

13. COURSES OF STUDY AND SCHEME OF ASSESSMENT

M.Sc. THEORETICAL COMPUTER SCIENCE

(2015 REGULATIONS)

(Minimum No. of credits to be earned: 210*)

Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
I SEMESTER									
15XT11	MATHEMATICAL METHODS	3	2	0	4	50	50	100	BS
15XT12	MATERIALS SCIENCE	4	0	0	4	50	50	100	BS
15XT13	ANALOG AND DIGITAL ELECTRONICS	4	0	0	4	50	50	100	BS
15XT14	C PROGRAMMING	3	0	0	3	50	50	100	PC
15XT15	ENGLISH FOR PROFESSIONAL SKILLS	3	0	0	3	50	50	100	HS
15XT16	MATERIALS SCIENCE AND DIGITAL ELECTRONICS LAB	0	0	4	2	100	-	100	BS
15XT17	C PROGRAMMING LAB	0	0	4	2	100	-	100	PC
15XT18	ENGINEERING GRAPHICS AND GEOMETRIC MODELLING	0	0	4	2	100	-	100	ES
15XT29	PERSONALITY AND CHARACTER DEVELOPMENT	0	0	** Refer Sem 2 and footnote					MC
Total 31Hrs		17	2	12	24	550	250	800	
II SEMESTER									
15XT21	DISCRETE STRUCTURES	3	0	0	3	50	50	100	BS
15XT22	COMPLEX VARIABLES AND TRANSFORMS	4	0	0	4	50	50	100	BS
15XT23	PROBABILITY AND STATISTICS	3	2	0	4	50	50	100	BS
15XT24	DATA STRUCTURES AND ALGORITHMS	3	0	0	3	50	50	100	PC
15XT25	OBJECT ORIENTED PROGRAMMING	3	0	0	3	50	50	100	PC
15XT26	MATHEMATICAL COMPUTING AND STATISTICAL PACKAGES LAB	0	0	4	2	100	-	100	BS
15XT27	DATA STRUCTURES LAB	0	0	4	2	100	-	100	PC
15XT28	OBJECT ORIENTED PROGRAMMING C++ LAB	0	0	4	2	100	-	100	PC
15XT29	PERSONALITY AND CHARACTER DEVELOPMENT	0	0	** Grade - - -					MC
Total 30Hrs		16	2	12	23	550	250	800	

* Indicated is the minimum number of credits to be earned by a student.

** - Total 40 hrs in semesters I & II put together. Grade: Completed / Not Completed.

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Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
III SEMESTER									
15XT31	STOCHASTIC PROCESSES	3	2	0	4	50	50	100	BS
15XT32	GRAPH THEORY	4	0	0	4	50	50	100	BS
15XT33	ABSTRACT ALGEBRA	3	0	0	3	50	50	100	BS
15XT34	ADVANCED DATA STRUCTURES	4	0	0	4	50	50	100	PC
15XT35	COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING	3	0	0	3	50	50	100	PC
15XT36	PYTHON PROGRAMMING LAB	0	0	4	2	100	-	100	PC
15XT37	ADVANCED DATA STRUCTURES LAB	0	0	4	2	100	-	100	PC
15XT38	ASSEMBLY LANGUAGE PROGRAMMING LAB	0	0	4	2	100	-	100	PC
	Total 31Hrs	17	2	12	24	550	250	800	
IV SEMESTER									
15XT41	LINEAR ALGEBRA AND NUMERICAL ANALYSIS	3	2	0	4	50	50	100	BS
15XT42	SOFTWARE ENGINEERING	3	0	0	3	50	50	100	PC
15XT43	OPTIMIZATION TECHNIQUES	3	0	0	3	50	50	100	BS
15XT44	OPERATING SYSTEMS	3	0	0	3	50	50	100	PC
15XT45	COMPUTER NETWORKS AND TCP/IP	3	0	0	3	50	50	100	PC
15XT46	OPTIMIZATION TECHNIQUES WITH R LAB	0	0	4	2	100	-	100	PC
15XT47	OPERATING SYSTEMS LAB (LINUX)	0	0	4	2	100	-	100	PC
15XT48	COMPUTER NETWORKS AND TCP/IP LAB	0	0	4	2	100	-	100	PC
	Total 29Hrs	15	2	12	22	550	250	800	

