1. Catalog Description

a) Course number: AET 3153

b) Title: Advanced Routing and Switching

c) Meeting times and Credit: 2-2-3

d) Term to be offered: S 2004

e) Short title: Advanced Routing

f) Course description: This course focuses on additional hardware and networking applications of the topics covered in AET 2523 Routing and Switching with emphasis on industrial networks of computer integrated machines.

g) Prerequisite: AET 2523 Routing and Switching Fundamentals

2. Objectives and Evaluation of the Course

a) Students will be able to perform the following tasks after completing this course:
   1. Apply the principles of networking to Local Area Network (LAN) design.
   2. Use switching in a local area networks.
   3. Develop a working knowledge of Virtual Local Area Networks.
   4. Use routing protocols in a network.
   5. Apply practical experience to industrial network management of Wide Area Networks (WAN), WAN design, and other WAN technologies.
   6. Apply practical experience to virtual private networking.
   7. Apply security techniques to an industrial network.
   8. Design project to create an industrial LAN and/or WAN that contains devices and machines such as Programmable Logic Controllers, Robots, Computer Numerically Controlled (CNC) Mill, CNC lathe, and other computer integrated machines.

b) Not a general education course.
c) Methods of assessing the objectives:

- Tests – Midterm and Final: 30%
- Lab experiences: 30%
- Design project and Presentation: 40%

3. Outline of the Course

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<tr>
<th>Week(s)</th>
<th>Topic</th>
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<tbody>
<tr>
<td>2</td>
<td>1. Configuring Internet Protocol (IP) routing in WANs Lab I, II, III, IV</td>
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<tr>
<td>1</td>
<td>2. Using switches in LANs and configuring Virtual Local Area Networks (VLANs) Lab V, VI</td>
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<td>2</td>
<td>3. Using dynamic routing, Internet gateway protocols, and multiprotocol routing in networks Lab VII, VIII, IX, X</td>
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<td>2</td>
<td>4. Managing routers in a wide area network Lab XI, XII, XIII</td>
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<td>1</td>
<td>5. Using encapsulation and Internet packet extended routing in different types of network protocols Lab XIV, XV</td>
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<td>2</td>
<td>6. Applying the basics of access lists, standard IP access lists, and extended IP access lists in securing a network Lab XVI, XVII, XVIII, XIX</td>
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<td>1</td>
<td>7. Configuring routers for ISDN and Frame Relay WAN Technologies Lab XX</td>
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<td>4</td>
<td>8. Design and present a project involving industrial LAN/WANs</td>
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4. Rationale

a) Purpose and need: Applied Engineering & Technology students in the Automation and Control Concentration are being required to work with, maintain, and design basic and advanced networking technologies in an industrial environment. Production floor machines are network ready today and are connected into an industrial plant wide network, which can connect into the corporate network.

The interconnection of networks within a facility and to other widely separated facilities and divisions of an organization has become paramount. A recent survey of industrial businesses on the need for e-Manufacturing and networking revealed that businesses want Applied Engineering & Technology graduates to have networking experiences. The survey indicated a 90% level of need for these skills.
b) Justification of the level of the course and a list of all prerequisites: This first semester junior level course is a continuation of the topics and experiences provided by the sophomore level routing and switching fundamentals course. Prerequisite is AET 2523 Routing and Switching Fundamentals.

c) Similarity to existing courses: None.

d) Impact on Program: Elective for students in the Automation and Control Concentration of the Applied Engineering & Technology program and Technology Education emphasis of the Career and Technical Education program. No changes to the current catalog necessary.

5. Implementation

   a) Faculty: Dr. Sam Guccione School of Technology.
   b) Additional costs to students: Engineering Journal and Workbook, Vol II, 2001 to be purchased in the Union Bookstore as a supplemental text.
      b. Lab Companion, Vol II, 2001
   d) Term to be first offered: Spring Semester 2004.

6. Community College Transfer: A community college course will not be judged as equivalent.

7. Date approved by the School of Technology Curriculum Committee: April 17, 2002

8. Date approved by the Lumpkin College of Business and Applied Sciences Curriculum Committee: September 12, 2002

9. Date approved by Council on Academic Affairs: October 17, 2002