Advanced Antenna Design

June 26 to July 03, 2023

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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 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. 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

Mr. Akshay Jain, Gurutvaa Systems Pvt. Ltd., Pune,
Prof. Vandana Sawant, SIES GST, Nerul
Prof. Sonal Hutke, SIES GST, Nerul
Prof. Hema Raut, SIES GST, Nerul.

Course Objectives:

Students should be able to
Design, analyse and test microstrip line.
Design of line feed and probe feed rectangular patch antenna and develop its applications.
Design and analysis of wearable antennas for ISM band.
Design and analysis of wide band antennas.
Design of array antennas and antenna optimization.

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, military communications, IOT applications and cso on.

Course Content:

Module	Contents	Hours
1	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. RECTANGULAR PATCH ANTENNA AND ITS APPLICATIONS : Introduction to microstrip structure, calculate dimensions of rectangular patch antenna at 2.4GHz, design and simulate edge feed rectangular patch antenna for various applications using HFSS.	6 hrs
2	Design and analysis of wearable antennas for ISM band.	6 hrs
3	Expert session on Antenna testing for industry applications	3 hrs
4	Design and analysis of RMSA using probe feed, current distribution.	6 hrs
5	WIDE BAND ANTENNA Introduction to wideband antennas, Design of wideband antennas.	6 hrs
6	Design of antenna arrays.	6 hrs
7	Mini Project on Design and Simulation of Antenna	40 hrs

Assessment:

1. Students will be assessed based on module wise assignments and quizzes.

2. Fifteen days internship will be provided in which students have to develop Mini projects based on the above concepts.

Course Co-Ordinator: Prof. Vandana Sawant

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Contact no.: 9820755314 /9969004169/9970286104

SIES GRADUATE SCHOOL OF TECHNOLOGY, NERUL
DEPARTMENT OF MECHANICAL ENGINEERING
Two-week Value-Added Course (Student Development Program)
on
Optimisation Techniques for Engineers
(26/06/2023 to 30/06/2023)
Program Schedule

S.N.	Session 1 (10:00 – 12:30)		Session 2 (01:30 – 04:00)
MONDAY **(26/06/2023)**	Design of antenna and parametric analysis. *(Prof. Sonal Hutke)*		Antenna optimization and analysis *(Prof. Sonal Hutke)*
TUESDAY **(27/06/2023)**	Design of array antenna and its analysis for gain and radiation pattern. *(Prof. Sonal Hutke)*		Expert session on Antenna testing for industry applications. *(Mr. Akshay Jain / Industry Expert)*
WEDNESDAY **(28/06/2023)**	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. *(Prof..Vandana Sawant)*	**LUNCH BREAK**	Rectangular patch antenna design Introduction to microstrip structure, calculate dimensions of rectangular patch antenna, design and simulate edge feed rectangular patch antenna for various applications using HFSS. *(Prof..Vandana Sawant)*
THURSDAY **(29/06/2023)**	Design and analysis of wearable antennas for ISM band. Design of Human phantom and SAR calculation. *(Prof..Vandana Sawant)*		Introduction to probe feed antenna design Design of RMSA and determination of various antenna parameters *(Prof. Hema Gavali).*
FRIDAY **(30/06/2023)**	Parametric analysis of the design and current distribution over the surface. *(Prof. Hema Gavali)*		Wide band antenna Introduction to wideband antennas, Design and analysis of wideband antenna. *(Prof. Hema Gavali)*

SIES Graduate School of Technology
Sri Chandrasekarendra Saraswati Vidyapuram
Sector 5, Nerul, Navimumbai-400706

