



School of Electrical Engineering (SELECT)



Vision

To offer an education in electrical engineering that provides strong fundamental knowledge, skills for employability, cross-disciplinary research and creates leaders who provide technological solutions to societal and industry problems.

Mission

- Provide personalized experiential learning in industry sponsored labs to prepare students in electrical engineering with strong critical thinking and employability skills.
- Foster design thinking, creativity and cross-disciplinary research with highly qualified faculty to create innovators and entrepreneurs in the broad area of electrical engineering.
- Collaborate with national and international partners to provide innovative solutions to societal and industry challenges.

Dean's Message



Dr. Mathew M. Noel
Professor and Dean
School of Electrical Engineering
Vellore Institute of Technology, Vellore

'Develop skilled engineers to meet industry needs and thereby develop responsible citizens for our country and society'

The School of Electrical Engineering (SELECT) has over 93 faculty members who pursued their UG, PG and Doctoral degrees from top-notch universities. The faculty members are consistently performing well in teaching and research. Faculty members and students frequently receive awards, laurels and prizes for outstanding research contributions in their respective fields.

The school offers B.Tech. (Electrical and Electronics Engineering), B.Tech. (Electronics and Instrumentation Engineering), M.Tech. (Power Electronics and Drives), M. Tech. (Control and Automation), Ph.D and Integrated Ph.D in Engineering. Both B.Tech. and M.Tech. programmes attract the Intelligent students from the country and abroad. The B.Tech. Electrical and Electronics Engineering and B.Tech. Electronics and Instrumentation Engineering Programmes are accredited by the Engineering Accreditation Commission of ABET. All UG & PG programmes of the school are accredited by the Institution of Engineering and Technology (IET), U.K.

The placement record of the school has always been impressive. Almost 100% of the students secure job from the campus placement and many of them are recruited in core companies. We encourage our students to carry out industry based projects during their B.Tech and M.Tech degrees. The School has state-of-the art laboratories in almost all the areas of Electrical, Electronics and Instrumentation Engineering. The School has the latest simulation tools to cater various specializations and is equipped with facilities for measurement, characterization and synthesis of experimental as well as theoretical results. SELECT has industry sponsored advanced laboratories for performing world class research and consultancy. Danfoss Advance Drives Lab, Schneider Electric Smart Energy Monitoring Lab, Fluke Testing and Calibration Lab, Q-Max Automated Test Engineering Lab (Alumni Sponsored Lab) and NxP Semiconductors, India, have established Centre of Excellence for students R&D activities under the guidance of faculty members and industry experts.

Faculty Achievements

1) Value Added Program on exploring MATLAB/Simulink

Date: 19th May to 23rd May, 2022

Control Systems, Sensors, Process Control and Automation are the core specialization areas in instrumentation engineering. Control systems are used to enhance production, safety and efficiency in various fields. Sensor data plays vital role for the effective functioning of control systems. Selection of proper sensors and designing the signal conditioning plays critical role in industrial applications. Process control deals with the science of maintaining the output of a specific process within a desired range. Process control is commonly used for mass production. Due to its precise nature, it enables the automation of industrial processes. The purpose of this VAP is to provide students a grasp of the fundamental concepts and operational characteristics of various sensors, designing controllers and programming PLCs. This skill will uplift the student's employability ratio.



2) Value Added Program on Circuit Simulation using ORCAD/MULTISIM

Date: 30th May to June 10th, 2022

Simulation software plays a vital role in industry4.0 that allows you to evaluate, compare and optimize alternative designs, plans and policies. As such, it provides a tool for designing and developing major circuits and allows to make decisions as per the requirement. OrCAD Spice Designer, an advanced circuit simulation and analysis for analogue and mixed-signal circuits. OrCAD® PSpice® and OrCAD Capture combine to provide industry-leading, schematic entry, native analog, mixed signal, and analysis engines to deliver a complete circuit simulation and verification solution. The software is used mainly by electronic design engineers and electronic technicians to create electronic schematics, perform mixed-signal simulation and electronic prints for manufacturing printed circuit boards. The value-added program aims to impart knowledge on applications of OrCAD for solving various electrical and electronics engineering problems.



3) VIT-Binghamton Joint Webinar Series:

Seminar 1: Fast Charging of Vanadium Redox Flow Batteries

Speaker: Dr. Pritam Das, Assistant Professor, Binghamton University

This lecture was the first in a joint webinar series between VIT University, Vellore and Binghamton University, USA. The speaker was Dr. Pritam Das who is an Assistant Professor at Binghamton University. Dr. Das present his research on the topic “Fast Charging of Vanadium Redox Flow Batteries”. It was well attended by students, research scholars and faculty from both VIT and Binghamton University. The session was very interactive and there were many questions from Research scholars working in this area.

