



**SARALA**  
**BIRLA**  
**UNIVERSITY**

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 2021-22**

## 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-ME</b>	Open Electives Course
<b>MOOC'S</b>	Massive Open Online Courses
<b>ME-P1</b>	Project Stage-I
<b>ME-P2</b>	Project Stage-II
<b>ME-P3</b>	Project Stage-III

<b>(Breakup of Credits)</b>		
<b>Sl. No.</b>	<b>Category</b>	<b>Breakup of Credits</b>
1	Humanities and Social Sciences including Management courses	12
2	Basic Science courses	23
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	33
4	Professional core courses	57
5	Professional Elective courses relevant to chosen specialization/branch	35
6	Open subjects – Electives from other technical and /or emerging subjects	13
7	Project work, seminar and internship in industry or elsewhere	16
9	Mandatory Courses [Environmental Sciences, Induction Program, Indian Constitution, Essence of Indian Traditional Knowledge]	2
<b>Total Credits:</b>		<b>191</b>

### CREDITS DISTRIBUTION (SEMESTER-WISE AND COURSE-WISE )

[illegible]

## HUMANITIES & SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	HSMC-101	English	3	0	0	3	I
2	HSMC-102	Technical Communication	2	0	0	2	II
3	HSMC-103	Technical Communication Lab	0	0	2	1	II
4	HSMC-104	French Through Communicative Approach-I	2	0	0	2	III
5	HSMC-105	French Through Communicative Approach-II	2	0	0	2	IV
6	HSMC-106	Organisational Behaviour	2	0	0	2	IV
Total Credit:						12	

BASIC SCIENCE COURSES							
Sl. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			L	T	P		
1	BSC-101	Chemistry	3	1	0	4	I
2	BSC-102	Chemistry Lab	0	0	3	1.5	I
3	BSC-103	Physics	3	1	0	4	II
4	BSC-104	Physics 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
Total Credit:						23	

## ENGINEERING SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			L	T	P		
1	ESC-101	Basic Electrical	3	1	0	4	I
2	ESC-102	Basic Electrical Lab	0	0	2	1	I
3	ESC-103	Introduction to Unix & C Programming	3	1	0	4	I
4	ESC-104	Introduction to Unix & C Programming Lab	0	0	2	1	I
5	ESC-105	Engineering Graphics & Design	1	0	4	3	I
6	ESC-106	Basic Electronic	3	1	0	4	II
7	ESC-107	Basic Electronic Lab	0	0	2	1	II
8	ESC-108	Data Structure	3	1	0	4	II
9	ESC-109	Data Structure Lab	0	0	2	1	II
10	ESC-110	Engineering Workshop Practices	1	0	4	3	II
11	ESC-111	Engineering Mechanics	3	1	0	4	III
12	ESC-112	Programming using MATLAB	0	0	2	1	III
13	ESC-113	Python Programming	1	0	2	2	VI
Total Credit						33	

## Professional Core Courses(Sem-III & IV)

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

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-201	Thermodynamics	3:01:00	4	III/IV
2	PCC-ME-202	Thermal Engineering Lab	0:00:02	1	III/IV
3	PCC-ME-203	Engineering Metrology	3:01:00	4	III/IV
4	PCC-ME-204	Production Technology	3:01:00	4	III/IV
5	PCC-ME-205	Basic Mechanical Engineering Lab	0:00:02	1	III/IV
6	PCC-ME-206	Material Engineering	3:01:00	4	III/IV
7	PCC-ME-207	Material Testing Lab	0:00:02	1	III/IV
8	PCC-ME-208	Strength of Material	3:01:00	4	III/IV
9	PCC-ME-209	Strength of Material Lab	0:00:02	1	III/IV
10	PCC-ME-210	Fluid Mechanics & Fluid Machine	3:01:00	4	III/IV
11	PCC-ME-211	Fluid Mechanics Lab	0:00:02	1	III/IV
12	PCC-ME-212	Applied Thermodynamics	3:01:00	4	III/IV
			<b>Total Credit:</b>	<b>33</b>	

