

Brochure

Advanced Antenna Design

June 28 to July 04, 2021

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Although the microstrip antenna has been extensively studied in the past few decades as one of the standard planar antennas, it still has a huge potential for further developments. Microstrip antennas are considered as the most common types of antennas due to their obvious advantages. Since there are several challenges in the design of antennas, a training programme on this topic would be very beneficial to enrich their knowledge and to carry out advanced research in antenna domain. The objective of this SDP is to train the participants in both fundamental and research levels.

About Instructors:

This course will be taught by a team of Dr. K. P. Ray, Professor, Dean & Head, Electronics Engineering and CSE Dept., Defence Institute of Advanced Technology Pune, Mr. Swapnil Gaul, Founder of Numergion (TaraNG), Dr. Shubhangi Kharche, Prof. Vandana Sawant,, Prof. Kintu Patel, SIES GST.

Course Objectives:

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| Students should be able to |
| Design and analyse microstrip line. |
| Develop applications of microstrip line. |
| Design of line feed rectangular patch antenna and develop its applications. |
| Design and analysis of electrically small antennas for wireless communication. |

Course Outcomes:

- Design and analysis of microstrip line.
- Design of the Patch Antenna.
- Simulation of the Patch Antenna using simulation software HFSS.
- To evolve, develop and improvise different types of patch antennas suitable for numerous applications like microwave communication, radar, mobile communication, IOT applications so on.

Course Content:

| Module | Contents | Hours |
|---------------|---|--------------|
| 1. | Installation and testing of related software. | 2 hrs |
| 2. | MICROSTRIP LINE: Design of microstrip line, S parameter analysis, characterization of microstrip line based on length of line, design and simulate impedance matching using quarter wave transformer using HFSS. | 2 hrs |
| 3. | RECTANGULAR PATCH ANTENNA AND ITS APPLICATIONS : Introduction to microstrip structure, calculate dimensions of rectangular patch antenna at 2.4GHz, design and simulate line feed rectangular patch antenna for various applications using HFSS. | 4 hrs |
| 4. | Design wired antennas and development of microstrip network. | 2hrs |
| 4. | Antennas for wireless communication | 2hrs |
| 5. | ELECTRICALLY SMALL ANTENNAS Introduction to electrically small antennas, design of electrically small antennas for wireless communication. | 4 hrs |
| 6. | WIDE BAND ANTENNA Introduction to wideband antennas, Design of wideband antennas. | 2 hrs |
| 7. | Antenna design and latest applications | 2 hrs |
| 8. | Mini Project on Design and Simulation of Antenna | 8 hrs |

Assessment:

1. Students will be assessed based on module wise assignments and quizzes.
2. In this value added course students will develop Mini projects based on above concepts.

Course Co-ordinator: Prof. Vandana Sawant

E mail ID: vandanas@sies.edu.in

Contact no.: 9820755314

Day wise schedule of workshop

| Day | Activity |
|--------------------|--|
| Day 1 28/6/2021 | INSTALLATION OF HFSS BY PROF. VANDANA SAWANT |
| | DESIGN AND SIMULATION OF MICROSTRIP LINE BY PROF. VANDANA SAWANT |
| Day 2 29/6/2021 | DESIGN, SIMULATION AND OPTIMIZATION OF QUARTERWAVE TRANSFORMER BY PROF. VANDANA SAWANT |
| | INTRODUCTION TO MICROSTRIP ANTENNA DESIGN, SIMULATION AND OPTIMIZATION OF EDGE FED MICROSTIP ANTENNA BY PROF. VANDANA SAWANT |
| Day 3 30/6/2021 | DESIGN, SIMULATION AND OPTIMIZATION OF INSET FEED MICROSTRIP ANTENNA BY PROF. VANDANA SAWANT |
| | ANTENNA DESIGN AND LATEST APPLICATIONS BY DR. K. P. RAY |
| Day 4 01/7/2021 | 1G-6G ANTENNA, TYPES, DESIGN, DRAWBACKS, ADVANTAGES AND CHALLENGES. BY DR. SHUBHANGI KHARCHE |
| | DESIGN OF ELECTRICALLY SMALL ANTENNA BY PROF. KINTU PATEL |
| Day 5 02/7/2021 | SIMULATION OF ELECTRICALLY SMALL ANTENNA BY PROF. KINTU PATEL |
| | WIRE ANTENNA DESIGN AND DEVELOPMENT OF MICROSTRIP NETWORK BY MR. SWAPNIL GAUL |
| Day 6 03/7/2021 | WIDEBAND ANTENNA, BODY WEARABLE ANTENNA BY PROF. VANDANA SAWANT |
| | FABRICATION OF ANTENNA AND MINIPROJECT DISTRIBUTION BY PROF. VANDANA SAWANT |
| Day 7 04/7/2021 | MINIPROJECT FOR ONE WEEK |

Department of Electronics and Telecommunication Engineering
Event Report

Advanced Antenna Design

June 28 to July 04, 2021

Event Information

Event Type: SDP

Event title: SDP on **Advanced Antenna Design**

Resource Person:

1. Prof. Vandana Sawant, Assistant Professor, SIESGST.
2. Dr. Shubhangi Kharche, Associate Professor, SIESGST.
3. Prof. Kintu Patel, Assistant Professor, SIESGST.
4. Dr. K.P. Ray, Professor, Dean & Head, Electronics Engineering and CSE Dept., Defence Institute of Advanced Technology Pune
5. Mr. Swapnil Gaul, Founder of Numergion (TaraNG)

Event date: June 28th -July4th 2021

Organized for: TE &BE-EXTC/IT Students

Organized by: Department of Electronics & Telecommunication

Target audience (branch & nos.): EXTC – 18
IT- 02

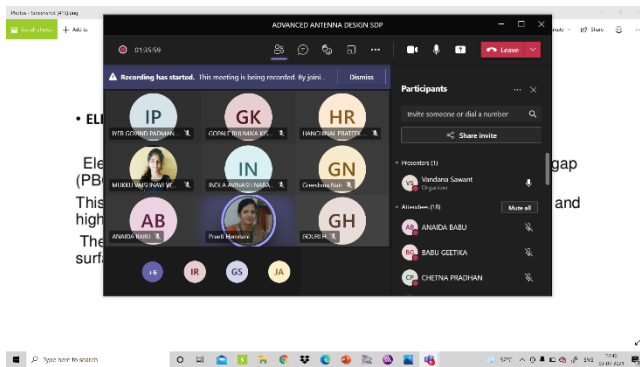
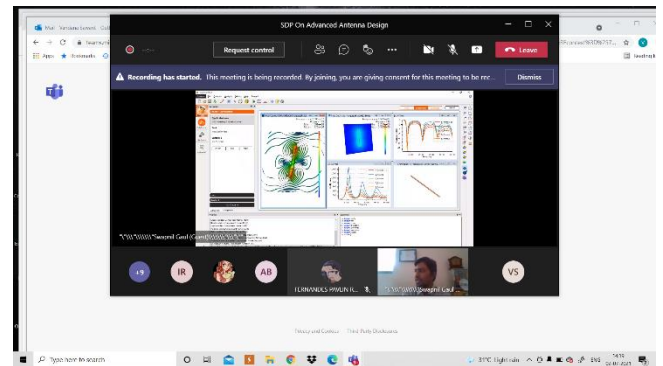
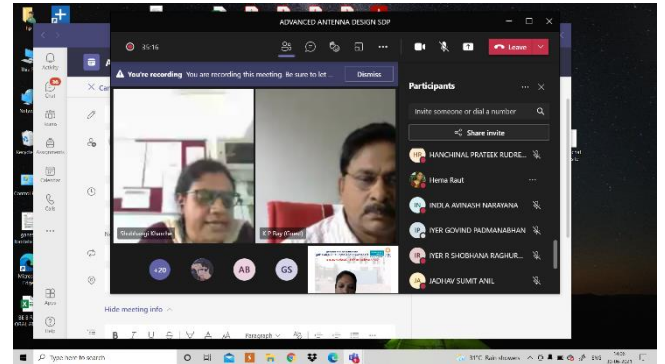
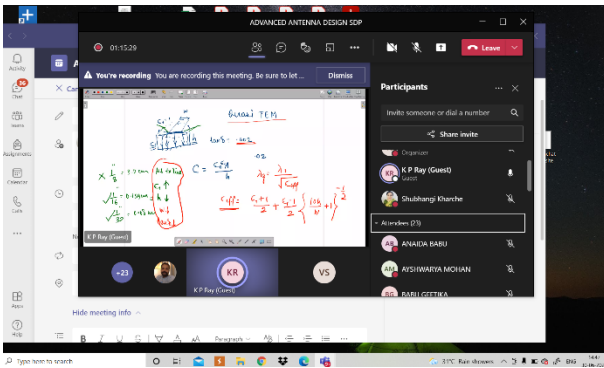
Attachments: 1. Photographs (in JPEG/PNG)
2. Attendance report
3. Feedback
4. Certificate