The screenshot shows a Zoom meeting interface. The main content is a presentation slide from Binghamton University titled "Vanadium Redox Flow Battery (VRFB) and Li-ion Battery: Comparison".

Vanadium Redox Flow Batteries (VRFB) Benefits:

- Decouple power and energy design
- Long life time (> 15000 cycles)
- Safe battery chemistry (Non-toxic, Non-flammable, environmental friendly).
- No cross-contamination
- Larger charge-discharge range (0-100%)

VRFB drawbacks compared to Li-ion batteries:

- Less terminal voltage
- lower power density
- Lower efficiency of Li-ion

The slide also features a graph titled "Standard potential (V) of redox couples" with a y-axis from -1.0 to 2.0. It shows various redox couples categorized by H₂ evolution (left) and O₂ evolution (right). Key couples include Zn²⁺/Zn, Sn²⁺/Sn, Cu²⁺/Cu, VO²⁺/VO²⁺, VO²⁺/VO³⁺, Br₂/Br⁻, Mn²⁺/MnO₂, and Ce³⁺/Ce⁴⁺.

The Zoom interface includes a participants list on the right with 29 participants, a video gallery in the center, and a bottom toolbar with controls like Mute, Start Video, Participants, Chat, Share Screen, Record, Reactions, and Leave.

4) VIT-Binghamton Joint Webinar Series:

Seminar 2: “Reinforcement Learning Control of Nonlinear Dynamical Systems”

Speaker: Dr Mathew M. Noel, Professor, VIT Vellore

This lecture was the second in a joint webinar series between VIT University, Vellore and Binghamton University, USA. The speaker was Dr. Mathew Noel who serves as the Dean of SELECT at VIT. Dr. Mathew, who is an expert in Machine Learning, discussed about “Reinforcement Learning Control of Nonlinear Dynamical Systems”. It was well attended by students, research scholars and faculty from both VIT and Binghamton University. The session was very interactive and there were many questions from Research scholars working in this area.

The screenshot displays a Zoom webinar interface. On the left, a slide titled "Reinforcement Learning" is shown. It features a block diagram of an "Agent" interacting with an "Environment". Below the diagram is a state transition diagram with states s_0, s_1, s_2 and actions a_0, a_1, a_2 . The slide also includes the text "Cost: Learn to choose actions that maximize" and the equation
$$R(s_0, a_0) + \gamma R(s_1, a_1) + \gamma^2 R(s_2, a_2) + \dots$$
. In the center, a video feed shows the speaker, Dr. Mathew M. Noel, wearing glasses and a headset. On the right, a "Participants (30)" list is visible, including names like Joshua Reddip..., Dr. Mithra (Co-host), ARUN N (Co-host), Joshi Kumar V (Co-host), Kathiravan Srinivasan (Co-host), Ning Zhou (Co-host), Ziang (John) Zhang (Co-host), B Sudha, Chelathamilan Thiyagarajan, Doug Summerville, Dr R. Seemivasan, evavu, Jaganatha Pandian, and Janani RB * 8th B2. The bottom of the screen shows the Zoom control bar with options like Unmute, Skip Video, Security, Participants, Chat, Share Screen, Reactions, Apps, Whiteboards, More, and End.

5) VIT-Binghamton Joint Webinar Series:

Seminar 3: Enhancement of Power System Reliability via Secondary Protective Control

Speaker: Dr N. Eva Wu, Professor, Binghamton University

This lecture was the third in a joint webinar series between VIT University, Vellore and Binghamton University, USA. The speaker was Dr N. Eva Wu who serves as a Professor at Binghamton University. Dr Wu presented her research on “Enhancement of Power System Reliability via Secondary Protective Control”. It was well attended by students, research scholars and faculty from both VIT and Binghamton University. The session was very interactive and there were many questions from Research scholars working in this area.

The screenshot displays a Zoom webinar interface. On the left, a presentation slide titled "Reliability Enhancement via SPC" is visible. The slide contains the following text:

- Impact of secondary protective control on availability [3,8]
 - Reliability: availability and system security
 - Availability model with PP misoperations and mitigation processes
 - Role of secondary protective control - maximize s_{12} and s_{22}
- Monotonic dependence of availability on security indices
- Reliability is an increasing function of security indices

The slide also includes a mathematical equation:
$$A_s = 1 - \frac{2s_{12}}{A_{12}} \left(1 - \frac{2s_{12}s_{22}}{1+s_{12}/s_{22}} \right)$$
 and a diagram labeled "Aggregated availability model" showing a network of nodes and connections. A small rainbow-colored diamond graphic is at the bottom of the slide.

In the center, a video feed shows the speaker, Dr. N. Eva Wu, wearing glasses and a blue shirt, speaking from a room with a desk and a door in the background.

