



South Indian Education Society's  
GRADUATE SCHOOL OF TECHNOLOGY, Navi Mumbai.  
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

## Advanced Antenna Design

June 27 to July 4, 2022

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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.

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### About Instructors:

This course will be taught by a team of

Dr. Uday Pandit Khot, Professor, St. Francis Institute of Technology, Mumbai.

Dr. Vivek Ashokan, ANSYS (HFSS expert) technology, Application Engineer  
ARK. Infosolutions.

Dr. Anjali Choudhari, Asst Prof., St. Francis Institute of Technology, Mumbai.

Prof. Vandana Sawant, SIES GST, Nerul

Prof. Sonal Hutke, SIES GST, Nerul

Prof. Hema Raut, SIES GST, Nerul.

### Course Objectives:

- 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 so on.

### Course Outcomes:

Students should be able to
Design and analyze microstrip line.
Design of line feed and probe feed rectangular patch antenna and develop its applications.
Design and analysis of textile antennas for military applications.
Design and analysis of wide band antennas.
Design of array antennas and antenna optimization.
Design of MIMO antenna and periodic structure.

### Course Content:

Module	Contents	Hours
1.	Keynote address, 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.	4 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.	6 hrs
4.	Design and analysis of textile antennas for military applications.	6hrs
5.	Design and analysis of RMSA using probe feed, current distribution.	6 hrs
6.	WIDE BAND ANTENNA Introduction to wideband antennas, Design of wideband antennas.	6 hrs
8.	Design of antenna arrays.	6 hrs
9.	Antenna optimization	6hrs
10.	MIMO Antenna	3hrs
11.	Antenna design using periodic structure.	4hrs
12.	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 above concepts.

Course Co-Ordinator: Prof. Vandana Sawant

E mail ID: [vandanas@sies.edu.in](mailto:vandanas@sies.edu.in)

Contact no.: 9820755314

### Day wise schedule of workshop

DATE	TIME	TOPIC
27-06-2022	10.00-12.50am	Inauguration and Keynote address by Dr.Uday Pandit
	1.30-4.00pm	Introduction to HFSS, Design of Microstrip line & Design of Quarterwave Transformer by Vandana Sawant
28-06-2022	10.00-12.50am	Design of Edge Feed Antenna by Ms. Vandana Sawant
	1.30-4.00pm	Design of Inset Feed textile Antenna by Vandana Sawant
29-06-2022	10.00-12.50am	Design of Probe Feed Antenna by Ms. Hema Raut
	1.30-4.00pm	Design of MIMO Antenna by Dr. Anjali Choudhari
30-06-2022	10.00-12.50am	Design of Ultra-Wide band Antenna by Ms. Hema Raut
	1.30-4.00pm	Design of Ultra-Wide band Antenna by Ms. Hema Raut
01-07-2022	10.00-12.50am	Antenna optimization by Ms. Sonal Hutke
	1.30-4.00pm	Design of Array Antenna by Ms. Sonal Hutke
04-07-2022	10.00-12.50am	Design of Array Antenna by Ms. Sonal Hutke
	1.30-4.00pm	Design of Antenna with periodic structure by Dr.Vivek Ashokan