Event Description

1. Electronics and Telecommunication Department of SIES GST had organized a hands on student development program for students of TE &BE EXTC and IT on topic “Advanced Antenna Design” from June 28th -July4th 2021. It was a one-week hands-on training conducted by Prof. Vandana Sawant, Assistant Professor, SIESGST, Dr. Shubhangi Kharche, Associate Professor, SIESGST, Prof. Kintu Patel, Assistant Professor, SIESGST, Dr. K.P. Ray, Professor, Dean & Head, Electronics Engineering and CSE Dept., Defense Institute of Advanced Technology Pune and Mr. Swapnil Gaul, Founder of Numergion (TaraNG). Since the invention of the Microstrip Antenna four decades ago, the demand for its application has been increasing rapidly, especially within the last two decades. However, these applications have been in demand mostly by the Department of Defense. Because of light weight, low cost, low profile, planar configuration, easy of conformal, superior portability, suitable for arrays, easy for fabrication, and easy integration with microwave monolithic integrate circuits (MMICs). They have been widely employed for the civilian and military applications in the form of broadcast radio, mobile systems, global positioning system (GPS), radio-frequency identification (RFID), multiple-input multiple-output (MIMO) systems, vehicle collision avoidance system, satellite communications, surveillance systems, direction finding, radar systems, remote sensing, biological imaging, missile guidance, body wearable antennas, and so on. The aim of was to SDP Introduction to basic understanding and designing of the Patch Antenna. Simulation of the Patch Antenna using simulation software HFSS and TARANG. To evolve, develop and improvise different types of patch antennas and wire antennas suitable for numerous applications like microwave communication, wireless communication, radar, mobile communication, RFID, IOT applications so on. This SDP is attended by students of TE&BE EXTC and IT. Course started with Introduction to Antenna and HFSS software then students were given hands on training on Design of microstrip line, quarter wave transformer. Design, Simulation and Optimization of a Microstrip Patch Antenna using HFSS software. Design, Simulation and Optimization of an Edge fed and Inset fed Microstrip Patch Antenna. Design, Simulation and Optimization of an Ultra-Wideband_Microstrip antenna, MIMO Antenna. Parameter enhancement of MSA by designing different types of periodic structure. Design, Simulation and Optimization of an Electrically small antenna. Design of Wire antenna and networking of microstrip antenna using TARANG software. Wearable Antenna and fabrication of antenna.

Course completion certificates were provided to the 20participants from third and fourth year of engineering.

1. Photographs (in JPEG/PNG)



2. Attendance report

(Also include responses details)

List of students and their percentage attendance:

