Course Outline for Electronic Systems Technology 57D

INDUSTRIAL NETWORKS AND INTERNET OF THINGS

Catalog Description:

ESYS 57D - Industrial Networks and Internet of Things 2.00 units

Strongly Recommended: ESYS 57A and , ESYS 57B

Grading Option: Letter Grade

Discipline:

<table>
<thead>
<tr>
<th>Units</th>
<th>Contact Hours</th>
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<tbody>
<tr>
<td></td>
<td>Week</td>
</tr>
<tr>
<td>Lecture</td>
<td>2.00</td>
</tr>
<tr>
<td>Laboratory</td>
<td>1.5</td>
</tr>
<tr>
<td>Clinical</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>2.00</td>
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Prerequisite Skills:

None

Measurable Objectives:

Upon completion of this course, the student should be able to:
1. configure, verify operation, and troubleshoot a wired IP network;
2. configure, verify operation, and troubleshoot a wireless IoT network;
3. describe security threats and countermeasures in IP and IoT networks;
4. describe how security frameworks, policies, and procedures are used to improve system security.

Course Content:

Course content, lecture:
1. Industrial networking with wired and wireless IP protocols.
2. Characteristics of IoT: Sensors, battery power, energy harvesting, data communication
3. Building and configuring an IoT network
4. Data collection and storage: big data and cloud services
5. Data encryption systems
6. Security frameworks, guidance, and policies

Course content, lab:
1. Wired Ethernet and IP configuration and troubleshooting
2. Wireless IEEE 802.11 configuration and troubleshooting
3. Installing, configuring, and troubleshooting wireless IoT devices
4. Data collection and storage
5. Monitoring networks
6. Data encryption and decryption

Methods of Presentation

1. Computer-based interactive curriculum
2. Laboratory exercises
3. Lectures
4. Online Assignments

Assignments and Methods of Evaluating Student Progress

1. Typical Assignments
   A. Lectures: After the instructor lectures on Big Data and Cloud Storage, describe two benefits and two risks to an organization of using Big Data and Cloud Storage.
   B. Computer-Based Interactive Curriculum: Complete the online learning object module on Network Internet Protocol (IPV6). At the completion of the interactive presentation, complete the end-of-module assessment.
   C. Laboratory exercises: Configure two IoT sensor modules, wireless access point, and gateway interface to a local network. Use network monitoring (sniffing) software to identify data from the sensor without a proper security configuration, and verify no identifiable data can be captured from a sensor with a proper security configuration. Present your findings in a report that identifies the misconfigured sensor and the potential for compromised data.

2. Methods of Evaluating Student Progress
   A. Class Participation
   B. Final Examination
   C. Laboratory exercises
   D. Quizzes

3. Student Learning Outcomes
   Upon the completion of this course, the student should be able to:
A. ESYS 57D SLO 1: The student will compare and contrast the wireless protocols for IoT industrial sensors.
B. ESYS 57D SLO 2: The student will configure, and troubleshoot as needed, multiple IoT sensors and demonstrate data collection.

**Textbooks (Typical):**
2. www.owasp.org (Open Web Application Security Project), Internet of Things Project

**Special Student Materials**
1. no additional student materials

**Abbreviated Class Schedule Description:**


**Strongly Recommended:** ESYS 57A and, ESYS 57B