Department of Electronics Engineering

Minutes of Board of Studies Meeting of Electronics Engineering (RGPV) held on 3.12.2025 Session: Jan-June 2026

The Board of Studies (BoS) meeting of the Electronics Engineering department was held on 3rd Dec 2025 at 11:30 AM onwards. Following external and internal members have attended online meeting through google link : https://meet.google.com/cmd-cesh-wju

BoS Member:

1. Dr. Laxmi Shrivastava, Professor & Head
2. Dr. R. P. Narwaria, Associate Professor
3. Dr. Madhav Singh, Assistant Professor
4. Dr. Vikas Mahor, Assistant Professor
5. Dr. Hemant Choubey, Assistant Professor
6. Dr. Varun Mishra, Assistant Professor
7. Dr. Mukesh Kumar Mishra, Assistant Professor
8. Dr. Kumar Gaurav, Assistant Professor
9. Dr. Shailendra Singh, Assistant Professor

Agenda of the BoS Meeting

Courses where revision was carried out*

(Course/subject name)	Course Code	Year/Date of introduction	Year/Date of revision	Percentage of content added or replaced	Agenda Item No.	Page No.	Link of relevant documents/minutes

New Courses added*

(Course/subject name)	Course Code	Activities/contents which have a bearing on increasing skill and employability	Agenda Item No.	Page No.	Link of relevant documents/minutes

Feedback on curriculum received from stakeholders: Analysis& ATR*

Stakeholder	Student	Faculty	Alumni	Employer
No of Responses	45	11	24	13
Link of Analysis			https://drive.google.com/file/d/1jbGSZWWkaXYtzG7Bceu5a8OscLMuMzU8/view?usp=sharing	https://docs.google.com/forms/d/1Md-TDGM03VLnYmLC8VmwYefNzmkyE9h18CuRwh0-ADM/edit#responses
ATR Link	https://drive.google.com/file/d/1AUcRcYxdGB-pWcr8pPOjqoMCcH6plzA4/view?usp=sharing	https://drive.google.com/file/d/1MB5H2hkJpNqT8yk56SUx1YZCyYWYpBNh/view?usp=sharing	https://drive.google.com/file/d/1jbGSZWWkaXYtzG7Bceu5a8OscLMuMzU8/view?usp=sharing	https://docs.google.com/document/d/1spxqd1x5jB6PL4eqeHFmfpFOgBFhACZg/edit?usp=drive_link&ouid=113399348550989221866&rtpof=true&sd=true
Link showing Excel sheet of Google Form details of stakeholders	https://drive.google.com/file/d/1AUcRcYxdGB-pWcr8pPOjqoMCcH6plzA4/view?usp=sharing	https://drive.google.com/file/d/1MB5H2hkJpNqT8yk56SUx1YZCyYWYpBNh/view?usp=sharing.	https://drive.google.com/file/d/1jbGSZWWkaXYtzG7Bceu5a8OscLMuMzU8/view?usp=sharing	https://docs.google.com/spreadsheets/d/1HTEo5wpv_3j_KpMbelA8ahwqtMIGFJ4V2KJtjNiBNQI/edit?resourcekey=&gid=1621199660#gid=1621199660

BoS Agenda Items	
Item 1	To confirm the minutes of previous BoS meeting held in the month of May-June 2025. *The minutes of previous BOS held on 3rd June 2025 has been finalized.*
Item 2	To propose the scheme structure of **VIII Semester** with the provision of **ONE DE & ONE OCcourse** to be offered in **online mode** with credit transfer for the **batch admitted in academic year 2022-23**. (**The total credits from I-VIII semester should not be less than 160 for this batch**). *The Scheme Structure of B.Tech VIII Semester with provision of One Departmental Electives and One Open Category courses has been discussed and finalized.* **Annexure I**
Item 3	To propose the list of courses which the students can opt from SWAYAM/NPTEL/ other MOOC Platforms/ Institution (MITS) MOOC, to be offered in online mode under **Departmental Elective (DE) category courses (DE4) and open category (OC3)** for credit transfer in the **VIII Semester** under the flexible curriculum (**Batch admitted in academic year 2022-23).** *The list of course which the students can opt from SWAYAM/NPTEL/MOOC based platforms, to be offered in online mode under department elective (DE) course, with credit transfer in the VIII Semester under the flexible curriculum has been discussed and finalized.* **Annexure II**
Item 4	To propose the list of "Additional Courses" which can be opted for getting an (i) Honours (for students of the host department) (ii) Minor Specialization (for students of other departments) **[These will be offered through SWAYAM/NPTEL/MOOC based Platforms for the B.Tech. VIII semester students (for the batch admitted in 2022-23)] and for B.Tech. VI semester (for the batch admitted in 2023-24].** *The list of Additional courses for Honours and Minor offered through SWAYAM/NPTEL/MOOC based Platforms for the B.Tech. VIII semester students (for the batch admitted in 2022-23)] and for B.Tech. VI semester (for the batch admitted in 2023-24].* **Annexure III**
Item 5	To review and finalize the **scheme structure of B.Tech VI Semester under** the flexible curriculum **(Batch admitted in 2023-24).** *The scheme structure of B.Tech. VI Semester under the flexible curriculum (Batch admitted in 2023-24) has been discussed and finalized.* **Annexure IV**
Item 6	To review & finalize the **syllabi for departmental Core Course(s) (DC)** of **B. Tech VI Semester** (**for batch admitted in 2023-24)** under the flexible curriculum along with COs. *The syllabi for all Departmental Core (DC) Courses of B.Tech. VI Semester (for batch admitted in 2023-24) under the flexible curriculum along with their COs has been discussed and finalized.* **Annexure V**
Item 7	To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered for batch admitted in 2023-24 **in online mode under Departmental Elective (DE) Course** with credit transfer, **in the VI Semester.** *The list of course which the students can opt from SWAYAM/NPTEL/MOOC based platforms, to be offered in online mode under department elective (DE) course, with credit transfer in the VI Semester*

