Sarvajanik Education Society
Sarvajanik College of Engineering & Technology
Dr. R. K. Desai Marg, Opp. Mission Hospital,
Athwalines, Surat-395001
SUTEX FACULTY OF ELECTRICAL ENGINEERING

AICTE Sponsored Six Days STTP

On

"Digital Signal Controllers for Control of Power Electronic Converters and Applications"

Series-I (14-19 Decemebr-2020)

Online Mode

Sarvajanik Education Society

SARVAJANIK COLLEGE OF ENGINEERING & TECHNOLOGY, SURAT

ELECTRICAL ENGINEERING DEPARTMENT

AICTE Sponsored
Six Days Online Short Term Training Program
on

DIGITAL SIGNAL CONTROLLERS FOR CONTROL OF POWER ELECTRONIC CONVERTERS AND APPLICATIONS

Organized by

Department of Electrical Engineering

(NBA Accredited)

Dr. Nilesh V. Shah
Coordinator

Prof. Aditi Hajari
Convener, HOD

Dr. Hiren H. Patel
Principal

Dr. Kalpesh Patil
Co-coordinator

Organising committee:
Prof. Sharad Patel, Prof. Hemin Motiwala, Prof. Krishna Vakharia, Prof. Dimple Bhanabhagvanwala

Series-I (14th –19th December-2020) **Series-II (1st –6th March-2021)**

Chief Patron
Shri Kamlesh Yagnik
Chairman, Sarvajanik Education Society

Patrons
Shri Yatish Parekh,
Chairman's Representative, SCET
Dr. Hiren H. Patel, Principal, SCET

Convener
Prof. Aditi Hajari, Head of Department, EED

Coordinator
Dr. Nilesh V. Shah, Associate Professor, EED

Co-coordinator
Dr. Kalpesh Patil, Assistant Professor, EED

Organizing Committee
Prof. Sharad Patel, Associate Professor, EED
Prof. Dimple Bhanabhgwanwala, Assist. Prof., EED
Prof. Krishna Vakharia, Assistant Professor, EED
Prof. Hemin Motiwala, Assistant Professor, EED

Program Monitoring Committee:

1) Dr. Hiren H. Patel, Principal, SCET (Chair Person)
2) Dr. Nilesh V. Shah, Associate Professor, EED, SCET (Program coordinator, Member Secretary)
3) Prof. Aditi Hajari, HOD, EED, SCET (Convener, Member)
4) Dr. Utpal T. Pandya, Professor and Head, Instrumentation and Control Engg. Dept., SCET (Member)
5) Dr. Shabbir Bohra, Professor, EED, SCET (Subject Expert, Member)

Programme Objective: Various applications in the field of power electronics and drives, renewable energy integration to grid, power quality conditioner, Electrical vehicles, instrumentation, automation system, biomedical equipments, communication, image processing etc. are developed using advanced digital signal processors/Microcontrollers. In this context it is of utmost importance to create expertise in this area to not only solve the software/hardware issues related to this applications but to also explore some new areas where these controllers can provide better control or can provide extra feature. Major objective of this short term training program (STTP) is to train the faculties for recent development in Digital Signal Processors/Microcontrollers Architecture, programming and controlling power electronic converters using Digital Signal Controller (DSC) for various applications. This training is also intended to help the researchers and the students to implement and validate their theoretical, analytical or simulation concepts of their research, especially for the domain of power electronics.

Relevance: In most of the UG/PG courses, there is subject of DSP/Microcontroller. Also, for research in the domains such as power electronics and drives, renewable energy integration to grid, active power conditioners, FACTs devices, biomedical Instrumentation, automation system etc. the implementation of the research project requires sound knowledge of some intelligent controller like DSP/Microcontroller. Thus, the knowledge of DSP/Microcontroller programming and its application are unavoidable. Hence, the STTP is designed to disseminate the knowledge about DSP/Microcontroller architecture, programming, and designing through interactive sessions and the hands-on training.

Benefit to Faculty: Faculties teaching the subjects related to DSP/Microcontroller can be benefitted by enhancing/sharing their knowledge through the interaction with the experts in the domain. The STTP can also be useful in guiding research scholar developing applications using DSP/Microcontroller. Faculty can be able to set new experiments in the field of controlling power electronic converters using DSP/Microcontroller.

COURSE CONTENT:

- Recent development in Digital Signal Controllers, architecture, peripherals and programming.
- Control of power electronic converters using digital signal controllers: DSP, ARM Microcontroller, DSPACE.
- Control of Power Electronic converters using DSC for recent applications like renewable energy sources integration with grid, power quality conditioners, distributed generation system, electrical vehicle, electrical drives.

Expected Outcome:

After the successful completion of the STTP, the participants can

- design, develop and debug software using Digital Signal Controller for power electronic converters
- develop embedded system/product using DSC
- develop experiments based on DSC for power electronics as well as other subjects
- validate analytical/simulation results of the research works using DSC based hardware
- Conduct workshop/STTP/FDP for the students, researchers, faculties and/or industries.

Programme Schedule (Series-I):

Day & Date	Session Time	Name of Expert and Affiliation	Topic
	9:00-9:30 AM		Registration
14-12-2020 Monday	**9:30-10:00 AM**		Inauguration
	10:00-11:45 AM	Dr. Kaushik Basu IISC, Bengaluru	Embedded Controllers for Power Electronic Converters
	11:45 AM-1:45 PM	Er. Ketan Patel Edutech Learning Solutions Pvt. Ltd., Vadodara	Introduction to C2000 DSP Architecture, Features, Peripherals
	2:15-4:00 PM	Er. Ketan Patel Edutech Learning Solutions Pvt. Ltd., Vadodara	Programming DSP28335 using code composer studio and demo of peripheral programming
15-12-2020 Tuesday	**9:30-11:30 AM**	Er. Ketan Patel Edutech Learning Solutions Pvt. Ltd., Vadodara	Control of Induction Motor/BLDC Motor using DSP28335, related peripherals and demo
	11:45 AM-1:30 PM	Dr. V. K. Shah ABB, Vadodara	Digitalisation in Electrical Power Systems- Evolutionary Trend
	2:00-4:00 PM	Prof. Dr. P. N. Tekwani Professor, Nirma University, Ahmedabad	Multi-level Inverter and Converters: their Control and Applications
16-12-2020 Wednesday	**10:00-11:45 AM**	Prof. Janak Patel SVNIT, Surat	Introduction to STM32 (ARM CORTEX M4) Microcontroller, Features, Peripherals
	11:45 AM-1:30 PM	Prof. Jasmin Patel Dr. S. & S. S. Ghandhy Engg. College, Surat	Programming STM32 (ARM Cortex- M4) Microcontroller, demo of peripheral programming
	2:00-4:00 PM	Dr. M. A. Mulla SVNIT, Surat	Laboratory Experimentation of VSC-based FACTS Controller.
17-12-2020 Thursday	**9:30-11:30 AM**	Prof. Jasmin Patel	Programming STM32 (ARM Cortex- M4) Microcontroller, demo of peripheral programming
	11:45 AM-1:30 PM	Prof. Janak Patel SVNIT, Surat	Design and Development of High Speed Data Acquisition Card using STM32 Microcontroller (Lab demo)
	2:00-4:00 PM	Dr. Krishna Vasudevan Professor, IIT, Madras	Control of Inverters for Grid Connected Photovoltaic Systems

Day & Date	Session Time	Name of Expert and Affiliation	Topic
18-12-2020 Friday	10:00-11:45 AM	Dr. Sabharaj Arya SVNIT, Surat	Design and Control of Custom Power Devices
	11:45 AM-1:30 PM	Mr. Pratik D Chaudhari, Mr. Utkarsh Pusadkar, Mr. Vaibhav Suryawanshi Dynafusion, Bengaluru	Rapid Control Prototyping – MicroLabBox **Demo:** ACMC Kit with Motor Control Applications
	2:15-4:00 PM	Mr. Tejas MK & Mr. Amandeep Singh, Dynafusion, Bengaluru	dSPACE Solution for Generic topology-oriented Modelling: Electrical Power Systems Simulation **Demo**: Electrical Power Systems Simulation
19-12-2020 Saturday	9:30-11:00 AM	Dr. V. A. Shah SVNIT, Surat	Application of Digital Signal Controller in Electrical Vehicle
	11:00-12:30 AM	Dr. Nilesh V. Shah SCET, Surat	Grid Interactive Photovoltaic System Operating under Uniform and Non-uniform Insolation Conditions
	12:30-2:00 PM	Dr. Nilesh V. Shah	Hardware Implementation of Grid Interactive Photovoltaic System using DSP28335
	2:30-4:00 PM	Dr. R. Chudamani SVNIT, Surat	Maximum Torque Per Ampere (MTPA) control of Interior Permanent Magnet Machine
	4:00-5:00 PM		Valedictory & Test

RESOURCE PERSONS (Series-I):

The resource persons invited for Series-I of STTP are from IIT, NIT, other reputed institutions and industry as well as from the host institute as listed below:

Dr. Kaushik Basu, IISC, Bengaluru
Dr. Krishna Vasudevan, IIT, Madras
Dr. V. K. Shah, ABB, Vadodara
Er. Ketan Patel, Edutech Learning Solutions Pvt. Ltd., Vadodara
Dr. P. N. Tekwani, Nirma University, Ahmedabad
Prof. Janak Patel, SVNIT, Surat
Dr. M. A. Mulla, SVNIT, Surat
Dr. V. A. Shah, SVNIT, Surat
Dr. R. Chudamani, SVNIT, Surat
Dr. Sabharaj Arya, SVNIT, Surat
Prof. J. M. Patel, Dr. S. & S. S. Ghandhy college of Engg. & Tech., Surat
Dr. Nilesh V. Shah, SCET, Surat
Engineers from Dynafusion, Bengaluru

Total Number of Registration (Series-I):

We had received 82 registrations for series–I. Based on the completion of the STTP and Test conducted by Programme Monitoring Committee, 43 participants have successfully completed the STTP Series-I. The list of participants of series-I who had successfully completed the STTP is mentioned below:

Sr. No.	Registr-ation ID	Name of Participant	Name of Institute	E-mail ID
1	DSC101	Mr. Rahul Raj R	Rajiv Gandhi Institue of Technology (GEC), Kottayam	rahulrajab17@gmail.com
2	DSC105	Mr. Makwana Dharmendra Himmatbhai	Shri Satsangi Saketdham Ram Ashram Group of Institutions, Vadasma	dharmendramakwana1991@gmail.com
3	DSC106	Mr. Prajapati Ketankumar Amthabhai	Shri Satsangi Saketdham Ram Ashram Group of Institutions, Vadasma	ketan.718@gmail.com
4	DSC107	Mr. Shreyas Babulal Patel	Shri Satsangi Saketdham Ram Ashram Group of Institutions, Vadasma	patel.shreyas17@gmail.com
5	DSC108	Mr. Tarunkumar Dashrathbhai Patel	Shri Satsangi Saketdham Ram Ashram Group of Institutions, Vadasma	ptarun611@gmail.com
6	DSC109	Mr. Anandkumar Girishkumar Acharya	Shri Satsangi Saketdham Ram Ashram Group of Institutions, Vadasma	acharya.anand8@gmail.com
7	DSC110	Mr. Janakkumar B. Patel	S. N. Patel Institute of Technology and Research Centre, Bardoli	janak.patel@snpitrc.ac.in
8	DSC112	Ms. Shahana Beegum O S	Rajiv Gandhi Institue of Technology (GEC), Kottayam	shahanabeegumos@gmail.com
9	DSC113	Ms. Anjumol Annie Varghese	Rajiv Gandhi Institue of Technology (GEC), Kottayam	anjuan.varghese@gmail.com
10	DSC114	Mr. Arunmaneesh R B	Rajiv Gandhi Institue of Technology (GEC), Kottayam	arunmaneeshrb@gmail.com
11	DSC115	Mr. Elias Abraham Roy	Rajiv Gandhi Institue of Technology (GEC), Kottayam	eliasabrahamroy@gmail.com
12	DSC116	Ms. Sindhu P Nair	Rajiv Gandhi Institue of Technology (GEC), Kottayam	sndhpnair@gmail.com
13	DSC117	Ms. Arya Sreekumar	Rajiv Gandhi Institue of Technology (GEC), Kottayam	aryasreekumar1996@gmail.com
14	DSC118	Ms. Gayathri K S	Rajiv Gandhi Institue of Technology (GEC), Kottayam	gayathriks521@gmail.com
15	DSC119	Mr. Rajeshkumar Mukhtar Prasad	Sarvajanik College of Engineering & Techology,Surat	rajesh.prasad@scet.ac.in
16	DSC120	Ms. Renuka Rasal	Sanjivani College of Engineering, Kopargaon	renukarasal1995@gmail.com
17	DSC121	Mr. HIREN JARIWALA	Shroff S. R. Rotary Institute of Chemical Technology, Ankleshwar	hiren.jariwala@srict.in
18	DSC122	Ms. Divya Chandran	Rajiv Gandhi Institue of Technology (GEC), Kottayam	divyachandrandivya@gmail.com
19	DSC123	Mr. Kashyap Mukesh Gandhi	Tolani Foundation Gandhidham Polytechnic, Gandhidham	kashyapeee@gmail.com
20	DSC124	Mr. Dennis Thomas	Amal Jyothi College of Engineering, Kerala	dennisthomas@amaljyothi.ac.in

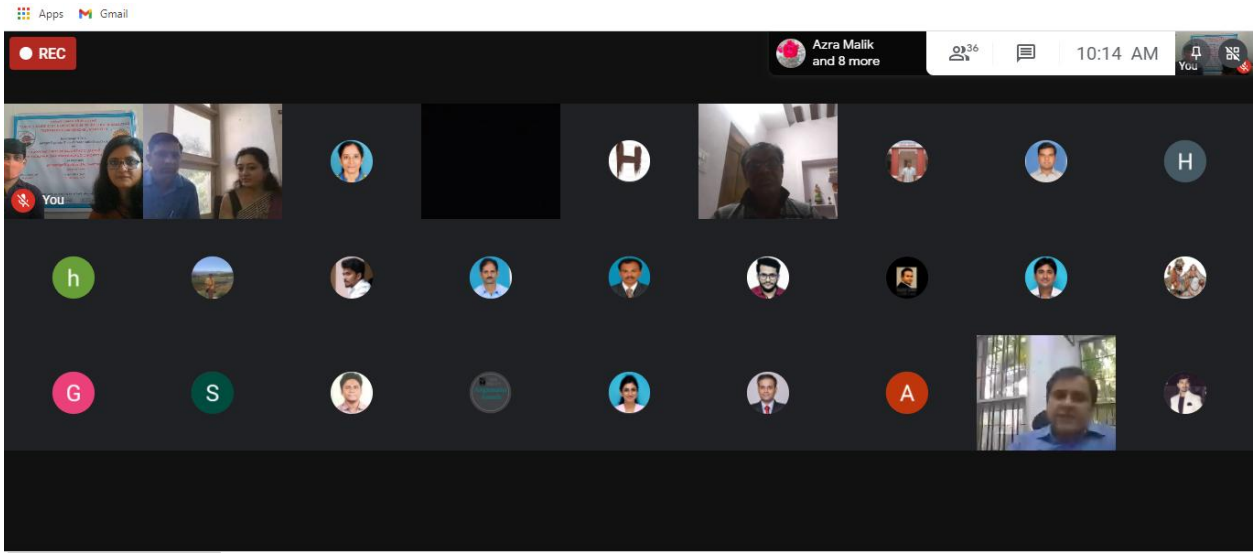
Sr. No.	Registr-ation ID	Name of Participant	Name of Institute	E-mail ID
21	DSC125	Mr. Satvinder Singh	J C Bose University of Science and technology YMCA, Faridabad	narwalsatvinder@gmail.com
22	DSC126	Mrs. Manishaben Divyeshkumar Gohil	Sardar Vallabhbhai Patel National Institute of Technology, Surat	mc@eed.svnit.ac.in
23	DSC127	Mr. Nikunjkumar Nareshbhai Patel	U. V. Patel College of Engg., Ganpat University, Mehsana	nnp01@ganpatuniversity.ac.in
24	DSC128	Mr. Uvesh Sipai	Marwadi University, Rajkot	uvesh.sipai@marwadieducation.edu.in
25	DSC129	Ms. Shilpa Xavier	Rajiv Gandhi Institue of Technology (GEC), Kottayam	shilpakallunkal95@gmail.com
26	DSC130	Mr. Nikhil Bhati	Engineering College, Bikaner	nikhilbhati@hotmail.com
27	DSC131	Mr. Shahal Puliyancheri	Rajiv Gandhi Institue of Technology (GEC), Kottayam	shahal2k17@gmail.com
28	DSC133	Ms. Azra Malik	Jamia Millia Islamia University, Delhi	amrocks.t786@gmail.com
29	DSC136	Mr. Adil Ayub Sheikh	Visvesvaraya National Institute Of Technology, Nagpur	sheikhadil445@gmail.com
30	DSC137	Mr. Ravikumar Kenguva	GVP College of Engineering (Autonomous),Andhra Pradesh	kraveee@gmail.com
31	DSC138	Dr. Salman Ahmad	Islamic University of Science and Technology, Awantipora	salman.ahmad@islamicuniversity.edu.in
32	DSC141	Mr. Anshuman Nayak	College of Engineering, Bhubaneswar	anshumannayak@gmail.com
33	DSC142	Dr. Urvi Nikunj Patel	Dr. S.& S.S.Ghandhy Government Engineering College, Surat	urvip3004@gmail.com
34	DSC143	Mr. Ranjithkumar B.	College of Engineering, Guindy	mbsrk88@gmail.com
35	DSC147	Mr. Bhavik Arvindbhai Brahmbhatt	Government Engineering College, Modasa	bhavik0072009@gmail.com
36	DSC148	Mr. Hardik D. Pandya	Sarvajanik College of Enginering &Techology, Surat	hardik.pandya@scet.ac.in
37	DSC151	Ms. Dharita Patel	BVM Engineering College, V.V. Nagar	dkpatel@bvmengineering.ac.in
38	DSC152	Dr. T.Suresh Padmanabhan	EGS Pillay Engineering College (AUTONOMOUS), Nagore	drtsp@egspec.org
39	DSC153	Mr. Angamuthu	PSG College of Technology, Coimbatore	aam.eee@psgtech.ac.in
40	DSC155	Mr. Raj Aryan	National Institue of Techology, Silchar	rajaryan.annamalai@gmail.com
41	DSC156	Mr. Chanakya Bharatbhai . Bhatt	Nirma University, Ahmedabad	chanakya.bhatt@nirmauni.ac.in
42	DSC157	Mr. Rajib Kumar Kar	CVR College Of Engineering,Telangana	rajibkrkar@yahoo.co.in
43	DSC159	Dr. A. S. S. Murugan	CVR College Of Engineering,Telangana	assm17174@gmail.com

Details of Day-wise session of STTP (Series-I)

Day-1 (Monday) (14th December-2020)

The first day of the STTP started with the inauguration ceremony headed by MOC Prof. Dimple Bhanabhagwanwala and Prof. Krishna Vakharia, Assistant Professors of Electrical Engineering Department, SCET. By offering warm welcome to the participants and guests present in the inauguration ceremony, Dr. Nilesh V. Shah, Associate Professor, Program Coordinator of the STTP presented brief introduction about the program objective, relevance, content of the STTP and expert speakers chosen for the STTP. Followed by brief introduction about the program, Dr. Hiren Patel, Principal, SCET has briefed participants about the organization SCET, one of the oldest self finance engineering college in Gujarat and its contribution in teaching-learning process in the engineering and technology in the region. Dr. Patel motivated participants to take benefit of the STTP by actively participating in the sessions. Finally, Dr. Kalpesh Patel, Co-coordinator of the STTP has given vote of thanks to AICTE for giving permission for organizing the STTP; Principal SCET, Management, Technical and Non-technical teams associated in organizing the STTP as well as participants for showing their interest in the STTP.

