

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**  
**UNIVERSITY POLYTECHNIC**

**DIPLOMA IN MECHANICAL 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.

## **Mission of Mechanical Engineering, University Polytechnic BIT Mesra**

- To cater skill-based quality education in Diploma in Mechanical engineering disciplines to the youth of Jharkhand, with a purpose of making them self-confident to serve nation.
- To impart an essence of inspiration in our students in the field of Mechanical Engineering so that they can serve the society through their knowledge and skill.
- To prepare the youth of the Jharkhand with knowledge of fundamentals of Mechanical Engineering and Technology so that they can fulfill to the society, state and nation's skilled manpower requirement.
- To dedicate/extend part of our departmental infrastructural facilities for the welfare of our society through technical education and knowledge.

## **PROGRAM OUTCOMES: DIPLOMA IN MECHANICAL ENGINEERING**

### **PROGRAM OUTCOMES (POs)**

Diploma holders of the Mechanical Engineering Program will be able to:

1. **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, fundamentals of science to solve the engineering problems.
2. **Problem analysis:** Identify and analyse well-defined engineering problems using 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 (PEOs)**

1. Analyse, design and solve problems related to Mechanical Engineering with the use of basic science, mathematics and engineering fundamental and adapt to changes in technology by self and continuous learning.
2. Work effectively as individuals and in a team, exhibiting leadership qualities to meet the goals of a project or the organization.
3. Work with professionalism and concern for environment to meet the societal needs.
4. Engage in higher learning leading to degrees or certifications.

### **PROGRAM SPECIFIC OUTCOMES (PSOs)**

1. Apply concepts in core areas of Mechanical engineering – Hydraulics and fluid power, management Systems, Mechanics of machines and thermal Engineering to solve technical issues.
2. Develop and optimize solutions in Computer aided modelling, manufacturing and advanced manufacturing platforms.
3. Ability to make a career in mechanical/ interdisciplinary fields.

**COURSE STRUCTURE (DIPLOMA ALL BRANCHES)**

**1<sup>ST</sup> SEMESTER**

**THREE WEEKS INDUCTION PROGRAM**

**Including UNIVERSAL HUMAN VALUE (UHV-I)**

<b>S. N.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>SEGMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>LECTURE HOUR</b>	<b>CREDIT</b>
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
		<b>Periods per week</b>		13	4	10	<b>27</b>	
		<b>Total credits</b>						<b>22</b>
		<b>Total periods per week</b>						<b>27</b>

**COURSE STRUCTURE (DIPLOMA ALL BRANCHES)**

**2<sup>ND</sup> SEMESTER (DIPLOMA)**

<b>S. N.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>SEGMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>LECTURE HOUR</b>	<b>CREDIT</b>
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
		<b>Periods per week</b>		13	2	10	<b>25</b>	
		<b>Total credits</b>						<b>18</b>
		<b>Total periods per week</b>						<b>25</b>

## COURSE STRUCTURE (DIPLOMA IN MECHANICAL ENGINEERING)

### Third Semester

S.N.	Subject Code	Segment	Subject	L	T	P	Credit
1	DME 301	PC	Thermal Engineering	3	0	0	3
2	DME 303	PC	Manufacturing Process	3	0	0	3
3	DME 305	PC	Fluid Mechanics & Hydraulic Machines	3	1		4
4	DME 307	PC	Mechanical Engineering Materials	3	0	0	3
5	DME 302	PC	Thermal Engineering Lab.	0	0	2	1
6	DME 304	PC	Manufacturing Process Lab.	0	0	2	1
7	DME306	PC	Fluid mechanics & Hydraulic M/C Lab	0	0	3	1.5
8	DME 308	PC	Machine Drawing	0	0	3	1.5
9	DHS 301	HS	Universal Human Values-II	2	0	0	0
10	DSE351	Summer Internship	Internship	0	0	0	2
			<b>Periods per week</b>	<b>14</b>	<b>1</b>	<b>10</b>	<b>-</b>
			<b>Total credits</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>20</b>
			<b>Total periods per week</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>25</b>