## Professional Core Courses(Sem-V & VI)

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

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-301	Heat Transfer	3:01:00	4	V/VI
2	PCC-ME-302	Heat Transfer Lab	0:00:02	1	V/VI
3	PCC-ME-303	Manufacturing Process	3:01:00	4	V/VI
4	PCC-ME-304	Production Practice Lab	0:00:02	1	V/VI
5	PCC-ME-305	Theory of Machines	3:01:00	4	V/VI
6	PCC-ME-306	Theory of Machines Lab	0:00:02	1	V/VI
7	PCC-ME-307	Design of Machine Elements	3:01:00	4	V/VI
8	PCC-ME-308	Design of Machine Elements Lab	0:00:02	1	V/VI
9	PCC-ME-309	Dynamics of Machines	3:01:00	4	V/VI

**Total Credit: 24**

## Professional Core Courses(Sem-VII& VIII)

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-401	Automation in Manufacturing	3:01:00	4	VII/VIII



## Professional Elective Courses (Sem V & VI)

**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	3:01:00	4	V/VI
2	PEC-ME-302	Automobile Engineering	3:01:00	4	V/VI
3	PEC-ME-303	Automobile Engineering Lab	0:00:02	1	V/VI
4	PEC-ME-304	Operation Research	3:01:00	4	V/VI
5	PEC-ME-305	Mechatronic Systems	3:01:00	4	V/VI
6	PEC-ME-306	Microprocessors in Automation	3:01:00	4	V/VI
7	PEC-ME-307	Composite Materials	3:01:00	4	V/VI

## Professional Elective Courses (Sem VII & VIII)

**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	3:01:00	4	VII/VIII
2	PEC-ME-402	Refrigeration & Air Conditioning Lab	0:00:02	1	VII/VIII
3	PEC-ME-403	Computer Aided Design	3:01:00	4	VII/VIII
4	PEC-ME-404	Computer Aided Design Lab	0:00:02	1	VII/VIII
5	PEC-ME-405	Power Plant Engineering	3:01:00	4	VII/VIII
6	PEC-ME-406	Gas Dynamics & Jet Propulsion	3:01:00	4	VII/VIII
7	PEC-ME-407	Total Quality Management	3:01:00	4	VII/VIII
8	PEC-ME-408	Design of Transmission Systems	3:01:00	4	VII/VIII
9	PEC-ME-409	Energy Conservation & Management	3:01:00	4	VII/VIII
10	PEC-ME-410	Finite Element Analysis	3:01:00	4	VII/VIII
11	PEC-ME-411	Process Planning & Cost Estimation	3:01:00	4	VII/VIII

# Open Elective Courses

Branch: Mechanical Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits
1	OEC-CSE-301	Machie Learing for Real-World Applications	3:01:00	4
2	OEC-EEE-305	Renewable Energy	3:01:00	4
3	OEC-EEE-306	Renewable Energy Lab	0:00:02	1
4	OEC-101	Economics	3:01:00	4
5	OEC-102	Sanskrit	4:01:00	4

# Project Work

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

<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Hrs. /Week L: T: P</b>	<b>Credits</b>	<b>Preferred Semester</b>
1	ME-P1	Project Stage-I (Mini Project/ Industrial Training)	0:00:04	2	VI
2	ME-P2	Project Stage-II (Minor Project) (To be continued in next semester)	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>	

# Massive Open Online Courses

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

Sl. No.	Course Code	Course Title	Hrs./ Week L: T: P	Credits
1	MOOCs -101	Artificial Intelligence for Real-World Application	3:01:00	4
2	MOOCs -102	Applications of Deep Learning & Neural Networks	3:01:00	4
3	MOOCs -103	Usability Design of Software Applications	3:01:00	4
4	MOOCs -104	Applied Cloud Computing	3:01:00	4
5	MOOCs -105	Information Security - Practitioner's Perspective	3:01:00	4
6	MOOCs -106	Innovation & Entrepreneurship	3:01:00	4
7	MOOCs -107	Practical Approach to Data Mining & Analytics	3:01:00	4
8	MOOCs -108	IoT & its Applications	3:01:00	4
9	MOOCs -109	Intelligent Game Design & its Applications	3:01:00	4
10	MOOCs -110	Industrial Mechatronic Systems	3:01:00	4
11	MOOCs -111	Solar Energy Technology & its Applications	3:01:00	4

