1. **Course Number and Course Title:**
   COE 434 – Wireless and Mobile Networks

2. **Credit Hours:**
   3 – 0 – 3

3. **Prerequisites and/or Co-Requisites:**
   Prerequisite: COE 370 (Communications Networks) or COE 371 (Computer Networks I)

4. **Name and Contact Information of Instructor:**
   Name: Dr. Rana E. Ahmed

5. **Course Description (Catalog Description):**
   Covers wireless communications and networks, location management, routing in ad hoc wireless network, file systems issues and caching strategies.

6. **Textbook and other Supplemental Material:**
   Textbook:
   - D. Agrawal, and Q. Zeng, *Introduction to Wireless and Mobile System*, 4th edition, Cengage Learning, 2016.

   Other supplemental material:
   - C. Beard and W. Stallings, *Wireless Communications Networks and Systems*, 2016, Pearson.

7. **Course Learning Outcomes:**
   Upon completion of the course, students will be able to:
   1. Apply the RF signal propagation principles to find the path loss and fade margin in the system
   2. Analyze major communication technologies, such as 802.11, Bluetooth, Wireless Sensor Networks, 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.

8. **Teaching and Learning Methodologies:**
   Methods include lectures, problem-based learning, class discussions, and group project report and presentation. Students learning is assessed via in-class quizzes, exams, homework, and quality of project report and presentation.

9. Course Topics and Schedule:

Topic/Activity	Weeks
RF Signal Propagation; Path Loss; Fading; Interference	Week 1
Link Budget Calculations; Antennas; MIMO	Week 2
Wireless Multiple Access; CSMA/CA; OFDMA	Week 3
Cellular Networks; 3G	Week 4
LTE; LTE-A; 5G	Week 5
Traffic Engineering	Week 6
Wireless LANs; Midterm I	Week 7
Ad hoc and wireless sensor networks	Week 8
Routing Protocols in Ad hoc networks	Week 9
Bluetooth	Week 10
ZigBee	Week 11
Mobility Management, File system and Caching; Midterm II	Week 12
Wireless Location Management; GPS	Week 13
Vehicular area networks; Near Field Communications (NFC)	Week 14
Review	Week 15
Final Exam	Week 16