



Course Title Internetworking Technologies I

College

Course Code EGCI 474

Undergraduate Program

Mahidol University International

Division Science

---

### TQF 3 Course Specifications

#### Section 1 General Information

1. Course code and course title

Thai	EGCI 474	เทคโนโลยีระหว่างเครือข่าย 1
English	EGCI 474	Internetworking Technologies I

2. Number of credits 4 (3-2-7) Credits

3. Program and type of subject

3.1 Program	Bachelor of Engineering ( <u>Computer Engineering</u> )
3.2 Type of Subject	Elective Course (Free Elective)

4. Course Coordinator and Course Lecturer

4.1 Course Coordinator	Dr. Noppadol Wanichworanant
4.2 Course Lecturer	Dr. Noppadol Wanichworanant

5. Trimester/ Year of Study

5.1 Trimester	Third trimester / for 3 <sup>rd</sup> year Computer Engineering
5.2 Course Capacity	Approximately 20 students

6. Pre-requisite None

7. Co-requisites None

**8.** Venue of Study Mahidol University, Salaya campus



---

## Section 2 Goals and Objectives

### 1. Course Goals

To develop student skills in applying internetwork technologies including ability to proficiently design and assign IP addresses according to network requirements. Students require to use their skills and knowledge from this course to be able to configure routers and switches to allow efficient communication over networks. The technologies such as virtual local area network (VLAN), inter VLAN routing, network redundancy, network availability and reliability, network security, wireless local area network (WLAN) and routing protocols must be understood and applies to meet network requirements in various scenarios.

### 2. Objectives of Course Development/Revision

#### 2.1 Course Objectives

1. Understand the internetworking technologies
2. Describe virtual local area network (VLAN), inter VLAN routing, network redundancy, network availability and reliability, network security, wireless local area network (WLAN) and routing protocols.
3. Design and assign IP addresses proficiently according to network requirements.
4. Write router and switch configurations to enable efficient communication over networks.

#### 2.2 Course-level Learning Outcomes: CLOs

By the end of the course, students will be able to (CLOs)

1. CLO1 Design and assign IP addresses efficiently according to network requirements.
2. CLO2 Write router and switch configurations to enable efficient communication in a network lab and simulator.



### Section 3 Course Management

#### 1. Course Description

(Thai) ลักษณะเชิงทฤษฎีและเชิงปฏิบัติของการจัดเส้นทางและสลับกลุ่มข้อมูล รวมถึง การออกแบบและกำหนดหมายเลขไอพี เครือข่ายเฉพาะที่เสมือน การจัดเส้นทางระหว่างเครือข่ายเฉพาะที่เสมือน การซ้ำสำรอง ความพร้อมใช้ ความเชื่อถือได้ ความมั่นคงปลอดภัย บนเครือข่าย เครือข่ายเฉพาะที่แบบไร้สาย และเกณฑ์วิธีจัดเส้นทาง มีการฝึกปฏิบัติในห้องปฏิบัติการ

(English) Theoretical and practical aspects of routing and switching; including IP address design and assignment, virtual local area network (VLAN), inter VLAN routing, network redundancy, network availability and reliability, network security, wireless local area network (WLAN) and routing protocols; required laboratory work.

#### 2. Credit hours per trimester

Lecture (Hour(s))	Laboratory/field trip/internship (Hour(s))	Self-study (Hour(s))
36 hours (3 hours x 12 weeks)	24 hours (2 hours x 12 weeks)	84 hours (7 hours x 12 weeks)

#### 3. Number of hours that the lecturer provides individual counseling and guidance.

1 hours/week



Course Title Internetworking Technologies I

College

Course Code EGCI 474

Undergraduate Program

Mahidol University International

Division Science

---

### Section 4 Development of Students' Learning Outcome

1. Short summary on the knowledge or skills that the course intends to develop in students (CLOs)

By the end of the course, students will be able to

1. CLO1 Design and assign IP addresses efficiently according to network requirements.
2. CLO2 Write router and switch configurations to enable efficient communication in a network lab and simulator.

