University College of Engineering Kakinada (A), JNTUK

M.Tech Course Structure (Computer and Communication)

I Semester

S. No	Course code	Course Name	Category	L	T	P	Credits
1	MTCC1101	Computer Networks	PC	3	0	3	4.5
2	MTCC1102	Embedded systems	PC	3	0	0	3
3	MTCC1103	1. Advanced Digital Signal Processing 2. Satellite Navigate Systems/ GPS 3. Coding Theory and Applications 4. Wireless communications and networks	PE	3	0	0	3
4	MTCC1104	1.Mobile computing 2. Machine Learning and applications 3. Data Structures and algorithms 4. Advanced computer Architecture	PE	3	0	0	3
5	MTCC1105	Research methodology and IPR		2	0	0	2
6	MTCC1106	Computer Networks Lab					
7	MTCC1107	Embedded systems Lab		0	0	3	1.5
8	MTCC1108	Audit course-1		2	0	0	0
			Total				17

II Semester

S. No	Course Code	Course Name	Category	L	T	P	Credits
1	MTCC1201	5G Communications	PC	3	0	3	4.5
2	MTCC1202	Internet of Things	PC	3	0	0	3
3	MTCC1203	1. Optical communications and networks 2. Smart Antennas 3. Network security and cryptography 4. Image and Video Processing	PE	3	0	0	3
4	MTCC1204	1. Artificial Intelligence 2. Real Time Operating Systems 3. Cloud Computing 4. Data Science	PE	3	0	0	3
5	MTCC1205	Advanced communications Lab					
6	MTCC1206	Internet of Things Lab		0	0	3	1.5
7	MTCC1207	Mini Project with Seminar		2	0	0	2
8	MTCC1208	Audit Course – 2		2	0	0	0
			Total				17

*Students be encouraged to go to Industrial Training/Internship for at least 2-3weeks during semester break.

Audit Course 1& 2

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

BOS members : 1) Dr. S. Srinivas Kumar
2) Dr. A. M. Prasad
3) Dr. N. Balaji

III Semester*

S. No	Course Code	Course Name	Category	L	T	P	Credits
1	MTCC1301	1. Data Acquisition systems 2. Big Data Analytics 3. Soft computing Techniques 4.Robotics 5. MOOCs-1 (NPTEL/SWAYAM)-12 Weeks	PE	3	0	0	3
2	MTCC1302	1. Image Processing 2. Coding Theory 3. Cellular & Mobile Communications 4. Biomedical Engineering 5. Signals & Systems 6. Control Systems 7.Intelligent Sensors 8. Intelligent Controllers 9. Data Communications 10. Satellite Communications MOOCs-2 (NPTEL/SWAYAM)-Any 12 Week Course on Engineering/ Management/ Mathematics offered by other than parent department	OE	3	0	0	3
3	MTCC1303	Dissertation Phase -I /Industrial Project **(to be continued and evaluated next semester)**		0	0	20	10#
			Total				16

#Evaluated and Displayed in IV Sem Marks list.

*Students going for Industrial Project/Thesis will complete these courses through MOOCs

IV Semester

S. No	Course Code	Course Name	Category	L	T	P	Credits
1	MTCC1401	Project/ Dissertation Phase-II **(Continued from III semester)**		0	0	32	16
			Total				16

Dr. K. Rama Devi

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M. Tech I Year I Semester C&CS – 2023

L	T	P	C
3	0	0	3

Coding Theory and Applications

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	H	L	M	M		M
CO2	M	L		M		H
CO3	M	M	H		M	M
CO4	M	L	H	M	M	H
CO5	M	L	M		M	H

Course Outcomes: At the end of the course, student will be able to

CO	Course Outcomes	(K)#
CO1	Understand the Basic Concepts of Information theory Probabilistic (stochastic) systems.	K2
CO2	Derive equations for entropy, mutual information and channel capacity for all kinds of channels.	K3
CO3	Apply linear block codes and cyclic codes for error detection and correction.	K4
CO4	Know the Galois field & related properties and apply BCH codes for error detection and correction.	K4
CO5	Apply convolution codes for performance analysis.	K5

Unit 1

INFORMATION THEORY AND SOURCE CODING: Uncertainty, information, entropy and its properties, entropy of binary memory less source and its extension to discrete memory less source, source coding theorem, data compression, prefix coding,Huffman coding, Lempel-Ziv coding, Source with memory and its entropy.

Unit 2

DISCRETE CHANNELS : Binary Symmetric Channel, mutual information & its properties, Channel capacity, channel coding theorem and its application to BSC, Shannon's theorem on channel capacity, capacity of a channel ofinfinite bandwidth, bandwidth - S/N trade off, practical communication systems in light of Shannon's

theorem, Fading channel, channels with memory.

Unit 3

GROUPS, FIELDS AND LINEAR BLOCK CODES : Galois field and its construction in GF(2^m) and its basic properties, vector spaces and matrices in GF(2), Linear block codes, systematic codes and its encoding circuit, syndrome and error detection, minimum distance, error detecting and correcting capabilities of block code, decoding circuit, probability of undetected error for linear block code in BSC, Hamming code and their applications.

