|  |  |
| --- | --- |
| **Course Title:**  | **Routing and Switching** |
| **Course Code:** | **332CCN-3** |
| **Program:** | **Computer Networks**  |
| **Department:**  | **Department of Network and communications Engineering**  |
| **College:** | **College of Computer Science and Information Systems** |
| **Institution:** | **Najran University** |

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# A. Course Identification

|  |  |
| --- | --- |
| **1. Credit hours:** | 3 (2, 2, 1) [**Theory, Lab, Tutorial**] |
| **2. Course type** |
| **a.** | University |  | College |  | Department | **✓** | Others |  |  |
| **b.** | Required | **✓** | Elective |  |  |
| **3. Level/year at which this course is offered:** | **Level 6th**  |
| **4. Pre-requisites for this course** (if any)**: 230CCN-3** |
| **5. Co-requisites for this course** (if any)**: NA** |
|  |

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

| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage**  |
| --- | --- | --- | --- |
| **1** | **Traditional classroom** | 75 | 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 ARP, Ethernet, IP Addressing, & Subnetting Review, CISCO IOS Basics, Bridge & Switch Operations Bridge Types, Bridge Enhancements, Bridging Loops & Spanning Tree Algorithm(802.1d) Network Layer/Routing Basics, Routing Tables Workstation Decision Process, ICMP & ICMP Redirect, Basic Router Configuration, Convergence, Static vs. Default Routes vs. Dynamic, Router Discovery Protocol, Routing Protocols, RIP Version 1, Routing Loops & Solutions – Count to Infinity, Maximum, Split Horizon, Poison Reverse, Hold Down Timers, Triggered Updates, RIP V2, Routing vs. Routed Protocols, Autonomous Systems, Exterior and Interior Gateway Protocols, OSPF, VLANs, VTP, STA implementation with VLANS, Trunking, Access Control Lists |
|  |
| 2. Course Main Objective |
| Prepare the students with the basic concepts of routing and switching so that he could Understand fundamental principles of Implementation for a LAN and WAN approved network design. Therefore, after a successful completion of this course students should be able to:* Understand fundamental principles of Implementation for a LAN and WAN approved network design.
* Configure a switch with VLANs and inter-switch communication.
* Create and Implement access lists to permit or deny specified traffic.
* Implement WAN links.
* Configure routing protocols on network devices.

Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI mode. |

## 3. Course Learning Outcomes

| **CLOs** | **Aligned****PLOs** |
| --- | --- |
| 1 | **Knowledge and Understanding** |  |
| 1.1 | Describe the concepts Operation of IP Data Networks. | K2 |
| 1.2 |  |  |
| 1.3 |  |  |
| 1... |  |  |
| **2** | **Skills :** |  |
| 2.1 | Configure a switch with VLANs and inter-switch communication. | S1, S2, S4 |
| 2.2 | Implement WAN links. | S2, S5 |
| 2.3 | Configure routing protocols on network devices. | S2, S5 |
| 2.4 | Apply the knowledge and methods of cloud computing and distributed systems in programming.  | S3, S5 |
| 2.5 | Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI mode. | S2, S3 |
| **3** | **Values:** |  |
| 3.1 | Implement Network Device Security | C3 |
| 3.2 |  |  |
| 3.3 |  |  |
| 3... |  |  |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Operation of IP Data Networks | 6 |
| 2 | LAN Switching Technologies | 7 |
| 3 | IP addressing (IPv4 / IPv6) | 7 |
| 4 | IP Routing Technologies | 10 |
| 5 | IP Services | 10 |
| 6 | Network Device Security | 10 |
| 7 | WAN Technologies | 10 |
| 8 | Revision | 5 |
| **Total** | 65 |

# 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 | Describe the concepts Operation of IP Data Networks. | TS:1-Interactive lectures using PowerPoint slides with more examples in the classTS:2- Engaging the students in problem-based learning through tutorialsTS:3- Lab DemonstrationsTS: 4 – Recall the topics discussed in the last lecture by asking questions to the students.TS: 5 – Associating the topics in each chapter with the CLO.TS:6 – Conducting oral quizzes by the end of each chapterTS:7 – Giving more example of Operation of IP Data Networks in the lectureTS: 8 – Discussion with the students in the class hours | * Locally Developed Exams such as Quiz, Mid & Final Exams with scoring rubrics
* Assignments involving critical and logical thinking questions
* Quizzes
 |
| 1.2 |  |  |  |
| … |  |  |  |
| **2.0** | **Skills** |
| 2.1 | Configure a switch with VLANs and inter-switch communication. | Lectures, Small Group Work, Small Group Discussion  | Midterm-1 Exam, Final Exam  |
| 2.2 | Implement WAN links. | Lectures, Small Group Work, Small Group Discussion  | Midterm-1 Exam, Final Exam  |
| 2.3 | Configure routing protocols on network devices. | Lectures, Small Group Work  | Midterm-2 Exam  |
| 2.4 | Apply the knowledge and methods of cloud computing and distributed systems in programming.  | Lectures, Small Group Work, Small Group Discussion  | Midterm-2 Exam, Final Exam  |
| 2.5 | Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI mode. | Lectures, Small Group Discussion, Lab Demonstrations  | Lab Assignment, Lab Final Exam  |
| **3.0** | **Values** |
| 3.1 | Implement Network Device Security | Lectures, Small Group Discussion, Lab Demonstrations | Lab Assignment, Lab Final Exam |
| 3.2 |  |  |  |
| … |  |  |  |

## 2. Assessment Tasks for Students

| **#** | **Assessment task\***  | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| **1** | Quiz and Assignment | TBA | 10% |
| **2** | Midterm Examination 1 | 5th week | 15% |
| **3** | Midterm Examination 2 | 9th week | 15% |
| **4** | Lab Activities | 8th week | 10% |
| **5** | Lab Final Examination | 14th week | 10% |
| **6** | Final Examination | 15th week | 40% |
| **7** |  |  |  |
| **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 :** |
| 1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (Include amount of time teaching staff are expected to be available each week) During the whole semester, 10 hours/week are reserved for students to guide them, to help them, to explain them topic which is not clear to them etc.  |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** | Cisco CCNA Routing and Switching 200-125 Official Cert Guide Library (2016) |
| **Essential References Materials** | 1. Jeff Doyle, Routing TCP/IP, Volume I, 2nd Edition Cisco Press, 2016.
2. Jeff Doyle, Routing TCP/IP, Volume II, 2nd Edition Cisco Press, 2016.
 |
| **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.
3. Routing and Switching Lab
 |
| **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 | Direct (A course survey is distributed to students to take their opinion) |
| feedback about the teaching strategies, assessment methods, textbooks, instructor | Faculty | Direct (Meeting with course coordinator and college coordinator periodically.) |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**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  |