



ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

**Course Specifications
(CE)**



Course Specifications

| | | |
|---|------------------------|----------------------------|
| Institution: | Umm Al-Qura University | Date of Report: 10/06/1437 |
| College/Department: Computer Engineering Department | | |

A. Course Identification and General Information

| | | | |
|---|-------------------------------------|------------------|----------------------------------|
| 1. Course title and code: Wireless Communications and Networks 14034105-3 | | | |
| 2. Credit hours: 3 + 0 | | | |
| 3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Computer Engineering | | | |
| 4. Name of faculty member responsible for the course Dr. Khaled Almotaire | | | |
| 5. Level/year at which this course is offered: Level 9/10 | | | |
| 6. Pre-requisites for this course (if any) (a) Computer Communication Systems (b) Probability and Statistics for Engineers. | | | |
| 7. Co-requisites for this course (if any) N/A | | | |
| 8. Location if not on main campus Umm Al-Qura University, Abidiyyah, Makkah Al-Mukarammah | | | |
| 9. Mode of Instruction (mark all that apply) | | | |
| a. Traditional classroom | <input checked="" type="checkbox"/> | What percentage? | <input type="text" value="100"/> |
| b. Blended (traditional and online) | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| c. e-learning | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| d. Correspondence | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| f. Other | <input type="checkbox"/> | What percentage? | <input type="text"/> |
| Comments: N/A | | | |

B Objectives

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| 1. What is the main purpose for this course? Overview of wireless communications and modern wireless systems & standards. Cellular concept, frequency reuse. Characterization of mobile radio propagation channels including Large-scale and small-scale effects. Multiple access techniques for wireless communications. Wireless networking. |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) This course provides the students the deep understanding with wireless communications and networking. This area is dynamic and the instructors will use research and magazine papers to include new topics with course. |

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

| 1. Topics to be Covered | | |
|--|--------------|---------------|
| List of Topics | No. of Weeks | Contact Hours |
| Introduction to Wireless Communications Systems and Modern Standards | 1-2 | 6 |
| Cellular Concept and Frequency Reuse | 3-4 | 6 |
| Radio Wave Propagation and Large-scale Path Loss | 5-7 | 9 |
| Channel Fading and Multipath in Radio Propagation | 8-10 | 9 |
| Multiple Access Techniques for Wireless Communications | 11-12 | 6 |
| Wireless Networking | 13-14 | 6 |

| 2. Course components (total contact hours and credits per semester): | | | | | | |
|--|---------|----------|------------|-----------|--------|-------|
| | Lecture | Tutorial | Laboratory | Practical | Other: | Total |
| Contact Hours | 42 | N/A | N/A | N/A | N/A | 42 |
| Credit | 42 | N/A | N/A | N/A | N/A | 42 |



3. Additional private study/learning hours expected for students per week.

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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

Course Learning Outcomes, Assessment Methods, and Teaching Strategy work together and are aligned. They are joined together as one, coherent, unity that collectively articulate a consistent agreement between student learning, assessment, and teaching.

The *National Qualification Framework* provides five learning domains. Course learning outcomes are required. Normally a course has should not exceed eight learning outcomes which align with one or more of the five learning domains. Some courses have one or more program learning outcomes integrated into the course learning outcomes to demonstrate program learning outcome alignment. The program learning outcome matrix map identifies which program learning outcomes are incorporated into specific courses.

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. **Fourth**, if any program learning outcomes are included in the course learning outcomes, place the @ symbol next to it.

Every course is not required to include learning outcomes from each domain.



| | NQF Learning Domains And Course Learning Outcomes | Course Teaching Strategies | Course Assessment Methods |
|------------|---|---|---|
| 1.0 | Knowledge | | |
| 1.1 | <p>Understand and describe the current and new trends in wireless communications networks</p> <p>Understand the radio wave propagation and the characterization of the wireless channel</p> <p>Characterize the tradeoffs among cellular radio concepts and frequency reuse, signal-to-interference ratio, capacity, and spectral efficiency</p> <p>Understand different multiple access techniques used for wireless communications and standards.</p> | Classroom lectures, power point slides and individual attention is used to develop knowledge of the course. | <p>Exercises & Home works , Quizzes, Midterm, Project , Final Exam</p> <p>Review outputs from the assignments in the computer lab and also from their assignments and projects.</p> |
| 2.0 | Cognitive Skills | | |
| 2.1 | <p>The student will be able to design and conduct experiments, analyze and interpret data.</p> <p>The student will design a system, component, or process.</p> <p>The student will design a system, component, or process.</p> <p>The student will identify, formulate, and solve engineering problems</p> <p>The student will know and identify contemporary issues.</p> | Assignments | Mid and Final Exams |
| 3.0 | Interpersonal Skills & Responsibility | | |
| 3.1 | Understand and communicate to others the importance and relevance of statistics in the modern world | Mainly based on teaching-centre approach with some hand-on problem solving | Mid and Final Exams |



| | | | |
|------------|---|--|--|
| | Be an independent learner, able to acquire further knowledge with some guidance or support. Participate in group discussions Manage time and meet deadlines | techniques. | |
| 4.0 | Communication, Information Technology, Numerical | | |
| 4.1 | Case studies: the key method of discovering a student's dexterity in analysing Their recommendations, opinions and suggestions Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills Class discussions should indicate a student's prowess in responding | Written Examinations Assignments Quizzes | Assignments, exams, reports, presentations and quizzes will test their analytic skills and communication skills Class discussions should indicate a student's prowess in responding |
| 5.0 | Psychomotor | | |
| 5.1 | N/A | N/A | N/A |

