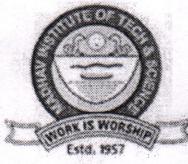


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माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर  
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR  
Deemed University  
(Declared under Distinct Category by Ministry of Education, Government of India)  
NAAC ACCREDITED WITH A++ Grade  
Gola Ka Mandir, Gwalior (M.P.) - 474005, INDIA  
Ph.: +91-751-2409300, E-mail: vicechancellor@mitsgwalior.in, Website: www.mitsgwalior.in



MITS

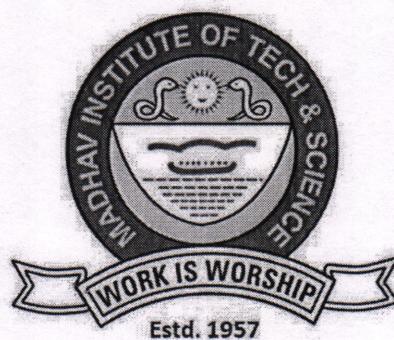
# Minutes

of

## Meeting

### BOARD OF STUDIES

September 12<sup>th</sup>, 2024



DEPARTMENT OF ELECTRICAL ENGINEERING  
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE-DU, GWALIOR



Date: 12-09-2024

## Minutes of Meeting Board of Studies

The Board of Studies (BoS) meeting of the Electrical Engineering department was held on 12<sup>th</sup> September 2024 at 4:00 PM onwards in hybrid mode. Following external members were invited in addition to the faculty members of the department:

1. Dr. Jawar Singh, Professor, Electrical Engineering Department IIT Patna (VC Nominee)
2. Dr. Manisha Dubey, Professor, Electrical Engineering Department, MANIT, Bhopal ((VC Nominee))

Above mentioned External experts and the following Internal members attended the meeting:

1. Dr. Manjaree Pandit, Professor & Dean Faculty of Engg. & Technology
2. Dr. A.K. Wadhwani, Professor
3. Dr. Sulochana Wadhwani, Professor & Head
4. Dr. Shishir Dixit, Professor
5. Prof. Ashis Patra, Associate Professor
6. Dr. Himmat Singh, Assistant Professor
7. Prof Rakesh Narvey, Assistant Professor
8. Dr. Vijay Bhuria, Assistant Professor

In addition, following internal faculty member were also present:

1. Prof Kuldeep Kumar Swarnkar, Assistant Professor
2. Prof Vishal Chaudhary, Assistant Professor

To Agenda-wise summary of the BoS meeting is as follows:

BoS Agenda Items	
EE Item 1	To propose the scheme structure for the Batch admitted in 2024-25 academic session under the Madhav Institute of Technology & Science-Deemed University (MITS-DU) (The total credits from I-VIII semester should not be less than 160 for this batch).  The scheme structure of for the Batch admitted in 2024-25 academic session under the Madhav Institute of Technology & Science-Deemed University (MITS-DU) is discussed and finalized. The scheme structure is annexed as Annexure -1.
EE Item 2	To review & finalize the syllabi for all courses of B. Tech I Semester (for batch admitted in 2024-25) under the flexible curriculum along with their COs.  The syllabi for all courses of B. Tech I Semester (for batch admitted in 2024-25) under the flexible curriculum along with their COs is discussed and finalized and annexed as Annexure -2.
EE Item 3	To review and finalize the Experiment list/ Lab manual for all the Laboratory Courses and Micro Project-I to be offered in B.Tech. I semester along with their COs.  The Experiment list/ Lab manual for all the Laboratory Courses and Micro Project-I to be

(a-2)



	<p>offered in B.Tech. I semester along with their COs is prepared and discussed with the internal &amp; external members. The finalized list is annexed at Annexure-3.</p>
EE Item 4	<p>To discuss and recommend the scheme structure for the Batch admitted in 2024-25 academic session &amp; syllabi of I semester PG Programme under the Madhav Institute of Technology &amp; Science-Deemed University (MITS-DU) (M.E./M.Tech./MCA/MBA/MUP) along with their Course Outcomes (COs)</p> <p><b>The scheme structure of for the ME admitted in 2024-25 academic session under the Madhav Institute of Technology &amp; Science-Deemed University (MITS-DU) is discussed and finalized. The scheme structure is annexed as Annexure-4 and the Syllabus is at Annexure-5.</b></p>
EE Item 5	<p>To review and finalize the syllabus/module of Classified Novel Engaging Course to be offered in I semester of PG programme.</p> <p><b>The syllabus/module of Classified Novel Engaging Course to be offered in I semester of PG programme is prepared and finalized and is Annexed at Annexure-6.</b></p>
EE Item 6	<p>To review and finalize the scheme structure for the Batch admitted in 2024-25 academic session &amp; syllabi of Research Methodology and Ethics Ph.D. Programme under the Madhav Institute of Technology &amp; Science-Deemed University (MITS-DU)</p> <p><b>The scheme structure for the Batch admitted in 2024-25 academic session &amp; syllabi of Research Methodology and Ethics Ph.D. Programme under the Madhav Institute of Technology &amp; Science-Deemed University (MITS-DU) is finalized and is annexed as Annexure-7.</b></p>
EE Item 7	<p>Any other matter: The feedback from the external members:</p> <ul style="list-style-type: none"><li>Regarding the mode of examination, it is suggested by the external members that Minor Evaluations should be conducted in MCQ mode whereas the final evaluation should be in pen paper mode for core subjects.</li><li>In II semester Scheme, there must be a Laboratory course in Network Analysis and , Analog &amp; Digital lab is missing</li><li>MAC and MWS should not be shown in the scheme. It should be conducted separately in the semester.</li><li>Electrical engineering scheme focused on core subject wise rather than multidisciplinary subjects</li><li>For PhD programme, Minor1 &amp; Minor 2 evaluations should be of 30 marks.</li></ul>

The meeting is ended with Vote of Thanks by the Chairperson.

