STRICTLY AS PER THE NEW REVISED SYLLABUS (REV-2019 'C' SCHEME) OF MUMBAI UNIVERSITY W.E.F ACADEMIC YEAR 2021-22 (AS PER CHOICE BASED CREDIT AND GRADING SYSTEM)



COMPUTER NETWORK

Bachelor of Engineering Third Year (T.E.) Degree Course in Computer Engineering | Semester 5



atest Solve University Question

Dr. MADHAVI H. WAGHMARE **YOGESH PINGLE** VAISHALI A. SHIRSATH



🚊 www.pragationline.com



f facebook.com/niralibooks



O @nirali.prakashan





A Text Book Of

COMPUTER NETWORK

(CSC503)

Semester - V BACHELOR OF ENGINEERING



THIRD YEAR DEGREE COURSE IN COMPUTER ENGINEERING

NEW SYLLABUS AS PER REV - 2019 'C' SCHEME OF MUMBAI UNIVERSITY
WITH EFFECT FROM 2021 - 2022

YOGESH PINGLE

DR. MADHAVI H. WAGHMARE

B.E., M.E. Computer
Deputy H.O.D. & Assistant Professor
Deptt. of Computer Science & Engg. (Data Science),
Vidyavardhini's College of Engg. & Technology,
Vasai - Mumbai.

Ph.D. M.Tech. Assistant Professor Deptt. of Information Technology, Vidyavardhini's College of Engg. & Technology, Vasai, Mumbai

VAISHALI A. SHIRSATH

M.E. Computer
Assistant Profesor
Deptt. of Information Technology
Vidyavardhini's College of Engg. & Technology
Vasai - Mumbai.

Price ₹ 300.00



Notice State of the Waller of

Dept. of Information Technology
Vidyavardhim's College of
Engineering and Technology
Vasai Road 401 202.

COMPUTER NETWORK

First Edition

February 2023

Authors

The text of this publication, or any part thereof, should not be reproduced or transmitted in any form or stored in any computer storage system or device for distribution including photocopy, recording, taping or information retrieval system or reproduced on any disc, tape, perforated media or other information storage device etc., without the written permission of Authors with whom the rights are reserved. Breach of this condition is liable for

Every effort has been made to avoid errors or omissions in this publication. In spite of this, errors may have crept in. Any mistake, error or discrepancy so noted and shall be brought to our notice shall be taken care of in the next edition. It is notified that neither the publisher nor the authors or seller shall be responsible for any damage or loss of action to any one, of any kind, in any manner, therefrom. The reader must cross check all the facts and contents with original Government notification or publications.

Published By: **NIRALI PRAKASHAN**

Tel - (020) 25512336/37/39

Abhyudaya Pragati, 1312, Shivaji Nagar, Off J.M. Road, Pune - 411005

Email: niralipune@pragationline.com

Polyplate

Printed By: Jayant Printery LLP

352/54, Murlidhar Temple Compound. Near Thakurdwar Post Office. Girgaum Road, Mumbai 400 002 Phone - 022 - 4366 7152

DISTRIBUTION CENTRES

PUNE

Nirali Prakashan (For orders outside Pune)

S. No. 28/27, Dhayari Narhe Road, Near Asian College

Pune 411041, Maharashtra

Tel: (020) 24690204; Mobile: 9657703143 Email: bookorder@pragationline.com

Nirali Prakashan

(For orders within Pune)

119, Budhwar Peth, Jogeshwari Mandir Lane Pune 411002, Maharashtra

Mobile: 9657703145, 9890997937 Email: niralilocal@pragationline.com

MUMBAI

Nirali Prakashan

Rasdhara Co-op. Hsg. Society Ltd., 'D' Wing Ground Floor, 385 S.V.P. Road

Girgaum, Mumbai 400004, Maharashtra

Mobile: 7045821020, Tel: (022) 2385 6339 / 2386 9976

Email: niralimumbai@pragationline.com

DELHI Nirali Prakashan

Room No. 2 Ground Floor 4575/15 Omkar Tower, Agarwal Road Darya Ganj, New Delhi 110002

> Mobile: 9555778814/9818561840 Email: delhi@niralibooks.com

KOLHAPUR

Nirali Prakashan

New Mahadvar Road, Kedar Plaza, 1st Floor Opp. IDBI Bank Kolhapur 416 012 Maharashtra Mob: 9850046155

