Sardar Patel College of Engineering, Andheri (West), Mumbai 400 058

T.Y.B.Tech. in Mechanical Engineering

Course Credit System

Academic Year 2019-20

NOTES:

(1) Refer (i) Academic rules and regulations and (ii) Examination rules and regulations for further details.

(2) Assessment criteria for laboratory/Tutorial work. i.e. weightage for assessment shall be as follows: (i) Attendance in Laboratory/Tutorial = 20%, (ii) Journal/Drawing sheet/Sketch book = 40%, (iii) MCQ/Oral/Test = 40%.

(3) Laboratory course is considered as a separate head of passing.

(4) The Mandatory courses are with Pass (P) and No Pass (NP) grades and offered institute wide, may be available in both semesters of year and must be passed before obtaining degree.

(5) Student can opt for an online course available on https://swayam.gov.in/ or https://onlinecourses.nptel.ac.in/ and inform department by filling up registration form. After successful completion of the course and approval from the department UG committee, the course title can appear on the grade card of the student.

(6) Department will offer the Value Added courses in a semester subject to availability of resources and enrollment of minimum 20 students opting for the course. Upon successful completion of the Value Added course, the grades of the courses will appear in the grade card of the student.

(7) List of Professional Elective Courses being offererd by department in a semester will be selected from Table PEC-TYBTECH for T.Y.B.Tech. and the list of elective courses being offered by department will be displayed at the beginning of semester.

(8) List of Open Elective Courses being offererd by institute in a semester will be selected from Table OEC-TYBTECH for T.Y.B.Tech. and the list of elective courses being offered by institute will be displayed at the beginning of semester.

(9) For Open Elective courses, students with C.P.I. higher than 8.5 can opt for obtaining the credits by completing a online course (approved by department) offered through SWAYAM or NPTEL portal instead of completing the elective courses offered by department/institute. Upon successful completion of course, the score given on certificate issued by SWAYAM/NPTEL will be converted to letter grade as per applicable examination regulation.

(10) The contents of core courses are aligned with the latest GATE syllabus. The mapping between GATE syllabus topics and core courses is given in Table GATE-MAP. The term work for these courses shall include evaluations along the pattern of GATE examinations, for example, part of the term work shall consist of MCQ similar to GATE examinations.

(11) The course contents, wherever appropriate, should include assessment based on Project Based Learning and a report of visit to an industry related to the course.

(12) One of the Course Outcome (CO), wherever applicable, shall include attainment of one of the essential skillsets: leadership skills, entrepreneurship skills, managerial skills, communication skills, collaborative skills.

(13) Students can optionally opt for Value Added Non Technical courses offered by Center for Continuing Education (CCE-SPCE). These courses are with zero credit and upon successful completion, the course titles will appear on student's grade card. The list of courses is given in Table-VNT

(14) L- Lecture, P- Laboratory, T-Tutorial.

