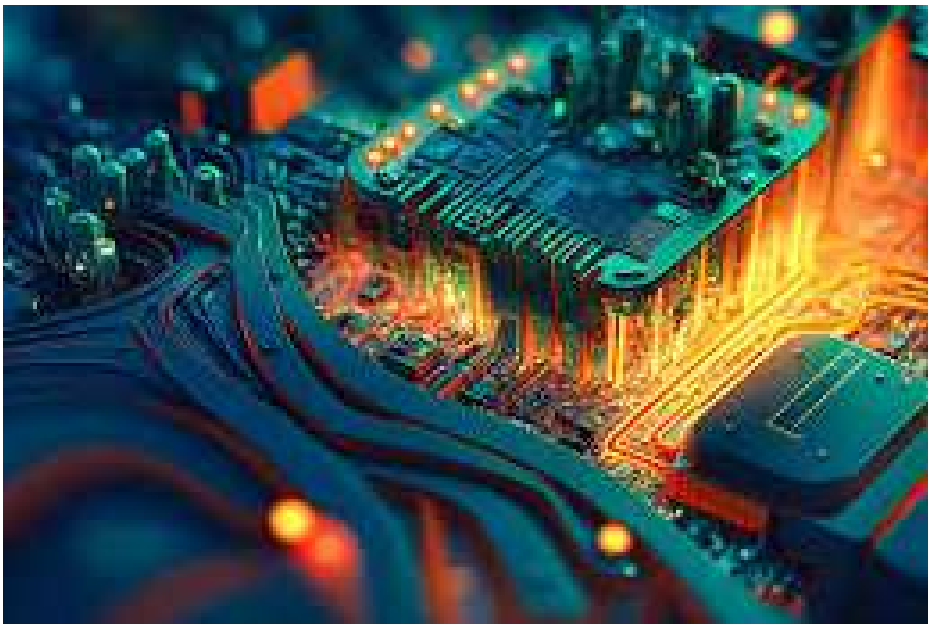
JUNE 2024 VOL.4 ISSUE 6

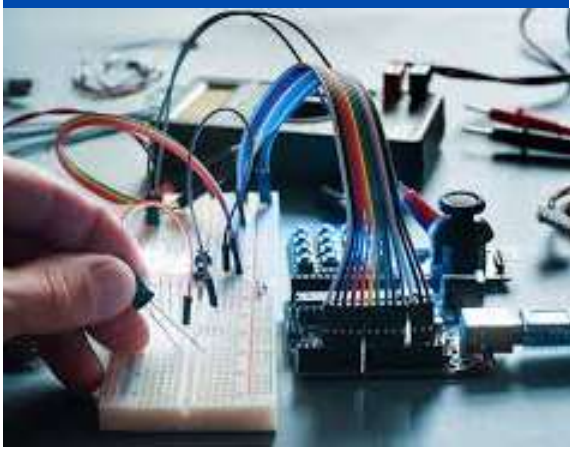
Sri Venkateswara College of Engineering

CIRCUIT TIMES

INSIGHTS

- Faculty Article
- Faculty Participation
- Faculty Publication
- Student Participation
- Academic Events
- Placement Activities
- Industrial Visits
- Alumni Testimonial





VISION OF DEPARTMENT

To excel in offering value based quality education in the field of Electronics and Communication Engineering, keeping in pace with the latest developments in technology through exemplary research, to raise the intellectual competence to match global standards and to make significant contributions to the society.

MISSION OF DEPARTMENT

To provide the best pedagogical atmosphere of highest quality through modern infrastructure, latest knowledge and cutting edge skills.

To fulfill the research interests of faculty and students by promoting and sustaining in house research facilities so as to obtain the reputed publications and patents.

To educate our students, the ethical and moral values, integrity, leadership and other quality aspects to cater to the growing need for values in the society.

FACULTY ARTICLE

SPIKING NEURAL NETWORS

BRIDGING NEUROSCIENCE AND ARTIFICIAL INTELLIGENCE

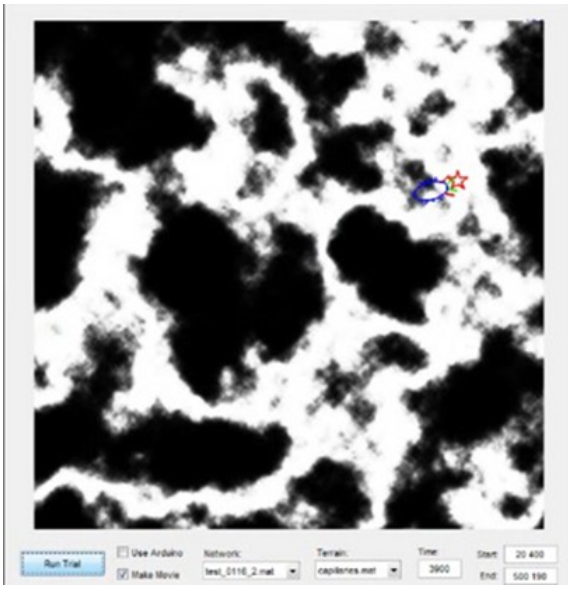
Mrs.S.M.Mehzabeen, M.E., (Ph.D),

Assistant Professor, Department of Electronics and Communication Engineering,
Sri Venkateswara College of Engineering (Autonomous), Sriperumbudur

INTRODUCTION:

Neural networks have revolutionized the field of artificial intelligence (AI), enabling machines to perform tasks ranging from image recognition to natural language processing with unprecedented accuracy. At the forefront of this innovation are artificial neural networks (ANNs), which simulate the way human brains process information. However, despite their remarkable achievements, ANNs often fall short of capturing the intricate dynamics and efficiency of biological brains. This is where Spiking Neural Networks (SNNs) come into play.

SNNs represent a paradigm shift in the way we design and understand neural networks, incorporating time-based information and mimicking the natural spike-based communication used by neurons in the brain. This article delves deep into the world of spiking neural networks, exploring their biological roots, underlying principles, and potential applications.



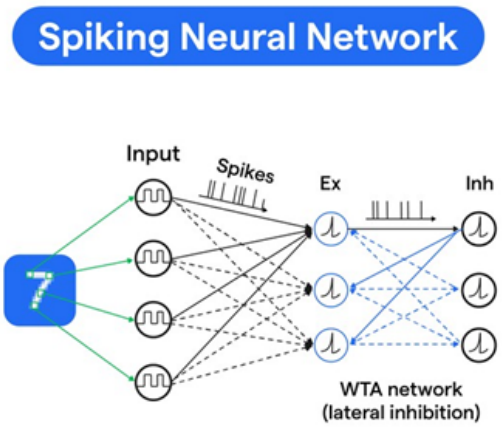


Figure 1 Spiking Neural network to find a target in an unknown terrain.

BACKGROUND AND HISTORY:

The concept of spiking neural networks traces its origins to the quest for understanding how the brain computes and processes information. Unlike traditional neural networks that operate on continuous signals, SNNs are inspired by the discrete spiking activity of biological neurons.