**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**

<b>Event Information</b>
<b>Event Type:</b> SDP
<b>Event title:</b> SDP on <b>Advanced Antenna Design</b>
<b>Resource Person:</b> <ol style="list-style-type: none"><li>1. Prof. Vandana Sawant, Assistant Professor, SIESGST.</li><li>2. Prof. Hema Raut, Assistant Professor, SIESGST.</li><li>3. Prof. Sonal Hutke, Assistant Professor, SIESGST.</li><li>4. Dr. Uday Pandit Khot, Professor, St. Francis Institute of Technology, Mumbai.</li><li>5. Dr. Vivek Ashokan, ANSYS (HFSS expert) technology, Application Engineer ARK. Infosolutions.</li><li>6. Dr. Anjali Choudhari, Asst Prof., St. Francis Institute of Technology, Mumbai.</li></ol>
<b>Event date:</b> June 27 <sup>th</sup> -July4 <sup>th</sup> 2022
<b>Organized for:</b> TE -EXTC Students
<b>Organized by:</b> Department of Electronics & Telecommunication
<b>Target audience (branch &amp; nos.):</b> EXTC – 21
<b>Attachments:</b> 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 student development program for students of TE EXTC on topic “Advanced Antenna Design” from June 27<sup>th</sup> -July 4<sup>th</sup> 2022. 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, Dr. Uday Pandit Khot, Professor, St. Francis Institute of Technology, Mumbai, Dr. Vivek Ashokan, ANSYS (HFSS expert) technology, Application Engineer ARK. Infosolutions and Dr. Anjali Choudhari, Asst Prof., St. Francis Institute of Technology, Mumbai.

2. 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 and so on. This SDP is attended by students of TE&BE EXTC and IT.

3. The course started with a keynote address by Dr. Uday Pandit. He explained how from the invention of the Microstrip Antenna four decades ago, the demand for its application has been increasing rapidly, especially within the last two decades. He also added these applications have been in demand 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, and how microwave engineers are satisfying these market demand with the help antenna design and embedded system.

4. Prof. Vandana Sawant started with the 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 an Edge fed and Inset fed Microstrip Patch Antenna.

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. Dr. Anjali Choudhari conducted a session on antenna design followed by Hands On session using HFSS.

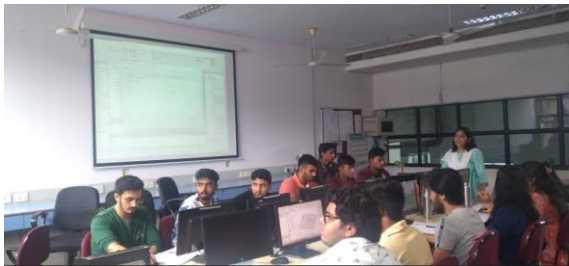
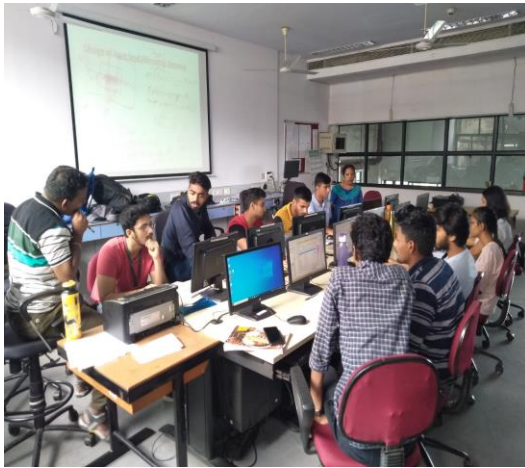
7. Prof. Sonal Hutke explained the use of Optimetrics in HFSS. Students designed probe feed antenna and used parametric analysis and optimization. Further she gave hands on sessions on array design using duplication along line method and Master slave method.

8. Dr. Vivek Ashokan a session on periodic structure design followed by Hands On session using HFSS.

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

### 1. Photographs (in JPEG/PNG)





## 2. Attendance report

(Also include responses details)

