Syllabus

Course Number: MSCT 664
Course Title: Routing & Switching

Course Description:
This course provides the Networking student an in-depth understanding of how network protocols are routed. This information is essential to the network professional and the long term success of MSCIT students. Students will be presented with a thorough background of how protocols are routed throughout networks and the Internet. The course will cover Internetworking, Switching technologies, Internet Protocol version 4 and 6, IOS commands and their functions, Virtual LAN's, and Wide Area Networks. This course will explain why there is a need to route protocols and the benefits. Students will also learn about what is involved in routing and switching.

Prerequisite Courses:
MSCT 620

Course Overview
Program Note: This course is being revised and students can expect outcomes, activities, and assignments to change as the course evolves through this process. Contact your facilitator or the program coordinator, Dr. Stephen Barnes (sbarnes@regis.edu), to get the latest updates or learn more about how this course is being updated.

This course is designed for students with at least one year of IT network and systems work experience. Students will learn to plan, configure, and verify the implementation of enterprise LAN and WAN solutions using a range of routing protocols and Cisco’s campus enterprise architecture.

Course Outcomes:
Upon completion of this course, learners should be able to:

- Know switching technologies and the difference between the different types.
- Complete understanding of the internetwork operating system (IOS) commands. Be able to configure routers and switches utilizing IOS commands.
- Understand the IP routing process. Create and configure static and default routing. Explain EIGRP, OSFP, and BGP routing.
- Be able to describe virtual LANs, frame tagging, inter-switching routing, and virtual trunk protocol.
• Understand Wide Area Network concepts pertaining to routing and switching.

Course Materials:

Required Texts:


Technology Tools:

USB to Serial Adaptor
GNS3
TFTP Server

Optional Materials:

Access to CCO account

Pre-Assignment:

Read D. Hucaby (2010). *CCNP SWITCH 642-813*: Chapter 2 – 5. In addition, students are expected to have read the readings assigned for the first week of class before the class begins.

Pre-Assignment Due Dates:

Classroom-based Format: This assignment is due the first night of class.
Online Format: The instructor will specify the due date for this assignment.
### Course Assignments and Activities:

<table>
<thead>
<tr>
<th></th>
<th>Topics &amp; Activities</th>
<th>Readings</th>
<th>Assignments and Associated Points</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Building Campus Networks:</strong> Review of Regis Policies and Procedures. Student Introductions.</td>
<td>CCNP Switch:</td>
<td>Switching Lab 1: 25 points</td>
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</tbody>
</table>
|   |                                                                                                                                                    | • Switching Labs and GNS Virtual Labs  
• Switch operation, switch port configuration, VLANs and Trunks, and VLAN Trunking Protocol             | • Chapter 2: Switch Operation  
• Chapter 3: Switch Port Configuration  
• Chapter 4: VLANs and Trunks Chapter 5: VLAN Trunking Protocol (VTP)                                    | • Configuring Interfaces  
• Setting up VLANs  
• Setting up Trunk links  
• Setting up VTP                                                                                     |
| 2 | **Building Campus Networks:** Aggregating switch links: EtherChannel, EtherChannel Negotiation Protocols, Configuration, and Troubleshooting STP: 802.1D Overview, Types of STP, STP root bridge, customization, convergence, and redundant link convergence | CCNP Switch:                                                                                                    | Switching Lab 2: 25 points                                                                                               |
|   |                                                                                                                                                    | • Chapter 6: Aggregating Switch Links  
• Chapter 7: Traditional Spanning Tree Protocol  
• Chapter 8: Spanning-Tree Configuration  
• Chapter 10: Advanced Spanning Tree Protocol                                                                | • Setting up EtherChannel  
• Setting up STP  
• Root Bridge  
• Rapid STP  
• STP with MST                                                                                       |
| 3 | **Building and Designing Campus Networks:** Multilayer Switching: InterVLAN Routing  
Enterprise Campus Network Design: Hierarchical network design and modular network design  
Layer3 High Availability: Router redundancy in multilayer switching – HSRP, VRRP, and GLBP                  | CCNP Switch:                                                                                                    | Switching Lab 3: 25 points                                                                                               |
|   |                                                                                                                                                    | • Chapter 11: Multilayer Switching  
• Chapter 12: Enterprise Campus Network Design  
• Chapter 13: Layer 3 High Availability                                                                 | • Setting up Multilayer Switching  
• Frist Hop Redundancy with HSRP and GLBP                                                                               |
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| 4 | **EIGRP overview:**  
  • Topology, routes, convergence, route summarization and filtering | CCNP Route:  
  • Ch 2: EIGRP Overview and Neighbor Relationship  
  • Ch 3: EIGRP Topology, Routes, and Convergence  
  • Ch 4: EIGRP Route Summarization and Filtering | Routing Lab 1: 25 points  
  • Configuring static and EIGRP  
  First research paper due: 50 |
| 5 | **OSPF overview**  
  • Topology, routes, route summarization, filtering, and OSPF virtual links | CCNP Route:  
  • Ch 5: OSPF Overview and Neighbor Relationship  
  • Ch 6: OSPF Topology, Routes, and Convergence  
  • Ch 7: OSPF Route Summarization, Filtering, and Default Routing  
  • Ch 8: OSPF Virtual Links | Routing Lab 2: 25 points  
  • Configuring OSPF for single and multiple areas |
| 6 | **Path Control**  
  • Basic IGP redistribution, and policy-based routing and IP service Level Agreement | CCNP Route:  
  • Ch 9: Basic IGP Redistribution  
  • Ch 10: Advanced IGP Redistribution  
  • Ch 11: Policy-Based Routing and IP Service Level Agreement | Routing Lab 3: 25 points  
  • Configuring Route redistribution  
  • Configuring Policy-Based routing |
| 7 | **BGP**  
  • iBGP, eBGP and BGP route filtering | CCNP Route  
  • Ch 12: Internet Connectivity and BGP  
  • Ch 13: eBGP  
  • Ch 14: iBGP and BGP Route Filtering | Routing Lab 4: 25 points  
  • Configuring Multihoming BGP  
  • Configuring route maps for BGP path selection |
| 8 | Makeup week | Second research paper due: 50 | Maximum Points Possible: |
### CC&IS Grading Scale