Unit 4

CYCLIC CODES AND BCH CODES : Basic properties of Cyclic codes, Generator and parity check matrix of cyclic codes, encoding and decoding circuits, syndrome computation and error detection, cyclic Hamming codes, encoding and decoding of BCH codes, error location and correction.

Unit 5

CONVOLUTIONAL CODES: Introduction to convolution code, its construction and Viterbi algorithm for maximum likelihood decoding. Automatic repeat request strategies and their throughput efficiency considerations.

TEXT BOOKS:

1. Modern Analog and Digital Communication Systems - B.P. Lathi and Zhi Ding., 1998, Oxford Univ. Press.
2. Error Control Coding: Fundamentals and Applications- Shu Lin and Costello, 2nd Edition, 2004, Pearson.

REFERENCE BOOKS:

1. Digital Communication - Sklar, 2nd Edition, 2001, USA:: Prentice hall.
2. Digital Communication – Haykin Simon, 4th edition, 2001, John Wiley & Sons Publ.
3. Digital Communication – Jihn G Proakis, 5th Edition. 2008, McGraw Hill.
4. Analog and Digital Communication- Schaum's Outline Series, 2nd Edition, 2003, TMH.

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NR

L	T	P	C
3	0	0	3

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M. Tech I Year I Semester C&CS - 2023

Dr. R. Madhu

Mobile Computing

UNIT-1

Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks. Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices.

UNIT-2

GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture. Wireless medium access control, CDMA, 3G, 4G and 5G Communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-20003G wireless communication standards, WCDMA 3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks, 5G Networks.

UNIT-3

Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

UNIT-4

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server.

UNIT-5

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11protocol layers, Wireless

application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

Text books:

1. Mobile Computing, 2nd edition, Raj kamal, Oxford,2011
2. Mobile Computing, Technology Applications and Service Creation, 2nd Edition, Asoke K Talukder, Hasanahmed, Roopa R Yavagal, McGraw Hill,2017

References:

1. "Principles of Mobile Computing," 2nd Edition, UWE Hansmann, Lother Merk, Martins.

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R23 UCEK (A) – M.Tech(C&CE) Syllabus w.e.f 2023-24

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mrs. Ch. Krishnaveni

M. Tech I Year I Semester C&CS - 2023

L	T	P	C
3	0	0	3

Embedded System Design

Pre-requisite:

Course Outcomes: At the end of the course, student will be able to

		Knowledge Level (K)#
CO1	Introduction to embedded system, Classification, applications in various areas of embedded system. Compare embedded system Versus general computing system	K4
CO2	Analyze typical embedded system. understand embedded communication interface	K4
CO3	Design embedded firmware approaches and development languages	K6
CO4	Design ARM architecture	K6
CO5	Illustrate operating modes and ARM processor families, categorize ARM instruction set	K3
CO6	Design and develop programming the raspberry pi using python.	K6

#Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	L	L	M	L	L
CO2	M	L	L	M	M	M
CO3	M	L	L	M	M	M
CO4	M	L	L	H	H	H
CO5	M	L	L	H	H	H

(Please fill the above with Levels **of Correlation, viz., L, M, H)**

UNIT I

Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II

Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III

Embedded Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT -IV

ARM:

ARM design philosophy, data flow model and core architecture, registers, program status register, instruction pipeline, interrupts and vector table, operating modes and ARM processor families.

Instruction Sets: Data processing instructions, addressing modes, branch, load, store instructions, PSR instructions, and conditional instructions.

UNIT -V

Raspberry Pi: Raspberry Pi board and its processor, Programming the Raspberry Pi using Python, Communication facilities on Raspberry Pi (I2C, SPI, UART), Interfacing of sensors and actuators.

Text Book:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

2. A. N. Sloss, D. Symes, and C. Wright, "ARM System Developer's Guide: Designing and Optimizing System Software", Elsevier, 2008.

3. S. Monk, "Programming the Raspberry Pi" McGraw-Hill Education, 2013.

REFERENCE BOOKS:

1. Steave Furber, "ARM system-on-chip architecture", Addison Wesley, 2000.

2. Embedded Systems - Raj Kamal, TMH.

3. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.

Ch. Krishnaveni — 15/1/24.

MTIC1108	VALUE EDUCATION	CATEGORY-MC	L-T-P 2-0-0	CREDITS 2

Course Outcomes: At the end of the course, student will be able to

		Knowledge Level (K)#
CO1	Understand the importance of values and self-development.	K2
CO2	Learn the importance of Human value and Discipline	K2
CO3	Develop the overall personality and behavior.	K4
CO4	Imbibe good values in student and emerge as responsible citizens.	K3
CO5	Discuss the different religious faiths, knowing the importance of character, self-management and contribute in building a healthy nation.	K2

UNIT I

Values and self-development –Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation. Standards and principles, Value judgements

UNIT II

Importance of cultivation of values, Sense of duty. Devotion, Self-reliance. Confidence, Concentration.Truthfulness, Cleanliness, Honesty, Humanity. Power of faith, National Unity, Patriotism.Love for nature ,Discipline

UNIT III

Personality and Behavior Development - Soul and Scientific attitude, Positive Thinking. Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendship.