## COURSE STRUCTURE (DIPLOMA IN MECHANICAL ENGINEERING)

			4 <sup>th</sup> Semester				
S.N.	Subject Code	SEGMENT	Subject	L	T	P	Credit
1	DME 401	PC	Strength of Materials	3	0	0	3
2	DME 403	PC	Engineering Instrumentation and Measurements	3	0	0	3
3		PE1		3	0	0	3
4		PE2		3	0	0	3
5		OE1		3	0	0	3
6	DME 402	PC	Strength of Materials Lab.	0	0	2	1
7	DME 404	PC	Engineering instrumentation and Measurements Lab.	0	0	2	1
8	DME 406	PC	CAD Lab.	0	0	2	1
9	DPR 451	MP	<b>Minor project</b>			4	2
10	DAU 401	MC	Essence of Indian Knowledge & Tradition	2			0
			<b>Periods per week</b>	<b>17</b>	<b>0</b>	<b>10</b>	
			<b>Total credits</b>	-	-	-	<b>20</b>
			<b>Total periods per week</b>	-	-	-	<b>27</b>
			<b>Program Elective Any</b>				
<b>PE1</b>	DPE 451	<b>Heat &amp; Power Engineering</b>					
	DPE 452	<b>Tool engineering</b>					
	DPE 453	<b>Power Plant Engineering</b>					
<b>PE2</b>	DPE 454	<b>Computer Integrated manufacturing</b>					
	DPE 455	<b>Industrial Robotics and Automation</b>					
	DPE 456	<b>Computer Aided design And Manufacturing</b>					
<b>OE1</b>	DOE 451	<b>Energy Resources and Utilization</b>					
	DOE 452	<b>Robotics</b>					



## COURSE STRUCTURE (DIPLOMA IN MECHANICAL ENGINEERING)

### Fifth Semester

S.N.	Subject Code	SEGMENT	Subject	L	T	P	Credit
1	DME 501	PC	Heat Transfer	3	0	0	3
2	DME 503	PC	IC Engines and Gas Turbine	3	0	0	3
3	DME 505	PC	Theory of Machines & Mechanisms	3	0	0	3
4		PE3		3	0	0	3
5		OE2		3	0	0	3
6	DME 502	PC	Heat Transfer Lab.	0	0	2	1
7	DME 504	PC	IC Engines and Gas Turbine Lab.	0	0	2	1
8	DME 506	PC	Theory of Machine Lab	0	0	2	1
9	DME 508	PC	CAM Lab.	0	0	2	1
10	DSI 551	SI	Summer Internship-II	0	0	0	3
11	DPR 551	MP	Project-I	0	0	2	1
			<b>Periods per week</b>	<b>15</b>	<b>0</b>	<b>10</b>	
			<b>Total credits</b>	-	-	-	<b>23</b>
			<b>Total periods per week</b>				<b>25</b>
		<b>Program elective3</b>					
<b>PE3</b>	DPE 551		<b>Advanced Manufacturing Process</b>	3	0	0	
	DPE 552		<b>Energy Resources and Utilization</b>	3	0	0	
	DPE 553		<b>Non-Conventional Energy Resources</b>	3	0	0	
<b>OE 2</b>	DOE 551		<b>Total Quality Management</b>	3	0	0	
	DOE 552		<b>Industrial Automation</b>	3	0	0	

## COURSE STRUCTURE (DIPLOMA IN MECHANICAL ENGINEERING)

### Sixth Semester

S.N.	Subject Code	SEGMENT	Subject	L	T	P	Credit
1	DME 601	PC	Design of Machine Elements	3	1	0	4
2	DME 603	PC	Refrigeration and Air-conditioning	3	0	0	3
3	DHS 601	HS	Entrepreneurship and Start-ups	3	1	0	4
4	DAU 601	MC	Indian Constitution	3	0	0	0
5		PE4		3	0	0	3
6		OE3	Elective	3	0	0	3
7	DME 604	PC	Refrigeration and Air-conditioning Lab.	0	0	2	1
8	DPR 651	MP	Project-II	0	0	6	3
9	DSE 651		Seminar	0	0	1	1
			<b>Periods per week</b>	18	2	9	-
			<b>Total credits</b>	-	-	-	<b>22</b>
			<b>Total periods per week</b>	-	-	-	<b>29</b>
			<b>Program Elective (Any one)</b>				
PE4	DPE 651		Advanced manufacturing process	3	0	0	
	DPE 652		Industrial and Production Management	3	0	0	
	DPE 653		Operation Research	3	0	0	
OE 3	DOE 651		<b>Non Conventional Energy Resources</b>	3	0	0	
	DOE 652		<b>Computer Aided Manufacturing</b>	3	0	0	