Sardar Patel College of Engineering
Academic Year 2019-20
Courses Offered for Third Year B.Tech. in Mechanical Engineering (Semester V)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)		End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	Points	Time (Hrs)		(Note 2)	
Core Courses													
1	Heat and Mass Transfer	PC-BTM501	3	0	0	3	20	20	100	3	60%	0	100
2	Mechatronics	PC-BTM503	3	0	0	3	20	20	100	3	60%	0	100
3	Dynamics of Machinery	PC-BTM512	2	0	0	2	20	20	100	3	60%	0	100
4	Thermal Systems	PC-BTM514	3	0	0	3	20	20	100	3	60%	0	100
5	Computer Aided Machine Drawing	PC-BTM515	1	0	0	1	20	20	100	3	60%	0	100
Laboratory Courses (Note 3)													
6	Heat and Mass Transfer Lab.	PC-BTM551	0	2	0	1	0	0	0	0	0	50	50
7	Mechatronics Lab.	PC-BTM553	0	2	0	1	0	0	0	0	0	50	50
8	Dynamic of Machinery Lab.	PC-BTM562	0	2	0	1	0	0	0	0	0	50	50
9	Thermal Systems Laboratory	PC-BTM564	0	2	0	1	0	0	0	0	0	50	50
10	Computer Aided Machine Drawing Lab.	PC-BTM565	0	2	0	1	0	0	0	0	0	50	50
Professional Elective Course - I (Note 7)													
11	Professional Elective Course - I	PE-BTM5xx	Refer Table PEC-TYBTECH			4	Refer Table PEC-TYBTECH						
Mandatory Courses (Note 4)													
12	Health Safety and Environment (HSE)*	MC-BTM003	2	0	1	0	20	20	100	3	60%	25	125
Online Courses (Note 5)													
13	Online Course	OL-BTM58x	0	0	0	0	0	0	0	0	0	0	0
Value Added Courses (Note 6)													
14	Reverse Engineering and Product Development	VA-BTM591	2	-	-	0	20	20	100	3	60%	0	100
Value Added Non-Technical Courses (Note13)													
15	Refer Table-VNT	VN-BTxxx	Refer Table-VNT										
	TOTAL					**21**							

(*): The course MC-BTM003 may be offered by department for its completion in online mode on SWAYAM/NPTEL portal by registering for an equivalent course approved by the department. In such case, student must obtain online course completion certificate for passing the course.

Sardar Patel College of Engineering
Academic Year 2019-20
Courses Offered for Third Year B.Tech. in Mechanical Engineering (Semester VI)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)		End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	Points	Time (Hrs)		(Note 2)	
Core Courses													
1	Manufacturing Planning and Control	PC-BTM605	3	0	1	4	20	20	100	3	60%	25	125
2	CAD/CAM/CIM	PC-BTM606	2	0	0	2	20	20	100	3	60%	0	100
3	Refrigeration and Air-conditioning	PC-BTM611	2	0	0	2	20	20	100	3	60%	0	100
4	Machine Design	PC-BTM612	3	0	1	4	20	20	100	3	60%	25	125
5	Internal Combustion Engine	PC-BTM614	2	0	0	2	20	20	100	3	60%	0	100
Laboratory Courses (Note 3)													
6	CAD/CAM/CIM Laboratory	PC-BTM656	0	2	0	1	0	0	0	0	0	50	50
7	Refrigeration and Air-conditioning Laboratory	PC-BTM661	0	2	0	1	0	0	0	0	0	50	50
8	Internal Combustion Engine Laboratory	PC-BTM664	0	2	0	1	0	0	0	0	0	50	50
Professional Elective Course - II (Note 7)													
9	Professional Elective Course - II	PE-BTM5xx	Refer Table PEC-TYBTECH			4	Refer Table PEC-TYBTECH						
Open Elective Course - I (Note 8,9)													
10	Open Elective Course - I	OE-BTx6xx	Refer Table OEC-TYBTECH			3	Refer Table OEC-TYBTECH						
Online Courses (Note 5)													
11	Online Course	OL-BTM68x	0	0	0	0	0	0	0	0	0	0	0
Value Added Courses (Note 6)													
12	CNC Programming	VA-BTM691	2	0	1	0	20	20	100	3	60%	25	125
Value Added Non-Technical Courses (Note13)													
13	Refer Table-VNT	VNT-BTxxx	Refer Table-VNT										
	TOTAL					**24**							

Sardar Patel College of Engineering
Academic Year 2019-20
TABLE PEC-TYBTECH: Professional Elective Courses - I and II for Third Year B.Tech. in Mechanical Engineering (Semester V and VI)

