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

Final Year B.Tech. in Mechanical Engineering
Course Credit System
Academic Year 2020-21

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 Table PEC-BTECH for final year 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 Table OEC-BTECH for final year 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) Semester VII: $ For Project course: contact hours = 2 and self-learning hours = 6 ; @ For project course, in-semester evaluation shall include one or more in-semester presentations. (*) 15 points for report and 15 points for presentation and viva voce examined by supervisor and one internal examiner.
Semester VIII: $ For Project course: contact hours = 2 and self-learning hours = 12 ; @ For project course, in-semester evaluation shall include one or more in-semester presentations. (*) 30 points for report and 30 points for presentation and viva voce examined by supervisor and one internal examiner.

(11) 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.

(12) 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.

(13) 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.

(14) 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

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

Sardar Patel College of Engineering
Academic Year 2020-21
Courses Offered for Final Year B.Tech. in Mechanical Engineering (Semester VII)

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	Design of Machines and Mechanical Systems	PC-BTM711	3	0	1	4	20	20	100	3	60%	25	125
2	Industrial Engineering and Project Management	PC-BTM714	3	0	1	4	20	20	100	3	60%	25	125
Professional Elective Course - III (Note 7)													
3	Professional Elective Course - III	PE-BTM7xx	Refer Table PEC-BTECH			4	Refer Table PEC-BTECH						
Open Elective Course - II (Note 8,9)													
4	Open Elective Course - II	OE-BTM7xx	Refer Table OEC-BTECH			3	Refer Table OEC-BTECH						
Project Course (Note 10)													
5	Project Stage I	PR-BTM798	0	2+6$	0	4	@	@	-	-	-	50*	50
Online Courses (Note 5)													
6	Online Course	OL-BTM78x	0	0	0	0	0	0	0	0	0	0	0
Value Added Courses (Note 6)													
7	Cloud Computing	VA-BTM791	2	0	1	0	20	20	100	3	60%	25	125
Value Added Non-Technical Courses (Note14)													
8	Refer Table-VNT	VN-BTxxx	Refer Table-VNT										
	TOTAL					**19**							

Sardar Patel College of Engineering
Academic Year 2020-21
Courses Offered for Final Year B.Tech. in Mechanical Engineering (Semester VIII)

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)	
Professional Elective Course - IV, V (Note 7)													
3	Professional Elective Course - IV	PE-BTM7xx	Refer Table PEC-BTECH			4	Refer Table PEC-BTECH						
4	Professional Elective Course - V	PE-BTM7xx	Refer Table PEC-BTECH			4	Refer Table PEC-BTECH						
Open Elective Course - III (Note 8,9)													
5	Open Elective Course - III	OE-BTM7xx	Refer Table OEC-BTECH			3	Refer Table OEC-BTECH						
Project Course (Note 10)													
6	Project Stage II	PR-BTM898	0	2+12$	0	7	@	@	-	-	-	100*	100
Online Courses (Note 5)													
7	Online Course	OL-BTM88x	0	0	0	0	0	0	0	0	0	0	0
Value Added Courses (Note 6)													
8	Big Data Analytics	VA-BTM891	2	0	1	0	20	20	100	3	60%	25	125
Value Added Non-Technical Courses (Note14)													
9	Refer Table-VNT	VN-BTxxx	Refer Table-VNT										
	TOTAL					**18**							

Sardar Patel College of Engineering

Academic Year 2020-21

TABLE PEC-BTECH: Professional Elective Courses - III, IV and V for Final Year B.Tech. in Mechanical Engineering (Semester VII and VIII)

