|  |  |
| --- | --- |
| **Course Title:**  | **Network Programming** |
| **Course Code:** | **433CCN-3** |
| **Program:** | **Bachelor of Science in Computer Networks** |
| **Department:**  | **Networks and Communications Engineering** |
| **College:** | **Computer Science and Information Systems** |
| **Institution:** | **Najran University**  |

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# A. Course Identification

|  |  |
| --- | --- |
| **1. Credit hours:**  |  |
| **2. Course type** |
| **a.** | University |  | College | **√** | Department |  | Others |  |  |
| **b.** | Required | **√** | Elective |  |  |
| **3. Level/year at which this course is offered:**  | Level (9) |
| **4. Pre-requisites for this course** (if any)**:**332CCN-3   |
| **5. Co-requisites for this course** (if any)**:** |
| N/A   |

## 6. Mode of Instruction (mark all that apply)

| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage**  |
| --- | --- | --- | --- |
| **1** | **Traditional classroom** | 3 | %100 |
| **2** | **Blended**  |  |  |
| **3** | **E-learning** |  |  |
| **4** | **Distance learning**  |  |  |
| **5** | **Other**  |  |  |

**7. Contact Hours** (based on academic semester)

|  |  |  |
| --- | --- | --- |
| **No** | **Activity** | **Contact Hours** |
| **1** | **Lecture** | 30 |
| **2** | **Laboratory/Studio** | 30 |
| **3** | **Tutorial**  | 15 |
| **4** | **Others** (specify) |  |
|  | **Total** | 75 |

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description Java I/O streams; Internet Addresses; URL class; The socket interface and Communication primitives; Protocols Design; Protocol specification; Protocol implementation; Processes; Threads and synchronization; Multithreaded clients and servers; InterThread communication; UDP and TCP Java network programming API is used to implement the practical aspects |
|  |
| 2. Course Main Objective |
| Upon the successful completion of this course, students will be able to:  * Discuss the basic concepts involved with network programming.
* Assess how protocols are implemented.
* Examine the advantages of multithreaded applications.

 * Analyze and compare the advantages/disadvantages of different transport layer protocols and justify their usage by some application protocols.

 * Manage Java Input/output streams and Java exception handling.
* Develop practical network protocols, for client and server side, using Java networking APIs
 |

## 3. Course Learning Outcomes

| **CLOs** | **Aligned****PLOs** |
| --- | --- |
| 1 | **Knowledge and Understanding** |  |
| 1.1  | Discuss the basic concepts involved with network programming.  | K1,K2  |
| 1.2  | Assess how protocols are implemented.  | K1,K2  |
| 1.3  | Examine the advantages of multithreaded applications.  | K2  |
|  |  |  |
| **2** | **Skills :** |  |
| 2.1 | Analyze and compare the advantages/disadvantages of different transport layer protocols and justify their usage by some application protocols.  | S6, S4 |
|  |  |  |
| **3** | **Values:** |  |
| 3.1  | Developing oral presentation skills.   | C2  |
| 3.2  | To illustrate the important components of communication skills and based on developing critical skills, observations, experiments, and feedback.    | C2  |
| 3.3 |  |  |
| 3... |  |  |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Networking review.  What Is a Network? How Do Networks Communicate?  What is a protocol?  Communication across Layers. Advantages of Layering.  TCP/IP Protocol Suite Layers.   | 4 1 |
| 2 | Java Overview        The Java Programming Language. Exception Handling. Files and Streams Multithreading Synchronization.  Deadlock and Interthread Communication.   | 14  |
| 3 | Internet Addressing and URL class  Internet Protocol Addresses and DNS Internet Addressing with Java. URL class  | 4 1 |
| 4 | Socket Programming (TCP)  Socket for clients. Socket for servers.   | 14  |
| 5 | User Datagram Protocol.  DatagramPacket and DatagramSocket Class. Listening for UDP and sending UDP Packets. User Datagram Protocol Example. Building a UDP Client/Server.   | 10  |
| 6 | Network python programming  | 9  |
| **Total** | 75 |

# D. Teaching and Assessment

## 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| **Code** | **Course Learning Outcomes** | **Teaching Strategies** | **Assessment Methods** |
| --- | --- | --- | --- |
| **1.0** | **Knowledge and Understanding** |
| 1.1  | Discuss the basic concepts involved with network programming.  | Lectures, Small Group Work, Small Group Discussion, Lab  | Quiz 1,Midterm-1 Exam, Final Exam, Lab Assignment, Lab Final Exam  |
| 1.2  | Assess how protocols are implemented.  | Lectures, Small Group Work, Small Group Discussion , Lab  | Quiz 1,Midterm-1 Exam, Final Exam Lab Assignment, Lab Final Exam  |
| 1.3  | Examine the advantages of multithreaded applications.  | Lectures, Small Group Work, Small Group Discussion , Lab  | Quiz 1,Midterm-2 Exam, Final Exam Lab Assignment, Lab Final Exam  |
| **2.0** | **Skills** |
| 2.1  | Analyze and compare the advantages/disadvantages of different transport layer protocols and justify their usage by some application protocols.  | Lectures, Small Group Work, Small Group Discussion , Lab  | Quiz 1,Midterm-2 Exam, Final Exam Lab Assignment, Lab Final Exam  |
|  |  |  |  |
|  |  |  |  |
| **3.0** | **Values** |
| 3.1  | Developing oral presentation skills.   | Lectures, Small Group Work, Small Group Discussion   | Group Assignment.  |
| 3.2  | To illustrate the important components of communication skills and based on developing critical skills, observations, experiments, and feedback.    | Lectures, Small Group Work, Small Group Discussion   | Group Assignment.  |
| … |  |  |  |

## 2. Assessment Tasks for Students

| **#** | **Assessment task\***  | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| **1** | Quiz and Assignment  | 2  | 10%  |
| **2** | Midterm Examination 1  | 5  | 15%  |
| **3** | Midterm Examination 2  | 9  | 15%  |
| **4** | Lab Activities  | 8  | 10%  |
| **5** | Lab Final Examination  | 14  | 10%  |
| **6** | Final Examination  | 15  | 40%  |
| **7** | Quiz and Assignment  | 2  | 10%  |
| **8** |  |  |  |

**\*Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

# E. Student Academic Counseling and Support

|  |
| --- |
| **Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :** |
| During the whole semester, 10 hours/week are reserved for students to guide them, to help them and to explain the topic which is not clear to them during the lecture.  |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** | Java Network Programming, Elliotte Rusty Harold, O'Reilly, Fourth Edition, 2013.  |
| **Essential References Materials** | 1. Introduction to Java Programming, Comprehensive Version, Liang, 10th edition.
2. Java™ Network Programming and Distributed Computing, David Reilly and Michael Reilly, M ISBN: 0-201-71037-4, Publisher: Addison Wesley Professional, 2002.
 |
| **Electronic Materials** | Available in Blackboard    |
| **Other Learning Materials** |  |

## 2. Facilities Required

| **Item** | **Resources** |
| --- | --- |
| **Accommodation**(Classrooms, laboratories, demonstration rooms/labs, etc.) | Lecture Rooms with 20 seats with smart table, Mic, Speaker, PC, Auto Projector with Screen and a white board or a smart board (male Section). |
| **Technology Resources** (AV, data show, Smart Board, software, etc.) | 1. Desktop/ Laptop computer Multimedia Projector
2. Laboratory contains an enough number of PC to accommodate all students with Java-related software like JCreator , J2SE , NetBean, Eclipse and JRE licensed version with network package should be installed.
 |
| **Other Resources** (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | 1. A File cabinet to keep class stuffs, papers and students files, and a printer to print program screen shots.   |

# G. Course Quality Evaluation

| **Evaluation****Areas/Issues**  | **Evaluators**  | **Evaluation Methods** |
| --- | --- | --- |
| Feedback about Course Learning Outcomes (CLOs)  | Students, Faculty  | Direct (A course survey is distributed to students to take their opinion)  |
| feedback about the teaching strategies, assessment methods, textbooks, instructor  | Students, Faculty | Direct (A course survey is distributed to students to take their opinion)   |
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**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

# H. Specification Approval Data

|  |  |
| --- | --- |
| **Council / Committee** |  |
| **Reference No.** |  |
| **Date** | January 19, 2019 |