



Vishnu Waman Thakur Charitable Trust's

VIVA Institute of Technology

Approved by AICTE, New Delhi, DTE, Government of Maharashtra, Affiliated to University of Mumbai
At- Shirgaon, Post-Virar (E.), Tal-Vasai, Dist-Palghar – 401 305.

Tel.: 777 000 2544 • Website : www.viva-technology.org

E-mail: contact@viva-technology.org / principalvit@vivacollege.org

Department of Electronics and Telecommunication Engineering

Course Name:	Fundamentals of MIMO wireless communication
Name of the Faculty:	Mrs. Sonali Gaikwad
Designation:	Assistant Professor
Organization/Institution:	Viva Institute of Technology
Duration:	09 th January 2024 to 02 nd April 2024
Time:	30 hours
Number of Students:	20

Course Objectives:

1. To understand the basic concepts of MIMO wireless communication.
2. To learn various wireless channels models and fading types in wireless communication
3. To understand MIMO Channel Characteristics
4. To learn fundamentals of Information Theory
5. To learn MIMO Channel Capacity

Course Outcomes:

After successful completion of the course, the students are able to:

1. To know the Overview of wireless communication systems and wireless channels
2. Able to know various wireless channels models and their behaviour.
3. To understand various MIMO channel characteristics and Diversity performance of MIMO channels
4. Able to find Mutual information, Entropy in MIMO channel.
5. Able to calculate MIMO channel capacity, capacity of unknown channel at transmitter and capacity of random channel.



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Programme Summary:

Duration: 30 Hours

Venue: VIVA Institute of Technology, Shirgaon.

Electronics & Telecommunication Engineering Department of VIVA Institute of Technology organized a 30 hours' Bridge course on Fundamentals of MIMO wireless communication during 09th January 2024 to 2nd April 2024 conducted by Mrs. Sonali Gaikwad.

The objective of the Fundamentals of MIMO wireless communication for EXTC Engineering training program is to learn importance of MIMO wireless communication. MIMO technology has transformed wireless communication by improving data rates, enhancing coverage, maximizing spectral efficiency, and reducing power consumption. With its integration into 5G networks, MIMO continues to play a crucial role in driving the advancement of mobile communications. Learning of MIMO wireless communication will help to apply research to interesting and challenging real-world problems. This course has provided comprehensive coverage of concepts in MIMO wireless communication and its applications.

The event was a success with very positive feedback from the participants. The speech by the Principal Dr. Arun Kumar was an inspiring one that covered the broad future scopes of the field. The Principal being an encouraging one who said that for such events where in student development is involved, he will always be supportive. In the speech given by Mrs. Archana Ingle, H.O.D of EXTC, students gained an idea of how this workshop can be utilized to take creative projects in the field of engineering.

Topics covered in course:



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Sr.no	Contents	Hrs.
1	Overview of MIMO Communication- Evolution and elements of Wireless Communication	02
2	Layered View of Transmitter and Receiver	02
3	Wireless Channel Models	02
4	Large Scale Propagation Models Path Loss and Shadowing	02
5	Small Scale Propagation Multipath Model	02
6	Small Scale Propagation Frequency Flat Fading	02
7	Coherence Time , Doppler Spectrum	02
8	Frequency Selective Fading	03
9	Expression of MIMO Channel, MIMO Channel Characteristics, Spatial Diversity	02
10	Selection Combining	02
11	Diversity Gain and Transmit MRC	02
12	Fundamentals of Information Theory	02
13	MIMO Channel Capacity, Capacity of Deterministic MIMO Channels	02
14	Capacity of Channel Unknown at Transmitter	02
15	Capacity of Random Channel	02

CO-PO MAPPING:

Course Outcome	Program Outcome												CO Target level
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	
CO1	3	3	3	3	-	-	-	-	-	-	-	-	3
CO2	3	3	3	3	-	-	-	-	-	-	-	-	3
CO3	3	3	3	3	-	-	-	-	-	-	-	-	3
CO4	3	3	3	3	-	-	-	-	-	-	-	-	3
CO5	3	2	3	2	-	-	-	-	-	-	-	-	2

Student Certificate format:



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NAAC "B++" Grade

Certificate of Appreciation

This to certify that Mr. / Ms. PANCHAL AMEY ANIL
student of **Electronics & Telecommunication Department** has successfully completed bridge course on
"Fundamentals of MIMO Wireless Communication" at VIVA Institute of Technology, Shirgaon, Virar(E)
conducted between 9th January 2024 to 2nd April 2024. His / Her contribution is appreciated.


(Mrs. Archana Ingle)
HEAD OF DEPARTMENT


(Dr. Arun Kumar)
Principal