SHRI GOVINDRAM SEKSARIA INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING
Minutes of BoS Meeting

Date: 03/02/2026

The meeting of members of Board of Studies was held in hybrid mode on 03/02/2026, (Tuesday) in the departmental conference room at 12 Noon. The following members were present,

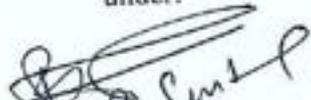| S.No	Members name	Designation
1	Dr. R.C. Gurjar	HOD & BoS (Chairman)
2	Prof. Ravi Sindal	Expert- outside Parent University Professor – IET – DAVV, Indore
3	Prof. Santosh Vishvakarma	Expert- outside Parent University Professor - IIT Indore
4	Dr. Mahendra Sakare	Expert- Alumni Assistant Professor – IIT Ropar
5	Dr Lalit Purohit	Dean (ARSD)- Special Invitee
5	Dr. P.P.Bansod	Member
6	Dr. Rajesh Khatri	Member
7	Mr. D.S. Ajnar	Member
8	Dr. G.G. Soni	Member
9	Ms. Tarni Joshi	Special Invitee
10	Ms. Kirti Bhargava	Special Invitee
11	Ms. Deepali Choudhary	Special Invitee
12	Ms. Arpita Kadel	Special Invitee
13	Ms. Neha Jadon	Special Invitee
14	Ms. Disha Sharma	Special Invitee
15	Dr. Sanchita Dass	Special Invitee
16	Ms. Neha Arya	Special Invitee
17	Ms. Bindu Solanki	Special Invitee
18	Students Members (8 students)	Special Invitee

Dr. C. C. Tripathi (External Expert-Director NITTR, Bhopal) & Mr. Rajat Pashine (Industry Expert) could not able to attend the meeting. Dr Santosh K. Vishwakarma & Dr Mahendra Sakare attended the meeting online via Google meet.
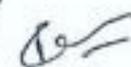
The eight student members from 1st year to 4th year (two from each year) also attended the meeting.
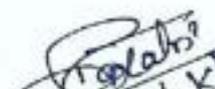
The deliberations of the meeting are as follows:

1. The Vision & Mission statements of the department are discussed & revised in alignment of recently adopted vision & mission of the institute. The revised statements are given in Annexure-I.
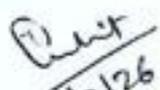
2. In Scheme of B.Tech- III Year –VI semester (w.e.f. Jan-June 2026 i.e. current session), the following two electives are included under Program elective IV. The two new electives added are under:

i) **Robotics & Drone Technology (6th semester)**
ii) **Verification using system Verilog (6th semester)**

The following changes are also recommended in scheme of B.Tech III Year, (VI semester w.e.f. Jan-June 2026):

i) Microcontroller & Embedded System of B.Tech III Year/ VI semester is replaced by **Embedded System Design**. This will be effective from Jan-June 2026 i.e. current session.

ii) The microprocessor system (EI37016) of B.Tech III Year/ V semester will be replaced by Microprocessor & Microcontroller (EI37xxx) for 2024 admitted students w.e.f. July-Dec 2026. (refer Annexure-II)

3. As there is change in scheme of III year, the old students (Few RR students) will be offered the new scheme with equivalent subjects (as given in Annexure-III Scheme for 2022 admitted). However the students of IV year, Sem B (RR and BA group) will be offered the subjects as per the old scheme. (refer Annexure-III)

Subjects as per old scheme (2022 admitted)- 3rd year/6th semester	Equivalent Subjects in current semester (2023 admitted)- 3rd year/6th semester
Filter Design & Simulation	Digital Signal Processing
Microcontroller & Embedded System Design	Embedded System Design
Elective-Mobile Communication	(i) Robotics & Drone Technology (ii) Verification Using System Verilog

4. Minor changes (10- 15%) are proposed in the syllabus of following subjects (w.e.f Jan June 2026):

Subject Code/Name	Year/Semester
Analog Electronics	B.Tech IV Sem
Sensors & Transducers	B.Tech IV Sem
Smart Sensors	B.Tech V Sem
CMOS VLSI Design	B.Tech V Sem
VLSI Technology	B.Tech VII Sem
Fiber Optics & Photonics	B.Tech VII Sem
Automation In Instrumentation	B.Tech VII Sem

5. As per the discussion in HOD meeting held on 22 Jan 2026, the scheme for UG B.Tech. (2025 admitted students) is also aligned with uniform scheme across all branches.

- The mathematics-IV in IV semester is proposed to be discontinued for 2025 admitted students and will be effective from 2026. However, few contents of mathematics-IV are proposed to be included in mathematics-III. The chairman BoS (Mathematics Dept.) is requested to make changes in mathematics-III and propose new nomenclature in the upcoming BoS.

- The scheme proposed by Dean ARSD for VIII semester, contains Internship Evaluation with sessional marks of 300 Marks (No end semester exam). The BoS recommends the scheme with SW & Practical. The revised scheme is attached in Annexure-IV & changes in the scheme proposed are pointed.

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6. There is no change in scheme of M.Tech (Microelectronics & VLSI design) for Jan June 2026, however the titles of Lab-I to IV are revised without affecting the contents w.e.f July Dec 2026 as given in Annexure-V.

Old scheme course name	New course name
LAB-I (CAD Tool Design I)	Lab-I: FPGA Based Digital Design
LAB-II (CAD Tool Design II)	Lab-II: CMOS Digital IC Design
LAB-III (VLSI Design Lab-I)	Lab-III: VLSI testing & Verification
LAB-IV (VLSI Design Lab-II)	Lab-IV: Analog & RF IC Design

7. Minor changes in syllabus of the subject Semiconductor Device & Process Modelling (EI69015) were made. They were approved by BoS members.(Annexure-VI)

8. The Students members suggested the contents of mathematics subject as per the requirement of GATE. Students were asked to submit the contents of Mathematics1, 2, 3 as per the need to chairman BoS.

The meeting ended with vote of thanks to all members of their valuable suggestions and time.