	under the flexible curriculum has been discussed and finalized. **Annexure VI**
Item 8	To review and finalize the courses & syllabi to be offered (for batch admitted in 2023-24) under the **Open Category (OC) Courses to be offered in traditional mode for B Tech VI semester** of other departments along with their COs. *The syllabus and scheme of courses to be offered (for batch admitted in 2023-24) under the Open Category (OC) Courses in traditional mode for B.Tech. VI semester students of other departments along with their COs has been discussed and finalized.* **Annexure VII**
Item 9	To review and finalize the **Experiment list/ Lab manual/Skill based mini-project** for all the Laboratory Courses to be offered in **B.Tech.VI semester (for batch admitted in 2023-24).** *The Experiment list/ Lab manual /Skill based mini-projectfor all the Laboratory Course to be offered in B.Tech. VI semester (for batch admitted in 2023-24) has been finalized and approved by BOS members.* **Annexure VIII**
Item 10	To review the PO attainment, CO-PO mapping matrix and action to be taken to improve PO ttainment level. *The PO attainment of 2021-2025 batch with attainments level and gap analysis has been discussed and finalized.* **Annexure IX**
Item 11	To review curricula feedback from various stakeholders, its analysis and impact**.** *Curricula feedback from various stakeholders includes students, faculty, employer and alumni have been discussed and action taken report has been finalized.* **Annexure X**
Item 12	Any other matter.

Annexure I

Item 2

To propose the scheme structure of **VIII Semester** with the provision of **ONE DE & ONE OC course** to be offered in **online mode** with credit transfer for the **batch admitted in academic year 2022-23**. (**The total credits from I-VIII semester should not be less than 160 for this batch**).

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination (B.Tech. Electronics Engineering)
B.Tech. VIII Semester *[For batches admitted in Academic Session 2022-23 onwards]*

S.N.	Subject Code	Category	Subject Name & Title	Maximum Marks Allotted					MOOCS		Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot								
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Term Work / Lab Work & Sessional	Assignment	Exams		L	T	P	
1.	**1408XX**	**DE**	**Departmental Elective-4***	-	-	-	-	-	25	75	100	-	-	-	**3**
2.	**9006XX**	**OC**	**Open Course -3**	-	-	-	-	-	25	75	100	3	-	-	**3**
3.	**2140804**	**DLC**	**Internship/Project (DLC-9)**	-	-	-	250	150	-	-	400	-	-	18	9
4.	**2140805**		**Professional Development#**	-	-	-	50		-	-	50	-	-	4	2
			Total	**-**	**-**	**-**	**300**	**150**	**50**	**150**	**650**	**3**	**-**	**22**	**17**
Additional Courses for obtaining Honours or minor Specialization by desirous students			**Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization**												

***All of these courses will run through SWAYAM/NPTEL/ MOOC**

 # Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG program(participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events and technical events)

List of DEs and OCs:

Department Electives-1 (DE-4) (1408XX)	Fundamental of Power Electronics (2140854)	FPGA based Signal Processing Systems (2140855)	Photonic integrated circuit (2140856)
Open Course-3 (OC-3)	Integrated Circuits and Applications(900604)	Sensors and Actuators (900602)	

Annexure II

Item 3

To propose the list of courses which the students can opt from SWAYAM/NPTEL/ other MOOC Platforms/ Institution (MITS) MOOC, to be offered in online mode under **Departmental Elective (DE) category courses (DE4) and open category (OC3)** for credit transfer in the **VIII Semester** under the flexible curriculum (**Batch admitted in academic year 2022-23).**

