George Mason University
Graduate Course Approval/Inventory Form

Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate:  ___X__ NEW  ____ MODIFY  ____ DELETE

Local Unit: ECE/TCom  Graduate Council Approval Date:

Course Abbreviation: TCOM  Course Number: 515

Full Course Title: Internet Protocol Routing: lecture and laboratory course

Abbreviated Course Title (24 characters max.): IP Routing: lect. & lab.

Credit hours: 3  Program of Record: MS in Telecommunications

Repeatable for Credit?  ___ D=Yes, not within same term  Up to hours
                   ___ T=Yes, within the same term  Up to hours
            _N__ N=Cannot be repeated for credit

Activity Code (please indicate):  ___X_ Lecture (LEC)  ___ Lab (LAB)  ___ Recitation (RCT)
                        ___ Studio (STU)  ___ Internship (INT)  ___ Independent Study (IND)
                        ___ Seminar (SEM)

Catalog Credit Format  3 : 1.5 : 1.5  Course Level:  GF(500-600)  ___X__ GA(700+)

Maximum Enrollment: 42  For NEW courses, first term to be offered: Fall 2004
Prerequisites or corequisites: Prerequisite courses TCOM 501, TCOM 502, and TCOM 509
Catalog Description (35 words or less)  Please use catalog format and attach a copy of the syllabus for new courses: Internet Protocol (IP) routing overview; static routing; dynamic routing; default routing, access lists; route redistribution; RIP, OSPF, IGRP, EIGRP, IS-IS, and BGP protocols submitted for comment. Real life scenarios are taught in the laboratory.

For MODIFIED or DELETED courses as appropriate:
Last term offered:  Previous Course Abbreviation:  Previous number:

Description of modification:

APPROVAL SIGNATURES:
Submitted by:  ___Jeremy Allnutt__________________ email: _jallnutt@gmu.edu__
Department/Program:  ___ECE/MS in Telecommunications ___ Date: _June 2003________
College Committee:  ________________________________ Date: __________________
Graduate Council Representative:  ________________________________ Date: __________________
GEORGE MASON UNIVERSITY
Course Coordination Form

Approval from other units:

Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

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Graduate Council approval: _______________________________ Date: ____________

Graduate Council representative: __________________________ Date: ____________

Provost Office representative: ____________________________ Date: ____________
1. CATALOG DESCRIPTION
(a) TCOM 515 Internet Protocol Routing: lecture and laboratory course (3.0:1.5:1.5)
(b) Prerequisites: TCOM 501, TCOM 502, and TCOM 509
(c) Catalog Description:

Internet Protocol (IP) routing overview; static routing; dynamic routing; default routing, access lists; route redistribution: RIP, OSPF, IGRP, EIGRP, IS-IS, and BGP protocols submitted for comment. Real life scenarios are taught in the laboratory element through exercises that involve configuring routers as network elements.

2. JUSTIFICATION
(a) Course Objectives
Students entering the MS in Telecommunications program come from a variety of educational and work backgrounds. Many will not have had any hands-on experience with the operational use of routers or switches in networks, even if they have taken courses in these areas (e.g. TCOM 501/502). This course is designed to introduce the basic concepts of layer 3 IP routing protocols through a half semester series of lectures and then to reinforce these lectures with hands-on laboratory elements in the second half of the semester. This paired concept of a lecture series followed by laboratory exercises will provide telecommunications students with real world information they can use throughout their masters course and in their working careers.

(b) Course Necessity
A hands-on laboratory course, which includes the necessary lecture element to provide the instructional background for the students so that they can derive the maximum benefit from the subsequent hands-on laboratory exercises, is seen as a critical part of the growth of the MS in Telecommunications program. Most competitive telecommunications programs have already incorporated a laboratory element into their degree programs.

(c) Relationship to Existing Courses
The lecture element of the course has elements that are similar to parts of TCOM 509 (Internet Protocols), TCOM 519 (Voice over IP), and related Special Topics courses on BGP, MPLS, IS-IS, etc. The laboratory element of the course builds upon the TCOM 514 Basic Switching lecture and lab course, which itself drew from the ECE 467 Network Implementation Laboratory that was taught for the first time in spring 2002.

3. APPROVAL HISTORY
ECE Department Date: November 14\textsuperscript{th}, 2003

IT&E Graduate Committee Date:

IT&E Dean Date:

4. SCHEDULING
The course will be offered every spring and fall semester as part of the regular TCOM program. If possible, it will also be offered in the summer session.

Proposed Instructors: Dr. Jeremy Allnutt, Ms. Pamela Van Meter, Ms. Teresa Dietrich Gurney, Mr. Matt Russell, Ms. Jennifer Hartz, and other faculty and adjunct professors, who are qualified in this area, will teach these courses.
5. COURSE OUTLINE

1.5 credit hour lecture element

(a) Syllabus

Week 1
Introduction, IP review, and static routing:
*Chapters 1, 2, and 3 in Doyle*

Week 2
Dynamic routing and RIP:
*Chapters 4, 5, and 7 in Doyle*

Week 3
OSPF:
*Chapter 9 in Doyle*

Week 4
IGRP and EIGRP:
Chapters 6 and 8 in Doyle

Week 5
IS-IS:
*Chapter 10 in Doyle*

Week 6
BGP:
*Stewart book*

Week 7
Route Redistribution, Access Lists, and Default Routes:
*Chapter 11, 12, 13, and Appendix in Doyle*

(b) Reading and Reference Material

Mandatory


Recommended

(c) Student Evaluation Criteria

Homework 10%
Midterm 30%
Course assignments 30%
Final 30%

1.5 credit hour laboratory element

(a) Syllabus

**Week 1**
*Laboratory exercise 1: Introduction to the lab and static IP routing*
Make physical connectivity between devices; Login to the terminal server via telnet; Manipulate the terminal server; Configure the router and its interfaces; Verify network connectivity among all devices; Examine an IP routing table; Configure static routes.

**Week 2**
*Laboratory exercise 2: dynamic RIP routing*
Make physical connectivity between device; Configure the router and its interfaces; Configure RIP; Turn up one additional link; Shut down two existing links; Enable authentication; Examine the IP routing table.

**Week 3**
Laboratory exercise 3: OSPF routing
*Make physical connectivity between devices; Configure the router and its interfaces; Configure OSPF; Turn up one additional link; Move two existing links to the new OSPF area; Enable authentication, Examine the IP routing table.*

1. **Week 4**
Laboratory exercise 4: EIGRP routing
*Make physical connectivity between devices; Configure the router and its interfaces; Configure EIGRP; Turn up one additional link; Turn auto-summarization on; Enable authentication; Examine the IP routing table.*

**Week 5**
Laboratory exercise 5: IS-IS routing
*Make physical connectivity between devices; Configure the router and its interfaces; Configure IS-IS; Turn up one additional link; Add a new IS-IS Level to the network; Examine the IP routing table.*

**Week 6**
Laboratory exercise 6: BGP routing
*Make physical connectivity between devices; Configure the router and its interfaces; Configure OSPF; Configure BGP; Bring up Internal and External BGP Peering; Import protocols to other protocols; Examine the IP routing table.*
Week 7 & 8
Laboratory exercise 7 (Final Exam): Capstone Lab
Lab exercise covering all topics covered in the lab segment of the course.

(d) Reading and Reference Material
Material and notes supplied by instructor, plus course books from lecture series.

(e) Student Evaluation Criteria

Laboratory activity  40%
Laboratory reports  60%