|  |  |
| --- | --- |
| **Course Title:**  | **Mobile and Wireless Network** |
| **Course Code:** | **441CCN-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(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 (9) |  |
| **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**  | 30  |
| **3**  | **Tutorial**  | 15  |
| **4**  | **Others** (specify)  |   |
|   | **Total**  | 75  |

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description The purpose of this course is to develop advanced network building skills and to study performance issues in advanced wireless and mobile networks. It covers current topics in wireless and mobile networks, including wireless media access control protocols, wireless network routing, congestion control, location management, mobile transport protocols and quality of service in wireless networks. It also investigates other areas important in the design of wireless and mobile networks required for supporting mobile distributed application, including mobile middleware and object architecture, mobile transaction, remote execution and mobile RPC, cache strategies for wireless networks. Other recent areas that are increasingly important are wireless ATMs and multimedia communication support.  |
|  |
| 2. Course Main Objective |
| Upon the successful completion of this course, students will be able to:  * Describe the wireless communications technologies and basic architecture of the wireless communication system.
* Explain the challenges in wireless communication such as multipath, media access control, wireless network routing, congestion control and quality of service.
* Illustrate the wireless LAN networks using IEEE 802.11 standard.
* Understand the cellular networks in terms of evolution, architecture and standards i.e. GSM.
* Principles of addressing and routing to mobile users; Mobile IP, handling mobility in networks and higher layer protocols.
* Wireless ATM and multimedia communication support.

Project management software is used to provide students with a hands-on experience to effectively use software to managing projects.  |

## 3. Course Learning Outcomes

| **CLOs** | **Aligned****PLOs** |
| --- | --- |
| 1 | **Knowledge and Understanding** |  |
| 1.1 | Describe the wireless communications technologies and basic architecture of the wireless communication system.  | K2  |
| 1.2 | Explain the challenges in wireless communication such as multipath, media access control, wireless network routing, congestion control and quality of service.   | K1, K2 |
| 1.3 | Illustrate the wireless LAN networks using IEEE 802.11 standard.  | K2 |
|  |  |  |
| **2** | **Skills :** |  |
| 2.1 | Understand the cellular networks in terms of evolution, architecture and standards i.e. GSM.   | S6 |
| 2.2 | Principles of addressing and routing to mobile users; Mobile IP, handling mobility in networks and higher layer protocols.   | S1 |
| 2.3 | Wireless ATM and multimedia communication support.  | S1, S6 |
| 2.4 | To illustrate the important components of communication skills and based on developing critical skills, observations, experiments, and feedback.   | S5 |
|  |  |  |
| **3** | **Values:** |  |
| 3.1 |  |  |
| 3.2 |  |  |
| 3.3 |  |  |
| 3... |  |  |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Overview of wireless network  | 4  |
| 2 | Characteristics of the wireless medium  | 4  |
| 3 | Physical layer alternatives for wireless networks  | 4  |
| 4 | Wireless medium access alternatives  | 4  |
| 5 | Network planning  | 4  |
| 6 | Wireless network operation  | 4  |
| 7 | GSM and TDMA technology  | 4  |
| 8 | CDMA technology, IS-95 and IMT-2000  | 4  |
| 9 | Mobile Data Networks  | 4  |
| 10 | Introduction to wireless LANs  | 4  |
| 11 | IEEE 802.11 WLANS  | 8  |
| 12 | Wireless ATM and HIPERLAN  | 4  |
| 13 | 4G amd 5G Wireless networks  | 4  |
| 14 | Ad Hoc Networking and WPAN  | 4  |
| **Total** | 60 |

# 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 wireless communications technologies and basic architecture of the wireless communication system.  | Lectures, Small Group Work, Small Group Discussion , Giving students tutorial related to scheduling algorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.    | Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.)  |
| 1.2 | Explain the challenges in wireless communication such as multipath, media access control, wireless network routing, congestion control and quality of service.   | Lectures, Small Group Work, Small Group Discussion , Giving students tutorial related to scheduling algorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.    | Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.)   |
| 1.3 | Illustrate the wireless LAN networks using IEEE 802.11 standard.  | Lectures, Small Group Work, Small Group Discussion , Giving students tutorial related to scheduling algorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.    | Class Quizzes. Assignment.  Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.) Final Exam  |
| **2.0** | **Skills** |
| 2.1  | Understand the cellular networks in terms of evolution, architecture and standards i.e. GSM.   | Lectures, Small Group Work, Small Group Discussion , Giving students tutorial related to scheduling algorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.   | Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.)  |
| 2.2 | Principles of addressing and routing to mobile users; Mobile IP, handling mobility in networks and higher layer protocols.   | Lectures, Small Group Work, Small Group Discussion , Giving students tutorial related to scheduling algorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.   | Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.)  |
| 2.3 | Wireless ATM and multimedia communication support.  | Lectures, Small Group Work, Small Group Discussion, Giving students tutorial related toscheduling lgorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.   | Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.)  |
| 2.4 | 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 , Giving students tutorial related to scheduling algorithms, thread, memory management etc.  Motivating students to work in the home, to search from the internet, to read related reference books by giving them assignments related to mobile and wireless communication.   | Midterm exam (Each exam consists of multiple choice questions, true/false, fill in the blanks, and theoretical questions.)  |
|  |  |  |  |
| **3.0** | **Values** |
| 3.1 |  |  |  |
| 3.2 |  |  |  |
| … |  |  |  |

## 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** | Kaveh Pahlavan, Prashant Krishnamoorthy, Principles of Wireless Networks - A united approach –John Wiley & Sons Inc., 2nd Revised edition, ISBN: 0470697083.  |
| **Essential References Materials** | * Mazliza Othman, Principles of Mobile Computing & Communications, Auerbach 2007, ISBN: 1420061585. 2.
* David Tse, Fundamentals of Wireless Communication, Cambridge University Press, 2005, ISBN: 0521845270.
* Amitabh Kumar, Mobilebroadcasting with WiMAX:Priciples Technology and Applications, Focal Press, 2008, ISBN: 0240810406
* John Ross, The Book of Wireless: A Painless Guide to WiFi and broadband Wireless, Starch Press, 2008, ISBN: 1593271697.
*

Note: Handouts will be distributed in class, when appropriate, to cover some of the course topics.   |
| **Electronic Materials** | Available in Blackboard    |
| **Other Learning Materials** | Wireless Networks Lab  |

## 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     |