



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

**Department of Computer and Communication
Engineering**

Minutes of 5th BoS Meeting
B.Tech, CCE

Venue : Seminar Hall,
Department of CCE,
Sri Manakula Vinayagar Engineering College

Date & Time : 10th September, 2022 at 9:30 A.M

2. A. 12. 2



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

(An Autonomous Institution)
Puducherry – 605 107

*5th - Board of Studies Meeting
in the Department of*
Computer and Communication Engineering

for the Programme
B.Tech – Computer and Communication Engineering

Venue

Seminar Hall, Department of CCE
Sri Manakula Vinayagar Engineering College
Madagadipet, Puducherry – 605 107

Date & Time

10.09.2022 & 9.30 am

MINUTES OF BOARD OF STUDIES

The Fifth Board of Studies meeting for B.Tech. Computer and Communication Engineering was held on 10th September 2022 at 9:30 A.M in the Seminar Hall, Department of CCE, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS
1	Dr. V.Bharathi Professor and Head, Department of CCE	Chairman
2	Dr. G. Nagarajan Professor, Department of ECE Pondicherry Engineering College, Puducherry	Member
3	Dr. G. Lakshmi Sutha Professor & Head, Department of ECE, National Institute of Technology, Karaikal	Member
4	Dr. T. T. Mirnalinee, Professor, Department of Computer Science and Engineering, SSN College of Engineering, Chennai	Member
5	Porseezhian Arumugugam Senior Engineering Manager Capgemini Engineering, Bengaluru	Member

6	Dr. S. Premkumar Associate Professor/ECE Sri Manakula Vinayagar Engineering College	Member
7	Ms. V.Logisvary Assistant Professor /ECE Sri Manakula Vinayagar Engineering College	Member
8	Ms. T.Sivaranjani Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
9	Ms. M.Indhumathi Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
10	Ms. R.V.Nalina Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
11	Mr.M.Gopinath Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
12	Arokiaraj Christian St.Hubert Assistant Professor /CSE Sri Manakula Vinayagar Engineering College	Member
13	Mrs.G.Namitha Assistant Professor /English Sri Manakula Vinayagar Engineering College	Member
14	Mrs. S.Geetha Assistant Professor /physics Sri Manakula Vinayagar Engineering College	Member
15	Dr. S. Savithri Assistant Professor /Chemistry Sri Manakula Vinayagar Engineering College	Member
16	Ms. D.Dheebia Assistant Professor /Mathematics Sri Manakula Vinayagar Engineering College	Member
17	Mr.V.Suresh Sr.Lead Engineer,Qualcom, Chennai	Member (Alumni)

AGENDA OF THE MEETING

Item No.	Particulars
BoS /2022 /UG/CCE 5.1	To review and confirm the minutes of fourth BoS meeting held on 28 th February 2022
BoS /2022 /UG/CCE 5.2	To consider and approve syllabi of VIII semester of B.Tech. CCE to be offered under Regulations 2020
BoS /2022 /UG/CCE 5.3	To discuss and approve the Professional electives offered in VIII semester as per Regulations 2020

BoS /2022 /UG/CCE 5.4	To discuss and confirm the Professional Elective and Open Electives courses opted in Semester IV for the B.Tech CCE students admitted in the Academic Year 2020-21
BoS /2022 /UG/CCE 5.5	To discuss and confirm the Professional Elective and Open Elective courses opted in Semester IV for the students admitted in 2020-21
BoS /2022 /UG/CCE 5.6	Any other items for improvement

MINUTES OF THE MEETING

Dr. V.Bharathi, Chairman, BoS initiated the meeting with a warm welcome and introduced the external members, the internal and co-opted members, and thanked them for accepting the invitation to the 5th BoS meeting. The Chairman proceeded with the presentation to deliberate on the agenda items.

