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EDUCATION AND TRAINING

International Master in Electric Vehicle Propulsion and Control

Centrale Nantes [01/09/2026 – Current]

City: Nantes | Country: France | Level in EQF: EQF level 7

International Master in Electric Vehicle Propulsion and Control (E-PiCo+) is a **two-year Erasmus Mundus Joint Master's programme** focused on advanced technologies for **electric vehicle propulsion and control**. The programme combines multidisciplinary studies in electric propulsion systems, control engineering, power electronics, electrical machines, and related technologies for electric mobility.

The programme involves international academic mobility across three countries: the **first semester** at **Centrale Nantes, France**; the **second semester** at **Università degli Studi dell'Aquila, Italy**; and the **third and fourth semesters** at **CINVESTAV, Mexico**.

The four-semester programme includes academic study, research, placement activities, and master's thesis preparation and defence.

B.Tech (Hons.) in Electrical and Electronics Engineering

National Institute of Technology, Tiruchirappalli [31/10/2022 – 25/08/2026]

Address: National Institute of Technology, Tiruchirappalli Tamil Nadu, India., 620015 Tiruchirappalli (India) |

Website: <https://www.nitt.edu/home/> | Final grade: 9.34 | Level in EQF: EQF level 6 | NQF Level: 6 | Type of credits: CGPA (Scale of 10) | Number of credits: 163 + 15 (Hons.)

Senior School Certificate Examination

Velammal Vidyalaya (Annexure), Mel Ayanambakkam, School, CBSE [07/2021 – 07/2022]

City: Chennai | Country: India | Final grade: 95.5%

Secondary School Examination

Vani Vidyalaya, Virugambakkam, School, CBSE [07/2019 – 07/2020]

City: Chennai | Country: India | Final grade: 91.83%

ACADEMIC ACHIEVEMENTS

[24/08/2026 – Current]

Erasmus Mundus Scholarship Holder | E-PiCo+ International Master in Electric Vehicle Propulsion and Control

Awarded the Erasmus Mundus Scholarship for the International Master in Electric Vehicle Propulsion and Control (E-PiCo+), covering tuition fees and providing a €1,400 monthly stipend for 24 months.

[30/06/2025 – 30/11/2025]

Final-Year Academic Exchange Programme | Indian Institute of Technology, Madras

- Selected for a **final-year academic exchange** at the **Indian Institute of Technology Madras**.
- Pursued the **7th semester** of **B.Tech** at **IIT Madras** under a **full credit-transfer arrangement**.
- **Degree awarded by National Institute of Technology Tiruchirappalli** (home institution).

Qualified GATE 2025 (EC) with 98.57 percentile – ALL INDIA RANK 1169 among 81,475 candidates appeared.

Qualified GATE 2025 (EE) with 98.28 percentile – ALL INDIA RANK 1166 among 67,701 candidates appeared.

INTERNSHIP AND FELLOWSHIP EXPERIENCE

[19/05/2026 – 04/06/2026]

Summer Training – Remote Sensing & GIS Using Python | India Space Academy (ISA)

Completed an intensive summer training programme on **Remote Sensing and Geographic Information Systems (GIS) using Python**, gaining practical exposure to geospatial data analysis, remote sensing techniques, GIS applications, and Python-based geospatial processing. Successfully completed the programme from **19 May 2026 to 04 June 2026** through **NIT Tiruchirappalli**.

[14/02/2026 – 10/05/2026]

Samsung Fellow (Grade I) – India Semiconductor Workforce Development Program (ISWDP)

- **Selected for the Grade I Samsung Fellowship** under the **India Semiconductor Workforce Development Program (ISWDP)**, an **IISc Bangalore-led national initiative** aimed at developing industry-ready semiconductor engineers.
- The programme provides **structured, hands-on training in semiconductor device modeling, IC design flows, and industry-standard EDA tools**.