Department of Electronics and Telecommunication Engineering

Event Report

Advanced Antenna Design

June 27 to July 04, 2022

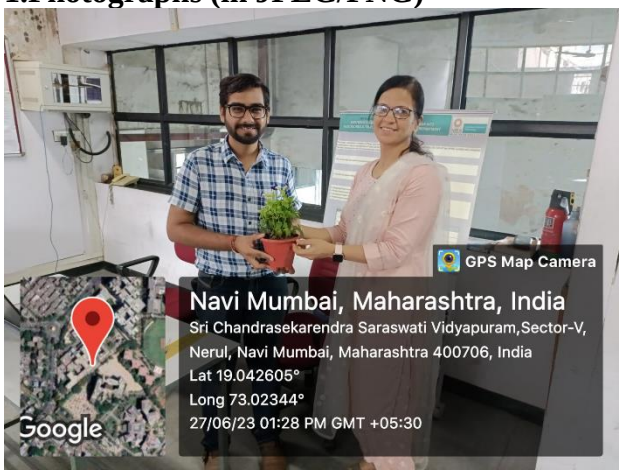
Event Information
Event Type: Value added course
Event title: Value added course on **Advanced Antenna Design**
Resource Person: 1. Prof. Vandana Sawant, Assistant Professor, SIESGST. 2. Prof. Hema Raut, Assistant Professor, SIESGST. 3. Prof. Sonal Hutke, Assistant Professor, SIESGST. 4. Mr. Akshay Jain, Gurutvaa Systems Pvt. Ltd., Pune,
Event date: June 26th June- July3rd 2023
Organized for: SE, TE -EXTC Students
Organized by: Department of Electronics & Telecommunication
Target audience (branch & nos.): EXTC – 24
Attachments: 1. Photographs (in JPEG/PNG) **2. Attendance report** **3. Feedback**