S.No.	Name	Signature
1	Dr. R.C. Gurjar	
2	Dr. Ravi Sindal	
3	Dr Santosh Vishwakarma	Attended in Online Mode
4	Dr Mahendra Sakare	Attended in Online Mode
5	Dr Lalit Purohit	3/2/26
6	Dr. P.P.Bansod	3/2/26
7	Dr. Rajesh Khatri	
8	Mr. D.S. Ajnar	
9	Dr. G.G. Soni	
10	Ms. Tarni Joshi	3/2
11	Ms. Kirti Bhargava	3/2/26
12	Ms. Deepali Choudhary	05/02
13.	Ms. Arpita Kadel	05/02/26
14	Ms. Neha Jadon	05/02/26
15	Ms. Disha Sharma	3/2/26
16	Dr. Sanchita Dass	3/2/26
17	Ms. Neha Arya	5/2/26
18	Ms. Bindu Solanki	
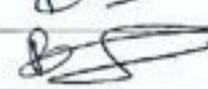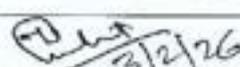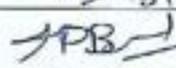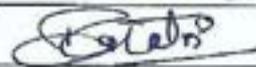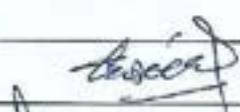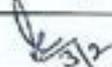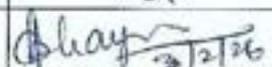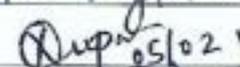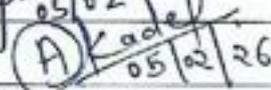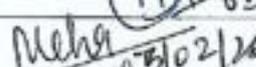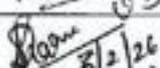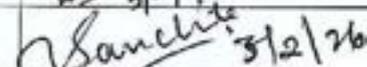
Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
B.Tech (Applicable to 2023-24 Enrolled Students)
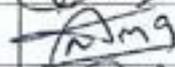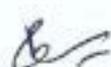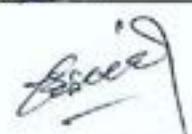
w.e.f July 2025

Batch 2023-2027(NEP-2020)

III Year / Semester-V

Academic Year :2025-26

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits		Maximum Marks				Total
				L	T	P	Th	Pr	Theory		Practical		
									End sem	CW	Pr	SW	
1	PCC	IT37005	Data Structure	3	-	-	3	-	70	30	-	-	100
2	PCC	EI37006	Microprocessor Systems	3	-	-	3	-	70	30	-	-	100
3	PCC	EI37007	CMOS VLSI Design	3	-	-	3	-	70	30	-	-	100
4	PEC		Program Elective Course-I	3	-	-	3	-	70	30	-	-	100
5	OEC		Program Elective Course-II	3	-	-	3	-	70	30	-	-	100
6	LC(IT)	IT37xxx	Data Structure (Lab)	-	-	2	-	1	-	-	60	40	100
7	LC(EI)	EI37xxx	Microprocessor Systems (Lab)	-	-	2	-	1	-	-	60	40	100
8	LC(EI)	EI37xxx	CMOS VLSI Design (Lab)	-	-	2	-	1	-	-	60	40	100
9	LC(EI)	EI37481	Test & Calibration (Lab)	-	-	2	-	1	-	-	60	40	100
10	PROJ	EI37482	Internship-I (Evaluation)	-	-	2	-	1	-	-	-	50	50
11	HSMC	HUM3702	Constitution of India*	2	-	-	-	-	-	50	-	-	50
			Total	17	0	10	15	5	350	200	240	210	1000

*Non-credit mandatory subject

III Year/ Semster-VI

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits		Maximum Marks				Total
				L	T	P	Th	Pr	Theory		Practical		
									End sem	CW	Pr	SW	
1	PCC	EI37xxx	Digital Signal Processing	3	-	-	3	-	70	30	-	-	100
2	PCC	EI37504	Embedded System Design	3	-	-	3	-	70	30	-	-	100
3	PCC	EE37505	Control Systems	3	-	-	3	-	70	30	-	-	100
4	PEC		Program Elective Course-III	3	-	-	3	-	70	30	-	-	100
5	OEC		Program Elective Course-IV	3	-	-	3	-	70	30	-	-	100
6	LC (EI)	EI37xxx	Digital Signal Processing (Lab)	-	-	2	-	1	-	-	60	40	100
7	LC (EE)	EExxx	Control Systems (Lab)	-	-	2	-	1	-	-	60	40	100
8	PEC-LC (EI)	EIxxx	Embedded System Design (lab)	-	-	2	-	1	-	-	60	40	100
9	PROJ	EIxxx	Major Project Phase-1	-	-	4	-	2	-	-	60	40	100
10	HSMC	HUMxxx	Essence of Indian Knowledge Tradition*	2	-	-	-	-	-	50	-	-	50
11	PROJ	Internship-II		Minimum 4-6 weeks-during vacation. Evaluation & Credit in VII Semester									
			TOTAL	17	0	10	15	5	350	200	240	160	950

*Non-credit mandatory subject

Vocational Degree in Electronics & Instrumentation Engg. will be awarded after acquiring additional 10 credits out of which 6 credits as 3 months industrial training within 5 years.

