

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI

UNIVERSITY POLYTECHNIC

DIPLOMA IN ELECTRICAL & ELECTRONICS ENGINEERING



CURRICULUM BASED ON CHOICE BASED CREDIT SYSTEM (CBCS)

2023

INSTITUTE VISION

To emerge as a leading technical training institution in the country and serve the nation and engineering profession with distinction by developing the most skilled human resources with comprehensive and modern training and skill-sets in selected engineering disciplines and trades.

INSTITUTE MISSION

1. To administer a technical training institute of highest standard of education and training commensurate with modern engineering practices.
2. To offer technical, diploma, and certificate courses to cater to contemporary demand and relevance to the engineering industry.
3. To adopt and implement modern curriculum of technical education and training.
4. To continuously upgrade the infrastructure necessary for practical training with new and contemporary machines and methods.
5. To arrange on job training and internships for the students and staff members with proper supervision.
6. To liaise with industry for internship and collaboration, and also, for arranging periodic review of infrastructure and training methods and modernizing teaching and training curriculum.
7. To create special program for the youth of the State of Jharkhand to help them acquire entrepreneurial and managerial skills, manufacturing capability, career advancement training and professional confidence.

ELECTRICAL AND ELECTRONICS ENGINEERING

DEPARTMENT VISION

To strive towards the development of the skilled human resources with comprehensive and modern technical skill-sets in the field of Electrical and Electronics Engineering while adhering to Universal Human Values to serve the nation and engineering profession with distinction.

DEPARTMENT MISSION

1. To offer quality technical education and skill development in the field of Electrical and Electronics engineering.
2. To nurture students' problem-solving abilities and familiarize them with the most recent advancements within the Electrical and Electronics discipline.
3. To promote interactions between industry and the institute to enhance students' employability and readiness for the workforce.
4. To encourage faculty engagement in Faculty Development Programs focused on upcoming technologies within Electrical and Electronics and to additionally, coordinate a range of technical activities, including electrical circuitry, simulation software, and troubleshooting, for students and staff under the department's appropriate supervision.
5. To facilitate partnerships with industry for internships and collaborations, and update the teaching and training curriculum within the field of Electrical and Electronics Engineering, emphasizing the department's key strengths.
6. To develop a distinctive program that enables students to gain entrepreneurial and managerial proficiencies in the Electrical and Electronics industry. This initiative is intended to merge with Universal Human Values to instil ethical values in students, thus fostering a commitment to serving the nation and the profession.

PROGRAM OUTCOMES (POs)

Diploma holders of the Electrical and Electronics Engineering Program will be able to:

1. **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals of Electrical and Electronics engineering to solve the engineering problems.
2. **Problem analysis:** Identify and analyse well-defined engineering problems using codified standard methods.
3. **Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.
4. **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate techniques to conduct standard tests and measurements.
5. **Engineering practices for society, sustainability, and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.
6. **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.
7. **Life-long learning:** Ability to analyse individual needs and engage in updating in the context of technological changes.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The program in Electrical and Electronics Engineering will prepare students:

PEO1: To develop expertise amongst students to understand and solve real-life problems related to Electrical and Electronics Engineering by applying the knowledge acquired.

PEO2: To adapt to state-of-the-art Electrical and Electronics Engineering technologies to work in multidisciplinary environments.

PEO3: To respond to the growing and changing needs of industries and academics through continuous learning of modern technologies in Electrical and Electronics.

PEO4: To inculcate an attitude to work efficiently in a team with professional ethics and universal human values.

PROGRAM SPECIFIC OUTCOMES (PSOs)

1. Apply the knowledge acquired in basic sciences and engineering to solve Electrical and Electronics engineering problems.
2. To develop proficiency in the installation, troubleshooting, and maintenance of electrical and electronic equipment and appliances.
3. To develop advanced skills in various domains of Electrical and Electronics Engineering.

COURSE STRUCTURE (DIPLOMA ALL BRANCHES)

1ST SEMESTER

THREE WEEKS INDUCTION PROGRAM

Including UNIVERSAL HUMAN VALUE (UHV-I)

S. N.	COURSE CODE	COURSE TITLE	SEGMENT	L	T	P	LECTURE HOUR	CREDIT
1	DBS 101	Engineering Chemistry	BS	3	1		4	4
2	DBS 103	Applied Physics-I	BS	2	1		3	3
3	DBS 105	Mathematics-I	BS	3	1		4	4
4	DES 101 / DES 201	Introduction to IT Systems / Fundamentals of Electrical & Electronics Engineering	ES	2	1		3	3
5	DBS 104/ DES 202	Applied Physics Lab / Fundamentals of Electrical & Electronics Engineering Lab	BS			2	2	1
6	DHS 101	Communication Skills-I	HS	3	0	0	3	3
7	DHS 102/104/106	Sports and Yoga/NSS/NCC	HS			2	2	1
8	DES 102	Engineering Graphics	ES			3	3	1.5
9	DES 104	Engineering Workshop Practice	ES			3	3	1.5
		Periods per week		13	4	10	27	
		Total credits						22
		Total periods per week						27

