Mobile Computing

1.1 Course Number: CS411

1.2 Contact Hours: 3-0-0 Credits: 9

1.3 Semester-offered: 4th Year-Odd

1.4 Prerequisite: Fundamental of Networking

1.5 Syllabus Committee Member: Dr. Sushum Biswas, Dr. Daya Sagar Gupta & Dr. Gargi Srivastava

2. **Objective:** This course provides students with an opportunity to explore the research issues in ubiquitous computing and its close relative, pervasive and mobile computing. Many traditional areas of computer science and engineering are impacted by the constraints and demands of ubiquitous computing. A primary focus of this course is to explore the high level facilities, system architecture, and protocols of the ubiquitous system.

3. **Course Content:**

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction to mobile computing	Definition, scope, essential elements of ubiquitous, pervasive, and mobile computing. An introduction, overview, and challenges to research topics in ubiquitous computing, including sensors, ambient displays, tangibles, middleware, mobility, and location and context awareness.	8
2	Architecture for ubiquitous computing	New devices and communications; and software architectures. Wireless standards & protocols for ubiquitous networks : Near field communication (NFC), Bluetooth classic, Bluetooth Low Energy (BLE), WiFi, and WiFi Direct.	7
3	Location in ubiquitous computing	Personal assistants, Location aware computing, Location tracking, Architecture, Location based service and applications (Indoor Positioning Techniques).	4
4	Integrating the physical and the virtual worlds	Sensing and actuation; awareness and perception. Context-aware Computing, Issues and Challenges, Developing Context-aware Applications, System Architecture.	5
5	Ubiquitous applications	The appropriate design; mixed reality and sensible design. Wearable computing, Glass and Augmented Reality, Eye-Tracking, Digital Pen and Paper Mobile	7

		social networking & crowd sensing, Event based social network.	
6	Application domains for ubiquitous computing	Illustration of some existing application domains for ubiquitous computing in such areas as gaming, workplaces, domestic spaces, museums and educational communities. Human Activity and Emotion Sensing, Health Apps Mobile peer-to-peer (p2p) computing Smart Homes and Intelligent Buildings, Mobile HCI, and Internet of Thinking IoT.	9
		Total	**40**

4. Readings

4.1 Textbook:

1) Ubiquitous Computing Fundamentals. Ed. John Krumm. ISBN: 1420093606. Chapman & Hall/CRC 2009.
2) Pervasive Computing and Networking, Mohammad S. Obaidat and et al., ISBN: 978-0-470-74772-8, Wiley 2011.

4.2 Reference books:

1) Wireless Sensor Networks: An Information Processing Approach - Feng Zhao and Leonidas Guibas, Morgan Kaufmann Publishers, 2004 (Indian Edition)

5 Outcome of the Course:

After completion of this course, student will be able

- To understand concepts of Mobile Communication. (Understand)
- To analyse the next generation Mobile Communication System. (Analyze)
- To understand network and transport layers of Mobile Communication. (Understand)
- Analyze various protocols of all layers for mobile and ad hoc wireless communication networks. (Analyze)
- To understand IP and TCP layers of Mobile Communication. (Understand)