

**SCIENCE AND ENGINEERING RESEARCH  
BOARD**

**KARYASHALA**

**On**

**Recent Trends in Dielectric  
Resonator Antennas**

**(15<sup>th</sup> – 21<sup>st</sup> July 2023)**

**Registration Link**

<https://forms.gle/zb4e4mFwdarYwdDg6>

**Endorsement cum NOC Form Link**

<https://shorturl.at/FGKQX>

**Undertaking Form Link**

<https://shorturl.at/ipxCl>

**Note:** The participants to the course will be faculty, research scholars, UG Scholars, PG Scholars from AICTE approved technical institutions; Industry Bureaucrats/Technicians and staff of host institutions.

**CHIEF PATRON**

Prof. S. N. Singh  
Director, ABV-IIITM Gwalior

**PATRON**

Prof. Manisha Pattanaik,  
HoD, EEE, ABV-IIITM Gwalior

**COORDINATOR**

**Dr. Pinku Ranjan**

**Co-Coordinator**

**Dr. Somesh Kumar**

**Dr. Rakesh Chowdhury**

**ADDRESS FOR CORRESPONDENCE**

**Dr. Pinku Ranjan**

Assistant Professor,  
Department of EEE, ABV-IIITM Gwalior  
Email: pinkuranjan@iiitm.ac.in  
pinkuranjan@gmail.com  
Contact No.: 07991101270

**IMPORTANT DATES**

Last date of receipt of application: **25<sup>th</sup> June 2023.**  
Notification about selection: By email

**One week**

**कार्यशाला (High - End Workshop)**

**on**

**Recent Trends in Dielectric  
Resonator Antennas  
(15<sup>th</sup> – 21<sup>st</sup> July 2023)**



**ORGANIZED BY**



विश्वजीयनामृतं ज्ञानम्

**Electrical and Electronics Engineering Dept.  
ABV-Indian Institute of Information Technology  
and Management Gwalior,  
Morena Link Road, Gwalior, Madhya Pradesh-  
474015  
www.iiitm.ac.in**

### ABOUT THE INSTITUTE:

Atal Bihari Vajpayee - Indian Institute of Information Technology & Management Gwalior (ABV-IIITM Gwalior) is India's premier Institute incepted by Ministry of Human Resource and Development (MHRD), Government of India in the year 1997 as a centre of excellence in the field of Information Technology and Management. It is foremost Institute providing superior quality higher education in the above areas and is located in the city of Gwalior in the northern part of the state of Madhya Pradesh, India. The Institute activities are aimed at developing a culture of inquiry and research through highly competitive academic environment, and close interaction between Institute and corporate world. Vibrant links with the industry are active. Institute is ISO 9001:2008 and NAAC 'A' certified. It has also been declared as Institute of National Importance by the Government of India. Institute has secured 81<sup>th</sup> Rank by NIRF survey 2019 among all Engineering Institutes across the country. Institute secured 164<sup>th</sup> ranked in the World and 1<sup>st</sup> rank in India in 2017 UI Green Metric World University Rankings evaluated by Universitas Indonesia in 2017.

### ABOUT DEPARTMENT:

Electrical and Electronics Engineering department was established in the year 2022, Previously it was under Information Technology department established in the year 1997. Since the inception, it is consistently creating its place of excellence not only within the institute but among its counter parts in the country and abroad. Bright students from all the parts of the country for quality education in IT & EC at under graduate, post graduate, and doctoral levels are attracted. The department has highly qualified and competent faculty members, and adequate facilities to support teaching and learning activity.

**OBJECTIVE:** This FDP aims at providing strong theoretical and practical experience in the field of Antenna Engineering. In Dielectric Resonator Antenna Design, leaders in the field describe state-of-the-art research in applying the latest methodologies in the context of tomorrow's most important wireless applications.

Communication services, Representatives of industries and academia have started to look into the technological developments toward the next generation (5G/6G), as the rollout of 4G mobile communication networks take place. mm wave communication, Software Defined Radio, HetNets, algorithms and architectures have an increasing important role to play in meeting the central challenges faced in the design of advanced wireless communication systems.