COURSE STRUCTURE (DIPLOMA ALL BRANCHES)

2ND SEMESTER (DIPLOMA)

S. N.	COURSE CODE	COURSE TITLE	SEGMENT	L	T	P	LECTURE HOUR	CREDIT
1	DBS 201	Applied Physics-II	BS	2	1		3	3
2	DBS 203	Mathematics-II	BS	3	1		4	4
3	DES 101 / DES 201	Introduction to IT Systems / Fundamentals of Electrical & Electronics Engineering	ES	3			3	3
4	DES 203	Engineering Mechanics	ES	3			3	3
5	DAU 201	Environmental Sciences	AUDIT	2			2	0
6	DBS 202	Applied Chemistry Lab	BS			2	2	1
7	DBS 104/ DES 202	Applied Physics Lab / Fundamentals of Electrical & Electronics Engineering Lab	ES			2	2	1
8	DES 204	Engineering Mechanics Lab	ES			2	2	1
9	DES 206	Introduction To IT Systems Lab	ES			2	2	1
10	DHS 202/204/206	Sports and Yoga/NSS/NCC	HS			2	2	1
		Periods per week		13	2	10	25	
		Total credits						18
		Total periods per week						25

**DIPLOMA PROGRAMME COURSE STRUCTURE
[2ND YEAR ONWARD COURSES]**

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
Based on CBCS system & OBE model
Recommended scheme of study
(For Diploma in Electrical & Electronics Engineering)

Semester of Study (Recommended)	Category of course	Course Code	Subjects	Mode of delivery & credits			Total Credits C- Credit	
				L	T	P		
THEORY								
THIRD	PC	DEE 301	Introduction to Electric Generation System	3	0	0	3	
		DEE 303	DC Machines and Transformers	3	1	0	4	
		DEE 305	Electrical Measurements and instrumentation	3	1	0	4	
		DEE 307	Analog & Digital Circuits	3	1	0	4	
		DEC 307	Electric Circuits & Networks	3	0	0	3	
	HS	DHS 301	Universal Human Values-II	2	0	0	0	
	SESSIONAL							
	PC	DEE 308	Analog and digital Lab	0	0	2	1	
		DEE 306	Electrical Measurements & Instrumentation Lab	0	0	2	1	
		Summer Internship	DSI 341	Summer Internship-I (4 weeks) after II Semester	0	0	0	2
PERIODS PER WEEK				17	3	4		
TOTAL (THEORY + LABS) CREDITS							22	
TOTAL PERIODS PER WEEK							24	

**DIPLOMA PROGRAMME COURSE STRUCTURE
[2ND YEAR ONWARD COURSES]**

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI

**Based on CBCS system & OBE model
Recommended scheme of study
(For Diploma in Electrical & Electronics Engineering)**

Semester of Study (Recommended)	Category of course	Course Code	Subjects	Mode of delivery & credits			Total Credits C- Credit	
				L-Lecture.	T-Tutorial.	P-practical		
				L	T	P	C	
THEORY								
FOURTH	PC	DEE 401	Fundamentals of Power Electronics	3	1	0	4	
		DEC 403	Microprocessor and Microcontroller	3	0	0	3	
		DEE 405	AC Rotating Machines	3	1	0	4	
	PE	DPE 441/442/443	PE-I	3	0	0	3	
	OE	DOE 441/442/443	OE-I [Courses from other Branches]	3	0	0	3	
	SESSIONAL							
	PC	DEE 402	Power Electronics Lab	0	0	2	1	
		DEC 404	Microprocessor and Microcontroller Lab	0	0	2	1	
		DEE 406	Electrical machine Lab.- I	0	0	2	1	
	Mandatory Course	DAU 401	Essence of Indian Knowledge and Tradition	2	0	0	0 (Non-credit)	
PERIODS PER WEEK				17	2	6		
TOTAL (THEORY + LABS) CREDITS							20	
TOTAL PERIODS PER WEEK							25	
GRAND TOTAL FOR SECOND YEAR							41	