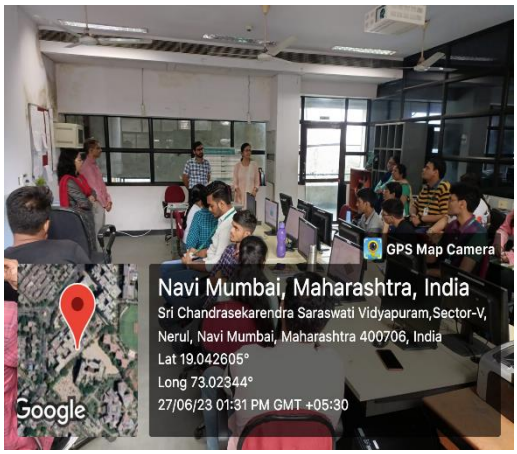
4. Certificate

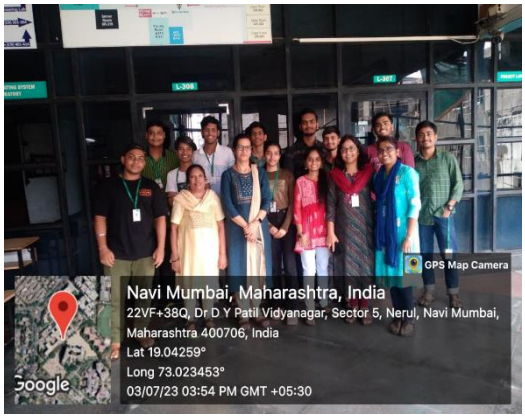
Event Description

1. The Electronics and Telecommunication Department of SIES GST had organized a hands-on value added course for students of SE & TE EXTC on topic "Advanced Antenna Design" from June 26th June- July3rd 2023. It was a one-week hands-on training followed by one week miniproject, conducted by Prof. Vandana Sawant, Assistant Professor, SIESGST, Prof. Hema Raut, Assistant Professor, SIESGST, Prof. Sonal Hutke, Assistant Professor, SIESGST, Mr. Akshay Jain, Gurutvaa Systems Pvt. Ltd., Pune.
2. The aim of this value-added course was to Introduction to basic understanding and designing of the Patch Antenna. Simulation of the Patch Antenna using simulation software HFSS. 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 and so on. This SDP is attended by students of SE&TE EXTC.
3. Prof. Sonal Hutke started the course, with an explanation of Optimetrics in HFSS. Students designed probe feed antenna and used parametric analysis and optimization. Further she gave hands on sessions on array design using duplication along line method and Master slave method.
4. Prof. Vandana Sawant started with the introduction to Microstrip lines then students were given hands on training on Design of microstrip line, quarter wave transformer. Design, Simulation and Optimization of an Edge fed and wearable Inset fed Microstrip Patch Antenna using Jeans material, Design of human phantom and parameter analysis.
5. Prof. Hema Raut conducted a session on antenna design using the probe feed method. Also, simulation and parametric analysis was explained. Further, a session on WB antenna and UWB antenna design was conducted followed by HandsOn session on UWB antenna design and its analysis.
6. Mr. Akshay Jain conducted a session on antenna testing of antenna, antenna parameter measurement. He also discussed carrier opportunities in RF fields.
7. .Course completion certificates were provided to the 19 participants from second and third year of engineering.

1.Photographs (in JPEG/PNG)

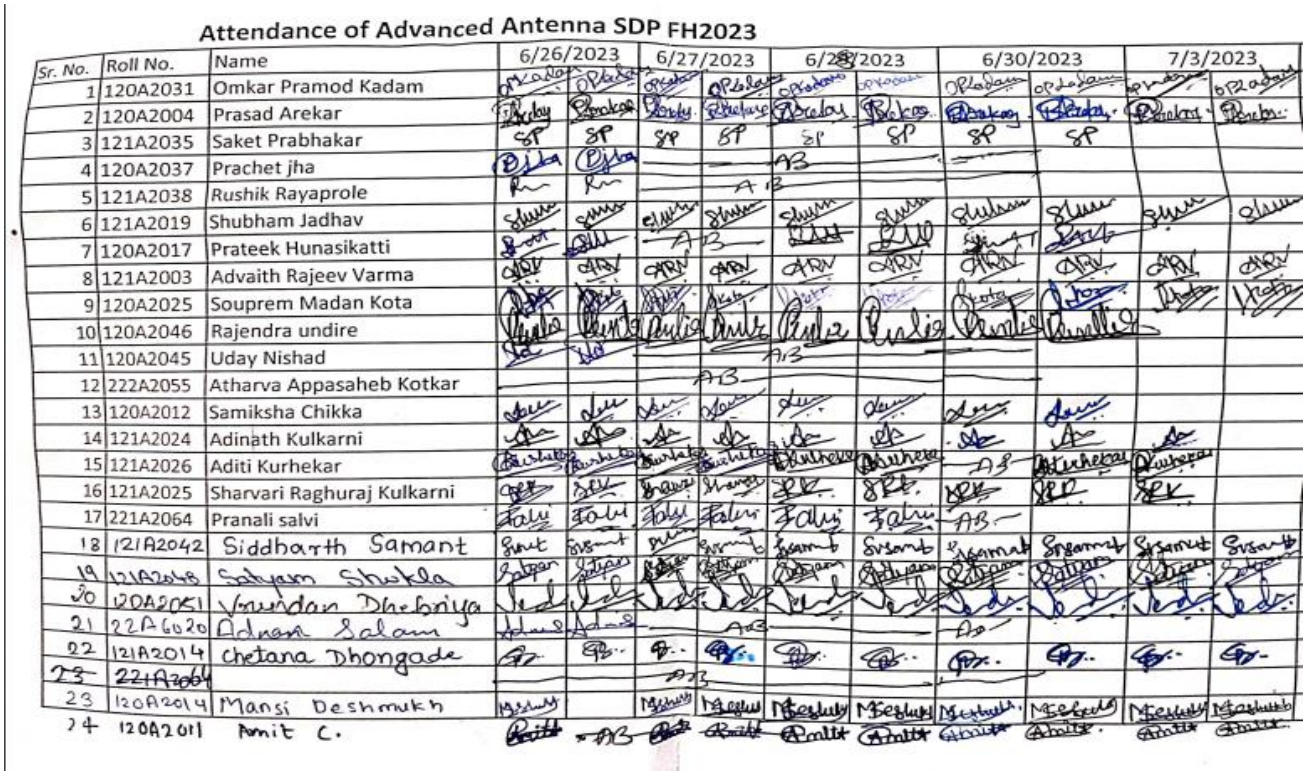






2. Attendance report : 19 participants attended value added course.

(Also include responses details)