- **Early Pioneers and Theories:** The notion of neuron spiking dates back to the mid-20th century with the work of Alan Hodgkin and Andrew Huxley, who developed a detailed mathematical model describing how action potentials (spikes) in neurons are initiated and propagated. Their model, awarded the Nobel Prize in 1963, laid the groundwork for later developments in computational neuroscience.
- **Development of SNN Models:** In the 1990s,researchers like Wolfgang Maass and Wulfram Gerstner began formulating the first models of spiking neurons, leading to the birth of SNNs as a distinct field. Their work emphasized the computational advantages of spike- based processing, such as energy efficiency and temporal coding.
- **Milestones in SNN Research:** Key milestones in SNN research include the development of the Leaky Integrate-and-Fire (LIF) model, the introduction of Spike-Timing-Dependent Plasticity (STDP) and the advancement of neuromorphic hardware that emulates the properties of biological neural networks.

BIOLOGICAL INSPIRATION:

At the heart of SNNs is their inspiration from biological neurons and synapses, the basic building blocks of the brain.

- **Neurons and Synapses:** Neurons communicate through electrical impulses known as spikes or action potentials. These spikes are generated when a neuron's membrane potential reaches a certain threshold, causing an all-or-nothing response. Synapses, the connections between neurons, play a crucial role in transmitting these spikes from one neuron to another.
- **Spiking Behavior:** The spiking activity of neurons is inherently sparse and discrete, characterized by brief, rapid bursts of electrical activity. This behavior allows for efficient information encoding and transmission over long distances within the nervous system.
- **Relevance to Neuroscience:** SNNs closely mimic the timing and dynamics of biological neurons, making them valuable tools for studying brain functions and disorders. They provide amore realistic model for investigating how neural circuits operate and adapt to new information.

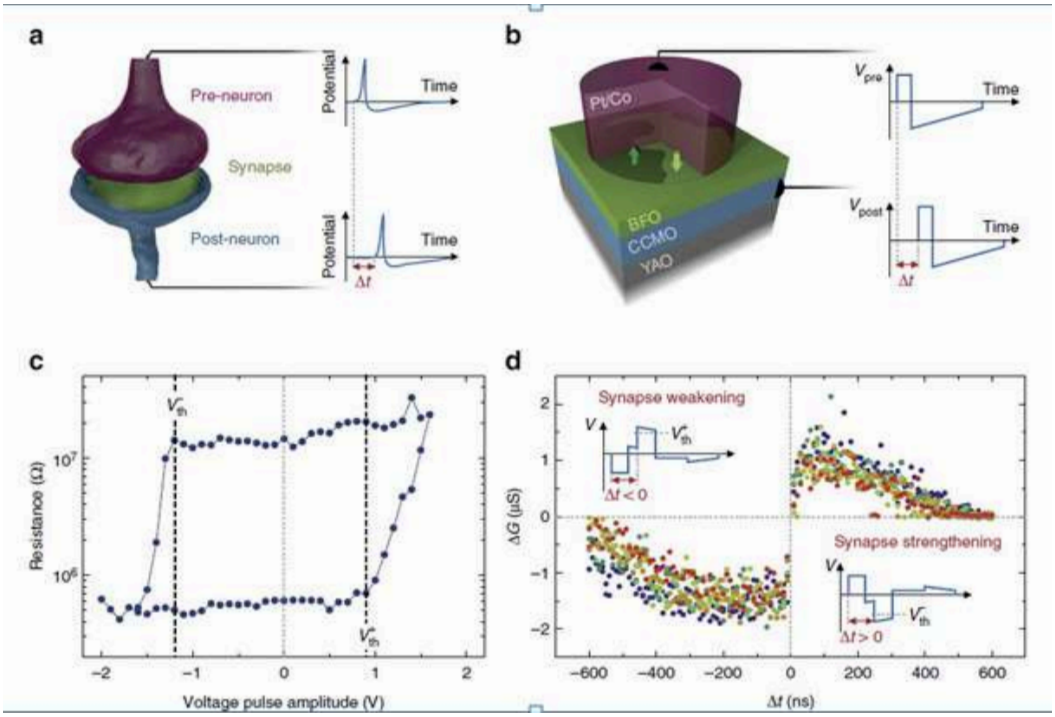


Figure 2 Artificial synapses based on FTJs

BASIC CONCEPTS OF SPIKING NEURAL NETWORKS:

Understanding SNNs begins with grasping the fundamental concepts and components that distinguish them from traditional ANNs.

Definition of a Spiking Neuron: A spiking neuron is a computational model that emits spikes based on its input and internal state. These spikes are discrete events, unlike the continuous activation levels in ANNs. Each spike represents a binary signal, either 'on' or 'off', much like a digital pulse.

Types of Spiking Neurons:

- **Integrate-and-Fire (I&F):** This model accumulates input over time and generates a spike when the membrane potential crosses a threshold. It is the simplest and most commonly used spiking neuron model.
- **Leaky Integrate-and-Fire (LIF):** An extension of the I&F model, it incorporates a 'leak' term, causing the membrane potential to decay over time if no input is received.
- **Hodgkin-Huxley Model:** A biophysically detailed model that simulates the ionic currents and conductance's in a neuron's membrane, capturing the complex dynamics of spike generation.

Key Differences from ANNs: Unlike ANNs, which rely on continuous-valued activations and weights, SNNs use discrete spikes and temporal coding to represent and process information. This allows SNNs to exploit the precise timing of spikes for more efficient and robust computations.

NEUROMORPHIC COMPUTING:

The mathematical underpinnings of SNNs provide the tools to model and analyze their complex behavior.

Neuron Models:

- **Leaky Integrate-and-Fire (LIF):** The LIF model describes how a neuron's membrane potential integrates incoming spikes and leaks over time, leading to a spike once a threshold is exceeded. Mathematically, it is represented by a differential equation incorporating a decay term and input spikes.
- **Izhikevich Model:** This model offers a balance between biological realism and computational efficiency, capturing diverse spiking patterns observed in biological neurons with fewer parameters than the Hodgkin-Huxley model.

Spike Timing and Coding Schemes:

- **Rate Coding:** Information is encoded in the frequency of spikes, with higher firing rates representing stronger signals.
- **Temporal Coding:** Information is encoded in the precise timing and patterns of spikes, allowing for more nuanced and complex representations.

Synaptic Plasticity:

- **Spike-Timing-Dependent Plasticity (STDP):** STDP is a form of synaptic plasticity where the strength of a synapse is adjusted based on the relative timing of pre- and post-synaptic spikes. If a presynaptic neuron spikes shortly before a postsynaptic neuron, the connection is strengthened, while the opposite timing leads to weakening.