ID	NAME OF THE STUDENT	ROLL NUMBER	BRANCH	YEAR	EMAIL ADDRESS
1	Chaitanya Shetty	119A2010	Extc	TE	<a href="mailto:shettychaitanya19@siesgst.ac.in">shettychaitanya19@siesgst.ac.in</a>
2	Jesno Joseph	220A2107	EXTC	TE	<a href="mailto:jesnojextc220@gst.sies.edu.in">jesnojextc220@gst.sies.edu.in</a>
3	Nahush Chandrashekar Bhagat	220A2103	EXTC	TE	<a href="mailto:nahushbextc220@siesgst.ac.in">nahushbextc220@siesgst.ac.in</a>
4	Avula Mahesh Kanakaiah	220A2102	Extc	TE	<a href="mailto:avulakextc220@gst.sies.edu.in">avulakextc220@gst.sies.edu.in</a>
5	Mitesh Haldankar	220A2106	EXTC	TE	<a href="mailto:miteshhextc220@siesgst.ac.in">miteshhextc220@siesgst.ac.in</a>
6	Yash Kishor Patil	220A2115	EXTC	TE	<a href="mailto:yashpextc220@siesgst.ac.in">yashpextc220@siesgst.ac.in</a>
7	Kurup Ashwin Venugopalan	119A2036	EXTC	TE	<a href="mailto:kurupashwin19@siesgst.ac.in">kurupashwin19@siesgst.ac.in</a>
8	Himesh Gawde	119A2021	EXTC	TE	<a href="mailto:himeshgextc119@gst.sies.edu.in">himeshgextc119@gst.sies.edu.in</a>
9	Bhushan Ghag	119A2022	Extc	TE	<a href="mailto:ghagbhushan19@siesgst.ac.in">ghagbhushan19@siesgst.ac.in</a>
10	Melethil shaheem	119A2041	EXTC	TE	<a href="mailto:melethilsextc119@gst.sies.edu.in">melethilsextc119@gst.sies.edu.in</a>



11	Arshiya Wagle	220A2130	EXTC A	TE	<a href="mailto:arshiyawextc220@siesgst.ac.in">arshiyawextc220@siesgst.ac.in</a>
12	Dhanshree tekale	220A2127	EXTC	TE	<a href="mailto:dhanshreetextc220@gst.sies.edu.in">dhanshreetextc220@gst.sies.edu.in</a>
13	Shruti Narayan Gope	119A2076	EXTC	TE	<a href="mailto:shrutinarayan19@siesgst.ac.in">shrutinarayan19@siesgst.ac.in</a>
14	Srishti Sharma	119A2072	EXTC	TE	<a href="mailto:srishtisharma19@siesgst.ac.in">srishtisharma19@siesgst.ac.in</a>
15	Yadav Soundarya Ariramakrishnan	119A2096	EXTC	BE	<a href="mailto:soundaryayextc119@gst.sies.edu.in">soundaryayextc119@gst.sies.edu.in</a>
16	Konar Balasubramaniyam	220A2112	Extc	TE	<a href="mailto:balakonar225@gmail.com">balakonar225@gmail.com</a>
17	Khush Vasudeo Patil	119A2030	EXTC	TE	<a href="mailto:khushpextc119@gst.sies.edu.in">khushpextc119@gst.sies.edu.in</a>
18	Hiten Sharma	119A2026	EXTC	TE	<a href="mailto:sharmahiten19@siesgst.ac.in">sharmahiten19@siesgst.ac.in</a>
19	Harshada koli	220A2111	Extc	TE	<a href="mailto:harshadakoli07@gmail.com">harshadakoli07@gmail.com</a>
20	Shreya Pundalik Kadam	120A2022	EXTC	OTHER	<a href="mailto:shreyakextc120@gst.sies.edu.in">shreyakextc120@gst.sies.edu.in</a>
21	Sayali Warde	120A2053	EXTC	OTHER	<a href="mailto:sayaliwextc120@gst.sies.edu.in">sayaliwextc120@gst.sies.edu.in</a>

List of students attended SDP:

Sr.No.	Name	Year	Branch	e-mail Id
1	Chaitanya Shetty	TE	EXTC	<a href="mailto:shettychaitanya19@siesgst.ac.in">shettychaitanya19@siesgst.ac.in</a>
2	Nahush Chandrashekar Bhagat	TE	EXTC	<a href="mailto:nahushbextc220@siesgst.ac.in">nahushbextc220@siesgst.ac.in</a>

