

INNOVATIVE TEACHING LEARNING PROCESSES/PEDAGOGICAL MATERIALS

Following are some of the Pedagogical Techniques and best practices for enhancement of overall learning experience of students which are implemented by faculties.

- Using modern teaching aids like multimedia projector (LCD), internet enable computer systems, faculty members try to represent content with very meaningful way
- Series of Expert talk on various topics are arranged for the students by renowned entrepreneur to bridge the gap between academic and industries.
- Faculty members and students are utilizing E-Library, NPTEL video lectures, Live telecast of online video lectures by BISAG and e-Journals to enhance their knowledge in different facet.
- The faculty members are encouraged to participate in faculty development program, short term courses, webinar, and workshops on latest topics to cultivate their technical knowledge and skills.
- The faculty members participate/present papers in national/international conferences and publish their articles in national/international journals.
- License version of National Instrumentation's LABview, Siemens's PLC, DCS and SCADA system which is utilized for Design, Engineering analysis and Project modules available in COE-Siemens of Automation and Process Instrumentation Lab
- License version of MATLAB which integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation.
- Industrial visits are arranged for students to develop practical knowledge as well as to keep them in touch with the latest technology used by the industries.
- By using Virtual Lab students are performing practical by modeling, simulation and able to solve assignment.

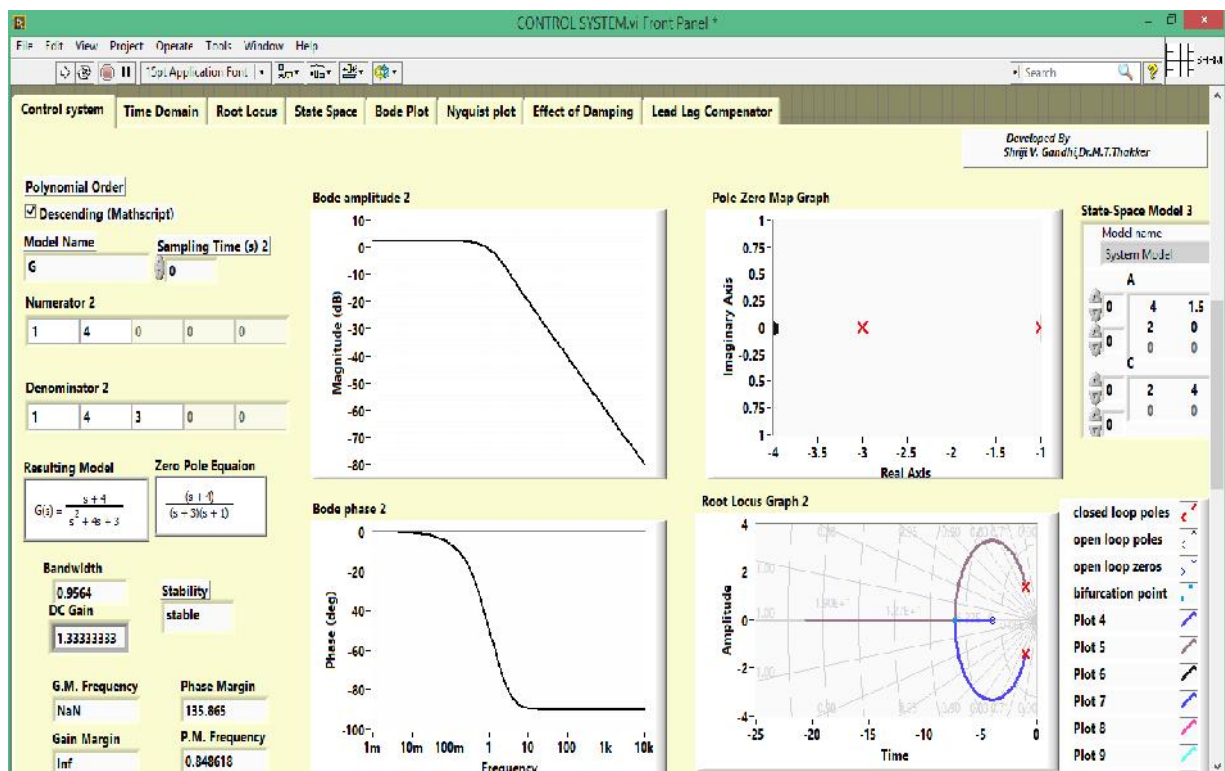
Some of the innovative teaching learning Processes/pedagogical materials has developed by department faculties which enhance students learning ability and creativity during regular curriculum. All these work are peer reviewed by experts and publically available on google scholars, research gate and as book chapters.

