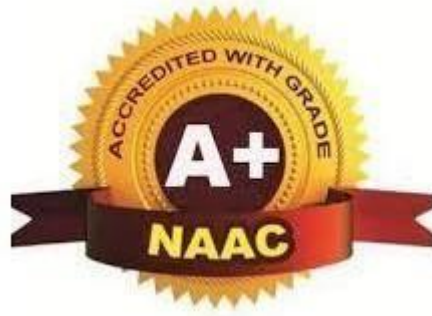




TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute



DEPARTMENT OF ELECTRICAL ENGINEERING

B.Tech. Electrical Engineering

Teaching Scheme & Syllabus

From

Academic Year 2022-23

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

Mission of Institute

1. To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.
2. To provide facilities and services to meet the challenges of Industry and Society.
3. To facilitate socially responsive research, innovation and entrepreneurship.
4. To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

Vision of the Department

To emerge as a learning hub and centre of excellence in the domain of Electrical Engineering.

Mission of the Department

1. To disseminate knowledge replete with quality education in the field of Electrical Engineering in meticulous and methodical manner.
2. To provide platform to address societal issues as well as challenges faced by industries.
3. To develop research culture and inculcate innovative and entrepreneurial skills.
4. To ensure overall development of students and staff by instilling knowledge and professional ethics as a part of lifelong learning.

Program Education Objectives (PEO)

1. Demonstrate and analyze the fundamental knowledge with respect to the various domains of Electrical Engineering.
2. Investigate and apply modern tools to develop innovativeness in different applications of Electrical Engineering domain.
3. Integrate new emerging trends and concepts in Electrical Engineering profession for sustainable development.
4. Develop professionals having managerial and administrative Qualities for Electrical Engineering related industries.
5. Promote lifelong learning, to prepare for the next challenges in the field of Electrical Engineering.

Program Outcomes (PO)

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

- PSO1:** Formulate the solutions to Electrical and Electronics Engineering problems using the basic concepts.
- PSO2:** Develop the process to interpret networks parameters in power system operation and control with their protection and driving mechanisms.
- PSO3:** Apply project based learning to conduct experiments with Electrical Machines, Power Electronics to develop energy efficient systems.

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: Electrical Engineering

Scheme of Instructions: Second Year B.Tech. in Electrical Engineering

Semester – III

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	BEE2301	Electrical Engineering Mathematics	3	-	-	3	3	15	15	10	60	100
2	BSC	BEE2302	Analog & Digital Electronics	3	-	-	3	3	15	15	10	60	100
3	ESC	BEE2303	Electrical & Electronics Measurement	3	-	-	3	3	15	15	10	60	100
4	PCC	BEE2304	Electrical Circuit Analysis	3	1	-	4	4	15	15	10	60	100
5	PCC	BEE2305	DC Machines & Transformer	3	-	-	3	3	15	15	10	60	100
6	HSMC	BSH2301	Human Values for Professional Society	3	-	-	3	3	15	15	10	60	100
7	BSC	BEE2307	Analog & Digital Electronics Lab	-	-	2	2	1	-	-	25	25	50
8	ESC	BEE2308	Electrical & Electronics Measurement Lab	-	-	2	2	1	-	-	25	25	50
9	PCC	BEE2309	Electrical Circuit Analysis Lab	-	-	2	2	1	-	-	25	25	50
10	PCC	BEE2310	DC Machines & Transformer Lab	-	-	2	2	1	-	-	25	25	50
11	MCC	BAU2303	Environmental Science	2	-	-	2	Audit	-	-	-	-	-
Total				20	01	08	29	23	90	90	160	460	800

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandatory Courses)
Credits	03	07	04	9	--	--	--	Yes
Cumulative Sum	06	25	18	9	--	--	--	--

PROGRESSIVE TOTAL CREDITS :35+23 = 58

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SCHEME OF INSTRUCTION & SYLLABI

Programme: Electrical Engineering

Scheme of Instructions: Second Year B.Tech. in Electrical Engineering

Semester – IV

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	PCC	BEE2401	Electro Magnetic Force	3		-	3	3	15	15	10	60	100
2	ESC	BEE2402	Signal & Systems	3	-	-	3	3	15	15	10	60	100
3	PCC	BEE2403	AC Machines	3	-	-	3	3	15	15	10	60	100
4	PCC	BEE2404	Microprocessor & Microcontroller	3	-	-	3	3	15	15	10	60	100
5	PCC	BEE2405	Electrical Power System	3	1	-	4	4	15	15	10	60	100
6	PCC	BEE2406	Python Programming Lab	-	-	4	4	2	-	-	50	50	100
7	PCC	BEE2407	AC Machines Lab	-	-	2	2	1	-	-	25	25	50
8	PCC	BEE2408	Microprocessor & Microcontroller Lab	-	-	2	2	1	-	-	25	25	50
9	PCC	BEE2409	Power System Simulation Lab	-	-	2	2	1	-	-	25	25	50
10	PROJ	BEE2411	Micro Project	-	-	2	2	1	-	-	25	25	50
11	MCC	BAU2404	Group Reading of Classics	2	-	-	2	Audit	-	-	-	-	-
Total				17	01	12	30	22	75	75	200	450	800

