Rishabh Kumar Sharma

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Education

Indian Institute of Technology Delhi — *New Delhi, India*
Ph.D. in Energy Science and Engineering; ***CPI: 9/10.0*** — *Aug 2022 – ongoing*

- Advisors: Dr. Sumit K. Chattopadhyay
- Relevant coursework: Selected Topics In Power Electronics; Power Electronic Converters; Modeling of Electrical Machines; Solar PV Power Generation; Distributed and Decentralized Energy System; Generation Transmission and Distribution; Electrical Energy Management; Computer Aided Analysis of Power Electronics; Research Writing.

National Institute of Technology Srinagar — *Srinagar, India*
B.Tech. in Electrical Engineering; ***CGPA: 8.367/10.0*** — *Aug 2017 – June 2021*

- Advisors: Dr. Ravi Bhushan

Lady A Singhania Ednl Academy Jhalawar — *Jhalawar, India*
All India Senior School Certificate Examination; ***Percentage: 85.4%*** — *May 2017*

Kendriya Vidyalaya No. 2 Kota — *Kota, India*
Secondary School Examination; ***CGPA: 10/10*** — *May 2015*

Publication

Conference

- R. K. Sharma, N. Tak and S. K. Chattopadhyay, "Single DC Source Based Asymmetric Multilevel Inverter : Principle, Modulation And Control," *2023 IEEE 2nd Industrial Electronics Society Annual On-Line Conference (ONCON), SC, USA, 2023, pp. 1-5*, doi: 10.1109/ONCON60463.2023.10430562.
- R. K. Sharma, and S. K. Chattopadhyay, "A Simplified Approach of Capacitor Sizing in FC-MLC for Wind Turbine based Smart Grid" *5th IEEE Intern. Conf. Sustainable Energy and Future Elec. Transport. (SEFET), Jaipur, India, 2025.*

Patent

- Chattopadhyay, Sumit Kumar, Sharma, Rishabh Kumar, "Three-Phase Multilevel Inverter With Flying Capacitor And Level Doubling Network For Enhanced Voltage Levels" Indian Patent application no. 202511033066, April 3, 2025.

Experience

CSIR - Central Scientific Instruments Organisation (CSIO) — *Chandigarh, India*
Project Intern — *Dec 2019 – Feb 2020*

- Project: Review of Energy Consumption and Distribution System in ISTC
- Conducted energy audit and analyzed annual energy consumption records to identify load trends.
- Designed and estimated a solar power plant layout tailored to site-specific conditions
- Performed technical overview of solar integration into existing infrastructure.
- Proposed energy-efficient strategies based on field survey and economic feasibility analysis

Western Central Railways — *Kota, India*
Training — *Oct 2019*

- Improvement of Energy Conservation Techniques
- Maintenance of Electrical Equipment in Passenger Coaches
- HT & LT Distribution System

Joy of Giving Society — *Kota, India*
Intern — *Aug 2019*

- Worked on physical, socio-emotional, and communication skill development of children
- Contributed to the "Masti Ki Pathshala" mixed-age group education project

National Thermal Power Corporation (NTPC) *Anta, India*
Intern *Dec 2018 – Jan 2019*

- Analyzed construction and working principles of synchronous generators used in CCGT based power plants
- Examined protection mechanisms such as differential relays, fault classification, and IEEE relay standards for generators
- Reviewed generator startup procedures, excitation techniques, and fault analysis for system reliability

TEACHING ASSITANTSHIP DUTY

ESL262: Electrical Mechanics
Course TA *Sem II, 2022–2023; 2023–2024; 2024–2025*

- Assisted with tutorials, quiz evaluation, and clarifying student doubts.

ESL273: Analog and Digital Electronics
Course TA *Sem I, 2023–2024*

- Assisted with tutorials, quiz evaluation, and clarifying student doubts.

ESL371: Design of Energy Systems
Course TA *Sem II, 2024–2025*

- Assisted with tutorials, quiz evaluation, and clarifying student doubts.

ESP260: Electrical Energy Lab (B Tech 3rd Year)
Lab TA *Sem II, 2023–2024 (Cycle-1); 2024–2025 (Cycle-1)*

- Assisted in lab sessions on:
  - Regulation of an Alternator by Synchronous Impedance Method.
  - Speed Control and $T - \omega$ Characteristics of a Separately Excited DC Motor.

ESP728: Energy Lab (M Tech ESN)
Lab TA *Sem II, 2023–2024 (Cycle-2); 2024–2025 (Cycle-2)*

- Assisted in lab sessions on:
  - Dimming Control of LED Light using Microcontroller.

PROJECTS

Review of Energy Consumption and Distribution System in ISTC Along with Designing, Estimation and Technical Over Viewing of Solar Plant

- Analyzed historical energy consumption trends and connected loads through field surveys.
- Designed and estimated a rooftop solar PV system layout for the ISTC campus.
- Evaluated technical and economic feasibility including payback period and tariff impact.
- Studied the substation layout and distribution scheme (11 kV/440 V), including capacitor bank operation and protection systems.
- Proposed energy efficiency strategies aligned with government initiatives on renewable energy.
- Recieved an Excellent grade for this project

Single-Phase Seven-Level Cascaded H-Bridge Multilevel Inverter for PV Solar System

- Designed and simulated a seven-level CHB-MLI inverter using SHE modulation for renewable energy integration using MatLab/Simulink.
- Integrated a boost converter and polycrystalline solar module for stepping up input PV voltage.
- Implemented microcontroller-based gate pulse generation using Arduino Mega for 12 MOSFET switches.
- Achieved a 240V, 1-Phase AC output with significantly reduced Total Harmonic Distortion (THD $\approx 33.01\%$.)
- Developed PCB designs using DesignSpark PCB and validated results through FFT analysis.
- Recieved an Excellent grade for this project

Awards & Achievements

MHRD Award for Academic Excellence: Received a cash award and letter of appreciation from Mrs. Smriti Zubin Irani, then Hon'ble Minister of HRD, Government of India, for securing the highest CGPA in the All India Secondary School Examination.

Winner Devil Device, Techvaganza 2019: Secured 1st place and received a cash prize in Devil Device, a hardware-based competition at Techvaganza 2019, the annual technical festival of NIT Srinagar.

Skills

Programming: C, MatLab, Python.
Technologies: dSPACE, LTSpice, Plecs, Simulink.
Visual Design: Photoshop, MS-Visio.
Typesetting: MS-Word, MS-Power Point, Latex.
Additional Courses: Power Electronics with Wide Band Gap Devices (NPTEL)

Competitive Exams Qualified

- GATE 2022 – Electronics and Communication Engineering
- GATE 2022 – Electrical Engineering
- GATE 2021 – Electrical Engineering
- JEE Advanced – Qualified
- JEE Main – Qualified

Research Interests

– Power Electronics for Renewable Energy Systems
– Multilevel Inverter Topologies and Control Strategies
– AC-DC–AC Conversion and High-Efficiency converter Design
– Grid Integration of Renewable Energy Sources
– Evacuation system for HVDC and its protection.

Organizations

Institute of Electrical and Electronics Engineers (IEEE) *Aug 2022 – ongoing*
Graduate Student Member