

Newsletter

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SIGNALS



HALF - YEARLY NEWS LETTER

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Newsletter

**Electronics & Communication
Engineering**



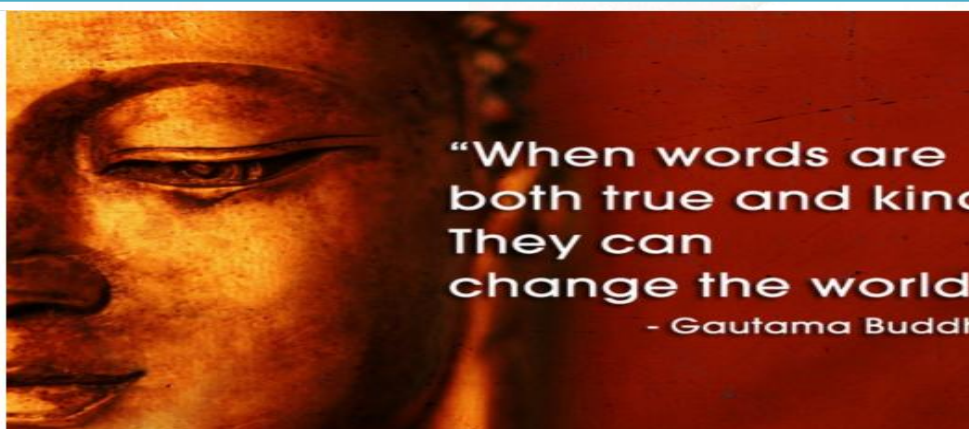
**PRASAD V POTLURI
SIDDHARTHA
INSTITUTE OF TECHNOLOGY**

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Inside:

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1. Workshops/Seminars/Guest Lectures/Training Programs/Symposiums/ Webinars organized

The department of Electronics and Communications Engineering organized ---

- i. A Guest lecture on **Modulation Classification: From Classical to Deep Learning Methods** for III ECE students on 25th February, 2026.

Resource Person: Dr. K. Shri Ramtej, Senior Assistant Professor, Department of ECE, Siddhartha Academy of Higher Education, Vijayawada.



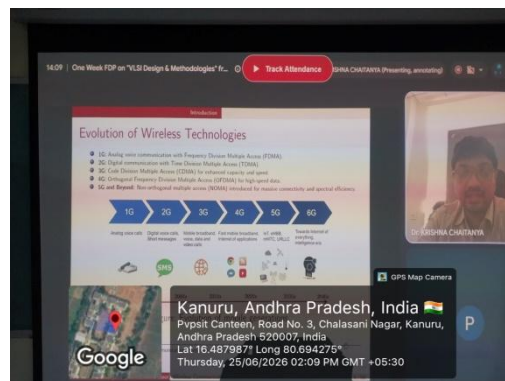
- ii. A one week workshop on **AI in Electronics** for II ECE students during 2nd – 7th March, 2026.

Resource Person: Maganti Srivalli, Jaishna Software.

- iii. A one week FDP on VLSI Design & Methodologies during 22nd – 26th June, 2026.

Resource Persons:

1. Dr. B K N Srinivasa Rao,
National Institute of Technology (NIT), Warangal.
2. Dr. B. Naresh Kumar Reddy,
National Institute of Technology (NIT), Tiruchy
3. Dr. Krishna Chaitanya A
National Institute of Technology (NIT), A.P.
4. P. Manikanta,
INTEL corporation, Bangalore.
5. Surya Ch.
Sense Semiconductor & IT Solutions Pvt Ltd



2. Papers presented in Seminars/Conferences/Symposiums by the faculty:

- i. Dr.T. Haritha presented a paper entitled **Near-Field Channel Modeling and Beamforming in 6G Wireless Networks**, 2026 Sixth International Conference on Advances in Electrical, Computing, Communications and Sustainable Technologies (ICAECT), Bhilai, India, ISBN: 979-8-3315-7322-5, doi.org/10.1109/ ICAECT 68478.2026.11426120 on 8th & 9th January, 2026.

3. Workshops/ Seminars/STTP/Conferences/Faculty Development Programmes/ Awareness programmes attended by the faculty:

a) Seminars/Webinars:

- i. Dr.B.Samuyelu participated in a seminar on **Maximise your Research Impact and Access in collaboration with APSCHE** organized by Taylor & Francis with APSCHE on 18th February, 2026.
- ii. Dr.V.S.D.Rekha participated in a seminar on **Computer Vision** organized by Study World College of Engineering, Coimbatore, Tamilnadu, India on 24th March, 2026.
- iii. Ms.T.Sushma participated in IEEE Coclave **Women in Microwaves, Antennas and Electromagnetics -Antenna Design and Optimization with AI using Antenna Toolbox** organized by IEEE Hyderabad and MTT_AP EMC Society on 10th April 2026.