Dr Vijay Bhuria

Prof Rakesh Narvey

Dr Himmat Singh

Prof Ashis Patra

Dr Shishir Dixit

Dr S. Wadhwani

Dr A.K. Wadhwani

Dr M Pandit

Present (online)  
Dr Jawar Singh  
Professor, IIT Patna

Present (online)  
Dr Manisha Dubey  
Professor, MANIT Bhopal

Dean  
Faculty of Engineering & Technology  
MITS-DU



## Annexure-I

### **Semester-Wise General Scheme Structure & Important Guidelines for Flexible Curriculum**

**(Batch admitted in Academic Session 2024-25 onwards)**

#### **Abbreviations Used**

<b>L</b>	Lecture
<b>T</b>	Tutorial
<b>P</b>	Practical
<b>HSMC</b>	Humanities and Social Sciences including Management Courses
<b>BSC</b>	Basic Science Courses
<b>ESC</b>	Engineering Science Courses
<b>DC</b>	Departmental Core
<b>DE</b>	Departmental Elective
<b>SPC</b>	Specialization Courses
<b>OC</b>	Open Category
<b>DLC</b>	Departmental Laboratory Courses
<b>MOOC</b>	Massive Open Online Course
<b>MWS</b>	Mandatory Workshop
<b>SP</b>	Semester Proficiency
<b>SIP</b>	Summer Internship Project
<b>SLP</b>	Self-learning Presentation
<b>PDC</b>	Professional Development Component
<b>PBL</b>	Project Based Learning
<b>PC</b>	Professional Certification
<b>MAC</b>	Mandatory Audit Course
<b>NEC</b>	Novel Engaging Course

*(Handwritten signatures and initials are present over the bottom left corner of the table.)*



**Department of Electrical Engineering**

**Scheme of Evaluation**

**B. Tech. I Semester (Electrical Engineering) (for batch admitted in academic session 2024-25)**

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation				
				Theory Block			Practical Block				Major Evaluation	Continuous Evaluation	Lab Work & Sessional	Major Evaluation							
				Minor Evaluation I	Minor Evaluation II	Quiz/Assignment															
1.	13241101	DC	Electrical Engineering Materials	20	20	30	30	-	-	100	3	-	-	3	Face to Face	MCQ	2Hrs				
2.	13241102	ESC	Computer Programming	20	20	30	30	-	-	100	2	-	-	2	Face to Face	MCQ	2 Hrs				
3.	13241103	ESC	Basic Civil Engineering & Mechanics	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs				
4.	13241104	ESC	Basic Mechanical Engineering	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs				
5.	13241105	ESC	Basic Electrical & Electronics Engineering	20	20	30	30	-	-	100	2	-	-	2	Face to Face	MCQ	2Hrs				
6.	13241106	DLC	Computer Programming Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-				
7.	13241107	DLC	Electrical & Electronics Engineering Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-				
8.	13241108	SP	Semester Proficiency <sup>1</sup>	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-				
9.	13241109	PBL	Micro Project-I <sup>2</sup>	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-				
10.	13241110	ESC	Engineering Physics Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-				
11.	NEC:XXXX	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	-	50	50	-	1	-	Interactive	SO	-				
<b>Total</b>				<b>100</b>	<b>100</b>	<b>150</b>	<b>150</b>	<b>330</b>	<b>170</b>	<b>1000</b>	<b>11</b>	<b>3</b>	<b>10</b>	<b>19</b>	<b>-</b>	<b>-</b>	<b>-</b>				
12.	13241111	MAC	Universal Human Values & Professional Ethics (UHVPE)	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs				
13.	13241112	MWS	Mandatory Workshop on Indian Constitution and Traditional Knowledge at Department Level (Duration: Two Days)									GRADE		Interactive	MCQ	-					
Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.																					

**Skill Internship Program (Soft Skill): Minimum 45 hours duration: To be credited in II Semester.**

<sup>1</sup>Semester Proficiency— includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses.

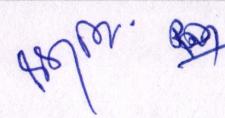
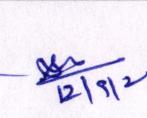
MCQ: Multiple Choice Question    AO: Assignment + Oral    PP: Pen Paper    SO: Submission + Oral    OB: Open Book

<sup>2</sup>This course will be distributed in the I Year Group wise among the programmes where ever required.

<sup>3</sup>Micro Project-I will be presented and evaluated through an interdisciplinary project evaluation committee.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	5	1	0	0	0	2	1	1	0	0	0	1	1	1

Mode of Learning						Mode of Examination						Total Credits	
Theory		Lab				Theory		Lab					
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	PP	MCQ	OB	SO	AO			
13	-	1	1	3	1	6	7	-	3	3	19		
68.4%	-	5.3%	5.3%	15.8%	5.3%	31.6%	36.8%	-	15.8%	15.8%	Credits %		

  
  
  
  

  
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Department of Electrical Engineering

## **Scheme of Evaluation**

## **B. Tech. II Semester (*Electrical Engineering*)**

(for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation.					
				Theory Block			Practical Block				L	T	P									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation													
				Minor Evaluation I	Minor Evaluation II	Quiz/Assignment		Lab Work & Sessional	Major Evaluation													
1.	13241201	DC	Network Analysis	20	20	30	30	-	-	100	3	-	-	3	Face to Face	MCQ	2 Hrs					
2.	13241202	DC	Measurement & Instrumentation	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs					
3.	13241203	DC	Analog & Digital Electronics	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2Hrs					
4.	13241204	ESC	Engineering Drawing	20	20	30	30	-	-	100	1	2	-	3	Face to Face	PP	2 Hrs					
5.	13241205	BSC	Calculus and Laplace Transforms	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs					
6.	13241206	DLC	Measurement & Instrumentation Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-					
7.	13241207	DLC	Problem Solving through Python Programming	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-					
8.	13241208	SP	Semester Proficiency <sup>§</sup>	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-					
9.	13241209	PBL	Micro Project-II <sup>#</sup> (Analog & Digital Electronics based)	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-					
10.	13241210	DLC	Engineering Chemistry Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-					
11.	13241211	HSMC	Language Lab	-	-	-	-	70	30	100	-	-	2	1	Blended	AO	-					
12.	NECXxxxx	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-					
13.	SIP1xxxx	SIP	Skill Internship Program (Soft Skill)	-	-	-	-	42	18	60	-	-	-	2**	Experiential	SO	-					
Total				100	100	150	150	442	218	1160	11	05	12	24	-	-	-					
14.	13241212	MAC	Sustainability & Environmental Science	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs					
15.	13241213	MWS	Mandatory Workshop on Indian Knowledge System at Department Level(Duration: Two Days)											GRADE	Interactive	MCQ	-					

Summer Semester of six-eight week duration will be conducted for makeup of I & II semester examination.

<sup>5</sup>Semester Proficiency— includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

**MCO:** Multiple Choice Question      **AO:** Assignment + Oral      **PP:** Pen Paper      **SO:** Submission + Oral      **QB:** Open Book

\*Micro Project-II will be presented and evaluated through an interdisciplinary project evaluation committee.