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		Program Elective-I (5th Semester)
1	EC37254	Analog & Digital Communication
2	EI37255	Smart Sensors
3	EI37256	Peripherals & Interfacing

		Program Elective-III
1	EI37703	High Frequency Engineering
2	EI37xxx	Analog Integrated Circuits
3	EI37704	Analytical Instrumentation

		Program Elective-II (5th Semester)
1	IP37251	Industrial Engineering & Management
2	CO37253	Artificial Intelligence
	EI3N003	(NPTEL) Fundamentals of Artificial Intelligence
	EI3N004	(NPTEL)Artificial Intelligence -"Search Methods for Problem Solving"

		Program Elective-IV
1	EC 37726	Mobile Communication
2	EI37xxx	Robotics & Drone Technology
3	EI37xxx	Verification using System Verilog

The Department will offer following Open Electives

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits		Maximum Marks				
				L	T	P	Th	Pr	Theory		Practical		Total
									End ser	CW	Pr	SW	
1	OE-I	EI37xxx	Digital Design Using HDLs	2	1	-	3	-	70	30	-	-	100

Open Elective-II (VI Semester)

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits		Maximum Marks				
				L	T	P	Th	Pr	Theory		Practical		Total
									End ser	CW	Pr	SW	
1	OE-II	EI37xxx	VLSI Test & Testability	2	1	-	3	-	70	30	-	-	100

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Shri Govindram Seksaria Institute of Technology and Science
Department of Electronics and Instrumentation Engineering
B. Tech. III Year SEM-B (4-YDC)
EI xxx Embedded System Design

HOURS PER WEEK			CREDITS			MAX. MARKS				
T	P	TU	T	P	TU	THEORY		PRACTICAL		TOTAL MARKS
3	2		3	1		CW	END SEM	SW	END SEM	
						30	70	40	60	100

PRE-REQUISITE: Digital Electronics, Microprocessor System

COURSE OBJECTIVES:
This course focuses to develop skills to use embedded system for specific tasks to excel in real-time performance, resource utilization and reliability in wide array of devices and simple applications. It will also enable them to use open-source embedded system for solving real time problems.

THEORY:

COURSE OUTCOMES:
On completion of course students will be able to achieve & demonstrate:
CO1: Classify embedded systems based on design, scale and application domain
CO2: Compare various microcontrollers (family) for different applications.
CO3: Interpret the communication standards of embedded systems.
CO4: Analyze the features of Real Time Operating System.
CO5: Develop the basic applications using Arduino/ Raspberry Pi

Unit - I Introduction to Embedded Systems
Embedded system description, layered model, classification & characteristics of embedded systems, types of embedded system, selection criteria of embedded systems, design process & design cycle, life cycle models- waterfall, V model, Spiral & rapid prototyping.

Unit - II Microcontroller Architecture
RISC & CISC architecture, ARM, features and applications, , microcontroller types, review of 8051/8251 microcontroller, PIC 16 series overview, PIC16F84A architecture, memory, timing, ports, oscillators, AVR microcontroller, types ATmega family: features, internal architecture & programming configurations, comparison of ATmega family.

Unit - III Communication Standards and Protocols
Modes of communication: serial, parallel, synchronous and asynchronous, communication protocols its types- Ethernet, Serial: I2C, CAN, USB, Serial peripheral interface (SPI), Wireless protocol: IrDA, Bluetooth, Zigbee, WiFi, LORA, LoWPAN, MQTT

Unit - IV Real Time Operating System
Operating system: general and real time operating system, characteristics of real time, operating system, functions of RTOS, task management: inter task communication and multitasking, scheduling types, scheduling algorithms- round robin, EDF, RMS, resource allocation and interrupt handling. Features of RTOS: watchdog timer, semaphore, deadlock: reasons of occurrence,

handling of deadlock

Unit - V I/O Interfacing with Arduino/ Raspberry Pi

Introduction to arduino, types-Arduino UNO, NANO, MEGA, functional block of Arduino, pin functions, analog I/O, digital I/O, timer. Raspberry pi architecture, functionality, GPIO, protocol pins, peripheral interfacing with Arduino & Raspberry Pi-keyboard, LCD, seven segment LED, relay, stepper motor, DC motor, Sensor interfacing with Arduino & pi.

TEXT BOOKS:

1. Muhamed Ali Mazidi, Sarmad Naimi, Sepehr Naimi, "AVR Microcontroller and Embedded Systems: Using Assembly and C", Pearson Education India, Delhi, 2013
2. David E. Simon, "An Embedded Software Primer, Addison-Wesley, Delhi, 2002
3. Tim Wilmshurst, "Designing Embedded Systems with PIC Microcontrollers Principles and applications", Elsevier

REFERENCE BOOKS:

1. K. V. K. K. Prasad, "Embedded Real –Time Systems concepts, Design & Programming Black Book, Dreamtech Press New Delhi, 2003
2. Michael McRoberts, Beginning Arduino, APRESS, 2011
3. Jeremy Blum, "Exploring Arduino Tools and Techniques for Engineering Wizardry", John Wiley & Sons, 2019

CO-PO Matrix for Theory

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	1								2	3		
CO2	3	2	2	1								2	3		
CO3	3	3	2	1								2	3		
CO4	3	2	1	1								2	3		
CO5	3	3	2	1	3	2						2	3		
Avg.	3	2.6	1.6	1	0.6	0.4						2	3		

ASSESMENT: Mid sem tests, end sem exam, assignments/quiz

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LABORATORY:

OBJECTIVES: After completion of lab course the students will be able to:
Demonstrate the use of microcontrollers for various applications and to interface basic components/ sensors on embedded platforms. This course enable students to test the designed circuits on simulation platforms used for microcontrollers.

LABORATORY OUTCOMES:
1. Demonstrate various instructions and application for Intel 8 bit microcontroller using Keil & Proteous.
2. Implement and verify peripheral interfacing with AVR microcontrollers using Atmel Studio, demonstrating correct operation through experimentation.
3. Configure and interface various sensors and electronic modules with an Arduino board and verify their operation through experimentation.
4. Design & Develop sensing & interfacing circuits using Raspberry Pi.
5. Communicate technical content related to microcontrollers, sensors and interfacing by preparing clear and well-structured lab reports.

LIST OF EXPRIMENTS:
1. Demonstration of Arithmetic, logical operations of 8051 microcontroller on Keil.
2. Demonstrate Use of 8051 microcontroller for generating square wave of a given frequency.
3. Interfacing LED with ATmega 32 and demonstrate on Atmel Studio.
4. Design Interfacing circuit for ATmega 32 to read switches connected at port D and output the content on LEDs connected to port B.
5. Demonstrate the use of Arduino board, its components, installation of IDE and Setup LED blinking program.
6. Setup LED blinking using Raspberry pi.
7. Interface temperature sensor with Arduino.
8. Interface LCD with Arduino.
9. Interface stepper motor and control its speed using Arduino.
10. Interface temperature sensor and display on LCD using Raspberry Pi.