- iv. Ms.T.Sushma participated in IEEE Coclave on **Women in Microwaves, Antennas and Electromagnetics RF Technologies for ISRO Payloads** organized by IEEE MTT-S/AP-S/EMC-S Joint Chapter on 11th April 2026.
- v. Dr.Habibulla MD participated in a seminar on **IP and sports -Ready Set Innovate** organized by Turnip Innovations Pvt. Ltd. on 24th April 2026.
- vi. Dr.Habibulla MD participated in a seminar on **Entrepreneurship foundations for deep tech startups** organized by Turnip Innovations Pvt. Ltd. on 19th June, 2026.
- vii. Dr.J.Ravindra Babu, Dr.B.Surya Prasada Rao participated in **Vision Summit 2026** organized by National Faculty Network, Masai during 19th – 20th June, 2026.
- viii. Dr.Habibulla MD participated in a seminar on **Multi-UART Design on Zynq MPSoC: AXI, PS-PL Integration on ZCU104** organized by AMD-Xilinx, CoreEL Technologies (I) Pvt Ltd. on 30th June, 2026.

b) Workshops:

- i. Dr.Habibulla MD participated in a workshop on **Turnip Innovation Festival 2026** organized by Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur on 31st January, 2026.
- ii. Dr.Habibulla MD participated in a workshop on **Continuous Professional Development (CPD) Workshop for Teachers** organized by Centre for Professional Development of Urdu Medium Teachers, Maulana Azad National Urdu University, Hyderabad during 15th May – 4th June, 2026.
- iii. Mrs.K.Aruna kumara, Dr.B.Samuyelu, Ms.T.Sushma, Mrs.D.Swathi participated in Workshop on **Surface Mount Technology (SMT) and PCB Assembly (PCBA)** organized by Amara Raja Skill Development Center, Diguvmagham, Chittoor during 8th –13th June, 2026.

- iv. Dr.V.Ratna Kumari, Mrs.D.Hareesha, Mrs.B.V.Subbayamma participated in Summer school on **Medical Imaging** organized by Department of ECE, IIIDM, Kancheepuram, Chennai during 15th –19th June, 2026.

c) Guest Lectures Attended:

- i. Dr. Habibulla MD, Dr.V.S.D.Rekha participated in a guest lecture on **Maximize Your Research Impact and Access** organized by APSCHE on 18th February, 2026.
- ii. Dr.Habibulla MD, Dr.B.Samuyelu, Ms.T.Sushma, Mrs.B.V.Subbayamma, Mr.K.Phani Rama Krishna, Dr.V.S.D.Rekha participated in a guest lecture **Learning More from Less: A Path towards Efficient Representation Learning with Minimal Supervision in Low-Resource Environments** organized by Research & Development Cell, PVPSIT on 4th March, 2026.
- iii. Dr.Ch.Gangadhar participated in a guest lecture on **Efficient Computing for AI and Robotics: From Hardware Accelerators to Algorithm Design** organized by IEEE IISc VLSI Chapter on 19th & 20th June, 2026.

d) Faculty Development Programmes:

- i. Dr.V.S.D.Rekha participated in FDP on **IoT for Teaching, Research and Innovation for Sustainable Development** organized by Department of Electronics and Communication Engineering in association with IEEE Student Branch, IIC, IETE Forum and Fun Electronics Association during 5th – 9th January, 2026.
- ii. Mrs.D.Swathi participated in FDP on **Advances in Renewable Energy: Emerging Systems and Sustainable Solutions** organized by Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur. during 27th – 31stJanuary, 2026.
- iii. Dr.A.Geetha Devi participated in FDP on **Quantum Sensing** organized by MNIT, JAIPUR during 2nd – 28th February, 2026.

- iv. Dr.Habibulla MD participated in FDP on **Generative & Agentic AI** organized by Sardar Vallabhbhai National Institute of Technology, Surat during 16th – 21st February, 2026.
- v. Dr.J.Ravindra Babu Dr. Habibulla MD, Mrs. D Swathi participated in FDP on **Recent Trends and Best Practices in Engineering and Technology** organized by Dept. of EEE, PVPSIT during 16th – 22nd March, 2026.
- vi. Dr.A.Geetha Devi participated in FDP on **Quantum Material** organized by MNIT Jaipur during 9th March – 2nd April, 2026.
- vii. Dr.B.Samuyelu participated in FDP on **AI Tools for Teaching, Research and Academic Writing** organized by Panjab University, Chandigarh during 6th – 10th April, 2026.
- viii. Dr.A.Geetha Devi participated in FDP on **Engineering Foundations of Quantum Technologies** organized by MNIT, Jaipur during 10th April – 2nd May, 2026.
- ix. Dr.T.Haritha, Mrs.K. Anitha, Ms.T. Sushma, Dr.T.Maha Lakshmi participated in FDP on **Mech Fusion-Exploration of Interdisciplinary Innovations** organized by Dept of ME, PVPSIT, Vijayawada during 27th April – 7th May, 2026.
- x. Dr.T.Haritha participated in FDP on **Recent Advances and Research Trends in Microwave, Millimeter wave antennas and RF communication systems** organized by Lakireddy Balireddy College of Engineering, Mylavaram during 4th –9th May, 2026.
- xi. Dr.J.Ravindra Babu, Dr.Ch.Gangadhar, Dr.B.Surya Prasada Rao, Mrs.K. Anitha, Mrs.K. Aruna Kumari, Ms.T. Sushma, Mrs.D.Hareesha, Dr.V.S.D.Rekha, Mrs.D.Praveena Bai participated in FDP on **Advanced Pedagogy and GAPC 4.0** organized by PVPSIT in association with NITTTR, Chennai during 4th – 8th May, 2026.
- xii. Dr.J.Ravindra Babu, Dr.Habibulla MD participated in FDP on **Future Ready Teaching Practices** organized by IIT, Mandi during 6th – 8th May, 2026.