On the right, a "Participants (16)" list is shown with the following names and icons:

- Joshua (Me)
- eva wu (Host)
- Elizabeth Kradjan (Co-host)
- Ning Zhou (Co-host)
- 92746522960
- Doug Summerville
- Kathiravan Srinivasan
- Michael Higgins
- Polanisamy
- Ravi K
- Seenivasan VIT India
- Shreyas Kodte
- Sudhir
- Tyler Murray

At the bottom of the interface, there are controls for "Unmute", "Start Video", "Participants", "Chat", "Share Screen", "Record", "Reactions", "Apps", and a "Leave" button.

6) VIT-Binghamton Joint Webinar Series:

Seminar 4: “Learning Control Schemes for Flexible Manipulators”

Speaker: Dr. Vinodh Kumar E, Associate Professor, VIT Vellore

This lecture was the fourth in a joint webinar series between VIT University, Vellore and Binghamton University, USA. The speaker was Dr Vinodh Kumar who serves as an Associate Professor at VIT. Dr Vinodh presented his research on “Learning Control Schemes for Flexible Manipulators”. It was well attended by students, research scholars and faculty from both VIT and Binghamton University. The session was very interactive and there were many questions from Research scholars working in this area.

The screenshot displays a Zoom webinar interface. At the top, there are video thumbnails for participants: Joshua, Vinodh Kumar E (the speaker), Ning Zhou, Divakar, and Manimozhi M. The main content is a slide titled "Reinforcement Learning Control".

The slide compares two control systems:

- Control system:** A block diagram showing a feedback loop with blocks for "Controller", "Plant", and "Measurement".
- Reinforcement learning system:** A diagram showing an "Agent" interacting with an "Environment".

Below the diagrams are two columns of components:

- Control system components:** Adaptation mechanism, Error/Cost function, Manipulated variable, Measurement, Plant, Controller.
- Reinforcement learning system components:** RL Algorithm, Reward, Action, Observation, Environment, Policy.

A central box states: "Reinforcement learning has parallels to control system design".

At the bottom of the slide, it reads: "Figure 16: RLC vs Classical control system".

The Zoom interface includes a "Participants (20)" list on the right, a "Share Screen" button at the bottom, and a "Leave" button in the bottom right corner.

Top Publications
April 2022

- 1) Pandiyan P., Sitharthan R., Saravanan S., Prabakaran N., Ramji Tiwari M., Chinnadurai T., Yuvaraj T., Devabalaji K.R., A comprehensive review of the prospects for rural electrification using stand-alone and hybrid energy technologies, *Sustainable Energy Technologies and Assessments*, **I.F.** 5.353
- 2) Sharma J., Sundarabalan C.K., Sitharthan R., Balasundar C., Srinath N.S., Power quality enhancement in microgrid using adaptive affine projection controlled medium voltage distribution static compensator, *Sustainable Energy Technologies and Assessments*, **I.F.** 5.353
- 3) Thirunavukkarasu M., Sawle Y., An Examination of the Techno-Economic Viability of Hybrid Grid-Integrated and Stand-Alone Generation Systems for an Indian Tea Plant, *Frontiers in Energy Research*, **I.F.** 4.008
- 4) Salehuddin N.F., Omar M.B., Ibrahim R., Bingi K., A Neural Network-Based Model for Predicting Saybolt Color of Petroleum Products, *Sensors*, **I.F.** 3.576
- 5) Manna S., Geetha M., Ghildiyal S., Stonier A.A., Peter G., Ganji V., Murugesan S., Ant Colony Optimization Tuned Closed-Loop Optimal Control Intended For Vehicle Active Suspension System, *IEEE Access*, **I.F.** 3.367
- 6) Kumar N.K., Gopi R.S., Kuppusamy R., Nikolovski S., Teekaraman Y., Vairavasundaram I., Venkateswarulu S., Fuzzy Logic-Based Load Frequency Control in an Island Hybrid Power System Model Using Artificial Bee Colony Optimization, *Energies*, **I.F.** 3.004
- 7) Raju K.U., Prabha N.A., Error-free and mean value based reversible data hiding using gravitational search algorithm in encrypted images, *Multimedia Tools and Applications*, **I.F.** 2.757
- 8) Joseph Raj A.N., Junmin C., Nersisson R., Mahesh V.G.V., Zhuang Z., Bilingual text detection from natural scene images using faster R-CNN and extended histogram of oriented gradients, *Pattern Analysis and Applications*, **I.F.** 2.580
- 9) Sarin C.R., Mani G., Stonier A.A., Arivarasu M., Samikannu R., Murugesan S., Multithreaded Multiswarm Model for Intelligent Economic Prosumer Load Dispatch for Battery Supported DC Microgrid, *Mathematical Problems in Engineering*, **I.F.** 1.305

