APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

B. Tech

Curriculum (2024)- Semester I to VIII

Mechanical Engineering

Branch Code: ME

(Group C)

Ambady Nagar, Sreekaryam

Thiruvananthapuram- 695016

FIRST SEMESTER (July-December): Group C														
10 Days Compulsory Induction Program and UHV														
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	GYMAT101	BSC	GC	Mathematics for Physical Science-1	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GZPHT121 / GCCYT122	BSC	GC	Physics for Physical Science / Chemistry for Physical Science	3	0	2	0	5.5	40	60	4	5
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	1	0	3.5	100	0		
8	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(30 Hours, NASSCOM)	MOOC				2			-	
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
	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 Physical Science	3	0	2	0	5.5	40	60	4	5
		GCCYT122			Chemistry for Physical Science									
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	PCMET205	PC	PC	Material Science and Engineering	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	1	0	3.5	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	PCMET302	PC	PC	Mechanics of Solids	3	1	0	0	5	40	60	4	4
3	C	PCMET303	PC	PC	Fluid Mechanics and Machinery	3	1	0	0	5	40	60	4	4
4	D	PBMET304	PC-PBL	PB	Manufacturing Processes	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	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	PCMEL307	PCL	PC	Computer Aided Machine Drawing & Modelling	0	0	3	0	1.5	50	50	2	3
8	Q	PCMEL308	PCL	PC	Materials Testing lab	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	Mathematics for Physical Science-4	3	0	0	0	4.5	40	60	3	3
2	B	PCMET402	PC	PC	Machine Tools and Metrology	3	1	0	0	5	40	60	4	4
3	C	PCMET403	PC	PC	Engineering Thermodynamics	3	1	0	0	5	40	60	4	4
4	D	PBMET404	PC-PBL	PB	Mechanics of Machinery	3	0	0	1	5.5	60	40	4	4
5	E	PEMET41N	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	PCMEL407	PCL	PC	Fluid Mechanics and Hydraulic Machines Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCMEL408	PCL	PC	Manufacturing Technology Lab	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 Engineers and 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 Engineers in S3 and Engineering Ethics & Sustainable Development in S4 and vice versa.*

PROGRAM ELECTIVE I: PEMET41N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PEMET411	Turbo Machinery	3-0-0-0	**3**	3
	PEMET412	Nuclear Energy	3-0-0-0		3
	PEMET413	Composite Materials	3-0-0-0		3
	PEMET414	Components of Intelligent Systems	3-0-0-0		3
	PEMET416	Advanced Metal Joining Techniques	3-0-0-0		3
	PEMET417	Technology Management	3-0-0-0		3
	PEMET418	Supply Chain and Logistics Management	3-0-0-0		3
	PEMET415	**Advanced Mechanics of Solids**	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.*

FIFTH 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	PCMET501	PC	PC	Dynamics of Machinery	3	1	0	0	5	40	60	4	4
2	B	PCMET502	PC	PC	Advanced Manufacturing Engineering	3	1	0	0	5	40	60	4	4
3	C	PCMET503	PC	PC	Heat and Mass Transfer	3	0	0	0	4.5	40	60	3	3
4	D	PBMET504	PC-PBL	PB	Management for Engineers	3	0	0	1	5.5	60	40	4	4
5	E	PEMET52N	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	PCMEL507	PCL	PC	Thermal Engineering Lab-1	0	0	3	0	1.5	50	50	2	3
8	Q	PCMEL508	PCL	PC	Mechanical Engineering Lab	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*
	S_5/ S_6	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: PEMET 52N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PEMET521	Computational Fluid Dynamics	3-0-0-0	**3**	3
	PEMET522	Design for Manufacture and Assembly	3-0-0-0		3
	PEMET523	Computer Aided Design and Analysis	3-0-0-0		3
	PEMET524	Additive Manufacturing	3-0-0-0		3
	PEMET526	Energy Economics and Policy	3-0-0-0		3
	PEMET527	Human Resources Management	3-0-0-0		3
	PEMET528	Operations Research	3-0-0-0		3
	PEMET525	**Instrumentation and Control Systems**	3-0-0-0		**5/3**

SIXTH 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	PCMET601	PC	PC	Industrial and Systems Engineering	3	0	0	0	4.5	40	60	3	3
2	B	PCMET602	PC	PC	Machine Design	3	0	0	0	4.5	40	60	3	3
3	C	PEMET63N	PE	PE	Elective-3	3	0	0	0	4.5	40	60	3	3
4	D	PBMET604	PC-PBL	PB	Thermal Engineering	3	0	0	1	5.5	60	40	4	4
5	F	GZEST605	ESC	GC	Design Thinking and Product Development (Group Specific Syllabus)	2	0	0	0	3	40	60	2	2
6	O	OEMET61N /IEMET61N	OE/ILE	OE/IE	Open Elective/Industry Linked Elective-1	3	0	0	0	4.5	40	60	3	3
7	L	PCMEL607	PCL	PC	Computer Aided Design and Analysis Lab	0	0	3	0	1.5	50	50	2	3
8	P	PCMEP608	PWS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
9	Q	PCMEL609	PCL	PC	Thermal engineering Lab-2	0	0	2	0	1	50	50	1	2
10	R/ M/ H		VAC		Remedial/Minor/Honours Course	3	1	0	0	5			4*	4*
	S5/ S6	Industrial Visit (Maximum of 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training												
Total										**32/ 37**			**23/26***	**26/29***

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: PEMET 63N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
C	PEMET 631	Power Plant Engineering	3-0-0-0	**3**	3
	PEMET 632	Compressible Fluid Flow	3-0-0-0		3
	PEMET 633	Industrial Tribology	3-0-0-0		3
	PEMET 634	Finite Element Methods	3-0-0-0		3
	PEMET 636	Nondestructive Testing	3-0-0-0		3
	PEMET 637	Industrial Safety Engineering	3-0-0-0		3
	PEMET 638	Marketing Management	3-0-0-0		3
	PEMET 635	**Advanced Materials**	3-0-0-0		**5/3**

OPEN ELECTIVE 1: OEMET 61N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OEMET 611	Introduction to Business Analytics	3-0-0-0	3	3
	OEMET 612	Quantitative Techniques for Engineers	3-0-0-0		3
	OEMET 613	Automotive Technology	3-0-0-0		3
	OEMET 614	Renewable Energy Engineering	3-0-0-0		3
	OEMET 615	Quality Engineering and Management	3-0-0-0		3
	OEMET 616	Additive Manufacturing	3-0-0-0		3
	OEMET 617	Solar Energy Conservation Systems	3-0-0-0		3

SEVENTH SEMESTER (July-December)														
Sl. No:	**Slot**	**Course Code**	**Course Tyne**	**Course Category**	**Course Title (Course Name)**	**Credit Structure**				**SS**	**Total Marks**		**Credits**	**Hrs/ Week**
						L	**T**	**P**	**R**		**CIA**	**ESE**		
1	A	PEMET74N / PEMEM74N	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	PEMET75N/ PEMEM75N	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	OEMET72N /IEMET72N/ OEMEM72N	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	HM C	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	PCMES705	PS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	PCMEP706/ PCMEI706	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: PEMET 74N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PEMET741	Gas Turbine and Jet Propulsion	3-0-0-0	**3**	3
	PEMET742	Automobile Engineering	3-0-0-0		3
	PEMET743	Design of Machine Elements	3-0-0-0		3
	PEMET744	Failure Analysis and Design	3-0-0-0		3
	PEMET746	Lean Manufacturing	3-0-0-0		3
	PEMET747	Reliability Engineering	3-0-0-0		3
	PEMET748	Robotics	3-0-0-0		3
	PEMET745	**Mechatronics**	3-0-0-0		**5/3**

PROGRAM ELECTIVE 5: PEMET 75N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
B	PEMET 751	Refrigeration and Air Conditioning	3-0-0-0	**3**	3
	PEMET 752	Acoustics and noise Control	3-0-0-0		3
	PEMET 753	Aerospace Engineering	3-0-0-0		3
	PEMET 754	Renewable Energy Engineering	3-0-0-0		3
	PEMET 756	Mobile Robotics	3-0-0-0		3
	PEMET 757	Flexible Manufacturing Systems	3-0-0-0		3
	PEMET 758	Quality Engineering and Management	3-0-0-0		3
	PEMET 755	**Optimization Techniques**	3-0-0-0		**5/3**