- xiii. Mr.K.Phani Rama Krishna, Mrs.L.Madhavi Devi participated in FDP on **Applied RF and Antenna Design using Ansys HFSS** organized by Charotar University of Science and Technology, Gujara during 11th – 16th May, 2026.
- xiv. Mrs.B.Swathi Lakshmi participated in FDP on **Advancing Frontiers in Antenna Technology** organized by Department of ECE, SVCE, Thirupathi during 18th – 23rd May, 2026.
- xv. Dr.J.Ravindra Babu, Dr.P.VenuMadhav participated in **Centre for Engineering Education Excellence** organized by IIT, Kanpur during 25th May – 6th June, 2026.
- xvi. Mrs.B.Swathi Lakshmi participated in FDP on **AI Powered Data Visualization using Tableau & Power BI** organized by IETE Vijayawada during 1st – 5th June, 2026.
- xvii. Mrs.B.Swathi Lakshmi participated in FDP on **Advanced Research Trends in 6G Wireless Communications and Intelligent IoT Systems** organized by Dept of ECE, SRKR Engineering College during 8th –13th June, 2026.
- xviii. Mrs.D.Praveena Bai participated in FDP on **Sustainable Energy Systems And Electrification Techniques for Future Mobility** organized by Dept. of Electrical and Electronics Engineering, PVPSIT, Vijayawada during 8th –12th June, 2026.
- xix. Dr.T.Balaji, Dr.V.S.D.Rekha, Dr.B.Surya Prasada Rao participated in FDP on **Deep Learning and Foundation Models for Vision, Language, Multimodal, and Quantum AI** organized by IIITDM, Kancheepuram during 8th –13th June, 2026.
- xx. Dr.L.Madhavi Devi participated in FDP on **Generative AI in Cyber Security** organized by Electronics & ICT Academy NIT Patna during 8th –19th June, 2026.

4. Publications by the faculty (National/International Journals/ Conferences):

a) Scopus indexed journals:

- i. Dr.B.Surya Prasada Rao published a paper entitled **Smart and Transparent Defense: A Hybrid Explainable AI Framework for Phishing Resilience**, IAENG International Journal of Computer Science, Vol.53, Issue 1, ISSN No: 1819-9224, PP: 336-346, Jan, 2026.
- ii. Dr.A.Geetha Devi published a paper entitled **Multi-Task Deep Learning Framework for Segmentation and Severity Estimation of Leaf Diseases in Multi-Crop Environments**, International Journal of Innovative Technology and Interdisciplinary Sciences, Vol.9, Issue 1, ISSN No: 2613-7305, PP: 210-227, Jan, 2026.
- iii. Dr.Ch.Gangadhar published a paper entitled **Exploring the role of behavioral analytics and anomaly detection in securing mobile networks for critical infrastructure**, Information Security Journal: A Global Perspective, Vol.35, Issue 1, ISSN No: 1939-3547, PP: 154-167, Feb, 2026.
- iv. Dr.Ch.Subba Rao published a paper entitled **Design and Implementation of a High Gain Compact IoT Wearable Antenna for Vital Signs Data Transmission Using ESP8266**, Progress In Electromagnetics Research C, Vol.169, ISSN No: 1937-8718, PP: 74-83, Apr, 2026.
- v. Dr.V.S.D.Rekha published a paper entitled **Thermally Controlled Tri-Band Metamaterial Perfect Absorber based on Vanadium Dioxide (VO₂) for Terahertz Communication Application**, Journal of Nano- and Electronic Physics, Vol.18, Issue 2 ISSN No: 2077-6772, PP: 02019(5pp), Apr, 2026.
- vi. Dr.J.Ravindra Babupublished a paper entitled **Federated Learning Based Traffic Intelligence for Privacy Preserving Distributed Optimization of Wireless**

Network Performance, Journal of Theoretical and Applied Information Technology, Vol.104, Issue 9, ISSN No: 1992-8645, PP: 416-428, May, 2026.

- vii. Dr.Habibulla MD, Dr.Ch. Gangadhar, Dr.K. Phani Rama Krishna published a paper entitled **Congestion avoidance in DEC protocol using Leaky Bucket Algorithm**, International Journal of Electronics and Telecommunications, Vol.72, Issue 2, ISSN No: 2300-1933, PP: 1-6, May, 2026.
- viii. Dr.J.Ravindra Babu published a paper entitled **Securing electric vehicle charging stations from adversarial cyber attacks using hybrid detection models**, Bulletin of Electrical Engineering and Informatics, Vol.15, Issue 3, ISSN No: 2302-9285, PP: 2054-2063, Jun, 2026.
- ix. Dr.V.S.D.Rekha published a paper entitled **Design of Single Element Penta Band, High Directive Gain Antenna for 5G MM Wave Applications - Telecommunications and Radio Engineering**, Vol.85, Issue 5, ISSN No: 0040-2508, PP: 63-72, Jun, 2026.

b) SCI/SCIE/ESCI indexed journals:

- i. Dr.T.Mahalakshmi published a paper entitled **Development of energy efficient routing and network life time optimization in IoT-based WSN by hybrid reptile search-artificial gorilla troops optimization-** Wireless Networks, Vol. 32, Issue 3, ISSN No: 1572-8196, PP: 1739-1768, Jun, 2026, SCIE & Scopus.