[19/05/2025 – 18/07/2025]

Summer Research Fellow – Indian Institute of Technology Madras (IITM)

- Completed a Summer fellowship training program at the **Indian Institute of Technology Madras (IITM)** under the guidance of **Prof. Aniruddan S.**
- Worked on **Design automation of a two-stage CMOS operational amplifier** in TSMC 0.18 μ m technology.
- Optimized device sizing and biasing conditions to meet key performance targets including **Gain, Unity Gain Bandwidth (UGB), Phase Margin, Slew Rate, Offset, ICMR, OCMR, and Power Dissipation**.
- Developed a **MATLAB-based automated iterative design flow for specification-driven optimization**, significantly reducing manual analog design effort.
- Incorporated short-channel effects and parameter extraction into the automated design methodology for improved accuracy.

[11/12/2024 – 03/01/2025]

Electrical Engineering Intern – ISRO SDSC SHAR

- Completed an **Internship training program at ISRO SDSC (Satish Dhawan Space Centre) SHAR (Sriharikota High Altitude Range)** under **SPP (Solid Propulsion Plant)**.
- Gained hands-on understanding of **precise induction motor controllers** used in propulsion-related systems.
- Studied **safety protocols and quality control measures** followed during the **manufacture of solid propellant mixtures**.
- Observed the **fabrication process of solid rocket boosters**, which play a critical role in **heavy-lift launch vehicle programs**.

RESEARCH EXPERIENCE

[15/01/2026 – 14/04/2026]

Final Semester Research Internship at the Indian Institute of Science (IISc), Bangalore

- Studying parity-time (PT) symmetric electronic systems using coupled gain-loss circuits.
- Building circuit-level and mathematical models to study system stability and operating behavior.
- Analyzing eigenvalues and stability to identify symmetry-breaking regions and exceptional points.
- Verifying system behavior using SPICE and MATLAB simulations, including AC and transient analysis.
- Running parameter sweeps to evaluate the impact of component mismatch and variations.

PUBLICATIONS

[2025]

Design of Buck Converter Integrated Circuit in 180nm SCL Technology with CMOS Logic

- Designed and implemented a current-programmed buck converter in 180nm SCL CMOS technology under the guidance of Prof. Saravana Ilango G at the National Institute of Technology Tiruchirappalli (NITT).
- Achieved 1.8V to 1.2V step-down conversion operating at 74 kHz using a 100 μ H inductor and 20 μ F capacitor with dual complementary CMOS switches for efficient power conversion.
- Integrated built-in short-circuit protection up to 240 mA for enhanced system reliability. Designed a weak-inversion bandgap reference for stable on-chip voltage reference generation.
- Developed supporting analog blocks including an operational amplifier (as comparator and oscillator), CMOS gate driver, SR latch, and ramp generator with appropriate design constraints.
- Carried out full design, simulation, and validation using Cadence Virtuoso and MATLAB-based modeling.
- Authored and presented a paper titled "Design of Buck Converter Integrated Circuit in 180 nm SCL Technology with CMOS Logic" at the National Power Electronics Conference (NPEC 2025), an IEEE-recognized international conference.
- This project was funded by the Indian Space Research Organisation (ISRO).

Authors: Surya Prakash JS, G Saravana Ilango | **Journal Name:** 12th National Power Electronic Conference (NPEC-2025) | **Publisher:** IEEE

PROJECTS

[05/2025 – Current]

Tool for determining carbon emission produced in EV infrastructure

- Working under the guidance of **Prof. Gautham Ram Chandra Mouli** at **Delft University of Technology (TU Delft)** on developing a **Life Cycle Assessment (LCA)-based model** to quantify **CO₂ emissions of Vehicles** in the Indian context.
- Built an **India-specific emission model** incorporating **national energy mix data** and **vehicle-type characteristics** across **manufacturing, operation, and end-of-life stages**.
- Implemented a **predictive modeling framework** to **forecast future emission scenarios**.
- Generated actionable insights to support **sustainable mobility planning, policy formulation, and industry strategies** for accelerating **India's EV transition**.