Sr. No.	Course Name	Specialization	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)		End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
				L	P	T		T-I	T-II	Points	Time (Hrs)		(Note 2)	
Professional Elective Courses I and II														
1	*Finite Element Methods for Mech. Engineers(*)*	*D*	*PE-BTM511*	*3*	*2*	*0*	*4*	*20*	*20*	*100*	*3*	*60%*	*50*	*150*
2	Automation of Engineering Drawings	D	PE-BTM512	3	2	0	4	20	20	100	3	60%	50	150
3	Design Thinking	D	PE-BTM513	3	0	1	4	20	20	100	3	60%	25	125
4	Intro. to System Modelling & Analysis	D	PE-BTM514	3	0	1	4	20	20	100	3	60%	25	125
5	Knowledge Based Engineering	D	PE-BTM515	3	0	1	4	20	20	100	3	60%	25	125
6	Smart Product Development	D	PE-BTM516	3	2	0	4	20	20	100	3	60%	50	150
7	Synthesis of Mechanisms	D	PE-BTM517	3	0	1	4	20	20	100	3	60%	25	125
8	Mechanical Vibrations	D	PE-BTM518	3	0	1	4	20	20	100	3	60%	25	125
9	Digital Manuacturing	M	PE-BTM531	3	0	1	4	20	20	100	3	60%	25	125
10	Intro. to Composite Material Technology	M	PE-BTM532	3	0	1	4	20	20	100	3	60%	25	125
11	Intro. to Computer Integrated Manufacturing	M	PE-BTM533	3	0	1	4	20	20	100	3	60%	25	125
12	Lean and Green Manufacturing	M	PE-BTM534	3	0	1	4	20	20	100	3	60%	50	150
13	Non-Destructive Testing	M	PE-BTM535	3	2	0	4	20	20	100	3	60%	50	150
14	Product Lifecycle Management	M	PE-BTM536	3	0	1	4	20	20	100	3	60%	25	125
15	Tool Engineering	M	PE-BTM537	3	0	1	4	20	20	100	3	60%	25	125
16	*Industrial Mgmt. and Entrepreneurship (*)*	*M*	*PE-BTM538*	*3*	*0*	*1*	*4*	*20*	*20*	*100*	*3*	*60%*	*25*	*125*
17	Additive Manufacturing	M	PE-BTM539	3	0	1	4	20	20	100	3	60%	25	125
18	Advanced Manufacturing Processes	M	PE-BTM540	3	0	1	4	20	20	100	3	60%	25	125
19	Advanced Heat Transfer	T	PE-BTM551	3	0	1	4	20	20	100	3	60%	25	125
20	Hydraulic Machinery	T	PE-BTM552	3	2	0	4	20	20	100	3	60%	50	150
21	Introduction to Aerodynamics	T	PE-BTM553	3	0	1	4	20	20	100	3	60%	25	125
22	Compressible Fluid Flow	T	PE-BTM554	3	0	1	4	20	20	100	3	60%	25	125

Note: Specializations are: D - Design, M - Manufacturing, T - Thermal Engineering

(*) This course may be simultaneously offered to both T.Y.B.Tech. and Final Year B.Tech. students.

Refer to Table PEC-BTECH for additional professional elective courses available to T.Y.B.Tech. students, if any.

Sardar Patel College of Engineering

Academic Year 2019-20

TABLE OEC-TYBTECH: Open Elective Courses - I for Third Year B.Tech. in Mechanical Engineering (Semester VI)

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)		End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	Points	Time (Hrs)		(Note 2)	
Open Elective Courses - I													
1	Computational Methods	OE-BTM611	2	0	1	3	20	20	100	3	60%	25	125
2	Introduction to Nanotechnology	OE-BTM612	3	0	0	3	20	20	100	3	60%	0	100
3	Entrepreneurship Development and Start-up	OE-BTM613	2	0	1	3	20	20	100	3	60%	25	100
4	Introduction to Optimization Methods	OE-BTM614	2	0	1	3	20	20	100	3	60%	25	125
5	*Project Management (*)*	*OE-BTM615*	*2*	*2*	*0*	*3*	*20*	*20*	*100*	*3*	*60%*	*50*	*150*
6	Project Management	OE-BTE601	3	0	0	3	20	20	100	3	60%	0	100
7	Artificial Intelligence	OE-BTE602	3	0	0	3	20	20	100	3	60%	0	100
8	Human Resources Dev. & Organizational Behaviour	OE-BTC611	3	0	0	3	20	20	100	3	60%	0	100
9	Sustainable Development	OE-BTC612	3	0	0	3	20	20	100	3	60%	0	100
10	Watershed Development and Management	OE-BTC613	3	0	0	3	20	20	100	3	60%	0	100
11	Artificial Intelligence Techniques	OE-BTC614	3	0	0	3	20	20	100	3	60%	0	100
12	Numerical Computations	OE-BTC615	3	0	0	3	20	20	100	3	60%	0	100
13	Engineering System and Development	OE-BTC616	3	0	0	3	20	20	100	3	60%	0	100
14	Online Course from SWAYAM/NPTEL (Note 9)	OE-BTS6Mx	0	0	0	3	0	0	100	0	100%	0	100

