



Estd. 1962
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NAAC(2021)
With CGPA 3.52

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

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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

Shivaji University, Kolhapur

Ph.D. Course work (Computer Science & Engineering Faculty)

Paper-II: Advances in Computer Sci. & Engineering

Teaching Scheme:

Theory: 4 Hrs/ Week

Examination Scheme:

Theory Examination: 80 Marks

Term Work: 20 Marks

Unit-1: Data Mining Technologies

(15 Hrs)

Data Mining Tasks, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining, Data Preprocessing: Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Classification- Decision Trees, Bayesian Classification, Rule-Based Classification, Neural Network-Based Algorithms, Support Vector Machines, Classification by Association Rule Analysis, Nearest Neighbor Classifier, Clustering- Classification of clustering algorithms, Hierarchical Algorithms, Agglomerative Algorithms, Divisive Clustering, K -Means Clustering, Clustering Large Databases, BIRCH, DBSCAN, CURE Algorithm. Association Rules- Apriori Algorithm, Applications and Trends in Data Mining, Data Mining Applications, Social Impacts of Data Mining, Trends in Data Mining.

Reference

1. J. Han and M. Kamber, "Data Mining- Concepts and Techniques", 2nd Edition, Morgan Kaufmann, 2006.
2. Margaret H. Dunham, "Data Mining Introductory and Advanced Topics", Prentice Hall
3. P. Tan, M. Steinbach and V. Kumar, "Introduction to Data Mining", Addison Wesley, 2006.

Unit-2: Networks and Security

(15 Hrs)

Overview of OSI layer Model and TCP/IP protocol model. IPv4 Addresses: Classful Addressing, Class less Addressing, Cellular and Ad Hoc wireless network, Applications of Ad Hoc Wireless Network, issues in ad hoc wireless networks, mac protocols for ad hoc wireless networks: Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Network, Design Goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention-Based Protocol. Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Symmetric and Asymmetric Key Algorithms, Key Management in Ad Hoc Wireless Networks, Secure Routing in Ad Hoc Wireless Networks, IP Security-IP Security Architecture, Authentication Header and Encapsulating Security Payload.

References

1. Holger Kars, "Protocols and architectures for WSN", Wiley publication.
2. M Jochen Schiller, "Mobile communication", Person Publication.
3. Mathew Gast, "802.11 wireless Networks the definitive guide", O'Reilly.
4. William Stallings, "Cryptography and Network Security", Fourth Edition, Pearson Education 2007.
5. Behrouz A. Forouzan, "Cryptography & Network Security", TMH 2007.
6. Robert Bragg, Mark Rhodes, "Network Security: The complete reference", TMH

Unit-3: Advanced Algorithms and Distributed Systems

(15 Hrs)

Performance analysis and randomized algorithms, Divide and Conquer method, Binary search, Greedy method and Dynamic Programming General methods, Minimum cost spanning trees, NP- hard problems, PARAM Algorithms -computational model, Fundamental techniques, Mesh Algorithms- Computational model, Packet routing fundamental algorithms, Hypercube Algorithms-Computational model, PPR routing fundamental algorithms. characterization of distributed systems, Examples of distributed systems, Trends in distributed systems, system models, Distributed File Systems, Distributed Shared Memory.

References

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, Sartaj Sahni and Sanguthewar Rajasekaran (Galgotia Publications).
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms," Third Edition PHI 2010
3. G Coulouris, J Dollimore and T Kindberg, "Distributed Systems Concepts and Design", fifth Edition, Pearson Education.
4. Kai Hwang, Faye A.Brigs, "Computer Architecture and Parallel Processing", Mc Graw Hill

Unit 4: Blockchain & Applications

(15hrs)

The history of blockchain and Bitcoin, Blockchain architecture, Generic elements of a blockchain, How blockchain works, Benefits, features, and limitations of blockchain, Two General Problem. Byzantine General problem and Fault Tolerance, Zero Knowledge Proof, Advantage over conventional distributed database, Merkle Patricia Tree, Life cycle of Blockchain application, Soft & Hard Fork, Private and Public blockchain, Distributed Consensus: The consensus algorithms in Blockchain, Proof of Work, Proof of Stake, Proof of Burn. Mining strategy, Attacks & Vulnerability, Cryptocurrency Stakeholders, Domain Name service & future of Blockchain.

Reference

4. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder “Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction”, Princeton University Press (July 19, 2016).
5. S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan,” Blockchain Technology: Cryptocurrency and Applications”, ‘Oxford University Press, 2019.
6. Josh Thompson, “Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming”, Create Space Independent Publishing Platform

The list of reference books is indicative.