Top Publications May 2022

- 1) Singirikonda S., Obulesu Y.P., Adaptive secondary loop liquid cooling with refrigerant cabin active thermal management system for electric vehicle, *Journal of Energy Storage*, **I.F.** 6.583
- 2) Mujeeb Rahman K.K., Monica Subashini M., A Deep Neural Network-Based Model for Screening Autism Spectrum Disorder, *Journal of autism and developmental*, **I.F.** 4.291
- 3) Selvakumar K., Vinodh Kumar E., Sailesh M., Varun M., Allan A., Biswajit N., Namrata P., Upasana S., Realtime PPG based respiration rate estimation for remote health monitoring applications, *Biomedical Signal Processing and Control*, **I.F.** 3.880
- 4) Basha C.H.H., Rani C., A New single switch DC-DC converter for PEM fuel cell-based electric vehicle system with an improved beta-fuzzy logic MPPT controller, *Soft Computing*, **I.F.** 3.643
- 5) Singh R.R., Baranidharan M., Subramaniam U., Bhaskar M.S., Rangarajan S.S., Abdelsalam H.A., Collins E.R., Senjyu T., An Energy-Efficient Start-Up Strategy for Large Variable Speed Hydro Pump Turbine Equipped with Doubly Fed Asynchronous Machine, *Energies*, **I.F.** 3.004
- 6) Ranganathan E., Natarajan R., Spotted Hyena Optimization Method for Harvesting Maximum PV Power under Uniform and Partial-Shade Conditions, *Energies*, **I.F.** 3.004
- 7) Robert F., Uma Sathyakam P., Perspective - Demystifying the Power Withstanding Capabilities of CNT Bundle Interconnects, *ECS Journal of Solid State Science and Technology*, **I.F.** 2.070
- 8) Muneappa Reddy J., Rajaram T., Xu Y., Modal Analysis on Control Impact of Fully Rated Converters-Based PMSG-WECS Connected to Turbine-Generator, *Electric Power Components and Systems*, **I.F.** 1.071
- 9) Karn A.L., Sachin V., Sengan S., Indra G.V., Ravi L., Sharma D.K., Subramaniaswamy V., DESIGNING A DEEP LEARNING-BASED FINANCIAL DECISION SUPPORT SYSTEM FOR FINTECH TO SUPPORT CORPORATE CUSTOMER'S CREDIT EXTENSION, *Malaysian Journal of Computer Science*, **I.F.** 0.622
- 10) Karn A.L., Ateeq K., Sengan S., Indra G.V., Ravi L., Sharma D.K., Subramaniaswamy V., B-LSTM-NB BASED COMPOSITE SEQUENCE LEARNING MODEL FOR DETECTING FRAUDULENT FINANCIAL ACTIVITIES, *Malaysian Journal of Computer Science*, **I.F.** 0.622

Top Publications
June 2022

- 1) Harish S., Sathyakam P.U., A review of tin selenide-based electrodes for rechargeable batteries and supercapacitors, *Journal of Energy Storage*, **I.F.** 6.583
- 2) Mohanraj J., Valliammai M., Sridevi S., Kanimozhi T., Vinodhkumar N., Sivabalan S., All Fiber-Optic Multi-Gas (NH₃, NO₂ and CO) Sensor based on MoWS₂ coated Fiber, *IEEE Sensors Journal*, **I.F.** 3.301
- 3) Ramadevi B., Bingi K., Chaotic Time Series Forecasting Approaches Using Machine Learning Techniques: A Review, *Symmetry*, **I.F.** 2.713
- 4) Praiselin W.J., Edward J.B., Enhancement of Power-Sharing Using Multivariable Angle Droop Control for Inverter Interfaced Distributed Generations in a Micro-Grid, *Journal of Electrical Engineering and Technology*, **I.F.** 1.069
- 5) Subramanian V., Vairavasundaram I., Comparative analysis of dual second-order generalized integrator-phase locked loop based series hybrid filter and static synchronous compensator for load voltage compensation and power quality improvement with grid synchronization in islanded microgrid, *Circuit World*, **I.F.** 0.875
- 6) Mani G., Joshi Kumar V., Stonier A.A., Prediction and forecasting of air quality index in Chennai using regression and ARIMA time series models, *Journal of Engineering Research (Kuwait)* , **I.F.** 0.620
- 7) Upendra Raju K., Prabha Nagarajan A., A Steganography Embedding Method Based on CDF-DWT Technique for Reversible Data Hiding Application Using Elgamal Algorithm, *International Journal of Foundations of Computer Science*, **I.F.** 0.416

**Editorial
Committee**

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