Suggested Guidelines for Learning Outcome Verb, Assessment, and Teaching

| NQF Learning Domains | Suggested Verbs |
|-------------------------|--|
| Knowledge | list, name, record, define, label, outline, state, describe, recall, memorize, reproduce, recognize, record, tell, write |
| Cognitive Skills | estimate, explain, summarize, write, compare, contrast, diagram, subdivide, differentiate, criticize, calculate, analyze, compose, develop, create, prepare, reconstruct, reorganize, summarize, explain, predict, justify, rate, evaluate, plan, design, measure, judge, justify, interpret, appraise |

| | |
|---|--|
| Interpersonal Skills & Responsibility | demonstrate, judge, choose, illustrate, modify, show, use, appraise, evaluate, justify, analyze, question, and write |
| Communication, Information Technology, Numerical | demonstrate, calculate, illustrate, interpret, research, question, operate, appraise, evaluate, assess, and criticize |
| Psychomotor | demonstrate, show, illustrate, perform, dramatize, employ, manipulate, operate, prepare, produce, draw, diagram, examine, construct, assemble, experiment, and reconstruct |

Suggested **verbs not to use** when writing measurable and assessable learning outcomes are as follows:

| | | | | | | |
|----------|----------|----------|------------|---------|-----------|------------|
| Consider | Maximize | Continue | Review | Ensure | Enlarge | Understand |
| Maintain | Reflect | Examine | Strengthen | Explore | Encourage | Deepen |

Some of these verbs can be used if tied to specific actions or quantification.

Suggested assessment methods and teaching strategies are:

According to research and best practices, multiple and continuous assessment methods are required to verify student learning. Current trends incorporate a wide range of rubric assessment tools; including web-based student performance systems that apply rubrics, benchmarks, KPIs, and analysis. Rubrics are especially helpful for qualitative evaluation. Differentiated assessment strategies include: exams, portfolios, long and short essays, log books, analytical reports, individual and group presentations, posters, journals, case studies, lab manuals, video analysis, group reports, lab reports, debates, speeches, learning logs, peer evaluations, self-evaluations, videos, graphs, dramatic performances, tables, demonstrations, graphic organizers, discussion forums, interviews, learning contracts, antidotal notes, artwork, KWL charts, and concept mapping.

Differentiated teaching strategies should be selected to align with the curriculum taught, the needs of students, and the intended learning outcomes. Teaching methods include: lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, guest speakers, memorization, humor, individual presentation, brainstorming, and a wide variety of hands-on student learning activities.



| 5. Schedule of Assessment Tasks for Students During the Semester | | | |
|--|---|---------------------|--------------------------------|
| | Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.) | Week Due | Proportion of Total Assessment |
| 1 | Quizzes | 4, 10 | 10 |
| 2 | Mid Term | 8, 12 | 20 |
| 3 | Assignments | Throughout semester | 05 |
| 4 | Project | Throughout semester | 25 |
| 5 | Final Exam | 16 | 40 |

D. Student Academic Counseling and Support

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)
 - For individual student consultations and academic advice teaching staff is expected to be available 8 hours per week.

E. Learning Resources

1. List Required Textbooks

- Theodore S. Rappaport, Wireless Communications: Principles & Practice, 2nd Edition, Prentice Hall, 2002, ISBN: 978-0130422323.

2. List Essential References Materials (Journals, Reports, etc.)

- J. W. Mark and W. Zhuang, Wireless Communications and Networking, Prentice Hall, 2003
- Andrea Goldsmith, Wireless Communications, Cambridge University Press, 2005
- D. Tse and P. Viswanath, Fundamentals of Wireless Communications, Cambridge Univ. Press, 2005.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- N/A

4. List Electronic Materials (e.g. Web Sites, Social Media, Blackboard, etc.)

- Provided by the instructor such as course, youtube, different articles.

5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- Using of Matlab or different simulations or programming languages such as Java or C/C++.

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)



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| 1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) |
| <ul style="list-style-type: none"> A Lecture room having Multimedia projector for lectures and students presentation. |
| 2. Computing resources (AV, data show, Smart Board, software, etc.) |
| <ul style="list-style-type: none"> N/A |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) |
| <ul style="list-style-type: none"> N/A |

G Course Evaluation and Improvement Processes

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| 1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching |
| <ul style="list-style-type: none"> Course Survey and students Feedback for each learning outcome of the course. |
| 2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor |
| <ul style="list-style-type: none"> Faculty meetings to discuss best practices and issues related to the course. Comparison of the course content with similar courses offered in others colleges. Updating course curriculum according to latest research done in the field. |
| 3. Processes for Improvement of Teaching |
| <ul style="list-style-type: none"> Departmental meetings. Faculty trainings. |
| 4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) |
| <ul style="list-style-type: none"> N/A |



5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Departmental meetings.

Faculty or Teaching Staff: _____

Signature: _____ Date Report Completed: _____

Received by: _____ Dean/Department Head

Signature: _____ Date: _____