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
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Semester of Study (Recommended)	Category of course	Course Code	Subjects	Mode of delivery & credits			Total Credits C- Credit	
				L-Lecture.	T-Tutorial.	P-practical		
				L	T	P	C	
THEORY								
FIFTH	PC	DEE 501	Control System	3	0	0	3	
		DEE 503	Power System	3	0	0	3	
	PE	DPE 541/542/543	PE-II	3	0	0	3	
		DPE 544/545/546	PE-III	3	0	0	3	
	OE	DOE 541/542/543	OE-II [Courses from other Branches]	3	0	0	3	
	SESSIONAL							
	PC	DEE 506	Electrical Workshop Lab	0	0	2	1	
		DEE 502	Control system Lab	0	0	2	1	
		DEE 504	Electrical machine Lab.- II	0	0	2	1	
	Project	DPR 541	Minor Project	0	0	2	1	
Summer Internship	DSI 541	Summer Internship-II (6 weeks) after IV Semester	0	0	0	2		
PERIODS PER WEEK				15	0	8		
TOTAL (THEORY + LABS) CREDITS							21	
TOTAL PERIODS PER WEEK							23	

DIPLOMA PROGRAMME COURSE STRUCTURE [2 ND YEAR ONWARD COURSES]								
BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI Based on CBCS system & OBE model Recommended scheme of study (For Diploma in Electrical & Electronics Engineering)								
Semester of Study (Recommended)	Category of course	Course Code	Subjects	Mode of delivery & credits			Total Credits C- Credit	
				L	T	P		C
THEORY								
SIXTH	PC	DEE 601	Switch Gear and Protection	3	1	0	4	
		DEE 603	Utilization of Electric power	3	1	0	4	
	PE	DPE 641/642/633	PE-IV	3	0	0	3	
	OE	DOE 641/642/643	OE-III [Courses from other Branches]	3	0	0	3	
	HSS	DHS 601	Entrepreneurship and Startup	3	0	0	3	
	Mandatory Course	DAU 601	Indian Constitution	2	0	0	0 (Non- credit)	
	SESSIONAL							
	PC	DEE 602	Power System Lab	0	0	2	1	
		DPE 635/644	PE-V Lab	0	0	2	1	
	Project	DPR 642	Major Project	0	0	4	2	
Seminar	DSE 642	Seminar	1	0	0	1		
PERIODS PER WEEK				18	2	8		
TOTAL (THEORY + LABS) CREDITS							22	
TOTAL PERIODS PER WEEK							28	
GRAND TOTAL FOR THIRD YEAR							43	

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING							
PROGRAMME ELECTIVES (PE)*							
SEMESTER	Code no.	Name of the PE courses	Prerequisite/ Corequisite courses with code	L	T	P	C
PE-I							
SEM-IV	DPE 441	Electrical Equipment Maintenance		3	0	0	3
	DPE 442	Industrial Instrumentation And Condition Monitoring		3	0	0	3
	DPE 443	Applied Communication		3	0	0	3
PE-II							
SEM- V	DPE 541	Industrial Automation & Control.		3	0	0	3
	DPE 542	Communication Technologies		3	0	0	3
	DPE 543	Principle of Electric Vehicle		3	0	0	3
PE-III							
SEM-V	DPE 544	Solar Power Technologies		3	0	0	3
	DPE 545	Electric Traction		3	0	0	3
	DPE 546	Electrical Testing and Commissioning		3	0	0	3
PE-IV							
SEM-VI	DPE 641	Applications of IOT		3	0	0	3
	DPE 642	Industrial Drives		3	0	0	3
	DPE 633	Programmable Logic Control		3	0	0	3
PE-V [Sessional]							
SEM-VI	DPE 635	Programmable Logic Controllers Lab		0	0	2	1
	DPE 644	Industrial Drives Lab		0	0	2	1

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING OPEN ELECTIVES (OE)*							
SEMESTER	Code No.	Name of the OE courses	Prerequisite s courses with code	L	T	P	C
OE-I							
FOURTH	DOE 441	Utilization of Electrical Energy		3	0	0	3
	DOE 442	Electric Vehicles		3	0	0	3
	DOE 443	Repair and maintenance of various power tools		3	0	0	3
OE- II							
FIFTH	DOE 541	Introduction to Power System		3	0	0	3
	DOE 542	Computational technique in Electrical engineering		3	0	0	3
	DOE 543	Building Electrification and House Wiring		3	0	0	3
OE- III							
SIXTH	DOE 641	Consumer Electronics		3	0	0	3
	DOE 642	Introduction to Sustainable Energy		3	0	0	3
	DOE 643	Electromechanical Energy Conversion		3	0	0	3
*OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS							