**King Saud University**

**College of Computer and Information Sciences**

**Department of Computer Engineering**

**CEN 344 –DATA COMMUNICATION Lab 1(0-2-0)**

**Semester II, Academic Year 2013-2014**

**Required Course: Su 3-5 PM, Mo 10-12 AM, Tu 3-5 PM, We 10-12 AM in Room 57.**

**Professor Information:**

Nasser-Eddine Rikli

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* *Course webpage*: <http://faculty.ksu.edu.sa/nrikli/courses/cen344.apsx>
* *Lab Assistant*: Eng. Hesham Tolba.

**Course Description (catalog):**

Transmission media characteristics and impairments; Digital modulation techniques: PCM, DPCM, and DM; Basic Shift Keying methods using: amplitude, phase, and frequency; Multiplexing techniques using analog and digital signals; Basic modem structure; Fiber optics communication.

**Corequisites:**

* **Courses**
  + - CEN 342.
* **Topics**
  + - Data Transmission.
    - Signals and systems.
    - Physics (electricity and electromagnetism).
    - Logic design I.

**Textbook(s) and/or Other Required Materials:**

#### Primary:

#### Data and Computer Communications, by W. Stallings, Prentice Hall.

#### Handouts + Software Information.

* **Supplementary:**
* B. A. Forouzan, Data Communications and Networking, McGraw Hill.
* F. Halsall, Data Communication, Computer Networks and Open Systems, Addison-Wesley.
* Tanenbaum, Computer Networks, Prentice Hall.

**Course Learning Outcomes:**

This course requires the student to demonstrate the following:

1. Identify transmission media characteristics and impairments;
2. Evaluate analog modulation techniques: AM and FM;
3. Evaluate digital modulation techniques: PCM;
4. Evaluate basic Shift Keying methods: ASK, PSK, FSK
5. Describe the operation and principles of multiplexing techniques;
6. Recognize the basic modem operation and structure.

**Major Topics covered and schedule in weeks:**

|  |  |
| --- | --- |
| Familiarization with UNI-Train equipment | 1 |
| Coaxial Lines/Four-wires Lines 1: Measuring the DC resistance. | 1 |
| Coaxial Lines/Four-wires Lines 2: Measuring the Longitudinal Inductance. | 1 |
| Coaxial Lines/Four-wires Lines 3: Measuring the Capacitance. | 1 |
| Optical Waveguides. | 1 |
| Analog modulation techniques 1: AM and FM. | 1 |
| Modems and Shift-Keying Techniques 1: ASK, FSK. | 1 |
| Modems and Shift-Keying Techniques 2: PSK, QPSK. | 1 |
| Pulse Amplitude Modulation. | 1 |
| Pulse Code Modulation 1: quantization, and companding. | 1 |
| Pulse Code Modulation 2: time division multiplexing. | 1 |
| Pseudo-Ternary Codes. | 1 |
| Pulse Position/Width Modulations. | 1 |
| Makeup/Review. | 1 |

**Grading**

Reports 20%

Attendance 10%

Performance 10%

Quiz for Preparation 10%

Final Experiment 20%

Final Written 30%

**Lab Report Policies**

Please follow the following steps to get an accepted complete report:

1. Print the experiment steps and background from the course website at: <http://faculty.ksu.edu.sa/nrikli/Courses/cen344.aspx>.
2. Read the experiment steps, its objective, and background.
3. Record your results on your copy.
4. For each exercise get the signature of your Instructor.
5. Append this copy to your submitted report.
6. The submitted report should include:
   1. A brief theoretical background on the experiment topic (10 pts).
   2. Comments on the results obtained (10 pts).
   3. Answers to the questions from the experiment steps (10 pts).
   4. Your copy of the signed experiment steps (10 pts).

Note that without the experiment steps signed and attached to your report, the report will not be graded.

**Contribution of Course to Meeting Curriculum Disciplines:**

|  |  |
| --- | --- |
| **Curriculum Discipline** | **Percentage** |
| Mathematics and Basic Science |  |
| Engineering Science | 30 |
| Engineering Design | 70 |
| General Education |  |

**Relationship of Course to Student Outcomes**

|  |  |  |
| --- | --- | --- |
| **Outcome** | **Student Outcome Description** | **Contribution** |
| (a) | an ability to apply knowledge of mathematics, science, and engineering |  |
| (b) | an ability to design and conduct experiments, as well as to analyze and interpret data | 🗸 |
| (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 |  |
| (d) | an ability to function on multidisciplinary teams | 🗸 |
| (e) | an ability to identify, formulate, and solve engineering problems |  |
| (f) | an understanding of professional and ethical responsibility |  |
| (g) | an ability to communicate effectively |  |
| (h) | the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context |  |
| (i) | a recognition of the need for, and an ability to engage in life-long learning |  |
| (j) | a knowledge of contemporary issues |  |
| (k) | an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. | 🗸 |

Prepared by: *Dr Nasser-Eddine Rikli*.