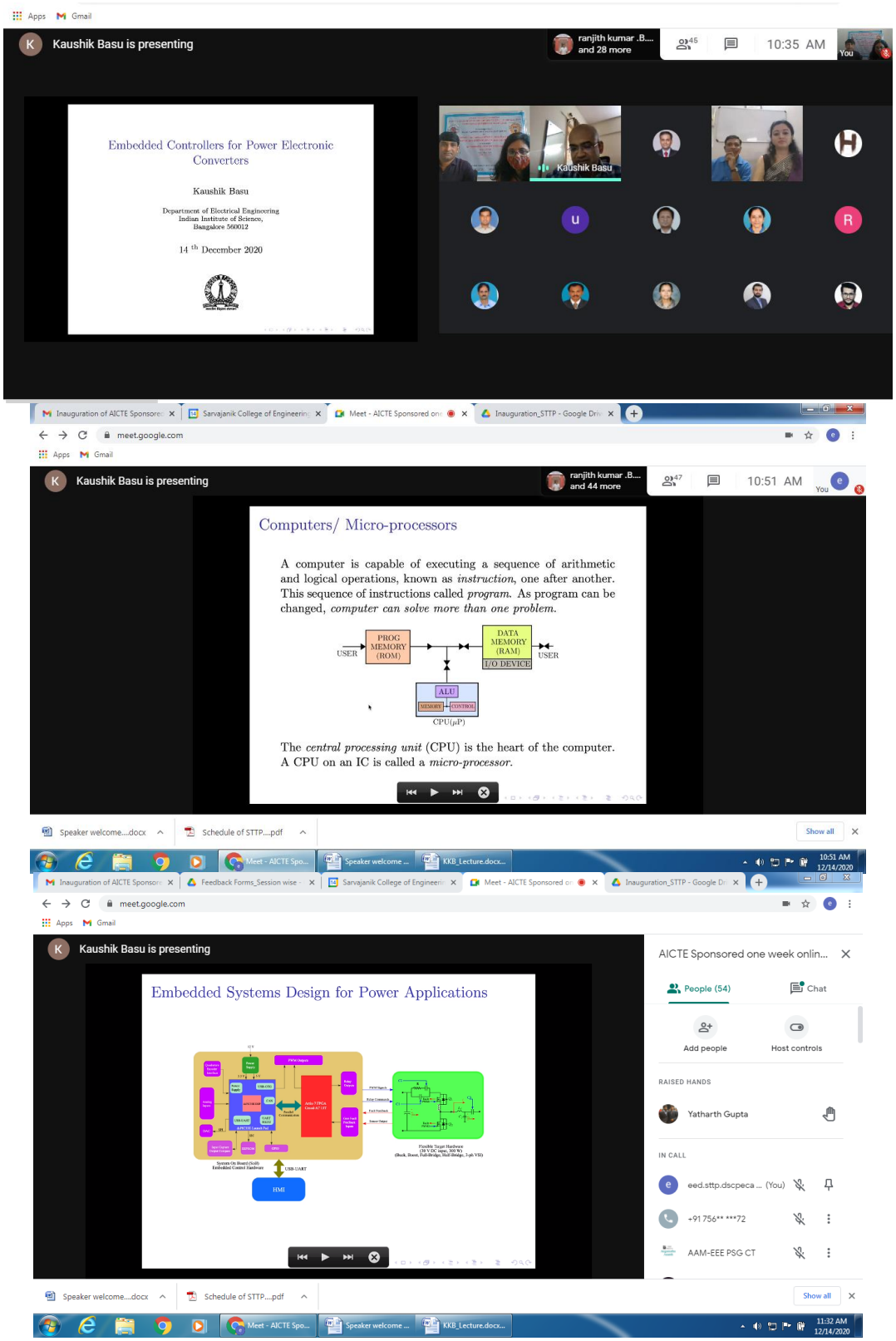
STTP Team



Glimpse of Inauguration on 14th December-2020

Day-I Session-I

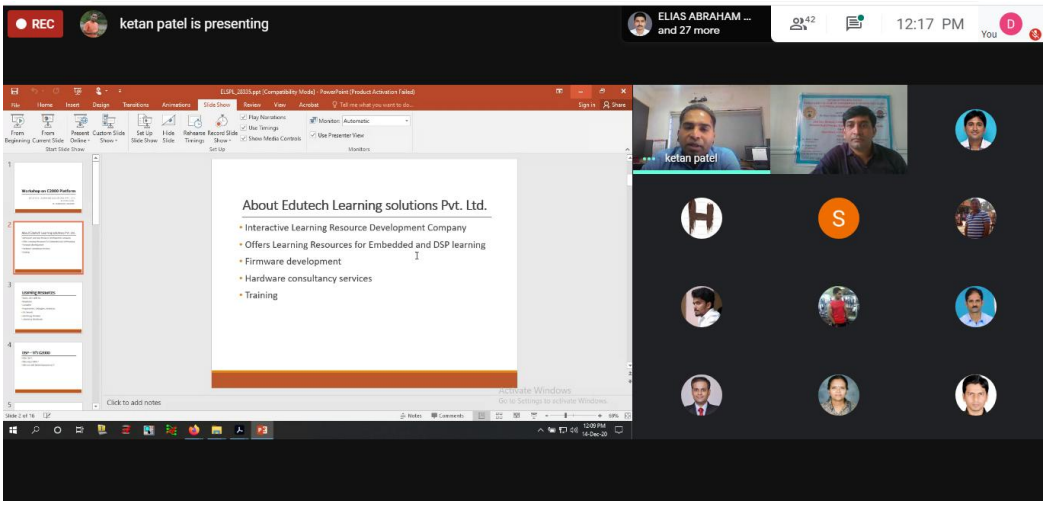
The STTP started with first keynote session on “Embedded Controllers for Control of Power Electronic Converters” delivered by Dr. Kaushik Basu, IISC bengaluru. Dr. Basu explained about different types of controllers like DSP, Microcontroller, FPGA and their major features. The need for these controllers for control of various power electronics converters applications was well elaborated by Dr. Basu. His talk charged participants about the overall STTP theme and need for learning such topics. Participants had enjoyed the session and appreciated the queries addressed by Dr. Basu.

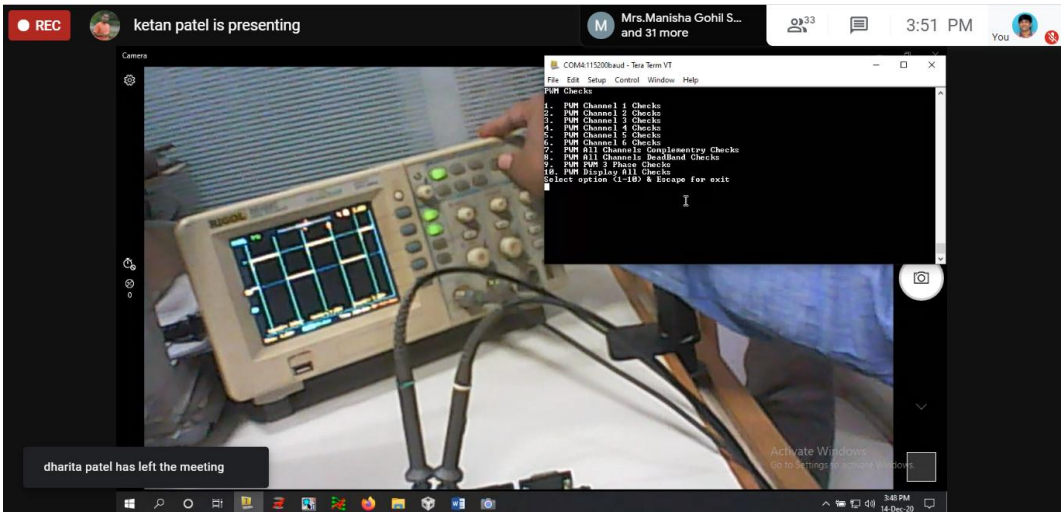


Glimpse of Day-1 session-I by Dr. Kaushik Basu, IISC Bengaluru

Day 1 Session-II & Session-III

On day-1, session-II and session-III were delivered by an industrial expert Er. Ketan Patel form Edutech Learning solutions PVT. Ltd, Vadodara. Seesion-II was on Introduction to Texas Instruments C2000 DSP Architecture, Features and Peripherals. Er. Ketan has briefly discussed about C2000 family of digital signal processors, major features and applications. The architecture of TMS320F2812 and TMS320F28335 DSPs which are useful for motor control and major electrical control applications were explained in details with associated peripherals. In session-III, programme development tool Code composure studio for TMS320F28335 is explained. The programming of various peripherls such as PWM timer, ADC, DAC using TMS320F28335 has been demonstrated in online mode. Finally, Er. Ketan very patiently solved the queries of the participants on programming and debugging software of TMS320F28335 DSP using code composure studio.



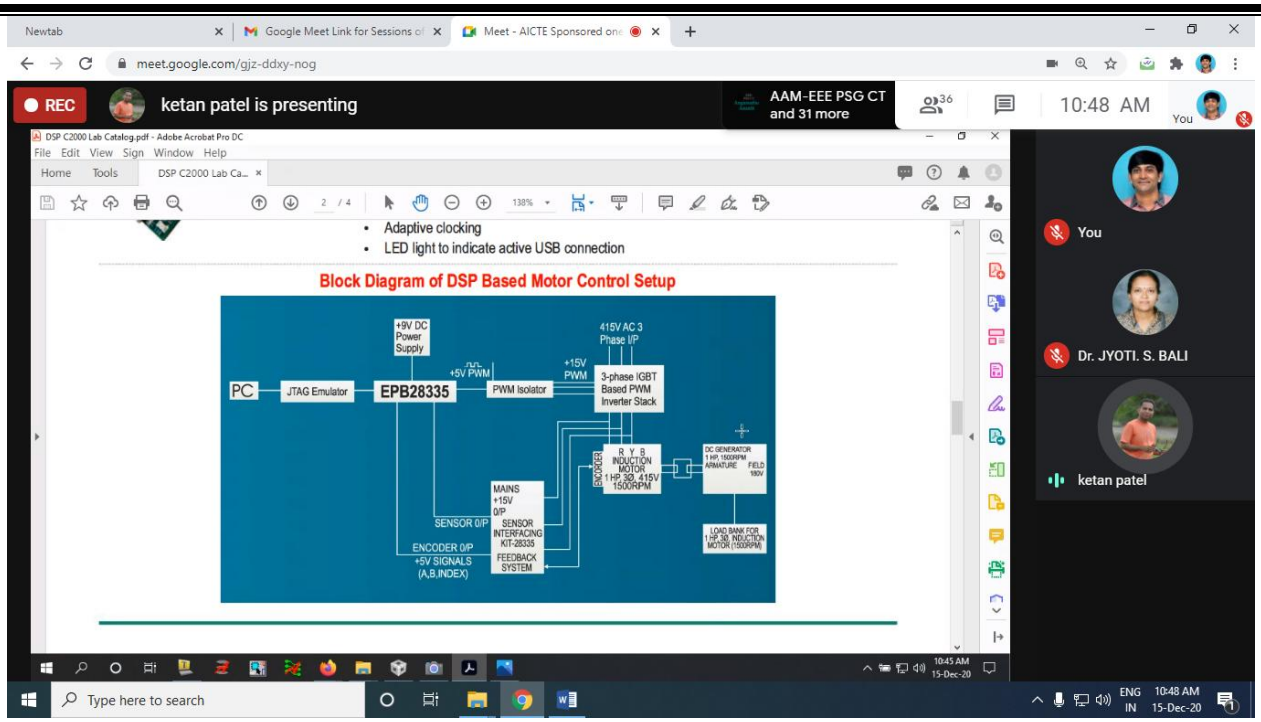


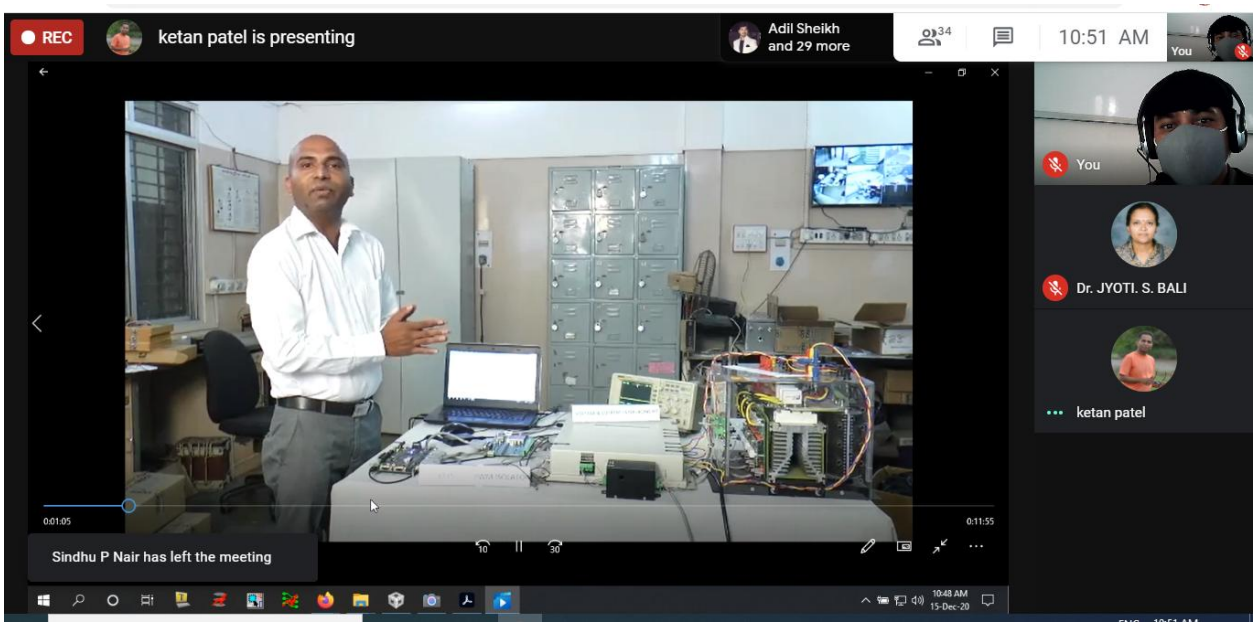
Glimpse of Day-1 session-II & III by Er. Ketan Patel from Edutech Learning Solutions Pvt. Ltd., Vadodara

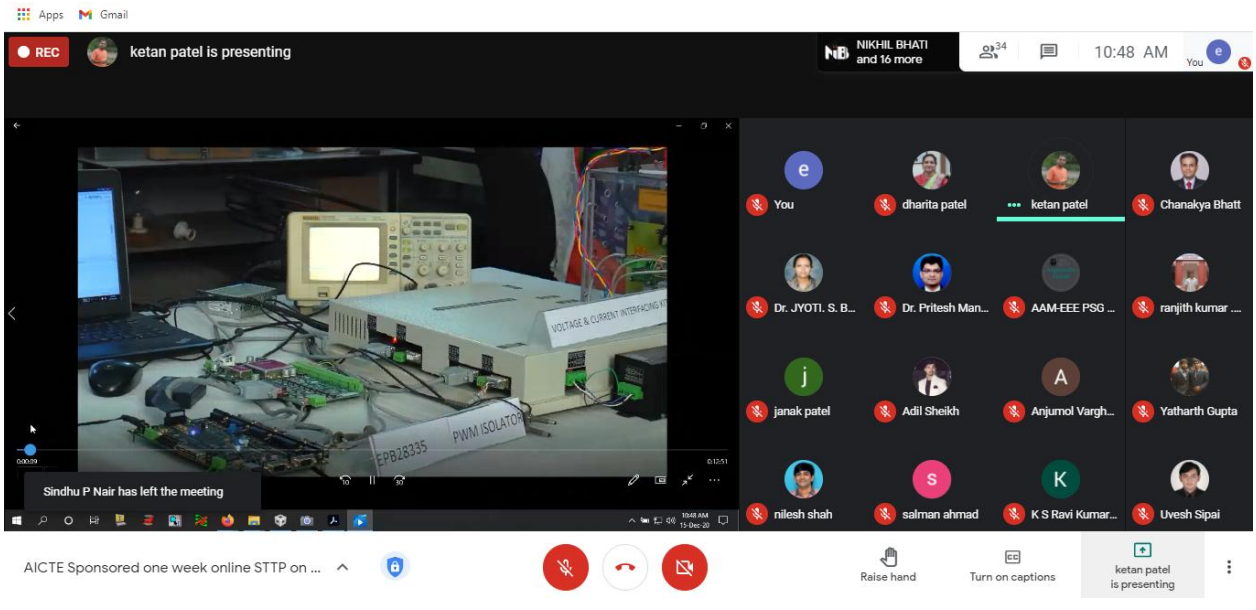
Day-2 (Tuesday) (15th December-2020)

Day-2 session-I

The first session of Day-II was again delivered by Er. Ketan Patel of Edutech Learning Solutions Pvt. Ltd. Vadodara. He explained the control of Induction Motor and BLDC Motor using TMS320F28335 with related programming and use of peripherals. He also demonstrated the applications of controlling Induction motor as well as BLDC motor remotely through recorded videos. The participants appretiated the practical session on demostration of Induction motor and BLDC motor control using TMS320F28335 by Er. Ketan Patel.



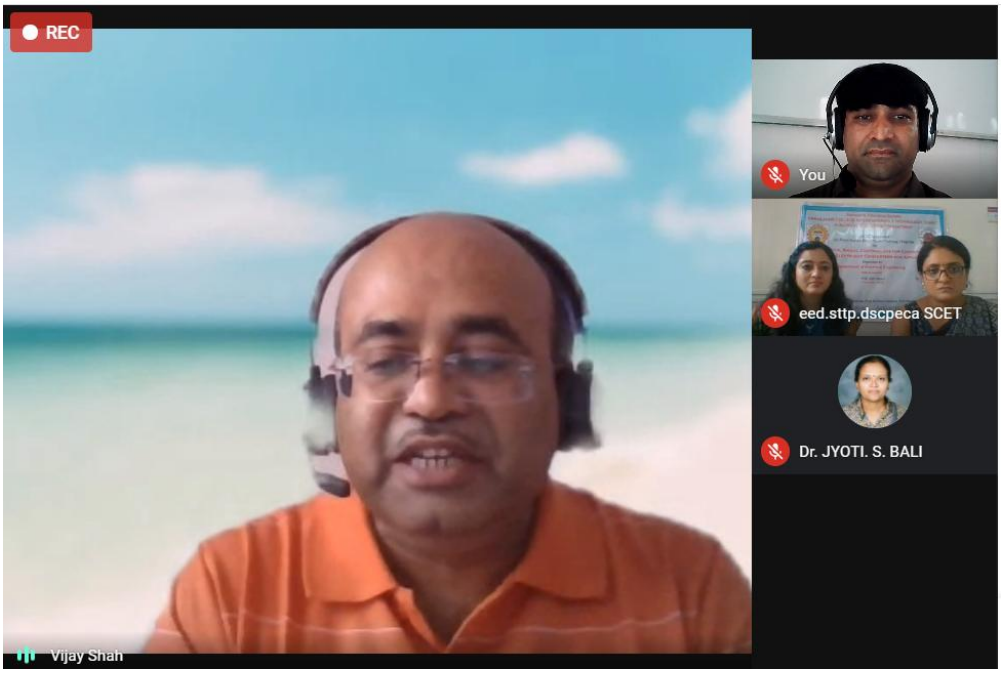


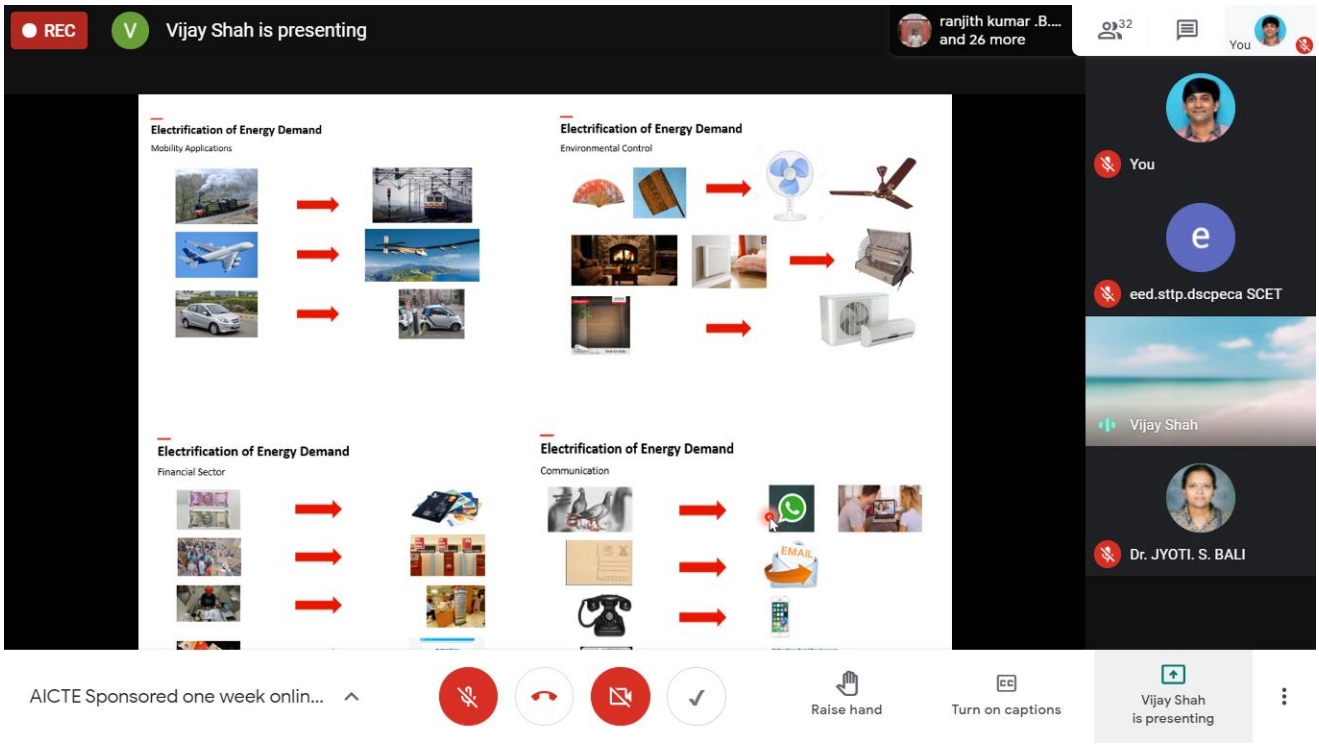


Glimpse of Day-2 session-I by Er. Ketan Patel from Edutech Learning Solutions Pvt. Ltd., Vadodara

Day-2 Session-II

The second session on day-II has been delivered by an eminent Industry expert Dr. V. K. Shah from ABB, Vadodara. Dr. V. K. Shah delivered a talk on "Digitalisation in Electrical Power Systems- Evolutionary Trend". He discussed about the trends of development in Microprocessors, Microcontrollers and DSP processors as demanded by various applications. His discussion majorly covered Digitalisation in Electrical Power Systems. The evolutionary trends in applications of processors and their control for protection of power system as well as HVDC system were of interesting parts covered by Dr. V. K. Shah. He discussed about scope of the controllers in enhancing the power system operation and control with advancements in Numerical relay and protective devices. Dr. V. K. Shah's vast industrial experience in the domain added a different flavour in the session and everyone appreciated the session very much.