S.No	Category Code	Course Code	Name of The course	Duration of the Course in weeks	Course		Name of the Mentor Faculty
					Start Date	End Date	
Electronics Engineering							
1	**DE-4**	2140856	Photonic integrated circuit	**12**	Jan 19, 2026	Apr 10, 2026	Dr. Hemant Choubey
2		2140854	Fundamental of Power Electronics	**12**	Jan 19, 2026	Apr 10, 2026	Dr. Kumar Gaurav
3		2140855	FPGA based Signal Processing Systems	**12**	Jan 19, 2026	Apr 10, 2026	Dr. Varun Mishra
4	**OC-3**	900604	Integrated Circuits and Applications	**12**	Jan 19, 2026	Apr 10, 2026	Dr. Madhav Singh
5		900602	Sensors and Actuators	**12**	Jan 19, 2026	Apr 10, 2026	Dr. Mukesh Kumar Mishra

Annexure III

Item -4

To propose the list of "Additional Courses" which can be opted for getting an

(i) Honours (for students of the host department)
(ii) Minor Specialization (for students of other departments)

[These will be offered through SWAYAM/NPTEL/MOOC based Platforms for the B.Tech. VIII semester students (for the batch admitted in 2022-23)] and for B.Tech. VI semester (for the batch admitted in 2023-24].

Sem	Category Code	Domain	Course Code	Name of the course	Duration of the Course in weeks	Course		Name of the Mentor Faculty
						Start Date	End Date	
Electronics Engineering								
VI	**Honors**	Communication and Signal Processing	H140601	Optical Wireless Communications for Beyond 5G Networks and IoT	12	Jan 19, 2026	Apr 10, 2026	Dr. Hemant Choubey
			H140606	Communication Networks	12	Jan 19, 2026	Apr 10, 2026	Dr. Kumar Gaurav
		VLSI Design	H140607	Analog IC design	12	Jan 19, 2026	Apr 10, 2026	Dr. Madhav Singh
			H140609	Integrated Circuits, MOSFETs, OP-Amps and their Applications	12	Jan 19, 2026	Apr 10, 2026	Dr. Mukesh Kumar Mishra
		Nano Technology	H140610	Basic Overview of Semiconductor Device Processing and IC Fabrication	12	Jan 19, 2026	Apr 10, 2026	Dr. R.P Narwaria
			H140611	Physics of Nanoscale Devices	12	Jan 19, 2026	Apr 10, 2026	Dr.Mukesh Kumar Mishra
	Minors	Control & Sensor Technology	M140606	Microprocessors and Microcontrollers	12	Jan 19, 2026	Apr 10, 2026	Dr.Mukesh Kumar Mishra
			M140607	Network Analysis	12	Jan 19, 2026	Apr 10, 2026	Dr. Hemant Choubey
			M140604	Communication Networks	12	Jan 19, 2026	Apr 10, 2026	Dr. Mukesh Kumar Mishra
			M140605	Optical Wireless Communications for Beyond 5G Networks and IoT	12	Jan 19, 2026	Apr 10, 2026	Dr. Kumar Gaurav
VII I	**Honors**	Communication and Signal	M140802	Signal Processing Techniques and its Applications	12	Jan 19, 2026	Apr 10, 2026	Dr. Kumar Gaurav

		Processing	M140810	Biomedical Signal Processing	12	Jan 19, 2026	Apr 10, 2026	Dr. Kumar Gaurav
		VLSI Design	H140809	Digital VLSI Testing	12	Jan 19, 2026	Apr 10, 2026	Dr. Kumar Gaurav
			H140807	Integrated Circuits, MOSFET,OPAmps and their Applications	12	Jan 19, 2026	Apr 10, 2026	Dr. R.P Narwaria
		Nano Technology	H140811	Basic Overview of Semiconductor Device Processing and IC Fabrication	12	Jan 19, 2026	Apr 10, 2026	Dr. Madhav Singh
			H140812	Physics of Nanoscale Devices	12	Jan 19, 2026	Apr 10, 2026	Dr. Madhav Singh
	Minors	Control & Sensor Technology	M140811	Embedded Sensing, Actuation and Interfacing Systems	12	Jan 19, 2026	Apr 10, 2026	Dr. R.P Narwaria
			M140806	Optical Fiber Sensors	12	Jan 19, 2026	Apr 10, 2026	Dr. R.P Narwaria
		Communication and Signal Processing	M140802	. Signal Processing Techniques and its Applications	12	Jan 19, 2026	Apr 10, 2026	Dr.Shailendra Singh
			M140810	Biomedical Signal Processing	12	Jan 19, 2026	Apr 10, 2026	Dr.Shailendra Singh

Annexure IV

Item -5

To review and finalize the **scheme structure of B.Tech VI Semester under** the flexible curriculum **(Batch admitted in 2023-24).**

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Scheme of Evaluation

B. Tech. VI Semester (Electronics Engineering)

(for batch admitted in academic session 2023-24)