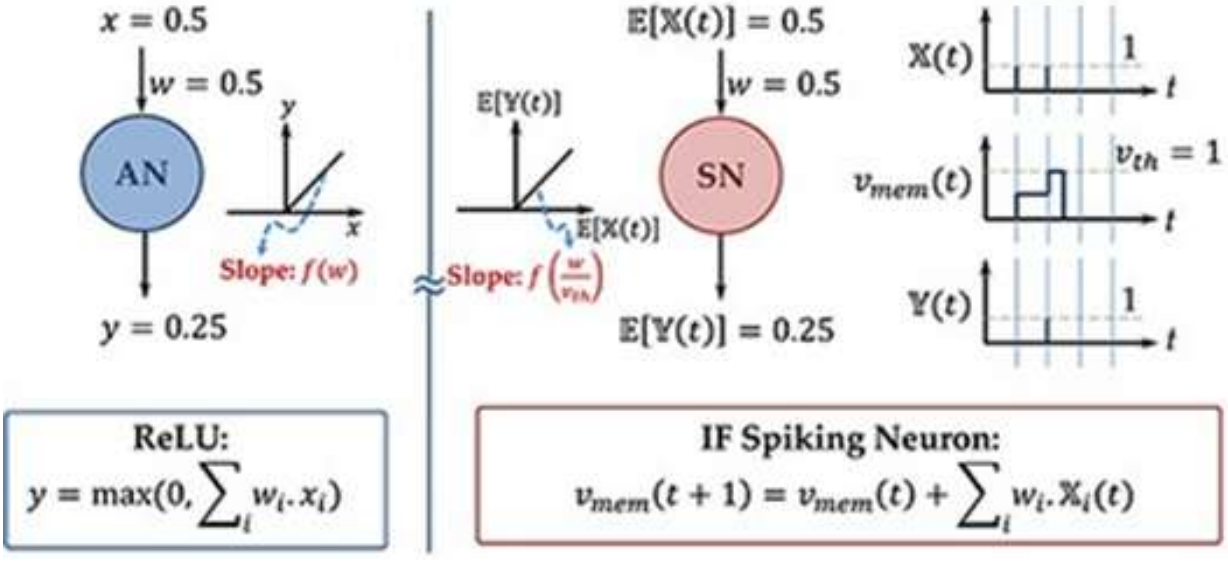


Figure 3 Binary and Spiking neural networks

NETWORK ARCHITECTURE AND DYNAMICS:

The architecture and dynamics of SNNs are crucial for understanding how they process and transmit information.

- **Structure of Spiking Neural Networks:** SNNs typically consist of layers of spiking neurons connected by synapses. These networks can be organized in various topologies, including feedforward, recurrent, and hierarchical structures, each suited to different types of computations.
- **Network Dynamics and Information Processing:** SNNs leverage the timing of spikes and the interactions between excitatory and inhibitory neurons to perform complex computations. These dynamics allow SNNs to efficiently encode and process temporal information, making them particularly suitable for tasks involving time-series data and real-time processing.
- **Role of Excitatory and Inhibitory Neurons:** Excitatory neurons promote spiking in other neurons, while inhibitory neurons suppress it. The balance between excitation and inhibition is essential for maintaining network stability and preventing runaway spiking activity.

SIMULATION AND IMPLEMENTATION:

Simulating and implementing SNNs requires specialized tools and technologies to capture their unique dynamics.

Software Tools and Frameworks:

- **NEST:** A widely used simulation tool for large-scale neural network models, offering high performance and flexibility for simulating SNNs.
- **Brian**: An open-source simulator designed for simplicity and ease of use, making it accessible for researchers and educators to model and experiment with SNNs.

Hardware Implementations:

- **Neuromorphic Chips:** These chips are designed to emulate the spiking behavior of biological neurons, providing hardware acceleration for SNNs. Examples include Intel's Loihi and IBM's True North, which offer low- power, high-speed processing for spike-based computations.

Challenges in Simulating SNNs: Simulating SNNs is computationally intensive due to the need to track the timing of individual spikes and the interactions between large numbers of neurons. Efficient simulation requires balancing accuracy with computational resources, often involving trade-offs in model complexity and simulation scale.

LEARNING ALGORITHMS:

Learning in SNNs involves adapting synaptic weights based on spike-based activity, drawing parallels with biological learning processes.

- **Supervised Learning Methods:** These methods involve training SNNs using labeled data, adjusting synaptic weights to minimize the difference between the network's output and the desired target. Techniques like spike-based gradient descent and backpropagation through time have been adapted for use in SNNs.
- **Unsupervised Learning Methods:** Unsupervised learning in SNNs focuses on discovering patterns in input data without predefined labels. Mechanisms such as Hebbian learning and STDP allow SNNs to learn representations based on the temporal correlations between spikes.
- **Reinforcement Learning in SNNs:** Reinforcement learning in SNNs involves learning to make decisions through interactions with an environment, receiving rewards or penalties based on performance. Spike-based versions of traditional reinforcement learning algorithms, such as Q-learning and policy gradient methods, enable SNNs to learn temporal sequences and control tasks..

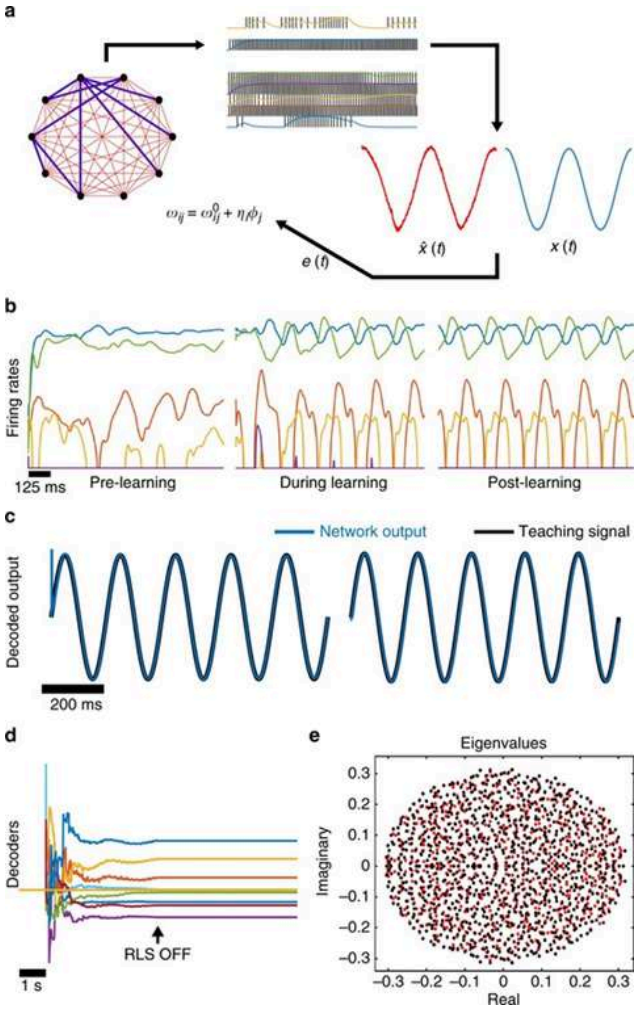


Figure 4 Learning Algorithms

APPLICATIONS OF SPIKING NEURAL NETWORKS:

SNNs have a wide range of applications, leveraging their unique capabilities in time-based processing and energy efficiency.