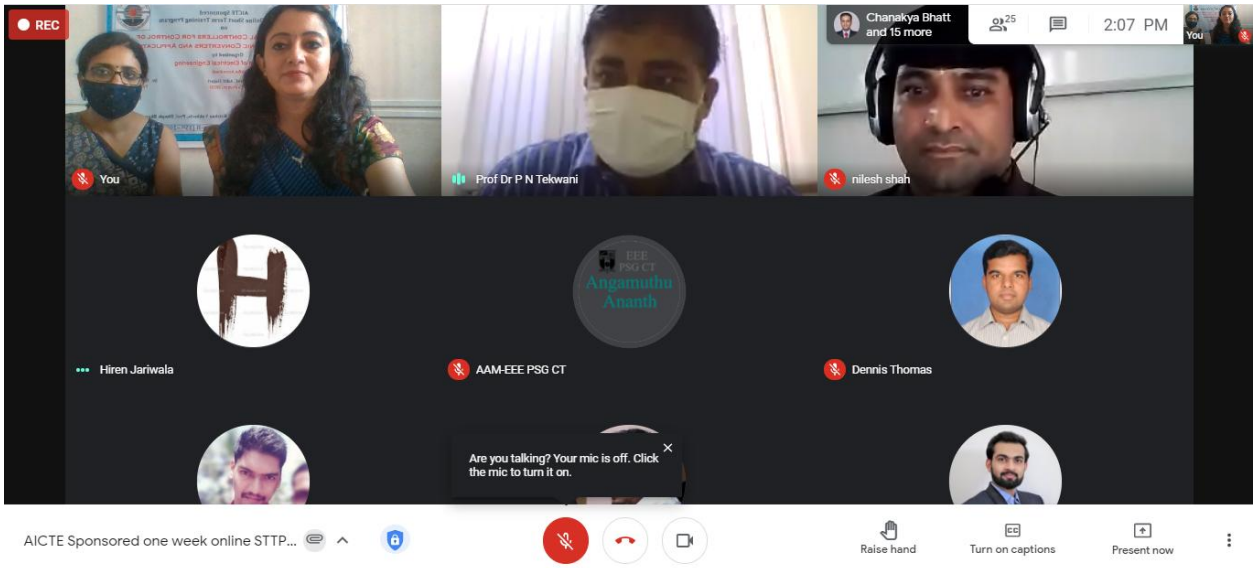


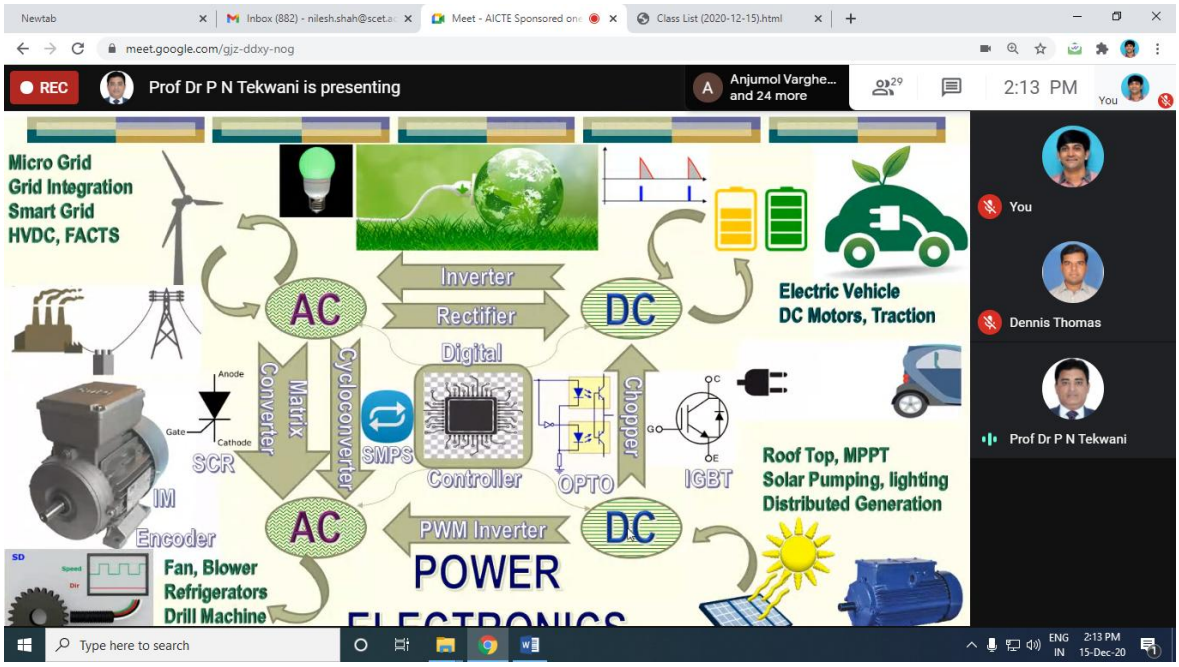


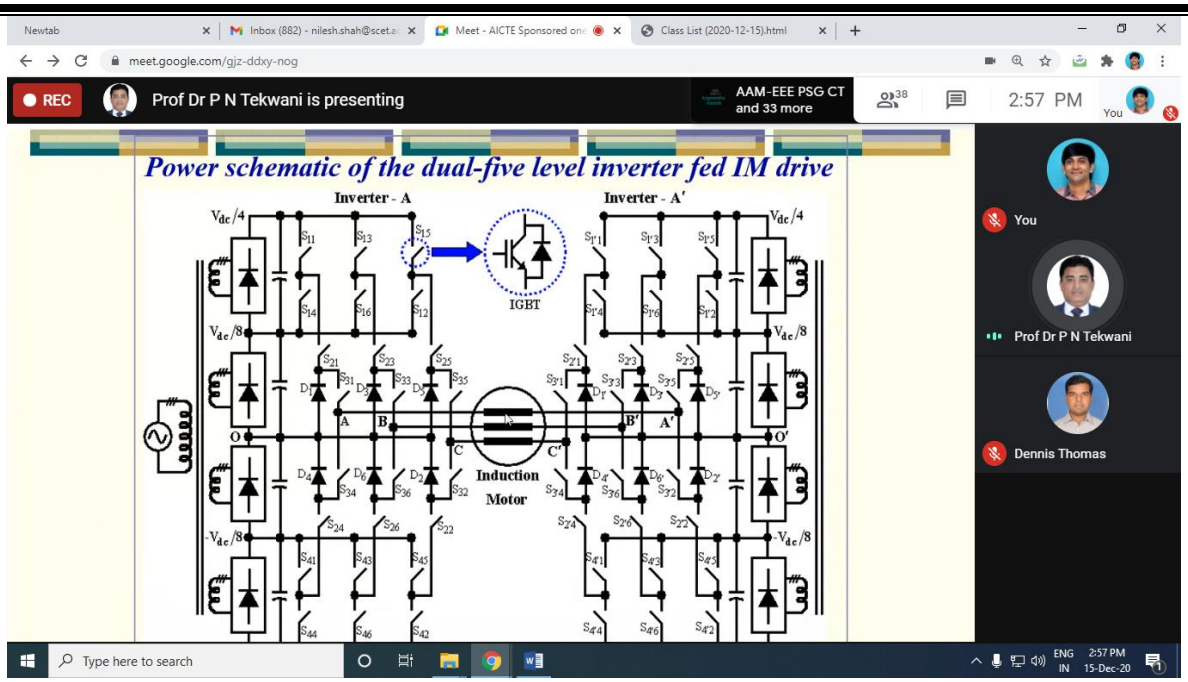
Glimpse of Day-2 Session-II delivered by Dr. V. K. Shah, ABB, Vadodara

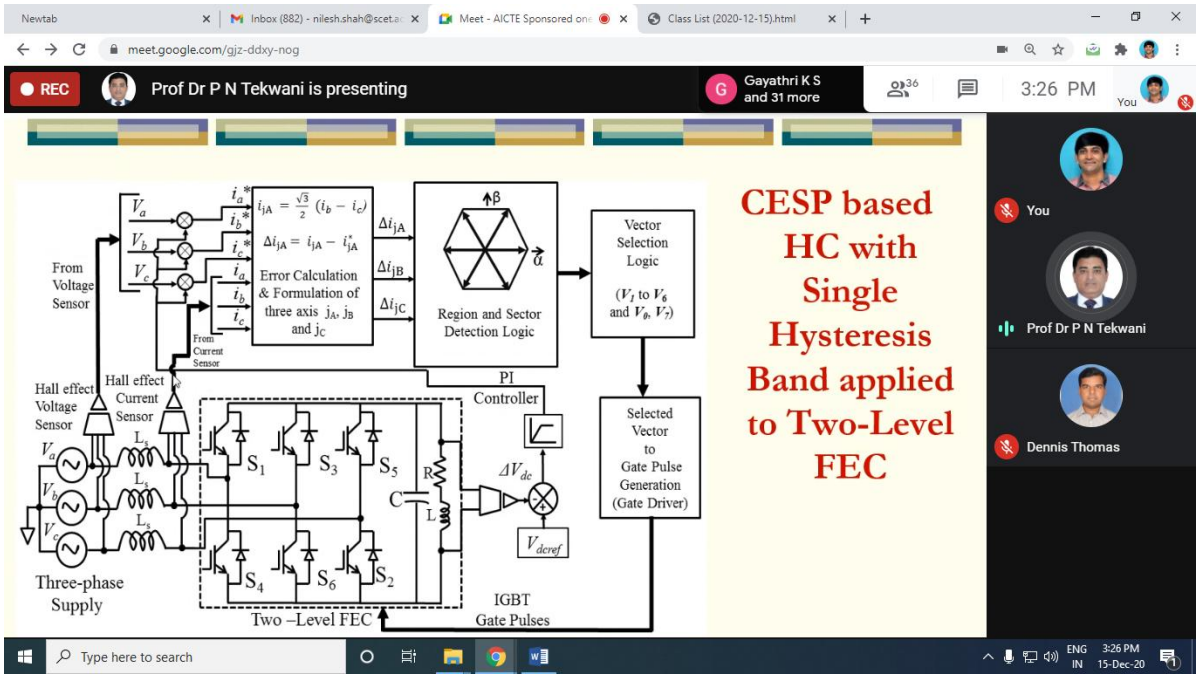
Day-2 session-III

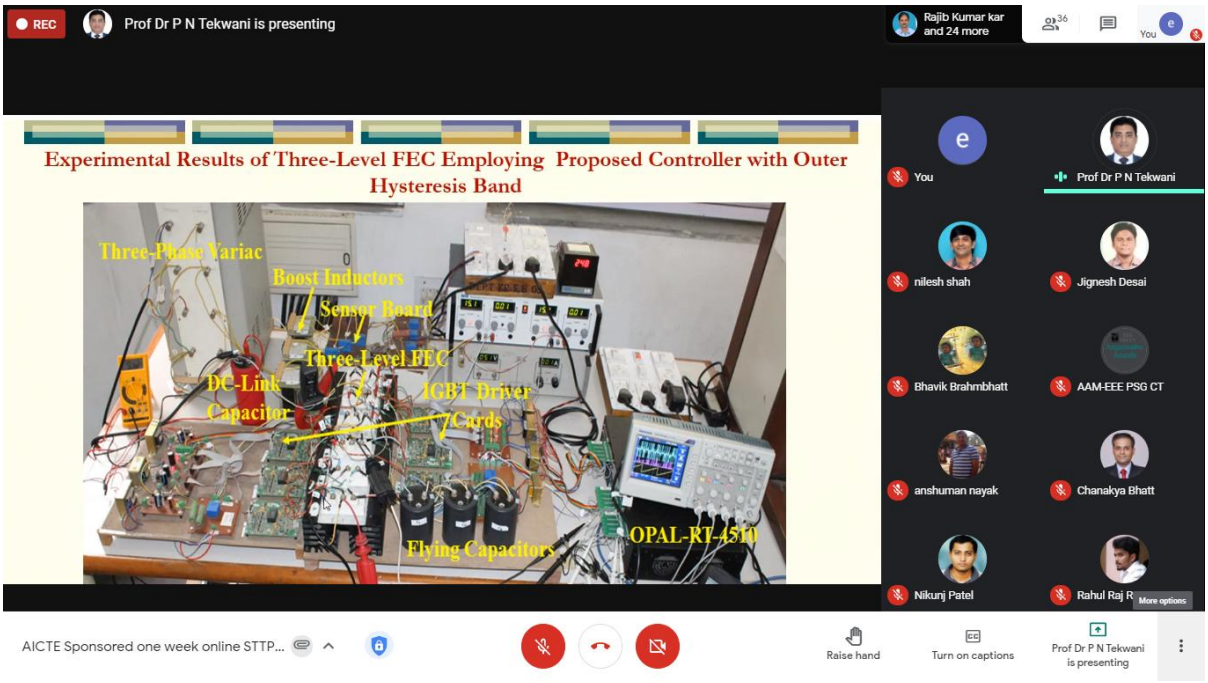
On day-2, last session was delivered by Dr. P. N. Tekwani, Professor, Nirma University. Dr. Tekwani delivered a talk on Multi-level Inverter and Converters: their Control and Applications. He had covered basic multilevel inverter topologies such as Cascaded H-Bridge MLI, Diode clamped MLI, Flying Capacitor MLI and control schemes. Dr. Tekwani also discussed various advanced topologies of MLI and its control schemes. He demonstrated MLI based Front End Converter topology with detailed design concepts and control using TMS320F28335 DSP. He had also demonstrated control of three-level MLI using OPAL-RT tool. Participants got enough insight about MLI topologies and their control using DSP and OPAL-RT.

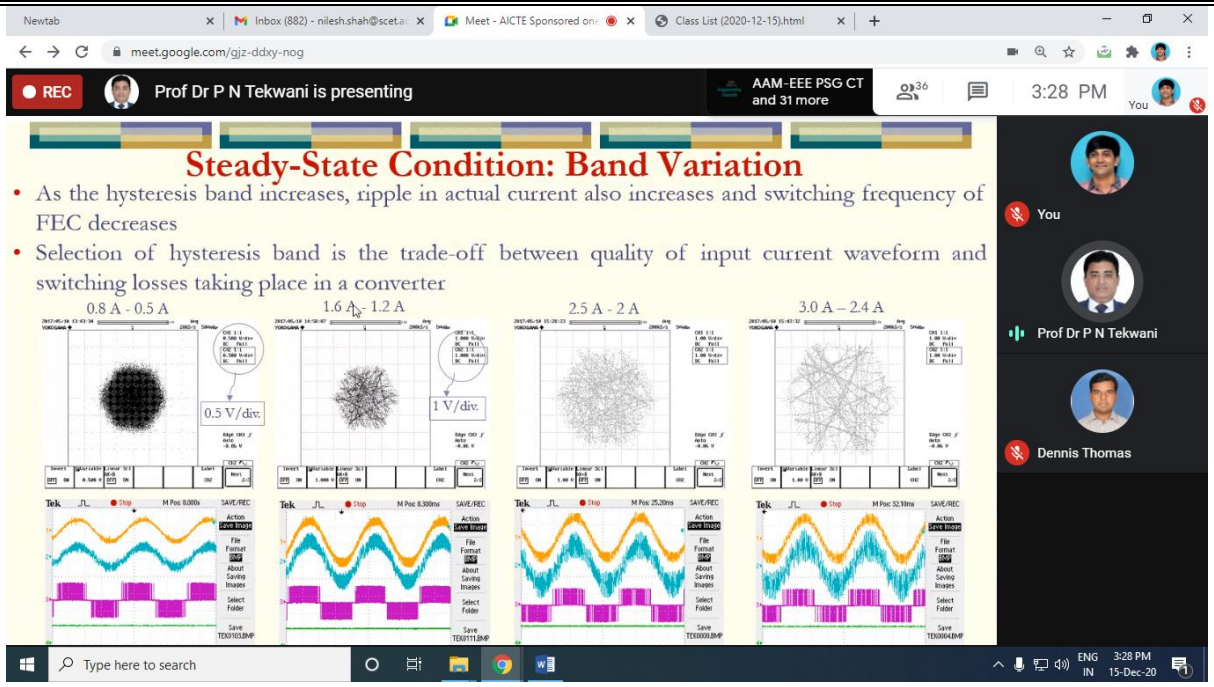





REC
Prof Dr P N Tekwani is presenting
AAM-EEE PSG CT and 33 more
2:57 PM
You
Power schematic of the dual-five level inverter fed IM drive
Inverter - A
Inverter - A'
IGBT
Induction Motor
You
Prof Dr P N Tekwani
Dennis Thomas
Type here to search
ENG IN 2:57 PM 15-Dec-20


REC
Prof Dr P N Tekwani is presenting
Gayathri K S and 31 more
3:26 PM
You
CESP based HC with Single Hysteresis Band applied to Two-Level FEC
From Voltage Sensor
Hall effect Voltage Sensor
Hall effect Current Sensor
Three-phase Supply
Error Calculation & Formulation of three axis
Region and Sector Detection Logic
Vector Selection Logic
PI Controller
Selected Vector to Gate Pulse Generation (Gate Driver)
IGBT Gate Pulses
Two –Level FEC
You
Prof Dr P N Tekwani
Dennis Thomas
Type here to search
ENG IN 3:26 PM 15-Dec-20


REC
Prof Dr P N Tekwani is presenting
Rajib Kumar kar and 24 more
Experimental Results of Three-Level FEC Employing Proposed Controller with Outer Hysteresis Band
Three-Phase Variac
Boost Inductors
Sensor Board
Three-Level FEC
DC-Link Capacitor
IGBT Driver Cards
Flying Capacitors
OPAL-RT-4510
You
Prof Dr P N Tekwani
nilesh shah
Jignesh Desai
Bhavik Brahmbhatt
AAM-EEE PSG CT
anshuman nayak
Chanakya Bhatt
Nikunj Patel
Rahul Raj R
More options
AICTE Sponsored one week online STTP...
Raise hand
Turn on captions
Prof Dr P N Tekwani is presenting



