INNOVATIVE TEACHING LEARNING

Classroom teaching:

The course delivery by the faculty is performed by implementing the following methodologies like

1) Active Learning
2) Collaborative Learning
3) Co-operative Learning/Flipped learning
4) Peer Led Team Learning
5) Experimental Learning
6) Project Based Learning
7) Chalk and talk - green/black board.
8) Animated videos
9) Case studies/Real world examples for application-based courses.
10) Use of Open-Source Software's like Multisim, P-SPICE etc.

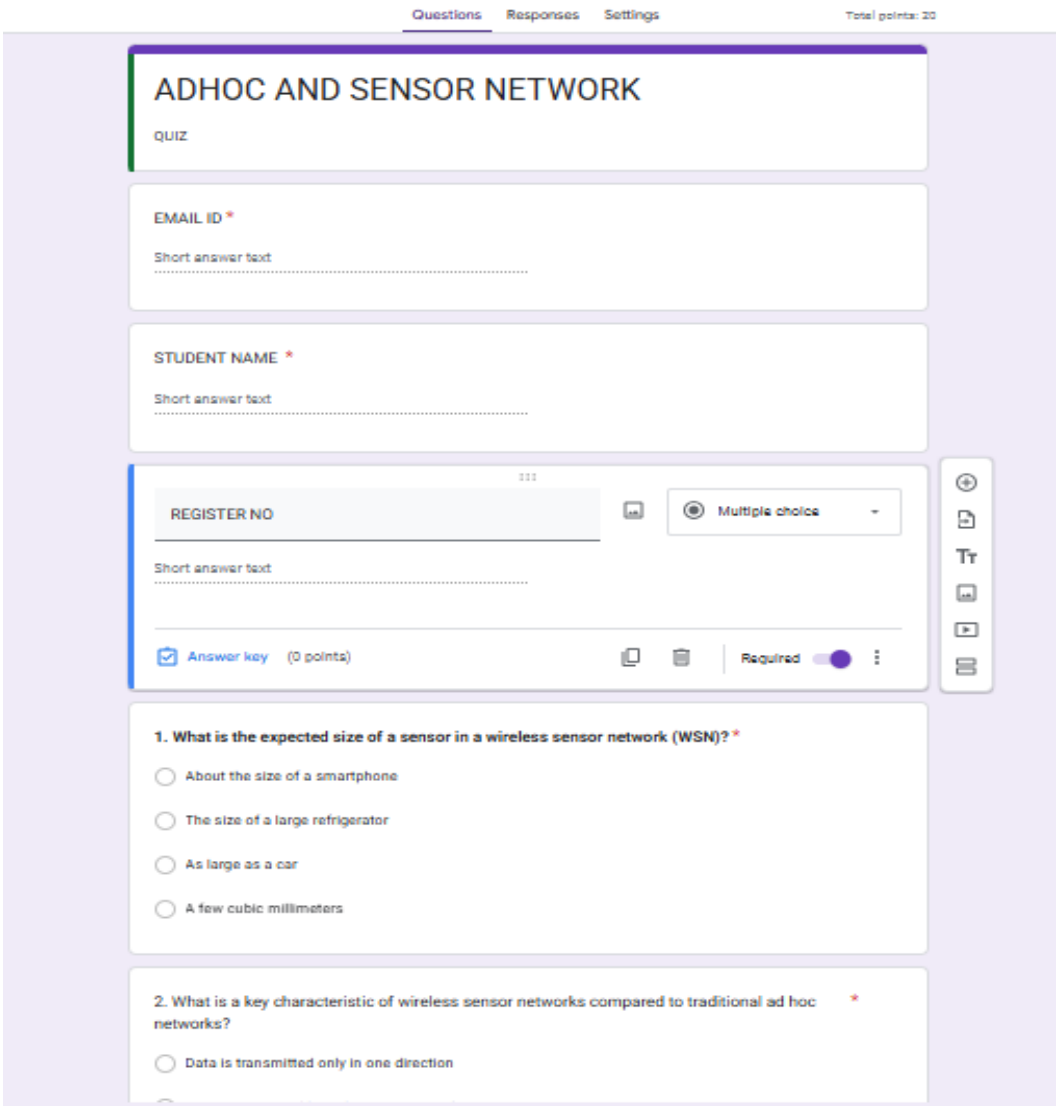
Apart from the above said learning methodologies, students also enhance their knowledge through

- Guest Lectures
- Industrial visits etc.