BoS /2022 /UG/CCE 5.1

To review and confirm the minutes of fourth BoS meeting held on 28th February 2022

The fourth BoS Meeting for B.Tech.-Computer and Communication Engineering under regulation 2020 was held on 28-02-2022 and confirmed the following points

- Discussed and Approved Syllabi of Semester VII under regulation 2020
- Discussed and Approved Syllabi of Professional Electives offered in Semester VII
- Discussed and Approved Syllabi of Open Elective-IV for other Department students
- Discussed about certification and Skill Development Courses offered in the academic year 2020-21.

Minutes are Reviewed and Confirmed

BoS /2022 /UG/CCE 5.2

To consider and approve syllabi of VIII semester of B.Tech. CCE to be offered under Regulations 2020

The BoS members reviewed the VIII Semester Syllabi and approved Syllabi of Professional Core course, "Block Chain Technology" without modification

Approved and recommended to Academic Council.

BoS /2022 /UG/CCE 5.3

To discuss and approve the Professional electives offered in VIII semester as per Regulations 2020

The members of the Board of Studies reviewed and discussed the syllabi for Professional Electives offered in the Eighth semester and recommended the following:

Professional Elective-V in VIII semester

S.No	Regulation	Semester	Subject Name with Code	Unit	Particulars
1	R-2020	VIII	Multiple Input Multiple Output Communication (U20CCE821)	II	Suggested to change Unit-2 title as Capacity Analysis of MIMO Channels
				IV and V	Suggested to swap Unit IV and Unit V
2	R-2020	VIII	Software Defined Networks (U20CCE822)	II and III	<ul style="list-style-type: none"> Suggested to merge Unit-II and Unit-III Suggested to introduce Concepts of Data Centre in Unit-III
3	R-2020	VII	Information Security (U20CCE823)	II	Suggested to Change Unit-II title as "Cryptography Techniques"
				IV	Suggested to include Program Security in Univ-IV

Professional Elective-VI in VIII semester

S.No	Regulation	Semester	Subject Name with Code	Unit	Particulars
1	R-2020	VIII	Millimeter Wave Personal Communication Systems (U20CCE826)	IV	Suggested to change Unit-4 title as "Diversity over MMW MIMO Channels"
2	R-2020	VIII	Next Generation Telecommunication Networks (U20CCE827)	-	Suggested to change course title is "Advanced Telecommunication Networks"
				III	Suggested to specify the network type in syllabus
3	R-2020	VIII	Pattern Recognition (U20CCE829)	IV and V	<ul style="list-style-type: none"> Suggested to swap Unit IV and V Suggested to include CNN algorithm in unit V
4	R-2020	VIII	Software Project Management (U20CCE830)	III	Suggested to include software estimation in Unit-III

Suggestions are considered and updated in the syllabi of respective course. The details are provided in Annexure-I

Approved the syllabi for Professional Elective-V and VI offered in the VIII semester with above-mentioned changes and recommended to Academic Council.

BoS /2022 /UG/CCE 5.4

To discuss and confirm the Professional Elective and Open Electives courses opted in Semester IV for the B.Tech CCE students admitted in the Academic Year 2020-21

BoS chairman presented students option in selecting following Professional and open Elective courses in the fourth semester for the students admitted in the Academic year 2020-21

- Professional Elective-I : U20CCE405- Operating Systems
- Open Elective- I : U20ECO402- Consumer Electronics

Appreciated for the methodology adopted for selecting Professional Elective and Open Elective

BoS /2022 /UG/CCE 5.5

To discuss the skill development and certification courses in the curriculum under Regulations 2020 for B.Tech. Computer and Communication Engineering for the students admitted in the year 2020-2021 and 2021-2022

- BOS Chairman listed following Certification courses completed and planned in the academic year 2021-22 are

Certification Courses offered for 2020-21 admitted students

Year/Sem	Certification course Name	Course Completion status Completed/Planned	Exam Completed Yes/No
II/III	IoT using Python	Completed	Yes
II/IV	CCNA	Completed	No

Certification Courses offered for 2021-22 admitted students

Year/Sem	Certification course Name	Course Completion status Completed/Planned	Exam Completed Yes/No
I/I	Web Programming-I	Completed	No
I/II	Web Programming-II	Planned	No

Appreciated for certification courses offered in curriculum

BoS /2022 /UG/CCE 4.6

Any other suggestions for improvement

The Board Chairman Briefed about Guest lectures, Faculty development Programs and students participation in different in the academic year 2021-22

Appreciated for the activities carried in the Department

The Board of Studies resolved to approve the above suggestions for B.Tech. Computer and Communication Engineering brought forward by the Chairman incorporating the above changes. The meeting was concluded at 12:30 PM with a vote of thanks by **Dr. V. Bharathi**, Head of Department, Computer and Communication Engineering.



Dr. V. Bharathi
Chairman
Professor and Head
Department of CCE, SMVEC



Dr. G. Nagarajan
Professor, Department of ECE
Pondicherry Engineering College, Puducherry



Dr. G. Lakshmi Sutha
Professor & Head, Department of ECE,
National Institute of Technology, Karaikal



Dr. T. T. Mirnalinee,
Professor, Department of Computer Science
and Engineering,
SSN College of Engineering, Chennai



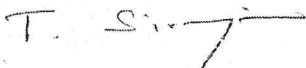
Porseezhian Arumugugam
Senior Engineering Manager
Cappgemini Engineering, Bengaluru



Dr. S. Premkumar
Associate Professor/ECE



Ms. V. Logisvary
Assistant Professor /ECE



Ms. T. Sivaranjani
Assistant Professor/CCE




Ms. M. Indhumathi
Assistant Professor/CCE




Ms. R. V. Nalina
Assistant Professor/CCE

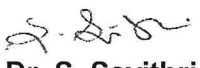



Mr. M. Gobinath
Assistant Professor/CCE



Arokiaraj Christian St. Hubert
Assistant Professor /CSE


Mrs. G. Namitha
Assistant Professor /English


Mrs. S. Geetha
Assistant Professor /physics


Dr. S. Savithri
Assistant Professor /Chemistry


Ms. D. Dheebia
Assistant Professor /Chemistry


Mr. V. Suresh
Sr. Lead Engineer, Qualcomm, Chennai

Annexure –I

Revised Semester- VIII Curriculum

Semester-VIII

Sl. No.	Course Code	Course Title
Theory		
1	U20CCT819	Block Chain Technology
2	U20CCE8XX	Professional Elective – V#
3	U20CCE8XX	Professional Elective – VI#
Practical		
4	U20HSP804	Entrepreneurship Management
Project Work		
5	U20CCW803	Project Phase – II
Employability Enhancement Course		
6	U20CCS809	Skill Development Course 9: NPTEL / MOOC-II
Professional Elective – V (Offered in Semester VIII)		
1	U20CCE821	Multiple Input Multiple Output Communication
2	U20CCE822	Software Defined Networks
3	U20CCE823	Information Security
4	U20CCE824	Augmented and Virtual Reality
5	U20CCE825	Deep Learning
Professional Elective – VI (Offered in Semester VIII)		
1	U20CCE826	Millimeter Wave Personal Communication Systems
2	U20CCE827	Advanced Telecommunication Networks
3	U20CCE828	Mobile Application Development
4	U20CCE829	Pattern Recognition
5	U20CCE830	Software Project Management

V. Bhanu

U20CCE821

**MULTIPLE INPUT MULTIPLE OUTPUT
COMMUNICATION**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To learn about concept of fading and diversity techniques.
- To understand about capacity of MIMO Channels.
- To learn space time blocks.
- To acquaint SU-MIMO with linear receivers.
- To study about Iterative decoding techniques.

Course Outcomes

After completion of the course, the students will be able to

CO1 – Describe concept of diversity and need of multiple antennas **(K2)**

CO2 – Estimate capacity and Information rates of MIMO channels **(K3)**

CO3 – Analyze the performance of space time block codes **(K3)**

CO4 – Apply Space-time codes for frequency selective channels **(K3)**

CO5 – Apply Concatenated codes for MIMO channels **(K3)**

UNIT 1 FADING CHANNELS AND DIVERSITY TECHNIQUES

(9 Hrs)

Wireless channels – Error/Outage probability over fading channels – Diversity techniques – Channel coding as a means of time diversity – Multiple antennas in wireless communications.