[01/2025 – 04/2025]

Simulation of adaptive coordination of relay in AC Micro grid using interior point method

- Developed an **adaptive directional overcurrent relay (DOCR) coordination model** for an **IEEE 34-bus AC microgrid system** using the **interior-point method**.
- Performed coordination using **recorded fault datasets** across **multiple operating modes and fault types**.
- Implemented and validated the complete framework in **MATLAB** and **Simulink**.
- Achieved **zero relay miscoordination** and a **9.6% reduction in total relay operating time** compared to conventional coordination schemes.

[01/2025 – 03/2025]

Optimizing the capacity of storage system using FPPT algorithm using Fuzzy logic

- Developed a **Simulink-based model** of a **solar PV system integrated with the grid** using a **boost converter controlled by a Fuzzy Logic-based FPPT algorithm**.
- Implemented a **buck converter-based battery charging system** using sensed **input and output parameters** for closed-loop control.
- Designed a **grid-tied three-phase Voltage Source Inverter (VSI)** with **d-q control strategy** for synchronized power injection into the AC grid.
- Achieved **steady-state error < 0.2%** and **transient error < 10%**, demonstrating high control accuracy and system stability.

[01/2025 – 04/2025]

Design and Hardware Implementation of Boost converter

- Designed and hardware-validated a **4 V–8 V, 100 kHz complementary boost converter** with **80 mV ripple at 200 Ω load**.
- Built and characterized a **1.25 mH custom inductor** and **2.5 μ F output capacitor**.
- Implemented **analog PWM control** with Arduino-based supervision and **DGD0506 gate driving**.
- Successfully **validated the boost converter performance through hardware testing**.

[09/2024 – 11/2024]

Simulation of MPPT Controller based on fuzzy logic

- Designed and implemented a **Fuzzy Logic-based MPPT (Maximum Power Point Tracking) controller** for a photovoltaic (PV) system.
- Computed MPPT control using **PV voltage (V_{pv}) and current (I_{pv})** by evaluating the **power-voltage slope (dP/dV)** and the **change in error**.
- Formulated **5 linguistic membership functions** for each input and implemented **25 fuzzy rules using Mamdani inference**.
- Generated the **duty cycle for a DC–DC boost converter** from the fuzzy controller output.
- Converted DC power to **three-phase AC using an SPWM-based Voltage Source Inverter (VSI)** for grid integration.
- Integrated a **Shunt Active Power Filter (SAPF)** to improve power quality and mitigate harmonics.

[08/2024 – 10/2024]

Hardware implementation of Voltage Source Inverter (VSI)

- Designed and implemented a **PWM (Pulse Width Modulation)-based Voltage Source Inverter (VSI)** using a **12 V DC supply**.
- Converted **12 V DC to 12 V AC** using a **full-bridge MOSFET inverter configuration**.
- Stepped up the inverter output using a **center-tapped transformer (12–0–12 V to 230 V)**.
- Successfully generated a **230 V AC output** suitable for **lighting applications**, validating the complete DC–AC power conversion chain through hardware implementation.

[07/2024 – 09/2024]

Simulation and Hardware Implementation of Low drop-out voltage regulator (LDO)

- Designed and implemented a **linear voltage regulator** using the **OP07 operational amplifier** as an **error amplifier**.
- Generated a **regulated 3 V DC output** from a **variable input supply of 4.5 V to 5.5 V DC**.
- Used a **high-precision reference diode, TL431A**, biased at **1 V** as the **reference voltage source**.
- Implemented a **feedback gain of 3** to achieve accurate **3 V regulation**.
- Enabled **adjustable output voltage capability** by varying the **feedback gain**, allowing operation as a **variable voltage regulator**.

[02/2024 – 04/2024]

Hardware implementation of Stereo Amplifier system

- Designed and implemented a **differential, volume-controlled stereo audio amplifier**.
- Amplified audio signals using the **TDA2030 IC**, optimized for **audio-frequency power amplification in differential mode of operation**.
- Achieved **high-fidelity stereo output** with **stable gain control and low distortion**, validating performance through hardware testing.