HSMC BSC ESC DC DE SPC OC DLC NEC SP SIP SLP PDC PBL MAC MWS

Mode of Learning							Mode of Examination					Total Credits	
Theory		Lab					Theory			Lab			
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO		
15	-	1	1	5	1	1	6	9	-	5	4	24	
62.5%	0.0%	4.2%	4.2%	20.8%	4.2%	4.2%	25.0%	37.5%	0.0%	20.8%	16.7%	Credits %	



**Department of Electrical Engineering**

**Scheme of Evaluation**

**B. Tech. III Semester (Electrical Engineering)**

*(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation							
				Theory Block			Practical Block				Major Evaluation	Continuous Evaluation	Lab Work & Sessional	Major Evaluation	L	T	P							
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Lab Work & Sessional															
				Minor Evaluation I	Minor Evaluation II	Quiz/Assignment																		
1.	13242101	BSC	Differential Equations, Matrices & Fourier Series	20	20	30	30	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs							
2.	13242102	DC	Data Structures	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs							
3.	13242103	DC	Electromagnetic Field Theory	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs							
4.	13242104	DC	Electrical Machines-I	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs							
5.	13242105	DC	Generation, Transmission & Distribution of Electric Power	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs							
6.	13242106	DLC	Electrical Machines-I Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-							
7.	13242107	DLC	Generation, Transmission & Distribution of Electric Power Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-							
8.	13242108	SP	Semester Proficiency <sup>s</sup>	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-							
9.	13242109	PBL	Macro Project-I <sup>h</sup>	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-							
10.	13242110	SLP	Self-learning/Presentation <sup>ss</sup> (SWAYAM/NPTEL/MOOC)	-	-	-	-	40	-	40	-	-	2	1	Mentoring Blended	SO	-							
11.	NECXXXX	NEC	Novel Engaging Course (Activity Based Learning)	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-							
Total				100	100	150	150	300	140	940	11	05	10	21	-	-	-							
12.	13242111	MAC	Cyber Security	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs							
13.	13242112	MWS	Mandatory Workshop on Internet of Things(IoT) at Department Level(Duration: Two Days)											GRADE	Interactive	MCQ	-							

**Skill Internship Project : Minimum 30 hours duration: To be credited in IV Semester**

<sup>s</sup>Semester Proficiency- includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral OB: Open Book

<sup>h</sup> Macro Project-I will be presented and evaluated through an interdisciplinary project evaluation committee. <sup>\*\*</sup> These credits will be transferred from Skill Internship Program.

<sup>ss</sup> Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance and presentation.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	1	0	4	0	0	0	2	1	1	0	1	0	1	1	1

Mode of Learning								Mode of Examination						Total Credits	
Theory		Lab						Theory		Lab					
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO				
15	-	1	1	2	1	1	6	9	-	4	2	21			
71.4%	0.0%	4.8%	4.8%	9.5%	4.8%	4.8%	28.6%	42.9%	0.0%	19.0%	9.5%	Credits %			

*(Handwritten Signatures/Initials)*



**Department of Electrical Engineering**

**Scheme of Evaluation**

**B. Tech. IV Semester (Electrical Engineering)**

(for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation				
				Theory Block			Practical Block				Major Evaluation	Continuous Evaluation		Lab Work & Sessional							
				Minor Evaluation I	Minor Evaluation II	Quiz/Assignment						Continuous Evaluation	Major Evaluation								
1.	13242201	DC	Electrical Machines-II	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs				
2.	13242202	DC	Power System Analysis	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs				
3.	13242203	DC	Power Electronics	20	20	30	30	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs				
4.	13242204	DC	Signal & Systems	20	20	30	30	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs				
5.	13242205	DC	Microprocessor & Microcontroller	20	20	30	30	-	-	100	3	-	-	3	Face to Face	MCQ	2 Hrs				
6.	13242206	DLC	Electrical Machines-II Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-				
7.	13242207	DLC	Power System Analysis Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-				
8.	13242208	DLC	Power Electronics & Drives Lab	-	-	-	-	70	30	100	-	-	2	1	Experimental	AO	-				
9.	13242209	SP	Semester Proficiency <sup>s</sup>	-	-	-	-	50	-	50	-	-	2	1	Face to Face	SO	-				
10.	13242210	PBL	Macro Project-II <sup>#</sup>	-	-	-	-	70	30	100	-	-	2	1	Experiential	SO	-				
11.	13242210	PC	Professional Certification	-	-	-	-	50	-	50	-	-	2	1	Blended	SO	-				
12.	NECXXXX	NEC	Novel Engaging Course	-	-	-	-	-	50	50	-	1	-	1	Interactive	SO	-				
13.	SIP2XXXX	SIP	Skill Internship Project	-	-	-	-	42	18	60	-	-	-	2**	Experiential	SO	-				
Total				100	100	150	150	422	188	1110	11	05	12	24	-	-	-				
14.	13242211	MAC	Project Management, Economics & Financing	20	20	30	30	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs				
15.	13242212	MWS	Mandatory Workshop on Computer Vision at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-				
16.	13242213	MWS	Mandatory Workshop on Life Skills at Department Level (Duration: Two Days)											GRADE	Interactive	MCQ	-				

Summer Semester of six-eight week duration will be conducted for makeup of previous semester examination.

Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree

<sup>s</sup>Semester Proficiency— includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral OB: Open Book

<sup>#</sup>Macro Project-II will be presented and evaluated through an interdisciplinary project evaluation committee.

