APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

B. Tech

Curriculum (2024)- Semester I to VIII

Safety & Fire Engineering

Branch Code: SF

(Group C)

Ambady Nagar, Sreekaryam

Thiruvananthapuram- 695016

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure L	T	P	R	SS	Total Marks CIA	ESE	Credits	Hrs./Week
FIRST SEMESTER (July-December): Group C
10 Days Compulsory Induction Program and UHV
1	A	GYMAT101	BSC	GC	Mathematics for Physical science - 1	3	0	0	0	4.5	40	60	3	3
2	B S1/S2	GZPHT121	BSC	GC	Physics for Engineers	3	0	2	0	5.5	40	60	4	5
		GCCYT122			Chemistry for Engineers									
3	C	GCEST103	ESC	GC	Engineering Mechanics	3	0	0	0	4.5	40	60	3	3
4	D	GCEST104	ESC	GC	Introduction to Mechanical Engineering & Civil Engineering (Part1: Mechanical Engineering)	2	0	0	0	3	20	30	2+2=4	4
					(Part 2: Civil Engineering)	2	0	0	0	3	20	30		
5	F	UCEST105	ESC	UC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	5
6	L	GCESL106	ESC	GC	Engineering Workshop	0	0	2	0	1	50	50	1	2
7	I* S1/S2	UCHWT127	HWP	UC	Health and wellness	1	0	1	0	0	50	0	1	2/3
		UCHUT128	HMC		Life Skills and Professional Communication	2	0	-	0	3	100	0		
8	S₁/S₂	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(30 Hours, NASSCOM)	\multicolumn{4}{c}{MOOC}	2			-	
\multicolumn{6}{c}{**Total**}					30/32			**20**	**24/25**
Bridge Course (Mathematics or Introduction to Computer Science) *:   Total 15 Hrs.

Valuation for HMC courses will be done at college level, Question papers will be provided by the University.
No Grade Points will be awarded for the MOOC course and I slot course.

➢ L-T-P-R: Lecture-Tutorial-Practical-Project

➢ SS(Self Study) Hours= 1.5L+0.5 T+0.5P+R

➢ CIA: Continuous Internal Assessment, ESE: End Semester Examination

Digital 101 (NASSCOM)
Sl. No:	**Technologies Covered**	**Hours**
1	Artificial intelligence and Big Data Analytics (AI/BDA)	11
2	Internet of Things (IoT)	2.5
3	Cyber Security	2.5
4	Block Chain	2.5
5	Robotic Process Automation	1.5
6	Augmented and Virtual Reality (AR and VR)	2.5
7	Cloud Computing	2.5
8	3 D Printing and Modelling	2
9	Web, Mobile Dev and Marketing	2
10	Responsible AI	1
\multicolumn{2}{c}{**Total Hours**}	**30**

Note: *Physics, Chemistry, Health and Wellness & Life Skill and Professional Communication can be offered in both Semester 1 (S1) and Semester 2 (S2). Institutions are encouraged to guide approximately 50% of their branches to choose between Physics or Chemistry (Slot B) and Health and Wellness or Life Skill and Professional Communication (Slot I) in Semester 1.*

SECOND SEMESTER (January-June): Group C													
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./Week
						L	T	P	R		CIA	ESE		
1	A	GYMAT201	BSC	GC	Mathematics for Physical science - 2	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GZPHT121	BSC	GC	Physics for Engineers	3	0	2	0	5.5	40	60	4	5
		GCCYT122			Chemistry for Engineers									
3	C	GCEST203	ESC	GC	Engineering Graphics and Computer Aided Drawing	2	0	2	0	4	40	60	3	4
4	D	GZEST204	ESC	GC	Basic Electrical & Electronics Engineering (Part 1: Electrical Engineering)	2	0	0	0	3	20	30	2+2=4	4
					(Part 2: Electronics Engineering)	2	0	0	0	3	20	30		
5	E	PCSFT205	PC	PC	Principles of Safety Management	3	1	0	0	5	40	60	4	4
6	F	UCEST206	ESC	UC	Engineering Entrepreneurship & IPR	3	0	0	0	4.5	60	40	3	3
7	I* S1/ S2	UCHWT127	HWP	UC	Health and wellness	1	0	1	0	0	50	0	1	2/3
		UCHUT128	HMC		Life Skills and Professional Communication	2	0	-	0	3	100	0		
8	L	GZESL208	ESC	GC	Basic Electrical and Electronics Engineering workshop	0	0	2	0	1	50	50	1	2
9	S$_1$/ S$_2$	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(30 Hours, NASSCOM)	MOOC							1	
Total										34			24	27/ 28

*No Grade Points will be awarded for the MOOC course and I slot course.