[02/2024 – 04/2024]

Hardware implementation of Stepper Motor Controller system

- Implemented a **PWM (Pulse Width Modulation)-based stepper motor control system** using the **Arduino Uno microcontroller board**.
- Generated **PWM control signals** to drive a **Solid State Relay (SSR)** for switching the motor input.

- Enabled **forward motion, reverse motion, and braking operations** through controlled PWM-based switching.
- Successfully validated the **motor control logic and hardware performance** through experimental testing.

[02/2024 – 04/2024]

Death prediction in a calamity

- Developed a **Logistic Regression-based classification model** to predict **survival outcome** using features such as **sex, age, ticket class, and number of family members traveling**.
- Trained and evaluated the model using the **Titanic dataset**, with a **70%–30% train-test split**.
- Achieved a **prediction accuracy of 83.3%** on the test dataset.
- Demonstrated the applicability of the model for **customer classification, disease prediction, and other binary classification problems**.

[07/2023 – 11/2023]

Hardware implementation of Digital Clock system

- Designed and implemented a **digital clock system** using the **TMS1943** and a **crystal oscillator circuit based on the MM5369 IC**.
- Utilized the **built-in common-cathode seven-segment display** of the TMS1943 to display **time in 12-hour format (hours and minutes)**.
- Implemented additional features including **minutes-seconds display, alarm, and snooze function**.
- Integrated a **9 V battery backup system** to maintain accurate timekeeping during **power supply interruptions**.
- Ensured **high timing accuracy and reliable operation** upon power restoration.

[07/2023 – 10/2023]

Hardware implementation of People counter system

- Designed and implemented a **digital head counter system** using the **CD4026 IC** and an **infrared (IR) optical sensor**.
- The IR sensor detects **object interruptions within a 10 cm range** and generates count pulses accordingly.
- Achieved **high-precision counting with a minimum interval of 10 ms** between successive detections.
- Implemented a **counting range up to 999** with an **in-built reset button** for system reinitialization.
- Successfully validated the system for **accurate real-time object/head counting applications**.

[11/2022 – 01/2023]

Hardware implementation of Eco-Friendly solar street lamp system

- Designed and implemented a **working replica of a solar-powered smart street lamp** using a **Passive Infrared (PIR) motion sensor, solar panel, and rechargeable lithium-ion battery**.
- The system **automatically senses ambient light conditions** using the **solar panel output** to enable day-night operation.
- When **sunlight falls below the threshold level**, the **PIR sensor activates** and detects **human motion within a 25 cm range**.
- Utilized **renewable solar energy stored during daytime** to power the system during night operation.
- Demonstrated an **energy-efficient, motion-activated lighting solution** suitable for smart and sustainable infrastructure applications.

CERTIFICATIONS

[Udemy - FastBit Embedded Brain Academy, 19/10/2025]

Microcontroller Embedded C Programming

Mode of learning: Online

[Udemy - Ian Judy, 06/10/2024]

Electricity and electronics - Robotics, learn by building

Mode of learning: Online

[Udemy - Edouard Renard, 27/09/2024]

Raspberry Pi for Beginners

Mode of learning: Online

NETWORKS AND MEMBERSHIPS

[01/03/2025 – Current] R10 -Asia and Pacific - Madras Section

Institute of Electrical and Electronics Engineers (IEEE) - Student Member

LANGUAGE SKILLS

Mother tongue(s): Tamil

Other language(s):

English

LISTENING C1 READING C1 WRITING C1

SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Microsoft Excel / Microsoft Word

Simulation & EDA Tools

Matlab and Simulink (Medium) / NgSpice / Cadence Virtuoso

Programming Languages

Python / C++

Technical Skills

Semiconductor Devices / Power Management IC Design / Mixed-Signal Circuits (Basics) / Digital Electronics / Micro controller and Interfacing / Analog Electronics / Power Converters / Analog IC Design