UNIT 2 CAPACITY ANALYSIS OF MIMO CHANNELS

(9 Hrs)

Capacity and Information rates of noisy, AWGN and fading channels – Capacity of MIMO channels – Capacity of non-coherent MIMO channels – Constrained signalling for MIMO communications.

UNIT 3 SPACE-TIME BLOCK AND TRELIS CODES

(9 Hrs)

Transmit diversity with two antennas: The Alamouti scheme – Orthogonal and Quasi-orthogonal space-time block codes – Linear dispersion codes – Generic space-time trellis codes – Basic space-time code design principles – Representation of space-time trellis codes for PSK constellation – Performance analysis for space-time trellis codes – Comparison of space-time block and trellis codes.

UNIT 4 SPACE-TIME CODING FOR FREQUENCY SELECTIVE CHANNELS

(9 Hrs)

MIMO frequency-selective channels – Capacity and Information rates of MIMO FS fading channels.– Space-time coding and Channel detection for MIMO FS channels – MIMO OFDM systems.

UNIT 5 CONCATENATED CODES AND ITERATIVE DECODING

(9 Hrs)

Development of concatenated codes – Concatenated codes for AWGN and MIMO channels – Turbo coded modulation for MIMO channels – Concatenated space-time block coding.

Text Books

1. Tolga M. Duman and Ali Ghrayeb, "Coding for MIMO Communication systems", John Wiley & Sons, West Sussex, England, 2007.
2. B. Gershman and N.D. Sidiropoulos, "Space-time processing for MIMO Communications", Wiley, Hoboken, NJ, USA, 2005.
3. Robert W. Heath Jr. Angel Lozano "Foundations of MIMO Communication", Cambridge University Press, 2019.

Reference Books

1. Jerry R. Hampton "Introduction To MIMO Communications", Cambridge University Press, 2014.
2. Ezio Biglieri, Robert Calderbank "MIMO Wireless Communications", Cambridge University Press, 2007.

3. E.G. Larsson and P. Stoica, "Space-time block coding for Wireless communications", Cambridge University Press, 2003.
4. M. Janakiraman, "Space-time codes and MIMO systems", Artech House, 2004.
5. H. Jafarkhani, "Space-time coding: Theory & Practice", Cambridge University Press, 2005

Web References

1. <https://www.electronics-notes.com/articles/antennas-propagation/mimo/what-is-mimo-multiple-input-multiple-output-wireless-technology.php>
2. https://nptel.ac.in/content/syllabus_pdf/117105132.php

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	1	2	-	3	-	-	-	-	-	1	-	3	1
2	3	2	1	2	-	3	-	-	-	-	-	1	-	3	1
3	3	2	1	2	-	3	-	-	-	-	-	1	-	3	1
4	3	2	2	3	-	3	-	-	-	-	-	1	-	3	1
5	3	2	2	3	-	3	-	-	-	-	-	1	-	3	1

Correlation Level: 1-Low, 2-Medium, 3- High

V. Bhanu

Course Objectives

- To grasp the fundamentals of software defined networks.
- To learn about open flow specification
- To understand the separation of the data centre
- To study about the SDN Programming.
- To study about the various applications of SDN

Course Outcomes

After completion of the course, the students will be able to

- CO1 - Describe the evolution of software defined networks (K2)
- CO2 - Express the various components of SDN and their uses (K2)
- CO3 - Design of Data Centre using SDN (K3)
- CO4 - Design of SDN in various environments (K3)
- CO5 - Application of SDN in current scenario (K3)

UNIT 1 INTRODUCTION

(9 Hrs)

Basic Packet-Switching Terminology– Modern Data Center – Traditional Switch Architecture –Autonomous and Dynamic Forwarding Tables– Need of SDN-Evolution of SDN – SDN Working principle – Centralized and Distributed Control and Data Planes

UNIT 2 OPENFLOW AND SDN CONTROLLERS

(9 Hrs)