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Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
V SEMESTER									
15XT51	THEORY OF COMPUTING	4	0	0	4	50	50	100	PC
15XT52	COMPUTATIONAL NUMBER THEORY AND CRYPTOGRAPHY	4	0	0	4	50	50	100	PC
15XT53	DATABASE DESIGN	3	0	0	3	50	50	100	PC
15XT54	DESIGN AND ANALYSIS OF ALGORITHMS	3	0	0	3	50	50	100	PC
15XT55	PROFESSIONAL ELECTIVE-I	3	2	0	4	50	50	100	PE
15XT56	JAVA PROGRAMMING LAB	0	0	4	2	100	-	100	PC
15XT57	RDBMS LAB	0	0	4	2	100	-	100	PC
15XT58	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0	0	4	2	100	-	100	PC
	Total 31 Hrs	17	2	12	24	550	250	800	
VI SEMESTER									
15XT61	MACHINE LEARNING	3	2	0	4	50	50	100	PC
15XT62	COMPUTER GRAPHICS AND VISUALIZATION	3	0	0	3	50	50	100	PC
15XT63	PRINCIPLES OF COMPILER DESIGN	3	0	0	3	50	50	100	PC
15XT64	SECURITY IN COMPUTING	3	0	0	3	50	50	100	PC
15XT65	OPEN ELECTIVE – I	3	2	0	4	50	50	100	OE
15XT66	COMPUTER GRAPHICS AND VISUALIZATION LAB	0	0	4	2	100	-	100	PC
15XT67	COMPILER DESIGN LAB	0	0	4	2	100	-	100	PC
15XT68	SECURITY IN COMPUTING LAB	0	0	4	2	100	-	100	PC
	Total 31 Hrs	15	4	12	23	550	250	800	
VII SEMESTER									
15XTP1	PROJECT WORK I – INDUSTRY / RESEARCH PROJECT	0	0	-	12	50	50	100	EEC

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M.Sc. THEORETICAL COMPUTER SCIENCE
2015 REGULATIONS

Course Code	Course Title	Hours/Week			Credit	Maximum marks			CATE GORY
		Lecture	Tutorial	Practical		CA	FE	Total	
VIII SEMESTER									
15XT81	GAME THEORY	3	0	0	3	50	50	100	PC
15XT82	PARALLEL AND DISTRIBUTED COMPUTING	3	0	0	3	50	50	100	PC
15XT83	MATHEMATICAL MODELLING	3	0	0	3	50	50	100	PC
15XT84	PROFESSIONAL ELECTIVE – II	3	2	0	4	50	50	100	PE
15XT85	OPEN ELECTIVE – II	3	2	0	4	50	50	100	OE
15XT86	PARALLEL AND DISTRIBUTED COMPUTING WITH HADOOP ARCHITECTURE LAB	0	0	4	2	100	-	100	PC
15XT87	OPEN SOURCE SOFTWARE LAB	0	0	4	2	100	-	100	PC
15XT88	RESEARCH SPECIALIZATION LAB	0	0	4	2	100	-	100	EEC
	Total 31 Hrs	15	4	12	23	550	250	800	
IX SEMESTER									
15XT91	INFORMATION RETRIEVAL	3	0	0	3	50	50	100	PC
15XT92	SOFTWARE PATTERNS	3	0	0	3	50	50	100	PC
15XT93	DATA MINING	3	0	0	3	50	50	100	PC
15XT94	PROFESSIONAL ELECTIVE – III	3	2	0	4	50	50	100	PE
15XT95	PROFESSIONAL ELECTIVE –IV	3	2	0	4	50	50	100	PE
15XT96	INFORMATION RETRIEVAL LAB	0	0	4	2	100	-	100	PC
15XT97	SOFTWARE PATTERNS LAB	0	0	4	2	100	-	100	PC
15XT98	DATA MINING LAB	0	0	4	2	100	-	100	PC
	Total 31 Hrs	15	4	12	23	550	250	800	
X SEMESTER									
15XTP2	PROJECT WORK II – INDUSTRY / RESEARCH PROJECT	0	0	-	12	50	50	100	EEC

