



THIRD-YEAR OF BACHELOR OF COMPUTER SCIENCE REVISED SYLLABUS ACCORDING TO CBCS

COURSE TITLE: WIRELESS SENSOR
NETWORKS AND MOBILE
COMMUNICATION

SEMESTER-V, W.E.F. 2021-2022

**Recommended by the Board of Studies in Computer Science
And**

Approved by the Academic Council

Devrukh Shikshan Prasarak Mandal's

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and
Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal. Sangameshwar, Dist. Ratnagiri-415804, Maharashtra,
India

Academic Council Item No: _____

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Computer Science
Name of the Class	:	Third Year
Semester	:	Six
No. of Credits	:	03
Title of the Course	:	Wireless Sensor Networks and Mobile Communication
Course Code	:	USCST61
Name of the Vertical	:	Elective I
Eligibility for Admission	:	Any 12 th Pass seeking Admission to Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	UG
Pattern of Marks Distribution for TE and CIA	:	70:30
Status	:	CBCS
To be implemented from Academic Year	:	2021-2022
Ordinances /Regulations (if any)	:	

Syllabus for Third Year of Bachelor of Science in Computer Science

(With effect from the academic year 2021-2022)

SEMESTER-V

Paper No.– 1

Course Title: Wireless Sensor Networks and Mobile Communication

No. of Credits - 03

Type of Vertical: Elective I

COURSE CODE: USCST61

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to...		
Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CO-01	Understand	After completion of this course, learner should be able to list various applications of wireless sensor networks, describe the concepts, protocols, design, implementation and use of wireless sensor networks.
CO-02	Apply	Also implement and evaluate new ideas for solving wireless sensor network design issues.

Syllabus for Third Year of Bachelor of Science in Computer Science

(With effect from the academic year 2021-2022)

SEMESTER-V

Paper No.– 1

Course Title: Wireless Sensor Networks and Mobile Communication

No. of Credits - 03

Type of Vertical: Elective I

COURSE CODE: USCST61

COURSE CONTENT			
Unit No.	Content	Credits	No. of Lectures
I	Introduction: Introduction to Sensor Networks, unique constraints and challenges. Advantage of Sensor Networks, Applications of Sensor Networks, Mobile Adhoc NETWORKS (MANETs) and Wireless Sensor Networks, Enabling technologies for Wireless Sensor Networks. Sensor Node Hardware and Network Architecture: Singlenode architecture, Hardware components & design constraints, Operating systems and execution environments, introduction to TinyOS and nesC. Network architecture, Optimization goals and figures of merit, Design principles for WSNs, Service interfaces of WSNs, Gateway concepts.	01	15
II	Medium Access Control Protocols: Fundamentals of MAC Protocols, MAC Protocols for WSNs, Sensor-MAC Case Study. Routing Protocols : Data Dissemination and Gathering, Routing Challenges and Design Issues in Wireless	01	15

	<p>Sensor Networks, Routing Strategies in Wireless Sensor Networks.</p> <p>Transport Control Protocols: Traditional Transport Control Protocols, Transport Protocol Design Issues, Examples of Existing Transport Control Protocols, Performance of Transport Control Protocols.</p>		
III	<p>Introduction, Wireless Transmission and Medium Access Control: Applications, A short history of wireless communication.</p> <p>Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.</p> <p>Telecommunication, Satellite and Broadcast Systems: GSM: Mobile services, System architecture, Radio interface, Protocols, Localization And Calling, Handover, security, New data services; DECT: System architecture, Protocol architecture; ETRA, UMTS and IMT- 2000.</p> <p>Satellite Systems: History, Applications, Basics: GEO, LEO, MEO; Routing, Localization, Handover.</p>	01	15

	Total	03	45
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Required Previous Knowledge

Students should know basic concepts related to computer and computer handling

Access to the Course

The course is available for all the students admitted for Bachelor of Science (Computer Science).

Forms of Assessment

The assessment of the course will be of Diagnostic, Formative and Summative type. At the beginning of the course diagnostic assessment will be carried out. The formative assessment will be used for the Continuous Internal Evaluation whereas the summative assessment will be conducted at the end of the term. The weightage for formative and summative assessment will be 60:40. The detailed pattern is as given below.

Semester End Evaluation (70 Marks)
Question Paper Pattern
Time: 2:30 hours

Question No.	Unit/s	Question Pattern	Marks
Q.1	I,II &III	MCQ/Fill in the blanks/One line sentence	10
Q.2	I	Descriptive Questions	20
Q.3	II	Descriptive Questions	20
Q.4.	III	Descriptive Questions	20
Total			70

Internal evaluation (30 Marks)

Sr. No.	Description	Marks
1	Classroom Tests	10
2	Project/ Viva/ Presentations/ Assignments	10
3	Attendance	10
Total		30

Grading Scale

10 points grading scale will be used. The grading scale used is O to F. Grade O is the highest passing grade on the grading scale, and grade F is a fail. The Board of Examinations of the college reserves the right to change the grading scale.

Reference book:

- Protocols and Architectures for Wireless Sensor Network, Holger Kerl, Andreas Willig, John Wiley and Sons, 2005
- Wireless Sensor Networks Technology, Protocols, and Applications ,Kazem Sohraby, Daniel Minoli and Taieb Znati, John Wiley & Sons, 2007
- Mobile communications, Jochen Schiller, 2nd Edition, Addison Wesley , Pearson Education, 2012

Text book:

- Techmax publication book

Additional References:

- Fundamentals of Wireless Sensor Networks, Theory and Practice, Walteneus Dargie, Christian Poellabauer , Wiley Series on wireless Communication and Mobile Computing, 2011
- Networking Wireless Sensors, Bhaskar Krishnamachari , Cambridge University Press, 2005

Course: USCSP68	Practical of USCST61 (Credits : 1, Lectures/Week: 3)
USCSP68	<p>Practical experiments require software tools like INET Framework for OMNeT++, NetSim , TOSSIM, Cisco packet tracer 6.0 and higher version.</p> <ol style="list-style-type: none"> 1. Understanding the Sensor Node Hardware. (For Eg. Sensors, Nodes(Sensor mote), Base Station, Graphical User Interface.) 2. Exploring and understanding TinyOS computational concepts:- Events, Commands and Task. <ul style="list-style-type: none"> - nesC model - nesC Components 3. Understanding TOSSIM for <ul style="list-style-type: none"> - Mote-mote radio communication - Mote-PC serial communication 4. Create and simulate a simple adhoc network 5. Understanding, Reading and Analyzing Routing Table of a network. 6. Create a basic MANET implementation simulation for Packet animation and Packet Trace. 7. Implement a Wireless sensor network simulation. 8. Create MAC protocol simulation implementation for wireless sensor Network. 9. Simulate Mobile Adhoc Network with Directional Antenna 10. Create a mobile network using Cell Tower, Central Office Server, Web browser and Web Server. Simulate connection between them.