ASSESMENT:

CO-PO Articulation Matrix for LAB

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	1		3				2			1	3		
CO2	3	3	3	1	3	2	1		2			3	3		
CO3	3	3	3	2	3	3	1		2			3	3		
CO4	3	3	3	2	3	3	1		2			3	3		
CO5	1									3		3			
Avg.	2.6	2.2	2	1	2.4	1.6	0.6		1.6	0.6		2.6	2.4		

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Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
B.Tech (Applicable to 2022-23 Enrolled Students)

Batch : 2022-2026
Academic Year 2024-25

III Year/ V Sem

| S.no. | Category | Subject Code | Subject Name | Period/Week | | | Maximum Marks | | | | Credits | | Total | Total Marks |
| | | | | L | T | P | Theory | | Practical | | T | P | | |
							End Sem	CW	End Sem	SW				
1	DC-8	IT37005	Data Structure	3		2	70	30	60	40	3	1	4	200
2	DC-9	EI37006	Microprocessor Systems	3		2	70	30	60	40	3	1	4	200
3	DC-10	EI37007	CMOS VLSI Design	3		2	70	30	60	40	3	1	4	200
4	OEC-I		Open Elective-1	3			70	30			3		3	100
5	PEC-1		Program Elective -I	3			70	30			3		3	100
6	DLC-3	EI37481	Test & Calibration			4			60	40		2	2	100
7	MC-3	HUM3702	Constitution of India	2				50						50
8	DLC-4	EI37482	Internship-1 (Evalution)			4				50		2	2	50
			Total	17	0	14	350	200	240	210	15	7	22	1000

III Year/ VI Sem

| S.no. | Category | Subject Code | Subject Name | Period/Week | | | Maximum Marks | | | | Credits | | Total | Total Marks |
| | | | | L | T | P | Theory | | Practical | | T | P | | |
							End Sem	CW	End Sem	SW				
1	DC-11	EI37511	Filter Design & Simulation	3		2	70	30	60	40	3	1	4	200
2	DC-12	EI37504	Microcontroller & Embedded System	3		2	70	30	60	40	3	1	4	200
3	DC-13	EE37505	Control System	3		2	70	30	60	40	3	1	4	200
4	OEC-II		Open Elective-II	3			70	30			3		3	100
5	PEC-II		Program Elective-II	3			70	30			3		3	100
6	DLC-5	EI37991	Mini Project			4			60	40		2	2	100
			Total	15	0	10	350	150	240	160	15	5	20	900

Internship-II To be completed any time during V/VI semester. Its evaluation/credits to be added in Semester VII(Minimum 4 Weeks Duration)

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List of Electives for 5th & 6th Semester

Program Elective-I

1	EC37254	Analog & Digital Communication
2	EI37255	Smart Sensors
3	EIxxx	Peripherals & Interfacing

Program Elective-II

1	EI37703	High Frequency Engineering
2	EI37xxx	Analog Integrated Circuits
3	EI37704	Analytical Instrumentation

Open Elective-I

1	IP37251	Industrial Engineering & Management
2	CO37253	Artificial Intelligence
	EI3N001	Fundamentals of Artificial Intelligence (NPTEL)
	EI3N002	Artificial Intelligence -"Search Methods for Problem Solving"(NPTEL)

Open Elective-II

1	IT 37xxx	Web Engineering
2	EC 37726	Mobile Communication
3	EC37727	Digital Signal Processing

3/2/26

Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
B.Tech (Applicable to 2024-25 Enrolled Students)
Tentative scheme (Subjected to be approved by Academic Council)

III Year / Semester-V

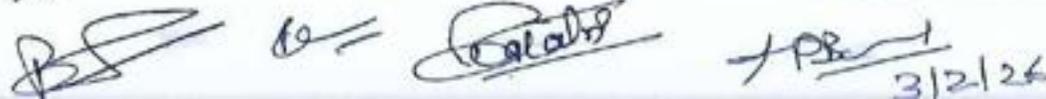Batch 2024-28(NEP-2020)
Academic Year :2026-27

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits		Maximum Marks				Total
									Theory		Practical		
				L	T	P	Th	Pr	End sem	CW	Pr	SW	
1	PCC	IT37015	Data Structure	3	-	-	3	-	70	30	-	-	100
2	PCC	EI37xxx	Microprocessor & Microcontroller	3	-	-	3	-	70	30	-	-	100
3	PCC	EI37017	CMOS VLSI Design	3	-	-	3	-	70	30	-	-	100
4	PEC		Program Elective Course-I	3	-	-	3	-	70	30	-	-	100
5	OEC		Program Elective Course-II	3	-	-	3	-	70	30	-	-	100
6	LC(IT)	IT37xxx	Data Structure (Lab)	-	-	2	-	1	-	-	60	40	100
7	LC(EI)	EI37xxx	Microprocessor & Microcontroller (Lab)	-	-	2	-	1	-	-	60	40	100
8	LC(EI)	EI37505	CMOS VLSI Design (Lab)	-	-	2	-	1	-	-	60	40	100
9	LC(EI)	EI37481	Test & Calibration (Lab)	-	-	2	-	1	-	-	60	40	100
10	PROJ	EI37482	Internship-I (Evaluation)	-	-	2	-	1	-	-	-	50	50
11	HSMC	HUM3702	Constitution of India*	2	-	-	-	-	-	50	-	-	50
			Total	17	0	10	15	5	350	200	240	210	1000

