

**King Fahd University of Petroleum and Minerals**  
**College of Computer Sciences and Engineering**  
**Department of Computer Engineering**  
**COE 241: Data and Computer Communications (3-0-3)**

**Pre-requisite:** MATH 102.

**Textbook:** *Data and Computer Communication*, William Stalling, Prentice Hall International, 9/e, 2011.

**References:** *Data Communications and Networking*. Behrouz A Forouzan, McGraw-Hill Science/Engineering/ Math; 5th edition, 2013.

**Instructor:** Dr. Ashraf S. Mahmoud, Room 22-420, Ext 1724, email: [ashraf@kfupm.edu.sa](mailto:ashraf@kfupm.edu.sa)

**Webpage:** [http://faculty.kfupm.edu.sa/coe/ashraf/RichFilesTeaching/COE131\\_241/coe131\\_241.htm](http://faculty.kfupm.edu.sa/coe/ashraf/RichFilesTeaching/COE131_241/coe131_241.htm)

**Class Time/Place:** UT 11:00-12:15 pm – Building 24, Room 125.

**Office Hours:** UT 10:00-10:45 and 12:30-13:15, or by appointment.

**Catalog Description:**

Introduction to data communication. Brief overview of the OSI model. Frequency response, bandwidth, filtering, and noise. Fourier series and transform. Introduction to the Z-transform. Information theory concepts such as Nyquist theorem, Shannon theorem, and Sampling theorem. Analog and digital modulation techniques. Pulse Code Modulation (PCM). Communication systems circuits and devices. Data encoding. Physical Layer Protocols. Data Link Control (point to point communication; design issues; link management; error control; flow control). Multiplexing Techniques.

**Attendance:** Attendance is required by all students. Official and authorized absence excuse must be presented to the instructor no later than one week following the absence. Unexcused absences lead to a “DEN” grade as per the university policy on this issue.

**Tentative Grading Policy:**

	<b>Date</b>
• Quizzes:	<b>13%</b>
• Homework:	<b>12%</b>
• Programming Assignment	<b>08%</b> (2 Matlab assignments)
• Essay/Presentation:	<b>07%</b>
• Major Exam I:	<b>13%</b> To be scheduled
• Major Exam II:	<b>17%</b> To be scheduled
• Final Exam:	<b>30%</b> (Comprehensive) Jan 1 <sup>st</sup> , 2014; 7:00 PM
<b>Total</b>	<b>100%</b>

**Course Learning Outcomes:**

1. Ability to apply knowledge of mathematics to understand basic concepts in communication engineering.
2. Ability to analyze and/or design basic communication systems, processes, and components.
3. Ability to identify, formulate, analyze, and solve basic communication engineering problems.
4. Ability to use modern programming tools and skills for the simulation, analysis, and design of basic communication systems and components.
5. Ability to demonstrate self learning skills and aptitudes.

### Weekly Course Schedule

Week	Topics
1	<ul style="list-style-type: none"> <li>• Communication Model, Data Communications, Networking</li> </ul>
2	<ul style="list-style-type: none"> <li>• Brief introduction to protocol Architecture (The OSI model)</li> <li>• Introducing the tool to be used in the programming assignment</li> </ul>
3	<ul style="list-style-type: none"> <li>• Data Transmission (concepts and terminology)</li> <li>• Analog and Digital Data Transmission</li> </ul>
4	<ul style="list-style-type: none"> <li>• Analog and Digital Data Transmission (continued)</li> <li>• Fourier Series Analysis and Fourier Transform Representation</li> <li>• Introduction to z-transform</li> </ul>
5	<ul style="list-style-type: none"> <li>• Transmission Impairments.</li> <li>• Nyquist formula and Shannon's Capacity</li> </ul>
6	<ul style="list-style-type: none"> <li>• Transmission Media: Guided and Wireless.</li> </ul>
7	<ul style="list-style-type: none"> <li>• Digital Data – Digital Signals</li> </ul>
8	<ul style="list-style-type: none"> <li>• Digital Data – Analog Signals</li> </ul>
9	<ul style="list-style-type: none"> <li>• Analog Data - Digital Signals</li> </ul>
10	<ul style="list-style-type: none"> <li>• Analog Data – Analog Signals</li> </ul>
11	<ul style="list-style-type: none"> <li>• Asynchronous and synchronous transmission</li> <li>• Types of errors, Error Detection</li> </ul>
12	<ul style="list-style-type: none"> <li>• Flow Control (stop-and-wait and sliding window flow)</li> <li>• Error Control (ARQ)</li> </ul>
13	<ul style="list-style-type: none"> <li>• Error Control (continued)</li> <li>• HDLC</li> </ul>
14	<ul style="list-style-type: none"> <li>• FDM and Synchronous TDM</li> </ul>
15	<ul style="list-style-type: none"> <li>• Statistical TDM, ADSL</li> </ul>