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	--	--	03	18	--	--	01	Yes
Cumulative Sum	06	25	21	27	--	--	01	--

PROGRESSIVE TOTAL CREDITS :58+22=80

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: Electrical Engineering

Scheme of Instructions: Third Year B.Tech. in Electrical Engineering

Semester – V

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	PCC	BEE3501	Control System Engineering	3	1	-	4	4	15	15	10	60	100
2	PCC	BEE3502	Power Electronics	3	-	-	3	3	15	15	10	60	100
3	PCC	BEE3503	Computer Aided Power System Analysis	3	1	-	4	4	15	15	10	60	100
4	PCC	BEE3504	Power Electronics Lab	-	-	2	2	1	-	-	25	25	50
5	PCC	BEE3505	Computer Aided Power System Analysis Lab	-	-	2	2	1	-	-	25	25	50
7	PROJ	BEE3506	Micro Project	-	-	2	2	1	-	-	25	25	50
8	PEC	BEE3507-10	Program Elective-I	3	-	-	3	3	15	15	10	60	100
9	PEC	BEE3511-14	Program Elective-II	3	-	-	3	3	15	15	10	60	100
10	OEC	B\$\$\$X01-16	Open Elective-I	3	-	-	3	3	15	15	10	60	100
11	MCC	BAU3505	Heritage	2	-	-	2	Audit	-	-	-	-	-
Total				20	2	6	28	23	90	90	135	435	750

* \$\$- CS, IT, EC, CE, ME, AE, BT

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	--	--	--	13	06	03	01	Yes
Cumulative Sum	06	25	21	40	06	03	02	--

PROGRESSIVE TOTAL CREDITS :80+23 =103

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: Electrical Engineering

Scheme of Instructions: Third Year B.Tech. in Electrical Engineering

Semester – VI

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	HSMC	BEE3601	Engineering Economics & Management	3	-	-	3	3	15	15	10	60	100
2	PCC	BEE3602	EHVAC & HVDC Transmission	3	-	-	3	3	15	15	10	60	100
	PCC	BEE3603	Electric Drives & Vehicle Technology	3	1	-	4	4	15	15	10	60	100
3	PCC	BEE3604	High Voltage Engineering Lab	-	-	2	2	1	-	-	25	25	50
	PCC	BEE3605	Electric Vehicle Technology Lab	-	-	2	2	1	-	-	25	25	50
4	PROJ	BEE3606	Mini Project#	-	-	2	2	2	-	-	50	50	100
5	PEC	BEE3607-10	Program Elective-III	4	-	-	4	4	15	15	10	60	100
6	PEC	BEE3611-14	Program Elective-IV	4	-	-	4	4	15	15	10	60	100
7	OEC	B\$\$XX01-16	Open Elective -II	3	-	-	3	3	15	15	10	60	100
8	MCC	BAU3606	Social Awareness	2	-	-	2	Audit	-	-	-	-	-
			Total	22	01	6	29	25	90	90	160	460	800

Every Student will undergo Industrial Training/Internship of Two weeks in summer vacation after B. Tech. V Sem. Examinations.

* \$\$- CS, IT, EC, CE, ME, AE, BT

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	03	--	--	09	08	03	02	Yes
Cumulative Sum	09	25	21	49	14	06	04	--

PROGRESSIVE TOTAL CREDITS :103+25 =128

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: Electrical Engineering

Scheme of Instructions: Final Year B.Tech. in Electrical Engineering

Semester – VII

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	PCC	BEE4701	Switchgear and Protection	3	-	-	3	3	15	15	10	60	100
2	PCC	BEE4702	Switchgear and Protection Lab	-	-	2	2	1	-	-	25	25	50
3	PCC	BEE4703	Internet of Things Lab	-	-	4	4	2	-	-	50	50	100
4	PEC	BEE4704-07	Program Elective-V	3	1	-	4	4	15	15	10	60	100
5	OEC	B\$\$\$XX01-16	Open Elective-III	4	-	-	4	4	15	15	10	60	100
6	OEC	B\$\$\$XX01-16	Open Elective-IV	4	-	-	4	4	15	15	10	60	100
7	OEC	B\$\$\$XX01-16	Open Elective-V	4	-	-	4	4	15	15	10	60	100
8	MCC	BAU4707	Behavioral and Interpersonal Skills	2	-	-	2	Audit	-	-	-	-	-
Total				20	01	6	27	22	75	75	125	375	650

*There will be two presentations, based on seminar topic to be selected in consultation with guide preferably based on emerging trends.