No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted									Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	$^{\$\$}$Mode of Exam.
				Theory Slot				Practical Slot			MOOCs			L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation		Assignment	Exam							
				End Sem. Exam.	$^{\$}$Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project									
1.	3140616	DC	Microcontroller Systems and Applications	50	10	20	20	40	30	30	-	-	200	3	-	2	**4**	Blended	PP
2.	3140XXX	DE	Departmental Elective* (DE-1)	-	-	-	-	-	-	-	25	75	100	3	-	-	**3**	Blended	PP
3.	900XXX	OC	Open Category (OC-1)**	50	10	20	20	-	-	-	-	-	100	3	-	-	**3**	Blended	PP
4.	3140617	MC	Artificial Intelligence & Machine Learning	50	10	20	20	40	30	30	-	-	200	3	-	2	**4**	Blended	MCQ
5.	3140618	DLC	Minor Project-II#	-	-	-	-	40	60	-	-	-	100	-	-	6	**3**	Offline	SO
6.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	-	-	50	-	-	2	**1**	Blended	SO
7		NSS	Natural Sciences& Skills##	200	40	80	80	120	40	40	-	-	600	1	-	2	**2***		
Total				**350**	**70**	**140**	**140**	**290**	**160**	**100**	**25**	**75**	**1350**	**13**	**-**	**14**	**20**	**-**	**-**
8.	1000007	**MAC**	Intellectual Property Rights (IPR)	50	10	20	20	-	-	-	-	-	100	2	-	-	GRADE	Online	**MCQ**
Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester																			
Additional Course for Honours or minor Specialization				**Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization**															

##Natural Sciences& skills; Engineering Physics / Engineering Chemistry / Environmental Science/ Language

("Natural Sciences & skills; treated as Mandatory Audit Courses from first to fourth semester and cumulative marks converted as a cluster of credits and awarded in the VI semester)

$proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

$^{\$\$}$**MCQ:** Multiple Choice Question $^{\$\$}$**AO:** Assignment + Oral $^{\$\$}$**PP:** Pen Paper $^{\$\$}$**SO:** Submission + Oral

***Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform with credit transfer**

****** **Course run in traditional mode** #The minor project-II may be evaluated by an internal committee for awarding sessional marks.

***This course run through SWAYAM/NPTEL/ MOOC platform**

***DE-1 (SWAYAM/NPTEL/ MOOC platform)**		****Open Category (OC-1)(For students of other branches)**	
3140665	RF and Microwave Networks	**2900118**	Optical Communication
3140662	Digital IC Design	**2900119**	MEMS &Mechatronics
3140663	Fuzzy sets, logic and System & Applications		

Annexure V

Item -6

To review & finalize the **syllabi for departmental Core Course(s) (DC)** of **B. Tech VI Semester** (**for batch admitted in 2023-24)** under the flexible curriculum along with COs.

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B.Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency	Mid Sem marks	Quiz/ Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
3140616	DC	Microcontroller Systems and Applications	50	10	20	20	40	30	30	200	3	-	2	4

Microcontroller Systems and Applications (3140616)

Course Objectives: To introduce the basic concepts of microcontroller and to develop assembly language programming skills along with the introduction of microcontroller applications.

UNIT-I: Introduction: Microcontroller architecture, classification, challenges and design issues, Von Neumann/Harvard architectures, CISC, RISC, microcontrollers types and their selection, Overview of the 8051 family, architecture, pin description, Flags, Register Banks, Internal Memory Organization, I/O configuration, Special Function Registers, addressing modes.

UNIT II: **Assembly programming and instruction of 8051:** An Overview of 8051 instruction set, Introduction to 8051 assembly programming, Assembling and running an 8051 program, Data types and Assembler directives, Arithmetic, logic instructions and programs, Jump, loop and call instructions, IO port programming.

UNIT III: Introduction to ARM Microcontroller: Introduction to pipelining based processors, applications of ARM, Architecture of ARM Cortex M3, Various Units in the architecture, General Purpose Registers, Special Registers, exceptions, interrupts, and stack operation.

UNIT IV: Interfacing real world devices with 8051 microcontroller: Memory address decoding, 8051 interfacing with memory, 8051 interface with 8255 PPI and various interfacings like: LCD, Matrix Keyboard, ADC, DAC and Stepper motor interfacing.

Unit V: System Design With Arduino Board: Overview of Arduino, Configuration, Interfacing, Board layout, Atmega328 specifications, Interfacing of Arduino with LED, Switches, Light dependent resistor (LDR), PWM, 16*2 LCD, Serial, L293D for motor interfacing, ADC.

Course Outcomes:
After successful completion of the course, students will be able to:

CO1. Explain the architecture of embedded system and 8051 microcontroller.
CO2. Develop programming skill for 8051 microcontroller.
CO3.Understand the 32-bit pipelined architecture of ARM microcontroller.
CO4.Design Interfacing circuitry for memory and I/O devices using different interfacing with 8051.
CO5. Develop skill in programming for Arduino with different peripherals.

Text Books:

1. Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. Mckinlay, “The 8051 Microcontroller and Embedded Systems using Assembly and C” Pearson Education India, 2nd EditionModern
2. Shibu K V, —”Introduction to Embedded Systems”, Tata McGraw Hill Education Private Limited.