Pedagogical Technique

**Teaching learning through Simulation module:
Control System Design using Lab VIEW**

Activities - Time domain and Frequency domain simulation module using LabVIEW. Developed for the subject related to Control System. Developed by - Dr. Manish Thakker

The Control Design and Simulation Module provide tools can analyze open-loop model behavior, design closed-loop controllers.



Outcome

Students can compare transfer function of frequency domain and time domain behavior with simulation and analytical methods. Also study response of single order and multiple order system on single click.

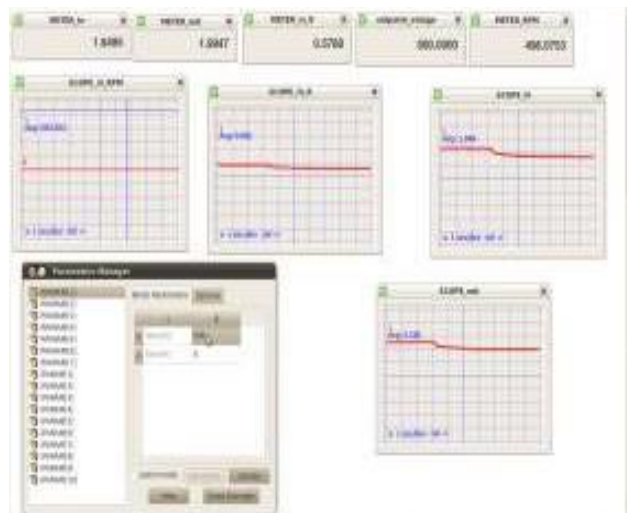
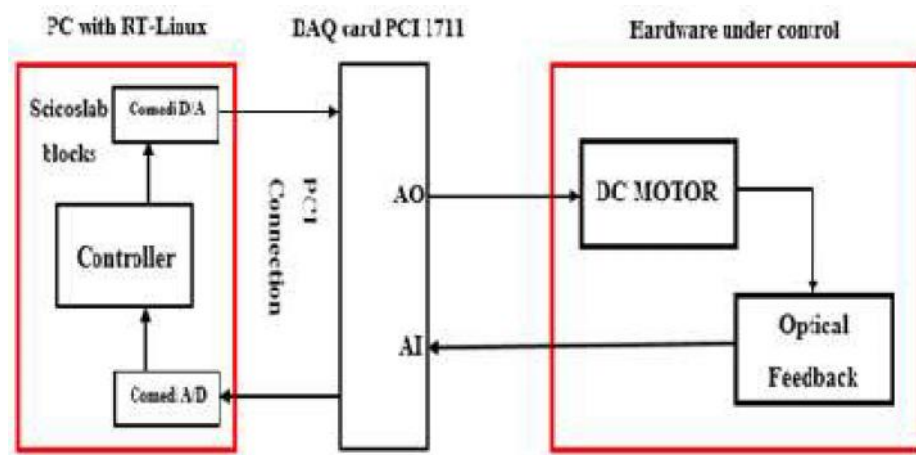
Pedagogical Technique

PID control of DC motor using Real-time Automation test platform in Linux environment

Developed by Prof.V.P.Patel

Activities: Simulation module for Control of DC motor using real time test platform based on Linux operating system used in the control related subjects.

Control of DC motor using real time test platform based on Linux operating system, free open source Simulation & control software SCILAB/SCICOS, interfacing driver code COMEDI. The Real-time Application Interface (RTAI) freeware is used to create hard real time system clock. That make Linux kernel full preemptive and deterministic. The main advantage of this type platform is that all software or codes are freely available from internet website.