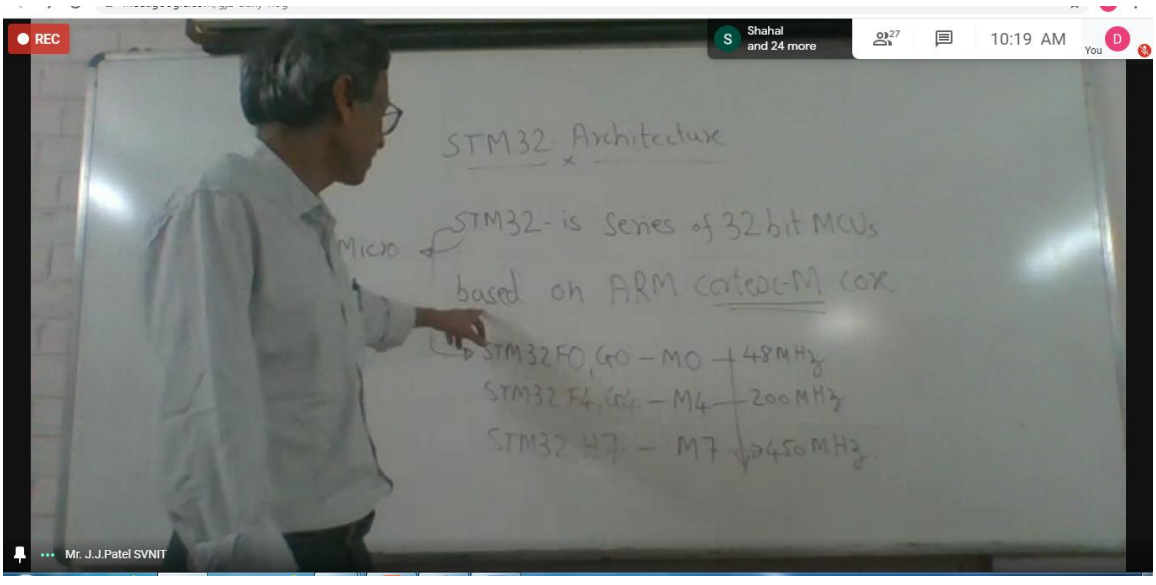
Glimpse of Day-2 Session-III by Prof. P. N. Tekwani, Nirma University, Ahmedabad

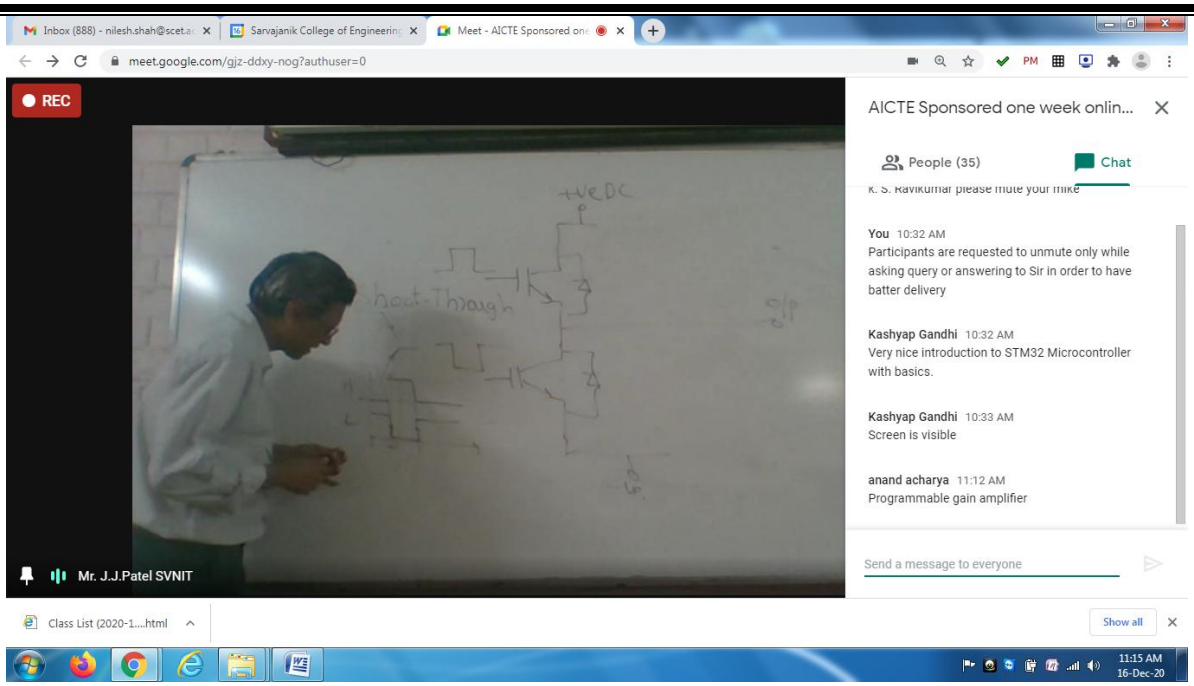
Thus, by the end of day-2, participants had learned the architecture, programming and various applications of Texas instruments DSPs TMS320F28xx with practical demonstration sessions presented by eminent domain experts.

Day-3 (Wednesday) (16th December-2020)

Day 3 Session-I

On day-3, First session was delivered by Prof. Janak J. Patel from SVNIT, Surat on "Introduction to STM32 (ARM CORTEX M4) Microcontroller, Features, Peripherals". Prof. Janak Patel has briefly discussed about ARM Cortex Microcntroller family, major features, onchip peripherals and applications. The architecture of STM32 ARM CORTEX M4 32-bit microcontroller with a goal of control of power electronic converters for various applications was excellently explained in detail with associated peripherals. Prof. Patel had strongly addressed the mathematical and peripheral power of STM32 Cortex M4 series ARM controller for different power electronic applications. Prof. patel had continously interacted with the participants during the session. The talk was delivered in the form of presentation as well as white-board teaching in online mode from the department of electrical engineering at SCET which was very much appreciated by the participants.

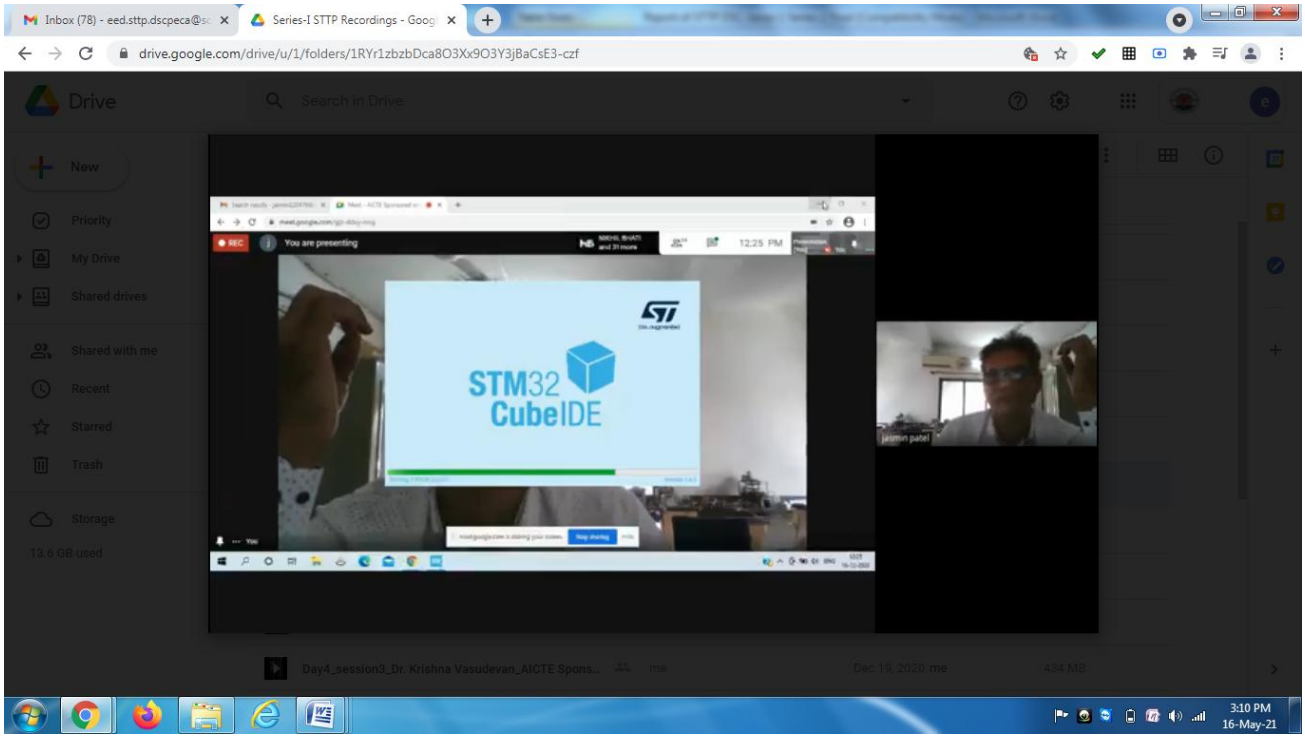


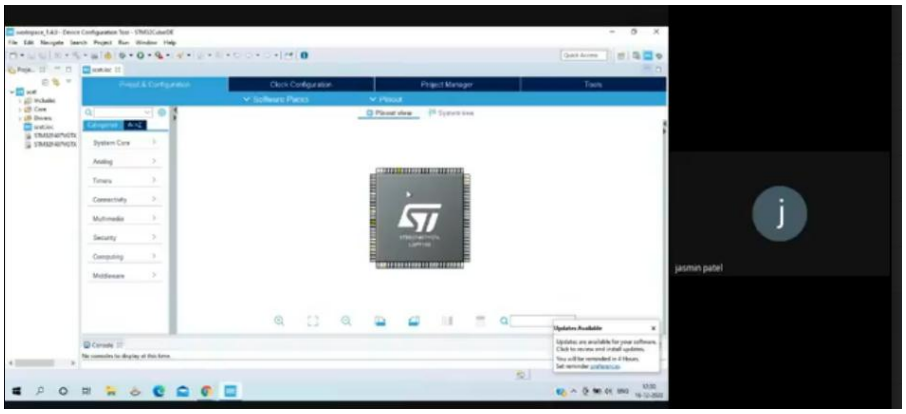


Glimpse of Day-3 Session-I by Prof. Janak Patel, EED, SVNIT, Surat

Day-3 Session-II

Second session of day-3 was delivered by Prof. Jasmin Patel from Dr. S. & S. S. Ganghy Engineering College, Surat on "Programming STM32 (ARM Cortex- M4) Microcontroller, demo of peripheral programming". Professor Jasmin explained various methods of programming STM32 ARM microcontroller. Highlighting, simplicity and ease of programming, Prof. Jasmin explained programming STM 32 microcontroller by using STM Cube IDE. He explained the development, compiling, program downloading and debugging techniques with online demonstration. He also explained STM32 GPIO port peripheral in detail and demonstrated STM32 Microcontroller Port-Programming. At the end of the talk, he developed confidence in participants about program development for STM32 Microcontroller using STM32 Cube IDE. Participants appreciated the practical oriented talk with demonstration presented by Prof. Jasmin.

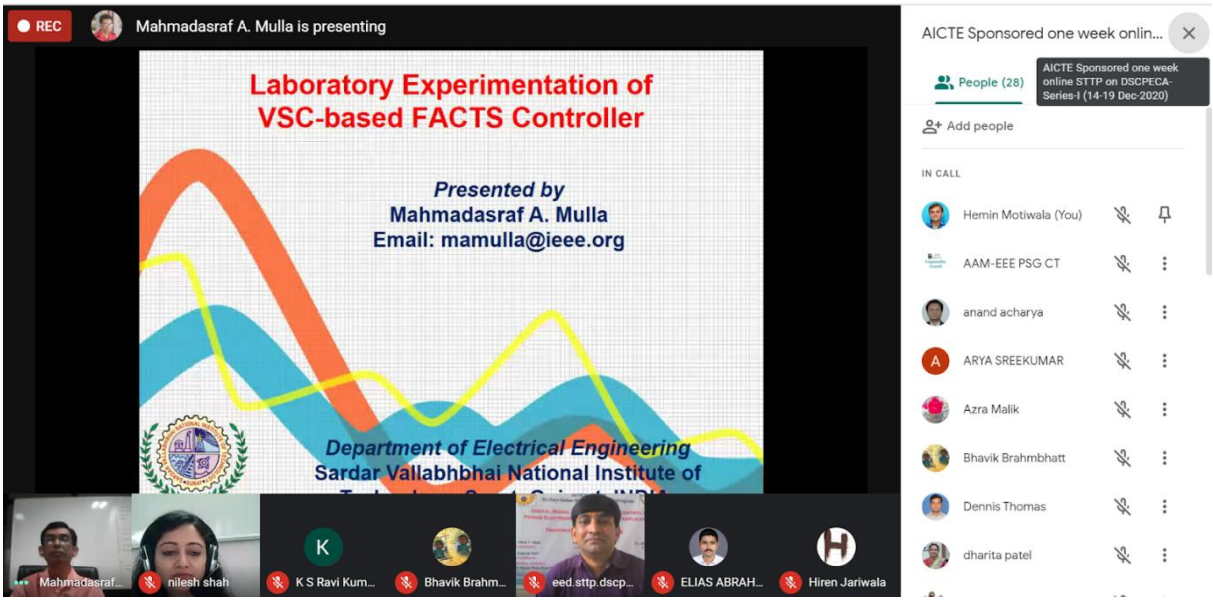


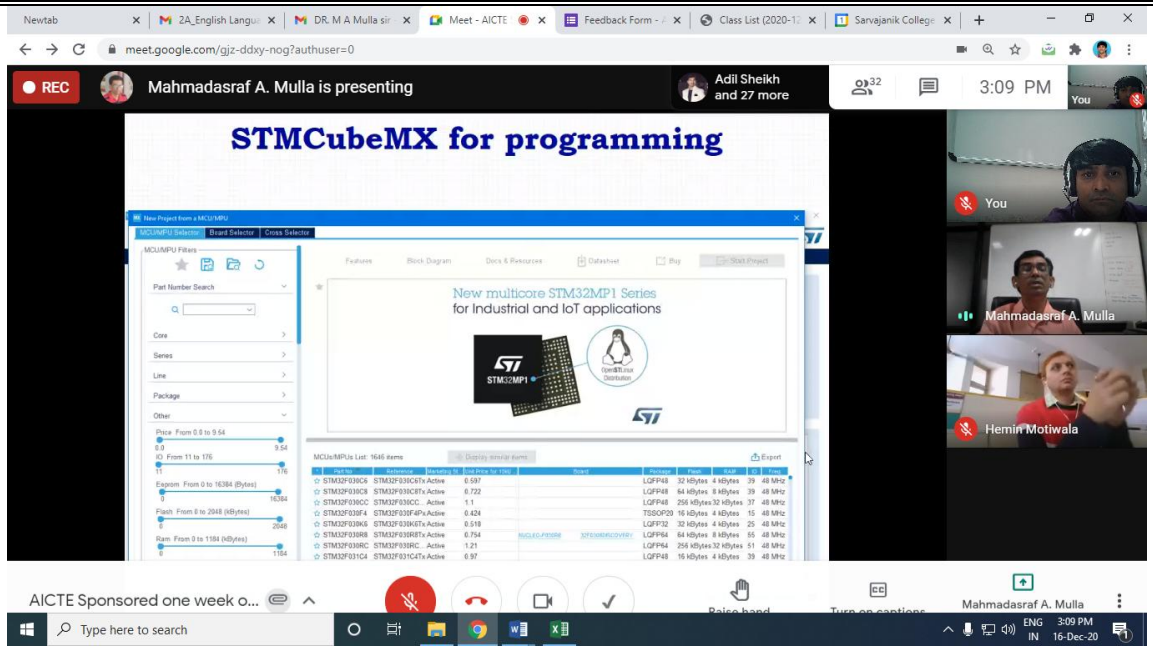


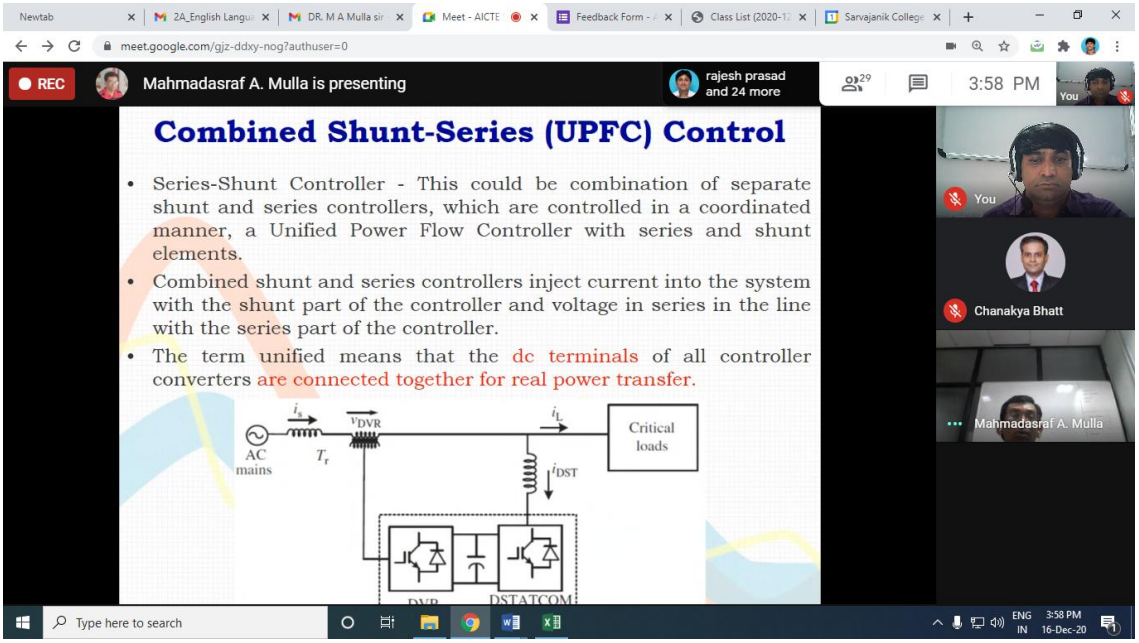
Glimpse of day-3 session-II by Prof. Jasmin Patel, Dr. S & S. S. Gandhy Engg. College, Surat

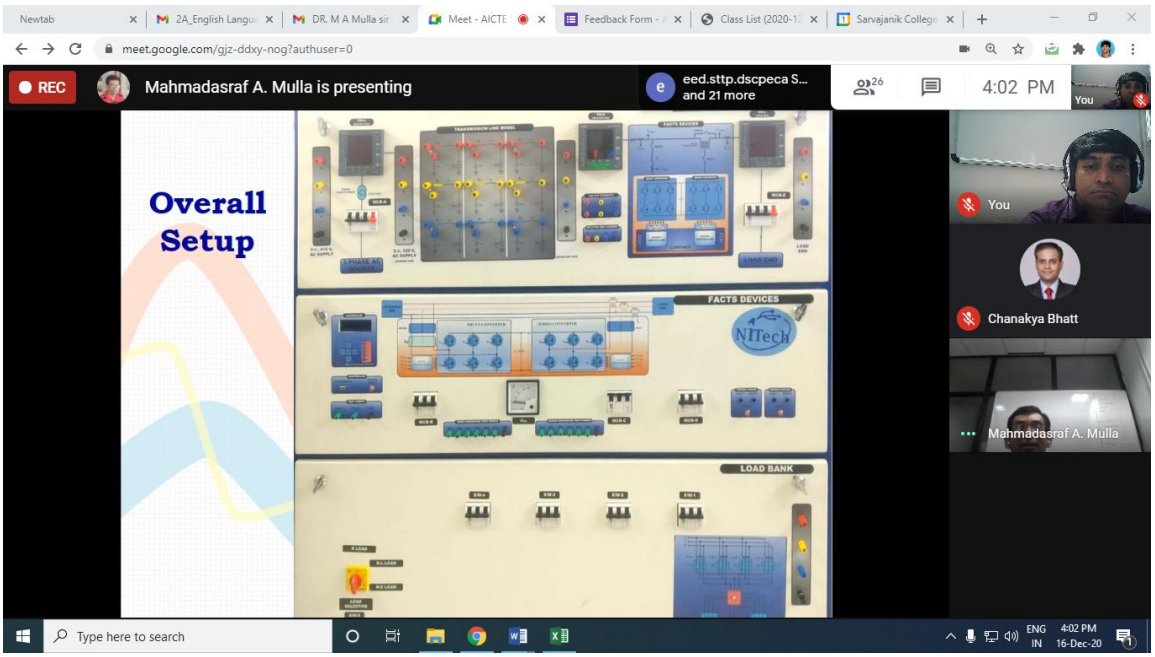
Day-3 Session-III

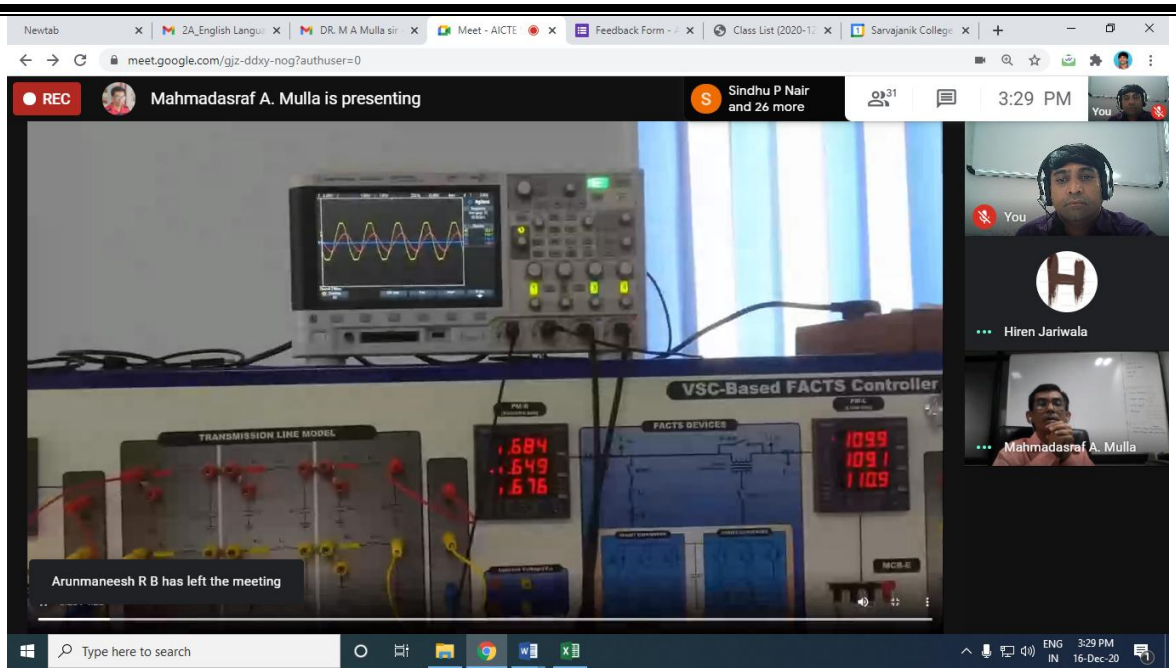
On day-3, session-III was delivered by Dr. Asaraf Mulla from SVNIT, Surat on "Laboratory Experimentation of VSC-based FACTS Controller". In his talk, Dr. Mulla discussed about need for FACTS controllers, different types of FACTS controller with their control strategies in detail. Dr. Mulla had also presented the control scheme implementation for Series, Shunt and UPQC controllers using STM32F704VG cortex M4 ARM Microcontroller. He has also demonstrated the results of implementation of FACTS controller through online video. His demonstration majorly included laboratory Experimental demonstration of FACTS controllers. The session was highly interactive and participants had appreciated the implementation of an important application of FACTS controller though control of VSI using STM32 Cortex M4 ARM microcontroller.




