1. **Course Title:**
   Advanced Internet Technologies

2. **Course Code:**
   EE5413

3. **Course Aims and Objectives:**

   3.1 **Aim**

   The aim of this course is to explore the advanced technologies which are implemented, developed or under research in the rapid changing area of the Internet. The course is designed on the base of its co-requisites: WANs and Communication Protocols (EE4010) which includes the introductive materials such as TCP/IP protocols and Internet architecture.

   It is also to examine the internal mechanisms and technologies that have been developed to support voice, data, and multimedia communications over Internet.

   3.2 **Objectives**

   3.2.1 To establish an adequate background for internet developers, network administrators, or anyone who needs to understand advanced TCP/IP technologies;

   3.2.2 To enable students to create interactive web pages using various languages, such as HTML, VRML, CGI script and JAVA;

   3.2.3 To study the utilization and development of various multimedia technologies on Internet;

   3.2.4 To provide sufficient training for Internet System Management, Application Development with Internet Technology, and Webmaster.

4. **Units:** 3

5. **Level:** P5

6. **Syllabus:**

   6.1 **Internet**

   Introduction to Internet : Architecture and Protocol
   Next Generation of Internet (NGI)
   Internet Request for Comment (RFC)
   Domain Name System : DNS Name Space, Resource Records, Name Servers
   Internet Addressing Authority : NIC
   IP addresses and routing
   Gateway-To-Gateway Protocol (GGP)
   Address Resolution Protocol (ARP)
IPv6

6.2 The World Wide Web (WWW)

W3C – The World Wide Web Consortium
Information Locating: HTTP, URL Scheme
HTTP/1.1 Specifications and Drafts
HTTP Messages, Request Methods, Response Messages
Hypertext Markup Language (HTML): Syntax and tags, Future Development
HTML 3.2 Reference Specification
Cascading Style Sheets
Web Page Design

6.3 Internet Multimedia Technologies

Multimedia: Definitions, Requirements
Inherited Constraints of Internet
Standardized data Formats for Multimedia
Multimedia Compression: JPEG, MPEG
Multimedia Data Transfer using Proprietary Protocols
Streamed Data Transfer

6.4 JAVA: The Internet Programming Language

Introduction
Classes and Objects
Applets
Control Structures
Object Construction and Destruction
Basic I/O
Class Variables
Class Methods
Garbage Collection

6.5 Interactive Web Page Design

Introduction to CGI-BIN Scripting
Clickable Image Maps: Perl Programming, CGI-BIN interfacing
Interactivity and Manipulation of 3D objects over Internet
Introduction to VRML: Specifications, Headers, Body, Bandwidth Concern, VRML Converters
Introduction to QTVR: Specifications, Generation Bandwidth Concern
Comparison between VRML and QTVR
6.6 Security Issues on the Internet

- Identifying Internet Security Threats
- Data Encryption Standard: Caeser Cipher, Polybius square, Trithemius progressive key
- Modern Encryption Method: Data Encryption Standard (DES), Rivest Shamir Adelman Scheme (RSA)
- Authentication
- Firewalls: Proxy Server, Dual-homed Gateway, Screened-host Gateway
- Threat Created by Scripting Languages and Java Applets
- Hardware versus Software Implementation of Security Systems
- Case Studies: PGP, Secured Email, Securing Server

6.7 Electronic Commerce

- Importance and the Requirements
- Transaction authorization methods
- Certificate Authority
- Netscape Security Developer Central
- Security Socket Layer
- Cybercash

7. Teaching Methods:

Teaching will be in the form of lectures with complementary tutorials and/or laboratory (laboratories). Tutorials will be informal, and may include a number of different support methods. For example:

- problem solving;
- general discussions;
- student presentations;
- resolving students’ difficulties.

The laboratory support, if any, will complement the lecture and reinforce students’ understanding of the material.

Teaching Pattern

Duration of course: 1 semester
Offered in: Semester B

Suggested lecture/tutorial/laboratory mix:

Total Hours:
- Lectures: 26 hours
- Tutorials*: 13 hours
* may be substituted with lectures/laboratories
8. **Assessment Pattern:**

*Examination duration:* 2 hours, at the end of the semester  
*Percentage of coursework, examination, etc.:*  30% CW;  70% Exam

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Coursework should be based on several different exercises distributed over the period of the semester; examples include homework assignments, short test, mini projects and presentations.

9. **Pre-requisites:**

  For postgraduates  
  Nil

  For undergraduates  
  EE3010 Data Communications and LANs; or EE3015 Computer Networks

10. **Pre-cursor:**

  For postgraduates  
  EE3010 Data Communications and LANs; or  
  EE3015 Computer Networks; or  
  EE5412 Telecommunication Networks

11. **Exclusive Courses:**

  For postgraduates  
  EE4012 Advanced Internet Technologies

12. **Equivalent Old Course Code and Title:**

    EE54313 Advanced Internet Technologies

13. **Booklist:**

    **Essential Reading**


Supplementary Reading