OPEN ELECTIVE 2: OEMET 72N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OEMET 721	Engineering Materials	3-0-0-0	3	3
	OEMET 722	Robotics	3-0-0-0		3
	OEMET 723	Finite Element Methods	3-0-0-0		3
	OEMET 724	Nondestructive Testing	3-0-0-0		3
	OEMET 725	Engineering Instruments and Measurements	3-0-0-0		3
	OEMET 726	Computational Heat Transfer	3-0-0-0		3
	OEMET 727	Power Plant Engineering	3-0-0-0		3

SL. No	**Course Code**	**Slot I: HMC Elective**
1	UEHUT704	Project Management: Planning, Execution, Evaluation and Control
2	UEHU**M**701	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)

EIGHTH 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	PEMET86N / PEMEM86N	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	OEMET83N /IEMET83N / OEMEM83N	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	PCMEP806/ PCMEI806/ PCMEJ806	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
5	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: PEMET 86N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PEMET 861	Cryogenic Engineering	3-0-0-0	**3**	3
	PEMET 862	Pressure Vessel and Piping Design	3-0-0-0		3
	PEMET 863	Hybrid and Electric Vehicles	3-0-0-0		3
	PEMET 864	Micro and Nano Manufacturing	3-0-0-0		3
	PEMET 866	Advanced Numerical Control in Manufacturing	3-0-0-0		3
	PEMET 867	Metal Additive Manufacturing	3-0-0-0		3
	PEMET 868	Nanotechnology	3-0-0-0		3
	PEMET 865	**Aircraft Design**	3-0-0-0		**5/3**

OPEN ELECTIVE 3:OEMET 83N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OEMET 831	Industrial Hydraulics and Automation	3-0-0-0	3	3
	OEMET 832	3D Printing and Tooling	3-0-0-0		3
	OEMET 833	Numerical Techniques Engineering	3-0-0-0		3
	OEMET 834	Business Organization and Development	3-0-0-0		3
	OEMET 835	World Class Manufacturing	3-0-0-0		3
	OEMET 836	Micro Electro Mechanical Systems	3-0-0-0		3
	OEMET 837	Product Design and Innovation	3-0-0-0		3

HMC Courses			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1/S2**	Life Skills and Professional Communication	1
2	**S3 /S4**	Economics for Engineers	2
3		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**	Mathematics for Physical Science-1	**3**
2	**S1/S2**	Physics for Physical Science	4
3		Chemistry for Physical Science	4
4	**S2**	Mathematics for Physical Science-2	3
5	**S3**	Mathematics for Physical Science-3	3
6	**S4**	Mathematics for Physical Science-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) (ME)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S2**	Material Science and Engineering	4
2	**S3**	Mechanics of Solids	4
3		Fluid Mechanics and Machinery	4
4		Computer Aided Machine Drawing & Modelling	2
5		Materials Testing lab	2
6	**S4**	Machine Tools and Metrology	4
7		Engineering Thermodynamics	4
8		Fluid Mechanics and Hydraulic Machines Lab	2
9		Manufacturing Technology Lab	2
10	**S5**	Dynamics of Machinery	4
11		Advanced Manufacturing Engineering	4
12		Industrial and Systems Engineering	3
13		Thermal Engineering Lab-1	2
14		Mechanical Engineering Lab	2
15	**S6**	Heat and Mass Transfer	3
16		Machine Design	3
17		Computer Aided Design and Analysis Lab	2
18		Thermal engineering Lab-2	1
Total Credits (Theory -10, Lab-8)			**52**

Programme Core-Project Based Learning (PBL)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S3**	PBMET304 Manufacturing Processes	4
2	**S4**	PBMET404 Mechanics of Machinery	4
3	**S5**	PBMET504 Thermal Engineering	4
4	**S6**	PBMET604 Management for Engineers	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	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		
6		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		
7	III	Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons	1 (40 Points)	
8		**Skilling Certificates** (Approved by the University)		

- ***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	PW	1
10	Skill Enhancement Courses (Digital 101)	SEC	1
11	Mandatory Student Activities	MSA	3
Total Credits			**170**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

B. Tech

Curriculum (2024)- Semester I to VIII

Civil Engineering

Branch Code: CE

(Group C)

Ambady Nagar, Sreekaryam

Thiruvananthapuram- 695016

FIRST SEMESTER (July-December): Group C														
10 Days Compulsory Induction Program and UHV														
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	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 Physical Science	3	0	2	0	5.5	40	60	4	5
		GCCYT122			Chemistry for Physical Science									
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	1	0	3	100	0		
8	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(30 Hours, NASSCOM)	MOOC				2			-	
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
	Total Hours	**30**

Note: *Engineering Physics, Engineering Chemistry, Health and Safety and Life skill and Life Skills and Professional Communication shall be offered in both S1 and S2. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Engineering Physics/ Engineering Chemistry in slot B and Health and wellness/ Life Skills and Professional Communication in slot in slot I in the first semester and remaining 50% to opt similarly in the second semester*

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 Physical Science	3	0	2	0	5.5	40	60	4	5
		GCCYT122			Chemistry for Physical Science									
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	PCCET205	PC	PC	Mechanics of Solids	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	1	0	3	100	0		
8	L	GCESL218	ESC	GC	Civil Engineering Drafting lab	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	PCCET302	PC	PC	Fluid mechanics	3	1	0	0	5	40	60	4	4
3	C	PCCET303	PC	PC	Structural analysis-I	3	1	0	0	5	40	60	4	4
4	D	PBCET304	PC-PBL	PB	Surveying & Geomatics	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	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	PCCEL307	PCL	PC	Survey Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCEL308	PCL	PC	Fluid mechanics Lab	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	Mathematics for Physical Science-4	3	0	0	0	4.5	40	60	3	3
2	B	PCCET402	PC	PC	Soil mechanics	3	1	0	0	5	40	60	4	4
3	C	PCCET403	PC	PC	Structural analysis-II	3	1	0	0	5	40	60	4	4
4	D	PBCET404	PC-PBL	PB	Design of concrete structures	3	0	0	1	5.5	60	40	4	4
5	E	PECET41N	PE	PE	PE-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	PCCEL407	PCL	PC	Materials testing lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCEL408	PCL	PC	Civil engineering modelling Lab	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 Engineers and 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 Engineers in S3 and Engineering Ethics & Sustainable Development in S4 and vice versa*.

PROGRAM ELECTIVE I: PECET 41N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PECET411	Advanced Solid Mechanics	3-0-0-0	**3**	3
	PECET412	Concrete Technology	3-0-0-0		3
	PECET413	Mechanics of Fluid Flow	3-0-0-0		3
	PECET414	Cartography and GIS	3-0-0-0		3
	PECET416	Engineering Geology	3-0-0-0		3
	PECET417	Numerical methods for Engineers	3-0-0-0		3
	PECET418	Environmental law and Policy	3-0-0-0		3
	PECET415	**Architectural Engineering**	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.*

FIFTH 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	PCCET501	PC	PC	Hydrology & water resources engineering	3	1	0	0	5	40	60	4	4
2	B	PCCET502	PC	PC	Transportation engineering	3	1	0	0	5	40	60	4	4
3	C	PCCET503	PC	PC	Environmental engineering	3	0	0	0	4.5	40	60	3	3
4	D	PBCET504	PC-PBL	PB	Foundation engineering	3	0	0	1	5.5	60	40	4	4
5	E	PECET52N	PE	PE	PE-2	3	0	0	0	4.5	40	60	3	3
6	I*	UCHUM506	HMC	UC	Constitution of India (MOOC)	-	-	-	-	2	-	-	1	-
7	L	PCCEL507	PCL	PC	Geotechnical engineering lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCEL508	PCL	PC	Concrete lab (MT-2)	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*
	S_5/ S_6	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: PECET 52N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PECET521	Advanced Structural Analysis	3-0-0-0	3	3
	PECET522	Modern Construction Technology	3-0-0-0		3
	PECET523	Open Channel Hydraulics	3-0-0-0		3
	PECET524	Disaster management	3-0-0-0		3
	PECET526	Applied hydrology and climatology	3-0-0-0		3
	PECET527	Town Planning	3-0-0-0		3
	PECET528	Optimization techniques and operations research for Civil Engineers	3-0-0-0		3
	PECET525	**Design of prestressed concrete**	3-0-0-0		**5/3**

