13. COURSES OF STUDY AND SCHEME OF ASSESSMENT

M.Sc. THEORETICAL COMPUTER SCIENCE (2018 REGULATIONS)

(Minimum No. of credits to be earned: 213*)

Course Code	Course Title	Hours/Week			Credit	Maximum marks			CATEGORY
		Lecture	Tutorial	Practical		CA	FE	Total	
IX SEMESTER									
18XT91	INFORMATION RETRIEVAL	3	0	0	3	50	50	100	PC
18XT92	SOFTWARE PATTERNS	3	2	0	4	50	50	100	PC
18XT93	MATHEMATICAL MODELLING	3	0	0	3	50	50	100	PC
18XT94	PROFESSIONAL ELECTIVE – IV (SELF STUDY)	3	2	0	4	50	50	100	PE
18XT95	OPEN ELECTIVE – II	3	2	0	4	50	50	100	PE
18XT96	INFORMATION RETRIEVAL LAB	0	0	2	1	100	-	100	PC
18XT97	MODELLING AND SIMULATION LAB	0	0	4	2	100	-	100	PC
18XT98	RESEARCH SPECIALIZATION LAB - II	0	0	4	2	100	-	100	PC
	Total 31 Hrs	**15**	**6**	**10**	**23**	**550**	**250**	**800**	
X SEMESTER									
18XTP2	PROJECT WORK II – INDUSTRY / RESEARCH PROJECT	**0**	**0**	**-**	**12**	50	50	100	EEC

CA – Continuous Assessment ; FE – Final Examination; CAT – Category; BS – Basic Sciences; HS – Humanities & Social Sciences; ES – Engineering Sciences; PC – Professional Core; PE – Professional Elective; OE – Open Elective; EEC – Employability Enhancement Course, MC – Mandatory Course.

Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
PROFESSIONAL ELECTIVES (Four to be opted)									
18XTE1	PRINCIPLES OF PROGRAMMING LANGUAGES	3	2	0	4	50	50	100	PE
18XTE2	REINFORCEMENT LEARNING	3	2	0	4	50	50	100	PE
18XTE3	NATURAL LANGUAGE PROCESSING	3	2	0	4	50	50	100	PE
18XTE4	DEEP LEARNING	3	2	0	4	50	50	100	PE
18XTE5	APPROXIMATION ALGORITHMS	3	2	0	4	50	50	100	PE
18XTE6	NETWORK ALGORITHMICS	3	2	0	4	50	50	100	PE
18XTE7	SOCIAL NETWORK ANALYSIS	3	2	0	4	50	50	100	PE
18XTE8	ADVANCED COMPUTER GRAPHICS	3	2	0	4	50	50	100	PE
18XTE9	COMPUTER VISION AND IMAGE ANALYSIS	3	2	0	4	50	50	100	PE
18XTEA	DATA COMPRESSION	3	2	0	4	50	50	100	PE
18XTEB	RANDOMIZED ALGORITHMS	3	2	0	4	50	50	100	PE
18XTEC	CLOUD COMPUTING	3	2	0	4	50	50	100	PE
18XTED	PERVASIVE COMPUTING	3	2	0	4	50	50	100	PE
18XTEE	BIG DATA AND MODERN DATABASE SYSTEMS	3	2	0	4	50	50	100	PE
18XTEF	PRINCIPLES OF COMPILER DESIGN	3	2	0	4	50	50	100	PE
18XTEG	NETWORK SCIENCE	3	2	0	4	50	50	100	PE
18XTEH	SECURITY MODELLING AND ANALYSIS	3	2	0	4	50	50	100	PE
18XTEI	INTERNET OF THINGS	3	2	0	4	50	50	100	PE
18XTEJ	EPIDEMIC MODELS	3	2	0	4	50	50	100	PE
18XTEK	STATISTICAL LEARNING	3	2	0	4	50	50	100	PE

Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
OPEN ELECTIVES (Two to be opted)									
18XTO1	COMPUTATIONAL FINANCE	3	2	0	4	50	50	100	OE
18XTO2	COMPUTATIONAL GEOMETRY	3	2	0	4	50	50	100	OE
18XTO3	DATA SCIENCE	3	2	0	4	50	50	100	OE
18XTO4	DATA VISUALIZATION	3	2	0	4	50	50	100	OE
18XTO5	PRINCIPLES OF MANAGEMENT AND BEHAVIOURAL SCIENCES	3	2	0	4	50	50	100	OE
18XTO6	ENTREPRENEURSHIP	3	2	0	4	50	50	100	OE
18XTO7	COMPUTATIONAL COMPLEXITY THEORY	3	2	0	4	50	50	100	OE
18XTO8	WIRELESS NETWORKS	3	2	0	4	50	50	100	OE
18XTO9	ADVANCED OPERATING SYSTEM S	3	2	0	4	50	50	100	OE
18XTOA	MOBILE COMPUTING	3	2	0	4	50	50	100	OE
18XTOB	COMPUTATIONAL FOUNDATIONS FOR ROBOTICS	3	2	0	4	50	50	100	OE
18XTOC	ENVIRONMENTAL SCIENCE AND GREEN COMPUTING	3	2	0	4	50	50	100	OE