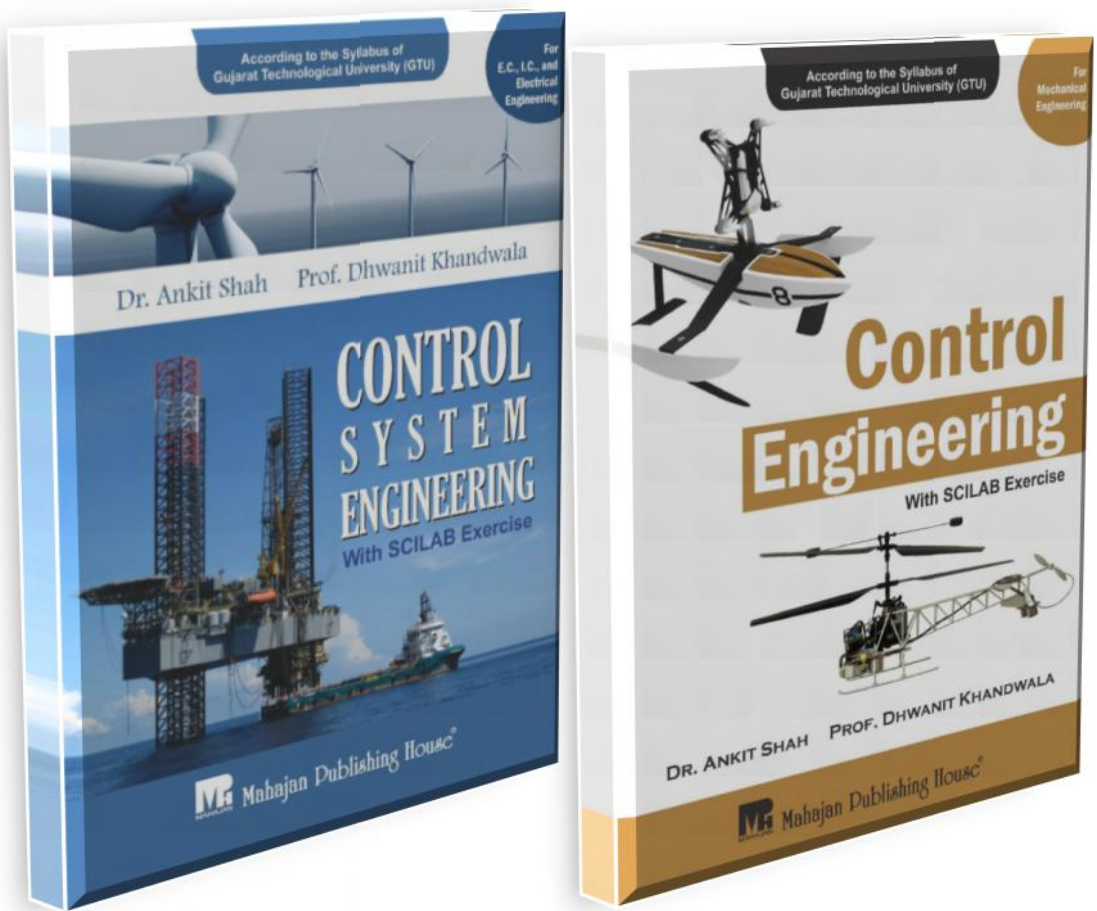
Outcome

Using this Automation test platform students learn Real time speed control of DC motor with Advantech PCI1711 DAQ card. Also learn interfacing of DAQ with Linux.

Pedagogical Technique

Reference books on Control Engineering and Control system engineering Authored by - Dr.A.K.Shah

Activities - A Reference book specifically written as per GTU syllabus which covers various soft tools and simulations in SCILAB in the field of Control System Engineering. This work is published in two reference books, this has also enhanced in teaching learning process not only in Instrumentation & Control Engineering but also in Mechanical, Electronics & Communications and Electrical Engineering and related branches. In this book, SCILAB based simulation codes are provided which is helpful to students in understanding the use of the software. SCILAB having advantage of open source software.