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Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
PROFESSIONAL ELECTIVES (Four to be opted)									
15XTE1	PRINCIPLES OF PROGRAMMING LANGUAGES	3	2	0	4	50	50	100	PE
15XTE2	MULTI PARADIGM PROGRAMMING LANGUAGES	3	2	0	4	50	50	100	PE
15XTE3	PROGRAM SEMANTIC ANALYSIS	3	2	0	4	50	50	100	PE
15XTE4	NATURAL LANGUAGE PROCESSING	3	2	0	4	50	50	100	PE
15XTE5	RANDOMIZED ALGORITHMS	3	2	0	4	50	50	100	PE
15XTE6	APPROXIMATION ALGORITHMS	3	2	0	4	50	50	100	PE
15XTE7	NETWORK ALGORITHMS	3	2	0	4	50	50	100	PE
15XTE8	WIRELESS NETWORKS	3	2	0	4	50	50	100	PE
15XTE9	SOCIAL NETWORK ANALYSIS	3	2	0	4	50	50	100	PE
15XTEA	ADVANCED COMPUTER GRAPHICS	3	2	0	4	50	50	100	PE
15XTEB	COMPUTER VISION AND IMAGE ANALYSIS	3	2	0	4	50	50	100	PE
15XTEC	DATA COMPRESSION	3	2	0	4	50	50	100	PE
15XTED	SEMANTIC WEB	3	2	0	4	50	50	100	PE
15XTEE	CLOUD COMPUTING	3	2	0	4	50	50	100	PE
15XTEF	PERVASIVE COMPUTING	3	2	0	4	50	50	100	PE
15XTEG	ADVANCED DATA BASE MANAGEMENT SYSTEMS	3	2	0	4	50	50	100	PE
15XTEH	SOFTWARE PROCESS MANAGEMENT	3	2	0	4	50	50	100	PE
15XTEI	ARTIFICIAL INTELLIGENCE	3	2	0	4	50	50	100	PE

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Course Code	Course Title	Hours/Week			Credit	Maximum marks			CAT
		Lecture	Tutorial	Practical		CA	FE	Total	
OPEN ELECTIVES (Two to be opted)									
15XT01	COMPUTATIONAL FINANCE	3	2	0	4	50	50	100	OE
15XT02	COMPUTATIONAL GEOMETRY	3	2	0	4	50	50	100	OE
15XT03	DATA SCIENCE	3	2	0	4	50	50	100	OE
15XT04	DATA VISUALIZATION	3	2	0	4	50	50	100	OE
15XT05	PRINCIPLES OF MANAGEMENT AND BEHAVIOURAL SCIENCES	3	2	0	4	50	50	100	OE
15XT06	ENTREPRENEURSHIP	3	2	0	4	50	50	100	OE
15XT07	INFORMATION THEORY AND ERROR CONTROL CODING	3	2	0	4	50	50	100	OE
15XT08	COMPUTATIONAL COMPLEXITY THEORY	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	15XT12	ENGLISH FOR PROFESSIONAL SKILLS	3:0:0:3	1