5. Faculty Achievements (Patents, Higher Qualification awarded, guest lectures given, awards and rewards, acted as a Resource person etc.):

a) Guest lectures delivered:

- i. Dr.B.Surya Prasada Rao delivered a guest lecture on **An Importance of Education: Human Values** for I B.Tech IOT Students of SR Gudlavalleru Engineering College, Gudlavalleru on 2nd February, 2026.

- ii. Dr.B.Surya Prasada Rao delivered a guest lecture on **Importance of Education on Human Values** at Sri Vasavi Engineering College, Tadepalligudem on 31st March, 2026.
- iii. Dr.B.Surya Prasada Rao delivered an expert lecture on **AI/ML for wireless Networks** in one week FDP on Advanced Research Trends in 6G Wireless Communications and Intelligent IoT Systems at SRKR Engineering College, Bhimavaram on 9th June, 2026.
- iv. Dr.B.Surya Prasada Rao delivered an expert lecture on **Intelligent IoT Systems for Smart Applications** in one week FDP on Dept. of IOT, SRGEC, Gudlavalleru on 27th June, 2026.

b) MOOCs/COURESERA courses completed by the faculty:

- i. **NPTEL online certification course** was conducted by various IIT's from January-June 2026. Exam was conducted in the month of March and April 2026. Following are the details of certified faculty members.

S.No	Name	Course Name	Final Score	Certificate Type
1	Dr V S D Rekha	Embedded System Design with ARM	61	Elite
2	Dr.K. Phani Rama Krishna	Introduction to Internet of Things	85	Elite+Silver

c) Others:

- i. Dr.B.Surya Prasada Rao attended as a Chief Guest for **IETE Students Day Celebrations** at Department of IOT, SR Gudlavalleru Engineering College, Gudlavalleru on 20th February, 2026.

- ii. Dr.Habibulla MD served as an Academia Coordinator for the institute-level event Vijayawada Dream Big Initiative, under NEP2020 organized by Nimra Institute of Dental Sciences, Vijayawada in association with Andhra Pradesh State Waqf Board. He also **delivered and conducted an interactive session/exercise on Personality Development** for undergraduate students on 25th April, 2026.

6. Students' achievements:

a) Co-curricular Activities:

i. Student Paper Publications and Presentations:

- i. R. Hari Prasad, M. Jahnavi, M. Jasintha, P. Jeevan Kumar of IV ECE presented paper titled **High Speed and Area efficient three operand adder using Han-Carlson parallel prefix architecture** - 14th International Conference on Contemporary Engineering & Technology, Chennai, India, 22nd & 23rd March 2026.
- ii. N. Bhavana, R. Bhavesh Kumar, U.B.S.S. Satyanarayana, P. Varshitha of IV ECE presented paper titled **A modular Hybrid multiplier design with pipe lined reduction for optimization delay performance** - 14th International Conference on Contemporary Engineering & Technology, Chennai, India, 22nd & 23rd March 2026.
- iii. A.Aravind, Siva Kumar, Divya Sree, Bande, K. Praneetha, B. Sravanthi of IV ECE presented paper titled **Novel conformal antenna design for 5G sub – 6GHz applications** - 3rd International Conference on Advances in Engineering and Medical Sciences by International School of Technology and Sciences for women, Rajanagaram, East Godavari on 17th & 18th April 2026.

ii. Certification Courses:

- i. **NPTEL online certification course** was conducted by various IIT's from January-June 2026. Exam was conducted in the month of March and April 2026. Following are the details of certified students.

S.No	Reg. No.	Name of the student	Final Score	Certificate Type
Course Name: Machine Learning, ML				
1	24501A0469	Merugumalli Anant Krishna	70	Elite Topper of 2% in this
2	24501A0470	Mohammad Inthiyaz	48	Successfully completed
3	24501A0484	Nandi Lakshmi Manogna	53	Successfully completed
4	24501A0490	Pagilla Mohith Chand	52	Successfully completed
5	24501A0491	Pakalapati Harshitha	51	Successfully completed
6	24501A04A	Sanjana Salins	51	Successfully completed
7	24501A04A	Seelam Jyothir Aditya Surya	52	Successfully completed
8	24501A04A	Aksa Benzeer	60	Elite
9	24501A04A	Shaik Sharmila Sulthana	52	Successfully completed
10	24501A04B	Tammineni Swetha	49	Successfully completed
11	24501A04B	Tatineni Pallav Sai Krishna	46	Successfully completed
12	25505A0410	Lakkoju Lakshmi Prathima	50	Successfully completed
13	25505A0411	Daizy Pujitha	53	Successfully completed
14	25505A0414	Tatakuntla Hemanth Venkat	54	Successfully completed
Course Name: Sensors and Actuators				
15	23501A0410	A Ramya Mounika	56	Successfully completed
16	23501A0416	B Charishma	53	Successfully completed
17	23501A0458	Koppula Pavani	72	Elite
18	23501A0472	Meka Sowmya	79	Elite+Silver
19	23501A0473	Merugumolu Purna Sahithi	55	Successfully completed
20	23501A0485	Pagidi Namratha	58	Successfully completed
21	23501A0494	Potluri Hanisha Moditha Satya	58	Successfully completed
22	23501A0495	Potta Geetha Naga Kowmudhi	61	Elite
23	23501A04B	Tadiparthi Monisha	70	Elite
24	23501A04B	Tirumalasetty Naga Dhatri	80	Elite+Silver
25	23501A04C	Vallabhaneni Bindu Sree	60	Elite