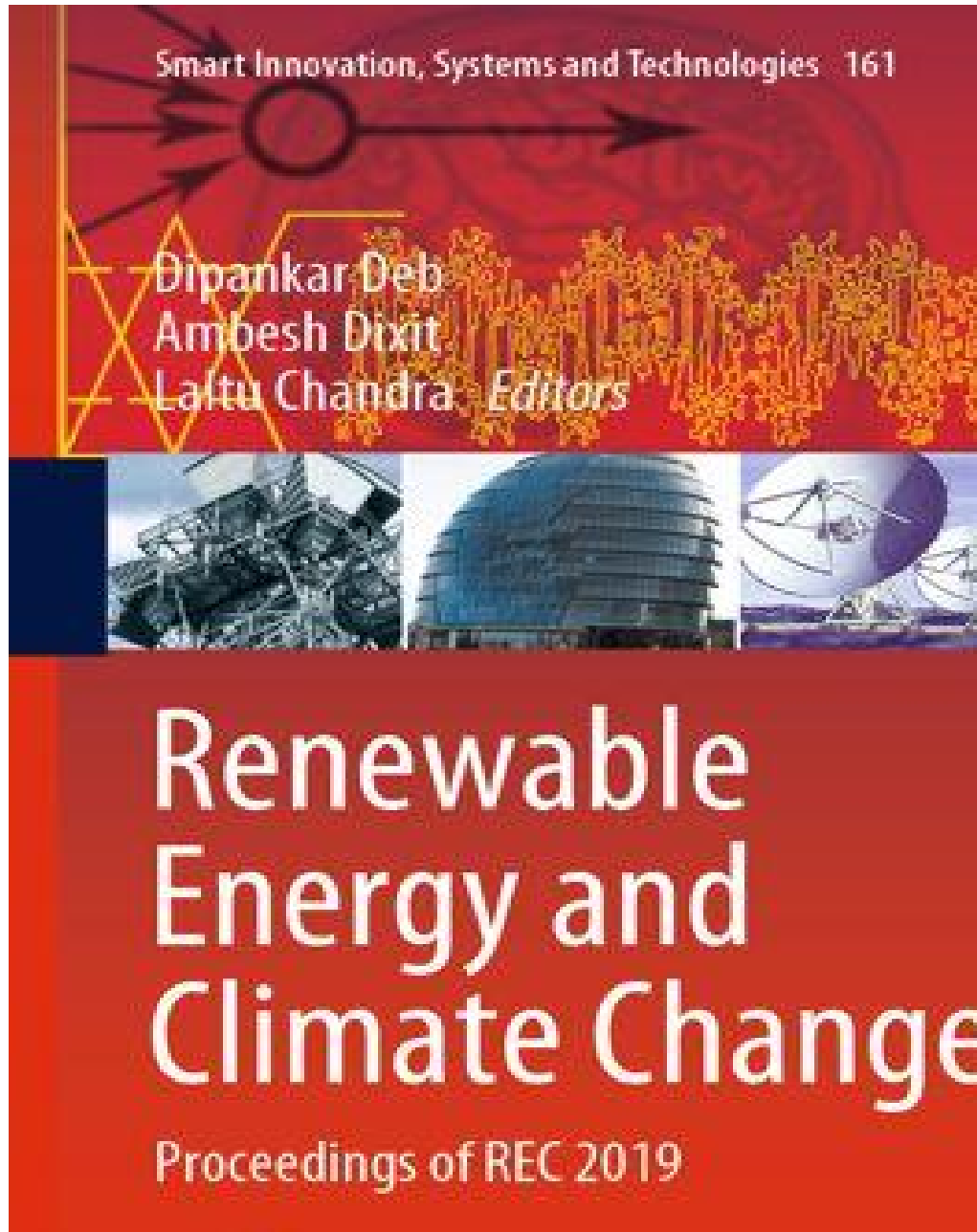
Outcome

Students can learn SCILAB- open source software and able to get analysis of various transfer function responses. Students can able to get the time response and frequency response analysis of the system. Students can able to find the state space model of the given transfer function using SCILAB.