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percentage</th>
<th>Grade Point</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>93 to 100</td>
<td>4.00</td>
</tr>
<tr>
<td>A–</td>
<td>90 to less than 93</td>
<td>3.67</td>
</tr>
<tr>
<td>B+</td>
<td>87 to less than 90</td>
<td>3.33</td>
</tr>
<tr>
<td>B</td>
<td>83 to less than 87</td>
<td>3.00</td>
</tr>
<tr>
<td>B–</td>
<td>80 to less than 83</td>
<td>2.67</td>
</tr>
<tr>
<td>C+</td>
<td>77 to less than 80</td>
<td>2.33</td>
</tr>
<tr>
<td>C</td>
<td>73 to less than 77</td>
<td>2.00</td>
</tr>
<tr>
<td>C–</td>
<td>70 to less than 73</td>
<td>1.67</td>
</tr>
<tr>
<td>D+</td>
<td>67 to less than 70</td>
<td>1.33</td>
</tr>
<tr>
<td>D</td>
<td>63 to less than 67</td>
<td>1.00</td>
</tr>
<tr>
<td>D–</td>
<td>60 to less than 63</td>
<td>.67</td>
</tr>
<tr>
<td>F</td>
<td>Less than 60</td>
<td>0</td>
</tr>
</tbody>
</table>

Additional information about grading can be found in the latest edition of the University Catalog, available at [http://www.regis.edu/Academics/Course%20Catalog.aspx](http://www.regis.edu/Academics/Course%20Catalog.aspx).

### CC&IS Policies and Procedures

Each of the following CC&IS Policies & Procedures is incorporated here by reference. Students are expected to review this information each term, and agree to the policies and procedures as identified here and specified in the latest edition of the University Catalog, available at [http://www.regis.edu/Academics/Course%20Catalog.aspx](http://www.regis.edu/Academics/Course%20Catalog.aspx) or at the link provided.

- The CC&IS Academic Integrity Policy.
- The Student Honor Code and Student Standards of Conduct.
- Incomplete Grade Policy, Pass / No Pass Grades, Grade Reports.
- The Information Privacy policy and FERPA. For more information regarding FERPA, visit the [U.S. Department of Education](http://www.ed.gov).  
- The HIPAA policies for protected health information. The complete Regis University HIPAA Privacy & Security policy can be found here: [http://www.regis.edu/About-Regis-University/University-Offices-and-Services/Auxiliary-Business/HIPAA.aspx](http://www.regis.edu/About-Regis-University/University-Offices-and-Services/Auxiliary-Business/HIPAA.aspx).

The CC&IS Policies & Procedures Syllabus Addendum summarizes additional important policies including, Diversity, Equal Access, Disability Services, and Attendance & Participation that apply to every course offered by the College of Computer & Information Sciences at Regis University. A copy of the CC&IS Policies & Procedures Syllabus Addendum can be found here: [https://in2.regis.edu/sites/ccis/policies/Repository/CCIS%20Syllabus%20Addendum.docx](https://in2.regis.edu/sites/ccis/policies/Repository/CCIS%20Syllabus%20Addendum.docx).