1) Active learning:

The faculties adopted an active learning methodology by involving students in the learning process more directly using activities like:

- Brainstorming, quiz, debate, group discussions, role play, games, model making, mini project, presentations, essay, elocutions, case studies and simulations on technical content. Replacing some lectures with animated PPTs.
- Hands-on experiences.
- Challenging students to take up open ended problems requiring critical/creative thinking. Short pauses for reflection during lectures, brief demonstration.



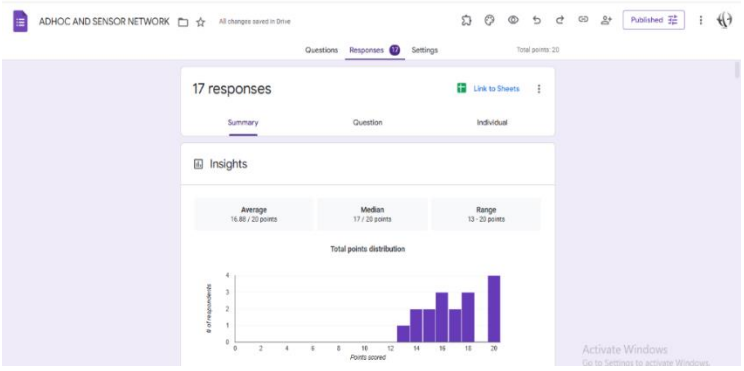


Fig 2.1.4 Online Quiz

2. Collaborative Learning:

This is implemented by forming student teams working jointly to solve a problem, complete a task/project, participate in debates or design a product.

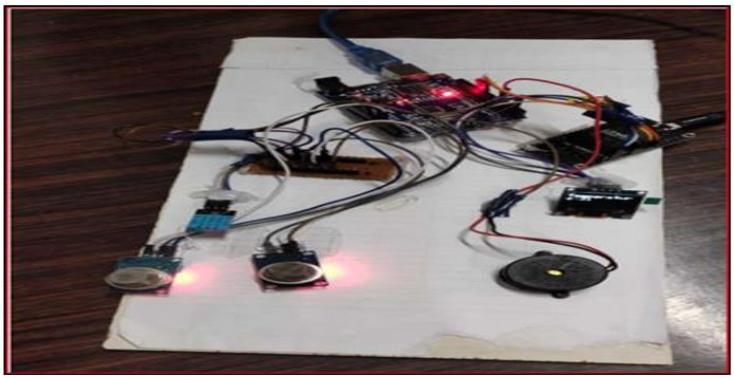


Fig 2.1.5: Working model of IoT

Fig 2.1.6: Street Light Controller

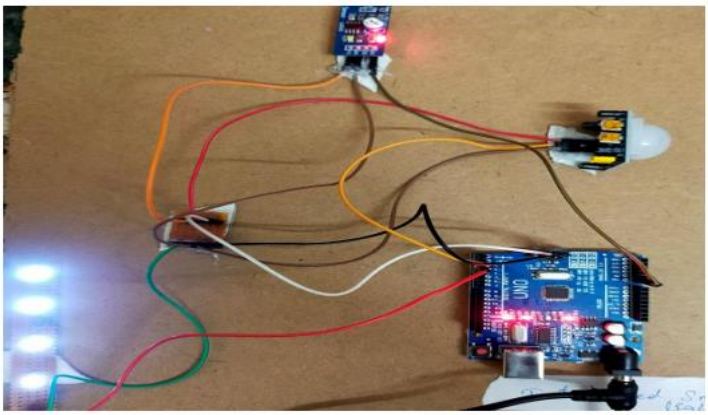


Fig 2.1.7: Automation Night Lighting System

The following table implies the working model implemented by the students during the academic year 2024-2025.

S.NO	COURSE CODE	COURSE NAME	TOPIC	TEAM MEMBERS
1	U20EC503	Processors And Controllers	Street Light Controller	Akash D Hari Prasath M Hariharan M
2	U20EC401	Analog Integrated Circuits	Mini Rechargeable Power Supply	Akash A Abishake R Jeffrin J Manibarathi
3	U20EC304	Electrical Engineering And Control Systems	Automatic Solar Tracker Using Arduino	Dinesh Kumar S Jagan Raj J Maha Ganesh V
4	U20EC602	VLSI Circuits And Cad Design	Wearable Women Safety Bracelet Using IoT	V.Manokanisha M.Srimathi S.Varsha
5	U20EC302	Electronic Circuits	Automation Night Lighting System	S.Praveen Kumar M.Vignesh A.Amsathkhan S.Pasapriyan

Table 2.1.1 Collaborative Learning

3. Cooperative Learning:

The department also focuses on cooperative learning methodologies. Students work together to maximize their own and each other's learning capabilities within the student chapters and also while performing various activities like think-pair-share, round table techniques, etc.