Reference Books:

1. Kenneth Ayal, “The 8051 Microcontroller”, Architecture, Programming and Applications.
2. SubrataGhoshal, “Embedded Systems and Robots, Projects using the 8051Microcontroller”.
3. David A Patterson and John L. Hennessy, “Computer Organization and Design ARM edition”

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	2	2	2	1	2	1	2	2	3	-	-
CO2	3	2	3	2	3	3	-	1	1	1	2	3	2	1
CO3	2	2	2	2	3	2	1	-	1	1	1	2	1	1
CO4	1	2	2	1	2	2	-	2	1	1	1	1	1	1
CO5	3	3	3	2	3	3	1	1	1	1	2	3	2	2

1 - Slightly; 2 - Moderately; 3 – Substantially

B.Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
3140617	MC	Artificial Intelligence & Machine Learning	50	10	20	20	40	30	30	200	3	-	2	4

Artificial Intelligence & Machine Learning (3140617)

Course Objectives: To provide the fundamental knowledge of Artificial Intelligence, Neural Network and Machine Learning, to present the basic representation and reasoning paradigms used in AI & ML, to understand the working of techniques used in AI & ML.

Unit – I Introducing Artificial Intelligence: Definition, Goals of AI, Task of AI, Computation, Psychology and Cognitive Science. Perception, Understanding, and Action. Artificial intelligence vs machine learning vs deep learning and other related fields. Applications of Artificial intelligence and Machine Learning in the real world.

Unit–II Problem, Problem Space and Search: Production System, Blind Search: BFS & DFS, Heuristic Search, Hill Climbing, Best First Search. **Introduction to Neural Networks:** History, Biological Neuron, Artificial Neural Network, Neural Network Architectures, Classification, & Clustering

Unit – III Introduction to Machine Learning: Traditional Programming vs Machine learning. Key Elements of Machine Learning: Representation, process (Data Collection, Data Preparation, Model selection, Model Training, Model Evaluation and Prediction), Evaluation and Optimization. Types of Learning: Supervised, Unsupervised and reinforcement learning. Regression vs classification problems.

Unit – IV: Supervised Machine Learning: Linear regression: implementation, applications & performance parameters. Decision tree classifier, terminology, classification vs regression trees, tree creation with Gini index and information gain, IDE3algorithms, applications and performance parameters. Random forest classifier. Case study on regression and classification for solving real world problems.

Unit – V: Unsupervised Machine Learning: Introduction, types: Partitioning, density based, DBSCAN, distribution model-based, hierarchical, Agglomerative and Divisive, Common Distance measures, K-means clustering algorithm. Case study on clustering for solving real world problems.

Text Books/ Reference Books:

1. Artificial Intelligence: A Modern Approach by Stuart J. Russell and Peter Norvig, PrenticeHall.
2. Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.
3. Introduction to AI & Expert System: Dan W. Patterson, PHI.
4. Pattern Recognition and Machine Learning, Christopher M. Bishop
5. Introduction to Machine Learning using Python: Sarah Guido
6. Machine Learning in Action: Peter Harrington

Course Outcomes:

After successful completion of the course, students will be able to:

CO1. Explain basic concepts of Artificial Intelligence & Machine Learning.
CO2. **Describe** the techniques for search and processing.
CO3. Compare AI, ANN & Machine Learning techniques.
CO4. Apply Supervised ML techniques to solve real world problems
CO5. Apply Unsupervised ML techniques to solve real world problems

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	2	2	1	1	2	1	-	3	-	-	-
CO2	2	3	1	1	3	3	-	1	1	1	3	3	2	2
CO3	3	2	2	2	3	2	1	-	1	1	1	2	1	1
CO4	2	2	2	1	-	2	-	1	1	1	1	2	2	2
CO5	2	3	3	2	3	3	1	1	1	1	2	3	2	3

1 - Slightly; 2 - Moderately; 3 – Substantially

Annexure VI

Item -7

To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered for batch admitted in 2023-24 **in online mode under Departmental Elective (DE) Course** with credit transfer, **in the VI Semester.**

S. No	Category Code	Course Code	Name of The course	Duration of the Course in weeks	Course Registration		Name of the Mentor Faculty
					Start Date	End Date	
Electronics Engineering							
1	DE-1	3140665	RF and Microwave Networks	12	19-01-2026	10-04-2026	Dr. Prateek Bhadouria
2		3140662	Digital IC Design	12	19-01-2026	10-04-2026	Dr. Vikas Mahor
3		3140663	Fuzzy sets ,logic and System &Applications	12	19-01-2026	10-04-2026	Dr. Hemant Choubey

Annexure VII

Item 8

To review and finalize the courses & syllabi to be offered (for batch admitted in 2023-24) under the **Open Category (OC) Courses to be offered in traditional mode for B Tech VI semester** of other departments along with their COs.

