Spring 2018

IT 445  Advanced Networking Principles II

Syllabus

Revised 01/03/2018

Section DL1:  Asynchronous Distance Learning Section
Instructor:  Pouyan Ahmadi
Email:  pahmadi@gmu.edu
Office:  BRH, Room 102B
Office Hours:  Monday 2:30 pm to 4:00 pm, by appointment

GTA:  TBA
Office:  TBA
Office Hours:  TBA
Phone:  TBA
Email:  TBA

* Asynchronous Distance Learning Section:

This is an online asynchronous distance learning section. Students will meet twice at SciTech campus on the following dates and times in order to take the Skills Exams. The Date and Time for the exams are as follows:

Skills Exam 1 on Feb 27, 2018 from 4:30 PM – 7:10 PM in BRH 260
Skills Exam on May 1, 2018 from 4:30 PM – 7:10 Pm in BRH 260

Prerequisite:

IT101, IT106 or IT108, IT212, Math108, and IT341

Description:

This course consists of two modules. Throughout the first module (Introduction to Scaling Networks) the focus will be on describing the use of the hierarchical network for a small business and the components of a wireless LAN infrastructure. Also, to describe recommendations for designing a network that is scalable, concepts such as LAN redundancy and link aggregation will
be discussed. In the area of routing protocols, more advanced concepts like adjusting and troubleshooting Single/Multi Area OSPF or EIGRP complex configurations will be covered in this course.

In the second module (Connecting Networks) the focus will be on the need for business network architectures that are designed to address emerging trends in IT. In this manner, the purpose of using WAN and various private/public WAN technologies, Point-to-Point connections, Frame Relay and Network/Port Address Translation (NAT/PAT) will be covered. Additionally, to get familiar with the benefits of VPN technology, IPsec framework along with GRE tunnel will be explained. At the end of this module important monitoring protocols such as SNMP, Syslog, and Netflow as well as some general troubleshooting guidelines will be described.

**Learning Outcomes:**

1. Design router and switch architecture and configurations
2. Wireless LAN configuration and troubleshooting
3. Configuration and troubleshooting of Single and Multiple Area OSPF
4. Configuration and troubleshooting of EIGRP networks
5. Network design models
6. Describe all types of WAN technologies
7. Design Network Address and Port Address Translation (NAT & PAT)
8. Understand, design, and configure Frame Relay networks and Point to Point Protocol (PPP)
9. Understand the concepts and processes related to VPNs, as well as the benefits of VPN implementations and the underlying protocols required to configure VPNs
10. Network Management tools for QoS
11. Learn the general process of troubleshooting

**Lecture Textbooks:**

*Scaling Networks Companion Guide* is the official supplemental textbook for the Scaling Networks course in the Cisco® CCNA® Academy
Connecting Networks Companion Guide is the official supplemental textbook for the Connecting Networks course in the Cisco® Networking Academy® CCNA® Routing and Switching curriculum.

**Slides:**  
Class lectures  
**Course Materials at:**  
https://mymasonportal.gmu.edu

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and Lab Work</td>
<td>15%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>5%</td>
</tr>
<tr>
<td>Skills Exam 1</td>
<td>15%</td>
</tr>
<tr>
<td>Skills Exam 2</td>
<td>15%</td>
</tr>
<tr>
<td>NetAcad Online Exam 1</td>
<td>5%</td>
</tr>
<tr>
<td>NetAcad Online Exam 2</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

Grades will be awarded in accordance with the GMU Grading System for undergraduate students. For details, refer to: http://catalog.gmu.edu/policies/academic/grading/#text

GMU does not dictate a grading scale:  
https://registrar.gmu.edu/topics/grading-scale/

This course uses the grading scale below but the scale may vary at instructor's discretion.

**Grading Scale:**

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>97 – 100%</td>
<td>A+</td>
</tr>
<tr>
<td>93 – 96%</td>
<td>A</td>
</tr>
<tr>
<td>90 – 92%</td>
<td>A-</td>
</tr>
<tr>
<td>87 – 89%</td>
<td>B+</td>
</tr>
<tr>
<td>83 – 86%</td>
<td>B</td>
</tr>
</tbody>
</table>
80 – 82% → B-
76 – 79% → C+
70 – 75% → C
60 – 69% → D
0 – 59% → F

Raw scores may be adjusted by the Instructor to calculate final grades.

