, research and development methodology, project management, technical writing, and presentation. Students present an introductory level final project incorporating telecommunications engineering designs that are fully documented and prototyped.

REQUIRED: B.Tech Telecommunications Engineering Technology

PRE-REQUISITES: TCET 3202

PRE/CO-REQUISITES: CST 2403

TEXTBOOK Instructor notes and handouts will be used.

References:

1. Design for Electrical and Computer Engineers

By Ralph Ford Chris Coulston

McGraw Hill, 2008, 9780073380353

2. Tools and Tactics of Design

By Peter G Dominick

Wiley, 2001, 9780471386483

Students may need to buy additional design components.

TOPICS: Telecommunications technology design, coding (MATLAB, C++), embedded systems, analysis of existing methods and solutions, description of possible innovative approaches to solve a problem, economics, ethics and societal impact of engineering, proposals presentation, design validations, performance in multidisciplinary design teams, system integration, testing and validation, design documentation and review, engineering management tools and techniques.

CLASS HOURS 1

LAB HOURS 2

CREDITS 2

Prepared by Professors Hossain and Mynbaev
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Description of laboratory work: The design work will include integration of various Telecommunications engineering technology principles, coding, problem solving skills and lab experiences the students gained throughout their undergraduate curriculum. Students will exercise research and development methodology as well as utilize other relevant skills such as troubleshooting, teamwork, and project management. The final product/prototype will be from any kind of Telecommunications technology, including wireless and optical networking technology.

GRADING POLICY: TCET 4182

Class Participation	10%
Preliminary Proposal	10%
Midterm Progress Report	15%
Final Project Report	25%
Oral presentation	15%
Prototype Demonstration	25%

Letter Grade	Numerical Grade Ranges	Quality
A	93-100	4.0
A-	90-92.9	3.7
B+	87-89.9	3.3
B	83-86.9	3.0
B-	80-82.9	2.7
C+	77-79.9	2.3
C	70-76.9	2.0
D	60-69.9	1.0
F	59.9 and below	0.0

COURSE OBJECTIVE, LEARNING OUTCOME AND ASSESSMENT: The following assessment techniques are correlated to the course objectives as follows. In addition, each assessment technique incorporates one or more of the following ABET Criterion 3 outcomes (3a-3k, PC.a - PC.d). **Few of the ABET outcomes are also considered as general education outcomes.**

Course Objective	Learning Outcome	Assessment
1. Identify a Telecommunications engineering technology problem and then design and implement system, component, program, switching technologies, and wide area	Students will demonstrate an ability to identify Telecommunications engineering technology problems and propose solutions to design a system or component.	Preliminary proposal

networking technologies to address the problem.(ABET Criteria 3d, 3f, PC.a, PC.b).		
2. Apply mathematics, science and engineering principles and skills to address Telecommunications engineering technology problems. (ABET Criteria 3a, 3b, PC.d)	Students will demonstrate science and engineering skills in terms of solving Telecommunications engineering technology problems through research, design, and development of their project.	Midterm progress report, final project report and prototype demonstration
3. Conduct, analyze, and interpret experiments; and apply experimental results to validate/improve design processes.(ABET Criteria 3c)	Students will demonstrate ability to conduct tests and measurements to validate or improve their Telecommunications design project.	Midterm progress report, final project report and prototype demonstration
4. Design and manage Telecommunications network within a set of realistic constraints including societal and global impact. (ABET Criteria 3j, PC.c)	Students will demonstrate design and implementation considerations in terms of economic, environmental, ethical, health, safety, social, political, sustainability, and manufacturability issues.	Preliminary proposal.
General Education Outcomes		
5. Contribute effectively in a team and demonstrate professional and ethical responsibilities including a respect for diversity.(ABET Criteria 3e, 3i)	Students will demonstrate elements of good teamwork, such as respect for diversity, ethical responsibility, conducting self-evaluation, and providing leadership while working towards successful completion of their project.	Class/lab participation.
6. Manage project in terms of timeliness and quality. (ABET Criteria 3k)	Students will use a project timeline, design review, cost analysis, and other relevant tools to demonstrate project management skills and quality improvement.	Midterm progress report and final project report.
7. Understand the need for learning a new technology as part of continuous professional development. (ABET Criteria 3h)	Students will research innovative solution for given technology problems and establish the need for lifelong learning to be current in a fast paced technology field.	Midterm progress report and final project report.
8. Demonstrate oral and written communication skills. (ABET Criteria 3g)	Students will develop a written design report and oral presentation for faculty and peers.	Final project report and oral presentation.

The course contents for TCET 4182 Telecommunications Capstone Project I course and the weekly tentative schedule including the series of lectures and laboratories will be the following:

Week	Lecture	Laboratory
1	Overview: <ul style="list-style-type: none"> • Introduction to the capstone project • Class policies 	<ul style="list-style-type: none"> • Discuss preliminary project ideas • Introduction to project management
2-3	Review of programming	<ul style="list-style-type: none"> • Write example program • Form project teams
4-5	Microcontrollers and applications	<ul style="list-style-type: none"> • Simple I/O programs
6	Project selection process: <ul style="list-style-type: none"> • Problem identification and description • Description of possible approaches to solving the problem • Selection of approach • Societal impact of the project • Ethical issues related to project 	<ul style="list-style-type: none"> • Identify and describe a problem • Propose a solution
7	Project management: <ul style="list-style-type: none"> • Project lifecycle/timeline • Resource allocation 	<ul style="list-style-type: none"> • Define specific target and timeline/milestones • Assign tasks to team members
8	Conceptual design: <ul style="list-style-type: none"> • Concept generation and evaluation • Requirements specifications • Deliverables 	<ul style="list-style-type: none"> • Develop detailed design of block diagram • Develop detailed design requirements in term of hardware and software with quantitative performance specifications • List the project deliverables
9	<ul style="list-style-type: none"> • Midterm progress report 	<ul style="list-style-type: none"> • Presentation and analysis
10-14	Design implementation and testing	<ul style="list-style-type: none"> • Build and troubleshoot prototype hardware and software
15	Presentations	<ul style="list-style-type: none"> • Prepare and demonstrate prototype • Oral presentation • Written final project report