SIXTH 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	PCCET601	PC	PC	Quantity surveying & valuation	3	0	0	0	4.5	40	60	3	3
2	B	PCCET602	PC	PC	Design of steel structures	3	0	0	0	4.5	40	60	3	3
3	C	PECET63N	PE	PE	PE-3	3	0	0	0	4.5	40	60	3	3
4	D	PBCET604	PC-PBL	PB	Construction project management	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	OECET61N /IECET61N	OE/ILE	OE/IE	OE/ILE-1	3	0	0	0	4.5	40	60	3	3
7	L	PCCEL607	PCL	PC	Transportation engineering lab	0	0	3	0	1.5	50	50	2	3
8	P	PCCEP608	PWS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
9	Q	PCCEL609	PCL	PC	Environmental engineering lab	0	0	2	0	1	50	50	1	2
10	R/ M/ H		VAC		Remedial/Minor/Honours Course	3	0	0	0	5			3*	3*
	S5 / S6	Industrial Visit (Maximum 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training												
Total										**32 / 37**			**23/26***	**26/29***

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: PECET 63N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
C	PECET 631	Advanced Design of Concrete Structures	3-0-0-0	**3**	3
	PECET 632	Irrigation and Drainage Engineering	3-0-0-0		3
	PECET 633	Ground Improvement Techniques	3-0-0-0		3
	PECET 634	Repair and rehabilitation of structures	3-0-0-0		3
	PECET 636	Solid and Hazardous Waste Management	3-0-0-0		3
	PECET 637	Traffic Engineering and Management	3-0-0-0		3
	PECET 635	**Advanced foundation Engineering**	3-0-0-0		**5/3**

OPEN ELECTIVE 1: OECET 61N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OECET 611	Introduction to Construction Engineering	3-0-0-0	3	3
	OECET 612	Environmental Laws and Policy	3-0-0-0		3
	OECET 613	Disaster management	3-0-0-0		3
	OECET 614	Environmental Impact Assessment	3-0-0-0		3
	OECET 615	Structural Geology	3-0-0-0		3
	OECET 616	Applied Earth Systems	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	PECET74N / PECEM74N	PE	PE	PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	PECET75N/ PECEM75N	PE	PE	PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	O	OECET72N /IECET72N/ OECEM72N	OE/ ILE	OE/IE	OE/ILE-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	Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	2	2
5	S	PCCES705	PWS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	PCCEP706/ PCCEI706	PWS	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: PECET 74N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PECET741	Structural Dynamics	3-0-0-0	**3**	3
	PECET742	Formwork Engineering	3-0-0-0		3
	PECET743	Environmental Geotechnology	3-0-0-0		3
	PECET744	Airport Planning and Design	3-0-0-0		3
	PECET746	Highway Material & Design	3-0-0-0		3
	PECET747	River Engineering	3-0-0-0		3
	PECET745	**Pavement Design and Construction**	3-0-0-0		**5/3**

PROGRAM ELECTIVE 5: PECET 75N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
B	PECET751	Groundwater Engineering	3-0-0-0	3	3
	PECET752	Sustainable Construction Practices	3-0-0-0		3
	PECET753	Advanced Geotechnical Investigation	3-0-0-0		3
	PECET754	Railway,Port and Harbor Engineering	3-0-0-0		3
	PECET756	Air and Noise Pollution Control Engineering	3-0-0-0		3
	PECET757	Finite element method	3-0-0-0		3
	PECET755	**Design of hydraulic structures**	3-0-0-0		**5/3**

OPEN ELECTIVE 2: OECET 72N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OECET721	Intelligent Transportation Systems	3-0-0-0	3	3
	OECET722	Environment Health and Safety	3-0-0-0		3
	OECET723	Watershed Conservation and Management	3-0-0-0		3
	OECET724	Forensic Engineering	3-0-0-0		3
	OECET725	Finance for Engineers	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)

EIGHTH 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	PECET86N / PECEM86N	PE	PE	PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	O	OECET83N /IECET83N / OECEM83N	OE/ILE	OE/IE	OE/ILE-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	PCCEP806/ PCCEI806/ PCCEJ806	PWS	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	8	12	100	0	4	8
Total										**20**			**11**	**16**

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: PECET 86N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PECET861	Water and air quality management	3-0-0-0	**3**	3
	PECET862	Valuation of Real Properties	3-0-0-0		3
	PECET863	Contracts Management	3-0-0-0		3
	PECET864	Advanced Design of steel Structures	3-0-0-0		3
	PECET866	Urban Transportation Planning.	3-0-0-0		3
	PECET867	Rural Water Supply and Onsite Sanitation Systems	3-0-0-0		3
	PECET865	**Design of Earthquake Resistant Structures**	3-0-0-0		**5/3**

OPEN ELECTIVE 3: OECET 83N					
SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OECET831	Waste management	3-0-0-0	3	3
	OECET832	Rainwater harvesting	3-0-0-0		3
	OECET833	Public Transportation Systems	3-0-0-0		3
	OECET834	Fundamentals of building planning	3-0-0-0		3
	OECET835	Hydrogeology	3-0-0-0		3

HMC Courses				
Sl. No:	**Semester**	**Course Code**	**Course Area**	**Credits**
1	**S1/S2**	UCHUT128	Life Skills and Professional Communication	1
2	**S3 /S4**	UCHUT346	Economics for Engineers	2
3		UCHUT347	Engineering Ethics and Sustainable Development	2
4	**S5**	UCHUM506	Constitution Of India. (MOOC)	1
5	**S7**	UEHUT704 /UEHUM70N	Elective (Project Management/Foreign Languages)	2
6	**S8**	UEHUT803 / UEHUM803	Organizational Behavior and Business Communication	1
Total Credits				**9**

BSC Courses			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1**	Mathematics for Physical Science-1	**3**
2	**S1/S2**	Physics for Physical Science	4
3		Chemistry for Physical Science	4
4	**S2**	Mathematics for Physical Science-2	3
5	**S3**	Mathematics for Physical Science-3	3
6	**S4**	Mathematics for Physical Science-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		Civil Engineering drafting lab	1
9	**S3**	Introduction to Artificial Intelligence and Data Science	4
10	**S6**	Design Thinking and Product Development (Group Specific Syllabus)	2
Total Credits			**29**

Programme Core Courses (PC) (CE)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S2**	Mechanics of solids	4
2	**S3**	Fluid mechanics	4
3		Structural analysis-I	4
4		Survey lab	2
5		Fluid mechanics lab	2
6	**S4**	Soil mechanics	4
7		Structural analysis-II	4
8		Materials testing lab	2
9		Civil engineering modelling Lab	2
10	**S5**	Hydrology & water resources engineering	4
11		Transportation engineering	4
12		Environmental engineering	3
13		Geotechnical engineering lab	2
14		Concrete lab (MTL-2)	2
15	**S6**	Quantity surveying & valuation	3
16		Design of steel structures	3
17		Transportation engineering lab	2
19		Environmental engineering lab	1
Total Credits (Theory -10, Lab-8)			**52**

Programme Core-Project Based Learning (PBL)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S3**	Surveying & geomatics	4
2	**S4**	Design of concrete structures	4
3	**S5**	Foundation engineering	4
4	**S6**	Construction project management	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	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		
6		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		
7	III	Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons	1 (40 Points)	
8		**Skilling Certificates** (Approved by the University)		

- ***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**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

B. Tech Curriculum-2024

Semester I to VIII

Electrical and Electronics Engineering

Branch Code:EE

(Group B)

Ambady Nagar , Sreekaryam

Thiruvananthapuram- 695016

FIRST SEMESTER (July-December): Group B														
10 Days Compulsory Induction Program and UHV														
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	GYMAT101	BSC	GC	Mathematics for Electrical Science-1	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GBPHT121	BSC	GC	Physics for Electrical Science	3	0	2	0	5.5	40	60	4	5
		GXCYT122			Chemistry for Electrical Science									
3	C	GMEST103	ESC	GC	Engineering Graphics and Computer Aided Drawing.	2	0	2	0	4	40	60	3	4
4	D	GXEST104	ESC	GC	Introduction to 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	F	UCEST105	ESC	UC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	5
6	L	GXESL106	ESC	GC	Basic Electrical and Electronics 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	1	0	3.5	100	0		
8	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC				2			-	
Total										**30/ 32**			**20**	**25/ 26**
Bridge Course (Mathematics or Introduction to Computer Science) *: **Total 15 Hrs.**														

