

MINUTES OF BOARD OF STUDIES MEETING

Board of Studies (BoS) meeting of B.Tech., EEE program was conducted on 14.02.2026 in hybrid mode from 10.00 am to 11.00 am at VFF-07, H-Block, VFSTR.

Agenda of the BoS Meeting:

1. Review and approval of upgrading the credits for the course *PV Technologies and Applications* and inclusion of *Foundations of Quantum Computing for Electrical Engineering*.
2. Approval of the new M.Tech. program in *Autonomous Electric Vehicles*.
3. Approval of NPTEL courses for EEE students.

The following members were present

Sl. No	Name of the Member	Designation and Address	Role
1	Dr. K. Mercy Rosalina	Professor	Chairperson
2	Dr. Jithendranath J.	Senior Project Engineer, Hitachi Energy Technology Services P. Ltd., Grid and Power Quality Solutions, Chennai Mobile: +91-9949537586 Email: jithendranath.j@hitachienergy.com	External Member (Industry)
3	Dr. B. Satish Babu	Sr. Staff Engineer, Infineon Technologies, Bangalore Phone: 9958006750 Email: satishbabu.bhugineni@infineon.com	Invited Member (External)
4	Dr. Polamraju V. S. Sobhan	Associate Professor & HoD	Internal Member
5	Dr. M. Subba Rao	Associate Professor	Internal Member
6	Dr. N. Bharath Kumar	Assistant Professor	Internal Member
7	Dr. A. R. Vijay Babu	Associate Professor	Internal Member
8	Mr. K. Ashok Kumar	Assistant Professor, VFSTR Deemed to be University, Off Campus	Internal Member
9	Dr. K. Chakravarthi	Assistant Professor (BoA), Department of EEE, VFSTR	Member Secretary

At the beginning of the meeting, the Chairperson of the BoS, Dr. K. Mercy Rosalina, Professor, Department of EEE, welcomed all the members and briefed them on the progress and activities of the department.

The following suggestions were given by the external members:

Dr. Jithendranath J.

- Suggested enriching the course *PV Technologies and Applications* by incorporating PV system design and latest application-oriented topics to meet current industrial demands, and recommended increasing the course credits from 3 to 4 considering the enhanced design-oriented and application-based content.
- Approved the course "*Foundations of Quantum Computing for Electrical Engineering*"
- Appreciated the introduction of the M.Tech. program in *Autonomous Electric Vehicles* as a future-oriented and industry-relevant program aligned with emerging trends in electric mobility, automation, and sustainable transportation technologies.
- Appreciated the introduction of new NPTEL courses for EEE students.

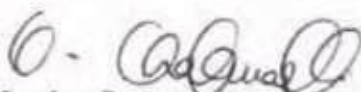
Dr. B. Satish Babu

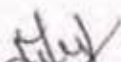
- Appreciated the inclusion of advanced concepts in the course PV Technologies and Applications.
- Appreciated and approved the inclusion of the course "Foundations of Quantum Computing for Electrical Engineering".
- Suggested including advanced and multidisciplinary topics such as autonomous driving technologies, battery management systems, embedded systems, IoT, Artificial Intelligence, Machine Learning, sensor fusion, and V2X communication in the curriculum.
- Suggested introducing Industrial Automation and Control as an NPTEL course.

The following resolutions were made after detailed discussion:

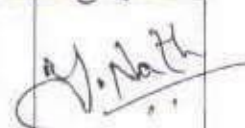
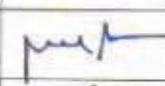
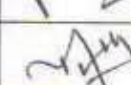
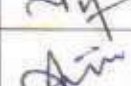
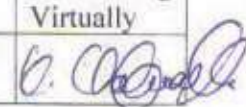
- The members approved the increase in credits for the course PV Technologies and Applications from 3 credits to 4 credits considering the enhanced design-oriented content, case studies, and application-based learning components.
- Approved the introduction of the M.Tech. program in *Autonomous Electric Vehicles* considering the rapid growth and future demand in EV and intelligent mobility sectors.
- The members approved the inclusion of NPTEL courses in emerging areas such as entrepreneurship, integrated circuits, smart grid technologies, and industrial automation in the curriculum.
 - 1 Artificial Intelligence: Knowledge Representation and Reasoning (12 Weeks)
 - 2 Entrepreneurship Essentials (12 Weeks)
 - 3 Advertising & Promotions Management (12 Weeks)
 - 4 Time Series Modelling and Forecasting with Applications in R (12 Weeks)
 - 5 Embedded Sensing, Actuation and Interfacing Systems (12 Weeks)
 - 6 Industrial Automation and Control (12 Weeks)
 - 7 Semiconductor device modeling and Simulation (12 Weeks)
 - 8 Smart Grid: Basics to Advanced Technologies (12 Weeks)
 - 9 Ethics in Engineering Practice (8 Weeks)
 - 10 Integrated Circuits, MOSFETS, OP-Amps and their Applications (12 Weeks)