THIRD SEMESTER (July-December)													
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
1	A	GYMAT301	BSC	GC	Mathematics for Physical science - 3	3	0	0	0	4.5	40	60	3	3
2	B	PCSFT302	PC	PC	Fire Engineering Fundamentals	3	1	0	0	5	40	60	4	4
3	C	PCSFT303	PC	PC	Fluid Mechanics and Hydraulic Machines	3	1	0	0	5	40	60	4	4
4	D	PBSFT304	PC-PBL	PB	Chemical Process Principles	3	0	0	1	5.5	60	40	4	4
5	F	GNEST305	ESC	GC	Introduction to Artificial Intelligence and Data Science	3	1	0		5	40	60	4	4
6	G S3/S4	UCHUT346	HMC	UC	Economics for Engineers	2	0	0	0	3	50	50	2	2
		UCHUT347			Engineering Ethics and Sustainable Development									
7	L	PCSFL307	PCL	PC	Fluid Mechanics & Hydraulic Machines Laboratory	0	0	3	0	1.5	50	50	2	3
8	Q	PCSFL308	PCL	PC	Machine Shop	0	0	3	0	1.5	50	50	2	3
9	R/M		VAC		REMEDIAL/MINOR/COURSE	3	1	0	0	5			4*	4*
Total										31/ 36			25/29*	27/31*

FOURTH SEMESTER (January-June)

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
1	A	GCMAT401	BSC	GC	Probability Distributions and Numerical Methods	3	0	0	0	4.5	40	60	3	3
2	B	PCSFT402	PC	PC	Strength of Materials	3	1	0	0	5	40	60	4	4
3	C	PCSFT403	PC	PC	Electrical Technology and Safety	3	1	0	0	5	40	60	4	4
4	D	PBSFT404	PC-PBL	PB	Hazard Identification and Risk Assessment & Mitigation	3	0	0	1	5.5	60	40	4	4
5	E	PESFT41N	PE	PE	Elective-1	3	0	0	0	4.5	40	60	3	3
6	G S3/S4	UCHUT346	HMC	UC	Economics for Engineers	2	0	0	0	3	50	50	2	2
		UCHUT347			Engineering Ethics and Sustainable Development									
7	L	PCSFL407	PCL	PC	Strength of Materials Laboratory	0	0	3	0	1.5	50	50	2	3
8	Q	PCSFL408	PCL	PC	Electrical Machines Laboratory	0	0	3	0	1.5	50	50	2	3
9	R/M /H		VAC		Remedial/Minor/Honours Course	3	1	0	0	5			4*	4*
	**Total**		31/ 36			24/ 28*	26/ 30*

Note: *Economics for Engineersand Engineering Ethics and Sustainable Development shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Economics for Engineersin S3 and Engineering Ethics&Sustainable Development in S4 and vice versa.*

PROGRAM ELECTIVE I: PEFST41N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PESFT411	Legal Aspects of Health, Safety and Environment	3-0-0-0	**3**	3
	PESFT412	Design for Safety	3-0-0-0		3
	PESFT413	Process Instrumentation and Control	3-0-0-0		3
	PESFT414	Energy Management and Conservation	3-0-0-0		3
	PESFT416	Life Safety in Building Fire	3-0-0-0		3
	PESFT417	Nuclear Safety	3-0-0-0		3
	PESFT418	Organizational Behaviour	3-0-0-0		3
	PESFT415	**Computational Fluid Dynamics**	**3-0-0-0**		**5/3**

Note : Level 5 courses in the B. Tech curriculum carry a total of 5 credits, consisting of 3 credits for the Programme Elective and 2 additional credits. The additional 2 credits shall be awarded only if the student meets the eligibility conditions specified in the B. Tech. -2024 regulations. If those conditions are not fulfilled, the student will receive only 3 credits for the course.