REC
Mahmadasraf A. Mulla is presenting
Adil Sheikh and 27 more
3:09 PM
STMCubeMX for programming
New multicore STM32MP1 Series
for Industrial and IoT applications
You
Mahmadasraf A. Mulla
Hemin Motiwala
AICTE Sponsored one week o...
Mahmadasraf A. Mulla
Type here to search
ENG IN 3:09 PM 16-Dec-20


REC
Mahmadasraf A. Mulla is presenting
rajesh prasad and 24 more
3:58 PM
Combined Shunt-Series (UPFC) Control
Series-Shunt Controller - This could be combination of separate shunt and series controllers, which are controlled in a coordinated manner, a Unified Power Flow Controller with series and shunt elements.
Combined shunt and series controllers inject current into the system with the shunt part of the controller and voltage in series in the line with the series part of the controller.
The term unified means that the dc terminals of all controller converters are connected together for real power transfer.
AC mains
Critical loads
DVR
DSTATCOM
You
Chanakya Bhatt
Mahmadasraf A. Mulla
Type here to search
ENG IN 3:58 PM 16-Dec-20


REC
Mahmadasraf A. Mulla is presenting
eed.sttp.dscpeca S... and 21 more
4:02 PM
Overall Setup
FACTS DEVICES
NITech
LOAD BANK
You
Chanakya Bhatt
Mahmadasraf A. Mulla
Type here to search
ENG IN 4:02 PM 16-Dec-20

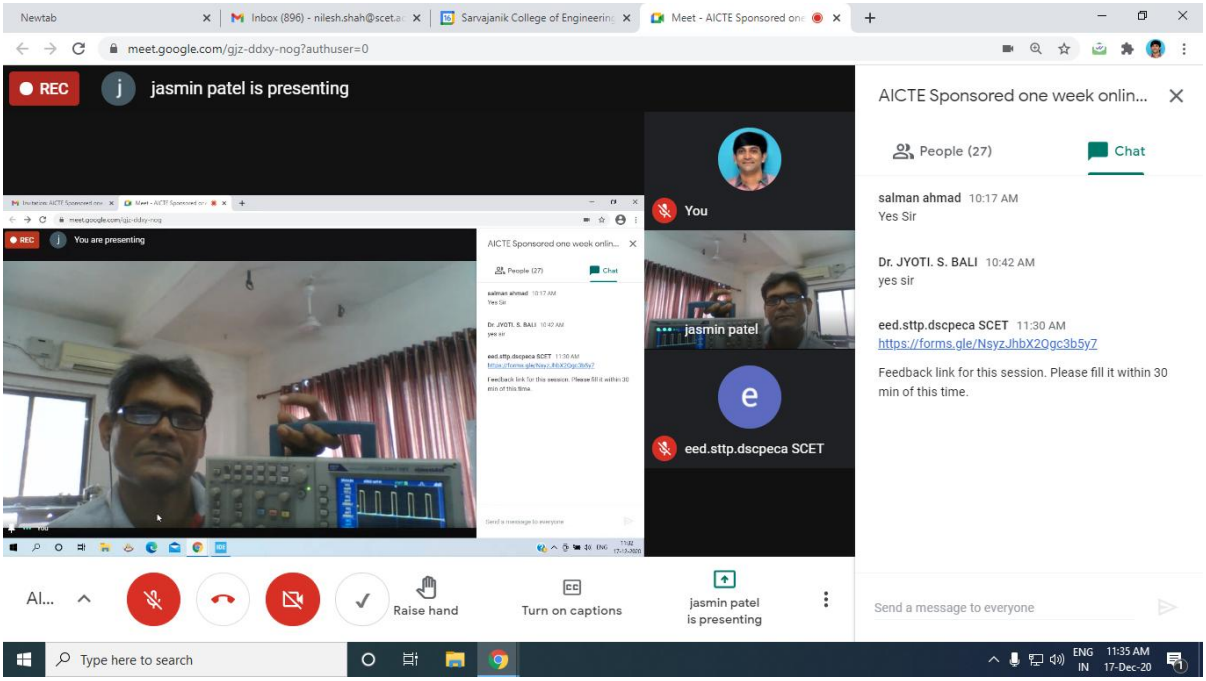


Glimpse of day-3 session-III by Dr. M. A. Mulla, SVNIT, Surat

Day-4 (Thursday) (17th December-2020)

Day-4 Session-I

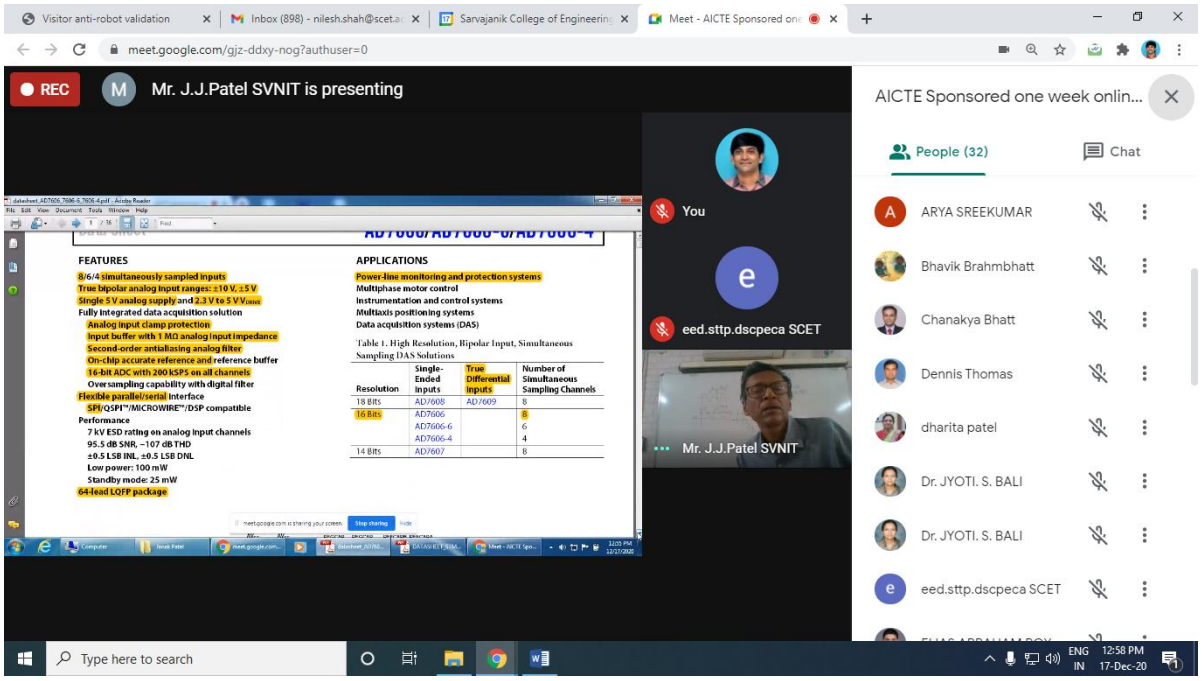
Session-I of day-4 was delivered by Prof. Jasmin Patel from Dr. S. & S. S. Ganghy Engineering College, Surat in continuation of his talk delivered on day-3 on "Programming STM32 (ARM Cortex- M4) Microcontroller, demo of peripheral programming". In this session, Professor Jasmin explained about timers and timer modes of STM32F704VG ARM controller. He discussed about generation of PWM pulse using timer of STM32F704VG ARM controller. He had also demonstrated timer programming using STM Cube IDE for PWM pulse generation. The generated PWM pulses were displayed on DSO and everyone witnessed the results of PWM pulse as per the programmed frequency. Everyone enjoyed the practical session and it has been very much appreciated.

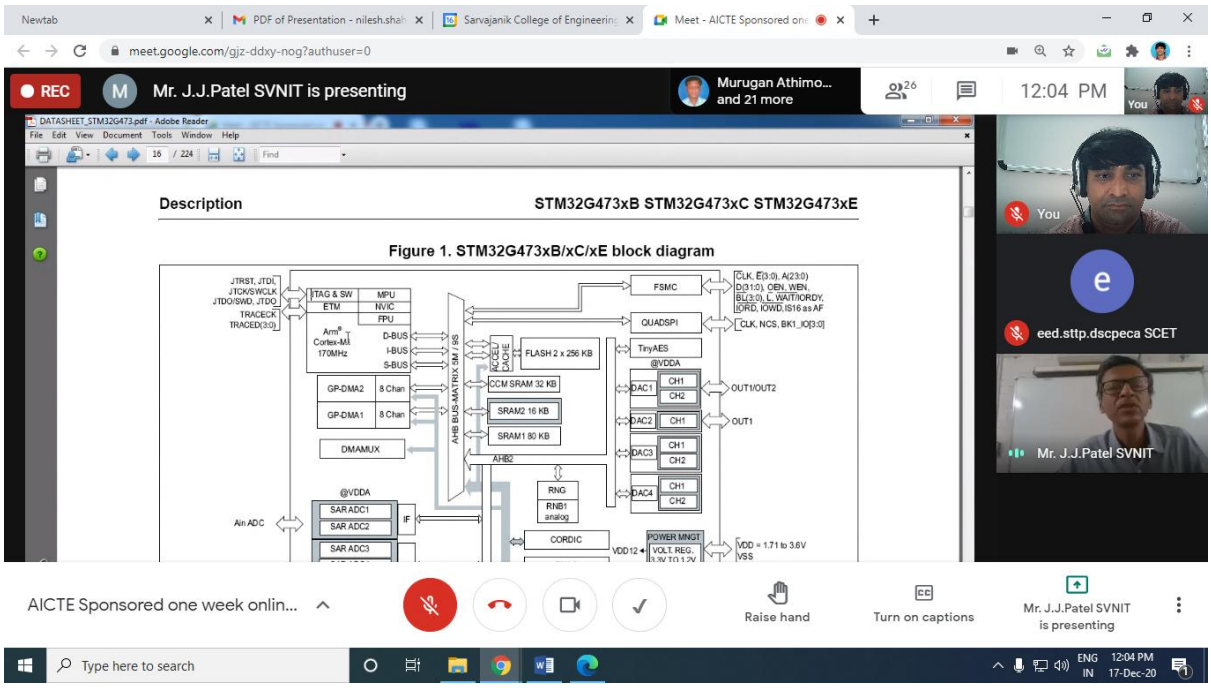


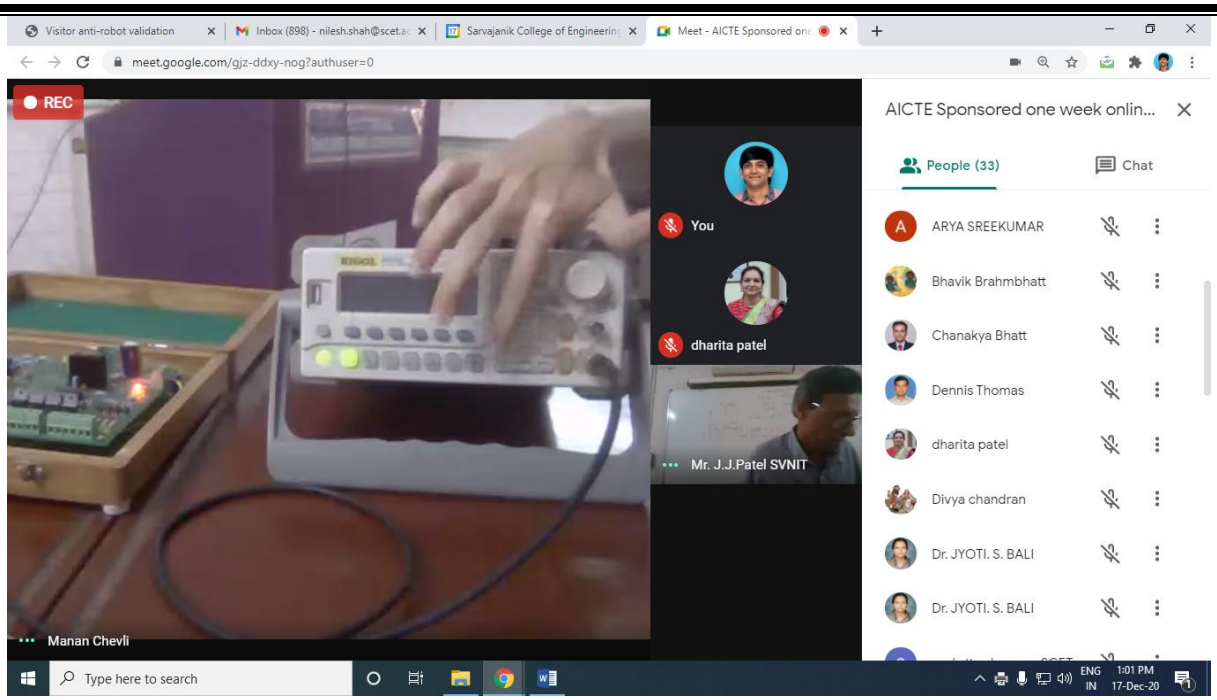
Glimpse of day-4 session-I by Prof. Jasmin Patel, S & S. S. Gandhy Engg. College, Surat

Day-4 Session-II

Day-4 session-II was delivered by Prof. Janak Patel of SVNIT, Surat on "Design and Development of High Speed Data Acquisition Card using STM32 Microcontroller (Lab demo)". In this session, Prof. Janak Patel had explained about the need for high speed data acquisition for many applications, the requirement of related peripherals of the controller such as ADCs, timer, DMA controller and then the programming of STM32F407VG Cortex M4 Microcontroller for acquiring the signals at high speed. He had also demonstrated the data acquisition and FFT analysis in online mode. Participants had well appreciated the practical session and demonstration. The session was delivered from the department of electrical engineering, SCET.



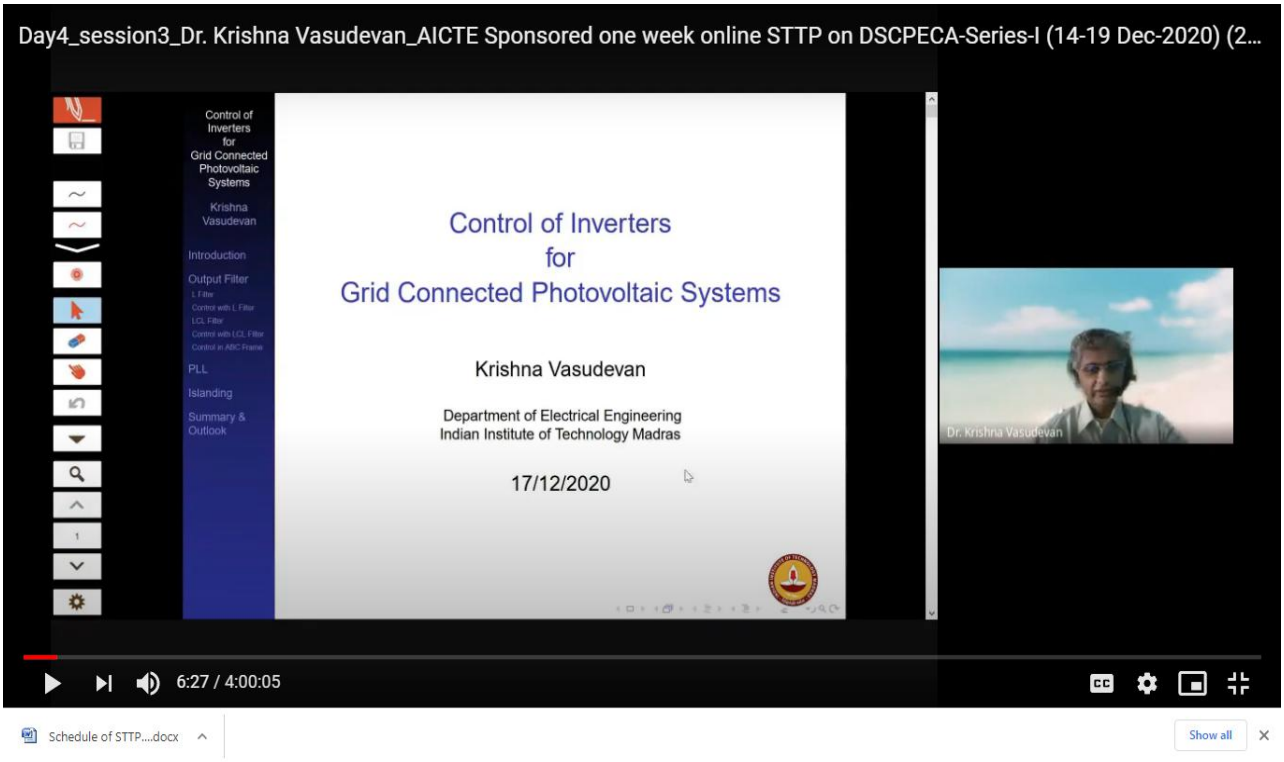


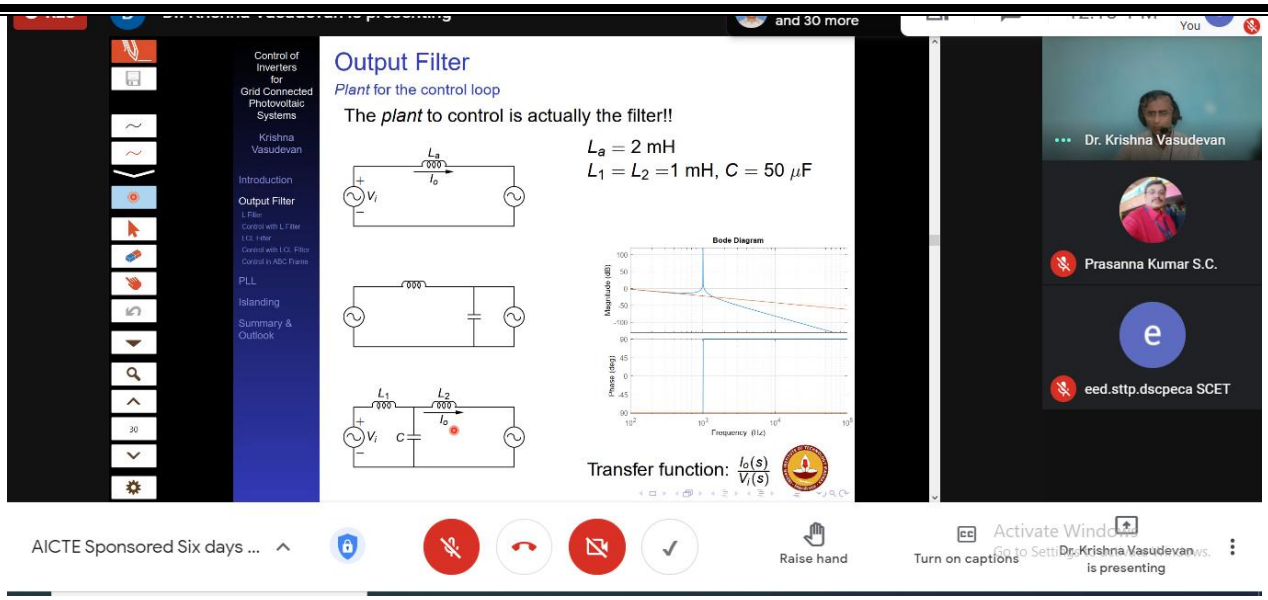


Glimpse of day-4 session-II delivered by Prof. Janak Patel, EED, SVNIT, Surat

Day-4 Session-III

On day-4, session-III was delivered by Dr. Krishna Vasudevan, Professor from IIT, Madras on "Control of Inverters for Grid Connected Photovoltaic Systems". Dr. Vasudevan highlighted the control goals for inverter for PV integration to grid and explained d-q based control technique in detail. He had also presented need of filter and about different types of filters with an idea of how to select filter for grid connected PV inverter. Dr. Vasudevan also presented islanded mode of operation of PV system. Dr. Vasudevan ended his talk by patiently solving all the queries of participants.



