BTech	UG Credits			PG Credits			Courses		Remarks
	DC	DE	OC*	PC	PE	Total	PC	PE	
EE1	60	10	0	24	27	51	**	**	If done ELL405, 4 credits shift from PC to PE
EE3	60	10	0	24	27	51	**	**	
CS1	59	11	0	20	31	51	***	***	
MT1	63.5	12	0	20	31	51	***	***	
PH1	58	12	0	30	21	51	3	7	

* Students opting for the dual degree with M.Tech. in Computer Technology will get a relaxation of the 10 OC credits required in the standard B.Tech. programme. The courses to be one in their place are among those they could have taken in the standard B.Tech curriculum.

** Programe Core: One classroom course, and 9 Program Electives: as below.

*** No classroom course as a Programme Core, and 10/11 Program Electives: as below

**** Programme Core: Three classroom courses, and 7 Program Electives: as below

CTech (dual degree) Programme Core courses for EE1/EE3 students:
ELL783 Operating Systems (3-0-2) [Only for those who have not done ELL405]
ELD780 Minor Project (0-0-4)
ELD880 Major Project Part 1 (0-0-12)
ELD881 Major Project Part 2 (0-0-24)

CTech (dual degree) Programme Core courses for CS1/MT1 students:
ELD780 Minor Project (0-0-4)
ELD880 Major Project Part 1 (0-0-12)
ELD881 Major Project Part 2 (0-0-24)

CTech (dual degree) Programme Core courses for PH1 students:
ELL781 Software Fundamentals of Computer Technology (3-0-0)
ELL782 Computer Architecture (3-0-0)
ELL783 Operating Systems (3-0-2)
ELD780 Minor Project (0-0-4)
ELD880 Major Project Part 1 (0-0-12)
ELD881 Major Project Part 2 (0-0-24)

Suggested credit distribution for students opting for dual degree with M.Tech. in Computer Technology:

EE1

Semester	UG Credits	PG Credits
VII	11.5	9 (PE)
VIII	6	6 (PC) + 6 (PE)
IX	0	6 (PC) + 12 (PE)
X	0	12 (PC)

EE3

Semester	UG Credits	PG Credits
VII	13	9 (PE)
VIII	9	6 (PC) + 6 (PE)
IX	0	6 (PC) + 12 (PE)
X	0	12 (PC)

The Programme Electives (PEs) have been structured as follows. A student has to choose from one of the *five* possible streams in the programme: Cognitive and Intelligent Systems (CIS), Embedded Intelligent Systems (EIS), Computer Communication and Networks (CCN), Multimedia Information Processing (MIP), and Internet Technologies (IT). The PEs that must be taken corresponding to a particular stream are listed in the table below. To emphasise this fact, these courses are written in *italicised bold-face* as the first two courses of each stream, in the list of PEs associated with the particular streams. The remaining PEs should preferably be taken from within the PE list specified for the student's chosen stream.

Stream	Course Numbers and Titles	
CIS	ELL784: Introduction to Machine Learning	ELL786: Multimedia Systems
EIS	ELL784: Introduction to Machine Learning	ELL787: Embedded Systems and Applications
CCN	ELL785: Computer Communication Networks	ELL786: Multimedia Systems
MIP	ELL786: Multimedia Systems	ELL787: Embedded Systems and Applications
IT	ELL784: Introduction to Machine Learning	ELL785: Computer Communication Networks

Courses mentioned in red colour: from other groups/Departments

Programme Electives (PE): Stream: Cognitive and Intelligent Systems (CIS)

Course#	Title	L-T-P	Credits
ELL784	*Introduction to Machine Learning*	*3-0-0*	*3*
ELL786	*Multimedia Systems*	*3-0-0*	*3*
ELL785	Computer Communication Networks	3-0-0	3
ELL787	Embedded Systems and Applications	3-0-0	3
ELL704	Advanced Robotics	3-0-0	3
ELL884	Information Retrieval	3-0-0	3
ELL789	Intelligent Systems	3-0-0	3
ELL882	Large-Scale Machine Learning	3-0-0	3
ELL799	Natural Computing	3-0-0	3
ELL796	Signals and Systems in Biology	3-0-0	3
ELL707	Systems Biology	3-0-0	3
ELL788	Computational Perception and Cognition	3-0-0	3
ELL891	Computational Linguistics	3-0-0	3
ELL886	Big Data Systems	3-0-0	3
ELL887	Cloud Computing	3-0-0	3
ELL741	Neuromorphic Engineering	3-0-0	3
ELL791	Neural Systems and Learning Machines	3-0-2	4
ELL888	Advanced Machine Learning	3-0-0	3
ELL793	Computer Vision	3-0-0	3
ELL715	Digital Image Processing	3-0-0	3
ELL798	Agent Technology	3-0-0	3
ELL795	Swarm Intelligence	3-0-0	3

Course#	Title	L-T-P	Credits
ELL794	Human-Computer Interface	3-0-0	3
ELL893	Cyber-Physical Systems	3-0-0	3
ELL883	Embedded Intelligence	3-0-0	3
ELL885	Machine Learning for Computational Finance	3-0-0	3
ELL890	Computational Neuroscience	3-0-0	3

Programme Electives (PE): Stream: Embedded Intelligent Systems (EIS)