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs./ Week
						L	T	P	R		CIA	ESE		
					FIFTH SEMESTER (July-December)									
1	A	PCSFT501	PC	PC	Structural Fire Safety and Design of Fire Protection Systems	3	1	0	0	5	40	60	4	4
2	B	PCSFT502	PC	PC	Qualitative and Quantitative approach in Safety	3	1	0	0	5	40	60	4	4
3	C	PCSFT503	PC	PC	Occupational Health, Hygiene and First Aid	3	0	0	0	4.5	40	60	3	3
4	D	PBSFT504	PC-PBL	PB	Heat and Mass Transfer Operations	3	0	0	1	5.5	60	40	4	4
5	E	PESFT52N	PE	PE	Elective-2	3	0	0	0	4.5	40	60	3	3
6	I*	UCHUM506	HMC	UC	Constitution Of India (MOOC)	-	-	-	-	2	-	-	1	-
7	L	PCSFL507	PCL	PC	Fire Engineering Laboratory	0	0	3	0	1.5	50	50	2	3
8	Q	PCSFL508	PCL	PC	Chemical Engineering Laboratory	0	0	3	0	1.5	50	50	2	3
9	R/M /H		VAC		Remedial/Minor/Honours Course	3	1	0	0	5			4*	4*
	S₅/ S₆				Industrial Visit (Maximum 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training									
Total										30 / 35			**23/27***	**24/28***

No Grade Points will be awarded for the MOOC course and I slot course.

PROGRAM ELECTIVE 2: PESFT 52N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PESFT 521	Non-destructive Testing Methods	3-0-0-0	**3**	3
	PESFT 522	Safety in Material Handling	3-0-0-0		3
	PESFT 523	Marketing Management	3-0-0-0		3
	PESFT524	Human and Organizational factors in safety	3-0-0-0		3
	PESFT 526	Safety in Construction	3-0-0-0		3
	PESFT 527	Transportation Systems and Safety	3-0-0-0		3
	PESFT 528	Theory of Fire Propagation and Dynamics	3-0-0-0		3
	PESFT 525	**Reliability Engineering**	**3-0-0-0**		**5/3**

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	L	T	P	R	SS	CIA	ESE	Credits	Hrs/Week
SIXTH SEMESTER (January-June)														
						Credit Structure					Total Marks			
1	A	PCSFT601	PC	PC	Hazard Control in industries	3	1	0	0	5	40	60	4	4
2	B	PCSFT602	PC	PC	Environmental Engineering and Toxic Risks	3	0	0	0	4.5	40	60	3	3
3	C	PESFT63N	PE	PE	Elective-3	3	0	0	0	4.5	40	60	3	3
4	D	PBSFT604	PC-PBL	PB	Chemical Process Safety	3	0	0	1	5.5	60	40	4	4
5	F	GCEST605	ESC	GC	Design Thinking and Product Development (Group Specific Syllabus)	2	0	0	0	3	40	60	2	2
6	O	OESFT61N /IESFT61N	OE/ILE	OE/IE	Open Elective/Industry Linked Elective-1	3	0	0	0	4.5	40	60	3	3
7	P	PCSFP607	PS	PC	Environmental Engineering & Industrial Hygiene Lab	0	0	3	0	1.5	50	50	2	3
7	L	PCSFL608	PCL	PC	Reliability Engineering and Computational Lab	0	0	3	0	1.5	50	50	2	3
9	P	PCSFP609	PS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
10	R/ M/ H		VAC		Remedial/Minor/Honours Course	3	0	0	0	4.5			3*	3*
	S5 / S6	Industrial Visit (Maximum 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training												
Total										32 / 36			23/26*	25/28*

Note: Open Electives are such courses which will be offered by other departments. Like CSE department students have to opt open electives from ECE/ME/EEE etc. departments.

