**UNIVERSITY OF THE CORDILLERAS**

**College of Information Technology and Computer Science**

**Course Syllabus in CCS.1165 – Multimedia Systems**

**1st Trimester, School Year: 2015- 2016**

1. **Course Code:** IT 12 – Data Communications and Networking

3 units

Lecture: two times a week – 3.33 hours x 10 weeks

Laboratory: three times a week – 5 hours x 10 weeks

1. **Course Description:**

The purpose of the course is to provide an overview of communication network functions and a good foundation for further studies in the subject. It involves understanding and application of design principles and methods for systems development and review of the underlying systems, and communications technologies and significant standardized systems.

The course provides instruction in data communication and computer networks through lectures, tutorials and laboratory work as well as reading instructions and training materials for the student's own work.

1. **Prerequisites:**

1. **Course Outcomes:**

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| **ATTRIBUTES OF GRADUATES OF UC-CITCS** | | |
| **Attributes** | **Code** | **Description** |
| Analytical Skills | AG1 | ITE Knowledge and Skills |
| Flexible | AG2 | Adapt to changes |
| Innovative | AG3 | Creative |
| Team Work | AG4 | Work productively in teams and leadership skills |
| Ethical Behavior & Practices | AG5 | Ethical behaviour |

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| **PROGRAM EDUCATIONAL OUTCOMES/OBJECTIVES** | | | |
| **Graduate Attribute** | **Graduate Outcomes Code** | **Graduate Outcomes** | **Attributes of Graduates of UC-CITCS** |
| Knowledge for Solving Computing Problems | IT1 | Apply knowledge of computing, science, and mathematics appropriate to the discipline. | AG1 |
| IT2 | Understanding best practices and standards and their applications. | AG1 |
| Problem Analysis | IT3 | Analyze complex problems, and identify and define the computing requirements appropriate to its solution. | AG1, AG2 |
| IT4 | Identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems. | AG1, AG2, AG3 |
| Design/Development of Solutions | IT5 | Design, implement, and evaluate computer-based systems, processes, components, or programs to meet desired needs and requirements under various constraints. | AG1, AG2 |
| IT6 | Integrate IT-based solutions into the user environment effectively. | AG1, AG2 |
| Modern Tool Usage | IT7 | Apply knowledge through the use of current techniques, skills, tools, and practices necessary for the IT profession. | AG1, AG2 |
| Individual and Team Work | IT8 | Function effectively as a member or leader of a development team recognizing the different roles within a team to accomplish a common goal. | AG3 |
| IT9 | Assist in the creation of an effective IT project plan. | AG1, AG2, AG3 |
| Communication | IT10 | Communicate effectively with the computing community and with society at large about complex computing activities through logical writing, presentations, and clear instructions. | AG1, AG2, AG3 |
| Computing Professionalism and Social Responsibility | IT11 | Analyze the logical and global impact of computing information technology on individuals, organizations, and society. | AG1, AG2, AG3, AG4 |
| IT12 | Understand professional, ethical, security and social issues, and responsibilities in the utilization of information technology. | AG1, AG4 |
| Life-Long Learning | IT13 | Recognize the need for and engage in planning self-learning and improving performance as a foundation for continuing professional development. | AG3, AG5 |

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| **COURSE LEARNING OUTCOMES** | | | | | | | | | | | | | | |
| **Course Outcomes** | **Course Outcomes Code** | **Program Educational Outcomes** | | | | | | | | | | | | |
| **IT1** | **IT2** | **IT3** | **IT4** | **IT5** | **IT6** | **IT7** | **IT8** | **IT9** | **IT10** | **IT11** | **IT12** | **IT13** |
| Understand and be able to explain the principles of a layered protocol architecture; be able to identify and describe the system functions in the correct protocol layer and further describe how the layers interact. | CO1 | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Understand, explain and calculate digital transmission over different types of communication media. | CO2 | I | I | I | I | I | I | I | I | I | I | I | I | I |
| Understand, explain and solve mathematical problems for data-link and network protocols. | CO3 | I | I | I | I | I | I | I |  | I | I |  | I | I |
| Describe the principles of access control to shared media and perform performance calculations. | CO4 |  | E | E | D |  |  |  |  | D | D |  |  |  |
| Understand and explain the principles and protocols for route calculations and be able to perform such calculations. | CO5 | E | E | E | D | D |  | D | D | D | D |  |  |  |
| Understand and explain reliable transmission and calculate the performance of TCP connections. | CO6 |  | E | E | D | D | E | D | D | D | D |  |  |  |
| Understand and be able to describe for common services, system services, such as name and address lookups, and communications applications. | CO7 | I | I | I | I | I | I | I | I | I | I | I | I | I |
| **Legend: I – Introduction E – Enabling D - Demonstration** | | | | | | | | | | | | | | |

1. **Bases of Evaluation:**
2. Course requirements that are evaluated based on the rubrics.
3. Online courses from EDX.org.
4. Prelim, midterm and final major examinations.
5. The standard grading system of the University.
6. Rubrics:
   1. Rubric for Diagrams (RFD)
   2. Rubric for Game Package (RFGP)
   3. Rubric for Research Paper (RFRP)
   4. Rubric for Presentations (RFP)