Finally, the Chairperson thanked all the external and internal members for their valuable suggestions and active participation in the meeting.


Member Secretary


Chairperson

The following are the members present for the board of studies meeting held at Department of Electrical and Electronics Engineering on 14.02.2026

Sl.	Name of the Member	Designation and Address	Signature
1	Dr. K. Mercy Rosalina	Professor	
2	Dr. Jithendranath J.	Senior Project Engineer, Hitachi Energy Technology Services P. Ltd., Grid and Power Quality Solutions, Chennai Mobile: +91-9949537586 Email: jithendranath.j@hitachienergy.com	
3	Dr. B. Satish Babu	Sr. Staff Engineer, Infineon Technologies, Bangalore Phone: 9958006750 Email: satishbabu.bhogineni@infineon.com	Participated the Meeting Virtually
4	Dr. Polamraju V. S. Sobhan	Associate Professor, HoD	
5	Dr. M. Subba Rao	Associate Professor	
6	Dr. N. Bharath Kumar	Assistant Professor	
7	Dr. A. R. Vijay Babu	Associate Professor	
8	Mr. K. Ashok Kumar	Assistant Professor, VFSTR Deemed to be University, Off Campus	Participated the Meeting Virtually
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PHOTOS




Chairman, BoS

B.Tech-EEE Modified syllabus

PV TECHNOLOGIES AND APPLICATIONS

L	T	P	SL	C
3	2	-	3	4

PREREQUISITE KNOWLEDGE:

Basics Physics, Basics of Electrical & Electronics Engineering

COURSE DESCRIPTION AND OBJECTIVES:

This course is aimed at familiarizing the students with the fundamentals, characteristics, parameters and manufacturing of solar PV cells, series and parallel connection of solar cells, I-V characteristics of a PV module. In these subject students will learn the sun tracking mechanisms, emerging solar cell technologies and battery energy storage systems. The course is also aimed at familiarizing the students with the design of PV system applications.

MODULE-I

18L+12T+0P+18SL = 48 hours

UNIT-I: SOLAR CELLS AND PV MODULES

Photovoltaic effect, Types of solar cells - Monocrystalline, polycrystalline and amorphous silicon cells, Single diode model of solar cell, current equation, I-V characteristics of a PV cell, Parameters of a solar cell, series and shunt resistances, cell efficiency, cell & module efficiencies, fill factor, Series and parallel connection of solar cells, effect of irradiation and temperature, shading and hot spots.

UNIT-II:

CLASSIFICATION AND COMPONENTS OF PV SYSTEMS

Classification of PV systems, small system for consumer applications, Hybrid solar PV system, PV system components – charge controller, solar inverter, net metering system.

PRACTICES:

- Demonstrate the I-V and P-V characteristics of PV module with varying radiation and temperature level
- Demonstrate the I-V and P-V characteristics of series and parallel combination of PV modules.
- Demonstrate the effect of shading on module output power.
- Demonstrate the working of diode as bypass diode and blocking diode in a PV module.
- Obtain the charging and discharging characteristics of a battery.

MODULE-II

27L+18T+0P+27SL =72 hours

UNIT- I:

BATTERY ENERGY STORAGE

Fundamental concept of batteries - Measuring of battery performance, Charging and discharging of a battery, Storage density, Energy density and safety issues; Types of batteries - Lead Acid, Nickel, Cadmium and Lithium-ion batteries, Choosing a battery for an application.

UNIT- II:

MAXIMUM POWER POINT TRACKING

Sun tracking – single and dual axis tracking, concept of MPPT technique, MPPT algorithms: Fixed voltage, FOCV, pilot cell, FSCC, P&O and Incremental Conductance. Aryabhata and Brahmagupta's studies on sun tracking methods.