Pedagogical Technique

Book Chapter on Climate Control on Green House System using Neural Predictive Controller by Dr. Manish Thakkar & Prof. Shriji Gandhi

Activities - A case study on Controlling Green House Parameters using Neural Predictive Controller was presented



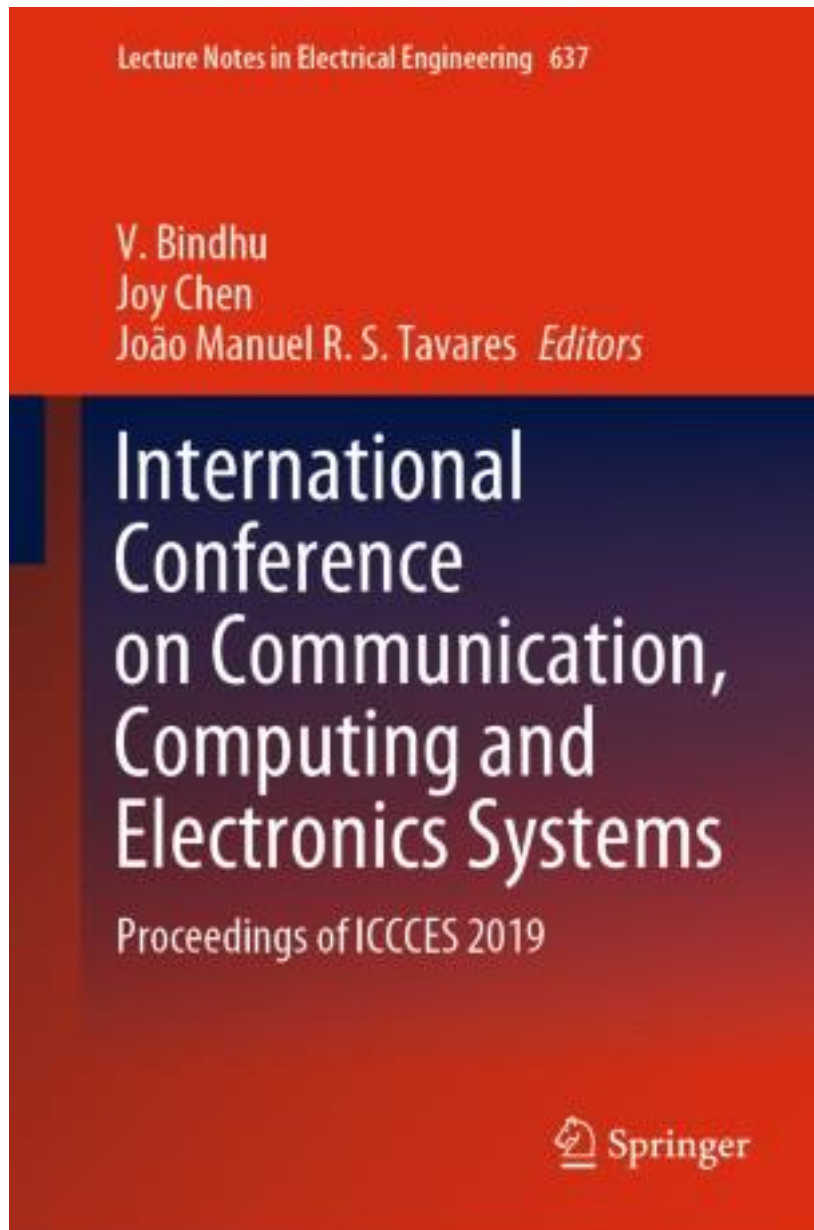
Outcome

Students become familiar with advance techniques of control system design used in application of Green House system.

Pedagogical Technique

Book Chapter on Lecture Notes in Electrical Engineering by Dr. A. K. Shah and Prof. V. V. Patel

Activities - An IEC 61131-3-Based PLC Timers Module Implemented on FPGA Platform was presented as book chapter.