Open Flow Specification – Drawbacks of Open SDN – SDN via APIs – SDN via Hypervisor-Based Overlays – SDN via Opening up the Device – SDN Controllers – Alternatives Overlap and Ranking

UNIT 3 DATA CENTRES

(9 Hrs)

Data Center demands – Tunneling Technologies for the Data Center – Path Technologies in the Data Center – Data Center Concepts and Constructs- Multitenant Data Center, Virtualized Multitenant Data Center – SDN Solutions for the Data Center Network – VLANs – EVPN – VxLAN – NVGRE

UNIT 4 SDN IN OTHER ENVIRONMENTS

(9 Hrs)

Wide area – Service provider and carrier networks – Campus networks – Hospitality networks – Mobile networks – In-line network functions – Optical networks – Use Cases for Input Traffic Monitoring, Classification, and Triggered Actions.

UNIT 5 EMERGING PROTOCOL, CONTROLLER, AND APPLICATION MODELS

(9 Hrs)

Reactive versus Proactive Applications – Open Daylight Controller –Traffic Engineering for Service Providers – Floodlight Controller – Bandwidth Calendaring – Data Center Orchestration

Text Books

1. Paul Göransson, Chuck Black, Timothy Culver “Software Defined Networks - A Comprehensive Approach”, Morgan Kaufmann publications, 2017.
2. Thomas D. Nadeau, Ken Gray, “SDN: Software Defined Networks, O'Reilly Media, 2013.

Reference Books

1. Siamak Azodolmolky “Software Defined Networking with OpenFlow”, packt publishing, 2013
2. Vivek Tiwari, “SDN and Open Flow for Beginners”, Amazon Digital Services, Inc., 2013.
3. Fei Hu, Editor, “Network Innovation through Open Flow and SDN: Principles and Design”, CRC Press, 2014.

Web References

1. <https://www.cisco.com/c/en/us/solutions/software-defined-networking/overview.html>
2. <https://www.zdnet.com/article/software-defined-networking.html>

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	1	-	3	-	-	-	-	-	-	-	3	2	3
2	3	3	1	-	3	-	-	-	-	-	-	-	3	2	3
3	3	2	1	1	3	-	-	-	-	-	-	-	3	2	3
4	3	2	1	2	3	-	-	-	-	-	-	-	3	2	3
5	3	2	2	2	3	-	-	-	-	-	-	-	3	2	3

Correlation Level: 1-Low, 2-Medium, 3- High

Course Objectives

- To understand the basics of Information Security
- To select appropriate techniques to tackle and solve problems in the discipline of information security management
- To learn authentication and digital signature concepts
- To become aware of program security
- To know the technological aspects of Network Security

Course Outcomes

After completion of the course, the students will be able to

- CO1** - Discuss the basics of information security (**K2**)
CO2 – Illustrate Symmetric Encryption Principles and algorithms (**K3**)
CO3 – Explore authentication and digital signature in information security (**K3**)
CO4 - Describe concepts of program security (**K3**)
CO5 - Design and implementation of Security Techniques in networks (**K3**)

UNIT I INTRODUCTION**(9 Hrs)**

Introduction - Attacks, Vulnerability, Security Goals, Security Services and mechanisms- Components of an Information System, Securing the Components, Balancing Security and Access

UNIT II CRYPTOGRAPHIC TECHNIQUES**(9 Hrs)**

Conventional substitution and transposition ciphers, One-time Pad, Block cipher and Stream Cipher, Steganography- DES, AES, RSA algorithms

UNIT III AUTHENTICATION AND DIGITAL SIGNATURES**(9 Hrs)**

Use of Cryptography for authentication, Secure Hash function, Key management – Kerberos

UNIT IV PROGRAM SECURITY**(9 Hrs)**

Nonmalicious Program errors – Buffer overflow, Incomplete mediation, Time-of-check to Time-of-use Errors, Viruses, Trapdoors, Salami attack, Man-in-the-middle attacks, Covert channels

UNIT V SECURITY IN NETWORKS**(9 Hrs)**

Threats in networks, Network Security Controls – Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honeypots, Traffic flow security, Firewalls – Design and Types of Firewalls, Personal Firewalls, IDS, Email Security – PGP, S/MIME

Text Books

1. Michael E Whitman and Herbert J Mattord, "Principles of Information Security", Vikas Publishing House, New Delhi, 2003.
2. Mark Stamp, Information Security Principles & Practice, WILEY INDIA 2006.
3. Charles P. Pfleeger, "Security in Computing", Pearson Education.