Homework Assignments, Lab Sessions
Homework assignments and lab sessions are available in Blackboard. In each lab session, you practice the lecture materials in Cisco innovative network simulation program, Packet Tracer. Acceptance of late homework assignment and lab session, will be at the sole discretion of the Instructor. Each homework assignment and lab session will be released for viewing 7 days prior to the due date. Late homework assignment and lab session, will not be accepted – if accepted, a penalty will be applied.

NetAcad Online Final Exam
Introduction to Networks and Routing & Switching Essentials final exams are conducted online at the Cisco Networking Academy (NetAcad) website. Retake of missed online NetAcad exams will be at the sole discretion of the Instructor. Missed NetAcad final exams will not be accepted.

Weekly Quizzes:
The quizzes will cover materials discussed during last lectures and will be conducted at the end of lab sessions in NetAcad website. These quizzes will be “closed book”– no reference materials will be permitted.

Midterm Exam:
The midterm exam will cover materials discussed up to Session 6. The midterm exam will be “closed book”– no reference materials will be permitted.

Final Exam:
The final exam will cover materials discussed primarily during Sessions 7 thru 15. The final exam will be “closed book”– no reference materials will be permitted. Final exams are retained by the IST Department and are not returned to students.
### Schedule:

<table>
<thead>
<tr>
<th>Week</th>
<th>Ch 1</th>
<th>Ch 2</th>
<th>Ch 3</th>
<th>Ch 4</th>
<th>Ch 5</th>
<th>Ch 6</th>
<th>Ch 7</th>
</tr>
</thead>
</table>
| **1**      | Review of Data Communications and Networking Principles | Released on: Jan 21  
- Lab Session 1 (IT 341 Review - Connecting Devices)  
- Lab Session 2 (IT 341 Review - Configuring IP Addresses) | **2** | LAN Redundancy | Released on: Jan 28  
- Lab Session 3.1 Examining a Redundant Design | **3** | Link Aggregation | Released on: Feb 4  
- Lab Session 3.2 Configuring PVST  
- Lab Session 4 Link Aggregation | **4** | Adjust and Troubleshoot Single-Area OSPF | Released on: Feb 11  
- Lab Session 5 OSPF Single Area  
- Lab Session 6 OSPF Multi Area | **5** | EIGRP | Released on: Feb 18  
- Lab Session 7 EIGRP |
<p>| Week of Jan 21 | Ch 1 – Introduction to Scaling Networks | <strong>2</strong> | Week of Jan 28 | Ch 2 – LAN Redundancy | <strong>3</strong> | Week of Feb 4 | Ch 3 – Link Aggregation | <strong>4</strong> | Week of Feb 11 | Ch 5 – Adjust and Troubleshoot Single-Area OSPF | <strong>5</strong> | Week of Feb 18 | Ch 7 – EIGRP |
| <strong>2</strong>      | Week of Jan 28 | <strong>3</strong> | Week of Feb 4 | <strong>4</strong> | Week of Feb 11 | <strong>5</strong> | Week of Feb 18 |</p>
<table>
<thead>
<tr>
<th>Week of</th>
<th>Chapter(s)</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 25</td>
<td>Ch 8 – EIGRP Advance Configuration and Troubleshooting</td>
<td>• Lab Session 8 EIGRP Advanced</td>
</tr>
<tr>
<td></td>
<td>Ch 9 – IOS Images and Licensing</td>
<td><strong>Due: Feb 18</strong></td>
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</tbody>
</table>
|              |                                                                             | • Lab Session 5 OSPF Single Area  
• Lab Session 6 OSPF Multi Area                                                                                                                  |
| Mar 4        | Skills Exam 1 on Feb 27, 2018 from 1:30 PM – 3:30 PM  
**BRH 260**                                                             | **Due: Feb 25**                                                                                                                                 |
|              |                                                                             | • Lab Session 7 EIGRP  
• Lab Session 8 EIGRP Advanced                                                                                                                  |
| Mar 4        | ➢ Take-home NetAcad Online Exam 1 on Mar 4 from 5-11pm  
➢ Take-home Midterm Exam on March 11 from 5-7pm                             |                                                                                                                                 |
| Mar 12-18    | Mon Mar 12 – Sun Mar 18                                                      |                                                                                                                                 |
| Mar 18       | Ch 1 – Hierarchical Network Design                                           | **Released on: Mar 18**  
• Lab Session 9 Propagating a Default Route in EIGRP for IPv4 and IPv6                                                                 |
|              | Ch 2 – Connecting to the WAN                                                 | **Due: March 25**                                                                                                                                 |
|              |                                                                             | • Lab Session 9 Propagating a Default Route in EIGRP for IPv4 and IPv6                                                                 |
|              |                                                                             | **Released on: March 25**  
• Lab Session 10 Frame Relay  
• Lab Session 11 Configuring PAP and CHAP Authentication                                                                                       |
| Mar 25       | Ch 3 – Point to Point Connections                                            | **Mar 25 between 5-11pm:**  
• Quiz 3 – Chapter 2                                                                                                                                 |
<p>|              | Ch 4 – Frame Relay                                                           |                                                                                                                                 |</p>
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Due</th>
<th>Released on:</th>
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<tbody>
<tr>
<td>10</td>
<td>Ch 5 – Network Address Translation (NAT/PAT)</td>
<td>Apr 1</td>
<td>Apr 1 between 5-11pm:</td>
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<tr>
<td>11</td>
<td>Ch 6 – Broadband Solutions</td>
<td>Apr 8</td>
<td>Apr 8 between 5-11pm:</td>
</tr>
<tr>
<td></td>
<td>Ch 7 – Securing Site-to-Site connectivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Ch 8 – Monitoring the Network</td>
<td>Apr 15</td>
<td>Apr 15 between 5-11pm:</td>
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<tr>
<td>13</td>
<td>Ch 9 – Troubleshooting the Network</td>
<td>Apr 22</td>
<td>Apr 22 between 5-11pm:</td>
</tr>
</tbody>
</table>

