NETWORK PROGRAMMING

1. Thông tin về học phần (General Information)

Tên học phần (Course name): Network Programming

Mã học phần (Course code): INT1433

Số tín chỉ (Number of credits): 3

Loại học phần (Course type): Compulsory

Học phần tiên quyết (Prerequisites):

Introduction to computing and programming

Học phần trước (Previous courses):

Học phần song hành (Parallel courses):

Các yêu cầu đối với học phần (Course requirements):

- Lecture room: Projector, microphone and speaker, air conditioner.
- Laboratory: computer with Java IDE, internet/intranet connection

Giờ tín chỉ đối với các hoạt động (Teaching and Learning hours):

- Lectures (lí thuyết):	30h
- Exercises (bài tập):	0h
- Projects (bài tập lớn):	08h
- Lab (thực hành):	07h
- Individual reading (tự đọc):	0h

Địa chỉ Khoa/Bộ môn phụ trách học phần (Address of the Faculty/Department in charge of the course):

- Address: Faculty of Information Technology 1 - Posts and Telecommunications Institute of Technology, Km10, Nguyen Trai Street, Ha Dong District, Hanoi.
- Phone number: (024) 33510432

2. Mục tiêu học phần (Objectives)

Về kiến thức (Knowledge):

The aim of this course is to provide learners with important knowledge about network programming including:

- basic concepts and fundamental tasks in Network Programming
- implement different important network protocol, such as HTTP, SMTP, FTP
- applications in Network Programming with TCP, UDP

Kỹ năng (Skills):

The aim of this course is to equip learners with skills in:

- applying the learned knowledge to build network applications using different models, like Client/Server, System distributed

Thái độ, Chuyên cần (Attitude):

Learners are required to attend the classes and complete assignments/projects.

3. Tóm tắt nội dung học phần (Description)

The aim of this course is to provide learners with the knowledge and skills related to network programming. The learners will study about Socket, RMI, JDBC, how to implement different network protocols and so on. Learners will put this into practice by developing an application. On completion of this course learners will be able to understand how a network-based application work and how to develop such applications from low level, without using ready-to-use libraries.

4. Nội dung chi tiết học phần (Outlines)

Chapter 1 Basic Network Programming concepts

1.1. Computer Networks

1.1.1. OSI model

1.1.2. TCP/IP model

1.2. Network Application Architecture

1.2.1. Standalone architecture

1.2.2. Client – server architecture

1.2.3. Distributed application

1.2.4. Peer-to-peer architecture

1.2.5. Multi-tier architecture

1.3. Multithread in Network Application

1.4. Overview of Java (Python) language

1.5. Case Study: Group discussion to determine the objective of final project

Chapter 2 Socket

2.1. Socket Overview

2.2. Socket TCP and Socket UDP

2.3. Socket TCP programming for Server

2.4. Socket TCP programming for Client

2.5. Socket UDP programming

2.6. Secure Sockets

2.7. Case Study: Building application with Socket TCP and UPD

Chapter 3 Working with Database

3.1. Overview

- 3.1.1. Database Connection
- 3.1.2. SQL Driver

3.2. Query and Statement

- 3.2.1. Statement and ResultSet
- 3.2.2. PrepareStatement
- 3.2.3. Other classes

3.3. Case study: Building an application following MVC using JDBC to connect Database

Chapter 4 Application layer programming

4.1 Application protocols, HTTP

4.2. FTP, SMTP, DNS

4.3. Case study: Building an application implement a protocol in the application layer

Chapter 5 Nonblocking I/O

5.1. An Example Client and Server

5.2. Buffers

- 5.2.1. Creating Buffers
- 5.2.2. Filling and Draining
- 5.2.3. Bulk Methods
- 5.2.4 Data Conversion

5.2.5. View Buffers

5.2.6. Compacting Buffers

5.2.7 Object Methods

5.3. Channels

5.3.1. SocketChannel

5.3.2. ServerSocketChannel

5.3.3. The Channels Class

5.3.4. Asynchronous Channels

5.3.5. Socket Options

Chapter 6 Broadcast and Multicast

6.1 Multicasting

6.1.1. Multicast Addresses and Groups

6.1.2. Clients and Servers

6.1.3. Routers and Routing

6.2. Working with Multicast Sockets

6.2.1. The Constructors

6.2.2. Communicating with a Multicast Group

6.3. Case study: Building application with Multicast

Chapter 7 Remote Procedure Call

7.1. Distributed programming

7.2 RMI techniques

7.2.1. Architecture

7.2.2. RMI for Server

7.2.3. RMI for Client

7.2.4. Registration and look up remote object

7.3. Case Study: Building application with RMI and DB

5. Học liệu (Textbooks)

5.1. Học liệu bắt buộc (Required Textbooks)

1. E. R. Harold, "Java Network Programming", 4th edition, O'Reilly, 2013

5.2. Học liệu tham khảo (Suggested Textbooks)

2. G.Reese. *Database Programming with JDBC and Java.* O'Reilly, 2003.

6. Phương pháp, hình thức kiểm tra – đánh giá kết quả học tập học phần – (Grading Policy)

Grading method	Percentage	Group/Individual
- Attendance	10%	Individual
- Exercises	20%	Individual
- Mid-term projects/exams	20%	Group
- Final examination	50%	Individual

Trưởng Bộ môn
(Head of Department)

Nguyễn Mạnh Hùng

Giảng viên biên soạn
(Lecturer)

Nguyễn Trọng Khánh