26	24505A0403	Goli Charana Sri	54	Successfully completed
Course Name: Data Base Management System				
27	23501A0444	Guntupalli Gangothri Lakshmi	56	Successfully completed
28	23501A0446	Jalapati Pallavi	62	Elite
Course Name: CMOS Digital VLSI Design				
29	24505A0409	Koneru Yoganand	55	Successfully completed
30	24505A0410	Madanambidu Raghava Datta	69	Elite
Course Name: Industrial Automation and Control				
31	22501A0406	Bande Divya Sree	60	Elite
32	22501A0441	Gudapati Srujana	54	Successfully completed
33	22501A0450	Kancharla Nishitha Krishna	52	Successfully completed
34	22501A0455	Madhan Akhil Kapalavai	65	Elite
35	22501A0457	Katipalli Anitha	61	Elite
36	22501A0465	Kollipara Sunny	54	Successfully completed
37	22501A0466	Kolusu Dhana Sri	65	Elite
38	22501A0494	Nelluru Navya Sri	51	Successfully completed
39	22501A04C	Bala Siva Sai Satyanarayana	60	Elite
40	22501A04D	Yarajarla Varsha	54	Successfully completed
41	23505A0401	Bandaru Swarupa	64	Elite
42	23505A0404	Thabitha Javvadi	71	Elite
43	23505A0406	Kakarla Sumanjali	53	Successfully completed
44	23505A0412	Ummadisetty Swarna Latha	62	Elite

iii. Internships done by Students:

139 IV B.Tech students completed internship offered by APSCHE, Skill Dzire in different courses.

Internships:

S. No	Reg. No. of the Student	Name of the Student	Name of the Company at Internship Completed	Name of the Course	Duration
1	22501A0401	Abdul Vahidunnisa	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 To 31.03.2026
2	22501A0402	Adabala Aravind Siva Kumar	APSCHE, Skill Dzire	Iot Systems & Smart Solutions	15.12.2025 To 31.03.2026
3	22501A0403	Amarthaluri Dedeethya Vardhan	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 To 31.03.2026
4	22501A0404	Anne Gnana Prasoon	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 To 31.03.2026
5	22501A0405	Azmeera Nagendra Babu	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
6	22501A0406	Bande Divya Sree	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
7	22501A0407	Banka Dundeswari	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
8	22501A0408	Banoth Dhanush	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
9	22501A0409	Baripati Gangadhar	APSCHE, Skill Dzire	Electrical Vehicle Technology	15.12.2025 to 31.03.2026
10	22501A0410	Bevara Sravanthi	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
11	22501A0411	Bonthu Maniteja	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026

12	22501A0412	Botlapati Ramya	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
13	22501A0413	Chadalavada Anusha	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
14	22501A0414	Chagantipati Aarthi Sree	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
15	22501A0415	Chalavadhi Yamini Sushma	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
16	22501A0416	Chalumuri Shanmukananda	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
17	22501A0417	Chegoni Prasanna Veera Durga	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
18	22501A0418	Chengalasetty Lakshmi Prasanna	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
19	22501A0419	Chennamsetty Karthikeyan	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
20	22501A0420	Chiniga Likhitha	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
21	22501A0421	Chinnapothula Kavyanjali	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
22	22501A0422	Chinta Prem	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
23	22501A0423	Chintada Jagadesh	APSCHE, Skill Dzire	Electrical Vehicle Technology	15.12.2025 to 31.03.2026
24	22501A0424	Chittem Sophiya Agatha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
25	22501A0426	Darapu Vara Lakshmi	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
26	22501A0427	Devarapalli Varshitha	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026

27	22501A0428	Devireddy Sai Balaji Reddy	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
28	22501A0430	Duddukuri Sai Venkat	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
29	22501A0431	Esali Paladugu	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
30	22501A0432	Ettikota Vardhan Babu	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
31	22501A0433	Gadireddy Prabhakara Rao	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
32	22501A0434	Gandi Narendra Varma	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
33	22501A0435	Gandikota Naveen Babu	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
34	22501A0436	Ganji Manoj Kumar	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
35	22501A0437	Ganji Sai Sharath	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
36	22501A0438	Garapati Kodanda Rama Abhishek	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
37	22501A0439	Garray Shyam Venkata Rama Swamy	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
38	22501A0440	Gorrela Vijay	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
39	22501A0441	Gudapati Srujana	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
40	22501A0442	Gundu Teja	APSCHE, Skill Dzire	Electrical Vehicle Technology	15.12.2025 to 31.03.2026
41	22501A0443	Gundu Yanosh	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026