Reference Books

1. Micki Krause, Harold F. Tipton, " Handbook of Information Security Management", Vol 1-3 CRC Press LLC, 2004.
2. Information Security Based on ISO27001/ISO 17799: A Management Guide by A Calder, Van Haren Publishing (19 July 2006).
3. Behrouz A. Forouzan, Cryptography & Network Security, TMH 2007.

Web References

1. <https://www.csoonline.com/article/3513899/what-is-information-security-definition-principles-and-jobs.html>
2. <https://www.iso.org/isoiec-27001-information-security.html>
3. <https://www.bmc.com/blogs/introduction-to-information-security-management-systems-isms/>

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	1	2	2	3	-	-	-	-	-	1	3	3	3
2	3	2	1	2	2	3	-	-	-	-	-	1	3	3	3
3	3	2	1	2	2	3	-	-	-	-	-	1	2	3	3
4	3	2	2	3	2	3	-	-	-	-	-	1	1	3	2
5	3	2	2	3	2	3	-	-	-	-	-	1	2	3	1

Correlation Level: 1-Low, 2-Medium, 3- High

V. Bhanu

Course Objectives

- To understand about millimetre wave characteristics
- To learn about of different modulation of mmWave
- To learn about MIMO in mmWave
- To understand about diversity in MIMO
- To learn about Beam steering and Beamforming in Mmwave

Course Outcomes

After completion of the course, the students will be able to

- CO1** – Describe about millimetre wave characteristics (K2)
CO2 – Illustrate different modulation of MmWave (K3)
CO3 – Describe MIMO techniques for MmWave (K2)
CO4 - Discuss about diversity in MIMO (K2)
CO5 – Demonstrate Beam steering and Beamforming in Mmwave (K2)

UNIT I MILLIMETER WAVE CHARACTERISTICS**(9 Hrs)**

Introduction – interference - indoor propagation effects - ITU indoor path loss model - link budget. Millimetre wave characteristics, channel performance at 60 GHz, gigabit wireless communications, development of millimetre wave standards, Coexistence with wireless backhaul.

UNIT II MODULATIONS FOR MMW COMMUNICATIONS**(9 Hrs)**

OOK - PSK - QAM - OFDM, MMW transceivers: Transceiver architecture .MMW antennas: Path loss and antenna directivity - Antenna beam width – Beam steering antenna.

UNIT III MMW MIMO**(9 Hrs)**

Spatial diversity of antenna arrays - Multiple antennas - Multiple transceivers - Noise coupling in a MIMO system.

UNIT IV DIVERSITY OVER MMW MIMO CHANNELS**(9 Hrs)**

Potential benefits of advanced diversity for MMW: Spatial and temporal diversity - Spatial and frequency diversity - Dynamic spatial, Frequency and modulation allocation.

UNIT V ADVANCED BEAMSTEERING AND BEAMFORMING**(9 Hrs)**

The need for beam steering / beamforming. Adaptive Frame Structure, Advanced Beam Steering Technology, Advanced Antenna ID Technology, Advanced Beam Forming Technology.

Text Books

1. Kao-Cheng Huang, Zhoacheng Wang, "Millimeter Wave Communication Systems", Wiley IEEE press, 2011.
2. K.C. Huang, Z. Wang, "Millimeter Wave Communication Systems", Wiley-IEEE Press, March 2011.
3. Robert W. Heath, Robert C. Daniel, James N. Theodore S. Rappaport, Murdock, "Millimeter Wave Wireless Communication", Prentice Hall, 2014.