BASIC SCIENCES (BS)				
S.No.	Course Code	Course Title	L:T:P:C	Preferred Semester
1	15XT11	MATHEMATICAL METHODS	3:2:0:4	1
2	15XT13	MATERIALS SCIENCE	4:0:0:4	1
3	15XT14	ANALOG AND DIGITAL ELECTRONICS	4:0:0:4	1
4	15XT16	MATERIAL SCIENCE AND DIGITAL ELECTRONICS LAB	0:0:4:2	1
5	15XT21	DISCRETE STRUCTURES	3:0:0:3	2
6	15XT22	COMPLEX VARIABLES AND TRANSFORMS	4:0:0:4	2
7	15XT23	PROBABILITY AND STATISTICS	3:2:0:4	2
8	15XT26	MATHEMATICAL COMPUTING AND STATISTICAL PACKAGES LAB	0:0:4:2	2
9	15XT31	STOCHASTIC PROCESSES	3:2:0:4	3
10	15XT32	GRAPH THEORY	4:0:0:4	3
11	15XT33	ABSTRACT ALGEBRA	3:0:0:3	3
12	15XT41	LINEAR ALGEBRA AND NUMERICAL ANALYSIS	3:2:0:4	4
13	15XT43	OPTIMIZATION TECHNIQUES	3:0:0:3	4

PROFESSIONAL CORE (PC)				
S.No.	Course Code	Course Title	L:T:P:C	Preferred Semester
1	15XT15	C PROGRAMMING	3:0:0:3	1
2	15XT17	C PROGRAMMING LAB	0:0:4:2	1
3	15XT24	DATA STRUCTURES AND ALGORITHMS	3:0:0:3	2
4	15XT25	OBJECT ORIENTED PROGRAMMING	3:0:0:3	2
5	15XT27	DATA STRUCTURES LAB	0:0:4:2	2
6	15XT28	OBJECT ORIENTED PROGRAMMING C++ LAB	0:0:4:2	2
7	15XT34	ADVANCED DATA STRUCTURES	4:0:0:4	3
8	15XT35	COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING	3:0:0:3	3
9	15XT36	PYTHON PROGRAMMING LAB	0:0:4:2	3
10	15XT37	ADVANCED DATA STRUCTURES LAB	0:0:4:2	3
11	15XT38	ASSEMBLY LANGUAGE PROGRAMMING LAB	0:0:4:2	3
12	15XT42	SOFTWARE ENGINEERING	3:0:0:3	4
13	15XT44	OPERATING SYSTEMS	3:0:0:3	4
14	15XT45	COMPUTER NETWORKS AND TCP/IP	3:0:0:3	4
15	15XT46	OPTIMIZATION TECHNIQUES WITH R LAB	0:0:4:2	4
16	15XT47	OPERATING SYSTEMS LAB (LINUX)	0:0:4:2	4
17	15XT48	COMPUTER NETWORKS AND TCP/IP	0:0:4:2	4
18	15XT51	THEORY OF COMPUTING	4:0:0:4	5
19	15XT52	COMPUTATIONAL NUMBER THEORY AND CRYPTOGRAPHY	4:0:0:4	5
20	15XT53	DATABASE DESIGN	3:0:0:3	5
21	15XT54	DESIGN AND ANALYSIS OF ALGORITHMS	3:0:0:3	5
22	15XT56	JAVA PROGRAMMING LAB	0:0:4:2	5
23	15XT57	RDBMS LAB	0:0:4:2	5
24	15XT58	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0:0:4:2	5
25	15XT61	MACHINE LEARNING	3:2:0:4	6
26	15XT62	COMPUTER GRAPHICS AND VISUALIZATION	3:0:0:3	6
27	15XT63	PRINCIPLES OF COMPILER DESIGN	3:0:0:3	6
28	15XT64	SECURITY IN COMPUTING	3:0:0:3	6
29	15XT66	COMPUTER GRAPHICS AND VISUALIZATION LAB	0:0:4:2	6
30	15XT67	COMPILER DESIGN LAB	0:0:4:2	6
31	15XT68	SECURITY IN COMPUTING LAB	0:0:4:2	6
32	15XT81	GAME THEORY	3:0:0:3	8
33	15XT82	PARALLEL AND DISTRIBUTED COMPUTING	3:0:0:3	8
34	15XT83	MATHEMATICAL MODELLING	3:0:0:3	8
35	15XT86	PARALLEL AND DISTRIBUTED COMPUTING WITH HADOOP ARCHITECTURE LAB	0:0:4:2	8
36	15XT87	OPEN SOURCE SOFTWARE LAB	0:0:4:2	8
37	15XT91	INFORMATION RETRIEVAL	3:0:0:3	9
38	15XT92	SOFTWARE PATTERNS	3:0:0:3	9
39	15XT93	DATA MINING	3:0:0:3	9
40	15XT96	INFORMATION RETRIEVAL LAB	0:0:4:2	9
41	15XT97	SOFTWARE PATTERNS LAB	0:0:4:2	9
42	15XT98	DATA MINING LAB	0:0:4:2	9