Labeling and Grouping of Courses

HUMANITIES AND SOCIAL SCIENCES (HS)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1	18XT15	ENGLISH FOR PROFESSIONAL SKILLS	3:0:0:3	I

BASIC SCIENCES (BS)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1.	18XT11	CALCULUS AND ITS APPLICATIONS	3:2:0:4	I
2.	18XT12	APPLIED PHYSICS	4:0:0:4	I
3.	18XT13	ANALOG AND DIGITAL ELECTRONICS	4:0:0:4	I
4.	18XT16	APPLIED PHYSICS AND DIGITAL ELECTRONICS LAB	0:0:4:2	I
5.	18XT21	DISCRETE STRUCTURES	3:2:0:4	II
6.	18XT22	COMPLEX VARIABLES AND TRANSFORMS	3:2:0:4	II
7.	18XT23	ABSTRACT ALGEBRA	4:0:0:4	II
8.	18XT26	COMPUTATIONAL MATHEMATICS WITH PYTHON	0:0:4:2	II
9.	18XT31	LINEAR ALGEBRA	4:0:0:4	III
10.	18XT32	GRAPH THEORY	4:0:0:4	III
11.	18XT33	PROBABILITY AND STATISTICS	4:0:0:4	III
12.	18XT41	STOCHASTIC PROCESSES	3:2:0:4	IV
13.	18XT43	OPTIMIZATION TECHNIQUES	3:0:0:3	IV

PROFESSIONAL CORE (PC)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1.	18XT14	PROBLEM SOLVING AND C PROGRAMMING	3:0:0:3	I
2.	18XT17	C PROGRAMMING LAB	0:0:4:2	I
3.	18XT24	DATA STRUCTURES AND ALGORITHMS	3:0:0:3	II
4.	18XT25	OBJECT ORIENTED PROGRAMMING	3:0:0:3	II
5.	18XT27	DATA STRUCTURES LAB	0:0:4:2	II
6.	18XT28	OBJECT ORIENTED PROGRAMMING LAB	0:0:4:2	II

7.	18XT34	ADVANCED DATA STRUCTURES	4:0:0:4	III
8.	18XT35	COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING	3:0:0:3	III
9.	18XT36	STATISTICAL COMPUTING AND R PROGRAMMING L AB	0:0:4:2	III
10.	18XT37	ADVANCED DATA STRUCTURES LAB	0:0:4:2	III
11.	18XT38	ASSEMBLY LANGUAGE PROGRAMMING LAB	0:0:4:2	III
12.	18XT42	DATABASE DESIGN	3:0:0:3	IV
13.	18XT44	OPERATING SYSTEMS	4:0:0:4	IV
14.	18XT45	COMPUTER NETWORKS AND TCP/IP	3:0:0:3	IV
15.	18XT46	OPERATING SYSTEMS LAB (LINUX)	0:0:4:2	IV
16.	18XT47	COMPUTER NETWORKS AND TCP/IP LAB	0:0:4:2	IV
17.	18XT48	RDBMS LAB	0:0:4:2	IV
18.	18XT51	THEORY OF COMPUTING	3:0:0:3	V
19.	18XT52	COMPUTATIONAL NUMBER THEORY AND CRYPTOGRAPHY	4:0:0:4	V
20.	18XT53	SOFTWARE ENGINEERING	3:2:0:4	V
21.	18XT54	DESIGN AND ANALYSIS OF ALGORITHMS	3:0:0:3	V
22.	18XT56	SCIENTIFIC COMPUTING LAB	0:0:4:2	V
23.	18XT57	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0:0:4:2	V
24.	18XT58	JAVA PROGRAMMING LAB	0:0:4:2	V
25.	18XT61	MACHINE LEARNING	3:2:0:4	VI
26.	18XT62	COMPUTER GRAPHICS AND VISUALIZATION	3:0:0:3	VI
27.	18XT63	ARTIFICIAL INTELLIGENCE	3:0:0:3	VI
28.	18XT64	SECURITY IN COMPUTING	3:0:0:3	VI
29.	18XT66	COMPUTER GRAPHICS AND VISUALIZATION LAB	0:0:4:2	VI
30.	18XT67	ARTIFICIAL INTELLIGENCE LAB	0:0:4:2	VI
31.	18XT68	SECURITY IN COMPUTING LAB	0:0:4:2	VI
32.	18XT81	GAME THEORY	3:0:0:3	VIII
33.	18XT82	PARALLEL AND DISTRIBUTED COMPUTING	3:0:0:3	VIII
34.	18XT83	DATA MINING	3:0:0:3	VIII
35.	18XT86	PARALLEL AND DISTRIBUTED COMPUTING LAB	0:0:4:2	VIII
36.	18XT87	DATA MINING LAB	0:0:4:2	VIII
37.	18XT91	INFORMATION RETRIEVAL	3:0:0:3	IX
38.	18XT92	SOFTWARE PATTERNS	3:2:0:4	IX
39.	18XT93	MATHEMATICAL MODELLING	3:0:0:3	IX
40.	18XT96	INFORMATION RETRIEVAL LAB	0:0:2:1	IX
41.	18XT97	SIMULATION AND MODELLING LAB	0:0:4:2	IX