Fig 2.1.8 Students Activities

Fig 2.1.9: Analog Circuit Analysis

Fig 2.1.10: Optical illusions

S.NO	TOPIC	ACTIVITY	COURSE CODE/COURSE NAME	TEAM MEMBERS
1	Think-Pair-Share Challenge	Students think individually, pair up to discuss, then share ideas with the class.	U23ECT41 / Communication Systems	Gowri S Dhivya Dharshini A Elakkiya A
2	Jigsaw Experts	Each student studies a section of the topic and teaches it to their group members.	U23ECT42/Linear Integrated Circuits	Kaviyarasan M Kavya M Keerthana P Kesavan M
3	Puzzle Pieces	Groups receive different parts of a problem or case	U20EC703/Fiber Optic	Aadhithyan R Abdulkader Nafeel S Abishekraj B

		study and must collaborate to solve it.	Communication and Networks	Abivarman M
4	Team Quest	Groups work through a set of tasks or questions, earning points for correct answers.	U20EC603/Image and Video Processing	Sona R Sophiya E Srimathi M Suruthika S

Table 2.1.2: Activities performed by students for Cooperative learning

4. Peer Led Team Learning:

Institute provides an environment for students to engage in intellectual discussions and work in team for problem-solving under the guidance of a peer leader to perform various activities.

Fig 2.1.11 Technical Talk

Fig 2.1.12 Explain and Explore

Fig 2.1.13 Concept Coaches

Fig 2.1.14: Peer-Led Case Study Crunch

S.NO	TOPIC	ACTIVITY	COURSE CODE/COURSE NAME	TEAM MEMBERS
1	Concept Coaches	Circuit Cipher and Name the Circuit	U23ECT42 / Linear Integrated Circuits	Gayathri E.S Dhinesh R Eswarraj A
3	Explain and Explore	Students explain ideas to teammates, helping deepen understanding and clarify confusion.	U20EC604 /Satellite Communication and Remote Sensing	Ijean S N Kulandhai Mani R Lingeshwaran R
4	Peer-Led Case Study Crunch	Teams analyse real-world cases collaboratively under the guidance of a peer leader.	U23ECT41 / Communication Systems	Lakshitha I G Lavanya M Mahalakshmi M
5	SEP	Technical Talk	U23ECT44/Networks and Security	Mr.P.Prasath

Table 2.1.3: Activities performed by students for Peer-Led learning

5. Experimental learning:

Field based experiential learning like Internship, Workshops, Service learning and class based experiential learning like role plays, games, case studies, simulation, virtual lab, presentations are practiced for students. We also implement Experimental learning through laboratory sessions. Per lab session Two experiments are conducted for students. Our Institute have tie up with NIT, Surathkal through which Virtual lab experiments are implemented which provides interactive simulation environments and also prepare students for remote experimentation by simulating equipment operation.