**Note: A student will be eligible to get Under Graduate degree with Honours or additional Minor Engineering, if he/she completes an additional 20 credits. These could be acquired through MOOCs.**

<b>Mandatory Courses</b>							
<b>Sl. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Hours per week</b>			<b>Credits</b>	<b>Preferred Semester</b>
			<b>L</b>	<b>T</b>	<b>P</b>		
1	MC-101	Induction Programme	0	0	0	0	I
2	MC-102	Environmental Science	2	0	0	2	IV
3	MC-103	Values & Ethics	2	0	0	0	IV
4	MC-104	PDP-I	2	0	0	0	I
5	MC-105	PDP-II	2	0	0	0	II
6	MC-106	PDP-III	2	0	0	0	III
7	MC-107	PDP-IV	2	0	0	0	IV
8	MC-108	PDP-V	2	0	0	0	V
9	MC-109	PDP-VI	2	0	0	0	VI
10	MC-110	PDP-VII	2	0	0	0	VII
11	MC-111	PDP-VIII	2	0	0	0	VIII
12	MC-112	PT & Games/NSS/NCC-I	0	0	0	0	I
13	MC-113	PT & Games/NSS/NCC-II	0	0	0	0	II
14	MC-114	Vedic Mathematics-I	2	0	0	0	VI
15	MC-115	Vedic Mathematics-II	2	0	0	0	VII
<b>Total Credit:</b>						<b>2</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
Theory										
1	Basic Science Course	BSC-101	Chemistry	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-101	Basic Electrical	3	1	0	4	30	70	100
4	Engineering Science Course	ESC-103	Introduction to Unix & C Programming	3	1	0	4	30	70	100
5	Humanities and Social Sciences including Management Course	HSMC-101	English	3	0	0	3	30	70	100
Total(A)							19	150	350	500
Practical/Drawing/Design										
1	Engineering Science Course	ESC-105	Engineering Graphics & Design	1	0	4	3	30	20	50
2	Basic Science Course	BSC-102	Chemistry Lab	0	0	3	1.5	30	20	50
3	Engineering Science Course	ESC-102	Basic Electrical Lab	0	0	2	1	30	20	50
4	Engineering Science Course	ESC-104	Introduction to Unix & C Programming Lab	0	0	2	1	30	20	50
Total(B)							6.5	120	80	200
Mandatory Courses										
1	Mandatory Course	MC-101	Induction Program	0	0	0	0	0	0	0
2	Mandatory Course	MC-112	PT & Games/NSS/NCC-I	0	0	2	0	0	0	0
3	Mandatory Course	MC-104	PDP-I	2	0	0	0	0	0	0
Total(C)							0	0	0	0
Grand Total (A+B+C)							25.5	270	430	700
L-Lecture, T-Tutorial, P-Practical										
IA- Internal Assessment, ESE-End Semester Examination										