(*) This course may be simultaneously offered to both T.Y.B.Tech. and Final Year B.Tech. students.

Refer to Table OEC-BTECH for additional open elective courses available to T.Y.B.Tech. students, if any.

Sardar Patel College of Engineering
Academic Year 2019-20
TABLE VNT: Value Added Non-Technical Courses for B.Tech. and M.Tech. Programmes

Sr. No.	Course Name	Code	Course Plan per Week (Hrs)			Credits	In semester Evaluation (Points)		End Semester Evaluation (Points)		End semester weightage (%)	Term work/Practical	Total Points
			L	P	T		T-I	T-II	Points	Time (Hrs)			
Professional Elective Courses I and II													
1	UBUNTU	VN-BT001	Refer to Course Contents			0	Refer to Course Contents						
2	Performing Arts and Script Writing	VN-BT002				0							
3	Financial Literacy	VN-BT003				0							
4	Self Defense Training	VN-BT004				0							
5	Yoga Health Technology for Self Management	VN-BT005				0							
6	Integrated Self Management	VN-BT006				0							
7	Photography	VN-BT007				0							

Table GATE-MAP: Alignment of Course Content with GATE Syllabus (2019)

B.Tech. in Mechanical Engineering

No.	Section	Core courses in SPCE Curriculum 2019-20	Topics From GATE Syllabus (2019)
1	D	Machine Design	Machine Design
2	D	Design of Machines and Mech. Systems	Machine Design
3	D	Kinematics of Machinery	Theory of Machines
4	D	Dynamics of Machinery	Theory of Machines, Vibrations
5	D	Solid Mechanics	Mechanics of Materials
6	D	Strength of Materials	Mechanics of Materials
7	D	Computer Aided Machine Drawing	Machine Design
8	M	CAD/CAM/CIM	Computer Integrated Manufacturing
9	M	Mechanical Engineering Measurements	Metrology and Inspection
10	M	Manufacturing Science	Casting, Forming and Joining Processes; Machining and machine tool operations
11	M	Manufacturing Planing and Control	Production Planning and Control, Inventory Control, Operations Research
12	M	Mechatronics	Computer Integrated Manufacturing
13	M	Ind. Engg. And Proj./Fin. Mgmt.	Production Planning and Control, Operations Research
14	M	Material Science	Engineering materials
15	T	Thermal Systems	Applications of Fluid mechanics and Thermal sciences
16	T	Fluid Mechanics	Fluid Mechanics
17	T	Heat and Mass Transfer	Heat-Transfer
18	T	Refrigeration and Air-conditioning	Applications of Fluid mechanics and Thermal sciences
19	T	Thermodynamics	Thermodynamics
20	T	Internal Combustion Engine	Applications of Fluid mechanics and Thermal sciences
21	MATH	Applied Mathematics, I, II, III, IV	Linear Algebra, Calculus, Differential Equations, Complex variables, Probability and Statistics, Numerical Methods

Note: Sections are: D - Applied Mechanics and Design, M -Materials, Manufacturing and Industrial Engineering, T - Fluid Mechanics and Thermal Sciences, MATH - Engineering Mathematics