PROGRAM ELECTIVE 3: PESFT 63N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
C	PESFT 631	Sustainable Manufacturing	3-0-0-0	3	3
	PESFT 632	Industrial Noise and Vibration Control	3-0-0-0		3
	PESFT 633	Health, Safety and Environmental Aspects of Fertilizer Industry	3-0-0-0		3
	PESFT 634	Leadership and Managing Change	3-0-0-0		3
	PESFT 636	Automobile Engineering and Safety	3-0-0-0		3
	PESFT 637	Chemical Technology and Reaction Engineering	3-0-0-0		3
	PESFT 638	Principles of Industrial Management	3-0-0-0		3
	PESFT 635	**Functional Safety**	**3-0-0-0**		**5/3**

OPEN ELECTIVE 1: OESFT 61N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OESFT 611	Reliability Engineering	3-0-0-0	3	3
	OESFT 612	Sustainable Manufacturing	3-0-0-0		3
	OESFT 613	Construction Safety Management	3-0-0-0		3
	OESFT 614	Principles of Industrial Management	3-0-0-0		3
	OESFT 615	Quality Engineering and Management	3-0-0-0		3
	OESFT 616	Chemical Process Safety	3-0-0-0		3

		OESFT 617			Environmental Pollution and Control	3-0-0-0			3

SEVENTH SEMESTER (July-December)														

Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	Credit Structure				SS	Total Marks		Credits	Hrs/ Week
						L	T	P	R		CIA	ESE		
1	A	PESFT74N / PESFM74N	PE	PE	Elective-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	PESFT75N/ PESFM75N	PE	PE	Elective-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	O	OESFT72N /IESFT72N/ OESFM72N	OE/ ILE	OE/IE	Open Elective/Industry Linked Elective-2 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
4	I*	UEHUT704 / UEHUM70N	HMC	UE	University Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	2	2
5	S	PCSFS705	PS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	PCSFP706/ PCSFI706	PS	PC	Option 1: Major Project Option 2: Internship (4-6 Months)	0	0	0	12	12	100	0	4	8
7	R/H		VAC		Remedial/Honours Course	3	0	0	0	4.5			3*	3*
Total										26/ 31			17/20*	22/25*

*No Grade Points will be awarded for the I slot courses
*The students can take the internship option either in 7th or in 8th semester.
* Option 1: Work on a Project in the institute/department under the mentorship of faculty members.
Option 2: Full semester Internship in Industry/organization (**7th or 8th semester**)

Note: Open Electives are such courses which will be offered by other departments.

PROGRAM ELECTIVE 4: PESFT 74N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PESFT 741	Energy Management and Conservation	3-0-0-0	**3**	3
	PESFT 742	Industrial Psychology	3-0-0-0		3
	PESFT 743	Entrepreneurship and Small Business Enterprises	3-0-0-0		3
	PESFT 744	Disaster Preparedness and Emergency Planning	3-0-0-0		3
	PESFT 746	Total Quality Management	3-0-0-0		3
	PESFT 747	Safety in Product Design	3-0-0-0		3
	PESFT 748	Human Factors Engineering	3-0-0-0		3
	PESFT 745	**Safety in Hydrocarbon Industries**	**3-0-0-0**		**5/3**

PROGRAM ELECTIVE 5: PESFT 75N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
B	PESFT 751	Advanced Safety Engineering and Management	3-0-0-0	**3**	3
	PESFT 752	Fluid Power Safety	3-0-0-0		3
	PESFT 753	Explosives Technology and Safety	3-0-0-0		3
	PESFT 754	Safety in Design of Structures	3-0-0-0		3
	PESFT 756	Safety In Textile Industry	3-0-0-0		3
	PESFT 757	Intellectual Property Rights	3-0-0-0		3
	PESFT 758	Food Safety and Sanitation	3-0-0-0		3
	PESFT 755	**Maritime Safety**	**3-0-0-0**		**5/3**

OPEN ELECTIVE 2: OESFT 72N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OESFT 721	Sustainability in Engineering	3-0-0-0	3	3
	OESFT 722	Safety in Design of Structures	3-0-0-0		3
	OESFT 723	Manufacturing Strategy	3-0-0-0		3
	OESFT 724	Total quality Management	3-0-0-0		3
	OESFT 725	Safety in Engineering Industry	3-0-0-0		3
	OESFT 726	Renewable Energy Engineering	3-0-0-0		3
	OESFT 727	Maritime Safety	3-0-0-0		3