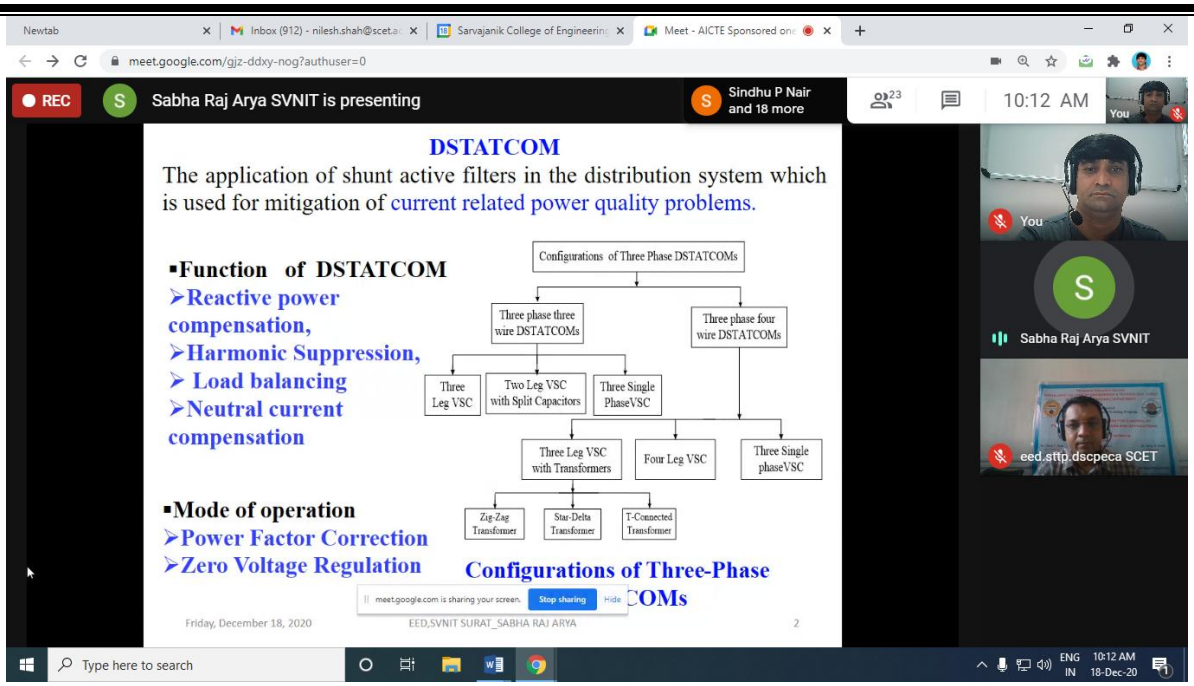


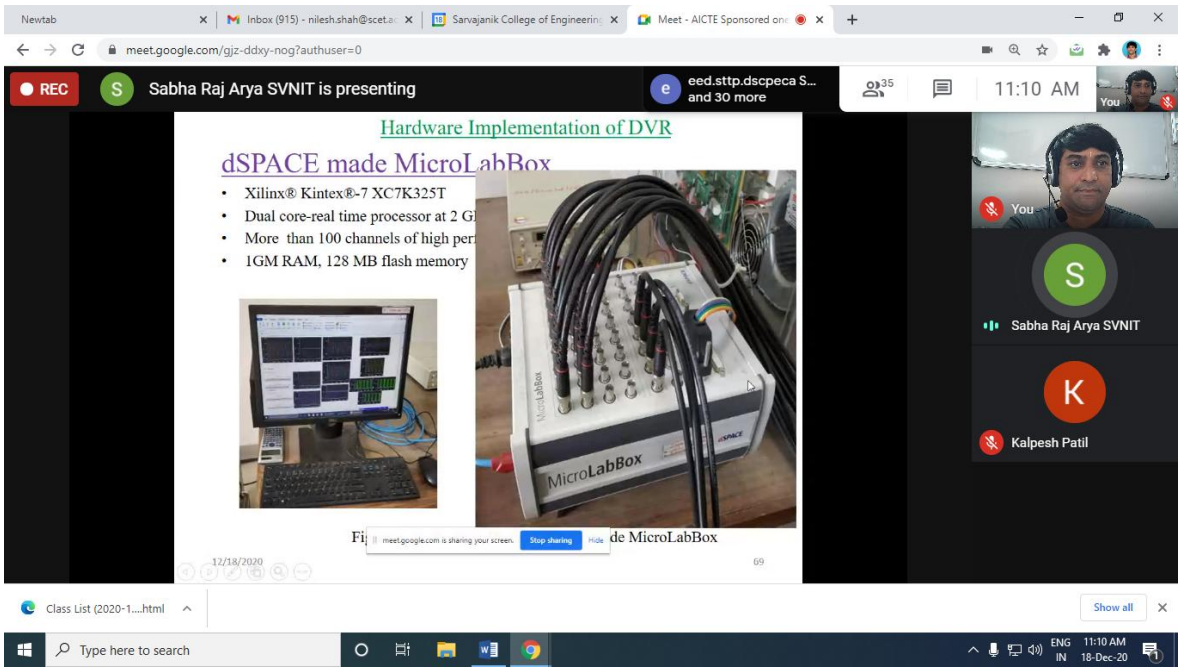
Glimpse of day-4 session-III delivered by Dr. Krishna Vasudevan, IIT Madras

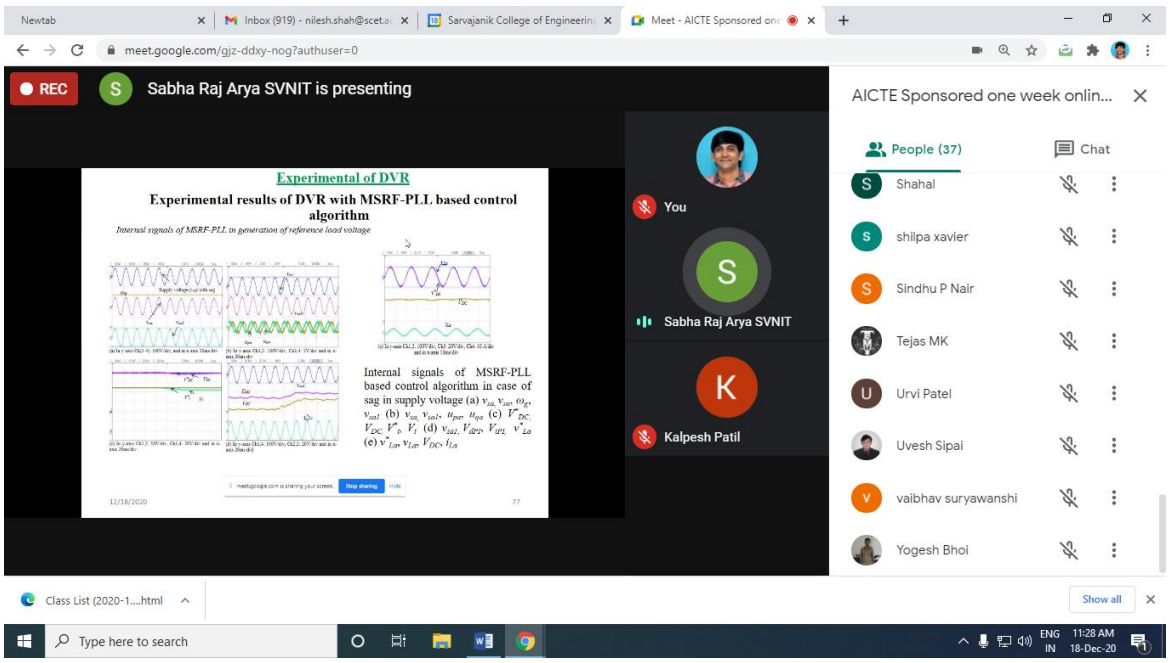
Day-5 (Friday) (18th December-2020)

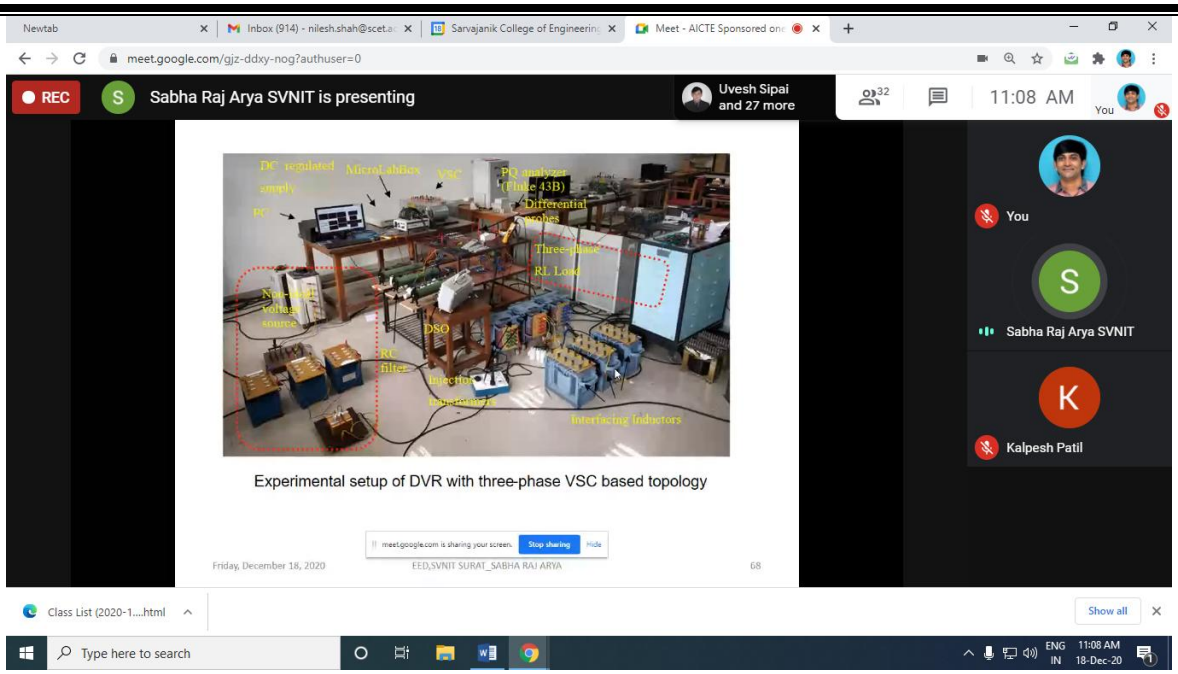
Day-5 Session-I

On day-5, session-I was delivered by Dr. Sabharaj Arya from SVNIT, Surat on "Design and Control of Custom Power Devices". Dr Arya briefly discussed about various custom power devices. Then he explained about D-STACOM and its control schemes. He had demonstrated the implementation of STATCOM by describing selection of various hardware components and control implementation using dSPACE1104. Dr. Arya had also demonstrated experimental set up of DVR and control scheme implementation using Microlabbox. Dr. Arya elaborated in detail about selection of various components for the development of prototype of DVR. The hardware based experimental results presented by Dr. arya has been very well appreciated by the participants.


Sabha Raj Arya SVNIT is presenting
Sindhu P Nair and 18 more
10:12 AM
DSTATCOM
The application of shunt active filters in the distribution system which is used for mitigation of current related power quality problems.
▪Function of DSTATCOM
➢Reactive power compensation,
➢Harmonic Suppression,
➢ Load balancing
➢Neutral current compensation
▪Mode of operation
➢Power Factor Correction
➢Zero Voltage Regulation
Configurations of Three Phase DSTATCOMs
Three phase three wire DSTATCOMs
Three phase four wire DSTATCOMs
Three Leg VSC
Two Leg VSC with Split Capacitors
Three Single PhaseVSC
Three Leg VSC with Transformers
Four Leg VSC
Three Single phaseVSC
Zig-Zag Transformer
Star-Delta Transformer
T-Connected Transformer
Configurations of Three-Phase
COMs
Friday, December 18, 2020
EED,SVNIT SURAT_SABHA RAJ ARYA
2
You
Sabha Raj Arya SVNIT
eed.sttp.dscpeca SCET


Sabha Raj Arya SVNIT is presenting
eed.sttp.dscpeca S... and 30 more
11:10 AM
Hardware Implementation of DVR
dSPACE made MicroLabBox
Xilinx® Kintex®-7 XC7K325T
Dual core-real time processor at 2 G
More than 100 channels of high per
1GM RAM, 128 MB flash memory
MicroLabBox
de MicroLabBox
12/18/2020
69
You
Sabha Raj Arya SVNIT
Kalpesh Patil

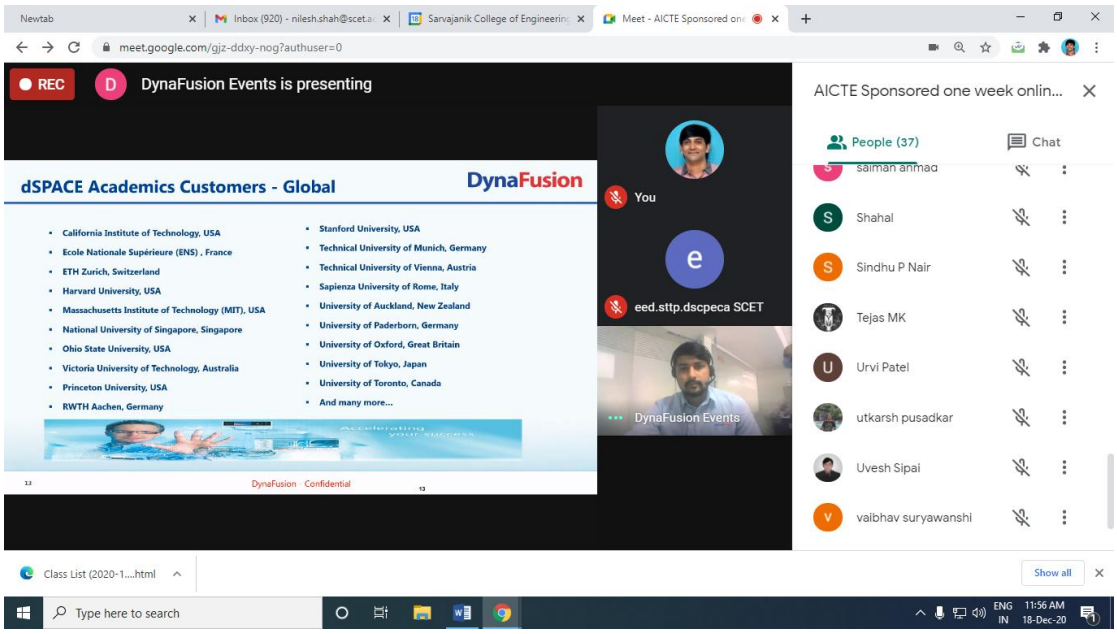

Sabha Raj Arya SVNIT is presenting
Experimental of DVR
Experimental results of DVR with MSRF-PLL based control algorithm
Internal signals of MSRF-PLL based control algorithm in case of sag in supply voltage
12/18/2020
77
You
Sabha Raj Arya SVNIT
Kalpesh Patil
AICTE Sponsored one week onlin...
People (37)
Chat
Shahal
shilpa xavier
Sindhu P Nair
Tejas MK
Urvi Patel
Uvesh Sipai
vaibhav suryawanshi
Yogesh Bhoi

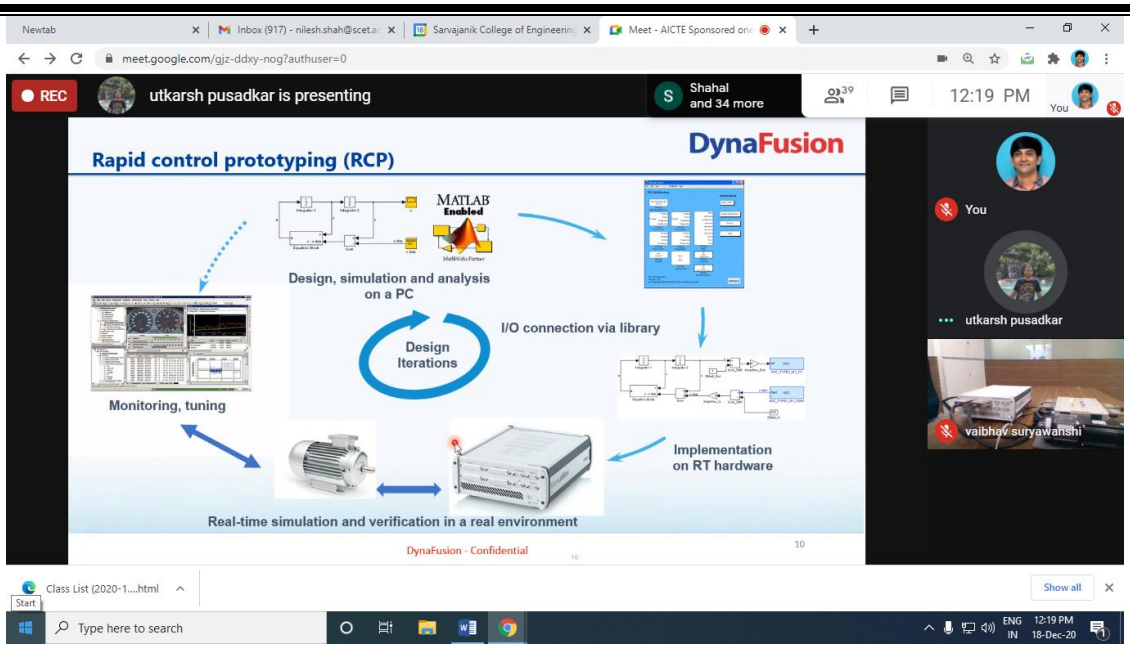


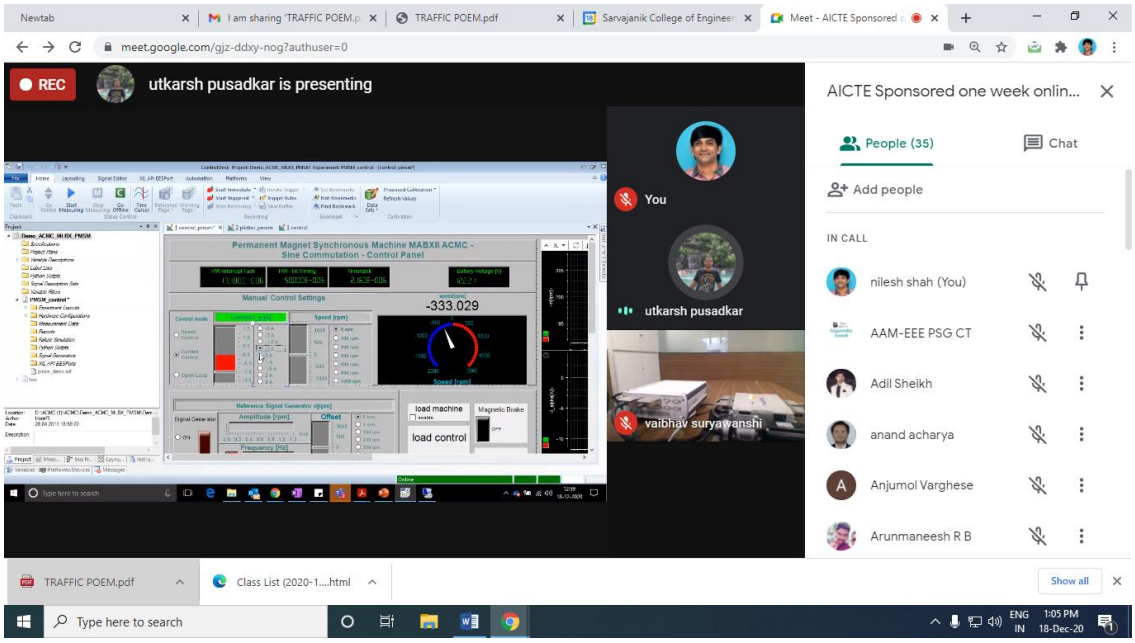
Glimpse of day-5 session-I delivered by Dr. Sabharaj Arya, SVNIT, Surat

Day-5 Session-II

On day-5, session-3 was delivered by a team of an Industrial expert from Dynafusion, Bengluru on "Rapid Control Prototyping – MicroLabBox". In the beginning of the session, Mr. Amandeep Sigh presented about dSPACE, Microlabboc and its academic well as industrial applications. Then Mr. Pushadkar had discussed about how rapid control prototypes can be developed using MicrolabBox for power electronic applications. He had explained hardware and software of the MicroLabbox. Mr. Pushdkar and team had also demonstrated development of motor control software using Matlab and MicroLabbox by implementing on real time hardware. Everyone present enjoyed the practical demonstrated by Dynafusion team.



