SHIVAJI UNIVERSITY, KOLHAPUR - 416 004, MAHARASHTRA

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शिवाजी विद्यापीठ, कोल्हापूर - ४१६ ००४, महाराष्ट्र

दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दूरध्वनी विभाग ०२३१—२६०९०९३/९४

Estd. 1962
"A⁺⁺" Accredited by
NAAC(2021)
With CGPA 3.52

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SU/BOS/Sci & Tech/470   Date : 26/06/2023

To,

1) **The Director,**
   Departments of Technology,
   Shivaji University, Kolhapur

2) **The Principal/ Director,**
   All affiliated Engineering Colleges/ Institute,
   Shivaji University, Kolhapur.

Subject: Regarding revised syllabus of **Ph. D. Coursework** under the Faculty of Science and Technology.

Sir/Madam,

     With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabus of **Ph. D. Coursework** under the Faculty of Science and Technology.

1.	Civil Engineering & Technology
2.	Mechanical Engineering & Technology
3.	Electrical Engineering & Technology
4.	Electronics Engineering & Technology
5.	Electronics and Telecommunication Engineering & Technology
6.	Textile Engineering & Technology
7.	Computer Science Engineering & Technology
8.	Environmental Engineering & Technology
9.	Pharmacy

     This syllabus will be implemented from the academic year 2023-24 i.e. from June 2023 onwards.

     You are therefore, requested to bring this to the notice of all students and teachers concerned.

     Thanking you,

                                                      Yours faithfully,

                                                      Dr. S. M. Kubal
                                                      Dy. Registrar

Copy to:

1	The Dean, Faculty of Science & Technology	7	Computer Centre (IT)
2	The Chairman, Respective Board of Studies	8	Affiliation Section (T.1)
3	Director, Examination and Evaluation	9	Affiliation Section (T.2)
4	Eligibility Section	10	P.G.Admission Section
5	O.E. – 4	11	P.G Seminar Section
6	Appointment Section	12	Meeting Section

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Paper II: Advances in Electronics & Telecommunication Engineering

Unit I: Wireless Communication and Networks

Computer simulation of radio channels, Overview of 4G-LTE networks, IP switching and MPLS- Overview of IP over ATM and its evolution to IP switching, Optical communication networks- DWDM based network, Optical network on chip, Introduction to near field communication, LoRa communication

Unit II: MIMO and multicarrier modulation

Narrowband MIMO model-parallel decomposition of MIMO channel-MIMO channel capacity-MIMO diversity gain Space-Time modulation and coding

Unit III: Mobile Data Networks and Ad-hoc Wireless Networks

Introduction, Data oriented CDPD Network, GPRS and higher data rates, Short messaging service in GSM, Mobile application protocol. Cellular and Adhoc wireless networks, applications, MAC protocols, Routing, Multicasting, Transport layer Protocols, quality of service browsining, deployment considerations, Adhoc wireless Internet

Unit IV: Capacity of wireless channel

AWGN channel capacity   Resources of AWGN channel, Linear time invariant Gaussian channel, Capacity of Fading Channels

Unit V: Wireless Security

Use of Wi-Fi , Service Set Identification (SSID) , Types of Wireless Security , WPA Security problems , Wi-Fi Protected Access (WPA) and Wi-Fi Protected Access II (WPA2) , Difference between WPA & WPA2 , Wireless Security Policy

Unit VI: Recent Technologies in Electronics & Telecommunication Engineering

Internet of Things,5G Network &Technology, Artificial Intelligence and Machine learning, Cloud Computing ,Cyber security

Text Books/References:

1. Data Communication and Tele Processing Systems - T. Housely, 2ndEdition, 2008, BSP.
2. Wireless communications, Principles and Practice, Theodore S.Rappaport, Pearson, 2nd Edition 2010
3. Introduction to Wireless Telecommunications systems and Networks - Gary J. Mulett. Publications- Cengage Learning India Edition.
4. Mobile Computing – Ashok K Talukdar, Roopa R Yavagal, Publication-TATA MGH
5. Vijay Garg, Wireless communication and networking, Morgan Caufmann

6. William Stallings, Wireless Communications and Networks, PHI
7. Ram Murthy C. Siva, Gurusamy Mohan, Wdm Optical Networks: Concepts, Design and Algorithms, 2011, PHI Learning
8. Jochen Schiller, Mobile Communication, 2/e, PEA, 2003