



**S**ARALA  
**B**IRLA  
**U**NIVERSITY

Established under the Sarala Birla University Act 2017 Govt. of Jharkhand as per Section 2(f) of UGC Act. 1956

**CURRICULUM  
FOR**

**B.Tech**

**in**

**Mechanical Engineering**

**(Based on UGC & AICTE- CBCS)**

**Effective from 2018-19**

## Definition of Credit

1 Hr. Lecture (L) Per Week	1 Credit
1 Hr. Tutorial (T) Per Week	1 Credit
1 Hr. Practical (P) Per Week	0.5 Credit
2 Hr. Practical (P) Per Week	1 Credit

## Course Code Definitions

Course code	Definitions
<b>BSC</b>	Basic Science Course
<b>ESC</b>	Engineering Science Course
<b>HSMC</b>	Humanities and Social Sciences including Management Course
<b>MC</b>	Mandatory Course
<b>PCC-ME</b>	Professional Core Course
<b>PEC-ME</b>	Professional Electives Course
<b>OEC</b>	Open Electives Course
<b>ME-P1</b>	Project Stage-I
<b>ME-P2</b>	Project Stage-II
<b>ME-P3</b>	Project Stage-III

# Structure of Mechanical Engineering (B. Tech)

## (Breakup of Credits)

Sl. No.	Category	Breakup of Credits
1	Humanities and Social Sciences including Management course	14
2	Basic Science course	23
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	29
4	Professional core course	48
5	Professional Elective courses relevant to chosen specialization/branch	17
6	Open subjects – Electives from other technical and /or emerging subjects	12
7	Project work, seminar and internship in industry or elsewhere	16
8	Mandatory Course [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	4
<b>Total Credits:</b>		<b>163</b>



## HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT COURSE

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	HSMC-101	English	3	0	0	3	II
2	HSMC-102	Technical Communication	2	0	0	2	III
3	HSMC-103	Technical Communication Lab	0	0	2	1	III
5	HSMC-104	Organisational Behaviour	2	0	0	2	VI
6	HSMC-105	French Through Communicative Approach-I	2	0	0	2	V
7	HSMC-106	French Through Communicative Approach-II	2	0	0	2	VI
8	HSMC-107	Professional Practice, Law & Ethics	2	0	0	2	VII
<b>Total Credits:</b>						<b>14</b>	

## BASIC SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			L	T	P		
1	BSC-101	Physics	3	1	0	4	I
2	BSC-102	Physics Lab	0	0	3	1.5	I
3	BSC-103	Chemistry	3	1	0	4	II
4	BSC-104	Chemistry Lab	0	0	3	1.5	II
5	BSC-105	Mathematics-I	3	1	0	4	I
6	BSC-106	Mathematics-II	3	1	0	4	II
7	BSC-107	Mathematics-III	3	1	0	4	III
<b>Total Credits:</b>						<b>23</b>	

## ENGINEERING SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	ESC-099	Basic Electrical Engineering	3	1	0	4	I
2	ESC-100	Basic Electrical Engineering Lab	0	0	2	1	I
3	ESC-103	Engineering Graphics & Design	1	0	4	3	I
4	ESC-104	Programming for Problem Solving	3	0	0	3	II
5	ESC-105	Programming for Problem Solving Lab	0	0	4	2	II
6	ESC-106	Workshop/ Manufacturing Practices	1	0	4	3	II
7	ESC-107	Engineering Mechanics	3	1	0	4	III
9	ESC-108	Electronics Devices	3	0	0	3	III
10	ESC-109	Electronics Devices Lab	0	0	2	1	III
11	ESC-110	Digital Electronics	3	0	0	3	IV
12	ESC-111	Digital Electronics Lab	0	0	2	1	IV
13	ESC-112	Programming using MATLAB	0	0	2	1	III
<b>Total</b>						<b>29</b>	