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	Process Eqpt. Design and Piping Engg.	D	PE-BTM711	3	0	1	4	20	20	100	3	60%	25	125
2	Design for Manufacturing and Assembly	D	PE-BTM712	3	0	1	4	20	20	100	3	60%	25	125
3	Introduction to Design of Power Transmission	D	PE-BTM713	3	0	1	4	20	20	100	3	60%	25	125
4	Electric Vehicle Design and Development	D	PE-BTM714	3	0	1	4	20	20	100	3	60%	25	125
5	Introduction to Fracture Mechanics	D	PE-BTM715	3	0	1	4	20	20	100	3	60%	25	125
6	Design of Material Handling Equipment	D	PE-BTM716	3	0	1	4	20	20	100	3	60%	25	125
7	Compliant Mechanisms	D	PE-BTM717	3	0	1	4	20	20	100	3	60%	25	125
8	Business Process Re-engineering and TQM	M	PE-BTM731	3	0	1	4	20	20	100	3	60%	25	125
9	Customer Relationship Management (CRM)	M	PE-BTM732	3	0	1	4	20	20	100	3	60%	25	125
10	Industrial Robotics	M	PE-BTM733	3	0	1	4	20	20	100	3	60%	25	125
11	Supply Chain Management	M	PE-BTM734	3	0	1	4	20	20	100	3	60%	25	150
12	Welding Process and Welding Technology	M	PE-BTM735	3	0	1	4	20	20	100	3	60%	25	125
13	Advanced IC Engine	T	PE-BTM751	3	0	1	4	20	20	100	3	60%	25	125
14	Computational Fluid Dynamics	T	PE-BTM752	3	0	1	4	20	20	100	3	60%	25	125
15	Introduction to Cryogenics	T	PE-BTM753	3	0	1	4	20	20	100	3	60%	25	125
16	Power Plant Engineering	T	PE-BTM754	3	0	1	4	20	20	100	3	60%	25	125
17	Automobile Engineering	T	PE-BTM755	3	0	1	4	20	20	100	3	60%	25	125
18	Renewable Energy Sources and Utilization	T	PE-BTM756	3	0	1	4	20	20	100	3	60%	25	125

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

Refer to Table PEC-TYBTECH for additional professional elective courses available to final year B.Tech. students, if any.

Sardar Patel College of Engineering

Academic Year 2020-21

TABLE OEC-BTECH: Open Elective Courses - II and III for Final Year B.Tech. in Mechanical Engineering (Semester VII and VIII)

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 - II and III													
1	Entreprise Resource Planning (ERP)	OE-BTM711	3	0	0	3	20	20	100	3	60%	0	100
2	Intro. to Research Methodology	OE-BTM712	3	0	0	3	20	20	100	3	60%	0	100
3	Introduction to MEMS	OE-BTM714	2	0	1	3	20	20	100	3	60%	25	125
4	Solar and Wind Technology	OE-BTM715	2	0	1	3	20	20	100	3	60%	25	125
5	*Internet of Things (IOT) (*)*	*OE-BTM716*	*2*	*0*	*1*	*3*	*20*	*20*	*100*	*3*	*60%*	*25*	*125*
6	*Introduction to Augmented Reality (*)*	*OE-BTM717*	*2*	*0*	*1*	*3*	*20*	*20*	*100*	*3*	*60%*	*25*	*125*
7	*Fundamentals of AI and Machine Learning (*)*	*OE-BTM718*	*2*	*0*	*1*	*3*	*20*	*20*	*100*	*3*	*60%*	*25*	*125*
8	Value Engineering	OE-BTM719	2	0	1	3	20	20	100	3	60%	25	125
9	Fire and Safety Management in Industry	OE-BTM720	3	0	0	3	20	20	100	3	60%	0	100
10	Engineering Economics	OE-BTE702	3	0	0	3	20	20	100	3	60%	0	100
11	Internet of Things	OE-BTE704	3	0	0	3	20	20	100	3	60%	0	100
12	Robotics	OE-BTE801	3	0	0	3	20	20	100	3	60%	0	100
13	Power Plant Engineering	OE-BTE802	3	0	0	3	20	20	100	3	60%	0	100
14	Image Processing	OE-BTE805	3	0	0	3	20	20	100	3	60%	0	100
15	Online Course from SWAYAM/NPTEL (Note 9)	OE-BTS7Mx	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-TYBTECH for additional open elective courses available to final year B.Tech. students, if any.

Sardar Patel College of Engineering
Academic Year 2020-21
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

B.Tech. in Mechanical Engineering

No.	Section	Core courses in SPCE Curriculum 2020-21	Topics From GATE Syllabus
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