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

Sl. No.	Category	Course Code	Course Title	Hours			Credit	Marks		
				L	T	P		IA	ESE	Total
Theory										
1	Basic Science Course	BSC-106	Mathematics-II	3	1	0	4	30	70	100
2	Humanities and Social Sciences including Management Course	HSMC-102	Technical Communication	2	0	0	2	30	70	100
3	Engineering Science Course	ESC-106	Basic Electronic	3	1	0	4	30	70	100
4	Basic Science Course	BSC-103	Physics	3	1	0	4	30	70	100
5	Engineering Science Course	ESC-108	Data Structure	3	1	0	4	30	70	100
Total(A)							18	150	350	500
Practical/Drawing/Design										
1	Engineering Science Course	ESC-110	Engineering Workshop Practices	1	0	4	3	30	20	50
2	Engineering Science Course	ESC-107	Basic Electronic Lab	0	0	2	1	30	20	50
3	Basic Science Course	BSC-104	Physics Lab	0	0	3	1.5	30	20	50
4	Humanities and Social Sciences including Management Course	HSMC-103	Technical Communication Lab	0	0	2	1	30	20	50
5	Engineering Science Course	ESC-109	Data Structure Lab	0	0	2	1	30	20	50
Total(B)							7.5	150	100	250
Mandatory Courses										
1	Mandatory Course	MC-102	Environmental Science	2	0	0	2	30	70	100
2	Mandatory Course	MC-113	PT & Games/NSS/NCC-II	0	0	2	0	0	0	0
3	Mandatory Course	MC-105	PDP-II	2	0	0	0	0	0	0
Total(C)							2	30	70	100
Grand Total (A+B+C)							27.5	330	520	850
L-Lecture, T-Tutorial, P-Practical										
IA- Internal Assessment, ESE-End Semester Examination										

# 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
Theory										
1	Basic Science Course	BSC-107	Mathematics-III	3	1	0	4	30	70	100
2	Engineering Science Course	ESC-111	Engineering Mechanics	3	1	0	4	30	70	100
3	Professional Core Course	PCC-ME-204	Production Technology	3	1	0	4	30	70	100
4	Professional Core Course	PCC-ME-203	Engineering Metrology	3	1	0	4	30	70	100
5	Humanities and Social Sciences including Management Course	HSMC-105	French Through Communicative Approach-I	2	0	0	2	30	70	100
6	Professional Core Course	PCC-ME-201	Thermodynamics	3	1	0	4	30	70	100
Total(A)							22	180	420	600
Practical/Drawing/Design										
1	Professional Core Course	PCC-ME-205	Basic Mechanical Engineering Lab	0	0	2	1	30	20	50
2	Engineering Science Course	ESC-112	Programming using MATLAB	0	0	2	1	30	20	50
3	Professional Core Course	PCC-ME-202	Thermal Engineering Lab	0	0	2	1	30	20	50
Total(B)							3	90	60	150
Mandatory Courses/MOOC'S										
1	Mandatory Course	MC-103	Values & Ethics	2	0	0	0	0	0	0
2	Mandatory Course	MC-106	PDP-III	2	0	0	0	0	0	0
Total(C)							0	0	0	0
Grand Total (A+B+C)							25	270	480	750

**L-Lecture, T-Tutorial, P-Practical**  
**IA- Internal Assessment, ESE-End Semester Examination**



**SEMESTER IV (2nd YEAR)**  
**Branch: Mechanical Engineering (B.Tech)**

**L-Lecture, T-Tutorial, P-Practical**  
**IA- Internal Assessment, ESE-End Semester Examination**

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
Theory										
1	Professional Core Course	PCC-ME-301	Heat Transfer	3	1	0	4	30	70	100
2	Open Elective Course	OEC-EEE-305	Renewable Energy	3	1	0	4	30	70	100
3	Professional Core Course	PCC-ME-303	Manufacturing Process	3	1	0	4	30	70	100
4	Professional Core Course	PCC-ME-305	Theory of Machines	3	1	0	4	30	70	100
5	Open Elective Course	OEC-CSE-301	Machie Learning for Real-World Applications	3	1	0	4	30	70	100
Total(A)							20	150	350	500
Practical/Drawing/Design										
1	Professional Core Course	PCC-ME-302	Heat Transfer Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ME-304	Production Practice Lab	0	0	2	1	30	20	50
3	Professional Core Course	PCC-ME-306	Theory of Machines Lab	0	0	2	1	30	20	50
4	Open Elective Course	OEC-EEE-306	Renewable Energy Lab	0	0	2	1	30	20	50
Total(B)							4	120	80	200
Mandatory Courses/MOOC'S										
1	Mandatory Course	MC-108	PDP-V	2	0	0	0	0	0	0
Total(C)							0	0	0	0
Grand Total (A+B+C)							24	270	430	700
L-Lecture, T-Tutorial, P-Practical										
IA- Internal Assessment, ESE-End Semester Examination										