42	22501A0444	Jasti Sai Prudhvi	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
43	22501A0445	Jonnalagadda Jaswanth	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
44	22501A0446	K Shanmathi	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
45	22501A0447	Kadiyam Lakshmi Prasanna	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
46	22501A0448	Kakarla Vijayendra Prasad	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
47	22501A0449	Kallakuri Srinidhi	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
48	22501A0450	Kancharla Nishitha Krishna	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
49	22501A0451	Kandi Anusha	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
50	22501A0452	Kandikonda Anisha	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
51	22501A0453	Kandira Nagaraju	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
52	22501A0454	Kannoju Chakri Krishnachari	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
53	22501A0455	Kapalavai Madhan Akhil	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
54	22501A0456	Kapavarapu Aswanth	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
55	22501A0457	Katipalli Anitha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
56	22501A0458	Katteda Reenajessy	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026

57	22501A0459	Katuri Yeswanth	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
58	22501A0460	Katuru Gunadeep	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
59	22501A0461	Kodali Praneetha	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
60	22501A0462	Koka Naga Venkata Sai Dara Baleswar	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
61	22501A0463	Kokku Rupesh Hari Sai	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
62	22501A0464	Kola Durga Gayathri	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
63	22501A0465	Kollipara Sunny	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
64	22501A0466	Kolusu Dhana Sri	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
65	22501A0467	Kolusu Srinivas	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
66	22501A0468	Kommukuri Charan	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
67	22501A0469	Konduri Venkata Naga Sri Guru Sasank	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
68	22501A0471	Koneti Sai Sankar	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
69	22501A0472	Kontam Neela Megha Sai	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
70	22501A0473	Malleboina Harshita	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026

71	22501A0474	Malleboyina Nithesh Babu	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
72	22501A0475	Mallimpalli Jasintha	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
73	22501A0477	Mandapati Praveen Teja	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
74	22501A0478	Manupati Akshaya	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
75	22501A0479	Marella Venkata Satya Aravind	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
76	22501A0480	Marupuru Venkata Hari Chandana	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
77	22501A0481	Mathe Manoj Koti	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
78	22501A0482	Meesala Lahari	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
79	22501A0483	Meduru Rohith Kumar	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
80	22501A0484	Midde Sree Ram	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
81	22501A0485	Mohammad Nahed Ahamed	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
82	22501A0486	Mohammad Sabiha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
83	22501A0487	Moka Naga Raju	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
84	22501A0488	Morla Sunanda	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
85	22501A0489	Munaga Raja Venkata Kamal	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026

86	22501A0490	Murapaka Nanditha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
87	22501A0491	Nariseti Venkata Sai Manikanta	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
88	22501A0492	Nekkanti Sneha Sree	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
89	22501A0493	Nelapati Vyshnavi	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
90	22501A0494	Nelluru Navya Siri	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
91	22501A0495	Nijampatnam Bhavana	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
92	22501A0496	Nirjogi Navya Niroshini	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
93	22501A0497	Nukala Sravya	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
94	22501A0498	Pagolu Sreeha Niveda	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
95	22501A0499	Palli Sravani	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
96	22501A04A0	Pamarthi Vaishnavi	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
97	22501A04A1	Parimi Prakash	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
98	22501A04A2	Pasam Sushma Priya	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
99	22501A04A3	Patnala Lokeswara Satya Sandeep	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
100	22501A04A4	Prathipati Jeevan Kumar	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026

101	22501A04A5	Prekki Satya Vamsi Krishna	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
102	22501A04A6	Puli Varshitha	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
103	22501A04A7	Ramanu Hariprasad	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
104	22501A04A8	Ramayanam Vamsi Krishna	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
105	22501A04A9	Rasineni Bhavesh Kumar	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
106	22501A04B0	Rekapalli Yuvaraj	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
107	22501A04B1	Rupaavath Sai Sri Anish	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
108	22501A04B2	Saggam Anand	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
109	22501A04B4	Shaik Noor Ahmad	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
110	22501A04B5	Shaik Sohail	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
111	22501A04B6	Siddabathula Gayathri	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
112	22501A04B7	Sudani Pragna	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
113	22501A04B8	Sumayya Sultana	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
114	22501A04B9	Sunkireddy Akhilreddy	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
115	22501A04C0	Talari Ysaswini	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026

116	22501A04C1	Thirumalasetti Som Swaroop	APSCHE, Skill Dzire	Artificial Intelligence	15.12.2025 to 31.03.2026
117	22501A04C2	Tummalapalli Himasri	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
118	22501A04C3	Uddagiri Bala Siva Sai Satyanarayana	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
119	22501A04C4	Uma Kureti	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
120	22501A04C5	V S L Lavanya Kompella	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
121	22501A04C6	Vallabhaneni Jaya Usha Sree	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
122	22501A04C7	Vanukuru Manasa	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
123	22501A04C8	Vejendla Sri Venkata Gnaneswar	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
124	22501A04C9	Vemula Varun Babu	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
125	22501A04D0	Vuyyala Sagar	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
126	22501A04D1	Yarajarla Varsha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
127	23505A0401	Bandaru Swarupa	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
128	23505A0402	Bhimala Sanjeevi	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
129	23505A0403	Chintha Jithin Krishna	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
130	23505A0404	Javvadi Thabitha	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026