<b>Professional Core Courses</b>					
<b>Branch: Mechanical Engineering (B.Tech)</b>					
Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-201	Thermodynamics	3:00:00	3	III/IV
2	PCC-ME-202	Basic Mechanical Engineering Lab	0:00:02	1	III/IV
3	PCC-ME-203	Material Engineering	3:00:00	3	III/IV
4	PCC-ME-204	Material Testing Lab	0:00:02	1	III/IV
5	PCC-ME-205	Strength of Material	3:00:00	3	III/IV
6	PCC-ME-206	Fluid Mechanics & Fluid Machine	3:00:00	3	III/IV
7	PCC-ME-207	Fluid Mechanics & Fluid Machine Lab	0:00:02	1	III/IV
8	PCC-ME-208	Applied Thermodynamics	3:00:00	3	III/IV
9	PCC-ME-209	Production Practice Lab	0:00:02	1	III/IV
<b>Total Credits:</b>				<b>19</b>	
<b>Professional Core Courses</b>					
<b>Branch: Mechanical Engineering (B.Tech)</b>					
Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-301	Automobile Engineering	3:00:00	3	V/VI
2	PCC-ME-302	Automobile Engineering Lab	0:00:02	1	V/VI
3	PCC-ME-303	Power Plant Engineering	3:00:00	3	V/VI
4	PCC-ME-304	Manufacturing Process	3:00:00	3	V/VI
5	PCC-ME-305	Kinetimatics & Theory of Machines	3:00:00	3	V/VI
6	PCC-ME-306	Kinetimatics & Theory of Machines lab	0:00:02	1	V/VI
7	PCC-ME-307	Design of Machine Elements	3:00:00	3	V/VI
8	PCC-ME-308	Design of Machine Elements Lab	0:00:02	1	V/VI
9	PCC-ME-309	Manufacturing Technology	3:00:00	3	V/VI
10	PCC-ME-310	Manufacturing Technology Lab	0:00:02	1	V/VI
<b>Total Credits:</b>				<b>22</b>	
<b>Professional Core Courses</b>					
<b>Branch: Mechanical Engineering (B.Tech)</b>					
Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-401	Heat Transfer	3:00:00	3	VII/VIII
2	PCC-ME-402	Heat Transfer Lab	0:00:02	1	VII/VIII
3	PCC-ME-403	Automation in Manufacturing	3:00:00	3	VII/VIII
<b>Total Credits:</b>				<b>7</b>	



## Professional Elective Courses

Branch: Mechanical Engineering(B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits	Preferred Semester
1	PEC-ME-301	Internal Combustion Engines	3:00:00	3	V/VI
2	PEC-ME-302	Mechatronic Systems	3:00:00	3	V/VI
3	PEC-ME-303	Microprocessors in Automation	3:00:00	3	V/VI
4	PEC-ME-304	Composite Materials	3:00:00	3	V/VI
5	PEC-ME-305	Computer Aided Design	3:00:00	3	V/VI

## Professional Elective Courses

Branch: Mechanical Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits	Preferred Semester
1	PEC-ME-401	Refrigeration & Air Conditioning	3:00:00	3	VII/VIII
2	PEC-ME-402	Refrigeration & Air Conditioning Lab	0:00:02	1	VII/VIII
3	PEC-ME-403	Gas Dynamics & Jet Propulsion	3:00:00	3	VII/VIII
4	PEC-ME-404	Process Planning and Cost Estimation	3:00:00	3	VII/VIII
5	PEC-ME-405	Design of Transmission Systems	3:00:00	3	VII/VIII
6	PEC-ME-406	Total Quality Management	3:00:00	3	VII/VIII
7	PEC-ME-407	Energy Conservation & Management	3:00:00	3	VII/VIII
8	PEC-ME-408	Wind & Solar Energy System	3:00:00	3	VII/VIII
9	PEC-ME-409	Computer Aided Design/CAM	3:00:00	3	VII/VIII
10	PEC-ME-410	Computer Aided Design/CAM Lab	0:00:02	1	VII/VIII

# Open Elective Course

Branch: Mechanical Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits
1	OEC-CSE-303	Artificial Intelligence	3:00:00	3
2	OEC-CSE-305	Machine Learning	3:00:00	3
3	OEC-EEE-413	Operation Research	3:00:00	3
4	OEC-CE-420	Production & Operation Management	3:00:00	3