S. No	Category	Subject Code	Subject Name
1	OC-1	900119	Optical Communication
2	OC-1	900118	MEMS &Mechatronics

B.Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
900119	OC	Optical Communication	50	10	20	20	-	-		100	3	-	-	3

Optical Communication (900119)

Course objectives: This course gives information to the students about the basics of signal propagation through optical fibers, fiber fabrication, fiber losses, components of optical fiber communication and optical networks.

Unit I - Overview of Optical Fiber Communications: Optical laws and definitions, Optical fiber modes and configurations, Mode theory, Step Index and Graded Index (GI) fibers ,Single mode and Multimode, Derivation for numerical aperture, V number and modes supported by step index fiber, Mode field diameter, Modes supported by GI fibers.

Unit II - Fabrication and Coupling of Optical Fiber: Fiber materials: Glass fiber, Active glass fiber, Plastic optical fiber, Fiber fabrication techniques: Outside vapour phase oxidation, Vapour phase axial deposition, Modified chemical vapour deposition, Plasma activated chemical vapour deposition, Fiber splicing techniques, Optical fiber connectors and couplers.

Unit III - Optical Sources and Detectors: Introduction to optical sources, LED'S, LASER diodes, Model reflection noise, Power launching and Coupling, Population inversion, Photo-detectors, PIN, Avalanche detector, Response time, Avalanche multiplication noise.

Unit IV - Signal Degradation in Optical Fibers: Signal degradation in optical fibers, Attenuation losses, Signal distortion in optical wave guides, Material dispersion, Wave guide dispersion, Chromatic dispersion, Inter-modal distortion, Pulse broadening in Graded index fibers, Mode coupling.

Unit V - Optical Communication and Networks: Coherent optical fiber communication, Modulation techniques for Homodyne and Heterodyne systems, Rise time budget and link power budget, eye pattern, optical network elements and topologies, SONET / SDH.

Text Books:

1. Optical Fiber Communication – By G. Keiser , Tata McGraw-Hill Education
2. Optical Fiber Communication- By John M. Senior, Prentice Hall

Reference Books:

1. Optical Communication Networks – By Biswanath Mukherjee , McGraw-Hill
2. Fiber- Optic communication systems - By Govind P. Agrawal, John Wiley & sons

Course Outcomes:

After the completion of this course students will be able to:

CO1: Explain the basic elements of optical fiber transmission.
CO2: Discuss fiber fabrication, splicing and optical connectors.
CO3: Describe the working of optical sources and optical detectors.
CO4: Calculate the channel impairments like losses and dispersion.
CO5: Analyze the Coherent optical transmission system and optical networks.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	2	2	2	2	1	1	1	3	3	3
CO2	3	3	1	3	2	2	2	2	1	1	1	3	3	3
CO3	3	3	1	1	3	2	2	2	1	1	1	3	3	3
CO4	3	2	1	1	3	2	2	2	1	1	1	3	3	3
CO5	3	2	1	1	3	2	2	2	1	1	1	3	3	3

1 - Slightly; 2 - Moderately; 3 – Substantially

B.Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
900118	OC	MEMS &Mechatronics	50	10	20	20	-	-		100	3	-	-	3

MEMS &Mechatronics (900118)

Course Objectives: To understand basics architecture of the mechatronics system; design and characteristics of different sensors, mechanical and electrical actuators and their selection for design of mechatronic systems

UNIT-I

Introduction to MEMS: basics of MEMS (Micro-Electro Mechanical Systems), need of miniaturization, micro fabrication, micromachining, material for MEMS, types of MEMS: RF-MEMS, Bio-MEMS, etc, Various applications.

UNIT-II
Introduction to Mechatronics systems: Basic building blocks of mechatronic systems. Mechatronics key elements, Mechatronics in home, office and industry automation, Scope of Mechatronics, advantages of Mechatronics, pre-requisites for Mechatronics.

UNIT-III
Sensors: Performance characteristics of sensors and transducers, position and speed measurement; proximity sensor, potentiometer, LVDT, digital optical encoder, stress and strain measurement; strain gauges, force measurement with load cells, temperature measurement; thermometer, thermocouple, vibration and acceleration measurement, pressure and flow measurement.

UNIT-IV
Actuators and Control unit: electromagnetic principles, solenoids and relays, electric motors, DC motors, stepper motors, Hydraulic and pneumatic actuators, micro actuators. Piezoelectric actuators. Selection criteria for sensors and actuators, interfacing of sensors and actuators, Control unit; Microcontroller, PLC.

UNIT-V
Mechatronics System: Manipulator/ Robotic arm, quad copter, mobile robots, Hexapod Robots, Humanoid and Biped Robots.

Text Books

1. Introduction to Mechatronics and Measurement Systems, Alciatore and Histand Tata McGraw-Hill

Reference Books

1. Mechatronics, Kenji Uchino and Jayne R. Giniewicz, publication: Marcel Dekker, Inc.
2. Applied Mechatronics- A. Smaili and F. Mrad, OXFORD university press.
3. Mechatronics System Design, Shetty and Kolk CENGAGE Learning, India Edition
4. Mechatronics, Necsulescu, Pearson education.