| I D | Roll Number | Student Full Name | YEA R | BRANC H | Email2 | % attendance |
|--------|----------------|-------------------------------|----------|------------|--|-----------------|
| 1 | 118A2033 | Gowda Sangita Vishwanath | BE | EXTC | sangitagextc118@gst.sies.edu.in | 100 |
| 2 | 119A3019 | Geetika Babu | SE | IT | geetikabit119@gst.sies.edu.in | 100 |
| 3 | 118A2038 | Govind Iyer | TE | EXTC | govindiextc118@gst.sies.edu.in | 80 |
| 4 | 119A3021 | Shobhana Iyer | TE | IT | shobhanaiit119@gst.sies.edu.in | 100 |
| 5 | 119A2011 | Chetna Pradhan | SE | EXTC | chetnapextc119@gst.sies.edu.in | 100 |
| 6 | 117A2037 | Shubham Nagoji Gorule | TE | EXTC | shubhamgextc117@gst.sies.edu.in | 100 |
| 7 | 118A2067 | Mukku Vaishnavi | TE | EXTC | vaishnavimextc118@gst.sies.edu.in | 100 |
| 8 | 118a2008 | Ayshwarya Mohan | BE | EXTC | ayshwaryamextc118@gst.sies.edu.in | 80 |
| 9 | 118A2004 | Anaida Babu | TE | EXTC | anaidarextc118@gst.sies.edu.in | 100 |
| 10 | 119A2018 | Pavlin Fernandes | SE | EXTC | pavlinfextc119@gst.sies.edu.in | 100 |
| 11 | 118A2046 | Kartik Pant | TE | EXTC | kartikpextc118@gst.sies.edu.in | 100 |
| 12 | 118A2039 | Sumit Anil Jadhav | TE | EXTC | sumitjextc118@gst.sies.edu.in | 100 |
| 13 | 118A2026 | Nishant Gharat | TE | EXTC | nishantgextc118@gst.sies.edu.in | 100 |
| 14 | 118A2035 | Prateek Hanchinal | BE | EXTC | prateekhextc118@gst.sies.edu.in | 100 |
| 15 | 118A2037 | Avinash Indla | BE | EXTC | avinashiextc118@gst.sies.edu.in | 100 |
| 16 | 218A2124 | Shriya Pravin Kamble | BE | EXTC | shriyakextc218@gst.sies.edu.in | 90 |
| 17 | 117A2072 | Nair Greeshma Unnikrishnan | BE | EXTC | greeshmanextc117@gst.sies.edu.in | 100 |
| 18 | 118A2032 | Gouri H | TE | EXTC | gourihextc118@gst.sies.edu.in | 100 |
| 19 | 118A2030 | Bhumika Gopale | BE | EXTC | bhumikagextc118@gst.sies.edu.in | 80 |
| 20 | 218A2126 | Swapnali Dhulap | BE | EXTC | Swapnalidextc218@gst.sies.edu.in | 70 |

3. Feedback (Analysis)

No. of students registered feedback: 20

Feedback is taken on course objective. Average rating is out of 5

1. Design and analyze microstrip line. Average rating: 4.60
2. Develop applications of microstrip line. Average rating: 4.30

3. Design of line feed rectangular patch antenna and develop its applications. Average Rating:4.35
4. Design and analysis of electrically small antennas for wireless communication. Average Rating: 4.25
5. Some specific comments given by students in feedback

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|---|
| No suggestion I learned very well as mam have gone through step by step, I even had fun rotating microstrip |
| Enlightening sessions by faculty as well as experts. |
| It was very interesting and informative. Add about various types of latest technologies used antennas in real life |
| The Antenna SDP was very informative, got to know a lot about Antenna concepts and how they actually work in real time systems. Also, in the expert talk sessions the real-life examples were very easy to grasp the concepts and to know the basics. |
| It was Amazing, something different from regular classes |
| It was very informative and I am now comfortable using the HFSS software. |
| It could be more informative. But nice session |
| Vadana mam and kintu mam explained the antenna concepts very well and they made this antenna designs very simple. |
| The SDP was great. It boosted my confidence regarding designing of antenna |
| Like to work on more projects on antenna-based topics |
| The SDP was well conducted and taught. Hopefully we will be able to get more projects in this |

Impact Analysis:

- 19 students attended Quiz conducted on microstrip lines and basic antenna parameters and all scored 100% marks.
- 19 students attended Quiz conducted on antenna array, wideband antenna, dual band antenna and 17 students scored 100% marks.
- 15 students attended Quiz conducted on electrically small dipole antenna and all students scored above 80% marks.
- 15 students attended Quiz conducted on antenna used in wireless networks and all students scored above 70% marks.
- 20 students completed miniproject based on antenna design and submitted report.
- 8 students decided to do their final year project in antenna design for various applications.

4. Certificate

 Graduate School of
Technology
RISE WITH EDUCATION

CR NO. EXTC : 207

CERTIFICATE

OF APPRECIATION

This is to certify that

Gowda Sangita Vishwanath of BE EXTC
has successfully completed 1 week SDP on
Advanced Antenna Design
conducted by Dept. of Electronics and Telecommunication, SIESGST
from 28th June to 4th July, 2021


Prof. Vandana Sawant
COURSE CO-ORDINATOR


DR. PREETI HEMNANI
HOD, EXTC DEPT.


DR. ATUL KEMKAR
PRINCIPAL, SIESGST