1. **Course number and name**
   COE 434 – Wireless and Mobile Networks

2. **Credits and contact hours**
   3 credit hours, 3 contact hours

3. **Instructor's or course coordinator's name**
   Dr. Rana E. Ahmed

4. **Textbook, title, author, and year**
   D. Agrawa, and Q. Zeng, *Introduction to Wireless and Mobile System*, 4th edition, Cengage Learning, 2016.

   Other supplemental materials
   W. Stallings, *Wireless Communications and Networks*, Prentice-Hall, 2005.

5. **Specific course information**
   a. **Brief description of content of the course (catalog description)**
      Covers wireless communications and networks, location management, routing in ad hoc wireless network, file systems issues and caching strategies.

   b. **Prerequisites or co-requisites**
      Prerequisites: COE 370 (Communications Networks) or COE 371 (Computer Networks I)

   c. **Indicate whether a required, elective, or selected elective course in the program**
      Selected Elective

6. **Specific goals for the course**
   a. **Specific outcomes of instruction**
      This course requires the student to demonstrate the following:
      1. Apply the RF signal propagation principles to find the path loss and fade margin in the system
      2. Understand the working of major communication technologies, such as 802.11, Bluetooth, to support mobile computing
      3. Analyze the working of cellular technologies and the associated access technologies
      4. Analyze various techniques used for mobile data management, data broadcast, and location management in mobile environment
      5. Analyze the working of ad hoc and wireless sensor networks, and the associated routing protocols
      6. Explain the principles and applications of near field communication, vehicular area networks and wireless positioning technologies.
      7. Analyze the mobile file systems and caching techniques
      8. Learn and research about latest trends in wireless and mobile networks and their applications.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

This course contributes in a significant way to the accomplishment of the following program outcomes:

Program outcome	Emphasis in this course
(a) an ability to apply knowledge of mathematics, science, and engineering	◑
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	○
(d) an ability to function on multidisciplinary teams	○
(e) an ability to identify, formulate, and solve engineering problems	◑
(f) an understanding of professional and ethical responsibility	
(g) an ability to communicate effectively	○
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	○
(i) a recognition of the need for, and an ability to engage in life-long learning	
(j) a knowledge of contemporary issues	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	○

Emphasis: ● High; ◑ Medium; ○ Low; Blank – Nothing Specific Expected

7. Brief list of topics to be covered

i. RF Signal Propagation; Path Loss; Fading; Interference
ii. Multiple Access
iii. Wireless LANs; Bluetooth; ZigBee
iv. Cellular Networks; GSM; 3G; LTE
v. Ad hoc and wireless sensor networks; Routing protocols
vi. Wireless Location Management
vii. Caching in mobile networks