* \$\$- CS, IT, EC, CE, ME, AE, BT

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	--	--	--	06	04	12	-	Yes
Cumulative Sum	09	25	21	55	18	18	04	--

PROGRESSIVE TOTAL CREDITS :128+22 =150

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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SCHEME OF INSTRUCTION & SYLLABI

Programme: **Electrical Engineering**

Scheme of Instructions: **Final Year B.Tech. in Electrical Engineering**

Semester – VIII

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./Wk	Credits	EXAM SCHEME				
									CT1	CT2	TA/CA	ESE	TOTAL
1	PROJ	BEE4801	Project	-	-	14	14	7	-	-	75	75	150
2	PCC	BEE4802	Professional Efficiency	-	2	-	-	2	-	-	-	50	50
3	HSMC	BEE4803	Project Management	3	1	-	4	4	15	15	10	60	100
4	MCC	BAU4808	Project based Science, Technology, Social, Design and Innovation	2	-	-	2	Audit	-	-	-	-	-
Total				5	3	14	20	13	15	15	85	185	300

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	04	--	--	02	--	--	07	Yes
Cumulative Sum	13	25	21	57	18	18	11	--

PROGRESSIVE TOTAL CREDITS :150+13 =163

Program: Electrical Engineering
List of Electives offered
By
Electrical Engineering Department

Program Elective- I	Program Elective- II	Program Elective- III	Program Elective- IV	Program Elective- V
Semester V	Semester V	Semester VI	Semester VI	Semester VII
BEE3507 - Solar Energy Utilization	BEE3511 - Wind Energy Utilization	BEE3607 - Biomass Energy and its Utilization	BEE3611 – Geothermal Energy Utilization	BEE4704 - Energy Audit and Management
BEE3508 - Utilization of Electrical Energy	BEE3512 – Power Plant Engineering	BEE3608 - Electrical Distribution System	BEE3612 - Elements of Substation Design	BEE4705 - Power System Operation & Control
BEE3509 - PLC – SCADA	BEE3513 - Robotics & Automation	BEE3609 - Industrial Automation	BEE3613 – Artificial Intelligence & its application	BEE4706 - Estimation and Costing in Electrical Engineering
BEE3510 -High Voltage Engineering	BEE3514 - Flexible AC Transmission System	BEE3610 – Power Quality	BEE3614 - Advanced Electrical Drives	BEE4707 – Digital Signal Processing

List of Open Elective					
Sr. No.	Course Code	Course Title	Sr. No.	Course Code	Course Title
1	BCSXX01	Cyber Law and Ethics	9	BMEXX09	Nanotechnology and Surface Engineering
2	BCSXX02	Block chain Technology	10	BMEXX10	Automobile Engineering
3	BITXX03	Cyber Security	11	BEEXX11	Power Plant System
4	BITXX04	Artificial Intelligence	12	BEEXX12	Electrical Materials
5	BECXX05	Internet of Things	13	BAEXX13	Avionics
6	BECXX06	Embedded Systems	14	BAEXX14	Unmanned Aerial Vehicles
7	BCEXX07	Introduction to Art and Aesthetics	15	BBTXX15	Biomaterials
8	BCEXX08	Metro Systems and Engineering	16	BBTXX16	Food and Nutrition Technology

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	Semester Wise Credits
Semester -I	02	09	07	--	--	--	--	18
Semester -II	01	09	07	--	--	--	--	17
Semester -III	03	07	04	09	--	--	--	23
Semester -IV	--	--	03	18	--	--	01	22
Semester -V	--	--	--	13	06	03	01	23
Semester -VI	03	--	--	09	08	03	02	25
Semester -VII	--	--	--	06	04	12	--	22
Semester -VIII	04	--	--	02	--	--	07	13
Cumulative Sum	13	25	21	57	18	18	11	163
AICTE	12+3	25	21	53	18	18	11	158+3


HOD Chairman

Department of Electrical Engineering
Tulsiramji Gaikwad Patil College of
Engineering & Technology, Nagpur



Dean Academics
Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
and Technology, Nagpur


Principal

Principal
Tulsiramji Gaikwad Patil College Of
Engineering and Technology, Nagpur