131	23505A0405	Kailay Santhosh Kumar	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
132	23505A0406	Kakarla Sumanjali	APSCHE, Skill Dzire	Embedded Systems Design	15.12.2025 to 31.03.2026
133	23505A0407	Medanki Sandeesha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
134	23505A0408	Meduri Jahnavi	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
135	23505A0409	Polagani Siva Babu	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
136	23505A0410	Ramavath Janardhan Naik	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.2025 to 31.03.2026
137	23505A0412	Ummadisetty Swarna Latha	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
138	23505A0413	Veeranki Lahari	APSCHE, Skill Dzire	VLSI Design & Chip Architecture	15.12.2025 to 31.03.2026
139	21501A04D1	Yellam Shashi Kiran	APSCHE, Skill Dzire	IoT Systems & Smart Solutions	15.12.202531.03.2026

b) Extra-curricular Activities:

- Mr. B. Siva Sai Krishna** of III ECE is selected as one of the member and shortlisted from District level Vikasit Bharat Youth parliament – 2026 to State level program on 05th march, 2026.



ii. Student Participations:

S.No	Reg. No.	Name of The Student	Year of Study	Name of The Institute	Paper/Poster/Project Contest Held on /At)	Title of The Paper/Poster/Project	Prize Won
1.	23501A0466	L. Yashwanth	III	Siddhartha Academy of Higher Education	20.02.2026 – 21.02.2026	GLIMPSE OF INDIA	Participation
2.	23501A0499	R. Krishna Vamsi	III	Siddhartha Academy of Higher Education	20.02.2026 – 21.02.2026	TECH QUIZ	Participation
3.	23501A0402	Abdul vazeer	III	NRI Institute of Technology	27.02.2026 – 28.02.2026	SUNRISE-2K26	Participation
4.	23501A0425	CH.Harsha	III	PSCMR College of Engineering & Technology, Vijayawada	07.01.2026 – 08.01.2026	Mind Sprint 2K25 36 Hours National Level Hackathon	Participation
5.	23501A0436	G.Abhiram	III	PSCMR College of Engineering & Technology, Vijayawada	07.01.2026 – 08.01.2026	Mind Sprint 2K25 36 Hours National Level Hackathon	Participation
6.	23501A0499	R. Krishna Vamsi	III	PSCMR College of Engineering & Technology, Vijayawada	07.01.2026 – 08.01.2026	Mind Sprint 2K25 36 Hours National Level Hackathon	Participation
7.	23501A0425	CH.Harsha	III	Lakireddy Balireddy College of Engineering	03.01.2026	MEDHA(Quiz)	Participation
8.	23501A0402	Abdul vazeer	III	Lakireddy Balireddy College of Engineering	03.01.2026	Udbhavana	Participation

7. Higher Education

Sl. No.	Reg. No. of the Student	Name of the Student	Year of Study	Name of the Competitive Exam	Score	Date
1	22501A0428	D. Sai balaji Reddy	IV	GATE 2026	422/R8390	15.02.2026
2	22501A0448	K. Vijayendra Prasad	IV	IELTS	6.5	26.03.2026
3	22501A0475	M. Jasintha	IV	GATE 2026	317/R17087	15.02.2026
4	23501A0420	B.Srinivas	III	GATE 2026	325/R16190	15.02.2026
5	23501A0465	A. Lakshmi Vara Priya	III	GATE 2026	373/R11619	15.02.2026

8. Students Contribution

Exploring Future Technologies:

FinFET vs GAAFET

A Simple Review of Advanced Transistor Technologies

Introduction

As transistors become smaller, it becomes difficult to control leakage current and power. Traditional planar MOSFETs face serious short-channel effects at very small sizes. FinFET and GAAFET are advanced transistor structures developed to improve control of the channel.

Short-Channel Effects

When the transistor size becomes very small, unwanted effects increase. These are called short-channel effects.

- Drain-Induced Barrier Lowering (DIBL): A high drain voltage can reduce the barrier near the source and increase leakage current.

- Subthreshold Leakage: Some current flows even when the transistor is supposed to be OFF, causing power loss.
- Gate Oxide Tunneling: At very small dimensions, electrons can pass through the very thin gate dielectric.

FinFET

FinFET is a three-dimensional transistor structure. Instead of using a flat channel, it uses a thin vertical silicon fin. The gate surrounds three sides of the fin. This gives the gate better control over the channel.

Main advantages of FinFET:

- Better control of the transistor channel.
- Lower leakage current.
- Reduced short-channel effects.
- Allows lower supply voltage compared with older planar devices.

Limitations of FinFET at very small sizes:

- The transistor width is limited by the number of fins.
- Leakage can occur near the bottom of the fin.
- Further scaling becomes difficult below the smallest FinFET generations.

GAAFET

GAAFET stands for Gate-All-Around Field-Effect Transistor. It is designed for transistor sizes smaller than those practical for FinFET. In a GAAFET, the gate surrounds the channel on all four sides. Nanosheet or ribbon-shaped channels can be stacked vertically.