Course Outcome:

After completion of this course, students will be able to:

CO1. **Interpret** MEMS, their types and applications.

CO2. **Analyse** the mechatronics system.
CO3. **Analyse** the performance characteristics of sensors and actuators.
CO4. **Interface** sensors and actuators using control unit such as microcontroller and PLC.
CO5. **Construct** the prototype of manual robotic arm.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	2	2	2	2	1	1	1	1	3	3
CO2	3	3	1	3	2	2	2	2	1	1	1	3	1	3
CO3	3	3	1	1	3	2	2	2	1	1	1	3	3	3
CO4	3	2	1	1	3	2	2	2	1	1	1	2	2	3
CO5	3	2	1	1	3	2	2	2	1	1	1	2	2	3

1 - Slightly; 2 - Moderately; 3 – Substantially

Annexure VIII

Item 9

To review and finalize the **Experiment list/ Lab manual/Skill based mini-project** for all the Laboratory Courses to be offered in **B.Tech.VI semester *(*for batch admitted in 2023-24).**

1	DC	3140617	Artificial Intelligence & Machine Learning Lab
2	DC	3140616	Microcontroller Systems and Applications Lab
3	DLC	3140618	Minor Project-II

B. Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
3140617	DC	Artificial Intelligence and Machine Learning Lab					40	30	30	100	-	-	2	1

Artificial Intelligence & Machine Learning Lab (3140617)

Course Objectives: To enhance skills in model training, hyper parameter tuning, and validation, ensuring robust and optimized machine learning solutions.

List of Experiments

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, Set.
2. Solve problems using decision and looping statements.
3. Apply Python built-in data types: Strings, list, Tuples, Dictionary, Set and their methods to solve any given problem
4. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
5. Computation on NumPy arrays using Universal Functions and Mathematical methods.
6. ImportaCSVfileandperformvariousStatisticalandComparisonoperations on rows/columns
7. Create Pandas Series and Data Frame from various inputs
8. Import any CSV file to Pandas Data Frame and perform the following:
    1. Visualizethefirstandlast10records
    2. Getthe shape, index and column details
    3. Select/Delete there cords(rows)/columns based on conditions.
    4. Perform ranking and sorting operations.
    5. Dore quired statistical operations on the given columns.
6. Find the count and uniqueness of the given categorical values.
9. Import any CSV file to Pandas Data Frame and perform the following:
    1. Handle missing data by detecting and dropping/filling missing values.
    2. Transform data using different methods.
    3. Detect and filter outliers.
    4. Perform Vectorized String operations on Pandas Series.
    5. Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.
10. Use scikit-learn package in python to implement following machine learning models to solve real world problems using open source datasets:
    1. Linear Regression model.
    2. Multi-linear regression model.
    3. Decision tree classification model.
    4. Random forest model.
    5. SVM model.
    6. K-means clustering model

B. Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
3140617	DC	Artificial Intelligence and Machine Learning Lab					40	30	30	100	-	-	2	1

Artificial Intelligence and Machine Learning Lab (3140617)

Skill Based Mini Project

1. Write a program to Predicting Iris Flower Species [Dataset: Iris dataset (available in scikit-learn).]
2. Write a program for Handwritten Digits Recognition [Dataset: MNIST dataset of hand written digits.]
3. Write a program for Sentiment Analysis on Movie Reviews [Dataset: IMDb movie reviews dataset.]
4. Write a program to Predict House Prices [Dataset: Housing price data from Kaggle.]
5. Write a program for Spam Email Detection [Dataset: Enron Email Dataset.]
6. Write a program for Image Classification on CIFAR-10 [Dataset: CIFAR-10 dataset.]
7. Write a program for Credit Card Fraud Detection [Dataset: Credit Card Fraud Detection dataset from Kaggle.]
8. Write a program for Predicting Stock Prices [Dataset: Yahoo Finance or Alpha Vantage API.]
9. Write a program for Customer Segmentation [Dataset: Online Retail Data from UCI Machine Learning Repository.]
10. Write a program to Digit Recognition in Sign Language [Dataset: ASL Alphabet dataset.]
11. Write a program for Predicting Diabetes Onset [Dataset: Diabetes dataset from UCI ML Repository.]
12. Write a program for Facial Recognition [Dataset: Labeled Faces in the Wild (LFW) dataset.]
13. Write a program for Movie Recommendation System [Dataset: Movie Lens dataset.]
14. Write a program for Predicting Employee Churn [Dataset: Human Resources Analytics dataset from Kaggle.]
15. Write a program for Text Generation with LSTM [Dataset: Various books, articles, or Kaggle text datasets.]
16. Write a program for Fake News Detection [Dataset: Fake news dataset from Kaggle.]
17. Write a program for Predicting Wine Quality [Dataset: Wine Quality dataset from UCI ML Repository.]
18. Write a program for Object Detection with YOLO [Dataset: COCO (Common Objects in Context) dataset.]
19. Write a program for Customer Lifetime Value Prediction [Dataset: Online Retail Data from UCI ML Repository.]
20. Write a program for Predicting Cardiovascular Disease [Dataset: Framingham Heart Study dataset.]

B. Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
3140616	DC	Microcontroller Systems and Applications Lab					40	30	30	100	-	-	2	1

Microcontroller Systems and Applications Lab (3140616)

Course Objectives: The objective of this course is to provide students with hands-on experience in designing, implementing, and testing embedded systems using microcontrollers.

List of Experiments

1. Write an assembly language program to transfer a block of data bytes from source memory to destination memory and demonstrate on 8051 microcontroller board.
2. Write an assembly language program to perform Addition/subtraction of a given number and demonstrate on 8051 microcontroller board.
3. Write an assembly language program to demonstrate conditional bit jump, conditional byte jump, unconditional jump, call and return instructions on 8051 microcontroller board.
4. Write an assembly language program to demonstrate the basic interface between an LCD display and 4 x 4matrix key board and demonstrate on 8051 microcontroller board.
5. Write an assembly language program to implement a basic temperature sensor using an ADC output is displayed on a 2x16 LCD and demonstrate on 8051 microcontroller board.
6. Write an assembly language program to implement the basic wave form generation using DAC, output is displayed on a CRO and demonstrate on 8051 microcontroller board.
7. Write an Arduino IDE program for Blinking an LED with a delay of 2 seconds and demonstrate on 8051 microcontroller Ardunio board.
8. Write an Arduino IDE program for to demonstrate automatic traffic light control using Ardunio board. Turn ON Red LED for 4 seconds, Green LED for 5 seconds, Yellow for 2seconds.
9. Write an Arduino IDE program for Blinking an 5 LEDs with a delay of 2 seconds in a sequence.
10. Write an Arduino IDE program for connecting a servo motor to Arduino board and rotate in clockwise and anti-clockwise direction using switches.

Course Outcomes:
After successful completion of the course, students will be able to:
CO1. Develop 8051 assembly language programming skills for the various arithmetic and logical operations.
CO2. Demonstrate interfacing of 8051 microcontroller board with various interfacing devices.
CO3. Design Arduino board based automated electronic systems.

B. Tech. VI Semester (Electronics Engineering)

Subject Code	Category Code	Subject Name	Theory Slot				Practical Slot			Total Marks	Contact Hr/week			Total Credits
			End Sem Marks	Proficiency in Subject course	Mid Sem Marks	Quiz/Assignment Marks	End Sem Mark	Lab work & Sessional Mark	Skill based mini project		L	T	P	
3140616	DC	Microcontroller Systems and Applications Lab					40	30	30	100	-	-	2	1

Microcontroller Systems and Applications Lab (3140616)

Skill Based Mini Project

1. Design and simulate Arduino based Temperature and Humidity monitoring system with DHT22 sensor on Proteus.
2. Design and simulate Arduino Password Based Door Lock System on Proteus.
3. Design and simulate Digital voltmeter using Arduino UNO Range: 0-50 volt Using SIMULINO UNO on Proteus.
4. Design and simulate Automatic Door Open System with Visitor Counter using ARDUINO UNO R3 on Proteus.
5. Design and simulate Arduino based light sensor using LDR on Proteus.
6. Design and simulate Arduino based Temperature and Humidity monitoring system with DHT22 sensor on Proteus.
7. Simulate a system to measure temperature using an LM35 sensor and display it on an LCD.
8. Design and simulate a traffic light control system with a pedestrian crossing signal.
9. Simulate a digital clock with a 7-segment display.
10. Simulate a motion detection system with an alarm using a PIR sensor.

Annexure IX

Item 10

To review the PO attainment, CO-PO mapping matrix and action to be taken to improve PO attainment level.

https://drive.google.com/file/d/15-zfP-N_nmqeBdw7YRdpfxEs-KixWqe1/view?usp=sharing

Annexure X

Item 11

To review curricula feedback from various stakeholders, its analysis and impact.

Alumni Feedback
https://docs.google.com/document/d/1sgEQYVMs4h_yuqeB1pboJ3FRaSIKSEo/edit?usp=sharing&ouid=101619927645802630196&rtpof=true&sd=true

Employer Feedback
https://docs.google.com/document/d/1ZYQxpQ4QqeJyys9NTIpd_Ka8lb6D_Uz/edit?usp=sharing&ouid=101619927645802630196&rtpof=true&sd=true

Student Curriculum Feedback
https://drive.google.com/file/d/1AUcRcYxdGB-pWcr8pPOjqoMCcH6plzA4/view?usp=sharing

Teacher Curriculum Feedback
https://drive.google.com/file/d/1MB5H2hkJpNqT8yk56SUx1YZCyYWYpBNh/view?usp=sharing