**Released on: Apr 1**
- Lab Session 12
- Network Address Translation

**Due: Apr 1**
- Lab Session 10 Frame Relay
- Lab Session 11 Configuring PAP and CHAP Authentication

**Apr 1 between 5-11pm:**
- Quiz 4 - Chapter 4

**Released on: Apr 8**
- Lab Session 13
- Site-to-Site connectivity

**Due: Apr 8**
- Lab Session 12 Network Address Translation

**Apr 8 between 5-11pm:**
- Quiz 5 - Chapter 5

**Released on: Apr 15**
- Lab Session 14 Monitoring

**Due: Apr 15**
- Lab Session 13
- Site-to-Site connectivity

**Apr 15 between 5-11pm:**
- Quiz 6 - Chapter 7

**Released on: Apr 22**
- Lab Session 15
- Troubleshooting

**Due: Apr 22**
- Lab Session 14 Monitoring

**Apr 22 between 5-11pm:**
- Quiz 7 - Chapter 8
<table>
<thead>
<tr>
<th>Week</th>
<th>Activity Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td><strong>Skills Exam on May 1, 2018 from 1:30 PM – 3:30 PM</strong>&lt;br.eulerAngles=90&gt;&lt;br&gt;BRH 260  &lt;br.eulerAngles=90&gt;Due on: <strong>Apr 29</strong>  &lt;br&gt;• Lab Session 15 Troubleshooting</td>
</tr>
<tr>
<td>16</td>
<td><strong>Reading Days</strong>&lt;br&gt;May 7 – 8  &lt;br&gt;Reading days provide students with additional study time for final examinations. Faculty may schedule optional study sessions, but regular classes or exams may not be held. &lt;br&gt;➢ Take-home NetAcad Online Exam 2 on May 6 from 5-11pm</td>
</tr>
<tr>
<td>Final Exam</td>
<td>➢ Take-home Final Exam on May 13 from 5-7pm</td>
</tr>
</tbody>
</table>

The reading assignment shown for each lecture is to be completed **prior to** that lecture.

*This schedule is subject to revision before and throughout the course.*

*Registered students should see* the Blackboard Learning System for the latest class schedule.