- **Pattern Recognition:** SNNs excel in recognizing patterns in spatiotemporal data, such as speech signals or handwriting, by exploiting the precise timing of spikes.
- **Robotics:** In robotics, SNNs offer advantages in sensorimotor control and real-time decision- making. Their ability to process sensory information and generate motor commands in a biologically plausible manner makes them ideal for applications in autonomous robots and prosthetic devices.
- **Sensory Processing:** SNNs are particularly suited for sensory processing tasks, mimicking the way biological systems handle inputs like visual and auditory signals. They can be used in systems that require rapid and efficient processing of dynamic sensory information.
- **Brain-Computer Interfaces (BCIs):** SNNs are used in BCIs to decode neural signals and translate them into commands for controlling external devices. Their compatibility with the spiking nature of biological neurons makes them effective in interpreting and utilizing brain activity for communication and control.

ADVANTAGES AND CHALLENGES

While SNNs offer significant advantages, they also face challenges that must be addressed for their full potential to be realized.

Advantages Over Traditional Neural Networks:

- **Temporal Dynamics:** SNNs can naturally encode and process temporal information, making them well-suited for tasks involving sequential data and real-time applications.
- **Energy Efficiency:** By using sparse, event- driven communication, SNNs can operate with lower power consumption compared to traditional ANNs, which makes them ideal for energy-constrained environments.
- **Biological Plausibility:** SNNs provide a closer approximation to the workings of the brain, offering insights into neural processing and enabling the development of more brain-like AI systems.

Current Limitations and Challenges:

- **Complexity and Computational Cost:** Simulating the precise timing of spikes and interactions in SNNs is computationally demanding, often requiring specialized hardware or efficient algorithms to manage the complexity.

- **Learning and Training:** Developing effective learning algorithms for SNNs remains a challenge due to the non-differentiable nature of spike-based communication. Researchers are actively exploring new methods to address these difficulties.
- **Scalability:** Scaling SNNs to handle large, real-world datasets and tasks poses significant hurdles, necessitating advancements in both software and hardware technologies.

Future Research Directions: Future research in SNNs aims to enhance their learning capabilities, improve their scalability and efficiency, and integrate them with other AI and computational neuroscience techniques. Advancements in neuromorphic hardware and cross-disciplinary approaches hold promise for overcoming existing limitations and expanding the applications of SNNs.

CASE STUDIES AND EXAMPLES:

Real-world applications and comparative analyses illustrate the practical impact and performance of SNNs.

Real-World Applications: SNNs have been successfully applied in various domains, such as:

- **Speech Recognition:** SNNs have demonstrated the ability to recognize and process speech patterns with high accuracy and low latency, outperforming traditional ANNs in specific tasks.
- Visual Processing: In computer vision, SNNs have been used to develop systems that mimic the visual cortex, achieving robust performance in tasks like object recognition and motion detection.
- **Neuroprosthetics:** SNNs have been employed in developing advanced neuroprosthetic devices that interface directly with the nervous system, providing more natural and effective control for users.
- **Comparative Performance Analysis:** Studies comparing SNNs with traditional ANNs have shown that SNNs can offer superior performance in tasks that involve temporal and spatiotemporal processing, particularly in scenarios where energy efficiency and real-time processing are critical.

CONCLUSION:

Spiking neural networks represent a fascinating convergence of artificial intelligence and neuroscience, offering a glimpse into the future of brain-inspired computing.

- **Summary of Key Points:** SNNs emulate the spiking behavior of biological neurons.

- **The Future Potential of SNNs:** As research continues to advance, SNNs are poised to play a significant role in various fields, from AI and robotics to neuroscience and medicine. Their potential to revolutionize how we understand and replicate brain functions makes them a promising area of study and application.
- **Final Thoughts:** The journey of spiking neural networks is just beginning, with much still to be explored and discovered. Their ability to bridge the gap between artificial intelligence and natural intelligence opens up exciting possibilities for the future of technology and human-machine interactions.

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- Maass, W. (1997). Networks of spiking neurons: The third generation of neural network models. Neural Networks, 10(9), 1659-1671.
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- Davies, M., et al. (2018). Loihi: A Neuromorphic Manycore Processor with On-Chip Learning. IEEE Micro, 38(1), 82-99.
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FACULTY PARTICIPATION

(SEMINAR/FDP/STTP/WORKSHOP/ONLINE COURSE/CONFERENCE)

- **Mr.L.K.Balaji Vignesh** successfully completed **online FDP** on the topic of **"PCB Design"** organized by **SkillDzire** in **collaboration with AICTE** Certification from 03.06.2024 to 30.06.2024

- **Mr.P.Arul** participated in **two days workshop** at **Department of Instrumentation Engineering, MIT Campus, Anna University, Chennai** organized by **Centre for Faculty and Professional Development** from 10.06.2024 to 11.06.2024

FACULTY PUBLICATION

- **Mrs.S.Mary Cynthia,** Hari Narayanan V, Hemanth K V, Dr.S.Jacily Jemila presented a paper titled **"Design and Analysis of 16-bit Vedic Multiplier using CSLA-BEC Architecture"** at the First International Conference on Emerging Trends in Microelectronics, Communication & Intelligent Systems **(ETMCIS 2024)-Springer** organized by **School of E&TC Engineering, MIT Academy of Engineering, Alandi (D), Pune** from 13.06.2024 to 15.06.2024

STUDENT PARTICIPATION

(Co-curricular Activities/Extra-curricular Activities)

- **Ms.V.T.Harinee, Mr.G.S.Haresh Krishna and Ms.B.Balasaraswathy (II Year ECE)** presented a project tilted **"VOICE AUTOMATED EMERGENCY RESPONSE SYSTEM"** under the track **Maker Fair -Maker Fair Direct Entry** has been selected for the **final round of IEEE YESIST12 2024 (Mentored by Dr.T.J.Jeyaprabha, ASP/ECE)**

Dear HARINEE V T & Team,

Greetings from YESIST12 2024!

Congratulations!! We are happy to inform you that your abstract submission - **VOICE AUTOMATED EMERGENCY RESPONSE SYSTEM** under the track **Maker Fair - Maker Fair Direct Entry** has been selected for the final round of IEEE YESIST12 2024. Your unique team ID for the final round is **MF24D0707117**. We appreciate the efforts of your mentor **T J JEYAPRABHA** for his/her guidance to this innovative project.

Your abstract stood out among 1000+ submissions, demonstrating exceptional creativity, innovation, and scholarly merit and it impressed our judging panel. We believe that your contribution will significantly enrich the discourse and add immense value at this international event.

The details of where and when the Grand Finale of YESIST12 2024 is mentioned below.

Venue: Tunis Science City, Rue La Cité des Sciences à Tunis, Tunis 1082, Tunisia | **Hybrid Mode** (Nearest Airport - Tunis-Carthage International Airport)

Dates: September 7 & 8, 2024 | 9.30 AM – 4.30 PM

Please visit the finale venue page https://ieeeyesist12.org/finale-2024-venue/ for more details.

On being shortlisted for the finale, we request the team members to kindly enroll yourself individually in the below link to confirm your team's participation during the finale. Please note that certificates will be provided to only those who enrolled in the form.

Event Registration Link: https://in.explara.com/e/ieee-yesist12-grand-finale-2024

The early bird registration is open now and closes on **20th June 2024**.

Participants are required to download and fill the Declaration Form, sign it, and upload it in the below mentioned link.

EVENTS ORGANIZED

- As part of **MOU** with **SPEL Semiconductors Limited, Students Internships** and **faculty trainings** were organized. Accordingly, **two students** have undergone **internship** and **two faculty members** have attended **faculty training** during the month of June 2024.

