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 2019-20

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
BSC	Basic Science Course
ESC	Engineering Science Course
HSMC	Humanities and Social Sciences including Management Course
MC	Mandatory Course
PCC-ME	Professional Core Course
PEC-ME	Professional Electives Course
OEC	Open Electives Course
ME-P1	Project Stage-I
ME-P2	Project Stage-II
ME-P3	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
Total Credits:		**163**

CREDITS DISTRIBUTION (SEMESTER-WISE AND COURSE-WISE)									
Semester	**HSMC**	**BSC**	**ESC**	**PCC**	**PEC**	**OEC**	**PROJECT**	**MC**	**Total Credit Semester-wise**
1st	0	9.5	8	0	0	0	0	0	17.5
2nd	3	9.5	8	0	0	0	0	0	20.5
3rd	3	4	9	4	0	0	0	0	20
4th	0	0	4	15	0	0	0	4	23
5th	2	0	0	14	0	3	0	0	19
6th	4	0	0	8	3	3	2	0	20
7th	2	0	0	4	7	3	5	0	21
8th	0	0	0	3	7	3	9	0	22
Total Credit Course-wise	14	23	29	48	17	12	16	4	163
Total Credit									163

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
			Total Credits:			**14**	

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
			Total Credits:			**23**	

ENGINEERING SCIENCE COURSES

Sl. No.	Course Code	Course Title	Hours per week			Credits	Preferred Semester
			L	T	P		
1	ESC-101	Basic Electrical & Electronics Engineering	3	1	0	4	I
2	ESC-102	Basic Electrical & Electronics Engineering Lab	0	0	2	1	I
3	ESC-100	Basic Electrical Engineering Lab	0	0	2	1	I
4	ESC-103	Engineering Graphics & Design	1	0	4	3	I
5	ESC-104	Programming for Problem Solving	3	0	0	3	II
6	ESC-105	Programming for Problem Solving Lab	0	0	4	2	II
7	ESC-106	Workshop/ Manufacturing Practices	1	0	4	3	II
8	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
					Total	**30**	

Professional Core Courses

Branch: Mechanical Engineering (B.Tech)

Sl. No.	Course Code	Course Title	Hrs. /Week L: T: P	Credits	Preferred Semester
1	PCC-ME-201	Thermodynamics	3:00:00	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
			Total Credits:	**19**	

Professional Core Courses

Branch: Mechanical Engineering (B.Tech)

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
			Total Credits:	**22**	

Professional Core Courses

Branch: Mechanical Engineering (B.Tech)

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
			Total Credits:	**7**	

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 & 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
			Total Credit:	**16**	

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
				Total Credit:		**4**	

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

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	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-101	Basic Electrical & Electronics Engineering	3	1	0	4	30	70	100
						Total(A)	**12**	**90**	**210**	**300**
Practical/Drawing/Design										
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-102	Basic Electrical & Electronics Engineering Lab	0	0	2	1	30	20	50
						Total(B)	**5.5**	**90**	**60**	**150**
Grand Total (A+B)							**17.5**	**180**	**270**	**450**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

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
Theory										
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 Courses	HSMC-101	English	3	0	0	3	30	70	100
						Total(A)	**14**	**120**	**280**	**400**
Practical/Drawing/Design										
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
						Total(B)	**6.5**	**90**	**60**	**150**
Grand Total (A+B)							**20.5**	**210**	**340**	**550**

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	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
						Total(A)	**16**	**150**	**350**	**500**
Practical/Drawing/Design										
1	Professional Core Course	PCC-ME-202	Basic Mechanical Engineering Lab	0	0	2	1	30	20	50
2	Humanities & 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
						Total(B)	**4**	**120**	**80**	**200**
Grand Total (A+B)							**20**	**270**	**430**	**700**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination

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
Theory										
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
						Total(A)	**19**	**210**	**490**	**700**
Practical/Drawing/Design										
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
						Total(B)	**4**	**120**	**80**	**200**
Grand Total (A+B)							**23**	**330**	**570**	**900**

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	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	Kinetimatics & 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
						Total(A)	**17**	**180**	**420**	**600**
Practical/Drawing/Design										
1	Professional Core Course	PCC-ME-302	Automobile Engineering Lab	0	0	2	1	30	20	50
2	Professional Core Course	PCC-ME-306	Kinetimatics & Theory of Machines Lab	0	0	2	1	30	20	50
						Total(B)	**2**	**60**	**40**	**100**
Grand Total (A+B)							**19**	**240**	**460**	**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										
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
						Total(A)	**16**	**180**	**420**	**600**
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
						Total(B)	**4**	**135**	**65**	**200**
Grand Total (A+B)							**20**	**315**	**485**	**800**

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 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
						Total(A)	**14**	**150**	**350**	**500**
Practical/Drawing/Design										
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
						Total(B)	**7**	**210**	**90**	**300**
Grand Total (A+B)							**21**	**360**	**440**	**800**

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-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
						Total(A)	**12**	**120**	**280**	**400**
Practical/Drawing/Design										
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
						Total(B)	**10**	**330**	**120**	**250**
Grand Total (A+B)							**22**	**450**	**400**	**650**

L-Lecture, T-Tutorial, P-Practical

IA- Internal Assessment, ESE-End Semester Examination