ECE481 Course Syllabus

1. **Course number and name: ECE 481:** Digital Communication Systems

2. **Credits and contact hours:** 3 credit hours, 3 contact hours

3. **Instructor's or course coordinator's name:** Moshe Kam

4. **Text book, title, author and year**
   B.P. Lathi and Z. Ding: Modern Digital and Analog Communication Systems, Fourth Edition, 2010, ISBN-13: 978-0-19-533145-5 (main text)

5. **Specific course information**
   A. brief description of the content of the course
      - Introduction to analog and digital communication systems and techniques; simulation of communication systems and techniques in MATLAB/Simulink; amplitude and angle modulations; sampling and digitization of signals; baseband and carrier-modulated digital transmission; signal detection and reception in noise; broad overview of the information-theoretic approach to communications and error-control coding.

   B. Prerequisites or co-requisties
      - ECE321

   C. Indicate whether a required, elective, or selected elective
      - Elective

6. **Specific goals for the course (CLO)**
      - The student will be able to
        1. describe and analyze the generation and reception of amplitude or angle modulated signals;
        2. recognize and provide a block-diagram level design of communication systems that use pulse modulation techniques and digital transmission of analog signals;
        3. recognize and provide a block-diagram level design of communication systems that use digital modulation and transmission systems;
        4. address the effect of noise in the reception of AM, FM, pulse-modulated and digital signals;
        5. describe the basic tenets of information theory as pertaining to communications, and perform basic calculations of relevant properties;
        6. describe the basic principles of error-control coding and use them in block-diagram level design of communication systems; and
        7. use the basic capabilities of MATLAB and Simulink for modeling and simulation of analog and digital communication systems.

7. Brief list of topics to be covered

Chapter	Topic	Week
2	Signals and Signal Space	1-2
3	Analysis and Transmission of Signals	3-4
6	Sampling and Analog to Digital Conversion	5-8
14	Error Correcting Methods	9
7	Principles of Digital Data Transmission	10-13
10	Performance Analysis of Digital Communication Systems	14-15

8. Student outcomes addressed by the course

A. an ability to apply knowledge of mathematics, science, and engineering (CLO 1, 2, 3, 4, 5, 6, 7)
B. an ability to design and conduct experiments, as well as to analyze and interpret data (CLO 1, 2, 3, 4, 6, 7)
C. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (CLO 2, 3, 6)
D. an ability to identify, formulate, and solve engineering problems (CLO 2, 3, 4, 6, 7)
E. a recognition of the need for, and an ability to engage in life-long learning (CLO 5, 6)
F. knowledge of contemporary issues (CLO 3,6)
G. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (CLO 7)

9. Grading

- Class participation, Homework 20%
- Weekly Quizzes 40%
- Final examination 40%.

10. Course Policies

- Homework submission: All homework are accepted through Moodle, and no written homework will be accepted.
- Intellectual Dishonesty: All submitted assignments would consist of only the student's own work. Seeking help from fellow students is encouraged; however, never ask others to do your work nor let others copy yours. If copying is suspected everybody involved will receive ZERO for the assignment.

11. NJIT Honor Code

The NJIT Honor Code will be strongly upheld. Violation will be referred to the Dean of Students for disciplinary action.