Reference Books

1. John S. Seybold "Introduction to RF propagation," John Wiley and Sons, 2005.
2. Chia-Chin Chong, Kiyoshi Hamaguchi, Peter F. M. Smulders and Su-Khiong, "Millimeter - Wave Wireless Communication Systems: Theory and Applications," Hindawi Publishing Corporation, 2007.
3. Xiang, W; Zheng, K; Shen, X.S; "5G Mobile Communications: Springer, 2016.

Website References

1. <https://www.pearson.com/us/higher-education/program/Rappaport-Millimeter-Wave-Wireless-Communications/PGM19461.html>

COs/POs/PSOs Mapping

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	-	-	-	1	1	1	2	2
CO2	3	3	2	1	1	-	-	-	-	-	1	1	1	2	2
CO3	3	3	2	1	1	-	-	-	-	-	1	1	1	2	2
CO4	3	3	2	1	1	-	-	-	-	-	1	1	1	2	2
CO5	3	3	2	1	1	-	-	-	-	-	1	1	1	2	2

Correlation Level: 1-Low, 2-Medium, 3- High

V. Bhanu

U20CCE827

**ADVANCED TELECOMMUNICATION
NETWORKS**

L	T	P	C	Hrs
3	0	0	3	45

Course Objectives

- To learn about next generation opportunities and challenges
- To learn about the services in telecom & cable
- To learn about NG networks and services
- To understand about IMS and convergence
- To learn about ad-hoc and sensor network

Course Outcomes

After completion of the course, the students will be able to

CO1 – Comprehend the concepts of challenges and opportunities in future Telecomm. (K2)

CO2 – Demonstrate about services in telecom & cable. (K2)

CO3 – Summarize about NG Networks and services. (K2)

CO4 – Analyse IMS and convergence management. (K3)

CO5 – Outline management of AD-HOC and Sensor network. (K2)

UNIT I CHANGES, OPPORTUNITIES, AND CHALLENGES

(9 Hrs)

Introduction, Changes, Opportunities, and Challenges, Major Management Challenges for a Value-Added Service: Triple Shift Service, The Grand Challenge: System Integration and Interoperability of Disjoined Islands, Examples of Management System Applications

UNIT II MANAGEMENT OF TRIPLE/QUADRUPLE –SERVICES- TELECOM & CABLE

(9 Hrs)

Context of Triple/Quadruple Play for Telecom Operators, Economic, Service, and Commercial Challenges, Technical Challenge, Technical Tool Box, Key Issues-Network and IS, CPE and Home N/w, Backbone. HFC Network, Digital TV, Data over Cable Service Interface Specification.

UNIT III ADVANCED TECHNOLOGIES, NETWORKS, AND SERVICES

(9 Hrs)

5G Technologies, 5G Networks, 5G Services, Management of 5G Services, 5G Technologies in Society.

UNIT IV IMS AND CONVERGENCE MANAGEMENT

(9 Hrs)

IMS Architecture, IMS Services, QoS Control and Authentication, Network and Service Management for NGN, IMS Advantages

UNIT V MANAGEMENT OF WIRELESS AD HOC AND SENSOR NETWORKS

(9 Hrs)

Overview, Logical Architectures, Functional and Physical Architectures, Information Architectures – Manager-Agent Communication Models, Management Interfaces and Protocols, Structure of Management Information and Models.

Text Books

1. Thomas Plevyak, Veli Sahin "Next Generation Telecommunications Networks, Services, and Management", Wiley IEEE Press, 2011.
2. Saadawi Tarek N, "Fundamentals of Telecommunication networks", John Wiley and Sons Inc, 2015.
3. Jonathan Rodriguez, "Fundamentals of 5G Mobile Networks", Wiley, 2015.
4. Thiagarajan Viswanathan, "Telecommunication Switching Systems and Networks", 2015.
5. Lillian Goleniewski, "Telecommunications Essentials", Second edition, 2006.