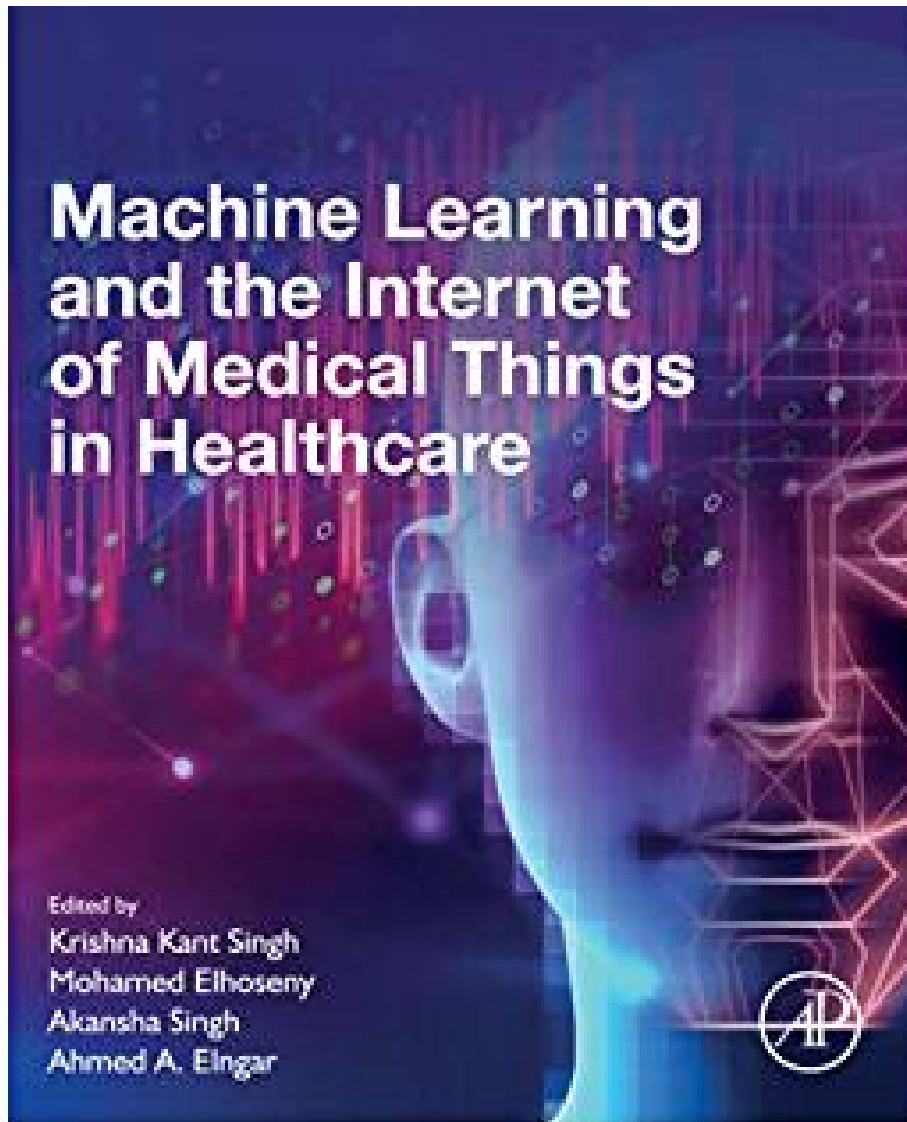
Outcome

Students become familiar with advance techniques for implementation of PLC on FPGA platform. Students are motivated to developed project of FPGA based PLC.

Pedagogical Technique

Book Chapter on Machine Learning and the Internet of Medical Things in Healthcare by Dr. A. K. Shah and Prof. V. V. Patel

Activities – “Machine learning for biomedical signal processing” presented as book chapter in Machine Learning and the Internet of Medical Things in Health by Academic Press, Elsevier



Outcome

Students can learn about the various applications of machine learning in Biomedical Engineering, biomedical signal processing to extract, analyze, and categorize various signals or images for diagnosis purposes.

Pedagogical Technique

Google Class Room - To enhance students learning through digital platform as well provide assignments, case study in various subjects.

Activities: Experiments are performed in different subject like Digital electronics, measurement and instrumentation, electrical machines, circuit and networks, etc subjects by faculty members. Assignments are also generated and assess for the various subjects by the faculties. Induction program is also conducted for the first year student using Google classroom.