The Dielectric Resonator Antenna technologies aim to support high radiation efficiency and gain as compared to conventional antennas. In this FDP, we will discuss the technologies that are being proposed for 6G hybrid antenna design. This FDP is intended to provide opportunity for young faculty members and researchers to enrich their knowledge in the area of Dielectric Resonator Antennas such as:

1. Focus on Recent Trends in Dielectric Resonator Antenna (DRA) for 5G/6G Communication.
2. To provide a comprehensive overview of the fundamental concepts MIMO DRA.
3. Designing of Microstrip patch antenna versus Dielectric Resonator Antennas.
4. To provide the latest challenges in designing of Dielectric Resonator Antennas (DRA) for Millimetre Wave applications.
5. Combining both Microstrip patch antenna and DRA to make hybrid structure as an open problem for research in related areas.
6. Filter design With Dielectric Resonator and Circularly Polarized DRA.
7. DRA optimization with Deep learning and Neural Network approach.

### COURSE CONTENTS:

**Module 1. Evolution and requirement of DRA:** Definition of DRA, Advantages and Disadvantages, Why DRA over microstrip antennas, Electromagnetic spectrum operating under DRA, Dielectric Materials

**Module 2. The complete analysis of the MIMO DRA for different wireless application frequency bands.**

**Module 3. Designing and fabrication process of DRA antenna.**

**Module 4. Designing and analysis of DRA for millimetre wave application.**

**Module 5. The application of hybrid antenna (Microstrip and DRA) will be in future communication.**

**Module 6. Antenna and Filter designing approach with combing as Filter synthesis and Circularly Polarized DRA**

**Module 7. DRA designing and optimization using Machine learning, Deep learning and Neural Network approach for future communication.**

**Hands-on training sessions will be provided on simulation tools for designing the antennas and fabricated prototype will be demonstrated as a reference.**

### COURSE OUTCOMES:

- Participants will be able to understand the fundamentals of Dielectric Resonator Antennas (DRA).
- Understand the designing and analysis process of DRA designing for wireless communication for IoT application.
- Participants will be able to simulate the DRA antenna and able to design and fabricate the Hybrid antenna and filter.
- Participants will also be able to understand the analysis and optimization of the proposed model.
- Recognise research problem in the field Antenna and Filter for future communication.

### HOW TO REACH:

ABV-IIITM Gwalior is located on Morena Link Road at a distance of about 3.5km and 8.5km from Gwalior railway station and Rajmata Vijay Raje Scindia city airport, respectively. The institute is easily accessible by road, and there are cabs and auto-rickshaws to commute from railway station or airport.

### **Experts Details:**

Dr. Pinku Ranjan, Assistant Professor, ABV-IIITM Gwalior (M.P.), India  
Mr. R. Vinay Kumar, Senior Engineer, Qualcomm, Hyderabad, India  
Prof. Kumar Vaibhav Srivastava, Professor, IIT-Kanpur, India  
Mr. P. Nitin, Senior Architect, Aeries Technology, Hyderabad, India  
Dr. Raghvendra Kumar Chaudhary, Associate Professor IIT-Kanpur, India  
Dr. Ravi Kumar Gangwar, Associate Professor, IIT(ISM)-Dhanbad (Jharkhand), India  
Dr. Anand Sharma, Assistant Professor, MN- NIT-Allahabad, Prayagraj (U.P.), India  
Dr. Rakesh Chowdhary, Assistant Professor, ABV-IIITM Gwalior (M.P.), India  
Dr. Somesh Kumar, Assistant Professor, ABV-IIITM Gwalior (M.P.), India  
Dr. Gourab Das, Assistant Professor, PEC Chandigarh, India  
Dr. Ajay Kumar Dwivedi, Associate Professor, NCET, Bengaluru, India  
Dr. Santosh Kumar Mahto, Assistant Professor, IIIT Ranchi, India  
Dr. Gaurav Varshney, NIT Patna, India