## Project Work

**Branch: Mechanical Engineering(B.Tech)**

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	ME-P1	Project Stage-I (Mini Project/ Industrial Training)	0:00:04	2	VI
2	ME-P2	Project Stage-II (Minor Project)	0:00:10	5	VII
3	ME-P3	Project Stage-III (Major Project Work & Dissertation)	0:00:18	9	VIII
<b>Total Credit:</b>				<b>16</b>	

## Mandatory Courses

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	MC-101	Induction Program	0	0	0	0	I
2	MC-102	Environmental Science	2	0	0	2	IV
3	MC-103	Values & Ethics	2	0	0	2	IV
<b>Total Credit:</b>						<b>4</b>	

**Note.**            **PDP: Personality Development Program**  
**PT: Physical Training**  
**NSS: National Service Scheme**  
**NCC: National Cadet Corps**

# COURSE STRUCTURE

**SEMESTER I (1st YEAR)**

**Branch: Mechanical Engineering(B.Tech)**

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Basic Science Course	BSC-101	Physics	3	1	0	4	30	70	100
2	Basic Science Course	BSC-105	Mathematics – I	3	1	0	4	30	70	100
3	Engineering Science Course	ESC-099	Basic Electrical Engineering	3	1	0	4	30	70	100
<b>Total(A)</b>							<b>12</b>	<b>90</b>	<b>210</b>	<b>300</b>
<b>Practical/Drawing/Design</b>										
1	Engineering Science Course	ESC-103	Engineering Graphics & Design	1	0	4	3	30	20	50
2	Basic Science Course	BSC-102	Physics Lab	0	0	3	1.5	30	20	50
3	Engineering Science Course	ESC-100	Basic Electrical Engineering Lab	0	0	2	1	30	20	50
<b>Total(B)</b>							<b>5.5</b>	<b>90</b>	<b>60</b>	<b>150</b>
<b>Grand Total (A+B)</b>							<b>17.5</b>	<b>180</b>	<b>270</b>	<b>450</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										

# COURSE STRUCTURE

SEMESTER II (1st YEAR)

Branch: Mechanical Engineering(B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Basic Science Course	BSC-103	Chemistry	3	1	0	4	30	70	100
2	Basic Science Course	BSC-106	Mathematics –II	3	1	0	4	30	70	100
3	Engineering Science Course	ESC-104	Programming for Problem Solving	3	0	0	3	30	70	100
4	Humanities and Social Sciences including Management Course	HSMC-101	English	3	0	0	3	30	70	100
<b>Total(A)</b>							<b>14</b>	<b>120</b>	<b>280</b>	<b>400</b>
<b>Practical/Drawing/Design</b>										
1	Engineering Science Course	ESC-106	Workshop/ Manufacturing Practices	1	0	4	3	30	20	50
2	Basic Science Course	BSC-104	Chemistry Lab	0	0	3	1.5	30	20	50
3	Engineering Science Course	ESC-105	Programming for Problem Solving Lab	0	0	4	2	30	20	50
<b>Total(B)</b>							<b>6.5</b>	<b>90</b>	<b>60</b>	<b>150</b>
<b>Grand Total (A+B)</b>							<b>20.5</b>	<b>210</b>	<b>340</b>	<b>550</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										

# COURSE STRUCTURE

SEMESTER III (2nd YEAR)

Branch: Mechanical Engineering(B.Tech)