UNIT- III:

DESIGN OF PV SYSTEMS, APPLICATIONS AND EMERGING TECHNOLOGIES

Design of PV Systems: Design of solar PV lantern and fan, residential PV system, solar powered EV charging station, solar water pumping systems.

Applications: Building Integrated Photovoltaics (BIPV), Transparent Solar Panels, Solar Roads, Floating Solar Power Plants, Space solar power satellites.

Emerging Technologies: Organic solar cells, Dye-synthesized solar cells, GaAs solar cells, Thermo Photovoltaics, Concentrated Photovoltaics

PRACTICES:

- Workout power flow calculations of standalone PV system of DC load with and without battery.
- Workout power flow calculations of standalone PV system of AC load with and without battery.
- Workout power flow calculations of standalone PV system of DC and AC load with and without battery.
- Review the different emerging solar cell technologies.
- Review the various applications of PV system.

COURSE OUTCOMES:

Upon successful completion of this course, students will have to ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Analyze the I-V characteristics of PV cells and modules	Analyze	1	1,2,3,4,5,6, 8,9
2	Analyze the effect of various parameters on the performance of a solar module	Analyze	1,2	1,2,3,4,5,6, 8,9
3	Classify the Solar PV systems based on requirements	Analyze	1,2	1,2,4,6, 8,9
4	Choose a battery for a particular application	Analyze	2	1,2,3,4,5,6, 8,9,11
5	Design the various applications of PV system.	Evaluate	2	1,2,4,5,6, 8,9,11

Mapping of SDGs and IKS

Sustainable Development Goals (SDGs)	Indian Knowledge System
SDG 7 (Affordable and Clean Energy)	YES
SDG 9 (Industry, Innovation, and Infrastructure)	
SDG 11 (Sustainable Cities and Communities)	
SDG 12 (Responsible Consumption and Production)	
SDG 13 (Climate Action)	

TEXT BOOKS:

1. Chetan Singh Solanki., Solar Photovoltaic: "Fundamentals, Technologies and Application", PHI Learning Pvt., Ltd., 2009.

REFERENCES:

1. Chetan Singh Solanki., "Solar Photovoltaic Technology and Systems: A Manual for Technicians" PHI Learning Pvt., Ltd., 2013.
2. Sukhatme .S.P, Nayak J.K., "Solar Energy", Tata McGraw Hill Education Private Limited, New Delhi, 2010.
3. John R. Balfour, Michael L. Shaw, Sharlave Jarosek., "Introduction to Photovoltaics", Jones & Bartlett Publishers, Burlington, 2011.
4. Jha .A.R, "Solar Cell Technology and Applications", CRC Press, 2010.

SKILLS:

- Distinguish between series and parallel combination of PV modules.
- Analyze the effect of shading on module output power.
- Choose a battery for a particular application.
- Justify the need of various solar cell technologies.

FOUNDATIONS OF QUANTUM COMPUTING FOR ELECTRICAL ENGINEERING

L	T	P	C
3	2	0	4

PREREQUISITE KNOWLEDGE:

Linear Algebra and Matrix Theory, Probability and Statistics, Digital Electronics, Basic Programming Skills.

COURSE DESCRIPTION AND OBJECTIVES:

This course introduces the principles of quantum computing, covering quantum mechanical foundations, mathematical modeling of quantum states, quantum logic gates, multi-qubit circuits, noise and error correction, and hands-on implementation using modern quantum programming tools, with relevance to electrical engineering applications.

MODULE-I

UNIT-I:

16L+4T+0P = 20 Hours

INTRODUCTION TO QUANTUM COMPUTING

Motivation and history: classical vs. quantum paradigm, postulates of quantum mechanics: superposition, interference, entanglement, measurement, representation of qubits using Dirac (bra-ket) notation, computational basis states and state preparation, quantum measurement and collapse, quantum volume, Quantum Moore's Law, logical qubit, Physical qubit vs logical qubit, development approaches, technological progress, challenges & realizations.