PROFESSIONAL ELECTIVES (PE)				
S.No.	Course Code	Course Title	L:T:P:C	Preferred Semester
1	15XTE1	PRINCIPLES OF PROGRAMMING LANGUAGES	3:2:0:4	FROM V
2	15XTE2	MULTI PARADIGM PROGRAMMING LANGUAGES	3:2:0:4	FROM V
3	15XTE3	PROGRAM SEMANTIC ANALYSIS	3:2:0:4	FROM V
4	15XTE4	NATURAL LANGUAGE PROCESSING	3:2:0:4	FROM V
5	15XTE5	RANDOMIZED ALGORITHMS	3:2:0:4	FROM VI
6	15XTE6	APPROXIMATION ALGORITHMS	3:2:0:4	FROM VI
7	15XTE7	NETWORK ALGORITHMS	3:2:0:4	FROM VI
8	15XTE8	WIRELESS NETWORKS	3:2:0:4	FROM V
9	15XTE9	SOCIAL NETWORK ANALYSIS	3:2:0:4	FROM V
10	15XTEA	ADVANCED COMPUTER GRAPHICS	3:2:0:4	FROM VII
11	15XTEB	COMPUTER VISION AND IMAGE ANALYSIS	3:2:0:4	FROM VIII
12	15XTEC	DATA COMPRESSION	3:2:0:4	FROM V
13	15XTED	SEMANTIC WEB	3:2:0:4	FROM V
14	15XTEE	CLOUD COMPUTING	3:2:0:4	FROM IX
15	15XTEF	PERVASIVE COMPUTING	3:2:0:4	FROM VI
16	15XTEG	ADVANCED DATA BASE MANAGEMENT SYSTEMS	3:2:0:4	FROM V
17	15XTEH	SOFTWARE PROCESS MANAGEMENT	3:2:0:4	FROM V
18	15XTEI	ARTIFICIAL INTELLIGENCE	3:2:0:4	V

OPEN ELECTIVES (OE)				
S.No.	Course Code	Course Title	L:T:P:C	Preferred Semester
1	15XTO1	COMPUTATIONAL FINANCE	3:2:0:4	VI or VIII
2	15XTO2	COMPUTATIONAL GEOMETRY	3:2:0:4	VI or VIII
3	15XTO3	DATA SCIENCE	3:2:0:4	VI or VIII
4	15XTO4	DATA VISUALIZATION	3:2:0:4	VI or VIII
5	15XTO5	PRINCIPLES OF MANAGEMENT AND BEHAVIOURAL SCIENCES	3:2:0:4	VI or VIII
6	15XTO6	ENTREPRENEURSHIP	3:2:0:4	VI or VIII
7	15XTO7	INFORMATION THEORY AND ERROR CONTROL CODING	3:2:0:4	VI or VIII
8	15XTO8	COMPUTATIONAL COMPLEXITY THEORY	3:2:0:4	VI or VIII

EMPLOYABILITY ENHANCEMENT COURSES (EEC)				
S.No.	Course Code	Course Title	L:T:P:C	Preferred Semester
1	15XTP1	PROJECT WORK I- INDUSTRY / RESEARCH PROJECT	0:0:0:12	7
2	15XT88	RESEARCH SPECIALIZATION LAB	0:0:4:2	8
3	15XTP2	PROJECT WORK II- INDUSTRY / RESEARCH PROJECT	0:0:0:12	10

ENGINEERING SCIENCES (ES)				
S.No.	Course Code	Course Title	L:T:P:C	Preferred Semester
1	15XT18	ENGINEERING GRAPHICS AND GEOMETRIC MODELING	0:0:4:2	1