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

SECOND SEMESTER (January-June): Group B														
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 Electrical Science-2	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GBPHT121	BSC	GC	Physics for Electrical Science	3	0	2	0	5.5	40	60	4	5
		GXCYT122			Chemistry for Electrical Science									
3	C	GBEST213	ESC	GC	Engineering Mechanics	3	0	0	0	4.5	40	60	3	3
4	D	GXEST204	ESC	GC	Programming in C	3	0	2	0	5.5	40	60	4	5
5	E	PCEET205	PC	PC	Measurements and Instrumentation	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	1	0	3.5	100	0		
8	L	GXESL208	ESC	GC	IT Workshop	0	0	2	0	1	50	50	1	2
	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC							1	
Total										**34**			**24**	**27/ 28**

**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

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.*

➢

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 Reality 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
	Total Hours	**30**

Skill Enhancement Course: *Digital 101 is an introductory Massive Open Online Course (MOOC) offered by NASSCOM. It is designed to provide students with foundational knowledge and skills in digital technologies, preparing them for further studies and careers in the digital domain. By incorporating the Digital 101 course into the curriculum, KTU ensures that all students gain valuable digital skills early in their academic journey, enhancing their readiness for advanced courses and future careers in technology.*

Course Registration and Completion*:*

- *Students have the flexibility to register and complete the Digital 101 course either in their first semester (S1) or second semester (S2).*
- *The credit for this course (1 credit) will be officially recorded in the second semester grade card.*

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 Electrical Science - 3	3	0	0	0	4.5	40	60	3	3
2	B	PCEET302	PC	PC	Circuits and Networks	3	1	0	0	5	40	60	4	4
3	C	PCEET303	PC	PC	DC Machines and Transformers	3	1	0	0	5	40	60	4	4
4	D	PBEET304	PC-PBL	PB	Analog Electronics	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	PCEEL307	PCL	PC	Circuits and Measurements Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCEEL308	PCL	PC	Analog Electronics Lab	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***
Bridge Course for Lateral Entry Students: Total 15 Hrs.														

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	GBMAT401	BSC	GC	Mathematics for Electrical Science - 4	3	0	0	0	4.5	40	60	3	3
2	B	PCEET402	PC	PC	Synchronous and Induction Machines	3	1	0	0	5	40	60	4	4
3	C	PCEET403	PC	PC	Power Electronics and Drives	3	1	0	0	5	40	60	4	4
4	D	PBEET404	PC-PBL	PB	Digital Electronics	3	0	0	1	5.5	60	40	4	4
5	E	PEEET41N	PE	PE	PE-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	PCEEL407	PCL	PC	DC Machines and Transformers Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCEEL408	PCL	PC	Power Electronics and Drives Lab	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 Engineers and 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 Engineers in S3 and Engineering Ethics &Sustainable Development in S4 and vice versa.*

PROGRAM ELECTIVE I: PEEET41N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
E	PEEET411	Electronic Instrumentation	3-0-0-0	3	3
	PEEET412	Renewable Energy Sources	3-0-0-0		3
	PEEET413	Mathematics for Machine Learning	3-0-0-0		3
	PEEET414	Theory of Computation	3-0-0-0		3
	PEEET416	Computer Organization	3-0-0-0		3
	PEEET417	Solid State Devices	3-0-0-0		3
	PEEET418	Illumination Technology	3-0-0-0		3
	PEEET419	Object Oriented Programming	3-0-0-0		3

FIFTH 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	PCEET501	PC	PC	Power Generation, Transmission and Protection	3	1	0	0	5	40	60	4	4
2	B	PCEET502	PC	PC	Electromagnetic Theory	3	1	0	0	5	40	60	4	4
3	C	PCEET503	PC	PC	Signals & Systems	3	0	0	0	4.5	40	60	3	3
4	D	PBEET504	PC-PBL	PB	Microprocessor and Embedded Systems	3	0	0	1	5.5	60	40	4	4
5	E	PEEET52N	PE	PE	PE-2	3	0	0	0	4.5	40	60	3	3
6	I*	UCHUM506	HMC	UC	Constitution of India (MOOC)	-	-	-	-	2	-	-	1	-
7	L	PCEEL507	PCL	PC	AC Machines Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCEEL508	PCL	PC	Microprocessor and Embedded Systems Lab	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*
	S_5/ S_6	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.

Industrial Training:
Students who are not participating in the industrial visit must attend industrial training during that period.

PROGRAM ELECTIVE 2: PEEET52N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
E	PEEET521	Energy Storage Systems	3-0-0-0	3	3
	PEEET522	Electric Vehicles	3-0-0-0		3
	PEEET523	Digital System Design	3-0-0-0		3
	PEEET524	Software Engineering	3-0-0-0		3
	PEEET526	Data Structures	3-0-0-0		3
	PEEET527	Introduction to Machine Learning	3-0-0-0		3
	PEEET528	Computer Network Systems	3-0-0-0		3

SIXTH 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	PCEET601	PC	PC	Control Systems	3	1	0	0	4.5	40	60	4	4
2	B	PCEET602	PC	PC	Electrical System Design and Estimation	3	0	0	0	4.5	40	60	3	3
3	C	PEEET63N	PE	PE	PE-3	3	0	0	0	4.5	40	60	3	3
4	D	PBEET604	PC-PBL	PB	Power System Analysis	3	0	0	1	5.5	60	40	4	4
5	F	GXEST605	ESC	GC	Design Thinking and Product Development	2	0	0	0	3	40	60	2	2
6	O	OEEET61N /IEEET61N	OE/ILE	OE/IE	OE/ILE-1	3	0	0	0	4.5	40	60	3	3
7	L	PCEEL607	PCL	PC	Control Systems Lab	0	0	3	0	1.5	50	50	2	3
8	P	PCEEP608	PWS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
9	Q	PCEEL609	PCL	PC	Power Systems Lab	0	0	2	0	1	50	50	1	2
10	R/ M/ H		VAC		Remedial/Minor/Honours Course	3	0	0	0	4.5			3*	3*
	S5/ S6	Industrial Visit (Maximum of 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training												
Total										**32/ 36**			**23/26***	**26/29***

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.

Industrial Training:
Students who are not participating in the industrial visit must attend industrial training during that period.

PROGRAM ELECTIVE 3: PEEET63N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
C	PEEET631	Digital protection of power systems	3-0-0-0	3	3
	PEEET632	Operating Systems	3-0-0-0		3
	PEEET633	High Voltage Engineering	3-0-0-0		3
	PEEET634	Internet of Things	3-0-0-0		3
	PEEET636	Digital Signal Processing	3-0-0-0		3
	PEEET637	Cloud Computing	3-0-0-0		3
	PEEET638	Optimization Techniques	3-0-0-0		3

OPEN ELECTIVE 1: OEEET61N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
O	OEEET611	Introduction to Control Systems	3-0-0-0	3	3
	OEEET612	Energy Management	3-0-0-0		3
	OEEET613	Renewable Energy Systems	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	PEEET74N/ PEEEM74N	PE	PE	PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	PEEET75N/ PEEEM75N	PE	PE	PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	O	OEEET72N /IEEET72N/ OEEEM72N	OE/ ILE	OE/IE	OE/ILE-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	HM C	UE	Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	2	2
5	S	PCEES705	PWS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	PCEEP706/ PCEEI706	PWS	PC	Option 1: Major Project Option 2: Internship (4-6 Months)	0	0	0	8	8	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*
Students can opt for the internship either in the **7th or 8th semester.*
** Option 1: Work on a Project in the institute/department under the mentorship of faculty members.*
*Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

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

PROGRAM ELECTIVE 4: PEEET74N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
A	PEEET741	Power System Operation and Control	3-0-0-0	3	3
	PEEET742	Energy Management and Auditing	3-0-0-0		3
	PEEET743	Special Electrical Machines	3-0-0-0		3
	PEEET744	Discrete Time Control Systems	3-0-0-0		3
	PEEET746	Digital Image Processing	3-0-0-0		3

PROGRAM ELECTIVE 5: PEEET75N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
B	PEEET751	Power Quality	3-0-0-0	3	3
	PEEET752	Nonlinear Control Systems	3-0-0-0		3
	PEEET753	Deep Learning	3-0-0-0		3
	PEEET754	Computer Vision	3-0-0-0		3