UNIT-II:

08L+12T+0P = 20 Hours

MATHEMATICAL FRAMEWORK FOR QUANTUM COMPUTING

Basic mathematical concepts: complex numbers, vectors, inner products, normalization, tensor products, single qubit and multi-qubit states, basis states and types of bases—computational (Z) basis, superposition (X) basis, and circular (Y) basis, basis transformation, eigenvalues and eigenstates, visualization of quantum states using the Bloch sphere, quantum parallelism, no-cloning theorem, measurement interpretation.

PRACTICES:

- Compare operations on classical bits and qubits using Python.
- Represent $|0\rangle$ and $|1\rangle$ states and visualize on the IBM Quantum Lab Bloch Sphere visualizer.
- Explore qubit superposition using Bloch Sphere.
- Create superposition and entangled states using Hadamard and CNOT gates.
- Simulate measurement of qubit states in different bases.
- Build custom quantum circuits and observe output states.

MODULE-II

UNIT-I:

16L+4T+0P = 20 Hours

SINGLE QUBIT QUANTUM LOGIC GATES AND CIRCUITS

Linear Transformations, quantum operators: Hermitian operators, unitary operators, basic single-qubit gates: Pauli gates (X, Y, Z), Hadamard (H), Phase gates (S, T), Dirac and matrix representations of gates, gate properties, single-qubit quantum circuit construction and analysis.

UNIT-II:

08L+12T+0P = 20 Hours

MULTI-QUBIT QUANTUM LOGIC GATES AND CIRCUITS

Multi-qubit gates: Controlled-X (CNOT), Controlled-Z, Controlled-Y, Toffoli, Dirac and Matrix representations of gates, Circuit construction principles and gate decompositions, implementation of classical gates using quantum gates, Bell states, Quantum teleportation, quantum gate implementation using simulation vs real quantum hardware, Introduction to quantum noise, decoherence, and error sources in quantum hardware, motivation for quantum error correction, fundamentals of Quantum Error Correction (QEC), overview of NISQ-era quantum computing.

PRACTICES:

- Compute the effect of X, Y, and Z gates on $|0\rangle$, $|1\rangle$, $|+\rangle$, $|-\rangle$, $|i\rangle$, and $| -i\rangle$.
- Construct single-qubit circuits to achieve specified state transformations and verify outcomes analytically.
- Construct two-qubit states and represent them using Dirac notation and matrix form.
- Use CNOT and Hadamard gates to generate Bell states and verify entanglement mathematically.
- Implement AND, OR, XOR, and XNOR gates using quantum gates and ancilla qubits.
- Install Qiskit and create basic quantum circuits using the QuantumCircuit module.
- Execute the same circuit on a simulator and on IBM Quantum hardware and compare results.

COURSE OUTCOMES:

Upon successful completion of this course, students will have to ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply quantum mechanical principles and qubit representations to model and distinguish classical and quantum computing systems.	Apply	1	1,2,11
2	Apply mathematical frameworks to construct and analyze single-qubit and multi-qubit quantum states in different bases.	Apply	1	1,2,4,11
3	Design and analyze single-qubit quantum logic gates and circuits using operator and matrix representations.	Analyze	2	1,2,3,4,5,8,9,11
4	Design and analyze multi-qubit quantum circuits, including classical logic implementation, entanglement generation, and error-prone quantum systems.	Analyze	2	1,2,3,4,5,8,9,11

TEXT BOOK:

1. M. A. Nielsen and I. L. Chuang, *Quantum Computation and Quantum Information*. Cambridge, U.K.: Cambridge University Press, 2010.

REFERENCE BOOKS:

1. E. Rieffel and W. Polak, *Quantum Computing: A Gentle Introduction*. Cambridge, MA, USA: MIT Press, 2011.
2. P. Kaye, R. Laflamme, and M. Mosca, *An Introduction to Quantum Computing*. Oxford, U.K.: Oxford University Press, 2007.

3. N. D. Mermin, *Quantum Computer Science: An Introduction*. Cambridge, U.K.: Cambridge University Press, 2007.
4. IBM Quantum, "Learn Quantum Computation using Qiskit – Qiskit Textbook." [Online]. Available: <https://qiskit.org/textbook>

SKILLS:

- Conceptual understanding of quantum mechanics and computation
- Design and analysis of quantum logic systems
- Algorithmic thinking for quantum processes
- Interdisciplinary applications in electrical engineering


Chairman, BoS