<sup>\*\*</sup> These credits will be transferred from Skill Internship Project.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
1	0	0	5	0	0	0	3	1	1	1	0	0	1	1	2

Mode of Learning							Mode of Examination							Total Credits
Theory			Lab				Theory			Lab				Total Credits
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO			
15	-	1	1	5	1	1	6	9	-	5	4			24
62.5%	0.0%	4.2%	4.2%	20.8%	4.2%	4.2%	25.0%	37.5%	0.0%	20.8%	16.7%			Credits %

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**Department of Electrical Engineering**

**Scheme of Evaluation**

**B. Tech. V Semester (Electrical Engineering)**

*(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted							Total Marks	Contact Hours per week	Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation					
				Theory Block			Practical Block		MOOCs												
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation	Assignment	Exam										
				Minor Evaluation I	Minor Evaluation II	Quiz/Assignment		Lab Work & Sessional													
1.	13243101	DC	Switchgear & Protection	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face				
2.	13243102	DC	Communication System Theory	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face				
3.	13243103	DC	Data Science	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face				
4.	132431xx	DE	Departmental Elective*(DE-1)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online				
5.	132431yy	SPC	Specialization Course (SPC-1)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face				
6.	13243104	DLC	Switchgear & Protection Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental				
7.	13243105	DLC	Data Science Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental				
8.	13243106	SP	Semester Proficiency\$	-	-	-	-	50	-	-	-	50	-	-	2	1	Face to Face				
9.	13243107	PBL	Cornerstone Project	-	-	-	-	70	30	-	-	100	-	-	4	2	Experiential				
Total				80	80	120	120	260	90	25	75	850	11	04	10	20	-				
10.	13243108	MAC	Supply Chain Management	20	20	30	30	-	-	-	-	100	2	-	-	GRADE	Blended				
11.	13243109	MWS	Mandatory Workshop on Blockchain at Department Level(Duration: Two Days)													GRADE	Interactive				

**Additional Course for Honours or Minor Degree:** Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree

\*Semester Proficiency- includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral OB: Open Book

\* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	3	1	1	0	2	0	1	0	0	0	1	1	1

Mode of Learning							Mode of Examination							Total Credits	
Theory		Lab					Theory		Lab						
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO				
12	3	0	2	2	1	0	6	9	-	3	2				20
60.0%	15.0%	0.0%	10.0%	10.0%	5.0%	0.0%	30.0%	45.0%	0.0%	15.0%	10.0%				Credits %

*(Handwritten Signatures and Stamps)*  
12/1/24



Department of Electrical Engineering

## **Scheme of Evaluation**

**B. Tech. VI Semester (Electrical Engineering )** (for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Major Evaluation	Duration of Major Evaluation.				
				Theory Block			Practical Block		MOOCs			L	T	P								
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Major Evaluation	Assignment												
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment			Lab Work & Sessional	Assignment	Exam											
1.	13243201	DC	Control Systems	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2 Hrs			
2.	13243202	DC	Artificial Intelligence & Machine Learning	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	MCQ	2Hrs			
3.	132432xx	DE	Departmental Elective*(DE-2)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs			
4.	132432yy	OC	Open Category Course (OC-1)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs			
5.	132432zz	SPC	Specialization Course (SPC-2)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face	PP	2 Hrs			
6.	13243203	DLC	Control System Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental	AO	-			
7.	13243204	DLC	Artificial Intelligence & Machine Learning Lab	-	-	-	-	70	30	-	-	100	-	-	2	1	Experimental	AO	-			
8.	13243205	SP	Semester Proficiency <sup>s</sup>	-	-	-	-	50	-	-	-	50	-	-	2	1	Face to Face	SO	-			
9.	13243206	PBL	Capstone Project	-	-	-	-	70	30	-	-	100	-	-	4	2	Experiential	SO	-			
Total				80	80	120	120	260	90	25	75	850	12	03	10	20	-	-	-			
10.	13243207	MAC	Disaster Management	20	20	30	30	-	-	-	-	100	2	-	-	GRADE	Blended	MCQ	1.5 Hrs			
11.	13243208	MWS	Mandatory Workshop on Intellectual Property Rights at Department Level(Duration: Two Days)													GRADE	Interactive	MCQ	-			

\*Semester Proficiency– includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses

**MCO: Multiple Choice Question AQ: Assignment + Oral**      **PP: Pen Paper**      **SQ: Submission + Oral**      **OB: Open Book**

\* Course run through SWAYAM/NPTEL / MOOC Learning Based Platform

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	2	1	1	1	2	0	1	0	0	0	1	1	1

Mode of Learning							Mode of Examination					Total Credits	
Theory		Lab					Theory			Lab			
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO		
12	3	0	2	2	1	0	6	9	-	3	2	20	
60.0%	15.0%	0.0%	10.0%	10.0%	5.0%	0.0%	30.0%	45.0%	0.0%	15.0%	10.0%	Credits %	



**माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर**  
**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**  
**Deemed to be University**  
(Declared under Distinct Category by Ministry of Education, Government of India)  
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Department of Electrical Engineering

## **Scheme of Evaluation**

## **B. Tech. VII Semester(*Electrical Engineering*)**

*(for batch admitted in academic session 2024-25)*

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode Of Exam.	Duration of Major Evaluation.					
				Theory Block			Practical Block		MOOCs				L	T	P									
				Continuous Evaluation			Major Evaluation	Continuous Evaluation	Lab Work & Sessional	Assignment	Exam													
				Minor Evaluation I	Minor Evaluation II	Quiz/ Assignment																		
1.	132441xx	DE	Departmental Elective (DE-3)	20	20	30	30	-	-	-	-	100	3	-	-	3	Face to Face	MCQ	2 Hrs					
2.	132441mm	DE	Departmental Elective* (DE-4)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs					
3.	132441yy	OC	Open Category Course (OC-2)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs					
4.	132441zz	SPC	Specialization Course (SPC-3)	20	20	30	30	-	-	-	-	100	2	1	-	3	Face to Face	PP	2 Hrs					
5.	13244101	SP	Semester Proficiency <sup>s</sup>	-	-	-	-	50	-	-	-	50	-	-	2	1	Face to Face	SO	-					
6.	13244102	DLC	Creative Problem Solving	-	-	-	-	70	30	-	-	100	-	-	2	1	Experiential	AO	-					
Total				60	60	90	90	120	30	25	75	550	10	02	04	14	-	-	-					
7.	13244103	MWS	Mandatory Workshop on Advanced Intellectual Property Rights at Department Level(Duration: Two Days)											GRADE	Interactive	MCQ	-	-						

<sup>3</sup>Semester Proficiency— includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in the semester courses.

**MCQ:** Multiple Choice Question      **AQ:** Assignment + Oral      **PP:** Pen Paper      **SO:** Submission + Oral      **QB:** Open Book

\* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform.