3	Avula Mahesh Kanakaiah	TE	EXTC	<a href="mailto:avulakextc220@gst.sies.edu.in">avulakextc220@gst.sies.edu.in</a>
4	Mitesh Haldankar	TE	EXTC	<a href="mailto:miteshhextc220@siesgst.ac.in">miteshhextc220@siesgst.ac.in</a>
5	Yash Kishor Patil	TE	EXTC	<a href="mailto:yashpextc220@siesgst.ac.in">yashpextc220@siesgst.ac.in</a>
6	Kurup Ashwin Venugopalan	TE	EXTC	<a href="mailto:kurupashwin19@siesgst.ac.in">kurupashwin19@siesgst.ac.in</a>
7	Himesh Gawde	TE	EXTC	<a href="mailto:himeshgextc119@gst.sies.edu.in">himeshgextc119@gst.sies.edu.in</a>
8	Bhushan Ghag	TE	EXTC	<a href="mailto:ghagbhushan19@siesgst.ac.in">ghagbhushan19@siesgst.ac.in</a>
9	Melethil shaheem	TE	EXTC	<a href="mailto:melethilsextc119@gst.sies.edu.in">melethilsextc119@gst.sies.edu.in</a>
10	Shruti Narayan Gope	TE	EXTC	<a href="mailto:shrutinarayan19@siesgst.ac.in">shrutinarayan19@siesgst.ac.in</a>
11	Srishti Sharma	TE	EXTC	<a href="mailto:srishtisharma19@siesgst.ac.in">srishtisharma19@siesgst.ac.in</a>
12	Khush Vasudeo Patil	TE	EXTC	<a href="mailto:khushpextc119@gst.sies.edu.in">khushpextc119@gst.sies.edu.in</a>
13	Hiten Sharma	TE	EXTC	<a href="mailto:sharmahiten19@siesgst.ac.in">sharmahiten19@siesgst.ac.in</a>
14	Shreya Pundalik Kadam	TE	EXTC	<a href="mailto:shreyakextc120@gst.sies.edu.in">shreyakextc120@gst.sies.edu.in</a>
15	Sayali Warde	TE	EXTC	<a href="mailto:sayaliwextc120@gst.sies.edu.in">sayaliwextc120@gst.sies.edu.in</a>

### 3. Feedback (Analysis)

No. of students registered feedback: 14

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

1. Design and analyze microstrip line. 4.86

2. Design of line feed and probe feed rectangular patch antenna and develop its applications. 4.71
3. Design and analysis of textile antennas for military applications. 4.50
4. Design and analysis of wide band antennas. 4.79
5. Design of array antennas and antenna optimization. 4.50
6. Design of MIMO antenna and periodic structure.4.71
7. Design of periodic structure. 4.57
8. Some specific comments given by students in feedback

1	Jesno Joseph	It was amazing
2	Nahush Bhagat	Each & every concepts were explained nicely
3	SHRUTI GOPE	Please send the PPTs.
4	Avula Kanakaiah	It was a great experience and knowledge I have gained .
5	HIMESH GAWDE	The session on Periodic Structure would have been even better if conducted offline.

#### **Impact Analysis:**

- 15 students attended Quiz. 07 students scored 80% marks.
- 08 students scored 60% marks.
- 16 students completed miniproject based on antenna design and submitted reports.
- 05 groups decided to do their final year project in antenna design for various applications.

#### **4. Certificate**



## CERTIFICATE OF COMPLETION

This is to Certify That  
**Mitesh Haldankar**  
Has successfully Completed the value-added course on  
**Advanced Antenna Design**  
from **27/6/2022** to **2/7/2022**  
Organized by **Electronics and Telecommunication** department, SIES GST.  
During the internship, he/she has successfully completed the project titled  
**Optimetrics in UWB antenna**

  
**Prof. Vandana Sawant**  
(Course Coordinator)

  
**Dr. Preeti Hemnani**  
(Head of Department)

  
**Dr. Atul kemkar**  
(Principal)