Attendance of Advanced Antenna SDP FH2023

Sr. No.	Roll No.	Name	6/26/2023		6/27/2023		6/28/2023		6/30/2023		7/3/2023	
1	120A2031	Omkar Pramod Kadam										
2	120A2004	Prasad Arekar										
3	121A2035	Saket Prabhakar	SP	SP	SP	SP	SP	SP	SP	SP		
4	120A2037	Prachet jha				AB						
5	121A2038	Rushik Rayaprole				AB						
6	121A2019	Shubham Jadhav										
7	120A2017	Prateek Hunasikatti			AB	AB						
8	121A2003	Advaith Rajeev Varma										
9	120A2025	Souprem Madan Kota										
10	120A2046	Rajendra undire										
11	120A2045	Uday Nishad				AB						
12	222A2055	Atharva Appasaheb Kotkar				AB						
13	120A2012	Samiksha Chikka										
14	121A2024	Adinath Kulkarni										
15	121A2026	Aditi Kurhekar							AB			
16	121A2025	Sharvari Raghuraj Kulkarni										
17	221A2064	Pranali salvi							AB			
18	121A2042	Siddharth Samant										
19	121A2048	Satyam Shukla										
20	120A2051	Virendra Dhebriya										
21	22A6020	Adnan Salam				AB						
22	121A2014	Chetana Dhongade										
23	221A2064				AB							
23	120A2014	Mansi Deshmukh										
24	120A2011	Amit C.		AB								

3. Feedback (Analysis)

No. of students registered feedback: 18

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

1. Design and analyse microstrip line.- 4.39
2. Design of line feed and probe feed rectangular patch antenna and develop its applications- 4.29

3. Design and analysis of textile antennas for military applications. - 4.39
4. Design and analysis of wide band antennas. - 4.11
5. Design of array antennas and antenna optimization. – 4.33
6. Antenna parameters testing using analyser - 4.33

7.Some specific comments given by students in feedback

It was a great and informative session. This SDP gave a lot of information about the field of RF engineering in current industry and its future scope.
Was a very informative session.....got to learn about how different types of Antennas are designed
Would have been great if there were more computers for all students
SDP was interesting . Faculty was really good and cooperative.
It was good. It would have been more interesting if we, TE would had some basic knowledge about antenna design. But still the teachers made extra efforts to explain the sessions in as lamen language as possible which was overwhelming.

The Sdp was very informative.The concepts were taught really well.Looking forward to attend further sdps.

Impact Analysis:

- 10 students attended Quiz. 04 students scored 80% marks.
- 06 students scored 60% marks.
- 19 students completed miniproject based on antenna design and submitted reports.
- 02 groups decided to do their final year project in antenna design for various applications.

4. Certificate

SIES
RISE WITH EDUCATION
Graduate School of Technology

CERTIFICATE
OF COMPLETION

CR. NO : **EXTC/SDP/0123/497**

presented to

Sharvari Raghuraj Kulkarni

has successfully completed the value-added course on
Advanced Antenna Design
and followed in-house internship from
26TH June, 2023 to 4TH July, 2023
organised by **Electronics and Telecommunication** Department, SIES GST,
during the internship he/she successfully completed the project titled
Design and Analysis of Microstrip Patch Antenna at 38 GHz

Ms. Vandana Sawant	Dr.Preeti Hemnani	Dr. Laxmi Sudha
(Course Co-ordinator)	(HOD, EXTC, SIESGST)	(Principal, SIESGST)