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	0	2	1	1	1	0	1	0	0	0	0	0	1

Mode of Learning							Mode of Examination					Total Credits	
Theory		Lab					Theory		Lab				
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO		
9	3	0	1	0	1	0	6	6	0	1	1	14	
64.3%	21.4%	0.0%	7.1%	0.0%	7.1%	0.0%	42.9%	42.9%	0.0%	7.1%	7.1%	Credits %	



### Department of Electrical Engineering

### Scheme of Evaluation

### B. Tech. VIII Semester(Electrical Engineering)(for batch admitted in academic session 2024-25)

S. No.	Course Code	Category Code	Course Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Learning	Mode of Exam.	Duration of Major Evaluation.				
				Theory Block			Practical Block		MOOCs			L	T	P								
				Continuous Evaluation		Major Evaluation	Continuous Evaluation	Major Evaluation	Assignment	Exam												
				Minor Evaluation I	Minor Evaluation II																	
1.	132442xx	DE	Departmental Elective* (DE-5)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs			
2.	132442yy	OC	Open Category Course*(OC-3)	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	3 Hrs			
3.	13244201	PBL	Industry Internship/Research Internship/ Innovation & Start-up	-	-	-	-	280	120	-	-	400	-	-	20	10	Experiential	SO	-			
4.	13244202	PDC	Professional Development##	-	-	-	-	-	50	-	-	50	-	-	4	2	Interactive	SO	-			
<b>Total</b>				-	-	-	-	280	170	50	150	650	06	-	24	18	-	-	-			

Summer Semester of six-eight week duration will be conducted to complete any backlog courses.

**Additional Course for Honours or Minor Degree: Permitted to opt for maximum two additional courses for the award of Honours or Minor Degree**

**MCQ:** Multiple Choice Question

**AO:** Assignment + Oral

**PP:** Pen Paper    **SO:** Submission + Oral

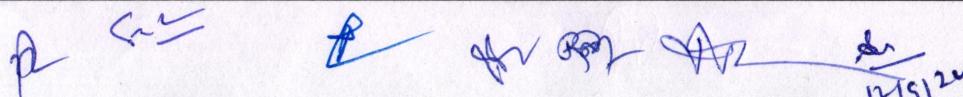
**OB:** Open Book

\*Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

## 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 programme (participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs, technical events, institute/department committees, etc.)

HSMC	BSC	ESC	DC	DE	SPC	OC	DLC	NEC	SP	SIP	SLP	PDC	PBL	MAC	MWS
0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0

Mode of Learning							Mode of Examination					Total Credits
Theory		Lab					Theory		Lab			Total Credits
Face to Face	Online	Interactive	Experiential	Experimental	Face to Face	Blended	PP	MCQ	OB	SO	AO	
0	6	2	10	0	0	0	0	6	0	12	0	18
0%	33.3%	11.1%	55.6%	0%	0%	0%	0%	33.3%	0%	66.7%	0%	Credits %


  
 P C S T H R S M 12/12/24



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**Department of Electrical Engineering**

**List of Department Elective Courses: (Traditional Mode)**

1. Power System Economics
2. Electrical Safety
3. Energy Storage Technologies
4. Electric Power Quality
5. Renewable Power Generation Systems
6. Integrated Energy Systems
7. Switched Mode Power supplies
8. Design of Electrical Apparatus
9. Utilization of Electrical Energy
10. Industrial Instrumentation and Automation
11. Electric Drives
12. HVDC & FACTS
13. Hybrid Vehicles
14. Restructured Power Systems
15. Semiconductor Based Sensors
16. Digital Circuit Design
17. Energy Auditing
18. High Voltage Engineering
19. Energy Auditing
20. Advanced Control System

**List of Open Category Courses: (Traditional Mode)**

1. Electrical Technology
2. Hybrid Vehicles
3. Biomedical Instrumentation
4. Energy Storage Systems and Applications
5. Industrial Instrumentation and Automation
6. Energy Conservation & Management
7. Applications of Electrical Equipment & Motors
8. Bio-Inspired Algorithms and Applications

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## Department of Electrical Engineering

### Specialization Courses:

#### Smart Grid Technologies:

- 1. Elements of Smart Grid System
- 2. Wide Area Monitoring and Control
- 3. Smart Grid Protection
- 4. Smart Grid Communications and Protocols

#### Power System & Energy

- 1. Sustainable and Renewable Energy Technology
- 2. Distributed Generation & Micro Grids
- 3. Power System Planning, Operation & Control
- 4. Energy Storage Technologies

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Annexure-2

## Syllabus

*Effective for Academic Year 2024-25*

# B.Tech. Program

in

# Electrical Engineering

(I Semester)



**Department of Electrical Engineering**



**Course Objectives:**

- The objective is to familiarize the students with different types of Engineering materials and their use in the field of Electrical Engineering.

**Unit-I. Conducting Materials:** The conductivity of metals and alloys, Generals properties, Classification of conducting materials, Low resistivity and high resistivity materials, their properties and applications, Electrical and mechanical properties and applications of Cu, Al, Steel, ACSR conductor, AAAC conductor, Tungsten, Molybdenum, Platinum, mercury, lead, manganin, metals and Alloys for fuses, superconductivity and its applications.

**Unit-II. Semiconductor Materials:** Classification of materials based on atomic structure, conductors, insulators and semiconductors, Electron energy and energy band theory, Semiconductor materials, Intrinsic semiconductors, Extrinsic semiconductor, N type materials, P type materials, minority and majority carriers., Merits of semiconductor materials, Factors affecting semiconductors, application of semiconductor materials, Hall Effect.

**Unit-III. Magnetic Materials:** Different terms associated with magnetic materials. Classification of magnetic materials: Diamagnetic, Paramagnetic and ferromagnetic materials. Curie point, Magnetostriction, electromagnet and its uses, Magnetization curve, Hysteresis and eddy current loss, Soft and hard magnetic materials, their properties and applications, its advantage and disadvantages, requirements of magnetic materials for use in Electrical machines, Magnetic anisotropy, Spontaneous magnetization.

**Unit-IV. Dielectric& Insulating Materials:** Behavior of dielectrics in static and alternating fields, polarization, Dielectric constant of mono atomic gases, ionic polarization, Dipolar polarization, internal fields in solids and liquids, permittivity, dielectric losses, significance of the loss tangent dipolar relaxation, Ferro electricity, piezoelectricity. General electrical, mechanical, thermal and chemical properties of insulating materials, classification of insulating materials on the basis of temperature rise. Gaseous insulating materials properties and application of nitrogen, liquid insulating materials, their main features

**Unit-V.Nanomaterials&Energy Efficient Materials:** Introduction to nanomaterials, general properties of nanomaterials, applications of nanomaterials in science, engineering and technology. **Energy Efficient Materials:** Green Materials, Biomaterials, Natural and Synthetic Polymers, Photovoltaic (PV) thin films for solar cells.