OPEN ELECTIVE 2: OEEET72N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
O	OEEET721	Design of Solar PV systems	3-0-0-0	3	3
	OEEET722	Hybrid and Electric Vehicles	3-0-0-0		3
	OEEET723	Introduction to Energy Storage Systems	3-0-0-0		3

Slot I: HMC Elective	
1	Project Management: Planning, Execution, Evaluation and Control
2	Proficiency course in French. (MOOC) (B1 level)
3	Proficiency Course in German (B1 Level). (MOOC)
4	Proficiency Course in Spanish (B1 Level) (MOOC)
5	Introduction to Japanese Language and Culture (N5 level). (MOOC)

EIGHTH 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	PEEET86N/ PEEEM86N	PE	PE	PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	O	OEEET83N /IEEET83N/ OEEEM83N	OE/ ILE	OE/IE	OE/ILE-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	PCEEP806/ PCEEI806/ PCEEJ806	PWS	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	8	8	100	0	4	8
Total										**20**			**11**	**16**

****No Grade Points will be awarded for the I slot courses***

** Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

PROGRAM ELECTIVE 6: PEEET86N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
A	PEEET861	Smart Grid Technologies	3-0-0-0	3	3
	PEEET862	HVDC and FACTS	3-0-0-0		3
	PEEET863	Mechatronic Systems	3-0-0-0		3
	PEEET864	Electronic Communication	3-0-0-0		3

OPEN ELECTIVE 3: OEEET83N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
O	OEEET 831	Introduction to Robotics	3-0-0-0	3	3
	OEEET 832	PLC and Automation	3-0-0-0		3
	OEEET 833	Mechatronic Systems and Control	3-0-0-0		3

HMC Courses			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1/S2**	Life Skills and Professional Communication	1
2	**S3/S4**	Economics for Engineers	2
3		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 B)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1**	Engineering Graphics and Computer Aided Drawing	3
2		Introduction to Electrical and Electronics Engineering	4
3		Algorithmic Thinking with Python	4
4		Basic Electrical and Electronics Engineering Workshop	1
5	**S2**	Foundations of Computing: From Hardware Essentials to Web Design / Engineering Mechanics (EEE, CP, RA and RU)	3
6		Programming in C	4
7		Engineering Entrepreneurship and IPR	3
8		IT 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) (CE,EE,ME)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S2**	Core 1- Measurements and Instrumentation	4
2	**S3**	Core 2- Circuits and Networks	4
3		Core 3- DC Machines and Transformers	4
4		Lab 1 - Circuits and Measurements Lab	2
5		Lab 2 - Analog Electronics Lab	2
6	**S4**	Core 4 – Synchronous and Induction Machines	4
7		Core 5 - Power Electronics and Drives	4
8		Lab 3 - DC Machines and Transformers Lab	2
9		Lab 4 –Power Electronics and Drives Lab	2
10	**S5**	Core 6 - Power Generation, Transmission and Protection	4

11		Core 7 - Electromagnetic Theory	4
12		Core 8 - Signals & Systems	3
13		Lab 5 - AC Machines Lab	2
14		Lab 6 - Microprocessor and Embedded Systems Lab	2
15	**S6**	Core 9 - Control Systems	3
16		Core 10 – Electrical System Design	3
17		Lab 7 - Control Systems Lab	2
		Lab 8 - Power System Lab	1
Total Credits (Theory -10, Lab-8)			**52**

Programme Core-Project Based Learning (PBL)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S3**	Core PBL-1	4
2	**S4**	Core PBL-2	4
3	**S5**	Core PBL-3	4
4	**S6**	Core PBL-4	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	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		
6		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		
7	III	Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons	1 (40 Points)	
8		**Skilling Certificates** (Approved by the University)		

- ***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**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

B. Tech Curriculum-2024

Semester I to VIII

Computer Science and Engineering

Branch Code: CS

(Group A)

Ambady Nagar , Sreekaryam

Thiruvananthapuram- 695016

FIRST SEMESTER (July-December): Group A

10 Days Compulsory Induction Program and UHV

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	GAMAT101	BSC	GC	Mathematics for Information Science-1	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GAPHT121	BSC	GC	Physics for Information Science	3	0	2	0	5.5	40	60	4	5
		GXCYT122			Chemistry for Information Science									
3	C	GMEST103	ESC	GC	Engineering Graphics and Computer Aided Drawing.	2	0	2	0	4	40	60	3	4
4	D	GXEST104	ESC	GC	Introduction to 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	F	UCEST105	ESC	UC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	5
6	L	GXESL106	ESC	GC	Basic Electrical and Electronics 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	1	0	3.5	100	0		
8	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC***				2			-	
Total										**30/ 32**			**20**	**25/ 26**

Bridge Course (Mathematics or Introduction to Computer Science) *: Total 15 Hrs.

SECOND SEMESTER (January-June): Group A

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	GAMAT201	BSC	GC	Mathematics for Information Science-2	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GAPHT121	BSC	GC	Physics for Information Science	3	0	2	0	5.5	40	60	4	5
		GXCYT122			Chemistry for Information Science									
3	C	GXEST203	ESC	GC	Foundations of Computing: From Hardware Essentials to Web Design	3	0	0	0	4.5	40	60	3	3
4	D	GXEST204	ESC	GC	Programming in C	3	0	2	0	5.5	40	60	4	5
5	E	PCCST205	PC	PC	Discrete Mathematics	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	1	0	3.5	100	0		
8	L	GXESL208	ESC	GC	IT Workshop	0	0	2	0	1	50	50*	1	2
	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC***							1	
Total										**34**			**24**	**27/ 28**

** Internal evaluation by college*

*****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

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.*

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 Reality 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
	Total Hours	**30**

Skill Enhancement Course: *Digital 101 is an introductory Massive Open Online Course (MOOC) offered by NASSCOM. It is designed to provide students with foundational knowledge and skills in digital technologies, preparing them for further studies and careers in the digital domain. By incorporating the Digital 101 course into the curriculum, KTU ensures that all students gain valuable digital skills early in their academic journey, enhancing their readiness for advanced courses and future careers in technology.*

Course Registration and Completion*:*

- *Students have the flexibility to register and complete the Digital 101 course either in their first semester (S1) or second semester (S2).*
- *The credit for this course (1 credit) will be officially recorded in the second semester grade card.*

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	GAMAT301	BSC	GC	Mathematics for Information Science-3	3	0	0	0	4.5	40	60	3	3
2	B	PCCST302	PC	PC	Theory of Computation	3	1	0	0	5	40	60	4	4
3	C	PCCST303	PC	PC	Data Structures and Algorithms	3	1	0	0	5	40	60	4	4
4	D	PBCST304	PC-PBL	PB	Object Oriented Programming	3	0	0	1	5.5	60	40	4	4
5	F	GAEST305	ESC	GC	Digital Electronics & Logic Design	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	PCCSL307	PCL	PC	Data Structures Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCSL308	PCL	PC	Digital Lab	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***
Bridge Course for Lateral Entry Students: Total 15 Hrs.														

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	GAMAT401	BSC	GC	Mathematics for Information Science-4	3	0	0	0	4.5	40	60	3	3
2	B	PCCST402	PC	PC	Database Management Systems	3	1	0	0	5	40	60	4	4
3	C	PCCST403	PC	PC	Operating Systems	3	1	0	0	5	40	60	4	4
4	D	PBCST404	PC-PBL	PB	Computer Organization and Architecture	3	0	0	1	5.5	60	40	4	4
5	E	PECST41N	PE	PE	PE-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	PCCSL407	PCL	PC	Operating Systems Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCSL408	PCL	PC	DBMS Lab	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***

Valuation for HMC courses will be done at college level, Question papers will be provided by the University.