**VI. Grading System:**

1. Prelim Score = 50% Prelim Class Standing + 50% Prelim Exam
2. Midterm Score = 50% Prelim Score + 50% Tentative Midterm Score
   1. Tentative Midterm Score = 50% Midterm Class Standing + 50% Midterm Exam
3. Final Score = 50% Midterm Score + 50% Tentative Final Score
   1. Tentative Final Score = 50% Final Class Standing + 50% Final Exam

**Note:** 1. CS is composed of the course requirements and the required online courses.

2. Scores are transmuted to an equivalent grade where a score of 50% is needed to get a passing grade of 75.

**VII. Course Content:**

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| **TOPICS** | **RESOURCES** | **TIME FRAME (HOURS, WEEK AND GRADING PERIOD)** | **INSTRUCTIONAL MODE** | **ACTIVITIES AND RUBRICS** | **LEARNING OUTCOMES** |
| Unit 1. Introductions   * Data Communications * Networks * The Internet * Protocols and Standards | B5, W1 | **Hours:**  5 hours  **Week:**  Week 1 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz 5. Audio Visual Presentations | Lab01. Learning about the Need for Standards.  Lab02. Viewing a NIC’s Physical Address and IP address information.  Lab03. Answer review questions for Chapter 01. | CO1  CO2 |
| Unit II. Network Models   * Layered Tasks * The OSI Model * Layers in the OSI Model * TCP/IP Protocol Suite * Addressing | B5, W1 | **Hours:**   * 1. hours   **Week:**  Week 1 and Week 2 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz 5. Audio Visual Presentations | Lab04. Viewing SSL  Lab05. Using the ping  Lab06. Answer review questions for Unit 02. | CO1  CO2  CO3  CO7  CO8 |
| Unit III. Physical Layer and Media   * Data and Signals   + Analog and Digital   + Periodic Analog Signals   + Digital Signals * Transmission Impairment * Data Rate Limits * Performance | B1,B4, W1 W2, W8 | **Hours:**  8.33 hours  **Week:**  Week 2 and 3 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz | Lab07. Protocol and Application of the TCP/IP  Lab08. Answer review questions for Unit 03. | CO1  CO2  CO3  CO4  CO7  CO8 |
| **PRELIM EXAMINATION** | | | | | |
| Unit IV. Digital Transmission   * Digital to Digital Conversion * Analog to Digital Conversion * Transmission Modes | B1, B3, W5 | **Hours:**  16.66 hours  **Week:**  Week 4, 5, 6 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz | Lab09. Network Protocol Analyzer (Sniffing and Identify Protocol used in Live Network)  Lab01. Answer review questions for Unit 04. | CO1  CO2  CO3  CO4  CO7  CO8 |
| Unit V. Analog Transmission   * Digital to Analog Conversion * Analog to Analog Conversion * Unit V. Transmission Media * Guided Media * Unguided Media: Wireless | B1, B2, W6 | **Hours:**  16.67 hours  **Week:**  Week 7 and week 8 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz | Lab11. Network Set-up  In this lab session, students are required to set-up a Wireless Local Area Network (WLAN) consists of 3 PC’s by following the procedures as in 5. This project must be done in group. Upon the completion of your project, each group must present your WLAN. | CO4  CO7  CO8  CO9 |
| **Midterm Examination** | | | | | |
| Unit VI. Connecting LANs, Backbone Networks, and Virtual LANs   * CONNECTING DEVICES   + Passive Hubs   + Repeaters   + Active Hubs   + Bridges   + Two-Layer Switches   + Routers   + Three-Layer Switches   + Gateway * BACKBONE NETWORKS   + Bus Backbone   + Star Backbone   + Connecting Remote LANs * VIRTUAL LANs   + Membership   + Configuration   + Communication Between Switches   + IEEE Standard | B2, B5, W4, W7, W8 | **Hours:**  13.33 hours  **Week:**  Week 8 and week 9 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz | Lab12. Measuring Throughput  In this lab, students are required to analyze the network’s performance based on the configuration setup as in lab 4. The experiment you will perform consists of a series of simple ping trials to your neighbor PC. This project must be done in group and upon completion, each group must present your output to the lab instructor. | CO4  CO7  CO8  CO9 |
| Unit VII. Wireless WANs: Cellular Telephone and  Satellite Networks   * CELLULAR TELEPHONY   + Frequency-Reuse Principle   + Transmitting   + Receiving   + Roaming   + First Generation   + Second Generation   + Third Generation * SATELLITE NETWORKS   + Orbits   + Footprint   + Three Categories of Satellites   + GEO Satellites   + MEO Satellites   + LEO Satellites | B2, B5, W4, W7, W8 | Hours:  13.67 hours  Week:  Week 9 and week 10 | 1. Lecture – Discussion 2. Recitation 3. Group Activity 4. Online Quiz | Lab13. Final Project. | CO4  CO7  CO8  CO9 |
| **FINAL EXAMINATION** | | | | | |

**VIII. References:**

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| **RESOURCE TYPE** | **RESOURCE CODE** | **RESOURCES** |
| Books | B1 | Forouzan, Data Communications and Networking, 4th Edition |
| B2 | Tanenbaum Andrew S., Computer Networks, 4th edition |
| B3 | William Stallings, Data and Computer Communications, 7th |
| B4 | Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, 4th Edition |
| B5 | Halsall Fred, Data Communications, Computer Networks and OSI, 4th edition |
| Websites | W1 | https://goo.gl/d1Tqhh |
| W2 | https://www.ieee.org |
| W3 | http://highered.mheducation.com/sites/0072967757/ |

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