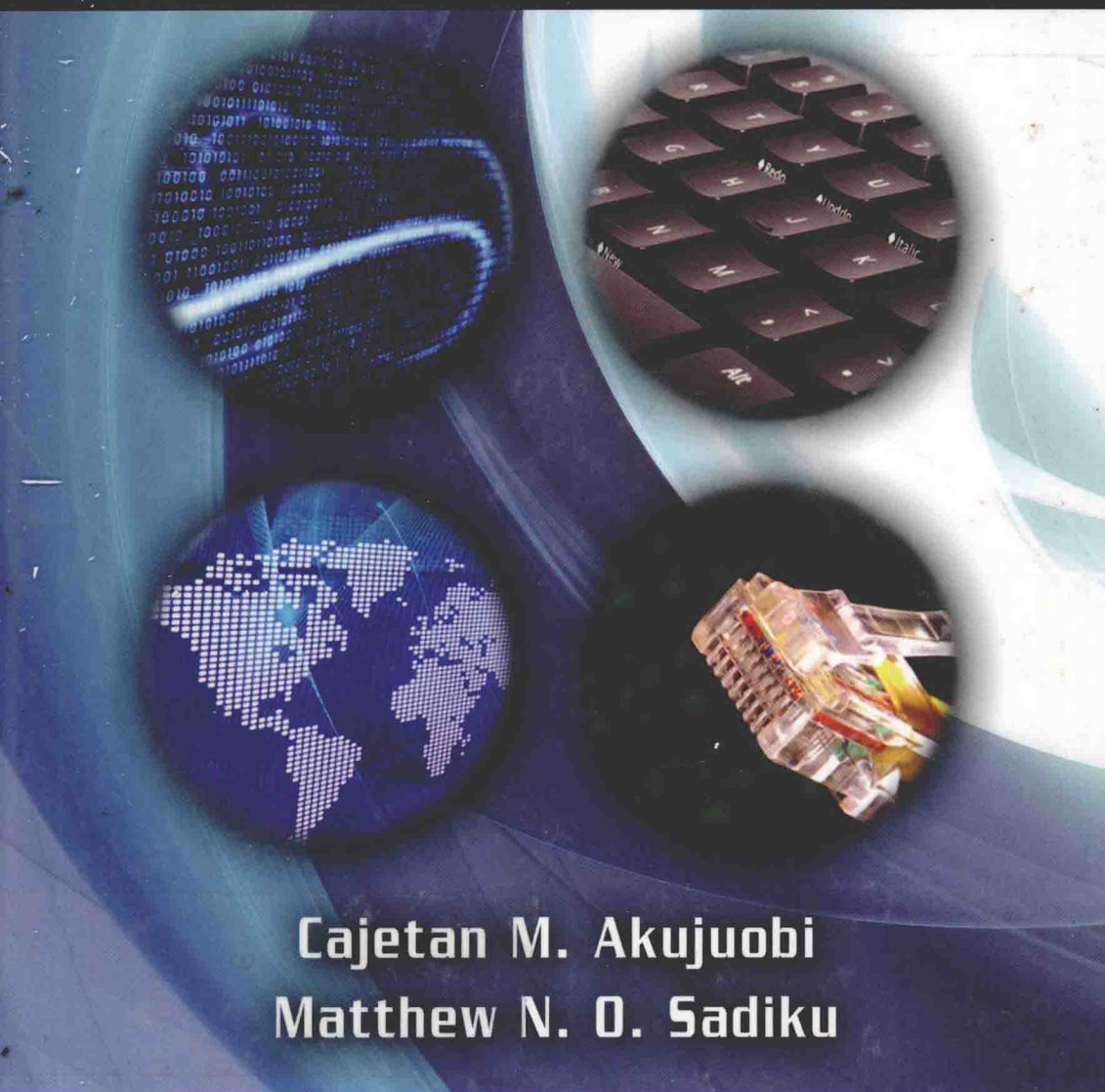


Introduction to Broadband Communication Systems



Cajetan M. Akujuobi
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Intra

Broadband Communication Systems

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Prairie View A & M University
Texas, U.S.A.