Main advantages of GAAFET:

- The gate has very strong control over the channel.
- Leakage current is reduced.
- Short-channel effects are better controlled.
- The channel width can be adjusted more easily by changing the nanosheet width.
- It is suitable for advanced 3 nm and 2 nm-class technology.

FinFET vs GAAFET

Feature	FinFET	GAAFET
Gate control	Gate surrounds 3 sides	Gate surrounds all 4 sides
Channel	Vertical silicon fin	Nanosheet / ribbon
Leakage control	Good	Better

Width adjustment	Limited by number of fins	Can be adjusted by sheet width
Scaling	Difficult at very small sizes	Designed for advanced nodes
Main benefit	Good performance and control	Very strong electrostatic control

GAAFET Manufacturing – Simple Steps

1. Grow alternating silicon and silicon-germanium layers.
2. Pattern the layers to form the transistor structure.
3. Remove the sacrificial silicon-germanium layers to create suspended silicon nanosheets.
4. Deposit the gate dielectric and metal around the nanosheets.
5. Complete the transistor connections and integration.

Industry Examples

- Samsung uses GAAFET technology under the name MBCFET.
- Intel uses its RibbonFET architecture for advanced process technology.
- TSMC is moving from FinFET to nanosheet GAAFET technology for its advanced nodes.

Conclusion

FinFET improved transistor control by using a gate around three sides of a vertical fin. GAAFET goes one step further by surrounding the channel on all four sides. Therefore, GAAFET provides better control and is more suitable for very small transistor technologies.

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23501A04A4

Neuromorphic Computing & Spiking Neural Networks

Simple Review of Brain-Inspired VLSI, In-Memory Computing and Memristive Hardware

1. Overcoming the Von Neumann Memory Wall

Theory

In a conventional computer, the processor (CPU/GPU) and memory (DRAM/SRAM) are separate. During AI calculations, data and weights have to move repeatedly between memory and the processor. This movement takes time and uses a lot of power. This problem is called the Von Neumann bottleneck.

Simple Explanation

Neuromorphic computing is designed like the human brain. In the brain, memory and processing are closely connected. Neuromorphic systems use small electrical pulses called spikes and process information only when an event occurs. This can reduce unnecessary power use.

Main Features

- Memory and processing are placed close together.
- Computing happens mainly when a spike or event is received.
- The system can operate with very low power.

Neuron Model – Leaky Integrate-and-Fire (LIF)

The LIF model describes how a neuron collects input current and produces a spike when its voltage reaches a threshold.

$$C_m \frac{dV(t)}{dt} = -(V(t) - V_{rest})/R_m + I_{syn}(t)$$

When $V(t)$ reaches the threshold voltage V_{thres} , the neuron produces an output spike.

2. Memristive In-Memory Crossbar Architecture

Theory

In-memory computing performs calculations inside the memory itself. Memristors store the weights and also help perform multiplication and addition.

Simple Explanation

Input spike voltages are applied to the rows of a memristor crossbar. The conductance of each memristor represents a synaptic weight. The currents in the columns are added together, giving the result of the matrix calculation without moving the weights to another memory.

Basic Calculation

Ohm's Law: $I = V \times G$

Total current: $I_{\text{total}} = \sum(V_i \times G_i)$

This allows matrix-vector multiplication to be performed directly in the memory array.

New Concept – 3D Memristive Integration

In advanced designs, RRAM or PCM memory devices can be placed in layers above silicon logic. This 3D approach can provide very high memory and synapse density.

3. Spike-Timing-Dependent Plasticity (STDP)

Theory

STDP is a learning method inspired by the brain. It changes the strength of a connection between two neurons depending on the timing of their spikes.

Simple Explanation

If the input neuron fires just before the output neuron, the connection becomes stronger. If the input neuron fires after the output neuron, the connection becomes weaker.

New Concept – On-Chip Learning

STDP can be implemented directly in hardware. This allows an edge device to learn from its surroundings without sending all the data to a cloud server for retraining.

4. Hardware Architecture Comparison

Different computing architectures have different advantages in terms of speed, power consumption and memory use.

Parameter	Von Neumann (CPU/GPU)	Systolic Array (TPU/NPU)	Neuromorphic SNN Core
Computing	Clock-driven	Synchronous matrix processing	Event-driven / asynchronous
Memory and Processing	Separate	Local SRAM buffers	Closely connected / in-memory
Power	High	Moderate	Very low
Information	FP32 / FP16	INT8 / INT4	Spikes and timing
Learning	Offline retraining	Offline retraining	Local learning using STDP

5. Industry Implementations and Edge Applications

Examples

- Intel Loihi 2: A neuromorphic processor designed for spiking neural networks and low-power AI.
- IBM TrueNorth: A neuromorphic chip designed to process information using spiking neurons with low power consumption.
- Event-Based Vision: Dynamic Vision Sensors (DVS) detect changes in a scene and can work with neuromorphic processors for fast response.

Future Applications

Neuromorphic processors, memristive memory and event-based sensors can be combined to build low-power edge devices. Possible applications include autonomous robots, drones, wearable devices and biomedical monitoring systems.

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