SL. No	Course Code	Slot I: HMC Elective
1	UEHUT704	Project Management: Planning, Execution, Evaluation and Control
2	UEHUM701	Proficiency course in French. (MOOC) (B1 level)
3	UEHUM702	Proficiency Course in German (B1 Level). (MOOC)
4	UEHUM703	Proficiency Course in Spanish (B1 Level) (MOOC)
5	UEHUM704	Introduction to Japanese Language and Culture (N5 level). (MOOC)

						Credit Structure				SS	Total Marks		Credits	Hrs/ Week

					EIGHT SEMESTER (January-June)									
Sl. No:	Slot	Course Code	Course Type	Course Category	Course Title (Course Name)	L	T	P	R	SS	CIA	ESE	Credits	Hrs/ Week
1	A	PESFT86N / PESFM86N	PE	PE	Elective-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	O	OESFT83N /IESFT83N / OESFM83N	OE/ILE	OE/IE	Open Elective/Industry Linked Elective-3 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	I*	UEHUT803 / UEHUM803	HMC	UC	Organizational Behavior and Business Communication (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	1	2
4	P	PCSFP806/ PCSFI806/ PCSFJ806	PS	PC	Option 1: Major Project Option 2: Internship (4-6 Months) Option 3: Major Project Phase -II (For the students who have not opted for internship in S7/S8)	0	0	0	12	12	100	0	4	8
	R/H		VAC		Project: Honours Course	0	0	0	4	4			4*	4
Total										24/28			11/15*	16/20

*__No Grade Points will be awarded for the I slot courses__
* __Option 2: Full semester Internship in Industry/organization (__*__7th or 8th semester__*__)__

PROGRAM ELECTIVE 6: PESFT 86N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PESFT 861	Environmental Economics	3-0-0-0	**3**	3
	PESFT 862	Renewable Energy Engineering	3-0-0-0		3
	PESFT 863	Project Management	3-0-0-0		3
	PESFT 864	Safety in Engineering Industry	3-0-0-0		3
	PESFT 866	Manufacturing Strategy	3-0-0-0		3
	PESFT 867	Supply Chain Logistics Management	3-0-0-0		3
	PESFT 868	Ecological Engineering	3-0-0-0		3
	PESFT 865	**Statistical and Computational Methods**	**3-0-0-0**		**5/3**

OPEN ELECTIVE 3: OESFT 83N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OESFT 831	Advanced Safety Engineering and Management	3-0-0-0	3	3
	OESFT 832	Supply Chain Management	3-0-0-0		3
	OESFT 833	Safety In Material Handling	3-0-0-0		3
	OESFT 834	Hazard Control in industries	3-0-0-0		3
	OESFT 835	Structural Fire Safety	3-0-0-0		5
	OESFT 836	Design of Fire Protection Systems	3-0-0-0		3
	OESFT 837	Qualitative and Quantitative approach in Safety	3-0-0-0		3

HMC Courses			
Sl. No:	Semester	Course Area	Credits
1	S1/S2	Life Skills and Professional Communication	1
2	S3	Economics for Engineers	2
3	/S4	Engineering Ethics and Sustainable Development	2
4	S5	Constitution Of India. (MOOC)	1
5	S7	Elective (Project Management/Foreign Languages)	2
6	S8	Organizational Behavior and Business Communication	1
Total Credits			**9**

BSC Courses			
Sl. No:	Semester	Course Area	Credits
1	S1	Group Specific Mathematics-1	**3**
2	S1/S2	Physics for Engineers	4
3		Chemistry for Engineers	4
4	S2	Group Specific Mathematics-2	3
5	S3	Group Specific Mathematics-3	3
6	S4	Group Specific Mathematics-4	3
Total Credits			**20**

ESC Courses (Group C)			
Sl. No:	Semester	Course Area	Credits
1	S1	Engineering Mechanics	**3**
2		Introduction to Mechanical Engineering/ Civil Engineering	4
3		Algorithmic Thinking with Python	4
4		Engineering Workshop	1
5	S2	Engineering Graphics and Computer Aided Drawing	3
6		Basic Electrical and Electronics Engineering	4
7		Engineering Entrepreneurship and IPR	3
8		Basic Electrical and Electronics Engineering Workshop	1
9	S3	Introduction to Artificial Intelligence and Data Science	4
10	S6	Design Thinking and Creativity	2
Total Credits			**29**