III Year/ Semster-VI

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week			Credits		Maximum Marks				Total
									Theory		Practical		
				L	T	P	Th	Pr	End sem	CW	Pr	SW	
1	PCC	EI37xxx	Digital Signal Processing	3	-	-	3	-	70	30	-	-	100
2	PCC	EI37xxx	Embedded System Design	3	-	-	3	-	70	30	-	-	100
3	PCC	EE37505	Control Systems	3	-	-	3	-	70	30	-	-	100
4	PEC		Program Elective Course-III	3	-	-	3	-	70	30	-	-	100
5	OEC		Program Elective Course-IV	3	-	-	3	-	70	30	-	-	100
6	LC (EI)	EI37xxx	Digital Signal Processing (Lab)	-	-	2	-	1	-	-	60	40	100
7	LC (EE)	EExxx	Control Systems (Lab)	-	-	2	-	1	-	-	60	40	100
8	PEC-LC (EI)	EIxxx	Embedded System Design (lab)	-	-	2	-	1	-	-	60	40	100
9	PROJ	EIxxx	Major Project Phase-I	-	-	4	-	2	-	-	60	40	100
10	HSMC	HUMxxx	Essence of Indian Knowledge Tradition*	2	-	-	-	-	-	50	-	-	50
11	PROJ	Internship-II		Minimum 4-6 weeks-during vacation. Evaluation & Credit in VII Semester									
			TOTAL	17	0	10	15	5	350	200	240	160	950

*Non-credit mandatory subject

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List of Electives for 5th & 6th Semester

Program Elective-I (5th Semester)		
1	EC37254	Analog & Digital Communication
2	EI37255	Smart Sensors
3	EI37256	Peripherals & Interfacing

Program Elective-II (5th Semester)		
1	IP37251	Industrial Engineering & Management
2	CO37253	Artificial Intelligence
	EI3N003	(NPTEL) Fundamentals of Artificial Intelligence
	EI3N004	(NPTEL)Artificial Intelligence -"Search Methods for Problem Solving"

Program Elective-III (6th semester)		
1	EI37703	High Frequency Engineering
2	EI37xxx	Analog Integrated Circuits
3	EI37704	Analytical Instrumentation

Program Elective-IV (6th semester)		
1	EC 37726	Mobile Communication
2	EI37xxx	Robotics & Drone Technology
3	EI37xxx	Verification using System Verilog

The Department will offer following Open Electives

Open Elective-II (VI Semester)													
				Hours per Week			Credits		Maximum Marks				
S.No.	Subject Category	Subject Code	Subject Name	L	T	P	Th	Pr	Theory		Practical		Total
									End sem	CW	Pr	SW	
1	OE-I	EI37xxx	Digital Design Using HDLs	2	1	-	3	-	70	30	-	-	100

				Hours per Week			Credits		Maximum Marks				
S.No.	Subject Category	Subject Code	Subject Name	L	T	P	Th	Pr	Theory		Practical		Total
									End sem	CW	Pr	SW	
1	OE-II	EI37xxx	VLSI Test & Testability	2	1	-	3	-	70	30	-	-	100

3/2/26

Shri G. S. Institute of Technology and Science
Department of Electronics and Instrumentation Engineering
M.Tech I Year SEM I (Microelectronics & VLSI Design)
EI 69015: Semiconductor Devices & Process Modeling

HOURS PER WEEK			CREDITS			MAX. MARKS				
T	P	TU	T	P	TU	THEORY		PRACTICAL		TOTAL MARKS
						CW	END SEM	SW	END SEM	
3	-	-	3	-	-	30	70	-	-	100

Pre-requisite: Semiconductor theory carrier density & carrier transport characteristics of semiconductor devices.

Course Objectives:
1. To enable the students to understand modeling & simulation.
2. To enable the students to understand and develop modeling of semiconductor devices with underlying physics.
3. To enable the students to understand and develop models for Semiconductor processes & simulation with constraints & parameters.

Course Outcomes:
CO1: Formulate mathematical expressions for model development & its simulation

CO2: Analyze equations for carrier transport for MOS Capacitor, pn junction & BJT.

CO3: To develop modeling equations for JFET & MOS transistor.

CO4: Understanding & creating models for VLSI processes like oxidation, ion implantation & diffusion.

CO5: Identify the implementation of various modeling tools for semiconductor devices & processes.

Course Contents

UNIT-1:
System, environment, input & output variables state variables; static & dynamic systems. Overview of modeling & simulation. Types of models. Types of simulation, Monte-Carlo simulation. Applications of modeling & simulation in VLSI devices, circuit design and fabrication.

UNIT-2:
Modeling of MOS resistance & capacitor. Static & dynamic models for PN junction diode. Effect of area and temperature. BJT models: Ebers-Moll & Gummel Poon. Advanced models with temperature, doping level & area effects on the BJT models.
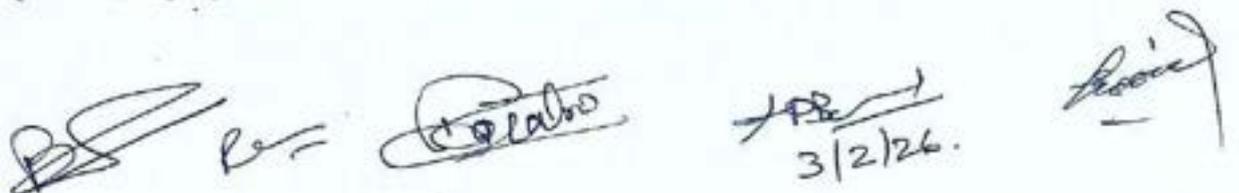
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UNIT-3:

Modeling of JFET & MOS transistor. Small & large signal models. Various levels of Models Effect of series resistances. Effect

of area, doping & temperature. Input & output parameter characterization. Evaluation of capacitances & resistances.

UNIT-4:

IC fabrication process flow. Wafer preparation, Etching & lithography. Modeling of above processes. Modeling of ion implantation, diffusion. Modeling equations in 1D & 2D.

UNIT-5:

Modeling of oxidation. Introduction to SPICE, TCAD Modeling tools. Modeling with MATLAB. Advanced Modeling tools. Case studies with MINIMOS tool.

Assessment:

Continuous evaluation of students through: Class attendance, Assignment, organizing Seminars/Quizzes and two mid Semester Tests Exam with weightage of 30% of total marks. End semester theory exam. Weightage in 70% of total marks.

