|  |  |
| --- | --- |
| **Course Title:** | **Network Analysis and Design** |
| **Course Code:** | **452CCN-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:** | | | | 3 (3,0,0) [**Theory, Lab, Tutorial**] | | | | | | | | | | | | |
| **2. Course type** | | | | | | | | | | | | | | | | |
| **a.** | University | |  | | College | | | **√** | Department | | | |  | Others |  |  |
| **b.** | | Required | | | | **√** | Elective | | |  |  | | | | | |
| **3. Level/year at which this course is offered:** | | | | | | | | | | | | Level (7) | | | | |
| **4. Pre-requisites for this course** (if any)**:**  N/A | | | | | | | | | | | | | | | | |
| **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** | **Correspondence** |  |  |
| **5** | **Other** |  |  |

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

|  |  |  |
| --- | --- | --- |
| **No** | **Activity** | **Contact Hours** |
| **1** | **Lecture** | 30 |
| **2** | **Laboratory/Studio** |  |
| **3** | **Tutorial** | 15 |
| **4** | **Others** (specify) |  |
| **1** | **Study** | 30 |
| **2** | **Assignments** | 15 |
| **3** | **Library** | 15 |
| **4** | **Projects/Research Essays/Theses** | 15 |
| **5** | **Others** (specify) |  |
|  |  |  |
|  |  |  |
|  | **Total** | 75 |

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description This course explains and discusses key concepts of network analysis and design, including: network architecture design, requirements analysis, different design considerations, IP addressing design, network architecture design, the network development  life  cycle, network performance analysis. |
|  |
| 2. Course Main Objective |
| After completing the course student will be able to:   * Know The network development life cycle. * Define the effect of performance requirements on the design of small to medium networks. * Describe the design methodologies and the standards to designs a small to medium networks. * Design different network architectures. * Design effective IP Addressing networks. * Analysis different networks in terms of Traffic flow analysis.   Analysis of loss and delay in networks. |

## 3. Course Learning Outcomes

| **CLOs** | | **Aligned****PLOs** |
| --- | --- | --- |
| 1 | **Knowledge and Understanding** |  |
| 1.1 | Define and understand the concepts and terminologies of network Analysis and design. | K1, K2 |
| 1.2 | Describe the  design  methodologies  and  the  standards  to designs a  small  to medium networks. | K2 |
| 1.3 | Understand The network development life cycle. | K2 |
|  |  |  |
| **2** | **Skills :** |  |
| 2.1 | Analysis and design different types of network based on network performance requirements. | S4 |
| 2.2 | Analysis different networks in terms of Traffic flow analysis. | S4, S6 |
| 2.3 | Design effective IP Addressing networks. | S1, S6 |
|  |  |  |
| **3** | **Values:** |  |
| 3.1 |  |  |
| 3.2 |  |  |
| 3.3 |  |  |
| 3... |  |  |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Introduction to Network Analysis and Design | 2 |
| 2 | Requirements Analysis | 2 |
| 3 | Network Analysis (Delay, Throughput, Probability Loss, etc.) | 2 |
| 4 | Design Process | 3 |
| 5 | Vendor, Equipment, and Service-Provider Evaluations (Making Technology Choices) | 3 |
| 6 | Network Architecture Design (campus, enterprise, branch & WAN) | 3 |
| 7 | Network Addressing Design | 3 |
| 8 | Design Considerations for Expanding an Existing Network | 3 |
| 9 | Network management & automation Design considerations | 3 |
| 10 | Network security design considerations | 3 |
| 11 | Case Studies of LAN Network Design | 3 |
| **Total** | |  |

# 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 | Define and understand the concepts and terminologies of network Analysis and design. | Lectures, Small Group Work, Small Group Discussion | Quiz 1,Midterm-1 Exam, Final Exam |
| 1.2 | Describe the design methodologies and the standards to designs a small to medium networks. | Lectures, Small Group Work, Small Group Discussion | Lectures, Small Group Work, Small Group Discussion |
| 1.3 | Understand The network development life cycle. | Lectures, Small Group Work, Small Group Discussion | Lectures, Small Group Work, Small Group Discussion |
| **2.0** | **Skills** | | |
| 2.1 | Analysis and design different types of network based on network performance requirements. | Lectures, Small Group Work, Small Group Discussion | Midterm-1 Exam, Midterm-2, Exam, Final Exam |
| 2.2 | Analysis different networks in terms of Traffic flow analysis. | Lectures, Small Group Work, Small Group Discussion | Midterm-1,   Exam, Final Exam |
| 2.3 | Design effective IP Addressing networks. | Lectures, Small Group Work, Small Group Discussion | Midterm-2 Exam |
| **3.0** | **Values** | | |
| 3.1 |  |  |  |
| 3.2 |  |  |  |
| … |  |  |  |

## 2. Assessment Tasks for Students

| **#** | **Assessment task\*** | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| **1** | Quiz 1 | 2 | %5 |
| **2** | Homeworks/ Presentation | 4 | %5 |
| **3** | Mid Term-1 Exam | 6 | %20 |
| **4** | Mid Term-2 Exam | 10 | %20 |
| **5** | Final Exam | 15 | %50 |
| **6** |  |  |  |
| **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 :** |
| 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** | 1.    James  D.  McCabe,  Network  Analysis,  Architecture,  and  Design,  Third  Edition,  Morgan  Kaufmann Publishers, Inc. 3rd  Edition, 2007, ISBN: 0123704804  2.    Shaun Hummel, Network Planning and Design Guide, Shaun Lloyd Hummel, 2006, ISBN: 0973379804 |
| **Essential References Materials** | 1.    P. Oppenheimer, Top-Down Network Design, Cisco Press, 2nd edition, ISBN: 1587051524  2.  T. Quinn-Andry and K. Haller, Designing Campus Networks, Cisco Press, ISBN: 1578700302  3.  Peter  Rybaczyk,  Cisco  Network  Design  Solutions  for  Small-Medium  Businesses,  CISCO  Press,  ISBN: 1587055341 |
| **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 | 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 |