 **Chapman & Hall/CRC**
Taylor & Francis Group
Boca Raton London New York

Chapman & Hall/CRC is an imprint of the
Taylor & Francis Group, an **informa** business

 **ScITECH**
PUBLISHING, INC.

Chapman & Hall/CRC
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

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Chapman & Hall/CRC is an imprint of Taylor & Francis Group, an Informa business

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Printed in the United States of America on acid-free paper
10 9 8 7 6 5 4 3 2 1

International Standard Book Number-13: 978-1-4200-6149-9 (Hardcover)

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Library of Congress Cataloging-in-Publication Data

Akujuobi, Cajetan M.

Introduction to broadband communication systems / Cajetan M. Akujuobi and
Matthew N.O. Sadiku.

p. cm.

Includes bibliographical references and index.

ISBN 978-1-4200-6149-9 (alk. paper)

1. Computer networks. 2. Broadband communication systems. I. Sadiku,
Matthew N.O. II. Title.

TK5105.5.A3945 2007

621.382--dc22

2007020078

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and the CRC Press Web site at
<http://www.crcpress.com>

Dedication

*Dedicated to our families:
Caroline, Obinna, and Chijioke
Kikelomo, Motunrayo, Ann, and Joyce*

Preface

Broadband communication is a type of telecommunication that supplies multiple channels of data in a single communications platform using some form of wave or frequency division multiplexing. In other words, broadband refers to the telecommunication in which a wide band of frequencies is available to transmit data. Broadband offers a new brand of services where data, voice, and video, commonly known as multimedia, can be delivered together as one packet. Some of the networks that are available for providing these types of services are asynchronous transfer mode (ATM), frame relay, and leased lines. These networks are instrumental in supplying customers with broadband services that have the potential of eventually overtaking the traditional dial-up Internet. Broadband communication systems distribute broadband services on the transmit end and also allow access to the services transmitted by the broadband provider on the receive end.

This book covers the typical broadband communication network systems. The question of why broadband networks are important in modern-day telecommunications is also covered. As evident from the outline, the book is divided into five parts. The book begins by providing the fundamental concepts of broadband communication systems. Part 1 discusses Internet-based networks—Internet, intranets, and extranets. Part 2 addresses networking technologies—X.25 and frame relay, fiber channel, synchronous optical network (SONET), virtual private network (VPN), integrated service digital network (ISDN), broadband ISDN (B-ISDN), and asynchronous transfer mode (ATM). Part 3 focuses on access networks—digital subscriber line (DSL), cable modem, and passive optical networks. Part 4 deals with wireless networks—wireless data services, personal communications service (PCS), and satellite communications. Part 5 covers network management and network security. The book concludes with networking testing, fault tolerance, and analysis.

The book is designed for a one- or two-semester course for senior-year undergraduate and beginning graduate engineering students. The prerequisite for taking the course is background knowledge of communication systems theory in general. The book can be used in giving short seminars on broadband communication systems. It may also serve as a reference for engineers developing broadband communication systems, managers involved in broadband communication systems planning, and researchers and instructors of broadband communication systems.

We would like to acknowledge the support we received from Dr. Milton Bryant, Dean of the College of Engineering, and Dr. John Attia, Head of the Department of Electrical and Computer Engineering, at Prairie View A&M University. Special thanks are due to the reviewers who went over the first and second drafts of the book. We extend our thanks to Shumon Alam, Research Associate at the Center of Excellence for Communication Systems Technology Research (CECSTR) at Prairie View A&M University, for his valuable contributions and help with drawing some of the

figures. We also thank Jie Shen for his contributions. We thank our undergraduate and graduate students who we have taught Broadband and Advanced Broadband Communication Systems courses to over the years. Finally, we owe much to our wives (Caroline and Kikelomo) and our children (Obinna, Chijioke, Motunrayo, Ann, and Joyce). Without their constant encouragement and love, this book would never have been completed.

Send your comments and suggestions on this book to us at cmakujuobi@pvamu.edu or mnsadiku@pvamu.edu.

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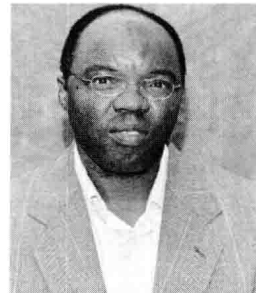


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He has published extensively and has written many technical reports. He was selected as one of the U.S. representatives for engineering educational and consultation mission to Asia in 1989. Prof. Akujuobi is a Senior Member of IEEE & ISA and a member of ASEE, SPIE, and Sigma Xi, the Scientific Research Society. He is one of the founding corporate members of the IEEE Standards Association (IEEE-SA), Industry Advisory Committee (IAC).

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