COURSE TITLE	**MOBILE AND PERVASIVE COMPUTING**
COURSE CODE	**01CT0716**
COURSE CREDITS	**5**

Objective:

1 The objectives of this course are to understand the pervasive computing and its applications, to introduce the concepts of mobile communication systems and pervasive computing, to understand the concepts of emerging wireless technologies and to be aware of pervasive computing practices.

2 The objectives of this course are • To understand the pervasive computing and its applications • To introduce the concepts of mobile communication systems and pervasive computing. • To understand the concepts of emerging wireless technologies. • To be aware of pervasive computing practices.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the fundamental concepts of pervasive computing.

2 Analyze the cellular network architecture and protocols.

3 Analyze various wireless network systems.

4 Design and implement pervasive application systems.

Pre-requisite of course: Analog and Digital Communication, Signals & Systems, Probability & Statistics , Algorithm and Data Structures and Object Oriented Programming

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Overview of Wireless Systems** Infrastructure-based vs Ad-hoc, Wireless LANs, Cellular systems, Sensor networks, Bluetooth, WiFi, WiMAX, Zigbee, RFID	10
2	**Medium Access:** Link Adaptation, Routing Protocols	5
3	**Mobility and Handoff Management:** Link layer mobility mechanisms (location management protocols), Network layer mobility mechanisms (Macro and Micro mobility protocols), Handoff management protocols	6
4	**Cellular Networks:** LTE and 5G overview, GSM network architecture, Protocols, frequency allocation, Mobility management	10

MR. CHANDRASINH DHIRUBHA PARMAR
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)

Contents : Unit	Topics	Contact Hours
5	**Pervasive Computing:** Principles & Characteristics, Pervasive devices, Smart sensors and actuators, Human-machine Interfaces, Biometrics	8
6	**Context Aware Sensor Networks:** Open protocols (SDP, Jini, SLP, UPnP), SyncML framework, Context aware mobile services, Context aware security	4
7	**Energy Efficiency, Energy harvesting, Localization (GPS/WiFi/GSM), Security** Energy Efficiency, Energy harvesting, Localization (GPS/WiFi/GSM), Security	4
8	**Recent Advances in Wearable devices** Recent Advances in Wearable devices	5
9	**Body Area Networks (BAN)** Body Area Networks (BAN)	4
Total Hours		**56**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment No. 1** Introduction to Android Integrated Development Environment. Develop an application that displays “Hello World !!!” message.	2
2	**Experiment No. 2** Create a login Activity. It asks for “username” and “password” from the user. If the username and password are valid, it displays a Welcome message using new activity.	2
3	**Experiment No. 3** Develop a calculator android application.	2
4	**Experiment No. 4** Develop an application for multimedia processing.	2
5	**Experiment No. 5** Developing an application for data persistence.	2
6	**Experiment No. 6** Develop an application to establish http connection and toast notification.	2
7	**Experiment No. 7** Develop an application that auto sends received SMS.	2
8	**Experiment No. 8** Develop an application that identifies the Bluetooth devices in the wireless range.	2
9	**Experiment No. 9** Develop an application for text communication using Bluetooth.	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
10	**Experiment No. 10** Develop an application that prints the signal strength of Wi-Fi connection	2
11	**Experiment No. 11** Develop an application that marks the present location of the device on google map.	2
12	**Experiment No. 12** Develop an application that demonstrates use of any built-in sensor.	2
Total Hours		**24**

Textbook :

1 Handbook of Wireless Networks and Mobile and Pervasive Computing, I. STOJMENOVIC, Wiley, 2002

References:

1 Context-aware Pervasive Systems: Architectures for a New Breed of Applications, Context-aware Pervasive Systems: Architectures for a New Breed of Applications, S. LOKE, CRC Press, 2006

2 5G Mobile and Wireless Communications Technology, 5G Mobile and Wireless Communications Technology, A. OSSEIRAN, J.F. MONSERRAT, P. MARSCH, Cambridge University, 2016

3 Mobile and Pervasive Computing, Mobile and Pervasive Computing, R. KAMAL, Oxford University, 2008

4 Principles of Mobile and Pervasive Computing, Principles of Mobile and Pervasive Computing, L. MERK, M. NICLOUS, Dreamtech, 2006

5 Mobile Ad hoc Networks: From Wireless LANs to 4G Networks, Mobile Ad hoc Networks: From Wireless LANs to 4G Networks, G. AGGELOU, McGraw-Hill, 2004

6 Android Hacker's Handbook, Android Hacker's Handbook, J.J. DRAKE, Z. LANIER, C. MULLINER, P.O. FORA, S.A. RIDLEY, G. WICHERSKI, John Wiley, 2014

7 “Mobile Computing”, “Mobile Computing”, Ashok K.Talukder and Roopa R.Yuvagal, Tata McGraw Hill, 2010

8 Pervasive Computing Technology and Architecture of Mobile Internet Applications, Pervasive Computing Technology and Architecture of Mobile Internet Applications, JochenBurkhardt, Horst Henn, Stefan Heper, Klaus Rindtorff and Thomas Schack, Addison Wesley, 2002

9 Pervasive Computing”, Pervasive Computing”, UweHansmann, L. Merk, M. Nicllous, T. Stober and U.Hansmann,, Springer Verlag, 2003

10 Mobile Communications, Mobile Communications, Johcehn H.Schiller, Addison-Wesley, 2003

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	25.00	20.00	10.00	15.00

Instructional Method:

1. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
2. Practical examination will be conducted at the end of the semester for evaluation of performance of students in laboratory
3. Students may use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory, etc
4. The course delivery method will depend upon the requirement of content and need of the students. The teacher in addition to conventional teaching method (Chalk and Talk) may use any of the tools such as demonstration, role play, Quiz, brainstorming, Flipped class, Project based learning, Collaborative learning, MOOCs etc. for effective teaching.

Supplementary Resources:

1. https://nptel.ac.in/courses/106106147/
2. https://www.coursera.org/videos/5g-training-qualcomm/hJkVd?query=mobile+computing&source=search&utm_campaign=programId%3ANNqDyxeeEeyRdxIhkRqYvw%3Bday%3A1632207600000%3Binvitation&utm_medium=email&utm_source=other
3. https://www.coursera.org/learn/wireless-communications

MR. CHANDRASINH DHIRUBHA PARMAR
Digitally signed by (Name of HOD)

DR. RAJENDRASINH BAHADURSINH JADEJA
Digitally signed by (Name of Dean/ Principal)