Email: kolhapur@niralibooks.com

DISTRIBUTION BRANCHES

BENGALURU Nirali Prakashan

Maitri Ground Floor, Jaya Apartments, No. 99, 6th Cross, 6th Main, Malleswaram, Bengaluru 560003 Karnataka; Mob: 9686821074

Email: bengaluru@niralibooks.com

JALGAON Nirali Prakashan

34, V. V. Golani Market, Navi Peth, Jalgaon 425001, Maharashtra

> Tel: (0257) 222 0395 Mob: 94234 91860

Email: jalgaon@niralibooks.com

NAGPUR Nirali Prakashan

Above Maratha Mandir, Shop No. 3, First Floor, Rani Jhanshi Square, Sitabuldi Nagpur 440012 (MAH)

Tel: (0712) 254 7129

Email: nagpur@niralibooks.com

SOLAPUR Nirali Prakashan

R-158/2, Avanti Nagar, Near Golden Gate, Pune Naka Chowk Solapur 413001, Maharashtra

Mobile 9890918687

Email: solapur@niralibooks.com

marketing@pragationline.com | www.pragationline.com

Also find us on f www.facebook.com/niralibooks

Dept. of Information Technology Vidyavardhini's College of

Engineering and Technology. Vasai Road 4rd 202.

About The Authors



Yogesh Pingle (Ph.D Pursuing in Computer Engineering, M.E Computers, B.E. Computers) is working as a Deputy HOD and an Assistant Professor in Computer Science and Engineering (Data Science) Department of Vidyavardhini's College of Engineering & Technology, Vasai, Maharashtra. He is pursuing his Ph.D. in Computer Engineering from Terna College of Engineering, Mumbai University. He did his B.E.in Computer Engineering from V.J.T.I. Mumbai and did his M.E. in Computer Engineering from TSEC, Mumbai. He has more than 19 years of teaching experience and 2+ years of industry experience as a Software Programmer. He has published 20+ research papers which are indexed in Google scholar, Scopus and Web of Science. He has been

worked as a session chairperson as well as co chairperson for the subject "Internet of Things – Considerations and Applications and ML" in IEEE international conference, at New Delhi. He has published 6 books on "Internet Programming", "Internet of Things", "Architecting of IOT", "Physical Computing & IOT Programming", "Internet of Everything". He has organized and conducted more than 50+ hands on workshops and STTP programs on topics such as Hands on Arduino UNO, Hands on Raspberry PI, Java Programming, Music Therapy for the development of staffs as well as students. He has developed many real time softwares. He is Harmonium Visharad as well as G-II certified in German Language from Max Mueller Bhavan. He is life member of CSI and ISTE. His interests include IoT (Internet of Things), Artificial Intelligence, Machine Learning and Music Therapy.



Dr. Madhavi Harish Waghmare, Assistant Professor, Dept. of Information Technolgy, Vidyavardhini's College of Engineering and Technology, Vasai. She received her M. Tech. in 2004 from CEDTI, Aurangabad and Ph.D. in 2019 from Sardar Patel Institute of Technology, University of Mumbai.



Vaishali Anil Shirsath received her M.E. degree in 2011 on Computer Engineering from D. Y. Patil Engineering College, Pune, and currently pursuing her Ph.D. from VeermataJijabai Technological Institute, Mumbai. Since 2004 she is associated with Vidyavardhini's College of Engineering and Technology, Mumbai, and is currently designated as an Assistant Professor in the Department of Information Technology.

BOOKS AVAILABLE AT

Pragati Book Corner - Email: pragatibookcorner@gmail.com

Apurva Building, Shop No. 1, Bhavani Shankar Road, Opp. Shardashram Society, Dadar (W), Mumbai 400028, Tel. (022) 24223526 | Mobile/Whatsapp: 9819935759

And Book Stores Near You - #AskforNIRALI

amazon

www.pragationline.com





E-BOOK AVAILABLE ON PRAGATIONLINE.COM

Scan QR Code to Access Pragationline E-Reader and Store Mobile App for Additional Content (Solved Papers, Videos, etc.)

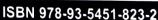
NIRALI PRAKASHAN - MUMBAI

Rasadhara Co-op Hsg. Soc. Ltd., 'D' Wing, Ground Floor, 385, S.V.P Road, Opp. New Harkisandas Reliance Hospital, Mumbai 400004.

Tel.: +91 223869976

Mobile/Whatsapp: 7045821020 Email: mumbai@niralibooks.com







Vidyavardhlai's College of Engineering and Technology. Vasni Road 401 202.