UNIT IV

Happiness Vs suffering, love for truth, Aware of self-destructive habits, Association and Cooperation.Doing best for saving nature

UNIT V

Character and Competence –Holy books vs Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence ,Humility, Role of Women, All religions and same message, Mind your Mind, Self-control, Honesty, Studying effectively.

SUGGESTED READING

1. Chakroborty, S.K. "Values and Ethics for organizations Theory and practice", Oxford University Press, New Delhi

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MTIC1105	Research Methodology and IPR	CATEGORY-MC	L-T-P 2-0-0	CREDITS 2

Pre-requisite:

Course Outcomes: At the end of the course, student will be able to

		Knowledge Level (K)#
CO1	Demonstrate good research problem and classify various types of research.	K2
CO2	Importance of literature review to identify research problem in thrust area of real world environment and formulate research ethics	K5
CO3	Elaborate effective writing, presentation of research proposal, and assessment various levels of research proposal in front of review committee.	K4
CO4	Examine nature of IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.	K6
CO5	Organize IPR protection that provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.	K3

UNIT – 1: Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

UNIT – 2: Effective literature studies approaches, analysis Plagiarism, Research ethics.Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

UNIT – 3: Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

UNIT – 4: Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

UNIT – 5: New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs

Text Books:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2nd Edition , "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007
5. Property Rights Under WTO", S. Chand, 2008

Reference Books:

1. Mayall , "Industrial Design", McGraw Hill, 1992.
2. Niebel , "Product Design", McGraw Hill, 1974.
3. Asimov , "Introduction to Design", Prentice Hall, 1962.
4. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.

Sri S. Nagarjuna

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R-23	I-M.Tech(C&CE) I-Semester	L	T	P	C
		3	0	3	4.5
COMPUTER NETWORKS					

Course Outcomes: At the end of the course, student will be able to

S. No.	Description	Knowledge Level (K)#
CO1	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.	K2
CO2	Specify and design the topological and routing strategies for an IP based networking infrastructure.	K3
CO3	Identify and understand various techniques of transmission and IEEE 802 standards for LAN.	K4
CO4	Describe the functions of Network Layer i.e. Logical addressing and Routing Mechanism.	K2
CO5	Learn and understand the advanced networking concepts, preparing the student for entry advanced courses in computer networking.	K4

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1			L			
CO2		H				
CO3				M		
CO4	M					
CO5		L		H		

UNITS	CONTENTS
UNIT–1	**Internet Architecture:** Introduction, Access Networks, The network Core, Peer-to-Peer Networks, Content Distribution Networks, Delay Tolerant Networks, Circuit Switching vs. Packet switching, Packet switching Delays and Congestion, Client/Server and Peer-to-Peer Architectures, MAC and LLC, Virtual LAN, Asynchronous Transfer Mode (ATM).
UNIT–2	**Network Layer Protocols:** Network Address Translator, Internet Control Message Protocol, SNMP, CIDR, IP Version6(IPv6), Difference between IPv4 Vs IPv6, Routing Protocol Basics in advanced networks, Distance Vector Routing Algorithm, Routing Information Protocol (RIP), Interior Gateway Routing Protocol (IGRP), Spanning Tree Protocol (STP).
UNIT–3	**Access Methods** - Pure ALOHA - Slotted ALOHA. Carrier Sense Multiple Access (CSMA) - Carrier Sense Multiple Access with Collision Detection(CSMA/CD) - Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) - Idle Signal Casting Multiple Access - Packet Reservation Multiple Access – IEEE 802.3 – IEEE 802.4 – IEEE 802.5 – IEEE 802.11 – FDDI – SONET Standard.
UNIT–4	**Routing:** Network–Layer Routing, Least-Cost-Path algorithms(Dijkstra's Algorithm), Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer. **Logical Addressing and Internetworking:** IPv4 Addresses- Address Space, Notations , Classful Addressing, Classless Addressing , Network Address Translation (NAT), IPv6 Addresses – Structure, Address Space, Internetworking - IPv4, IPv6, Transition from IPv4 to IPv6.

UNIT–5	**Transport and End-to-End Protocols:** Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, performance evaluation of TCP protocol, HTTP and HTTPS, FTP and SFTP, Domain Name Service, TCP and UDP sockets. **Advanced Internetworking:** Multimedia Networking, Voice-Over IP, SIP, H.323, RTP, RTCP.

TEXT BOOKS :

1. Computer Networking: A Top-Down Approach, 6/e, James F. Kurose and Keith W. Ross, Pearson Education, 2012.
2. Larry L. Peterson and Bruce S. Davie, Computer Networks: A systems approach, Morgan Kaufman, 5th Edition, 2012
3. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill

Reference:

1. High Speed Networks and Internets – Performance and Quality of Service, William Stallings, Second Edition, Pearson Education.
2. Top-Down Network Design, Priscilla Oppenheimer, Second Edition, Pearson Education
3. William Stallings, Data and Computer Communication, Prentice Hall of India.
4. S.Keshav, An Engineering Approach to Computer Networking , Pearson Education.