**Recommended Books:**

1. Science of Engineering Materials By C.M.Srivastava&C.Srinivasan,New Age International Publisher,2010.
2. A Text Book of Electrical Engineering Materials By P.L. Kapoor, Khanna Publication,2016
3. Electrical Engineering Materials By A.J. Dekker, PHI,2015
4. An Introduction to Electrical Engineering Materials By C.L. Indulkar, S. Thiravengadam, S. Chand & Co,2006

**Course Outcomes**

After completing this course, the student will be able to:

**CO1:** Describe the properties and applications of conducting materials.

**CO2 :** Explain behavior of semiconductor materials, their classification and applications.



**CO3: Select appropriate Magnetic materials for given applications.**

**CO4:Select appropriate insulating material depending upon specific requirement**

**CO5: Discuss the merits and demerits of nanomaterials in green technology**

## Course Articulation Matrix

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



**Course Objectives:**

- To develop the understanding of algorithms, programming approaches and program documentation techniques.
- To study the concepts of procedural and object oriented programming.
- To design and implement basic programming solutions using programming constructs.

**Unit-I. Introduction to Programming:** Types of computer programming languages, Program Execution and Translation Process, Problem solving using Algorithms and Flowcharts. Introduction to C++ Programming: Data Types, Constants, Keywords, variables, input/output, Operators & Expressions, Precedence of operators.

**Unit-II. Control Statements and Decision Making:** goto statement, if statement, if-else statement, nesting of if statements, The switch statement, while loop, do...while loop, for loop, nesting of for loops, break and continue statement. Function Basics, Function Prototypes, Passing Parameter by value and by reference, Default Arguments, Recursion. Arrays: One-dimensional Arrays, Multidimensional Arrays, Passing Arrays to Functions.

**Unit-III. Strings, Pointers, Structures and File handling:** Operations on Strings, Basics of Pointers & Addresses, reference variable, Pointer to Pointer, Pointer to Array, Array of Pointers, Pointer to Strings. Dynamic memory allocation using new and delete operators. Structures & Union, Pointer to Structure, Self-Referential Structures. File Concepts, Study of Various Files and Streams, operations on files.

**Unit-IV. Object Oriented Paradigm:** Features of OOPS, Comparison of Procedural Oriented Programming with Object Oriented Programming, Abstract Data Types, Specification of Class, Visibility Modes, Defining Member Functions, Scope Resolution Operator, Constructors, its types, and Destructors, Creating of Objects, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Friend Function.

**Unit-V. Polymorphism: Introduction:** Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading. Inheritance: Introduction, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath.

**Recommended Books:**

1. C++ How to Program, H M Deitel and P J Deitel, Prentice Hall.
2. Programming with C++, D Ravichandran, T.M.H.
3. Computing Concepts with C++ Essentials, Horstmann, John Wiley.
4. The Complete Reference in C++, Herbert Schildt, TMH.
5. Object-Oriented Programming in C++, E Balagurusamy.
6. Fundamentals of Programming C++, Richard L. Halterman.

**Course Outcomes:**

After completing this, the students will be able to:

CO1: Develop algorithms and flowchart for a given problem

CO2: Describe the concepts of procedural programming

CO3: Explain the concepts of object oriented programming and its significance in the real world

CO4: Develop computer programs to solve real world problems

CO5: Debug & test program effectively

Syllabus I Semester 2024 Admitted Batch



## Course Articulation Matrix

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

Re: Car for any days

**Course Objectives:**

To develop a thorough understanding of building materials and construction elements, including their properties, placement, and stabilization on site, while applying principles of statics to analyze forces on rigid bodies and determinate structures, such as beams and trusses, ensuring safe and efficient construction practices.

**Unit-I Building Materials:** Stones, bricks, cement, timber - types, properties, test & uses, Introduction of concrete properties & Laboratory tests on concrete, curing of concrete and mortar Materials.

**Unit-II Surveying & Positioning:** Introduction to surveying, Survey stations, Measurement of distances-conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different methods, reciprocal levelling.

**Unit-III Mapping & Sensing:** Mapping details and contouring, Plan tables and related devices. Introduction of theodolite. Measurement of areas and volumes, application of measurements in quantity computations, Introduction of remote sensing and its applications.

**Unit-IV Forces and Equilibrium:** Graphical and Analytical Treatment of Concurrent and non-concurrent co-planar forces, free body Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses, method of joints, method of Sections. Frictional force in equilibrium problems.

**Unit-V Centre of Gravity and moment of Inertia:** Centroid and Centre of Gravity, Moment of Inertia of Composite section, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.

**Recommended Books:**

1. Surveying, Vol.-1, Punmia B.C., Laxmi Publications, 17<sup>th</sup> edition, 2016
2. Building Material, B.C. Punmia, Laxmi Publications, 2016
3. A textbook of Engineering Mechanics, D.S. Kumar, Katson Publications, 2013
4. Basic Civil Engineering, S. Ramamurtam & R. Narayan, Dhanpat Rai Pub., 3<sup>rd</sup> edition, 2013

**Courses Outcomes**

Upon completion of the course, a student will be able to

CO1: Explain concepts and terminologies of building materials, surveying and mechanics.

CO2: Apply various methods for surveying and mechanics.

CO3: Determine the location, area and volume of objects on ground surface.

CO4: Solve the problems of surveying and mechanics by using various methods.

CO5: Analyse the effects of system of forces on rigid bodies in static conditions

**Course Articulation Matrix**

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

1 - Slightly; 2 - Moderately; 3 - Substantially



### Course Objectives:

To develop the fundamentals of Engineering materials, measurement and reciprocating machines and to understand the Thermodynamic laws, steam generator and reciprocating machines for solving engineering problems.

**Unit-I: Materials:** Classification of engineering material, composition of cast iron and carbon steels on iron-carbon diagram and their mechanical properties; Alloy steel and their applications; Stress-Strain diagram, Hooks law and modulus of elasticity. Tensile, shear, hardness and fatigue testing of materials.

**Unit-II: Measurement:** Temperature, pressure, velocity, flow, strain, force and torque measurement, concept of measurement error & uncertainty analysis, measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set; introduction to lathe drilling, milling and shaping machines.

**Unit-III Fluids:** Fluid properties, pressure, density and viscosity; pressure variation with depth, static and kinetic energy; Bernoulli's equation for incompressible fluids, viscous and turbulent flow, working principle of fluid coupling, pumps, compressors, turbines.

**Unit-IV Thermodynamics:** Zeroth, First, second and third law of thermodynamics; steam properties, steam processes at constant pressure, volume, enthalpy & entropy, classification and working of boilers, Refrigeration, vapour compression cycles, coefficient of performance (COP).