Note: *Economics for Engineers and 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 Engineers in S3 and Engineering Ethics &Sustainable Development in S4 and vice versa.*

PROGRAM ELECTIVE I: PECST41N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
E	PECST411	Software Engineering	3-0-0-0	**3**	3
	PECST412	Pattern Recognition	3-0-0-0		3
	PECST413	Functional Programming	3-0-0-0		3
	PECST414	Coding Theory	3-0-0-0		3
	PECST416	Signals And Systems	3-0-0-0		3
	PECST417	Soft Computing	3-0-0-0		3
	PECST418	Computational Geometry	3-0-0-0		3
	PECST419	Cyber Ethics, Privacy, And Legal Issues	3-0-0-0		3
	PECST415	**VLSI Design**	3-0-0-0		**5/3**
	PECST495	**Advanced Data Structures**	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.*

FIFTH 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	PCCST501	PC	PC	Computer Networks	3	1	0	0	5	40	60	4	4
2	B	PCCST502	PC	PC	Design and Analysis of Algorithms	3	1	0	0	5	40	60	4	4
3	C	PCCST503	PC	PC	Machine Learning	3	0	0	0	4.5	40	60	3	3
4	D	PBCST504	PC-PBL	PB	Microcontrollers	3	0	0	1	5.5	60	40	4	4
5	E	PECST52N	PE	PE	PE-2	3	0	0	0	4.5	40	60	3	3
6	I*	UCHUM506	HMC	UC	Constitution Of India (MOOC)	-	-	-	-	2	-	-	1	-
7	L	PCCSL507	PCL	PC	Networks Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCSL508	PCL	PC	Machine Learning Lab	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*
	S_5/ S_6	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.***

Industrial Training:
Students who are not participating in the industrial visit must attend industrial training during that period.

PROGRAM ELECTIVE 2: PECST52N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
E	PECST521	Software Project Management	3-0-0-0	**3**	3
	PECST522	Artificial Intelligence	3-0-0-0		3
	PECST523	Data Analytics	3-0-0-0		3
	PECST524	Data Compression	3-0-0-0		3
	PECST526	Digital Signal Processing	3-0-0-0		3
	PECST527	Computer Graphics & Multimedia	3-0-0-0		3
	PECST528	Advanced Computer Architectures	3-0-0-0		3
	PECST525	**Data Mining**	3-0-0-0		**5/3**
	PECST595	**Advanced Graph Algorithms**	3-0-0-0		**5/3**

SIXTH 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	PCCST601	PC	PC	Compiler Design	3	1	0	0	5	40	60	4	4
2	B	PCCST602	PC	PC	Advanced Computing Systems	3	0	0	0	4.5	40	60	3	3
3	C	PECST63N	PE	PE	PE-3	3	0	0	0	4.5	40	60	3	3
4	D	PBCST604	PC-PBL	PB	Fundamentals of Cyber Security	3	0	0	1	5.5	60	40	4	4
5	F	GAEST605	ESC	GC	Design Thinking and Product Development (Group Specific Syllabus)	2	0	0	0	3	40	60	2	2
6	O	OECST61N /IECST61N	OE/ILE	OE/IE	OE/ILE-1	3	0	0	0	4.5	40	60	3	3
7	L	PCCSL607	PCL	PC	Systems Lab	0	0	3	0	1.5	50	50	2	3
8	P	PCCSP608	PWS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
9	R/ M/ H		VAC		Remedial/Minor/Honours Course	3	0	0	0	4.5			3*	3*
	S5/ S6	Industrial Visit (Maximum of 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.

Industrial Training:
Students who are not participating in the industrial visit must attend industrial training during that period.

PROGRAM ELECTIVE 3: PECST63N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
C	PECST631	Software Testing	3-0-0-0	**3**	3
	PECST632	Deep Learning	3-0-0-0		3
	PECST633	Wireless & Mobile Computing	3-0-0-0		3
	PECST634	Advanced Database Systems	3-0-0-0		3
	PECST636	Digital Image Processing	3-0-0-0		3
	PECST637	Fundamentals of Cryptography	3-0-0-0		3
	PECST638	Quantum Computing	3-0-0-0		3
	PECST639	Randomized Algorithms	3-0-0-0		3
	PECST635	**Cloud Computing**	3-0-0-0		**5/3**
	PECST695	**Mobile Application Development**	3-0-0-0		**5/3**

OPEN ELECTIVE 1: OECST61N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
O	OECST611	Data Structures	3-0-0-0	3	3
	OECST612	Data Communication	3-0-0-0		3
	OECST613	Foundations of Cryptography	3-0-0-0		3
	OECST614	Machine Learning for Engineers	3-0-0-0		3
	OECST615	Object Oriented Programming	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	PECST74N/ PECSM74N	PE	PE	PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	PECST75N/ PECSM75N	PE	PE	PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	O	OECST72N /IECST72N/ OECSM72N	OE/ ILE	OE/IE	OE/ILE-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	HM C	UE	Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	2	2
5	S	PCCSS705	PWS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P**	PCCSP706/ PCCSI706	PWS	PC	Option 1: Major Project Option 2: Internship (4-6 Months)	0	0	0	8	8	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.*

Valuation for HMC courses will be done at college level, Question papers will be provided by the University.

Students can opt for the internship either in the **7th or 8th semester.

Option 1: Work on a Project in the institute/department under the mentorship of faculty members.

*Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

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

PROGRAM ELECTIVE 4: PECST74N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
A	PECST741	Formal Methods in Software Engineering	3-0-0-0	**3**	3
	PECST742	Web Programming	3-0-0-0		3
	PECST743	Bioinformatics	3-0-0-0		3
	PECST744	Information Security	3-0-0-0		3
	PECST746	Embedded Systems	3-0-0-0		3
	PECST747	Blockchain and Cryptocurrencies	3-0-0-0		3
	PECST748	Realtime Systems	3-0-0-0		3
	PECST749	Approximation Algorithms	3-0-0-0		5
	PECST745	**Computer Vision**	3-0-0-0		**5/3**
	PECST795	**Topics in Theoretical Computer Science**	3-0-0-0		**5/3**

PROGRAM ELECTIVE 5: PECST75N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
B	PECST751	Advanced Computer Networks	3-0-0-0	**3**	3
	PECST752	Responsible Artificial Intelligence	3-0-0-0		3
	PECST753	Fuzzy Systems	3-0-0-0		3
	PECST754	Digital Forensics	3-0-0-0		3
	PECST756	Game Theory and Mechanism Design	3-0-0-0		3
	PECST757	High Performance Computing	3-0-0-0		3
	PECST758	Programming Languages	3-0-0-0		3
	PECST759	Parallel Algorithms	3-0-0-0		3
	PECST755	**Internet of Things**	3-0-0-0		**5/3**
	PECST785	**Algorithms For Data Science**	3-0-0-0		**5/3**

OPEN ELECTIVE 2: OECST72N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
O	OECST721	Cyber Security	3-0-0-0	3	3
	OECST722	Cloud Computing	3-0-0-0		3
	OECST723	Software Engineering	3-0-0-0		3
	OECST724	Computer Networks	3-0-0-0		3
	OECST725	Mobile Application Development	3-0-0-0		3

Slot I: HMC Elective	
1	Project Management: Planning, Execution, Evaluation and Control
2	Proficiency course in French. (MOOC) (B1 level)
3	Proficiency Course in German (B1 Level). (MOOC)
4	Proficiency Course in Spanish (B1 Level) (MOOC)
5	Introduction to Japanese Language and Culture (N5 level). (MOOC)

EIGHTH 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	PECST86N/ PECSM86N	PE	PE	PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	O	OECST83N /IECST83N/ OECSM83N	OE/ ILE	OE/IE	OE/ILE-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**	PCCSP806/ PCCSI806/ PCCSJ806	PWS	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	8	8	100	0	4	8
Total										**20**			**11**	**16**

****No Grade Points will be awarded for the I slot courses***

Valuation for HMC courses will be done at college level, Question papers will be provided by the University.

*** Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

PROGRAM ELECTIVE 6: PECST86N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
B	PECST861	Software Architectures	3-0-0-0	**3**	3
	PECST862	Natural Language Processing	3-0-0-0		3
	PECST863	Topics in Security	3-0-0-0		3
	PECST864	Computational Complexity	3-0-0-0		3
	PECST866	Speech and Audio Processing	3-0-0-0		3
	PECST867	Storage Systems	3-0-0-0		3
	PECST868	Prompt Engineering	3-0-0-0		3
	PECST869	Computational Number Theory	3-0-0-0		3
	PECST865	**Next Generation Interaction Design**	3-0-0-0		**5/3**

OPEN ELECTIVE 3: OECST83N					
SLOT	**COURSE CODE**	**COURSES**	**L-T-P-R**	**HOURS**	**CREDIT**
O	OECST831	Introduction to Algorithms	3-0-0-0	3	3
	OECST832	Web Programming	3-0-0-0		3
	OECST833	Software Testing	3-0-0-0		3
	OECST834	Internet of Things	3-0-0-0		3
	OECST835	Computer Graphics	3-0-0-0		3

HMC Courses			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1/S2**	Life Skills and Professional Communication	1
2	**S3/S4**	Economics for Engineers	2
3		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**	Mathematics for Information Science-1	3
2	**S1/S2**	Physics for Information Science	4
3		Chemistry for Information Science	4
4	**S2**	Mathematics for Information Science-2	3
5	**S3**	Mathematics for Information Science-3	3
6	**S4**	Mathematics for Information Science-4	3
Total Credits			**20**

ESC Courses (Group A)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1**	Engineering Graphics and Computer Aided Drawing	3
2		Introduction to Electrical and Electronics Engineering	4
3		Algorithmic Thinking with Python	4
4		Basic Electrical and Electronics Engineering Workshop	1
5	**S2**	Foundations of Computing: From Hardware Essentials to Web Design / Engineering Mechanics (EEE, CP, RA and RU)	3
6		Programming in C	4
7		Engineering Entrepreneurship and IPR	3
8		IT 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**	Discrete Mathematics	4
2	**S3**	Theory of Computation	4
3		Data Structures and Algorithms	4
4		Data Structures Lab	2
5		Digital Lab	2
6	**S4**	Database Management Systems	4
7		Operating Systems	4
8		Operating Systems Lab	2
9		DBMS Lab	2
10	**S5**	Computer Networks	4
11		Design and Analysis of Algorithms	4
12		Machine Learning	3

13		Networks Lab	2
14		Machine Learning Lab	2
15	**S6**	Compiler Design	4
16		Advanced Computing Systems	3
17		Systems Lab	2
Total Credits (Theory -10, Lab-7)			**52**

Programme Core-Project Based Learning (PBL)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S3**	Object Oriented Programming	4
2	**S4**	Computer Organization and Architecture	4
3	**S5**	Microcontrollers	4
4	**S6**	Fundamentals of Cyber Security	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**	Miniproject	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	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		
6		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		
7	III	Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons	1 (40 Points)	
8		**Skilling Certificates** (Approved by the University)		

- ***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**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

B. Tech Curriculum-2024

Semester I to VIII

Computer Science and Engineering (Data Science)

Branch Code: CD

(Group A)

Ambady Nagar, Sreekaryam

Thiruvananthapuram- 695016

FIRST SEMESTER (July-December): Group A														
10 Days Compulsory Induction Program and UHV														
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	GAMAT101	BSC	GC	Mathematics for Information Science-1	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GAPHT121	BSC	GC	Physics for Information Science	3	0	2	0	5.5	40	60	4	5
		GXCYT122			Chemistry for Information Science									
3	C	GMEST103	ESC	GC	Engineering Graphics and Computer Aided Drawing.	2	0	2	0	4	40	60	3	4
4	D	GXEST104	ESC	GC	Introduction to 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	F	UCEST105	ESC	UC	Algorithmic Thinking with Python	3	0	2	0	5.5	40	60	4	5
6	L	GYESL106	ESC	GC	Basic Electrical and Electronics 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	1	0	3.5	100	0		
8	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC***				2			-	
Total										**30/ 32**			**20**	**25/ 26**
Bridge Course (Mathematics or Introduction to Computer Science) *: **Total 15 Hrs.**														

SECOND SEMESTER (January-June): Group A														
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	GAMAT201	BSC	GC	Mathematics for Information Science-2	3	0	0	0	4.5	40	60	3	3
2	B S1/ S2	GAPHT121	BSC	GC	Physics for Information Science	3	0	2	0	5.5	40	60	4	5
		GXCYT122			Chemistry for Information Science									
3	C	GXEST203	ESC	GC	Foundations of Computing: From Hardware Essentials to Web Design	3	0	0	0	4.5	40	60	3	3
4	D	GYEST204	ESC	GC	Programming in C	3	0	2	0	5.5	40	60	4	5
5	E	PCCST205	PC	PC	Discrete Mathematics	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	1	0	3.5	100	0		
8	L	GXESL208	ESC	GC	IT Workshop	0	0	2	0	1	50	50*	1	2
	S_1/ S_2	UCSEM129	SEC	UC	Skill Enhancement Course: Digital 101(NASSCOM)	MOOC							1	
Total										**34**			**24**	**27/ 28**

- ***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

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.*

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 Reality 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
	Total Hours	**30**

Skill Enhancement Course: *Digital 101 is an introductory Massive Open Online Course (MOOC) offered by NASSCOM. It is designed to provide students with foundational knowledge and skills in digital technologies, preparing them for further studies and careers in the digital domain. By incorporating the Digital 101 course into the curriculum, KTU ensures that all students gain valuable digital skills early in their academic journey, enhancing their readiness for advanced courses and future careers in technology.*

Course Registration and Completion*:*

- *Students have the flexibility to register and complete the Digital 101 course either in their first semester (S1) or second semester (S2).*
- *The credit for this course (1 credit) will be officially recorded in the second semester grade card.*

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	GAMAT301	BSC	GC	Mathematics for Information Science-3	3	0	0	0	4.5	40	60	3	3
2	B	PCCST302	PC	PC	Theory of Computation	3	1	0	0	5	40	60	4	4
3	C	PCCST303	PC	PC	Data Structures and Algorithms	3	1	0	0	5	40	60	4	4
4	D	PBCST304	PC-PBL	PB	Object Oriented Programming	3	0	0	1	5.5	60	40	4	4
5	F	GAEST305	ESC	GC	Digital Electronics & Logic Design	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	PCCSL307	PCL	PC	Data Structures Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCDL308	PCL	PC	Python and Statistical Modeling Lab	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***
Bridge Course for Lateral Entry Students: Total 15 Hrs.														

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	GAMAT401	BSC	GC	Mathematics for Information Science-4	3	0	0	0	4.5	40	60	3	3
2	B	PCCST402	PC	PC	Database Management Systems	3	1	0	0	5	40	60	4	4
3	C	PCCST403	PC	PC	Operating Systems	3	1	0	0	5	40	60	4	4
4	D	PBCST404	PC-PBL	PB	Computer Organization and Architecture	3	0	0	1	5.5	60	40	4	4
5	E	PECDT41N	PE	PE	PE-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	PCCSL407	PCL	PC	Operating Systems Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCSL408	PCL	PC	DBMS Lab	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 Engineers and 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 Engineers in S3 and Engineering Ethics &Sustainable Development in S4 and vice versa.*

PROGRAM ELECTIVE I: PECDT41N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PECST411	Software Engineering	3-0-0-0	3	3
	PECDT412	Foundations of Security in Computing	3-0-0-0		3
	PECST413	Functional Programming	3-0-0-0		3
	PECST416	Signals and Systems	3-0-0-0		3
	PECST417	Soft computing	3-0-0-0		3
	PEADT418	Microcontrollers	3-0-0-0		3
	PEADT415	**Foundations of Pattern Recognition**	**3-0-0-0**		**5/3**
	PECST495	**Advanced Data Structures**	**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.*

FIFTH 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	PCCST501	PC	PC	Computer Networks	3	1	0	0	5	40	60	4	4
2	B	PCCST502	PC	PC	Design and Analysis of Algorithms	3	1	0	0	5	40	60	4	4
3	C	PCCDT503	PC	PC	Data Analytics	3	0	0	0	4.5	40	60	3	3
4	D	PBCDT504	PC-PBL	PB	Big Data Processing	3	0	0	1	5.5	60	40	4	4
5	E	PECDT52N	PE	PE	PE-2	3	0	0	0	4.5	40	60	3	3
6	I*	UCHUM506	HMC	UC	Constitution of India (MOOC)	-	-	-	-	2	-	-	1	-
7	L	PCCSL507	PCL	PC	Networks Lab	0	0	3	0	1.5	50	50	2	3
8	Q	PCCDL508	PCL	PC	Data Analytics Lab	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*
	S_5/ S_6	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.***

Industrial Training:
Students who are not participating in the industrial visit must attend industrial training during that period.