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Basic Science Course	BSC-107	Mathematics –III	3	1	0	4	30	70	100
2	Professional Core Course	PCC-ME-201	Thermodynamics	3	0	0	3	30	70	100
3	Engineering Science Course	ESC-108	Electronics Devices	3	0	0	3	30	70	100
4	Humanities and Social Sciences including Management Course	HSMC-102	Technical Communication	2	0	0	2	30	70	100
5	Engineering Science Course	ESC-107	Engineering Mechanics	3	1	0	4	30	70	100
<b>Total(A)</b>							<b>16</b>	<b>150</b>	<b>350</b>	<b>500</b>
<b>Practical/Drawing/Design</b>										
1	Professional Core Course	PCC-ME-202	Basic Mechanical Engineering Lab	0	0	2	1	30	20	50
2	Humanities and Social Sciences including Management Course	HSMC-103	Technical Communication Lab	0	0	2	1	30	20	50
3	Engineering Science Course	ESC-112	Programming using MATLAB	0	0	2	1	30	20	50
4	Engineering Science Course	ESC-109	Electronics Devices Lab	0	0	2	1	30	20	50
<b>Total(B)</b>							<b>4</b>	<b>120</b>	<b>80</b>	<b>200</b>
<b>Grand Total (A+B)</b>							<b>20</b>	<b>270</b>	<b>430</b>	<b>700</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										

# COURSE STRUCTURE

**SEMESTER IV (2nd YEAR)**

**Branch: Mechanical Engineering(B.Tech)**

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Professional Core Course	PCC-ME-205	Strength of Material	3	0	0	3	30	70	100
2	Professional Core Course	PCC-ME-203	Material Engineering	3	0	0	3	30	70	100
3	Engineering Science Course	ESC-110	Digital Electronics	3	0	0	3	30	70	100
4	Professional Core Course	PCC-ME-206	Fluid Mechanics & Fluid Machine	3	0	0	3	30	70	100
5	Professional Core Course	PCC-ME-208	Applied Thermodynamics	3	0	0	3	30	70	100
6	Mandatory Course	MC-103	Values & Ethics	2	0	0	2	30	70	100
7	Mandatory Course	MC-102	Environmental Science	2	0	0	2	30	70	100
<b>Total(A)</b>							<b>19</b>	<b>210</b>	<b>490</b>	<b>700</b>
<b>Practical/Drawing/Design</b>										
1	Engineering Science Course	ESC-111	Digital Electronics Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ME-207	Fluid Mechanics & Fluid Machine Lab	0	0	2	1	30	20	50
3	Professional Core Course	PCC-ME-209	Production Practice Lab	0	0	2	1	30	20	50
4	Professional Core Course	PCC-ME-204	Material Testing Lab	0	0	2	1	30	20	50
<b>Total(B)</b>							<b>4</b>	<b>120</b>	<b>80</b>	<b>200</b>
<b>Grand Total (A+B)</b>							<b>23</b>	<b>330</b>	<b>570</b>	<b>900</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										



# COURSE STRUCTURE

**SEMESTER V (3rd YEAR)**

**Branch: Mechanical Engineering(B.Tech)**

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Professional Core Course	PCC-ME-301	Automobile Engineering	3	0	0	3	30	70	100
2	Professional Core Course	PCC-ME-303	Power Plant Engineering	3	0	0	3	30	70	100
3	Professional Core Course	PCC-ME-304	Manufacturing Process	3	0	0	3	30	70	100
4	Professional Core Course	PCC-ME-305	Kinematics & Theory of Machines	3	0	0	3	30	70	100
5	Open Elective Course	OEC-CSE-303	Artificial Intelligence	3	0	0	3	30	70	100
6	Humanities and Social Sciences including Management Course	HSMC-105	French Through Communicative Approach-I	2	0	0	2	30	70	100
<b>Total(A)</b>							<b>17</b>	<b>180</b>	<b>420</b>	<b>600</b>
<b>Practical/Drawing/Design</b>										
1	Professional Core Course	PCC-ME-302	Automobile Engineering Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ME-306	Kinematics & Theory of Machines Lab	0	0	2	1	30	20	50
<b>Total(B)</b>							<b>2</b>	<b>60</b>	<b>40</b>	<b>100</b>
<b>Grand Total (A+B)</b>							<b>19</b>	<b>240</b>	<b>460</b>	<b>700</b>
<b>L-Lecture, T-Tutorial, P-Practical</b>										
<b>IA- Internal Assessment, ESE-End Semester Examination</b>										