EVENTS ORGANIZED

- The **Department of ECE** organized a **Five Days Online Short Term Training Programme** on **"Embedded Systems, IoT and Security"** in association with **IETE Students Forum** from 10.06.2024 to 14.06.2024 between 06.00 p.m to 07.30 p.m in Google Meet Platform. The session was handled by various resource persons. **[1) Mr.C.Dhanasekar, Senior Electronics Team Leader, Valeo India Private Limited, Chennai 2) Mr.Rakesh Elamaran, Security Engineer 2, Comcast, Chennai 3) Dr.P.Rajasekaran, Assistant Professor, Department of Computing Technologies, SRM Institute of Science and Technology, Kattankulathur, Chennai 4) Mr. Tejwin Gehlot, Firmware Developer, Ortusolis Technology Solutions Private Limited, Bengaluru 5) Mr. D. Balabharathi, Software System Architect, Boat Lifestyle, Bangalore]**. The event was really informative and interactive with participants to develop knowledge in the field of Embedded Systems. The Speaker has created many doubts during the queries session. The event was organized by **Dr.T.J.Jeyaprabha, Associate Professor/ECE, Dr.M.Bindhu, Associate Professor/ECE, Mrs.R.Kousalya, Assistant Professor/ ECE, Mrs.B.Sarala, Assistant Professor/ECE, Mr.L.K.Balaji Vignesh, Assistant Professor/ECE and Mr.A.Mahadevan, Assistant Professor/ECE** under the guidance of Dr.S.Ganesh Vaidyanathan, Principal and Dr.G.A.Sathish Kumar, HOD/ECE.

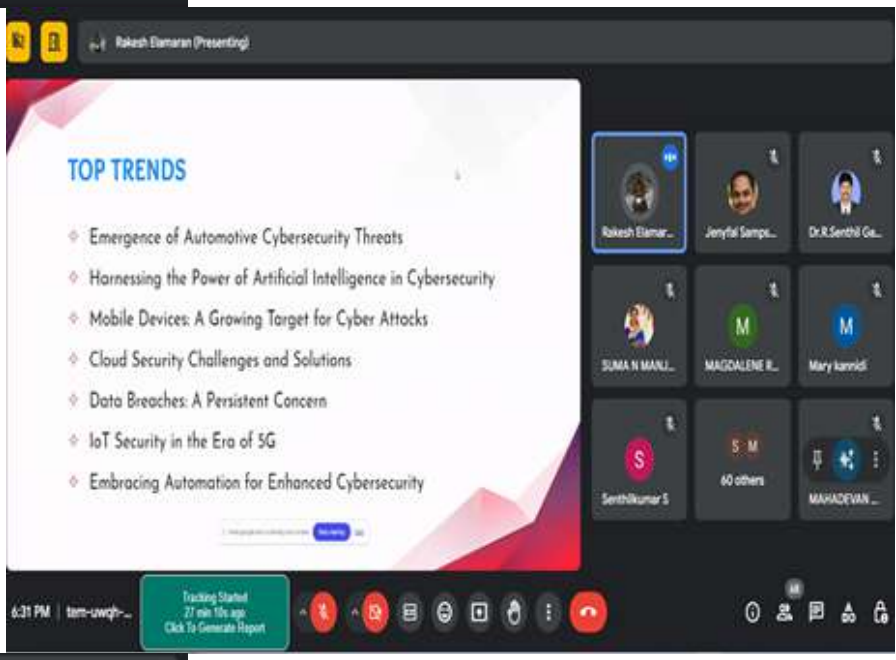
FIVE DAYS ONLINE SHORT TERM TRAINING PROGRAMME
ON
"EMBEDDED SYSTEMS, IoT and SECURITY"

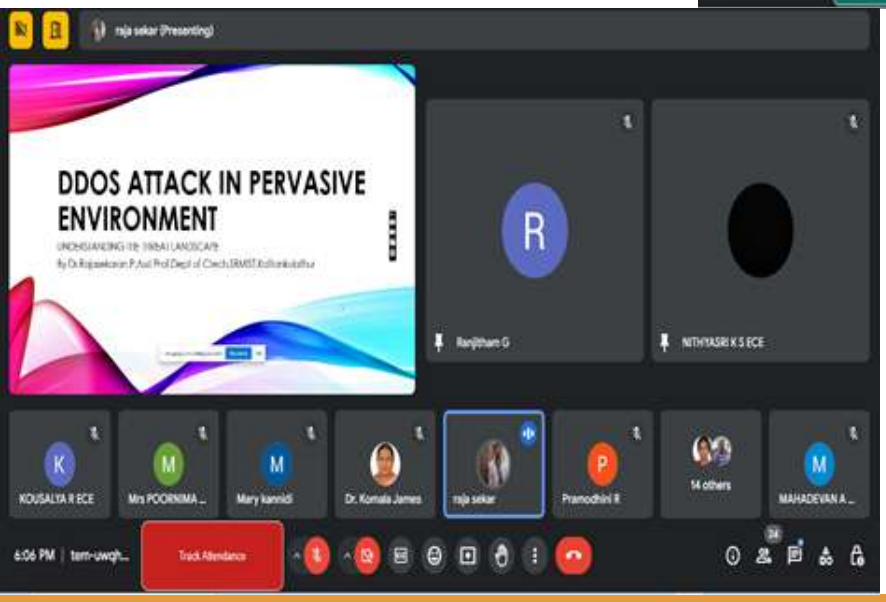
Programme Schedule

Venue: Google Meet Time: 6.00 p.m. - 7.30 p.m.

Date	Topic	Resource Person
10.06.2024 (Monday)	Emerging Trends in Embedded System Design	Mr. Dhanasekar Chinnppan, Electronics Team Leader, Valeo India Pvt. Ltd., Chennai
11.06.2024 (Tuesday)	Recent Trends in Security	Mr.Rakesh Elamaran, Security Engineer 2, Comcast, Chennai.
12.06.2024 (Wednesday)	DDos Attack in Pervasive Environment	Dr. P. Rajasekaran, Assistant Professor, Dept. of Computing Technologies, SRM Institute of Science and Technology, Chennai
13.06.2024 (Thursday)	IoT Based Device in Industry 4.0	Mr. Tejwin Gehlot, Firmware Developer, Ortusolis Technology Solutions Pvt. Ltd, Bengaluru
14.06.2024 (Friday)	Unlocking FreeRTOS: Deep Dive with Hands-On Workshop	Mr. D. Balabharathi, Software System Architect Boat Lifestyle, Bangalore,

EVENTS ORGANIZED





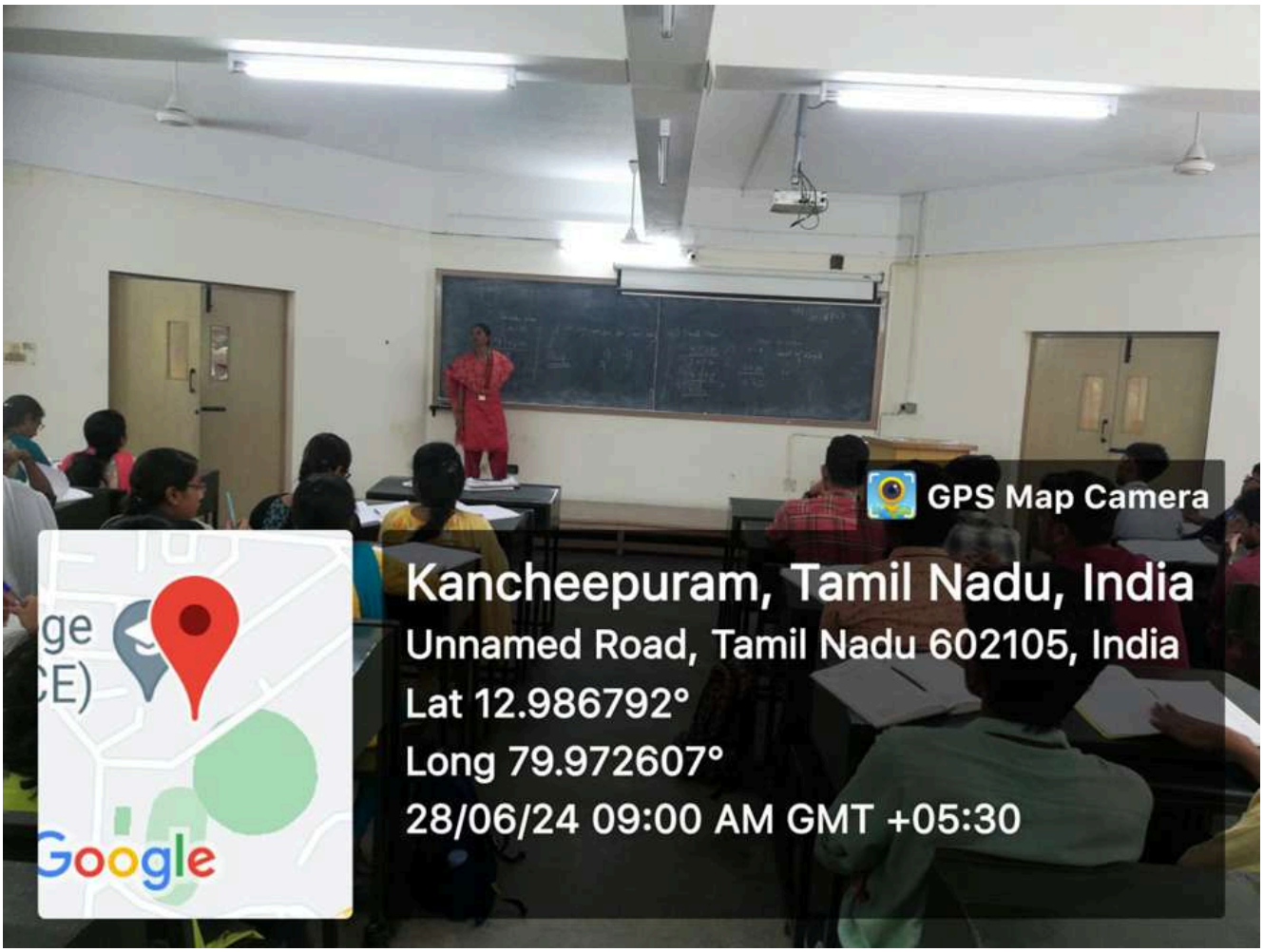
PLACEMENT ACTIVITIES

- The **Training and Placement Cell** and the **Department of Electronics and Communication Engineering** jointly organized **"Department Specific Training Program"** for final year students from 11.06.2024 to 15.06.2024. The core subjects were allotted to all the faculty members as per the following table. The assessment test was conducted at the end of each session.

Date	EC A	EC B	EC C	EC A	EC B	EC C
11/06/2024	Dr. N. Kumaratharan (Communication Systems)	Mrs.C Gomatheeswari Preethika (Transmission Lines)	Mrs.R Kousalya (Circuit theory)	Dr. S. R. Malathi (Microprocessor & Microcontrollers)	Mrs.K S Subhashini (Microprocessor & Microcontrollers)	Dr. T. J. Jeyaprabha (Digital Communication)
12/06/2024	Dr. A. Ramya (Digital Circuits)	Dr. M. Bindhu (Electron devices)	Mr.S P Sivagnana Subramanian (Communication Systems)	Dr. S Vijayanand (Embedded Systems)	Mrs. S.M. Abinaya (Electron Devices)	Mrs.S M Mehzabeen (Microprocessor & Microcontrollers)
13/06/2024	Mrs. B. Elakkiya (Circuit Theory)	Mr.P. Arul (Microprocessor & Microcontrollers)	Mrs.B Sarala (Digital Circuits)	Mrs. S. Mary Cynthia (Transmission Lines)	Dr. D. Menaka (Digital Signal Processing)	Dr M.Kavitha (Digital Circuits)
14/06/2024	Mrs.K Srividhya (Electron Devices)	Mr.S Senthil Rajan (Communication Systems)	Mrs.S.Radhika (Electron Devices)	Mr.N Sathish (Control Systems)	Mr.L.K.Balaji Vignesh (Electron Devices)	Dr. R. Gayathri (Digital Signal Processing)
15/06/2024	Mrs.S Kalyani (Microprocessor & Microcontrollers)	Mr.P Muthukumaran (Circuit Theory)	Mr. D. Silambarasan (Digital Signal Processing)	Mr. A. Mahadevan (Electron Devices)	Dr. M. Athappan (Digital Circuits)	Mr.M K Varadarajan (Microprocessor & Microcontrollers)

PLACEMENT ACTIVITIES

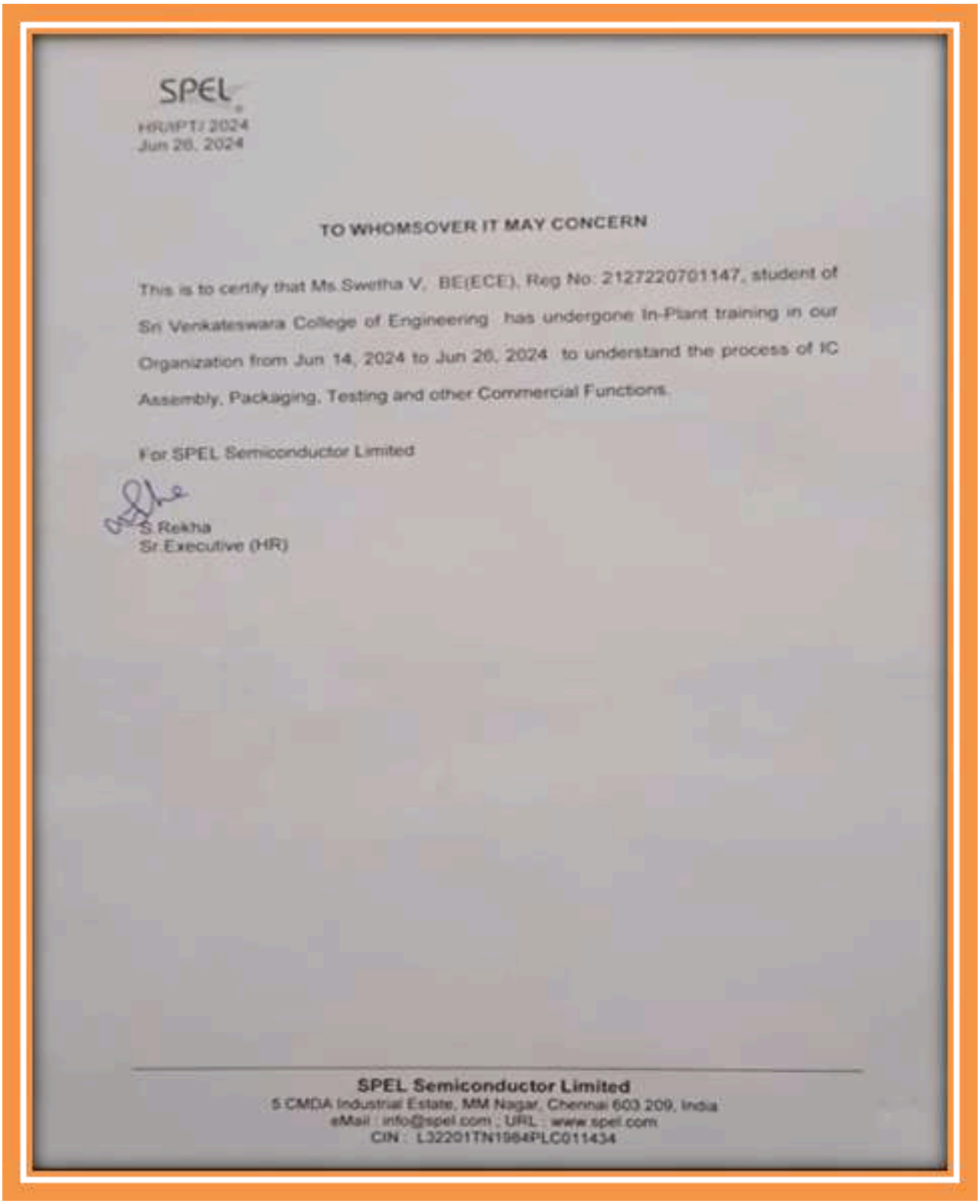
- The **Training and Placement Cell** organized a **"Technical Training Program"** for final year students from 17.06.2024 to 06.07.2024. The training topics covered the following programming languages like C programming, Python, Java etc.



INDUSTRIAL VISITS

- **Dr.S.R.Malathi and Mr.L.K.Balaji Vignesh** participated in **one day (Industrial Training Program)** at **SPEL Semiconductor Limited, Marimalai Nagar** on 13.06.2024

- **Ms.V.T.Harinee (Second-year ECE "A")** and **Ms.V.Swetha (Second-year ECE 'C")** had undergone **Industrial visit (In-Plant Training)** to **SPEL Semiconductor Limited, Maraimalai Nagar** on 14.06.2024 to 26.06.2024



SPEL

HR/IPT/ 2024
Jun 26, 2024

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms.Swetha V, BE(ECE), Reg No: 2127220701147, student of Sri Venkateswara College of Engineering has undergone In-Plant training in our Organization from Jun 14, 2024 to Jun 26, 2024 to understand the process of IC Assembly, Packaging, Testing and other Commercial Functions.

For SPEL Semiconductor Limited

S.Rekha
Sr.Executive (HR)

SPEL Semiconductor Limited
5 CMDA Industrial Estate, MM Nagar, Chennai 603 209, India
eMail : info@spel.com ; URL : www.spel.com
CIN : L32201TN1984PLC011434

INDUSTRIAL VISITS

- **Dr.M.Athappan** participated in **five days (Industrial Training Program)** at **Pantech Solutions, Chennai** from 24.06.2024 to 28.06.2024

28-06-2024

To

Dr.M.Athappan ASP/ECE,
Sri Venkateswara College Engineering,
Sriperumbudur,
Chennai.

Dear Sir,

We are really happy and thank you for your visit to our Industry for five days from 24/06/2024 to 28/06/2024. It was a pleasure to meet you and discuss about our products based on VLSI, DSP and Embedded. We had a fruitful discussion with our R&D team on our upcoming new products, IOT based kit's and some research products.We thank you for spending your valuable time with us and for your interest on our products.

For Pantech Prolabs India Pvt Ltd.,
(Authorised Signatory)

MR.M.MALAIYAPPAN,
MARKETING MANAGER.

PANTECH PROLABS INDIA PVT LTD,
#41 Rajeswari Street, Santhosh Nagar,
Kandanchavadi, OMR
Chennai - 600 096, Tamilnadu, India.

Support : support@pantechsolutions.net
Sales : sales@pantechsolutions.net
+91-98409 74408

ALUMNI TESTIMONIAL

Ms.V.Preethi
Lead Data Scientist,
Target, Bangalore

"The main strength of SVCE I would say is the faculty members. The amount of training and moral support they provide is commendable. The placement cell is another big strength of SVCE. SVCE not only strives hard to get all eligible students placed, but also brings the best companies in the industry. I would like to sincerely thank SVCE for laying the foundation for my career"**-Ms.V.Preethi, (Batch 2010-2014)**

PROGRAM OUTCOMES

PO1: Engineering Knowledge: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PROGRAM OUTCOMES

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

PROGRAM OUTCOMES

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change

PROGRAM EDUCATIONAL OBJECTIVES

PEO1: Create value to organizations as an EMPLOYEE at various levels, by improving the systems and processes using appropriate methods and tools learnt from the programme.

PEO2: Run an organization successfully with good social responsibility as an ENTREPRENEUR, making use of the knowledge and skills acquired from the programme.

PEO3: Contribute to the future by fostering research in the chosen area as an ERUDITE SCHOLAR, based on the motivation derived from the programme.

PROGRAM SPECIFIC OUTCOMES

PSO-1: An ability to apply the concepts of Electronics, Communications, Signal processing, VLSI, Control systems etc., in the design and implementation of application oriented engineering systems.

PSO-2: An ability to solve complex Electronics and communication Engineering problems, using latest hardware and software tools, along with analytical and managerial skills to arrive appropriate solutions, either independently or in team.

PROGRAM OFFERED BY THE DEPARTMENT

- **B.E. in Electronics and Communication Engineering**
- **M.E. in Communication Systems**
- **Ph.D / MS (by Research)**

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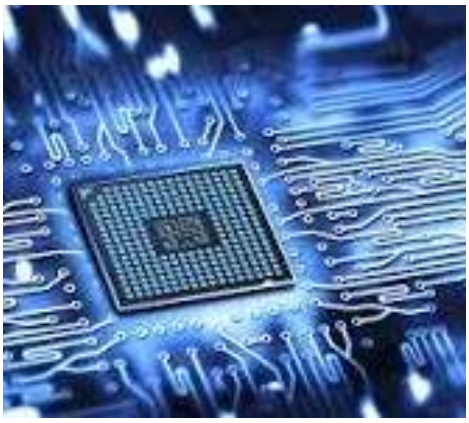
Sri Venkateswara College of Engineering

Autonomous Institution, Affiliated to Anna University, Chennai
Approved by the AICTE, Accredited by NAAC

ELECTRONICS AND COMMUNICATION ENGINEERING

ABOUT THE DEPARTMENT

The Department of ECE was started in the year 1985 and is presently accredited by the NBA. The postgraduate program (M.E) in Communication Systems was started in 2002. There are about 38 faculty members in the department and 14 of them are doctorates. The department is well equipped with lab facilities and software tools like IE3D, ADS, CST Studio, Lab View, Tanner Tools, Cadence, MATLAB, and Prototype Machine.



SALIENT FEATURES OF ECE

- The Program has been accredited by the NBA since April 2002.
- Recognized by Anna University, Chennai as an approved research centre for Ph.D. and MS (by Research) with effect from May 2009.
- The major thrust areas of research are RF and Microwave Engineering, Wireless Networks, Network Security, VLSI, Cognitive Radio, Image & Signal Processing, Neural Networks & Soft Computing, Embedded Systems & IoT, Machine Learning, Nano Technology, Robotics, and Artificial Intelligence.
- The department is doing a good number of consultancy work in the field of PCB Prototyping and RF measurements using a Network Analyzer.
- On average over 75 companies visit our department for campus placements External Research grant of Rs 48.26 Lakhs received from ISRO and Cognizant Technology Solutions in the last five years for carrying out various projects.
- Students actively participate in research projects related to Wireless Communications, Networking, Embedded Systems & IoT, Virtual Reality, Robotics, Drones etc.
- Student Counselling Service at SVCE is committed one to promote the mental health and well-being of our students by providing accessible, quality mental health services.
- Student counsellors are available on campus for confidential counselling to all students.
- The department has signed over 12 MOUs with reputed companies to ensure the Industry Institute Interaction.
- Training programs are being conducted to enhance the employability skills of the students and also to achieve good placement in various Industries.

MESSAGE FROM HoD's DESK

The Department of ECE consistently does a commendable job in disseminating the latest knowledge and inviting specialists from diverse domains for discussions on the most recent advancement and trends besides conducting regular classes. We hope every student who visits our department has an engaging, motivating and positive experience. We consistently strive to ensure that instructors and other staff personnel possess the necessary abilities and knowledge to stimulate their students' intellectual curiosity, creativity and critical thinking. I hope you enjoy your time here and thoroughly use our amenities for promising career development

Dr. G.A. SATHISH KUMAR HoD/ECE

VISIT WWW.SVCE.AC.IN

Contact US

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admissionenquiry@svce.ac.in

SCAN & APPLY

CHOOSING SVCE: A PATHWAY TO SUCCESS AND GROWTH

- One of the prestigious and top ranked Autonomous engineering institution affiliated to Anna University, Chennai.
- Accredited by NAAC and NBA.
- Over 28 % of the alumni work abroad.
- Highest placement offers of Rs.25 LPA and 20 LPA in PayPal and Amazon.
- Highly qualified faculty and staff with an average experience of over 20 years.
- World class Laboratories to foster innovation and research.
- Alumni working in fortune 500 companies like Google, Microsoft, Facebook, Mercedes Benz, INTEL, etc.,
- State-of-the- art-campus with modern amenities in the industrial corridor of Chennai.

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A Bachelor's Degree in Electronics and Communication Engineering with expertise in one of the following specialization

HONOURS SPECIALIZATION

Wireless Communication Systems

VLSI

Antenna and Microwave Technology

Signal Processing and Data Science

IoT Systems and its Applications

Networking and Security

Our Recruiting Companies

accenture, amazon, Deloitte., Infosys, wipro, Ford, Cognizant, CATERPILLAR, SCHWING Stetter, FLSmidth, PayPal, verizon, SIEMENS, ASHOK LEYLAND, ABB, ThoughtWorks, Tech Mahindra, Atos Syntel, Capgemini, TCS 50, YAMAHA, TechnipFMC, HEXAWARE, freshworks, Informatica, vedanta, wood., SAINT-GOBAIN, HCL, HYUNDAI, Honeywell, TVS, flex., TEMENOS

Top Universities where our students are pursuing Higher Education

MINORS

Artificial Intelligence and Machine Learning and Machine Learning

Data Science and Analytics

Robotics

Semiconductors

Advanced Communications

Bio-medical Signal Processing

And Many More....

Sri Venkateswara College of Engineering

Autonomous Institution, Affiliated to Anna University, Chennai
Approved by the AICTE, Accredited by NAAC

DEPARTMENT OF ELECTRONICS AND COMMMUNICATION ENGINEERING

M.E COMMUNICATION SYSTEMS

ADMISSIONS OPEN FOR THE ACADEMIC YEAR 2024-25

SVCE started the Department of Electronics and Communication Engineering in the year 1985. The Department offers B.E. in Electronics and Communication Engineering and M.E. in Communication Systems. It is also approved as aResearch Centre in Ph.D and MS (by Research) programmes by Anna University, Chennai.

ABOUT SVCE

Sri Venkateswara College of Engineering (Autonomous) is a premier self-financing institution started in the year 1985. The college offers 10 B.E/B.Tech Programmes and 10 M.E/M.Tech Programmes in Engineering and Technology. The Programs are approved by AICTE and the college is affiliated to Anna University, Chennai. The college is also accredited by National Assessment and Accreditation Council (NAAC). Many programs are accredited by National Board of Accreditation (NBA). The college is also certified by ISO 9001:2015. The institution received the autonomous status in the year 2016. Our Vision is to be a leader in Higher Technical Education and Research by providing state-of-the-art facilities to transform the learners into global contributors and achievers.

ADMISSION INFORMATION

A pass in a recognized Bachelor's degree or equivalent in the relevant field and should have obtained atleast 50% in the qualifying degree examination. Admissions are through Tamil Nadu Common Entrance Test (TANCET) conducted by Anna University or GATE

RESEARCH GRANTS

Our faculty members have received major external research grants from prestigious organizations such as ISRO, AICTE, DRDO, and TNSCST, etc., to the tune of ₹56.26 Lakhs in the last three years for doing various funded projects.

SCHOLARSHIPS FOR PG STUDENTS

- Tution fee (Rs. 50,000/year) waiver for 30% of the students of sanctioned class strength on merit basis, as applicable.
- Management Scholarship for tution fees and assistance for books and instruments.
- GATE Scholarship of Rs. 12,400 per month for students having valid GATE Score. Sponsorships for students to attend conferences.
- Intramural M.E/M.Tech Student Research Grant to carry out innovative projects.

RESEARCH AREAS

Join the Revolution: Transform Communication Systems with SVCE

- Biomedical Instrumentation
- Computer Networks & Network Security
- Digital Signal Processing & Image Processing
- Embedded Systems
- Fiber Optic Communication
- IoT (Internet of Things)
- Nano Electronics
- RF & Microwave Engineering
- Robotics & Artificial Intelligence
- VLSI & Microelectronics
- Wireless Communication Networks

MAJOR RECRUITERS

ERICSSON, CSS CORP, TAFE, amazon, TATA COMMUNICATIONS, ZOHO Work. Online, Infosys, Cognizant, WIPRO, accenture High performance. Delivered., L&T Infotech, HCL