DLC SEM III IC 2018

Stream **Classwork** People Grades

+ Create Meet Google Calendar Class Drive folder

- Experiment 1 Basic gates and Universal gates Filed Aug 1, 2018
- Experiment 2 Half adder, full adder using lo... Edited Aug 1, 2018
- Experiment 3 Code converters Edited Aug 1, 2018
- Experiment 5 Encoders and Decoders Edited Aug 2, 2018
- Experiment 4 Application of Boolean e... Edited Aug 2, 2018
- Experiment 6 Multiplexer and De multiplex... Colled Jul 27, 2018
- Experiment 7 Details of magnitude compar... Filed Jul 27, 2018

EM SEM III IC 2018
LAB-2
Class code: pebbyr
Meet link Generate Meet link

Upcoming
No work due soon
View all

Announce something to your class

Kruti Joshi posted a new assignment: experiment no. 8
Aug 21, 2018

Kruti Joshi posted a new assignment: experiment no. 7
Aug 21, 2018

Outcome

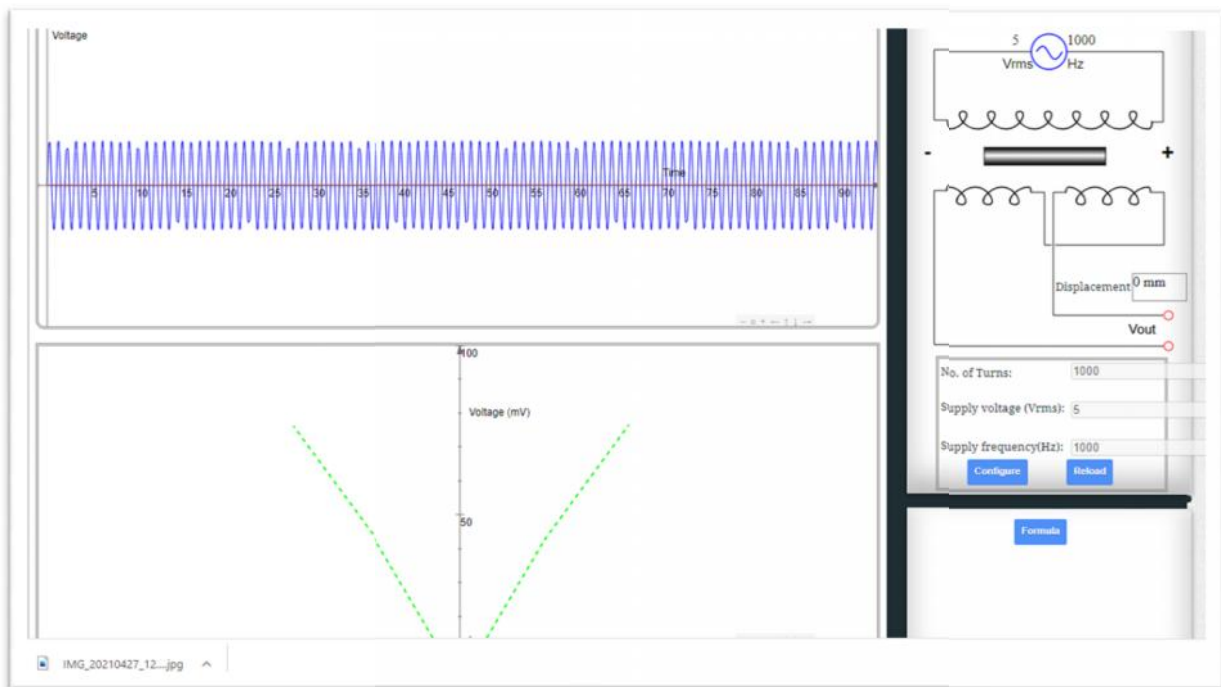
Students are more interacting, submitting assignments on time. Students remote learning is also enhanced and having more visualization while performing experiments. Students are aware about the importance of timely submission along with assessment scheme.

Pedagogical Technique

Virtual Labs - To enhance students learning through digital platform as well provide remote exposure of practicals and various IIT Virtual Labs are used.