Course#	Title	L-T-P	Credits
ELL784	*Introduction to Machine Learning*	*3-0-0*	*3*
ELL787	*Embedded Systems and Applications*	*3-0-0*	*3*
ELL785	Computer Communication Networks	3-0-0	3
ELL786	Multimedia Systems	3-0-0	3
ELP780	Software Lab	0-1-4	3
ELP781	Digital Systems Lab	0-1-4	3
ELL704	Advanced Robotics	3-0-0	3
ELL735	Analog Integrated Circuits	3-0-0	3
ELL734	MOS VLSI	3-0-0	3
ELL748	System-on-Chip Design and Test	3-0-0	3
ELL731	Mixed Signal Circuit Design	3-0-0	3
COLxxx	Synthesis of Digital Systems	3-0-0	3
ELL790	Digital Hardware Design	3-0-0	3
ELL720	Digital Signal Processing 1	3-0-0	3
COLxxx	System Level Design and Modelling of Digital Systems	3-0-0	3
ELL899	Testing and Fault Tolerance	3-0-0	3
ELL802	Adaptive and Learning Control	3-0-0	3

ELL767	Mechatronics	3-0-0	3
ELL766	Appliance Systems	3-0-0	3
ELL898	Pervasive Computing	3-0-0	3
ELL887	Cloud Computing	3-0-0	3
ELL728	Optoelectronic Instrumentation	3-0-0	3
ELL883	Embedded Intelligence	3-0-0	3
ELL791	Neural Systems and Learning Machines	3-0-2	4
ELL797	Energy-Efficient Computing	3-0-0	3
ELL733	Digital ASIC Design	3-0-2	4
ELP831	IEC Laboratory-I	0-0-6	3

Programme Electives (PE): Stream: Computer Communication and Networks (CCN)

Course#	Title	L-T-P	Credits
ELL785	**Computer Communication Networks**	**3-0-0**	**3**
ELL786	**Multimedia Systems**	**3-0-0**	**3**
ELL784	Introduction to Machine Learning	3-0-0	3
ELL787	Embedded Systems and Applications	3-0-0	3
ELP780	Software Lab	3-0-0	3
ELP782	Computer Networks Lab	0-1-4	3
ELP781	Digital Systems Lab	0-1-4	3
ELL711	Signal Theory	3-0-0	3
ELL894	Network Performance Modeling and Analysis	3-0-0	3
ELL889	Protocol Engineering	3-0-0	3
ELL892	Internet Technologies	3-0-0	3

ELL895	Network Security	3-0-0	3
ELL896	Mobile Computing	3-0-0	3
ELL897	Network Management	3-0-0	3
ELL723	Broadband Communication Systems	3-0-0	3
ELL714	Basic Information Theory	3-0-0	3
ELL813	Advanced Information Theory	3-0-0	3
ELL716	Telecom Switching and Transmission	3-0-0	3
ELL710	Coding Theory	3-0-0	3
ELL712	Digital Communications	3-0-0	3
ELL816	Satellite Communication	3-0-0	3
ELL818	Telecom Technologies	3-0-0	3
ELL817	Access Networks	3-0-0	3
ELL725	Wireless Communication	3-0-0	3
ELP725	Wireless Communication Lab	0-1-4	3
ELL717	Optical Communication Systems	3-0-0	3
ELL820	Photonic Switching and Networking	3-0-0	3
ELP720	Telecommunication Networks Laboratory	0-1-4	3
ELP821	Advanced Telecommunication Networks Laboratory	0-1-4	3
ELP822	Network Software Laboratory	0-1-4	3
ELL898	Pervasive Computing	3-0-0	3
ELL887	Cloud Computing	3-0-0	3
ELL797	Energy-Efficient Computing	3-0-0	3

Programme Electives (PE): Stream: Multimedia Information Processing (MIP)

Course#	Title	L-T-P	Credits
ELL786	***Multimedia Systems***	***3-0-0***	***3***
ELL787	***Embedded Systems and Applications***	***3-0-0***	***3***
ELL784	Introduction to Machine Learning	3-0-0	3
ELL785	Computer Communication Networks	3-0-0	3
ELL715	Digital Image Processing	3-0-0	3
ELL720	Digital Signal Processing 1	3-0-0	3
ELL792	Computer Graphics	3-0-0	3
CRL707	Human and Machine Speech Communication	3-0-0	3
ELL793	Computer Vision	3-0-0	3
ELL788	Computational Perception and Cognition	3-0-0	3
ELL882	Large Scale Machine Learning	3-0-0	3
ELL711	Signal Theory	3-0-0	3
ELL719	Detection and Estimation	3-0-0	3
ELL718	Statistical Signal Processing	3-0-0	3
ELL714	Basic Information Theory	3-0-0	3
ELL813	Advanced Information Theory	3-0-0	3
ELL710	Coding Theory	3-0-0	3

Programme Electives (PE): Stream: Internet Technologies (IT)

Course#	Title	L-T-P	Credits
ELL784	***Introduction to Machine Learning***	***3-0-0***	***3***
ELL785	***Computer Communication Networks***	***3-0-0***	***3***
ELL786	Multimedia Systems	3-0-0	3

ELL787	Embedded Systems and Applications	3-0-0	3
ELP781	Digital Systems Lab	0-1-4	3
ELP721	Embedded Telecom Systems Lab	0-1-4	3
ELL892	Internet Technologies	3-0-0	3
ELP780	Software Lab	0-1-4	3
ELP782	Computer Networks Lab	0-1-4	3
ELL798	Agent Technologies	3-0-0	3
ELL896	Mobile Computing	3-0-0	3
ELL884	Information Retrieval	3-0-0	3
ELL898	Pervasive Computing	3-0-0	3
ELL766	Appliance Systems	3-0-0	3
ELL895	Network Security	3-0-0	3
ELL765	Smart Grid Technology	3-0-0	3
ELL772	Planning and Operation of a Smart Grid	3-0-0	3
ELP855	Smart Grids Lab	0-1-4	3
ELL723	Broadband Communication Systems	3-0-0	3
ELL887	Cloud Computing	3-0-0	3
ELL797	Energy-Efficient Computing	3-0-0	3