Reference Books

1. Hsiao-Hwa Chen, Mohsen Guizani "Next Generation Wireless Systems and Networks", John Wiley and Sons, 2006
2. Manohar Naidu Ellanti, Steven Scott Gorshe "Next Generation Transport Networks Data, Management, and Control Planes ", Springer, 2005.
3. Salah Aidiarons, Thomas Plevayk, "Telecommunications Network Technologies and Implementations", Eastern Economy Edition IEEE press, New Delhi, 1998.

4. Lakshmi. G, Raman, "Fundamentals of Telecommunication Network Management", Eastern Economy Edition IEEE Press, New Delhi.
5. Wireless Communications and Networks, 3G and beyond, ITI Saha Misra, TMH.

Web References

1. <https://www.digitalmarketplace.service.gov.uk/digital-outcomes-and-specialists/opportunities/10136>.

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	1	2	1	-	-	3	1	1	1	3	2
CO2	3	3	2	-	1	2	1	-	-	3	1	1	1	3	2
CO3	3	3	2	-	1	2	1	-	-	3	1	1	1	3	2
CO4	3	3	2	-	1	2	1	-	-	3	1	1	1	3	2
CO5	3	3	2	-	1	2	1	-	-	3	1	1	1	3	2

Correlation Level: 1-Low, 2-Medium, 3- High

V. Bhanu

	L	T	P	C	Hrs
U20CCE830 SOFTWARE PROJECT MANAGEMENT	3	0	0	3	45

Course Objectives

- To understand the software project planning and evaluation techniques.
- To plan and manage projects at each stage of the software development life cycle.
- To learn about the activity planning and risk management principles.
- To develop skills to manage the various phases involved in project management.
- To deliver successful software projects that support organization's strategic goals.

Course Outcomes

After completion of the course, the students will be able to

CO1–Understand project management principles while developing software. **(K2)**

CO2–Obtain adequate knowledge about software process models and software effort estimation techniques. **(K3)**

CO3–Estimate the risks involved in various project activities. **(K3)**

CO4–Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles. **(K1)**

CO5–Learn staff selection process and the issues related to people management. **(K3)**

UNIT I PROJECT EVALUATION AND PROJECT PLANNING (9 Hrs)

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION (9 Hrs)

Software process and Process Models – Choice of Process models - Rapid Application development – Agile methods – Dynamic System Development Method – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II model

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT (9 Hrs)

Project schedules – Activities – Sequencing and scheduling – Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning – Risk Management

UNIT IV PROJECT MANAGEMENT AND CONTROL (9 Hrs)

Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – Software Configuration Management – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS (9 Hrs)

Managing people – Organizational behaviour – Best methods of staff selection – Motivation – The Oldham – Hackman job characteristic model – Stress – Health and Safety – Ethical and Professional concerns – Working in teams – Decision making – Organizational structures

Text Books

1. Bob Hughes, Mike Cotterell and Rajib Mall, "Software Project Management "Fifth Edition, Tata McGraw Hill, New Delhi, 2012.
2. Ian Sommerville, "Software Engineering", Addison-Wesley, 9th edition, 2016.

Reference Books

1. Robert K. Wysocki, "Effective Software Project Managementll " Wiley Publication, 2011.
2. Walker Royce:, "Software Project Managementll- Addison-Wesley, 1998.

- Gopalswamy Ramesh, "Managing Global Software Projectsll ", McGraw Hill Education (India), Fourteenth Reprint 2013.

Web References

- <https://nptel.ac.in/courses/106/105/106105218/>
- <https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/>
- https://www.tutorialspoint.com/software_engineering/software_project_management.html

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COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	1	-	-	-	-	2	3	2	3	2	3	-	-
2	1	2	3	-	-	-	-	2	3	2	3	2	3	-	-
3	2	3	3	-	-	-	-	2	2	3	3	3	2	-	-
4	2	1	3	-	-	-	-	2	3	1	3	3	3	-	-
5	2	3	3	-	-	-	-	2	3	3	3	3	3	-	-

Correlation Level: 1-Low, 2-Medium, 3- High

V. Bhanu