**Unit-V Reciprocating Machines:** Steam engines, hypothetical and actual indicator diagram; Carnot cycle and ideal efficiency; Otto and diesel cycles; working of two stroke & four stroke petrol and diesel IC engines.

### Recommended Books:

1. Narula; Material Science; TMH
2. Agrawal B & CM; Basic Mechanical Engineering; TMH
3. Nag PK, Tripathi et al; Basic Mechanical Engineering; TMH
4. Rajput; Basic Mechanical Engineering;
5. Sawhney GS; Fundamentals of Mechanical Engineering; PHI
6. Nakra and Chaudhary; Instrumentation and Measurement; TMH
7. Nag PK; Engineering Thermodynamics; TMH
8. Ganesan; Combustion Engines; TMH.

### Course Outcomes:

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

CO1: Select appropriate material for specific engineering applications

CO2: Develop a foundational understanding of measurement principles, focusing on the accurate and precise measurement of physical quantities such as temperature, pressure, velocity, flow, strain, force, and torque

CO3: Describe the principles of fluid motion, including the concepts of static and kinetic energy in fluid systems.



CO4: Apply thermodynamics laws to analyze energy exchanges and transformations in various thermodynamic systems.

CO5: Study the Otto and Diesel cycles in detail, learning how these cycles govern the operation of internal combustion (IC) engines and influence their efficiency and performance.

#### Course Articulation Matrix

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

1 - Slightly; 2 - Moderately; 3 - Substantially

*CW* *AB* *RQ* *DS* *\**  
*A*



**Course Objectives:**

- To impart basic knowledge of the DC and AC circuits and their applications.
- To familiarize the students with the basic knowledge of magnetic circuits, transformer, rotating electrical machine and its terminology.
- To make familiarize the students about the working of, various electronic circuits and its importance.

**Unit I - D.C. Circuits Analysis:** Voltage and Current Sources: Dependent and independent source, Source conversion, Kirchhoff's Law, Mesh and Nodal analysis. Network theorems: Superposition theorem, Thevenin's theorem & Norton's theorem and their applications.

**Unit II -Single-phase AC Circuits:** Generation of sinusoidal AC voltage, definitions: Average value, R.M.S. value, Form factor and Peak factor of AC quantity, Concept of Phasor, analysis of R-L, R-C, R-L-C Series and Parallel circuit, Power and importance of Power factor.

**Unit III- Magnetic Circuits& Resonance:** Magnetic Circuits: Concept of MMF, flux and magnetic reluctance, Self and mutual inductances, Dot convention, coefficient of coupling and coupled circuits. Resonance: Series and Parallel resonance, Bandwidth, Q-factor and selectivity.

**Unit IV- Single-phase Transformer &Rotating Electrical Machines:** Single phase transformer, Basic concepts, construction and working principal, Ideal Transformer and its phasor diagram at No Load, Voltage, current and impedance transformation, Equivalent circuits and its Phasor diagram, voltage regulation, losses and efficiency, testing of transformers, Construction & working principle of DC and AC machine.

**Unit V - Digital Electronics, Devices & Circuits:** Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, Demorgan's theorem, Logic gates- symbolic representation and their truth table, Introduction to semiconductors, Diodes, V-I characteristic, Bipolar junction transistors and their working, Introduction to CB, CE & CC transistor configurations.

**Recommended Books:**

1. Basic Electrical and Electronics Engineering, D.P. Kothari & I.J. Nagrath-Tata McGraw Hill
2. Basic Electrical and Electronics Engineering, V N Mittle& Arvind Mittal -Tata McGraw Hill
3. Basic Electrical and Electronics Engineering, S. K Bhattacharya -Pearson
4. Electrical Machinery- A.E. Fitzgerald, C. Kingsley and Umans - TMH
5. Principles of Electrical Engineering- Vincent Del Toro- Prentice Hall.
6. Basic Electrical Engineering -A.E. Fitzgerald, Higginbotham and Grabel -TMH
7. Integrated Electronics- Millmann&Halkias

**Course Outcomes: Basic Electrical & Electronics Engineering**

At the end of the course, the student will be able to:

**CO 1. Solve dc & ac circuits by applying fundamental laws & theorems**



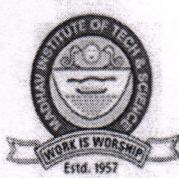
- CO 2.** Analyze magnetic circuits and resonance characteristics of ac electric circuits
- CO 3.** Describe the working principle, construction, applications of single phase transformer & rotating electrical machines
- CO 4.** Select the logic gates for various applications in digital electronic circuits
- CO 5.** Explain the characteristics and parameters of Diode and Transistor

**Course Articulation Matrix**

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

1 - Slightly; 2 - Moderately; 3 – Substantially

*[Handwritten signatures and initials in blue ink, including initials P, C, R, and a signature]*



माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर  
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR  
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## List of Experiments

&

## Micro Project-1

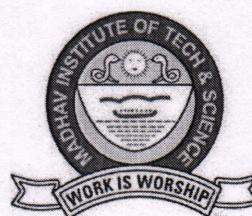
*Effective for Academic Year 2024-25*

## B.Tech. Program

in

## Electrical Engineering

(I Semester)