Subject Name - Measurements

Faculty: V. V. Patel, N. A. Kanani, & H.K.Shastri



Outcome

V lab overcomes the limitations such as lack of resources for repeated experiments, safety, time constraints etc. Virtual learning environments come with no such limitations, and present a viable educational approach for subjects. It isn't hard to see how virtual labs can open a world of possibilities to students, and aid them in mastering even the most complex of concepts.

For knowledge acquisition, relying on an immersive virtual environment results in valuable learning outcomes with visualization elements, in a space that is both safe and flexible.

Pedagogical Technique

Practical simulation in ABB AC1131 software in PLC Subject by Prof. Lalit S. Patel

Activities - Through AC1131 simulation software real time schedule also interfaces with PLC program, with same addressing. Through AC1131 simulation software ladder programming, function block programming, illustrated logic programming is also possible. Relay connections and input/output connections with plc and hardware is also learn through simulation software.

The screenshot displays the ABB AC1131 simulation software interface. The main window is titled 'AC1131 - IIR LSP.pro'. The left pane shows the project structure with 'PLC_PRG (PRG)' selected. The central pane displays the ladder logic program (LSP) for 'PLC_PRG (PRG-LD)'. The program consists of several rungs (0001 to 0013) with the following logic:


- 0001: Is0(%IX3.0) = FALSE
- 0002: f1(%IX2.4) = FALSE
- 0003: f2(%IX2.5) = FALSE
- 0004: Is1(%IX3.1) = BOOL AT %IX2.5
- 0005: Mup(%QX2.0) = FALSE
- 0006: Mdown(%QX2.1) = FALSE
- 0007: Is2(%IX3.2) = TRUE
- 0008: f0(%IX2.3) = FALSE
- 0009: Mup1(%MX2.0) = FALSE
- 0010: Mup2(%MX2.1) = FALSE
- 0011: Mdown1(%MX2.2) = FALSE
- 0012: Mdown2(%MX2.3) = FALSE
- 0013: Y(%MW1001.0) = 0

The right pane shows a SCADA interface with a vertical panel labeled 'Mup'. It features a green button 'f2', a red button 'Is2', a grey button 'f1', and a green button 'Is1'. The bottom status bar shows 'FLASH ONLINE SIM RUN STOP FORCE I/O READ' and the system time '5:44 PM 17-Apr-21'.

Outcome

From the simulation software for PLC practical student can learn how to perform ladder programming from given task of sequence. Student can observe the real time activation of all NO/NC contacts and its effects on final outputs and its movements in scada. Also students can use interlocks in any system and its applications.

Pedagogical Technique	Flipped Class room
Activities - Subject link Constitution of India, Integrated Personality Development and Contributed Personality Development students given topic and provide platform to present as well faculties coach them for improvement of presentation skills.	
Pedagogical Technique	NPTEL Video Lecture
Activities - Subject link Constitution of India, Integrated Personality Development and Contributed Personality Development students given topic and provide platform to present as well faculties coach them for improvement of presentation skills.	

Pedagogical Technique	Summer Boot Camp
Activities - Students were given an opportunity to present their skills among school children as well in various functions.	
	
A summer boot camp on Innovation organized and Robocon Students interacting with school children, 14-6-2019	
Outcome	
Students get exposure and gain confidence about their technical and managerial skills	

Pedagogical Technique

Technical Chart making Competition using Microsoft Publisher

Activities - A short training is provided on Microsoft publisher and Competition of technical charts on various subjects like control system, Process Control, Electronics etc. were organized to enhance students learning. A chart making competition was organized under ISA student chapter of Instrumentation & Control Eng. Dept on 25/02/2020. In this competition, 18 students from 4th sem IC and 15 students from 6th sem IC were participated. This competition is co-ordinated by Mayank Patel-ISA student chapter in charge, Dr. Ankit K. Shah-Asst. Prof. IC dept. under the guidance of Head of Instrumentation and Control Department Dr. Manish Thakker. Three winners from 4th sem IC and three winners from 6th sem IC were declared based on Creativity, originality and content presented in charts.



Outcome

Students learn the use of Microsoft publisher as well their innovative skills for representing various technical topics improved. Also, some good charts available in laboratory for students display.