Text Books:

1. Siegfried Seleberherr, "Analysis and Simulation of Semiconductor Devices", Springer Vienna Wien, NewYork.
2. Walter. L. Engl. 'Process and Device Modeling" Illustrated Edition, North Holland 1986.
3. R. Raghuram, "Computer Simulation of Electronic Circuits", John Wiley.

References Books:

1. K. Lee, M. Shur, T. A Fjedly& T. Yetterdal, Semiconductor Device Modeling for VLSI, Prentice-Hall.
2. Nandita Dasgupta & Amitava Dasgupta, " Semiconductor Devices: Modeling & Technology", Second Edition, PHI 2004.
3. Cristopher M. Snowden, " Semiconductor Device Modelling", Second Edition, Springer-Verlag, London.

CO-PO Articulation Matrix:

CO-PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	1
CO2	3	3	2	1	1
CO3	2	3	1	2	2
CO4	2	2	1	-	-
CO5	2	2	1	-	-
AVG.	2.4	2.4	1.4	0.8	0.8

Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
B.Tech (Applicable to 2025-26 Enrolled Students)

II Year/III Semester

Batch : 2025-29 (NEP 2020)
Academic Year 2026-27

Semester - A

S.No.	Subject Category	Subject Code	Subject Name	Hours/Week			Credits		Maximum Marks				Total Marks	Total Credits
				L	T	P	T	P	Theory		Practical			
									Th.	CW	Pr.	SW		
1	BSC	MA27014	Mathematics - III (to be nomenclature by BoS Mathematics)	3	1	-	4	-	70	30	-	-	100	4
2	PCC	EI27011	Circuit analysis & Synthesis	3		-	3	-	70	30	-	-	100	3
3	PCC	EI27xxx	Digital System design using HDL	3	-		3	-	70	30	-	-	100	3
4	PCC	EI27013	Electronic Devices & Circuits	3	-	-	3	-	70	30	-	-	100	3
5	ESC	EI27012	Fundamentals of Measurement	3	-	-	3	-	70	30	-	-	100	3
6	PCC	EI27401	Circuit analysis & Synthesis	-	-	2	-	1	-	-	60	40	100	1
7	PCC	EI27403	Electronic Devices & Circuits	-	-	2	-	1	-	-	60	40	100	1
8	ESC	EI27402	Fundamentals of Measurement	-	-	2	-	1	-	-	60	40	100	1
		EI27xxx	Digital System design with HDL			2		1			60	40	100	1
9	LC	EI27xxx	Skill Lab-I: Circuit Simulation &PCB Designing	-	-	2	-	1	-	-	60	40	100	1
10	HSMC	CoE	One Elective from CoE-I or CoE-II		2	2	2	1		50		50	100	3
			Total	15	3	12	18	6	350	200	300	250	1100	24
			Minor/Honours/Value Added Courses (Optional)	3	-	2	3	1						4

II Year/IV Semester

Semester - B

S.No.	Subject Category	Subject Code	Subject Name	Hours/Week			Credits		Maximum Marks				Total Marks	Total Credits
				L	T	P	T	P	Theory		Practical			
									Th.	CW	Pr.	SW		
1	PCC	EI27511	Analog Electronics	3		-	3	-	70	30	-	-	100	3
2	PCC	EI27521	Sensors & Transducers	3		-	3	-	70	30	-	-	100	3
3	PCC	EI27xxx	Microprocessor & Microcontroller	3	-	-	3	-	70	30	-	-	100	3
4	PCC	EI27xxx	Analog & Digital Communication	3	1	-	4	-	70	30	-	-	100	4
5	ESC	TSC4	Verification Using System Verilog	3	1	-	4	-	70	30	-	-	100	4
6	PCC	EI27801	Analog Electronics	-	-	2	-	1	-	-	60	40	100	1
7	PCC	EI27802	Sensors & Transducers	-	-	2	-	1	-	-	60	40	100	1
8	PCC	EI27xxx	Microprocessor & Microcontroller	-	-	2	-	1	-	-	60	40	100	1
9	PCC	LC27xxx	Skill Lab-II: Scripting, Scientific Computing & System	-	-	2	-	1	-	-	60	40	100	1
10	HSMC	CoE	One Elective from CoE-I or CoE-II		2	2	2	1		50		50	100	3
			Total	15	4	10	19	5	350	200	240	210	1000	24
			Minor/Honours/Value Added Courses (Optional)	3	-	2	3	1						4

** 4-6 weeks training during semester break after IV sem is mandatory.

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*CoE-1	Electives from CoE BGP	*CoE-2	Electives from CoE for the Sc of Happiness
CoE-1_1	Economics for Engineers	CoE-2_1	
CoE-1_2	Enterprenurial Economics	CoE-2_2	
CoE-1_3	Environmental Science	CoE-2_3	
CoE-1_4	Dance and Music	CoE-2_4	
CoE-1_5	Global Language	CoE-2_5	
CoE-1_6	Metaphysics An Depistemology Of Indian Philosophy	CoE-2_6	
CoE-1_7	Sanskrit language and Panini's Hrammes	CoE-2_7	
CoE-1_8	Prakrit Language	CoE-2_8	
CoE-1_9	Ancient Indian Mathematics	CoE-2_9	
CoE-1_10	Indian Calendar and Astronomy	CoE-2_10	.
CoE-1_11	Applied Economics (Data Analysis and Social Sciences)	CoE-2_11	
CoE-1_12	Economatrix and Game Theory (economic modeling)	CoE-2_12	
CoE-1_13	Advance Enterprenureship	CoE-2_13	
CoE-1_14	Indian Constitution and legal professional framework	CoE-2_14	
CoE-1_15	Universal Human Values & SDGs	CoE-2_15	
CoE-1_16	Ancient Indian Knowledge Treasure	CoE-2_16	
CoE-1_17	Professional English	CoE-2_17	
CoE-1_18		CoE-2_18	
CoE-1_19		CoE-2_19	
CoE-1_20		CoE-2_20	

