

B. Tech in Quantum Science and Engineering

[B. Tech (QS)]

Credit Distribution

Division	Sub-Division	Credit
IC Core courses	IC Compulsory	40
	IC Basket	6
	IKS	3
	HSS	12
Discipline Courses	Discipline Core	44
	Discipline Electives	24
Elective Courses	Free Electives	21
	MTP, ISTP, or equivalent	12
	Total	162

Disciplinary Core courses for BTech (QS)

Sl. No.	Course Code	Course Name	L-T-P-C	Semester
1	IC 272	Machine Learning	2-0-2-3	III
2	QS 302 or PH 301	Foundation of Quantum Technology Quantum Mechanics and Application	3-0-0-3	III
3	EP 301	Engineering Mathematics -2	3-1-0-4	III
4	EP 321	Foundation of Electrodynamics	3-0-0-3	III
5	QS 301	Survey of Quantum Technology	3-0-0-3	III
6	PH 302	Statistics Thermodynamics	3-0-0-3	IV
7	QS 406	Introduction to Quantum Communication	3-0-0-3	IV
8	QS 407	Introduction to Quantum Sensing	3-0-0-3	IV
9	PH 501	Solid State Physics	3-0-0-3	IV
10	CS 212	Design of Algorithm	3-0-2-4	V
11	CS 305	Artificial Intelligence	3-0-0-3	V
12	QS 304P	Basic Laboratory course on Quantum Technologies	1-0-4-3	V
13	QS 509	Engineering Foundation of Quantum Technologies	3-0-0-3	VI
14	QS 501P	Experiments in Quantum Optics	3-0-0-3	VI
15	PH 502	Photonics	3-0-0-3	VI

Code of QT courses is updated to QS to match with the program name (Quantum Science and Engineering).

Discipline Electives Courses for BTech (QS)

Sl. No.	Course Code	Course Name	L-T-P-C	Semester
1	ME 353	Electronic Material and their Applications	3-0-0-3	
2	EP 403	Physics of Atoms and Molecules	3-0-0-3	
3	DS 404	Information Security and Privacy	3-0-0-3	
4	PH 559	Introduction to Quantum Optics	3-0-0-3	
5	QS 510	Solid State Physics for Quantum Technologies	3-0-0-3	
6	QS xxx	Cryogenics Quantum Electronics	3-0-0-3	
7	CS 520	Introduction to Quantum Computing	3-0-0-3	
8	PH 579	Advanced Quantum Computation and Information	3-0-0-3	
9	PH 601	Mesoscopic Physics and Quantum Transport	3-0-0-3	
10	PH 603	Advanced Condensed Matter Physics	3-0-0-3	
11	PH 605	Superconductivity	3-0-0-3	
12	PH 613	Special Topics in Quantum Mechanics	3-0-0-3	
13	CS 669	Pattern Recognition	3-0-0-3	
14	CS 671	Deep Learning and Applications	3-0-0-3	

Semester wise course distribution for BTech (QS)

Semester-I

Sl.No.	Course Code	Course Name	L-T-P-C
1	IC 112	Calculus	1.5-0.5-0-2
2	IC 113	Complex variables and Vector Calculus	2-0-0-2
3	IC 140	Engineering Graphics for Design	2-0-3-4
4	IC152	Introduction to Python and Data Science	3 -0-2-4
5		IC core basket-1	x-x-0-3
6	HS xxx	HSS Course	3-0-0-3
7	IC181	Introduction to Consciousness and Holistic Wellbeing	3-0-0-3
		Total	21

Semester II

Sl. No.	Course Code	Course Name	L-T-P-C
1	IC 114	Linear Algebra	2-0-0-2
2	IC 115	ODE & Integral Transforms	2-0-0-2
3	IC 161	Applied Electronics	3-0-0-3
4	IC 161P	Applied Electronics Lab	0-0-3-2
5	IC 252	Probability and Statistics	3 -0-2-4

6	IC 121	Mechanics of Particles and Waves [IC core basket-2]	2.5-0.5-0-3
7	IC 221P	Physics Practicum	0-0-3-2
8	IC 102P	Foundation of Design Practicum	1-0-6-4
		Total	22

Semester III

Sl. No.	Course Code	Course Name	L-T-P-C
1	IC 272	Machine Learning	3-0-0-3
2	PH301*	Quantum Mechanics and Applications	3-0-0-3
3	EP 301	Engineering Mathematics -2	3-1-0-4
4	EP321	Foundation of Electrodynamics	3-0-0-3
5	QT 301	Survey of Quantum Technology	3-0-0-3
6		Free Elective -1	3-0-0-3
7		HSS Course	3-0-0-3
		Total	22

QS 302 is equivalent to PH301, Students may choose any one out of these.

Semester-IV

Sl. No.	Course Code	Course Name	L-T-P-C
1	IC 201P	Design Practicum	0-0-6-3
2	QS 406	Introduction to Quantum Communication	3-0-0-3
3	QS xxx	Reverse Engineering	0-0-2-1
4	PH 501*	Solid State Physics	3-0-0-3
5	PH 302	Statistical Thermodynamics	3-0-0-3
6	HS xxx	HSS Course	3-0-0-3
7	QS 407	Introduction to Quantum Sensing	3-0-0-3
8		Discipline Elective -1	3-0-0-3
		Total	22

Semester-V

Sl. No.	Course Code	Course Name	L-T-P-C
1	CS 212	Design of Algorithm	3-0-2-4
2	CS 305	Artificial Intelligence	3-0-0-3
3	QS 304 P	Basic Laboratory course for Quantum Technologies	1-0-4-3
4		Discipline Elective -2	3-0-0-3
5		Discipline Elective -3	3-0-0-3
6		HSS Course	3-0-0-3
7		Free Elective -2	3-0-0-3
		Total	22

Semester -VI

Sl. No.	Course Code	Course Name	L-T-P-C
1	QS 509	Engineering Foundation of Quantum Technologies	3-0-0-3
2	QS 501P	Experiments in Quantum Optics	1-0-4-3
	PH 502	Photonics	3-0-0-3
4		Discipline Elective -4	3-0-0-3
5		Discipline Elective -5	3-0-0-3
6		Free Elective -3	3-0-0-3
7	DP 301P	ISTP or equivalent	0-0-6-4
		Total	22

Semester VII

Sl. No.	Course Code	Course Name	L-T-P-C
1		Discipline Elective -6	3-0-0-3
		Discipline Elective -7	3-0-0-3
2		Free Elective - 4	3-0-0-3
3		Free Elective – 5	3-0-0-3
4	DP 401P	MTP-1	0-0-4.5-3
		Total	15

Semester- VIII

Sl.No.	Course Code	Course Name	L-T-P-C
1		Discipline Elective -8	3-0-0-3
2		Free Elective - 6	3-0-0-3
3		Free Elective – 7	3-0-0-3
4	DP 402P	MTP-2	0-0-7.5-5
5	IC 010	Internship	2
		Total	16