# 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

Theory	
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1	Professional Core Course	PCC-ME-309	Dynamics of Machines	3	1	0	4	30	70	100
2	Professional Core Course	PCC-ME-307	Design of Machine Elements	3	1	0	4	30	70	100
3	Professional Elective Course	PEC-ME-302	Automobile Engineering.	3	1	0	4	30	70	100
4	Professional Elective Course	PEC-ME-301	Internal Combustion Engines	3	1	0	4	30	70	100
5	Professional Elective Course	PEC-ME-304	Operation Research	3	1	0	4	30	70	100
Total(A)							20	150	350	500
Practical/Drawing/Design										
1	Professional Core Course	PCC-ME-308	Design of Machine Elements Lab	0	0	2	1	30	20	50
2	Professional Elective Course	PEC-ME-303	Automobile Engineering Lab	0	0	2	1	30	20	50
3	Engineering Science Course	ESC-113	Python Programming	1	0	2	2	30	20	50
4	Project Work	ME-P1	Project Stage-I (Mini Project/ Industrial Training)	0	0	4	2	75	25	100
Total(B)							6	165	85	250
Mandatory Courses										
1	Mandatory Course	MC-109	PDP-VI	2	0	0	0	0	0	0
2	Mandatory Course	MC-114	Vedic Mathematics-I	2	0	0	0	0	0	0
Total(C)							0	0	0	0
Grand Total (A+B+C)							26	315	435	750
L-Lecture, T-Tutorial, P-Practical										
IA- Internal Assessment, ESE-End Semester Examination										



## 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
Theory										
1	Professional Elective Course	PEC-ME-401	Refrigeration & Air Conditioning	3	1	0	4	30	70	100
2	Professional Core Course	PCC-ME-401	Automation in Manufacturing	3	1	0	4	30	70	100
3	Professional Elective Course	PEC-ME-403	Computer Aided Design	3	1	0	4	30	70	100
Total(A)							12	90	210	300
Practical/Drawing/Design										
1	Professional Elective Course	PEC-ME-402	Refrigeration & Air Conditioning Lab	0	0	2	1	30	20	50
	Professional Elective Course	PEC-ME-404	Computer Aided Design Lab	0	0	2	1	30	20	50
3	Project Work	ME-P2	Project Stage-II (Minor Project)	0	0	10	5	75	25	100
Total(B)							7	135	65	200
Mandatory Courses										
1	Mandatory Course	MC-110	PDP-VII	2	0	0	0	0	0	0
2	Mandatory Course	MC-115	Vedic Mathematics-II	2	0	0	0	0	0	0
Total(C)							0	0	0	0
Grand Total (A+B+C)							19	225	275	500

**L-Lecture, T-Tutorial, P-Practical**

**IA- Internal Assessment, ESE-End Semester Examination**

# 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
Theory										
1	Professional Elective Course	PEC-ME-405	Power Plant Engineering	3	1	0	4	30	70	100
2	Professional Elective Course	PEC-ME-406	Gas Dynamics & Jet Propulsion	3	1	0	4	30	70	100
3	Professional Elective Course	PEC-ME-407	Total Quality Management	3	1	0	4	30	70	100
Total(A)							12	90	210	300
Practical/Drawing/Design										
1	Project Work	ME-P3	Project Stage-III (Major Project Work & Dissertation)	0	0	18	9	75	25	100
Total(B)							9	75	25	100
Mandatory Courses/MOOC'S										
1	Mandatory Course	MC-111	PDP-VIII	2	0	0	0	0	0	0
Total(C)										
Grand Total (A+B+C)							21	165	235	400
L-Lecture, T-Tutorial, P-Practical										
IA- Internal Assessment, ESE-End Semester Examination										