2. Teaching methods for developing the knowledge or skills specified in item 1 and evaluation methods of the course learning outcomes

Course Code	Teaching methods	Evaluation Methods
CLO1	Interactive Lecture, Demonstration, Assignments	Written Examination, Assignment Evaluation
CLO2	Interactive Lecture, Demonstration, Assignments	Written Examination, Assignment Evaluation



**Section 5 Teaching and Evaluation Plans**

1. Teaching plan

Week	Topic	Number of Hours		Teaching Activities/ Media	Lecturer
		Lecture Hours	Lab/Field Trip/Internship Hours		
1	Basic Device Configuration & Switching Concepts	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
2	VLAN	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
3	Inter-VLAN Routing	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
4	STP & EtherChannel	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
5	DHCPv4 and DHCPv6	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
6	VLSM	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
7	LAN Security	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
8	WLAN	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
9	Routing Concepts	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
10	Static Routes	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
11	RIPv1	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
12	RIPv2	3	2	Interactive Lecture, Demonstration, Assignments	Noppadol W.
13	Final Examination			Final Assessment	
	Total	36	24		



1.1 Lesson Plan

Class	Topic/Details	Number of hours		Instructors	Note
		In-Class sessions	Lab sessions		
1	Wed 9.00-12.00 Basic Device Configuration & Switching Concepts		2	Noppadol W.	
2	Fri 10.00-12.00 Basic Device Configuration & Switching Concepts	3		Noppadol W.	
3	Wed 9.00-12.00 VLAN		2	Noppadol W.	
4	Fri 10.00-12.00 VLAN	3		Noppadol W.	
5	Wed 9.00-12.00 Inter-VLAN Routing		2	Noppadol W.	
6	Fri 10.00-12.00 Inter-VLAN Routing	3		Noppadol W.	
7	Wed 9.00-12.00 STP & EtherChannel		2	Noppadol W.	
8	Fri 10.00-12.00 STP & EtherChannel	3		Noppadol W.	
9	Wed 9.00-12.00 DHCPv4 and DHCPv6		2	Noppadol W.	
10	Fri 10.00-12.00 DHCPv4 and DHCPv6	3		Noppadol W.	
11	Wed 9.00-12.00 VLSM		2	Noppadol W.	
12	Fri 10.00-12.00 VLSM	3		Noppadol W.	
13	Wed 9.00-12.00 LAN Security		2	Noppadol W.	



Class	Topic/Details	Number of hours		Instructors	Note
		In-Class sessions	Lab sessions		
14	Fri 10.00-12.00 LAN Security	3		Noppadol W.	
15	Wed 9.00-12.00 WLAN		2	Noppadol W.	
16	Fri 10.00-12.00 WLAN	3		Noppadol W.	
17	Wed 9.00-12.00 Routing Concepts		2	Noppadol W.	
18	Fri 10.00-12.00 Routing Concepts	3		Noppadol W.	
19	Wed 9.00-12.00 Static Routes		2	Noppadol W.	
20	Fri 10.00-12.00 Static Routes	3		Noppadol W.	
21	Wed 9.00-12.00 RIPv1		2	Noppadol W.	
22	Fri 10.00-12.00 RIPv1	3		Noppadol W.	
23	Wed 9.00-12.00 RIPv2		2	Noppadol W.	
24	Fri 10.00-12.00 RIPv2	3		Noppadol W.	
	Total	36	24		



## 2. Plan for Assessing Course Learning Outcomes

### 2.1 Assessing and Evaluating Learning Achievement

#### a. Formative Assessment

The assessment tools such as assignments and exams are used to evaluate student's understanding by their ability to describe routing and switching technologies; including IP address design and assignment, virtual local area network (VLAN), inter VLAN routing, network redundancy, network availability and reliability, network security, wireless local area network (WLAN), routing technologies. Students should also be able to write router and switch configurations to enable efficient communication over networks.