# COURSE STRUCTURE

**SEMESTER VI (3rd YEAR)**

**Branch: Mechanical Engineering(B.Tech)**

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Professional Core Course	PCC-ME-309	Manufacturing Technology	3	0	0	3	30	70	100
2	Professional Core Course	PCC-ME-307	Design of Machine Elements	3	0	0	3	30	70	100
3	Professional Elective Course	PEC-ME-301	Internal Combustion Engines	3	0	0	3	30	70	100
4	Humanities and Social Sciences including Management Course	HSMC-106	French Through Communicative Approach-II	2	0	0	2	30	70	100
5	Open Elective Course	OEC-CSE-305	Machine Learning	3	0	0	3	30	70	100
6	Humanities and Social Sciences including Management Course	HSMC-104	Organisational Behaviour	2	0	0	2	30	70	100
<b>Total(A)</b>							<b>16</b>	<b>180</b>	<b>420</b>	<b>600</b>
1	Professional Core Course	PCC-ME-310	Manufacturing Technology Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ME-308	Design of Machine Elements Lab	0	0	2	1	30	20	50
3	Project Work	ME-P1	Project Stage-I (Mini Project/ Industrial Training)	0	0	4	2	75	25	100
<b>Total(B)</b>							<b>4</b>	<b>135</b>	<b>65</b>	<b>200</b>
<b>Grand Total (A+B)</b>							<b>20</b>	<b>315</b>	<b>485</b>	<b>800</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										

# COURSE STRUCTURE

**SEMESTER VII (4th YEAR)**

**Branch: Mechanical Engineering(B.Tech)**

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Professional Core Course	PCC-ME-401	Heat Transfer	3	0	0	3	30	70	100
2	Professional Elective Course	PEC-ME-408	Wind & Solar Energy System	3	0	0	3	30	70	100
3	Professional Elective Course	PEC-ME-409	Computer Aided Design/CAM	3	0	0	3	30	70	100
4	Open Elective Course	OEC-CE-420	Production & Operation Management	3	0	0	3	30	70	100
5	Humanities and Social Sciences including Management Course	HSMC-107	Professional Practice, Law & Ethics	2	0	0	2	30	70	100
<b>Total(A)</b>							<b>14</b>	<b>150</b>	<b>350</b>	<b>500</b>
<b>Practical/Drawing/Design</b>										
1	Professional Elective Course	PEC-ME-410	Computer Aided Design/CAM Lab	0	0	2	1	30	20	50
2	Project Work	ME-P2	Project Stage-II (Minor Project)	0	0	10	5	150	50	200
3	Professional Core Course	PCC-ME-402	Heat Transfer Lab	0	0	2	1	30	20	50
<b>Total(B)</b>							<b>7</b>	<b>210</b>	<b>90</b>	<b>300</b>
<b>Grand Total (A+B)</b>							<b>21</b>	<b>360</b>	<b>440</b>	<b>800</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										

# COURSE STRUCTURE

**SEMESTER VIII (4th YEAR)**

**Branch: Mechanical Engineering (B.Tech)**

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
<b>Theory</b>										
1	Professional Elective Course	PEC-ME-401	Refrigeration & Air Conditioning	3	0	0	3	30	70	100
2	Professional Core Course	PCC-ME-403	Automation in Manufacturing	3	0	0	3	30	70	100
3	Professional Elective Course	PEC-ME-407	Energy Conservation and Management	3	0	0	3	30	70	100
4	Open Elective Course	OEC-EEE-413	Operation Research	3	0	0	3	30	70	100
<b>Total(A)</b>							<b>12</b>	<b>120</b>	<b>280</b>	<b>400</b>
<b>Practical/Drawing/Design</b>										
1	Professional Elective Course	PEC-ME-402	Refrigeration & Air Conditioning Lab	0	0	2	1	30	20	50
2	Project Work	ME-P3	Project Stage-III (Major Project Work & Dissertation)	0	0	18	9	300	100	200
<b>Total(B)</b>							<b>10</b>	<b>330</b>	<b>120</b>	<b>250</b>
<b>Grand Total (A+B)</b>							<b>22</b>	<b>450</b>	<b>400</b>	<b>650</b>
<b>L-Lecture, T-Tutorial, P-Practical</b> <b>IA- Internal Assessment, ESE-End Semester Examination</b>										