SEM-III	CoE-1	CE/ME/EE/EC/EI	SEM-IV	CoE-2	CE/ME/EE/EC/EI
	CoE-2	IP/BM/IT/CS		CoE-1	IP/BM/IT/CS
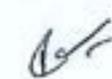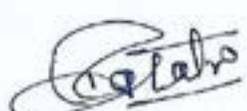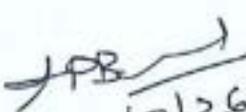
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Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
B.Tech (Applicable to 2025-26 Enrolled Students)

III Year/V Semester

Semester - A

S.No.	Category	Subject Code	Subject Name	Hours/Week L	Hours/Week T	Hours/Week P	Credits T	Credits P	Theory End	Theory CW	Practical End	Practical SW	Total Credits	Total Credits
1	PCC	EI37017	CMOS VLSI Design	3			3		70	30			100	3
2	PCC	EI37xxx	Embedded System Design	3			3		70	30			100	3
3	PCC	IT37005	Data Structure	3	1		4		70	30			100	4
4	MOPEC	TSC4	Multidisciplinary Open Elective-I	3		-	3		70	30	-	-	100	3
5	PEC	TSC5....	Technical Elective-I	3		-	3	-	70	30	-	-	100	3
6	LC	EI37505	CMOS VLSI Design			2		1			60	40	100	1
7	LC	EI37xxx	Embedded System Design			2		1			60	40	100	1
8	LC	IT37xxx	Data Structure			2		1			60	40	100	1
9	LC	LSC4	Skill Lab-III: Test & Calibration	-		2	-	1	-	-	60	40	100	1
10	INT	LSC5	Industrial Training* (Internship Evaluation-I)	-		4	-	2	-	-	-	100	100	2
			Total	15	1	12	16	6	350	150	240	260	1000	22
			Minor/Honours/Value Added Courses	3	-	-	3	-	-	-	-	-	3	3

* Evaluation of 4-6 weeks training during semester break after IV sem is mandatory.

Technical Elective – I

Sn	Sub.	Subject Nomenclature	Mode
1	EI37255	Smart Sensors	Offline
2	EI37xxx	High Frequency Engineering	Offline
3	EI3Nxxx	NPTEL	MOOCs

Multidisciplinary Open Elective-I

S.No	Sub.	Subject Nomenclature	Pre-requisite	S.No	Sub.Code	Subject Nomenclature	Pre-requisite
		Electrical Engineering				**Applied Physics**	
1	EEXXOX	Generation Distribution & Utilization of Elect. Energy	FEEE	1			Pre-requisite
		Civil Engineering				**Applied Chemistry**	
1			Pre-requisite	1			Pre-requisite
		IP Engineering				**Applied Mathematics**	
1			Pre-requisite	1			Pre-requisite
		Elex & Instru Engineering				**DOMS**	
1	EI37xxx	Digital Design Using HDLs	Digital Electronics	1			Pre-requisite
		Elex & TC Engineering				**Pharmacy**	
1			Pre-requisite	1			Pre-requisite
		Biomedical Engineering				**CoE (Center of Excellence**	
1			Pre-requisite	1		Robotics and AI	Nil
		Computer Sc. Engineering		2		Quantum Computing	Nil
1			Pre-requisite	3		Drone Technology	Nil
		Mechanical Engineering		4		Metronic	Nil
1			Pre-requisite	5			Nil
		Information Technology		6			Nil
1			Pre-requisite	7			Nil

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III Year/VI Semester
Semester - B

S.No.	Category	Subject Code	Subject Name	Hours/Week L	T	P	Credits T	P	Theory End	CW	Practical End	SW	Total Marks	Total Credits
1	PCC	EI37xxx	Digital Signal Processing	3	-		3		70	30			100	3
2	PCC	EI37xxx	Process Instrumentation	3			3		70	30			100	3
3	PCC	EE37xxx	Control System	3	-		3		70	30			100	3
5	PEC	TSC4	Technical Elective – II	3	1	-	4	-	70	30	-	-	100	4
6	PEC	TSC5	Technical Elective – III	3	-	-	3	-	70	30	-	-	100	3
7	LC	EI37xxx	Process Instrumentation			2		1			60	40	100	1
	LC	EI37xxx	Digital Signal Processing			2		1			60	40	100	1
6	LC	EE37xxx	Control System			2		1			60	40	100	1
9	PR	LSC4	Minor Project	-	-	6	-	3	-	-	60	40	100	3
			Total	15	1	12	16	6	350	150	240	160	900	22
			Minor/Honours/Value Added Courses (Optional)	3	-	-	3	-	-	-	-	-	3	3

** 4-6 weeks training during semester break after VI sem is mandatory.

		Technical Elective – II	
Sn	Sub.	Subject omnclature	Mode
1	EI37xxx	VLSI Technology	Offline
2	EI37xxx	Internet of Things	Offline
3		NPTEL	MOOCs

		Technical Elective – III	
Sn	Sub.	Subject omnclature	Mode
1	EI37xxx	Analytical Instrumentation	Offline
2	EI37xxx	Automation In Instrumentation	Offline
3	EI37xxx	Robotics & Drone Technology	Offline
4		NPTEL	MOOCs
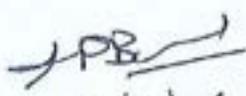
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IV Year/VII Semester

Semester - A

Batch : 2025-29 (NEP 2020)
Academic Year 2028-29

S.No.	Category	Subject Code	Subject Name	Hours/Week L	Hours/Week T	Hours/Week P	Theory End Sem	Theory CW	Practical End Sem	Practical SW	Credits T	Credits P	Total Marks	Total Credits
1	PCC	BM47xxx	Medical Instrumentation	3	-	-	70	30	-	-	3	-	100	3
2	PCC	EI47xxx	Fiber Optics & Photonics	3	-	-	70	30	-	-	3	-	100	3
3	LC	PCC	Medical Instrumentation	-	-	2	-	-	60	40	-	1	100	1
4	LC	PCC	Fiber Optics & Photonics	-	-	2	-	-	60	40	-	1	100	1
5	INT	INT	Industrial Training** (Internship Evaluation-II)	-	-	-	-	-	-	100	-	2	100	2
6	PRO	PRO	Major Project	-	-	8	-	-	60	40	-	4	100	4
	Total		For AB group	6	0	12	140	60	180	220	6	8	600	14
			For BA group			24				300		12	12	12
5			Minor/Honours/Value Added Courses (Optional)	3	-	-	-	-	-	-	3	-	3	3

** Internship Evaluation of 4-6weeks training during semester break after VI sem is mandatory.

IV Year/VIII Semester

Semester - B

S.No.	Subject Category	Subject Code	Subject Name	Hours per Week L	Hours per Week T	Hours per Week P	Credits Th	Credits Pr	Theory Th.	Theory CW	Practical Pr.	Practical SW	Total	Total Credits
1	PROJ	EIxxxx	Industrial Training/Internship (Min. 16-20 weeks)	-	-	24	-	12	- -	-	180	120	300	12
OR														
1	PROJ	EIxxx	Research work -Research Paper/institute incubated start-up	-	-	24	-	12	-	-	180	120	300	12
		TOTAL		-	-	24	-	12	-	-	180	120	300	3

Note: **Student require to complete minimum 16-20 weeks of industrial training/internship during the semester break
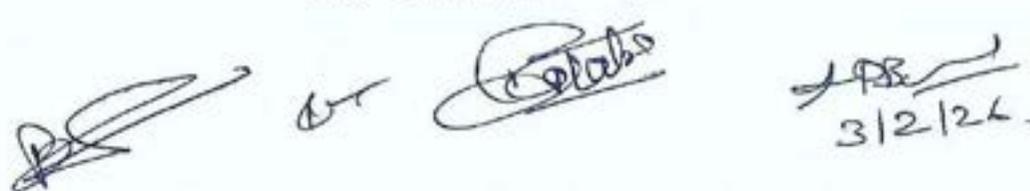
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Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
M.Tech. (Microelectronics & VLSI Design)

Academic Year 2026-27
Batch: 2026-28

Semester-I

S.no.	Subject Code	Subject Name	Period/Week			Maximum Marks				Credits		Total Credits	Total Marks
						Theory		Practical					
			L	T	P	End Sem	CW	End Sem	SW	T	P		
1	EI69012	Design of Integrated circuits	3			70	30			3		3	100
2	EI69014	Hardware Descriptive Laguage	3			70	30			3		3	100
3	EI69015	Semiconductor Device & Process Modelling	3			70	30			3		3	100
4		Elective -I	3			70	30			3		3	100
5		Elective-II	3			70	30			3		3	100
6	EI69453	LAB-I FPGA Based Digital Design			4			60	40		2	2	100
7	EI69454	LAB-II CMOS Digital IC Design			4			60	40		2	2	100
8	EI69500	Comprehensive Viva										Grade	Grade
		Total	15	0	8	350	150	120	80	15	4	19	700

Semester-II

S.no.	Subject Code	Subject Name	Period/Week			Maximum Marks				Credits		Total Credits	Total Marks
						Theory		Practical					
			L	T	P	End Sem	CW	End Sem	SW	T	P		
1	EI69511	Communication RF-IC Design	3			70	30			3		3	100
2	EI69512	Mixed Signal Circuit Design	3			70	30			3		3	100
3	EI69513	VLSI Test & Testability	3			70	30			3		3	100
4		Elective -III	3			70	30			3		3	100
5		Elective-IV	3			70	30			3		3	100
6	EI69853	LAB-III VLSI Testing & Verification			4			60	40		2	2	100
7	EI69854	LAB-IV Analog & RF IC Design			4			60	40		2	2	100
8	EI69882	Minor Project/LAB-II			2				50		1	1	50
9	EI69900	Comprehensive Viva										Grade	Grade
		Total	15	0	10	350	150	120	130	15	5	20	750

3/2/26.

Shri G.S. Institute of Technology & Science, Indore
Electronics & Instrumentation Engineering Department
M.Tech. (Microelectronics & VLSI Design)

Semester-III

| S.no. | Subject Code | Subject Name | Period/Week | | | Maximum Marks | | | | Credits | | Total Credits | Total Marks |
| | | | L | T | P | Theory | | Practical | | T | P | | |
						End Sem	CW	End Sem	SW				
1	EI69931	Industrial Training/Term Paper/Seminar*			8				50		4	4	50
2	EI69932	Dissertation Phase-I			20			60	40		10	10	100
3	MA69902	Research Methodology & IPR**	2			70	30·			2		2	100
		Total	2	0	28	70	30	60	90	2	14	16	250

*Industrial Training to be carried out between II & III semester during Vacation.

** This course can be staudied on;line with prior permission of HOD, however end sem exam will be conducted in institute.

Semester-IV

| S.no. | Subject Code | Subject Name | Period/Week | | | Maximum Marks | | | | Credits | | Total | Total Marks |
| | | | L | T | P | Theory | | Practical | | T | P | | |
						End Sem	CW	End Sem	SW				
1	EI69952	Dissertation Phase-II			32			120	80		16	16	200
		Total	0	0	32	0	0	120	80	0	16	16	200

List of Electives

Elective-I Semester-I	
EI69205	Analog IC Design
EI69211	Application Specific Integrated Circuit
EI69206	Memory Design & Testing

	Elective-II Semester-I	
1	EI69301	VLSI Technology
2	EI69302	Electromechanical Systems (MEMS) structure, Sensor & Application
3	EI69303	SoC Design

Elective-III Semester-II	
EI69705	System Hardware Design
EI69706	Embedded System Design
EI69707	VLSI Signal Processing

	Elective-IV Semester-II	
1	EI69751	Low Power VLSI Design
2	EI69752	NanoTechnology
3	EI69751	Optoelectronics Integrated Circuits

3/2/26.

BoS Student Members

B.Tech IV Year	Shivam Bansal 0801EI221089	
	Kaushiki Doble 0801EI221048	
B.Tech III Year	Vanisha Pathak 0801EI231105	
	Varun Chourasia 0801EI231106	
B.Tech II Year	Darshan Choudhary 0801EI241019	
	Samriddhi Purohit 0801EI241077	
B.Tech I Year	Anmol Singh 0801EI251016	
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