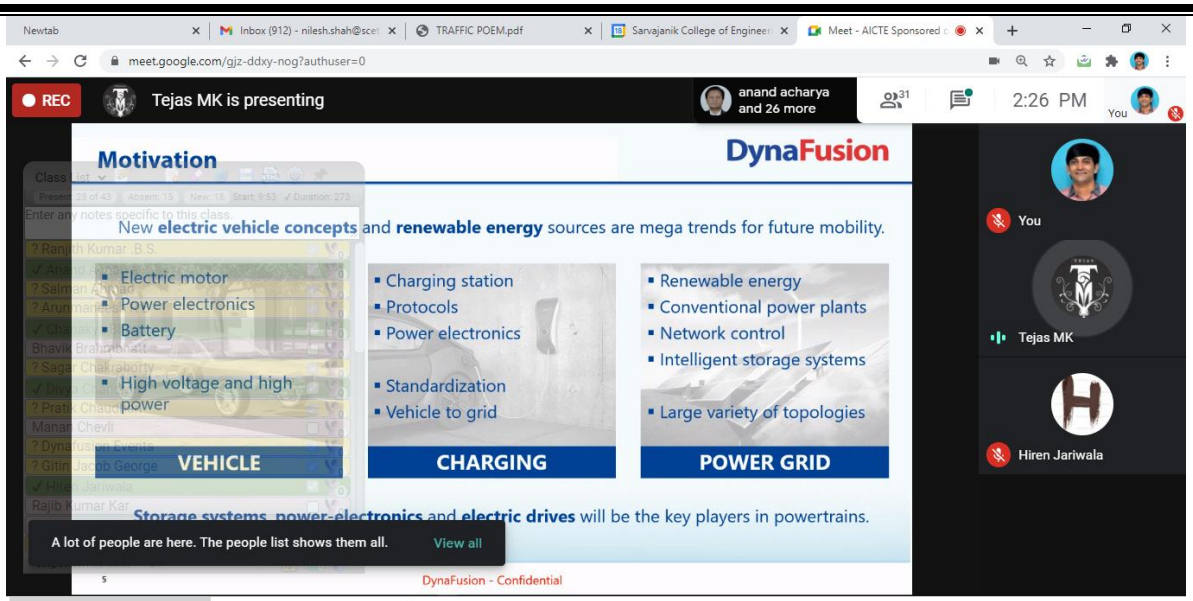


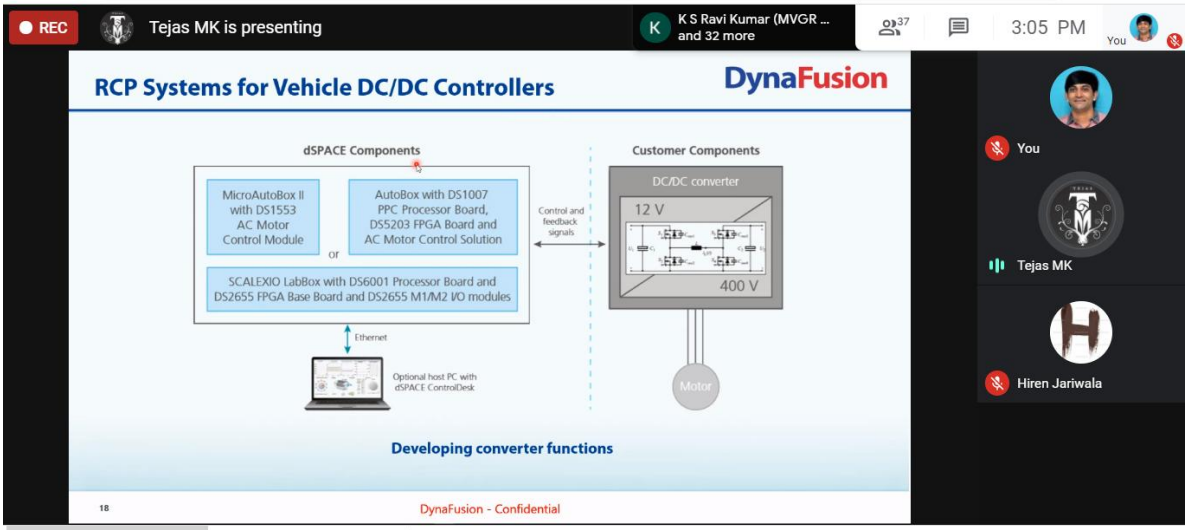


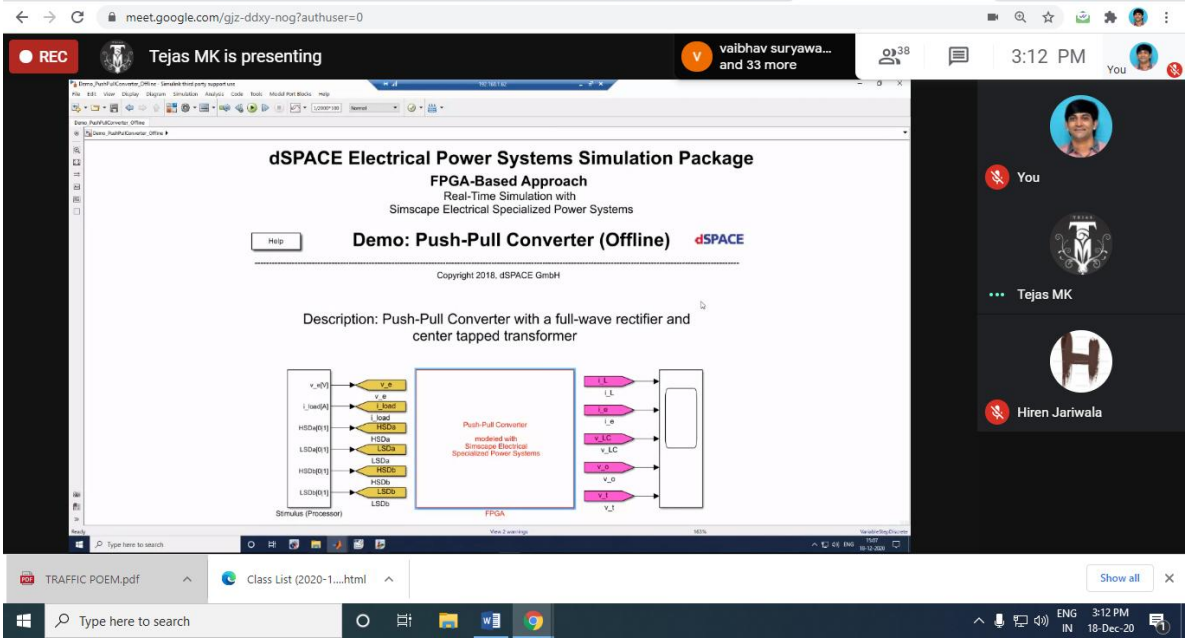
Glimpse of day-5 session-II delivered by Mr. Amandeep Singh, Mr. Utkarsh, Dynafusion, Bengluru

Day-5 Session-III

Session-2 on day-5 was again delivered by a team of an Industrial expert from Dynafusion, Bengluru on "dSPACE Solution for Generic topology-oriented Modelling: Electrical Power Systems Simulation". Mr. Tejas form dynafusion presented about various applications of dSPACE in electrical power system. He had discussed about various versions of dSPACE suitable for different applications. He also discussed about electrical vehicle, vehicle charging and renewable energy applications. Mr. Teaj demonstrated about how rapidly a control prototype can be developed for DC-DC converters for vehicle battery charging using dSPACE. He also presented a demo of Push-Pull converter control in online mode. Participant had appreciated the session delivered by Dynafusion team on rapid control prototyping of using dSPACE.





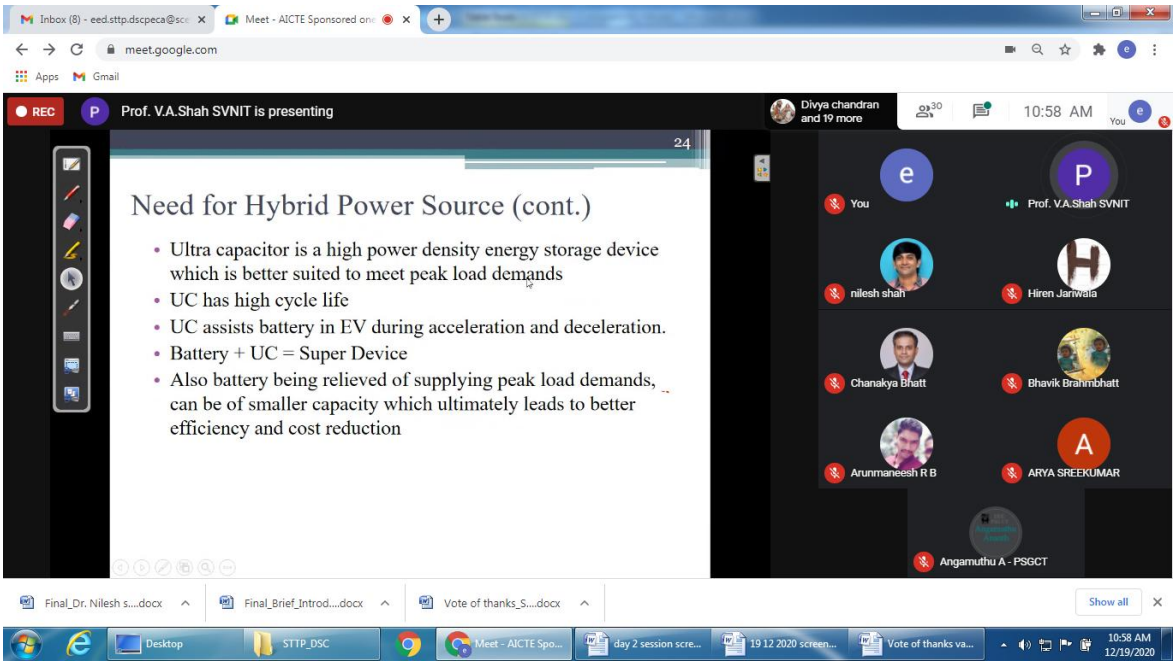


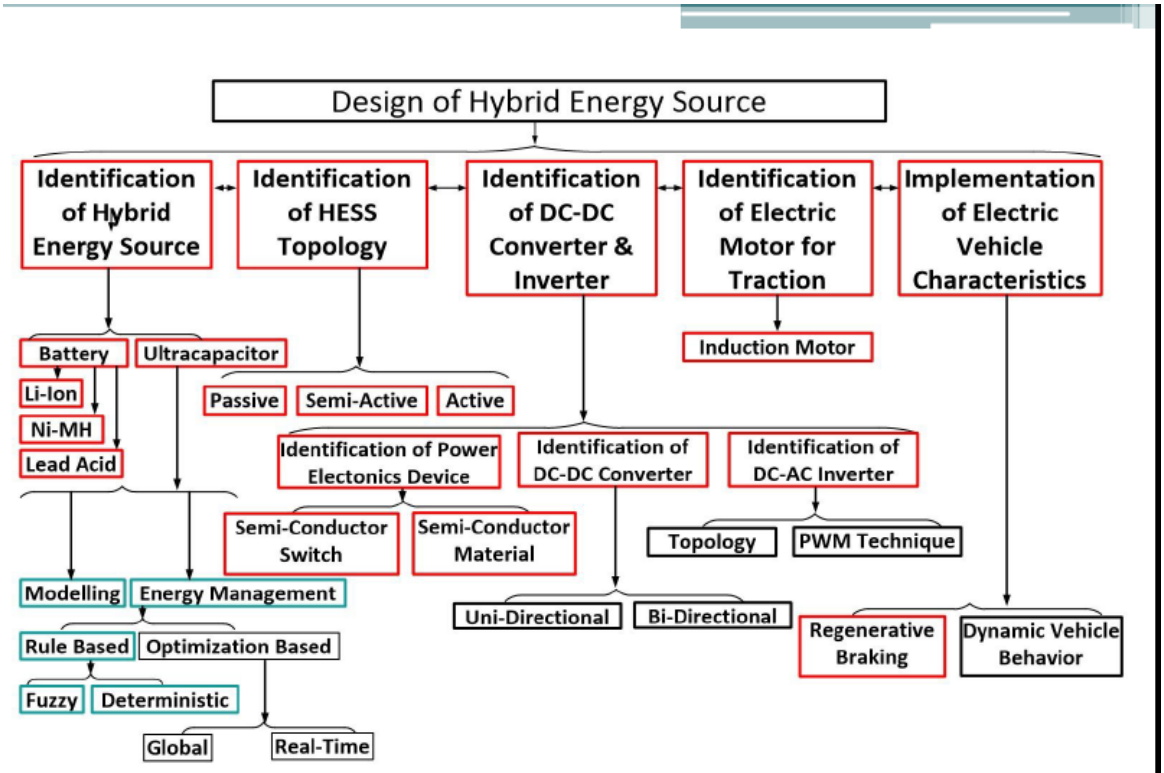
Glimpse of day-5 session-III by Mr. Amandeep Singh, Mr. Tejas M.K., Dynafusion, Bengluru

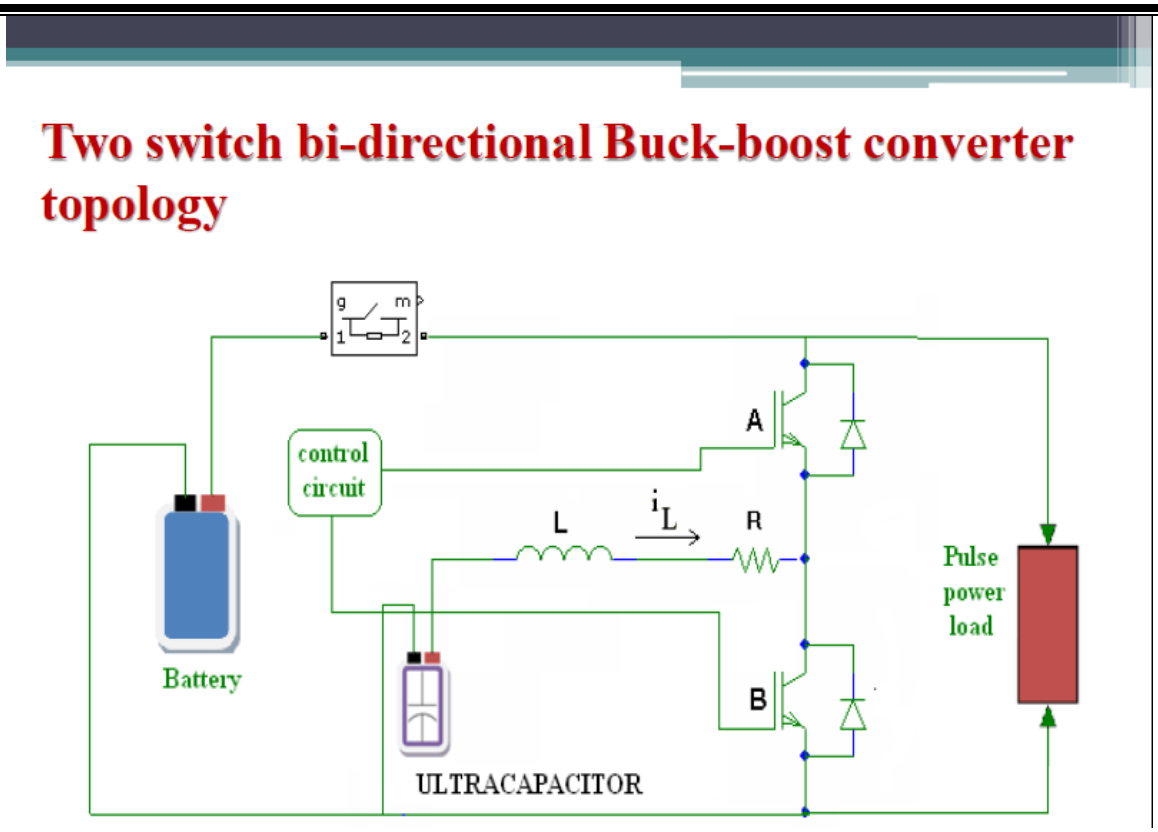
Day-6 (Saturday) (19-12-2021)

Day-6 Session-I

Session-I on day-6 was delivered by Prof. V. A. Shah from SVNIT, Surat on **Application of Digital Signal Controller in Electrical Vehicle with a focus on "Design and control of Battery-Supercapacitor Hybrid Power Sources for EV".** Prof. Varsha Shah briefly discussed about basics of electrical and hybrid electrical vehicles. Then she had explained about the need of Hybrid power source for EV. She presented the detailed scheme of Battery-Supercapacitor based hybrid power source with design consideration. She had explained the control scheme in detail and presented the simulation as well as experimental results. Finally, she had highlighted about different types of digital signal controllers used for EV applications in industries. Dr. Varsha had also solved all queries of participants satisfactorily.