Programme Core Courses (PC)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S2**	Principles of Safety Management	4
2	**S3**	Fire Engineering Fundamentals	4
3		Fluid Mechanics and Hydraulic Machines	4
4		Fluid Mechanics & Hydraulic Machines Laboratory	2
5		Machine Shop	2
6	**S4**	Strength of Materials	4
7		Electrical Technology and Safety	4
8		Strength of Materials Laboratory	2
9		Electrical Machines Laboratory	2
10	**S5**	Structural Fire Safety and Design of Fire Protection Systems	4
11		Chemical Technology and Reaction Engineering	4
12		Occupational Health, Hygiene and First Aid	3
13		Fire Engineering Laboratory	2
14		Chemical Engineering Laboratory	2
15	**S6**	Hazard Control in industries	4
16		Environmental Engineering and Toxic Risks	3
17		Environmental Engineering & Industrial Hygiene Lab	2
18		Reliability Engineering and Computational Lab	2
Total Credits (Theory -10, Lab-7)			**52**

Programme Core-Project Based Learning (PBL)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S3**	Core PBL-1 - PBSFT304 - Chemical Process Principles	4
2	**S4**	Core PBL-2 – PBSFT404 - Hazard Identification and Risk Assessment & Mitigation	4
3	**S5**	Core PBL-3 – PBSFT504 - Heat and Mass Transfer Operations	4
4	**S6**	Core PBL-4 – PBSFT504 - Chemical Process Safety	4
Total Credits			**16**

Programme Elective Courses (PE)			
Sl. No:	**Semester**	**Course Type**	**Credits**
1	S4	PE-1	3
2	**S5**	PE-2	3
3	**S6**	PE-3	3
4	**S7**	PE-4	3
5		PE-5	3
6	**S8**	PE-6	3
Total Credits			**18**

Open Elective Courses/Industry Elective(OE/IEL)			
Sl. No:	**Semester**	**Course Type**	**Credits**
1	**S6**	OE/ILE-1	3
2	**S7**	OE/ILE-2	3
3	**S8**	OE/ILE-3	3
Total Credits			**9**

Project/ Internship and Seminar			
Sl. No:	**Semester**	**Course Type**	**Credits**
1	**S6**	Mini Project	2
2	**S7**	Seminar	2
3		Major Project/Internship	4
4	**S8**	Major Project/Internship/Research Project	4
Total Credits			**12**

Activity Points				
Sl. No.	**Group**	**Courses**	**Credits**	**Minimum Credit Requirements**
1		NSS, NCC, NSO (National Sports Organization)		
2	I	Arts/Sports/Games	1 (40 Points)	
3		Union/Club Activities		
4		English Proficiency Certification (TOFEL, IELTS, BEC etc.)		
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		3 Credits (One credit from each Group)
6	II	Short Term Internship (Minimum 2 weeks), Clinical Exposure/Training (Minimum 2 weeks), Conferences/Paper Presentation/ Workshop Activities/ Professional Body Activities, Participation in University level/State Level/ National Level Hackathons	1 (40 Points)	
7		Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons		
8	III	**Skilling Certificates** (Approved by the University)	1 (40 Points)	

- *Students are required to acquire a minimum of 120 activity points, with at least 40 points per group, to fulfill the curriculum requirement of 3 activity credits.*
- *For B. Tech Lateral Entry students, 30 points per group are required. A minimum of 90 activity points must be acquired to obtain the 3 activity credits mandated by the curriculum.*

Course classifications of the B. Tech Programmes and Overall Credit Structure			
Sl. No	**Category**	**Code**	**Credits**
1	Humanities and Social Sciences including Management Courses	HMC	9
2	Basic Science Courses	BSC	20
3	Engineering Science Courses	ESC	29
4	Programme (Professional) Core Courses	PCC	52
5	Programme (Professional) Core Courses-Project Based Learning	PBL	16
6	Programme Elective Courses	PEC	18
7	Open Elective Courses/Industry Linked Elective	OEC/ILE	9
8	Mini Project,Project Work/Internship and Seminar	PWS	12
9	Health and Wellness	HWP	1
10	Skill Enhancement Courses (Digital 101)	SEC	1
11	Mandatory Student Activities	MSA	3
Total Credits			**170**