PROFESSIONAL ELECTIVES (PE)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1.	18XTE1	PRINCIPLES OF PROGRAMMING LANGUAGES	3:2:0:4	FROM V
2.	18XTE2	REINFORCEMENT LEARNING	3:2:0:4	FROM VIII
3.	18XTE3	NATURAL LANGUAGE PROCESSING	3:2:0:4	FROM V
4.	18XTE4	DEEP LEARNING	3:2:0:4	FROM VI
5.	18XTE5	APPROXIMATION ALGORITHMS	3:2:0:4	FROM VI
6.	18XTE6	NETWORK ALGORITHMICS	3:2:0:4	FROM VI
7.	18XTE7	SOCIAL NETWORK ANALYSIS	3:2:0:4	FROM V
8.	18XTE8	ADVANCED COMPUTER GRAPHICS	3:2:0:4	FROM VIII
9.	18XTE9	COMPUTER VISION AND IMAGE ANALYSIS	3:2:0:4	FROM VIII
10.	18XTEA	DATA COMPRESSION	3:2:0:4	FROM V
11.	18XTEB	RANDOMIZED ALGORITHMS	3:2:0:4	FROM V
12.	18XTEC	CLOUD COMPUTING	3:2:0:4	IX
13.	18XTED	PERVASIVE COMPUTING	3:2:0:4	FROM VI
14.	18XTEE	BIG DATA AND MODERN DATABASE SYSTEMS	3:2:0:4	FROM V
15.	18XTEF	PRINCIPLES OF COMPILER DESIGN	3:2:0:4	FROM VI
16.	18XTEG	NETWORK SCIENCE	3:2:0:4	FROM V
17.	18XTEH	SECURITY MODELLING AND ANALYSIS	3:2:0:4	FROM VI
18.	18XTEI	INTERNET OF THINGS	3:2:0:4	FROM V
19.	18XTEJ	EPIDEMIC MODELS	3:2:0:4	FROM V
20.	18XTEK	STATISTICAL LEARNING	3:2:0:4	FROM VIII

OPEN ELECTIVES (OE)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1.	18XTO1	COMPUTATIONAL FINANCE	3:2:0:4	VIII or IX
2.	18XTO2	COMPUTATIONAL GEOMETRY	3:2:0:4	VIII or IX
3.	18XTO3	DATA SCIENCE	3:2:0:4	VIII or IX
4.	18XTO4	DATA VISUALIZATION	3:2:0:4	VIII or IX
5.	18XTO5	PRINCIPLES OF MANAGEMENT AND BEHAVIOURAL SCIENCES	3:2:0:4	VIII or IX
6.	18XTO6	ENTREPRENEURSHIP	3:2:0:4	VIII or IX
7.	18XTO7	COMPUTATIONAL COMPLEXITY THEORY	3:2:0:4	VIII or IX
8.	18XTO8	WIRELESS NETWORKS	3:2:0:4	VIII or IX
9.	18XTO9	ADVANCED OPERATING SYSTEM S	3:2:0:4	VIII or IX
10.	18XTOA	MOBILE COMPUTING	3:2:0:4	VIII or IX
11.	18XTOB	COMPUTATIONAL FOUNDATIONS FOR ROBOTICS	3:2:0:4	VIII or IX
12.	18XTOC	ENVIRONMENTAL SCIENCE AND GREEN COMPUTING	3:2:0:4	VIII or IX

EMPLOYABILITY ENHANCEMENT COURSES (EEC)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1	18XTP1	PROJECT WORK I – INDUSTRY / RESEARCH PROJECT	0:0:0:12	VII
2	18XT88	RESEARCH SPECIALIZATION LAB - I	0:0:4:2	VIII
3	18XT98	RESEARCH SPECIALIZATION LAB - II	0:0:4:2	IX
3	18XTP2	PROJECT WORK II – INDUSTRY / RESEARCH PROJECT	0:0:0:12	X

ENGINEERING SCIENCES (ES)				
S.No.	**Course Code**	**Course Title**	**L:T:P:C**	**Preferred Semester**
1	18XT18	ENGINEERING GRAPHICS AND GEOMETRIC MODELLING	0:0:4:2	I