

Punyashlok Ahilyadevi Holkar Solapur University, Solapur



Name of the Faculty: Science & Technology

(As per New Education Policy 2020)

Subject:- Electronics & Telecommunication Engineering

Name of the Course: Second Year B. Tech (Sem.– III & IV)

(Syllabus to be implemented from-2024-25)



PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

S. Y. B. Tech (Electronics & Telecommunication Engineering)

NEP 2020 Compliant Curriculum With effect from 2024-2025

Semester –IV

Distribution	Course Code	Name of the Course	Engagement Hours			Credits	FA	SA			Total
			L	T	P		ESE	ISE	ICA	OE/ PO E	
PCC	ENTPCC-04	Signals and Systems	3			03	70	30			100
PCC	ENTPCC-05	Control System	2	1		03	70	30	25		125
PCC	ENTPCC-06	Analog Integrated Circuits	3		2	04	70	30	25	25	150
SEC	ENTSEC-01	Data Structure	1		2	02			25	25	50
Economic/ Management	EM-02	Project Management and Economics	2		0	02		25	25		50
OE	OE-02	Open Elective-II	2		2	03	70	30	25		125
MDM	ENTMDM-02	MD Minor-II	2		2	03	70	30	25		125
VEC	VEC-01	Professional Ethics	1		2	02	50*		25		75
		Total	16	1	10	22	400	175	175	50	800
		Environmental Science	1				40	10			50

*VEC-01 Examination will be MCQ based

BSC- Basic Science Course

ESC- Engineering Science Course,

PCC- Programme Core Course , AEC-

Ability Enhancement Course,

IKS- Indian Knowledge System,

CC- Co-curricular Courses,

VSEC-Vocational and Skill Enhancement Course

Basket of Multidisciplinary Minor (MDM)

A) Multidisciplinary Minor in “Controllers and Applications”

Semester	Course Code	Course Title
III	ENTMDM-01A	Digital Techniques
IV	ENTMDM-02A	8051 Microcontroller
V	ENTMDM-03A	PIC Microcontroller
VI	ENTMDM-04A	Advanced Microcontrollers
VII	ENTMDM-05A	Programmable Logic Controller

B) Multidisciplinary Minor in “Internet of Things”

Semester	Course Code	Course Title
III	ENTMDM-01B	Sensor Technology
IV	ENTMDM-02B	Fundamentals of IoT
V	ENTMDM-03B	IoT Networks and Security
VI	ENTMDM-04B	Industrial IoT
VII	ENTMDM-05B	IoT Cloud Platform

Multidisciplinary Minors are for the students of Other Program

A) Multidisciplinary Minor in “Controllers and Applications”

Semester	Course Code	Course Title
IV	ENTMDM-02A	8051 Microcontroller

A) Multidisciplinary Minor in “Internet of Things”

Semester	Course Code	Course Title
IV	ENTMDM-02B	Fundamentals of IoT



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S. Y. B. Tech (Electronics & Telecommunication Engineering)

Semester-IV (as per NEP) w.e.f. 2024-25

MDM- 02B: Fundamentals of IOT

Teaching Scheme:

Lecture - 2 Hrs/week, 2 credits

Practical - 2 Hrs/week, 1 credits

Examination Scheme:

ESE- 70 Marks

ISE - 30 Marks

ICA – 25 Marks

Course Objective:

1. Describe the evolution of the IoT concept.
2. Explain the basic characteristics of IoT.
3. Distinguish the IoT from other related technologies.
4. Explain the IoT architectures.
5. Articulate the pros and cons of IoT.
6. Apply the IoT architecture concepts for specific IoT applications.
7. Understand the implementation aspect of IoT architecture.

Course Outcome:

After completion of the Course, Students will be able to:

1. Understand the basics of IoT, things, smart connecting devices, IP & network layers, application protocols
2. Implement of blocks of IoT system – things, smart devices, IP & network layers, application protocols
3. Apply the various Things, smart devices IoT Protocols and Application Protoco (Datalink, Network, Transport, Session, Service) for real-time applications
4. Analyse of various existing IoT Systems
5. Evaluate various IoT architecture, IoT protocols with relevant hardware/software

Prerequisite:

- Basic knowledge of microprocessor, C programming
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UNIT-I: Introduction:

(03 Hrs)

The genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and OT, IoT Challenges

Internal Continuous Assessment (ICA):

At Least 08 practical's based on topics of the syllabus to be performed either in software tools and/or

UNIT-II: IoT Network Architecture:**(05Hrs)**

Drivers behind new network architectures, Comparing IoT architectures, A simplified IoT Architecture, The core IoT functional stack, IoT Data management and compute stack

UNIT-III: The “Things” in IoT:**(05 Hrs)**

Introduction to IoT enabled devices, Sensors, Actuators, Micro-electro-mechanical systems (MEMS), Introduction to Arduino,/R

SECTION – II**UNIT-IV: Connecting Smart Objects:****(04 Hrs)**

Communication criteria, IoT Access Technologies – IEEE 802.15.4, IEEE 802.15.4g & 802.15.4e, IEEE 1901.2a, IEEE 802.11ah, LoRaWAN, NB-IoT and other LTE variations

UNIT-V: IP as the IoT Network Layer:**(04 Hrs)**

The business case for IP, The need for optimization, optimizing IP for IoT, Profiles and Compliances

UNIT-VI: Application Protocols for IoT:**(05 Hrs)**

The transport layer, IoT Application Transport Methods, SCADA, Generic web-based protocols, IoT application layer protocols: CoAP, MQTT.

hardware kits.

Exp. NO.	List of Experiments
Exp:1	Study the fundamental of IOT software's and components.
Exp:2	Familiarization with Arduino/Raspberry Pi and perform necessary software
Exp:3	To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.
Exp:4	To interface DHT11 sensor with Arduino/Raspberry Pi and write a program to print temperature and humidity readings.
Exp:5	To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.
Exp:6	To interface OLED with Arduino/Raspberry Pi and write a program to print temperature and humidity readings on it.
Exp:7	To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.
Exp:8	To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when '_1'/'0' is received from smartphone using Bluetooth

Exp:9	Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to thingspeak cloud.
Exp:10	Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data from thingspeak cloud.

Text Books-

Vijay Madiseti and Arshdeep Bahga, “Internet of Things (A Hands-on- Approach)”, 1st Edition, VPT, 2014.

Reference books-

1. David Hanes, Gonzelo Salgueiro, Patrick Grossetete, Robert Barton, and Jerome Hentry, “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”, Cisco Pres, 2017.
2. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.
3. Peter Waher, “Learning Internet of Things”, PACKT publishing, BIRMINGHAM –MUMBAI
4. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3-642-19156- 5 e-ISBN 978-3-642-19157-2, Springer
5. Daniel Minoli, “Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications”, ISBN: 978-1-118-47347-4, Willy Publ