**Important Dates**

- Last day to add classes: Refer to the link below
- Final drop deadline with 67% tuition penalty: Refer to the link below
- Last day of classes: Refer to the link below

https://registrar.gmu.edu/calendars/spring-2018/

**Religious Holidays**

A list of religious holidays is available on the University Life Calendar page. Any student whose religious observance conflicts with a scheduled course activity must contact the instructor at least 1-week in advance of the conflict date in order to make alternative arrangements.
Attendance Policy

Departmental policy requires students to take exams at the scheduled time and place, unless there are truly compelling circumstances supported by appropriate documentation. Except in such circumstances, failure to attend a scheduled exam will result in a score of zero (0) for that exam, in accordance with Mason policy on final exams. Students should not make travel plans or other discretionary arrangements that conflict with scheduled classes and/or exams. If the University is closed due to weather or other unforeseen conditions, final exams may be rescheduled – students are strongly advised not to make plans that would prevent them from attending exams that may be rescheduled during the entire exam period.

Communications

Registered students will be given access to a section of the Blackboard Learning System for this course. Blackboard will be used as the primary mechanism to disseminate course information, including announcements, lecture slides, homework and other assignments, and scores for homework and exams.

Communication with the Instructor on issues relating to the individual student should be conducted using GMU email, via telephone, or in person - not in the public forums on Blackboard. GMU email is the preferred method – for urgent messages, you should also attempt to contact the Instructor via telephone. Federal privacy law and GMU policy require that any communication with a student related in any way to a student's status be conducted using secure GMU systems – if you use email to communicate with the Instructor you MUST send messages from your GMU email account.

Lecture slides are complements to the lecture process, not substitutes for it - access to lecture slides will be provided in Blackboard.

All course materials (lecture slides, assignment specifications, etc.) are published on Blackboard. This allows users of most computing platforms to view and print these files. Microsoft® Word (or a compatible word processing application) is required for preparing assignments – it is available on computers in the Mason open labs.

Privacy

Instructors respect and protect the privacy of information related to individual students. Issues relating to an individual student will be discussed via email, telephone or in person. Instructors will not discuss issues relating to an individual student with other students (or anyone without a need to know) without prior permission of the student.

Assessable work other than final exams will be returned to individual students directly by the Instructor (or by a faculty or staff member or a Teaching Assistant designated by the Instructor or via another secure method). Under no circumstances will a student's graded work be returned to another student.

Faculty and staff will take care to protect the privacy of each student's scores and grades.

Disability Accommodations

The Office of Disability Services (ODS) works with disabled students to arrange for appropriate accommodations to ensure equal access to university services. Any student with a disability of any kind is strongly encouraged to register with ODS as soon as possible and take advantage of the services offered.
Accommodations for disabled students must be made in advance – ODS cannot assist students retroactively, and at least one week's notice is required for special accommodations related to exams. Any student who needs accommodation should contact the Instructor during the first week of the semester so the sufficient time is allowed to make arrangements.

**Honor Code**

All members of the Mason community are expected to uphold the principles of scholarly ethics. Similarly, graduating students are bound by the ethical requirements of the professional communities they join. The ethics requirements for some of the communities relevant to IT graduates are available via the following links:

[ACM Code of Ethics and Professional Conduct](#)

[IEEE Code of Ethics](#)

On admission to Mason, students agree to comply with the requirements of the [GMU Honor System and Code](#). The Honor Code will be strictly enforced in this course. Honor Code cases are heard by a panel consisting of students – students who meet the requirements are encouraged to nominate themselves to serve on the Honor Committee.

Any use of the words or ideas of another person(s), without explicit attribution that clearly identifies the material used and its source in an appropriate manner, is plagiarism and will not be tolerated. The Instructor reserves the right to use manual and/or automated means (including such services as Turnitin.com) to detect plagiarism in any work submitted by students for this course, and to direct Teaching Assistants and/or other faculty and/or staff members to do likewise in support of this course.

For this course, the following requirements are specified:

- All assessable work is to be prepared by the individual student, unless the Instructor explicitly directs otherwise.
- All work must be newly created by the individual student for this course for this semester.
- Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.

Students may seek assistance with assigned work (and are encouraged to do so if they feel the need), provided:

- The directions for the assigned work do not prohibit such assistance.
- Such assistance is acknowledged in the submitted work, clearly identifying the person(s) giving assistance and the nature of the assistance given.
- Any work to be submitted is prepared entirely and exclusively by the student submitting it. Students are expressly prohibited from sharing any assessable work for this course in any manner with other students (except students assigned as Teaching Assistants to this course and the student's section), unless all students involved have had their work graded and returned by the Instructor, or the Instructor has explicitly approved such sharing.