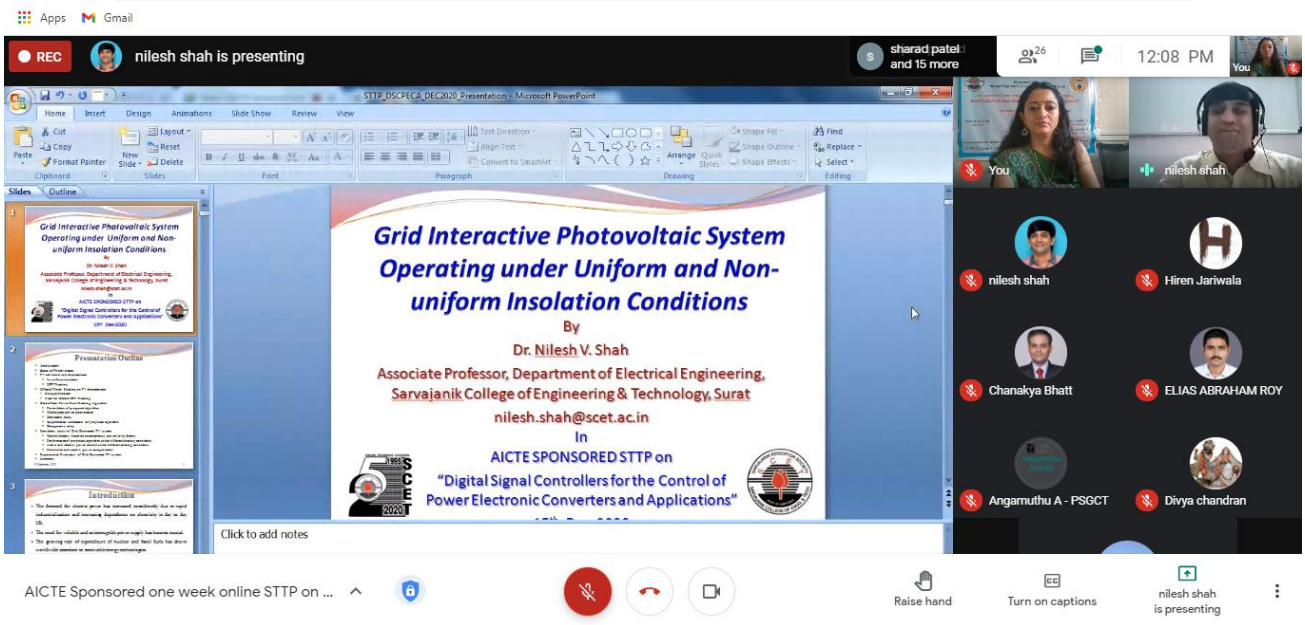


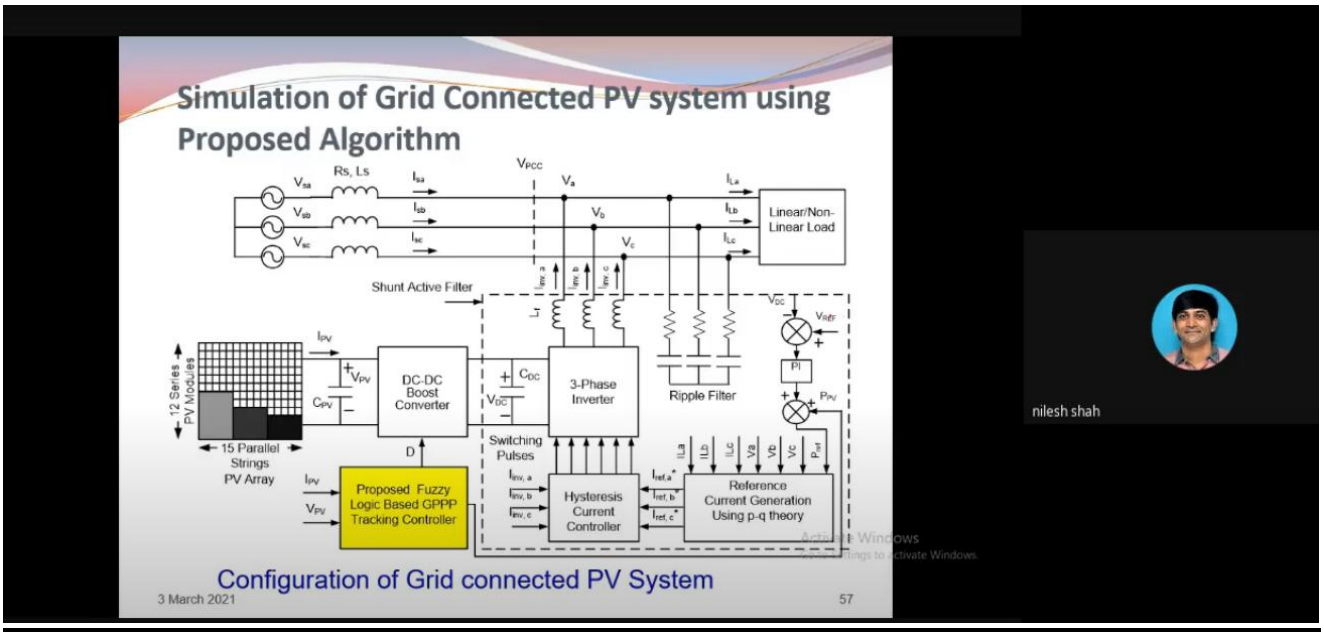
Glimpse of Day-6 session-1 by Dr. V. A. Shah, SVNIT Surat

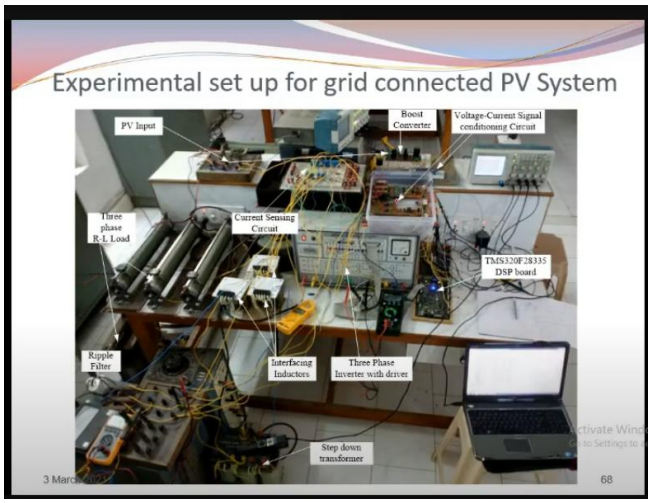
Day-6 Session-II & session-III

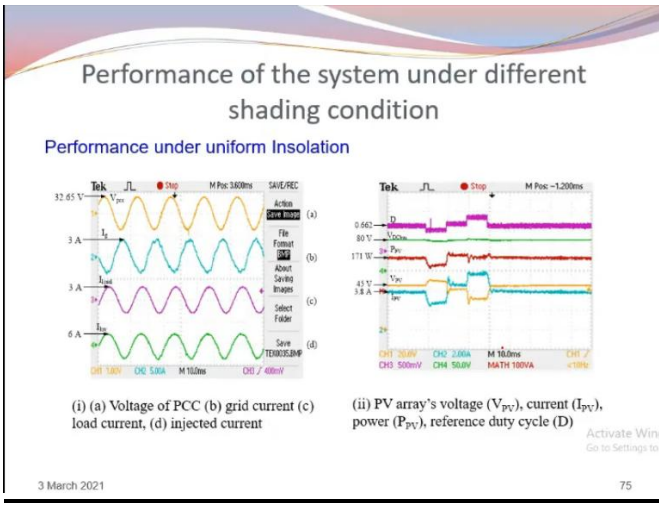
On day-6 session-II was delivered by Dr. Nilesh V. Shah from SCET on "Grid Interactive photovoltaic system operating under uniform and Non-uniform insolation conditions". By giving basic introduction of PV system, Dr. Nilesh explained the need for global peak power point tracking algorithm for large PV system. He had presented fuzzy logic based global peak power point tracking with simulation results. He also explained about grid interactive PV system and presented simulation results for active and reactive power control, harmonic elimination that had justified the overall utilization of the PV system.

In continuation with session-II, Dr. Nilesh conducted session-III on "Hardware Implementation of Grid Interactive Photovoltaic System using DSP28335". He explained about major features required in the processor for implementing control algorithm of grid interactive PV system and highlighted suitability of TMS320F28335 DSP for implementing such control algorithm. He explained about the implementation of fuzzy logic based global peak power point tracking algorithm using embedded 'C' programming of TMS320F28335 DSP. The algorithm was validated by presenting experimental results for various partial shading conditions that had build confidence amongst participants about such implementation. The detailed implementation of control algorithm of inverter based on p-q theory was also explained and the experimental results were presented for various partially shaded conditions. The utilization of PV inverter by incorporating reactive power compensation as well as non-linear load harmonic elimination specifically during night was well elaborated with relevant experimental results obtained by using TMS320F28335 DSP processor. Participants had appreciated the experimental implementation work presented by Dr. Nilesh.





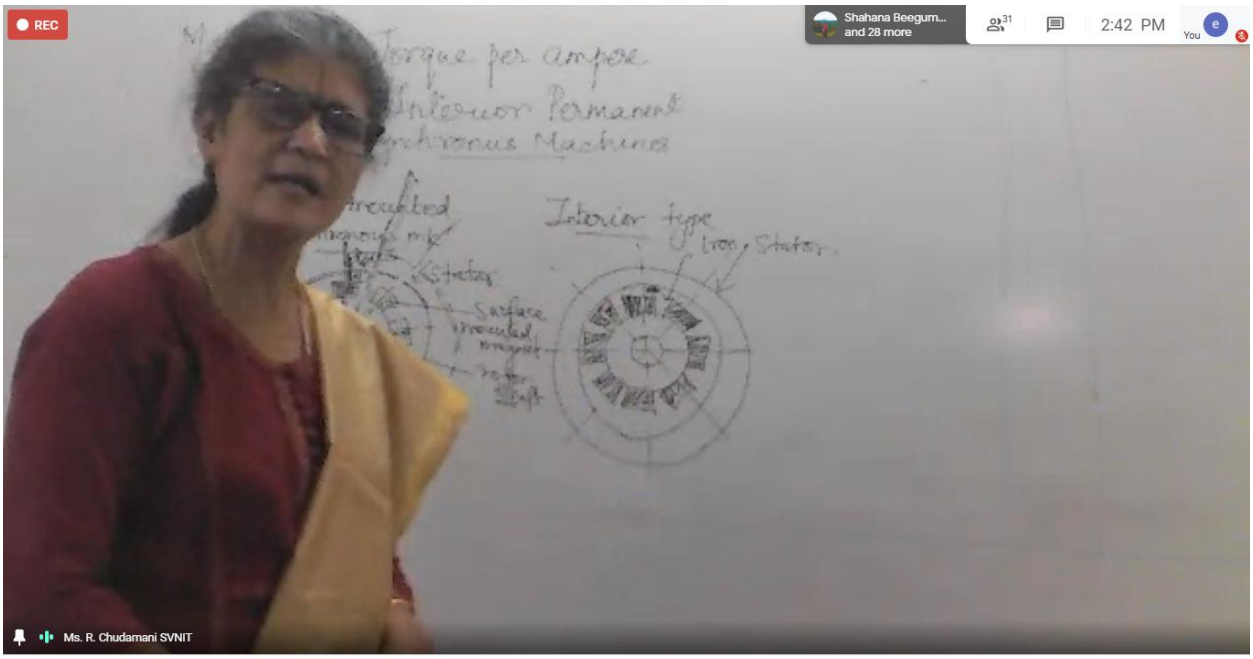




Glimpse of day-6 session-II & session-III by Dr. Nilesh Shah, SCET Surat

Day-6 Session-IV

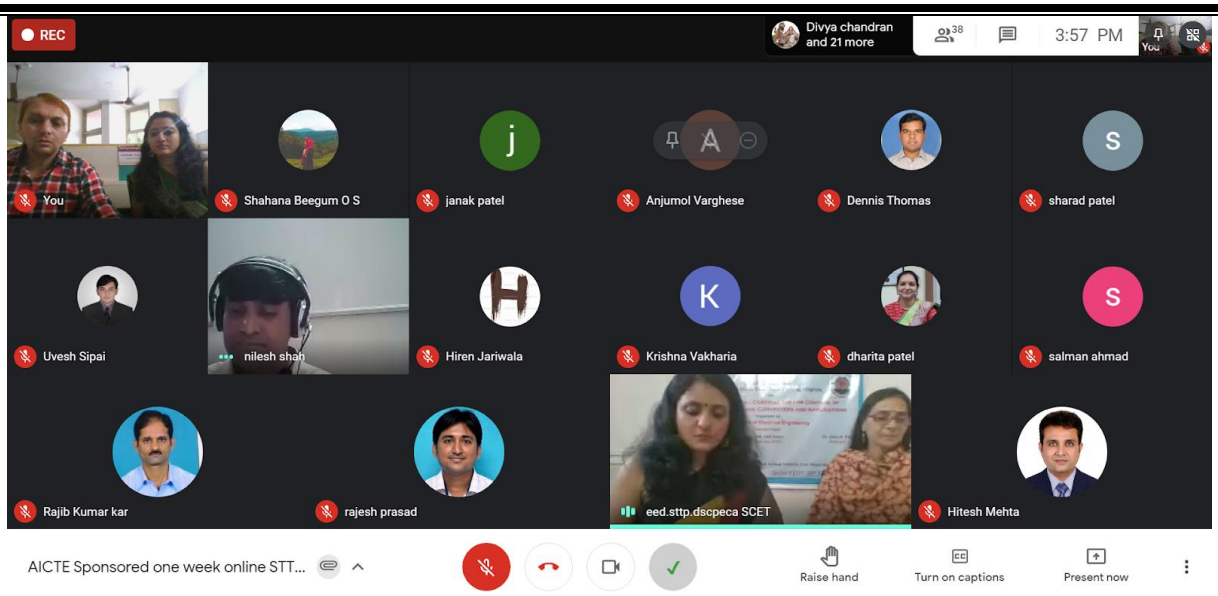
On day-6 session-IV was delivered by Dr. R. Chudamani from SVNIT, Surat on "Maximum Torque Per Ampere (MTPA) control of Interior Permanent Magnet Machine". Dr. Chudamani had given brief idea about the control goal of PMSM and discussed about various control technique. She had explained in detail about maximum torque per ampere control of interior Permanent Magnet Machine. The white board conventional way of explaining mathematical framework of the algorithm was well appreciated by participants. Dr. Chudamani had also explained about implementation aspects of the algorithm using digital signal controllers. She ended the session by highlighting scope of further research work in the domain of control of Permanent Magnet synchronous motor.



Glimpse of day-6 session-IV by Dr. R. Chudamani, SVNIT Surat

Day-6 Valedictory session

Day-6 of the STTP ended with the valedictory ceremony headed by MOC Prof. Dimple Bhanabhagwanwala and Prof. Krishna Vakharia, Assistant Professors of Electrical Engineering Department, SCET. By offering warm welcome to the participants and guests present in the Valedictory ceremony, Dr. Nilesh V. Shah, Associate Professor, Program Coordinator of the STTP presented brief introduction about the program and the content covered by eminent experts. Dr. Nilesh also thanked AICTE for granting the STTP and all the experts who have shared their domain knowledge. Then participants were asked share their views and feedback about the STTP. Participants had given excellent feedback about the successful completion of the STTP and thanked the organizing team for arranging wonderful expert session for thw topics of the STTP. All have appreciated the lab sessions conducted in online mode. Finally, Prof. Aditi Hajari, Head of Electrical Engineering Department, SCET has given vote of thanks to AICTE for giving permission for organizing the STTP; Principal SCET, Management, Technical and Non-technical teams associated in organizing the STTP as well as participants for showing their interest in the STTP.



Glimpse of Valedictory Session

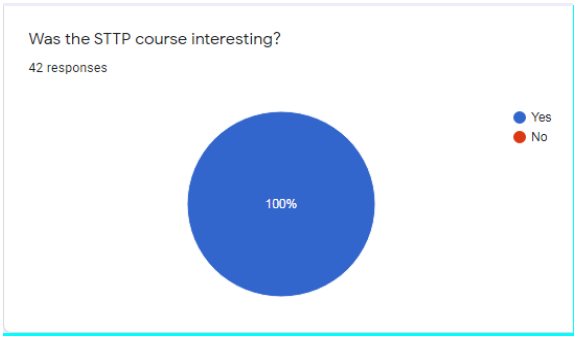
Thus series-I of the one week AICTE sponsored STTP has been successfully completed and ended with Joy and Happiness of learning the course on “Digital Signal Controllers for control of Power Electronic Converters and Applications" amongst participants as well as organizing team.

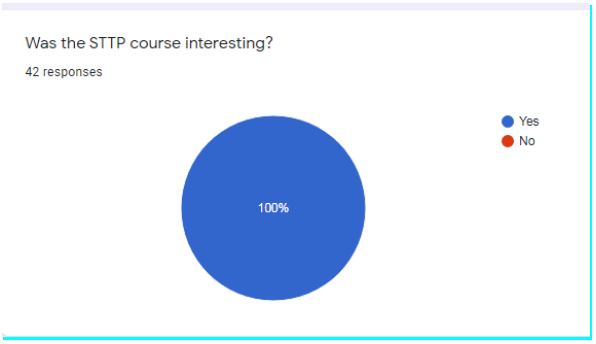
Outcomes of the STTP

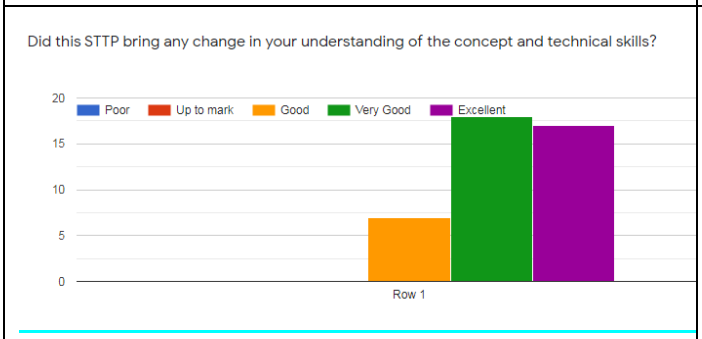
1. Enhanced the knowledge in the domain control of power electronic converters using digital signal controllers
2. Created expertise in development of power electronic converters for various applications such as electrical drives, renewable energy integration with grid, electrical vehicles, power quality conditions, power system protective relays.
3. Ability to design, develop and debug software using Digital Signal Controller for control of power electronic converters and its applications.
4. Enriched the participants with the recent trends in digital signal controllers for various industrial applications.
5. Enlighten to pursue research in the domain of power electronic converters and applications.
6. Exposure of developing experiments for control of power electronic converters for various applications.
7. Validate analytical/simulation results of the research works using DSP28335, STM32F407VG Cortex M4 Microcontroller, dSPACE, Microlabbox.
8. Conduct workshop/STTP/FDP for the students, researchers, faculties and/or industries.

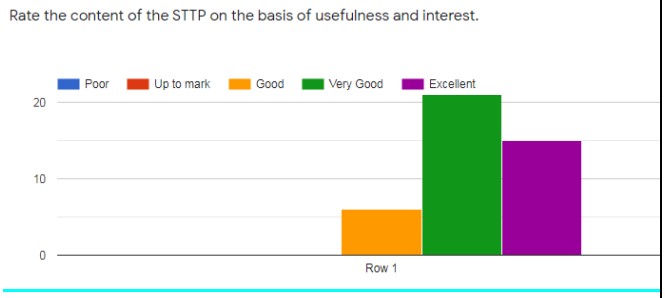
Feedback of the STTP

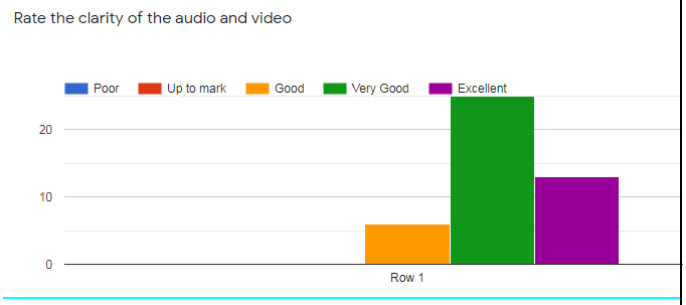
The feedback of the STTP is pretty good. Participants appreciated the content, delivery, quality of experts and learning outcome from the STTP. The detailed feedback analysis is mentioned as under:

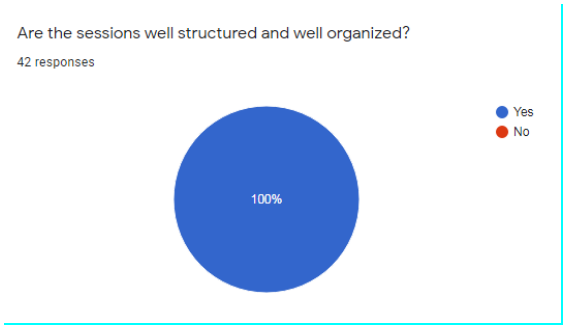


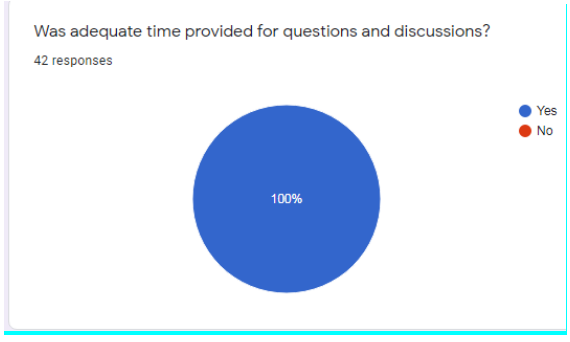












Acknowledgement

Department of Electrical Engineering, SCET is very much thankful to **AICTE** for supporting the STTP and permitting SCET to organize the STTP for the benefit of teaching community, research scholars. The STTP has helped faculties and research scholars for enhancing their expertise in the domain of control of power electronic converters using digital signal controllers for various applications which is an indirect help to the students who wants to perceive their career in the domain of power electronic converters and applications. We would also like to thank SCET management for encouraging such knowledge sharing activity, **Dr. Hiren Patel**, Principal, SCET for providing an opportunity to apply for the STTP, and Dr. Chirag Pauwala, Dean R & D, SCET to provide support wherever needed.

Report Compiled by STTP Team

Dr. Nilesh V. Shah (Program Coordinator, Member Secretary)

Dr. Kalpesh Patil, Co-coordinator

Organizing committee members:

Prof. S. B. Patel, Prof. Dimple Bhanabhagwanwala,

Prof. Krishna Vakharia, Prof. Hemin Motiwala

****