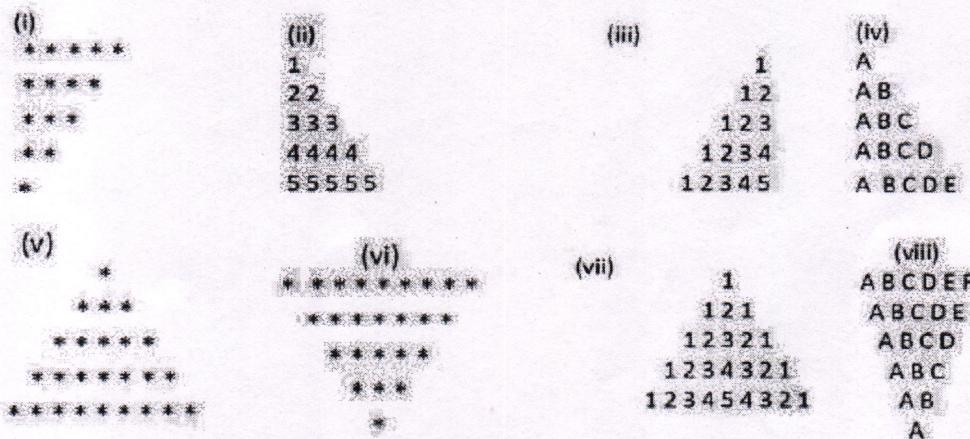


**Department of Electrical Engineering**



## LIST OF EXPERIMENTS

1. Write a program to add two numbers and display its sum.
2. Write a Program to calculate and display the volume of a cylinder for height and radius parameters to be input from the user.
3. Write a program to realize the following expressions:
  - a.  $v = u + at$
  - b.  $S = ut + 1/2(at^2)$
4. Write a program to take input of name, enrollment number and marks obtained by a student in 5 subjects of 100 marks each and display the name, enrollment number with percentage score secured.
5. Write a program to swap values of two variables with and without using the third variable.
6. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
7. Write a program to find the largest of three numbers using ternary operators.
8. Write a program to find the roots of quadratic equation.
9. Write a Program to Check Whether a Number is Prime or not.
10. Write a program to check whether the entered year is leap year or not. (Hint: a year is leap if it is divisible by 4 and divisible by 100 or 400.)
11. Write a program to print the sum of digits of a number using for loop.
12. Write a program to display the following pattern using for loops.



13. Write a program to Display Fibonacci Sequence.
14. Write a program to display different kind of pyramid patterns using for loops.
15. Write a program to add two matrices of the same order.
16. Write a program to show the working of predefine functions in string.
17. Write a program to illustrate concept of function and different type of functions.
18. Write a program to find factorial of a number using recursion.
19. Write a program to find sum of natural numbers using recursion.
20. Write a program to illustrate concept of structure and union in c programming.



21. Write a Program to calculate electricity bill. Read starting and ending meter reading. The charges are as follows.

No. of Units	Consumed Rate in(Rs)
1-100	1.50 per unit
101-300	2.00 per unit for excess of 100 units
301-500	2.50 per unit for excess of 300 units
501-above	3.25 per unit for excess of 500 units

22. Write a program which copies the contents of one file to another file using command line arguments.  
23. Write a program to reverse the first n characters in a file use command line arguments.  
24. Write a program to find total marks of individual student and average marks for 10 students using structures.  
25. Write a program to create structure called traveler and members of structure are train no, coach no, seat no, source ,destination , gender, age, name and departure date

#### Course Outcomes:

After the completion of the lab, the student will be able to –

- CO 1. Write computer program in C++ language.  
CO 2. Apply knowledge of programming to solve real-world problems  
CO 3. Acquire teamwork skill for working effectively in groups  
CO 4. Prepare an organized report of the programs with necessary flowcharts. .

#### Course Articulation Matrix

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



## LIST OF EXPERIMENT

1. To verify Kirchhoff's Current Law & Kirchhoff's Voltage Law.
2. To verify Superposition Theorem
3. To determine resistance & inductance of a choke coil.
4. To determine active & reactive power in a single phase A.C circuit.
5. To determine voltage ratio & current ratio of a single phase transformer.
6. To determine the polarity of a single phase transformer.
7. To perform open circuit & short circuit test on a single phase transformer.
8. To study multimeter & measure various electrical quantities
9. To study of constructional details of DC machine.
10. To determine the V-I characteristics of diode in forward bias & reverse bias condition.
11. To determine phase and line quantities in three phase star and delta connection
12. To study of effect of open and short circuits in simple circuits
13. To plot Transistor CB characteristics (Input and Output)
14. To plot Transistor CE characteristics (Input and Output)

**Course Outcomes:**

After the completion of the lab, the student will be able to –

- CO 1. Verify circuit theorems.
- CO 2. Perform tests on transformer for determination of losses, efficiency & polarity.
- CO 3. Acquire teamwork skills for working effectively in groups
- CO 4. Prepare an organized technical report on experiments conducted in the laboratory

**Course Articulation Matrix****Course Articulation Matrix**

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

1 - Slightly; 2 - Moderately; 3 – Substantially



### List of Projects

- Design and Implementation of Wireless Mobile Charging System
- Water Flow Sensor to Measure the Flow of Water in a Pipe
- Utilization of Power Electric Socket for Enhanced Functionality
- Design and Development of a USB-Powered Electric Socket
- Design and Implementation of an IoT-Based Liquid Level Monitoring System
- Development of a PIN Diode-Based Fire Detection System
- Designing and Implementing an Alert System for Machine Overheating Detection
- Design and Development of a USB-Powered Electric Socket
- Design and Implementation of an IoT-Based Liquid Level Monitoring System
- Design and Implementation of an Automatic Night Light
- Development of Q&A Website for MITS
- Development of a Battery Level Indicator System
- Design and Optimization of a Touch-Activated Light Switch
- Design and Implementation of an Automatic Night Light
- Development and Implementation of a Simple DC Motor Speed Controller
- Implementation of a Smart Doorbell with Sound and Light Integration
- Optimization and Implementation of a USB Mobile Charger
- Design and Development of a Simple Solar-Powered Light
- Designing and Implementing an Alert System for Machine Overheating Detection
- Design and Development of a Simple Solar-Powered Light
- Development of a Smartphone Stand with Video Calling & Recording Capabilities
- Design and Implementation of an Infrared (IR) Remote Control System
- Implementation of countdown clock and timer in python
- Development of a Temperature-Controlled Fan
- Design and Optimization of a Simple Capacitive Touch Sensor
- Development and Implementation of a Solar-Powered Mobile Charger
- Design and implement operations on Doubly Linked List (DLL) with professor data
- Design and Development of a Motion-Activated Security Light
- Optimization of a Basic LED Traffic Light System
- Development of a Simple Touch Dimmer Circuit
- Design and Development of a Mini Emergency Light
- Design and implement operations on Doubly Linked List (DLL) with professor data
- Development of a Simple Burglar Alarm Using LDR
- Development of a Simple Burglar Alarm Using LDR
- Design and Development of a Rainwater Alarm System
- Program to design a Snakes game
- Design and Development of a Mini Emergency Light
- Development of a Simple Touch Dimmer Circuit
- Program to implement an Online Voting System using a graph and linked list
- Implementation of a Solar Battery Charger
- Implementation of a Clap Switch Circuit
- Program to implement an Online Voting System using a graph and linked list
- Design and Implementation of an Automatic Street Light
- Design of a Simple Metal Detector
- Development of a Simple Sound Level Meter
- Development of an Electric Fuse Tester
- Development of a Series and Parallel Circuit
- Design and Development of a Simple DC Motor Control
- Design and Implementation of a 2-Way Switch