#### b. Summative Assessment

##### (1) Tools and Percentage Weight in Assessment and Evaluation

Learning Outcomes	Assessment Methods	Assessment Ratio (Percentage)	
CLO1 Design and assign IP addresses efficiently according to network requirements	Assignments	10	30
	Examination	20	
CLO2 Write router and switch configurations to enable efficient communication in a network lab and simulator.	Assignments	30	70
	Examination	40	
Total			100



Course Title Internetworking Technologies I  
College

Undergraduate Program  
Mahidol University International

Course Code EGCI 474

Division Science

(2) Grading System

Grade	Achievement	Final Score (% range)	GPA
A	Excellent	90-100	4.0
B+	Very Good	85-89	3.5
B	Good	80-84	3.0
C+	Fairly Good	75-79	2.5
C	Fair	70-74	2.0
D+	Poor	65-69	1.5
D	Very Poor	60-64	1.0
F	Fail	Less than 60	0.0

(3) Re-examination (If course lecturer allows to have re-examination)

N/A - (Not applicable with MUIC)

3. Student Appeals

The student wishing to appeal according to grading result must submit a written and signed appeal form personally to the academic affair unit. It is prohibited to assign another person to appeal on one's behalf. The written appeal form is then sent to the program director and chair of department. The final decision is transferred for approval by the faculty committee. The result of appeal then is informed to the student.



Course Title Internetworking Technologies I  
College

Undergraduate Program  
Mahidol University International

Course Code EGCI 474

Division Science

---

### Section 6 Teaching Materials and Resources

1. Textbooks and/or other documents/materials

Todd Lammle. CCNA Routing and Switching Complete Study Guide 2nd Edition.  
Sybex; 2016

2. Recommended textbooks and/or other documents/materials

None

3. Other Resources (If any)

- 1) Cisco Networking Academy: <https://www.netacad.com>
- 2) Packet Tracer Official Tutorials: <https://static-pt-assets.s3.amazonaws.com/tutorials72.htm>



---

### Section 7 Evaluation and Improvement of Course Management

1. Strategies for effective course evaluation by students
  - 1.1 Evaluation of peers by students
  - 1.2 Student evaluation
    - 1.2.1 Course content
    - 1.2.2 Course management
    - 1.2.3 Suggestions
    - 1.2.4 Overall opinions
2. Evaluation strategies in teaching methods
  - 2.1 Student evaluation
  - 2.2 Presentation
3. Improvement of teaching methods  
Use evaluation from 1 and 2 for course improvement
4. Evaluation of students' learning outcome  
Analysis of students' learning outcomes using scores from each CLOs for evaluation.
5. Review and improvement for better outcome  
Review the course before trimester starts, before each teaching period and review course contents every 3 years.



**Appendix**  
**Alignment between Courses and Program**

Table 1 The relationship between course and Program Learning Outcomes (PLOs)

Internetworking Technologies I	Program Learning Outcomes (PLOs)					
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
EGCI 474			P,M	P,M		

**Note:** Indicate the level of CLOs by letter I, R, P or M. Using the information as shown in the Curriculum Mapping of TQF2

Table 2 The relationship between CLOs and PLOs

EGCI 474	Program Learning Outcomes (PLOs)					
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1 Design and assign IP addresses efficiently according to network requirements			✓			
CLO2 Write router and switch configurations to enable efficient communication in a network lab and simulator.				✓		



Course Title Internetworking Technologies I  
College

Undergraduate Program  
Mahidol University International

Course Code EGCI 474

Division Science

Table 3 The description of PLOs and SubPLOs of the course

PLOs	SubPLOs
PLO3 Evaluate the computer requirements and identify the appropriate engineering knowledge for developing computer applications.	3.1 Analyze problems that exists in computer system 3.2 Examine user behaviour and requirements related to computer in the system
PLO4 Generate potential solutions for problem solving with computer engineering knowledge and skills.	4.4 Choose appropriate software and tools for project development 4.6 Construct engineering system using computer engineering knowledge for problem solving