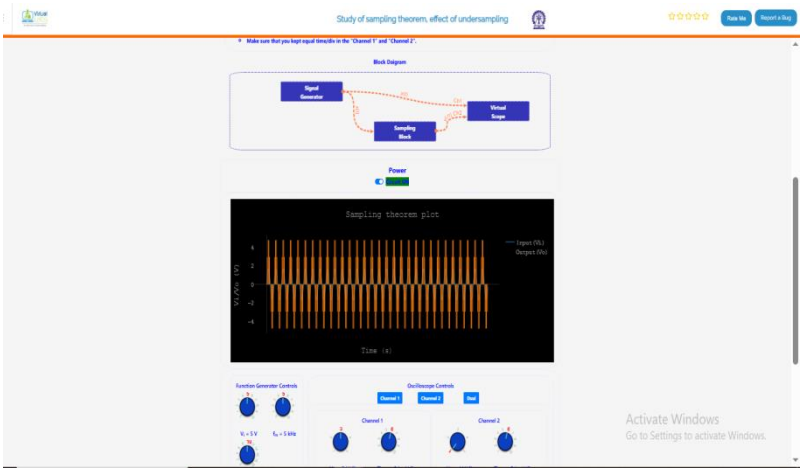


Fig 2.1.15 Experimental Learning through Virtual Lab

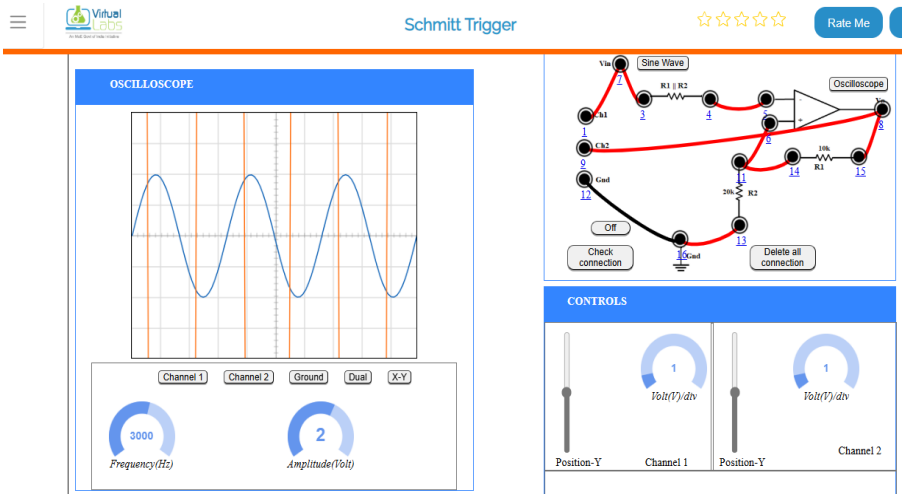


Fig 2.1.16 Schmitt Trigger

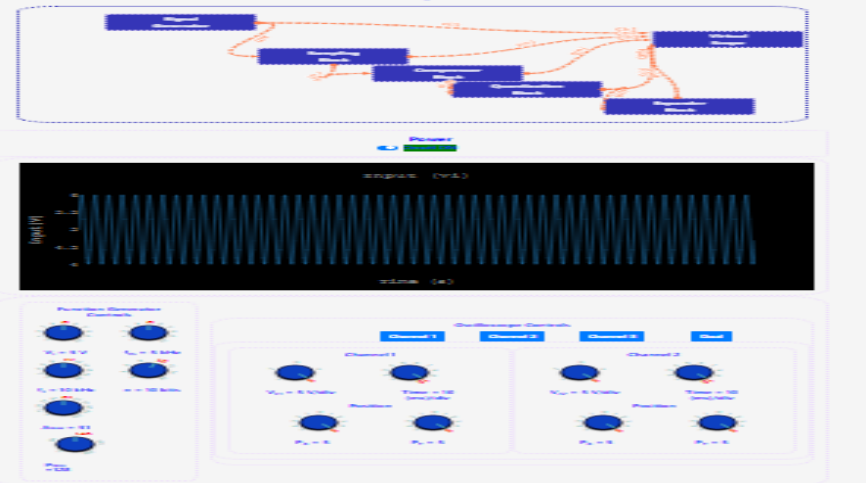


Fig 2.1.17: Companding Technique

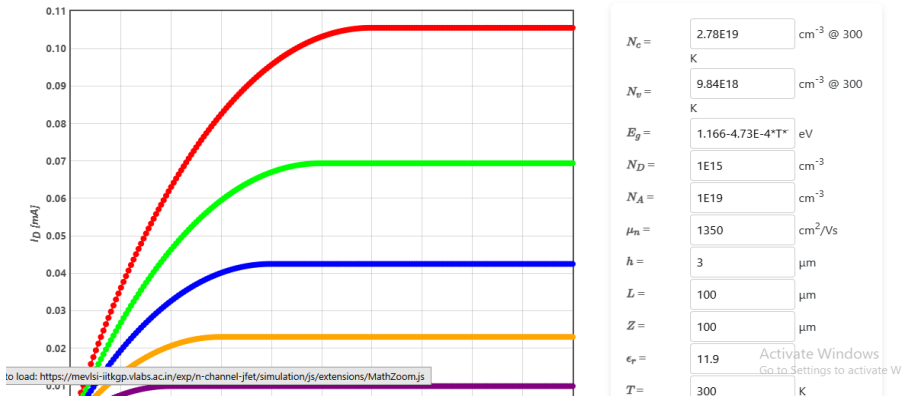


Fig 2.1.18: Output Characteristics of n-channel JFET

S.NO	COURSE CODE	COURSE NAME	EXPERIMENTS CONDUCTED THROUGH VIRTUAL LAB	LINK
1	U23ECP41	Communication Systems Laboratory	Amplitude Modulation	https://tinyurl.com/k4tue7he
2	U23ECP42	Linear Integrated Circuits Laboratory	Schmitt Trigger	https://tinyurl.com/j36642sb
3	U20EC507	Signal Processing and Networking Laboratory	Companding Technique	https://tinyurl.com/y99sydt5

4	U20EC606	VLSI Laboratory	JFET	https://tinyurl.com/m6hsrth7

Table 2.1.4: Details of virtual lab experiments

6. Project based learning:

One of the notable recent pedagogical advancements undertaken by the department is the adoption of **Project-Based Learning (PBL)**. This instructional methodology employs a dynamic, student-centered classroom approach, enabling students to gain a deeper understanding of theoretical concepts while simultaneously enhancing their practical competencies.

By engaging the students in projects that address real-world challenges, students are encouraged to extend and apply their engineering knowledge toward developing innovative solutions. Students are encouraged to carry out mini projects to apply their engineering knowledge from fifth semester onwards till seventh semester. Each student must take up mini project based on the core subject they learn in the current semester with help of faculty mentor. At the end of each semester projects are evaluated by the External Experts.

Sample project executed by the student during the academic year **2024–25** is given below:

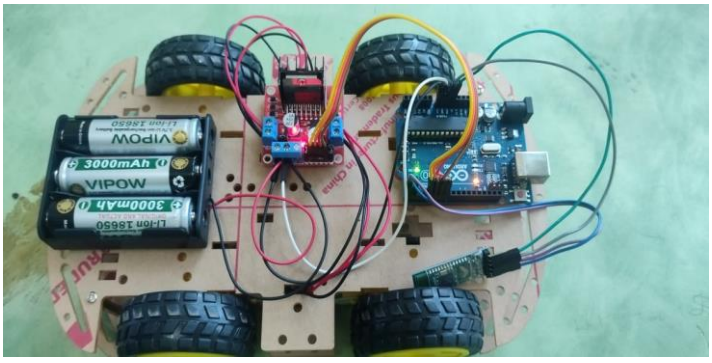


Fig 2.1.19 Project Model of Bluetooth Controlled car

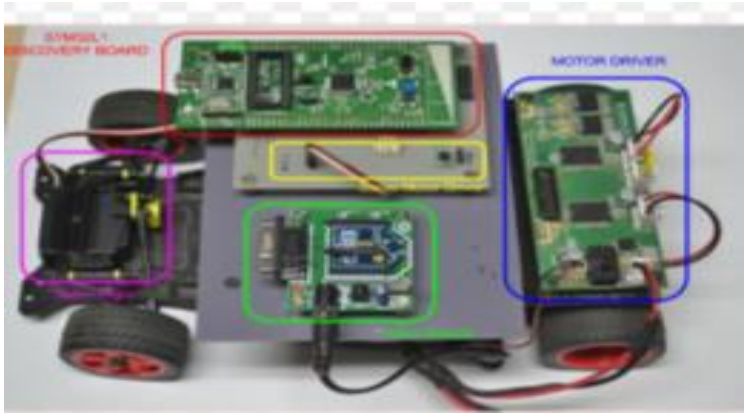


Fig 2.1.20: RFID-Based Embedded Robot Car for Human Tracking

A team of 3 to 5 students works cohesively on a project/problem under the guidance of a mentor.

S.No	Project Title	Team Members
1	Intelligent Wireless Power Transfer System For Electric Vehicles Using AI	Sivaranjani S Sri Devikala B Swetha P Yogeshwari P
2	"A Gain-Enhanced Patch Antenna With A Periodic Microstrip Rampart Line"	Sanjai T Sarathy K Srikanth S Manikandan L
3	RFID-Based Embedded Robot Car For Human Tracking	Rajamohan S Saffiyulla D Sanjeev S
4	"Stepped Impedance Microstrip Low Pass Filter For 6 Ghz Microwave Applications"	Pragatheeshwaran S Subash S Surya S Praveen Kumar L
5	Aadvanced AI Humanoid Epigenetics Nanobot	Raja Rohit Kumar Sah Suthin Krishna Ps Pailayaswanth Kumar Kathiravan

Table 2.1.5: Project details performed by students