|  |  |
| --- | --- |
| **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**  |

Table of Contents

[A. Course Identification 3](#_Toc951372)

[6. Mode of Instruction (mark all that apply) 3](#_Toc951373)

[B. Course Objectives and Learning Outcomes 3](#_Toc951374)

[1. Course Description 3](#_Toc951375)

[2. Course Main Objective 3](#_Toc951376)

[3. Course Learning Outcomes 3](#_Toc951377)

[C. Course Content 4](#_Toc951378)

[D. Teaching and Assessment 4](#_Toc951379)

[1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods 4](#_Toc951380)

[2. Assessment Tasks for Students 4](#_Toc951381)

[E. Student Academic Counseling and Support 5](#_Toc951382)

[F. Learning Resources and Facilities 5](#_Toc951383)

[1.Learning Resources 5](#_Toc951384)

[2. Facilities Required 5](#_Toc951385)

[G. Course Quality Evaluation 5](#_Toc951386)

[H. Specification Approval Data 6](#_Toc951387)

# 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)   |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**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     |