PROGRAM ELECTIVE 2: PECDT52N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
E	PECST521	Software Project Management	3-0-0-0	3	3
	PECST522	Artificial Intelligence	3-0-0-0		3
	PECDT523	Data Privacy and Security	3-0-0-0		3
	PECST524	Data Compression	3-0-0-0		3
	PEADT526	Computational Biology	3-0-0-0		3
	PECST527	Computer Graphics and Multimedia	3-0-0-0		3
	PECST528	Advanced Computer Architectures	3-0-0-0		3
	PECST525	**Data Mining**	**3-0-0-0**		**5/3**
	PECST595	**Advanced Graph Algorithms**	**3-0-0-0**		**5/3**

SIXTH 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	PCCST601	PC	PC	Compiler Design	3	1	0	0	5	40	60	4	4
2	B	PCCDT602	PC	PC	Machine Learning	3	0	0	0	4.5	40	60	3	3
3	C	PECDT63N	PE	PE	PE-3	3	0	0	0	4.5	40	60	3	3
4	D	PBCDT604	PC-PBL	PB	Data Visualization and Programming with R	3	0	0	1	5.5	60	40	4	4
5	F	GAEST605	ESC	GC	Design Thinking and Product Development (Group Specific Syllabus)	2	0	0	0	3	40	60	2	2
6	O	OECDT61N /IECDT61N	OE/ILE	OE/IE	OE/ILE-1	3	0	0	0	4.5	40	60	3	3
7	L	PCCDL607	PCL	PC	Big Data Processing Lab	0	0	3	0	1.5	50	50	2	3
8	P	PCCDP608	PWS	PC	Mini Project: Socially Relevant Project	0	0	0	3	3	50	50	2	3
9	R/M/H		VAC		Remedial/Minor/Honours Course	3	0	0	0	4.5			3*	3*
	S5/S6	Industrial Visit (Maximum of 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.

Industrial Training:
Students who are not participating in the industrial visit must attend industrial training during that period.

PROGRAM ELECTIVE 3: PECDT63N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
C	PECST631	Software Testing	3-0-0-0	**3**	3
	PECDT632	Data Warehousing	3-0-0-0		3
	PECDT633	Basics of Robotics and Automation	3-0-0-0		3
	PECDT634	Cloud Computing	3-0-0-0		3
	PECST636	Digital Image Processing	3-0-0-0		3
	PECST639	Randomized Algorithms	3-0-0-0		3
	PECDT635	**Web Mining**	**3-0-0-0**		**5/3**
	PECDT695	**Deep Learning**	**3-0-0-0**		**5/3**

OPEN ELECTIVE 1: OECDT61N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OECST611	Data Structures	3-0-0-0	3	3
	OECST612	Data Communication	3-0-0-0		3
	OECST613	Foundations of Cryptography	3-0-0-0		3
	OECST614	Machine Learning for Engineers	3-0-0-0		3
	OECST615	Object Oriented Programming	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	PECDT74N/ PECDM74N	PE	PE	PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	B	PECDT75N/ PECDM75N	PE	PE	PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
3	O	OECDT72N/ IECDT72N/ OECDM72N	OE/ ILE	OE/IE	OE/ILE-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	Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	2	0	0	0	3	50	50	2	2
5	S	PCCDS705	PWS	PC	Seminar	0	0	3	0	1.5	50	0	2	3
6	P	PCCDP706/ PCCDI706	PWS	PC	Option 1: Major Project Option 2: Internship (4-6 Months)	0	0	0	8	8	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*
Students can opt for the internship either in the **7th or 8th semester.*
** Option 1: Work on a Project in the institute/department under the mentorship of faculty members.*
*Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

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

PROGRAM ELECTIVE 4: PECDT74N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PECDT741	Recommendation Systems	3-0-0-0	3	3
	PECDT742	Financial Data Science	3-0-0-0		3
	PECDT743	Foundations of Computer Vision	3-0-0-0		3
	PECST742	Web Programming	3-0-0-0		3
	PECST743	Bioinformatics	3-0-0-0		3
	PECST747	Blockchain and Cryptocurrencies	3-0-0-0		3
	PECDT745	**Information Retrieval**	**3-0-0-0**		**5/3**
	PECDT795	**Advanced Database Systems**	**3-0-0-0**		**5/3**

PROGRAM ELECTIVE 5: PECDT75N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
B	PECDT751	Graph Databases and Analysis	3-0-0-0	3	3
	PECDT752	Introduction to Internet of Things	3-0-0-0		3
	PECDT753	Mobile Applications	3-0-0-0		3
	PECST752	Responsible Artificial Intelligence	3-0-0-0		3
	PECST754	Digital Forensics	3-0-0-0		3
	PECST757	High Performance Computing	3-0-0-0		3
	PECST759	Parallel Algorithms	3-0-0-0		3
	PECDT755	**Reinforcement Learning**	**3-0-0-0**	**3**	**5/3**

OPEN ELECTIVE 2: OECDT72N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OECST721	Cyber Security	3-0-0-0	3	3
	OECST722	Cloud Computing	3-0-0-0		3
	OECST723	Software Engineering	3-0-0-0		3
	OECST724	Computer Networks	3-0-0-0		3
	OECST725	Mobile Application Development	3-0-0-0		3

Slot I: HMC Elective	
1	Project Management: Planning, Execution, Evaluation and Control
2	Proficiency course in French. (MOOC) (B1 level)
3	Proficiency Course in German (B1 Level). (MOOC)
4	Proficiency Course in Spanish (B1 Level) (MOOC)
5	Introduction to Japanese Language and Culture (N5 level). (MOOC)

EIGHTH 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	PECDT86N/ PECDM86N	PE	PE	PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes)	3	0	0	0	4.5	40	60	3	3
2	O	OECDT83N/ IECDT83N/ OECDM83N	OE/ILE	OE/IE	OE/ILE-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	PCCDP806/ PCCDI806/ PCCDJ806	PWS	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	8	8	100	0	4	8
Total										**20**			**11**	**16**

No Grade Points will be awarded for the I slot courses

** Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

PROGRAM ELECTIVE 6: PECDT86N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
A	PECDT861	Time Series Modeling and Analysis	3-0-0-0	3	3
	PECDT862	Healthcare Data Analytics	3-0-0-0		3
	PECDT863	Social Network Analysis	3-0-0-0		3
	PECST862	Natural Language Processing	3-0-0-0		3
	PECST866	Speech and Audio Processing	3-0-0-0		3
	PECST867	Storage Systems	3-0-0-0		3
	PECST868	Prompt Engineering	3-0-0-0		3
	PECST865	**Next Generation Interaction Design**	**3-0-0-0**	**3**	**5/3**

OPEN ELECTIVE 3: OECDT83N

SLOT	COURSE CODE	COURSES	L-T-P-R	HOURS	CREDIT
O	OECST831	Introduction to Algorithms	3-0-0-0	3	3
	OECST832	Web Programming	3-0-0-0		3
	OECST833	Software Testing	3-0-0-0		3
	OECST834	Internet of Things	3-0-0-0		3
	OECST835	Computer Graphics	3-0-0-0		3

HMC Courses			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1/S2**	Life Skills and Professional Communication	1
2	**S3/S4**	Economics for Engineers	2
3		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 A)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S1**	Engineering Graphics and Computer Aided Drawing	3
2		Introduction to Electrical and Electronics Engineering	4
3		Algorithmic Thinking with Python	4
4		Basic Electrical and Electronics Engineering Workshop	1
5	**S2**	Foundations of Computing: From Hardware Essentials to Web Design	3
6		Programming in C	4
7		Engineering Entrepreneurship and IPR	3
8		IT Workshop	1
9	**S3**	Introduction to Artificial Intelligence and Data Science	4
10	**S6**	Design Thinking and Product Development	2
Total Credits			**29**

Programme Core Courses (PC)			
Sl. No:	**Semester**	**Course Area**	**Credits**
1	**S2**	Core 1	4
2	**S3**	Core 2	4
3		Core 3	4
4		Lab-1	2
5		Lab-2	2
6	**S4**	Core 4	4
7		Core 5	4
8		Lab-3	2
9		Lab-4	2
10	**S5**	Core 6	4
11		Core 7	4
12		Core 8	3
13		Lab-5	2
14		Lab-6	2
15	**S6**	Core 9	4
16		Core 10	3
17		Lab-7	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	4
2	**S4**	Core PBL-2	4
3	**S5**	Core PBL-3	4
4	**S6**	Core PBL-4	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	I	NSS, NCC, NSO (National Sports Organization)	1 (40 Points)	3 Credits (One credit from each Group)
2		Arts/Sports/Games		
3		Union/Club Activities		
4	II	English Proficiency Certification (TOFEL, IELTS, BEC etc.)	1 (40 Points)	
5		Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score.		
6		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		
7	III	Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons	1 (40 Points)	
8		**Skilling Certificates** (Approved by the University)		

- ***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**