

Course Structure (B. Tech. / B.S. in Innovation with Mathematics and IT)

Key: T: Theory, L: Lab, P: Project/Internship

Semester I

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
I.1	Seeing the world through calculus: First Steps	3	4	0	7	100	100	0	200
I.2	The Science and Art of Logic and Programming	3	4	0	7	100	100	0	200
I.3	Language and Communication: Computational Linguistics	3	4	0	7	100	100	0	200
I.4	Information organization and the art of problem solving	3	4	0	7	100	100	0	200
Engineering Kitchen: Innovation Lab									
Activity Module::									
IV.6*	Creative Writing equally distributed over the first four semesters	4	0	0	4	100	0	0	100
Grand Total		16	16	0	32	400	400	0	800

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Semester II

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
II.1	Modeling continuous change through ordinary differential equations and complex analysis	3	4	0	7	100	100	0	200
II.2	Reflecting thought processes via object oriented programming	3	4	0	7	100	100	0	200
II.3	Linearity in Nature: Engineering through Linear Algebra	3	4	0	7	100	100	0	200
II.4	The art of communication	4	0	0	4	100	0	0	100
Engineering Kitchen: Innovation Lab									
Activity Module::									
II.5	Summer Internship	0	0	7	7	0	0	100	100
IV.6*	Creative Writing equally distributed over the first four semesters	4	0	0	4	100	0	0	100
Grand Total		13	12	7	32	400	300	100	800

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Semester III

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
III.1	Modeling change in the world around us : partial differential equations with MATLAB	3	4	0	7	100	100	0	200
III.2	Constructing Computers: deconstructing digital architecture	3	4	0	7	100	100	0	200
III.3	Impact of Technology: Philosophical Implications	4	0	0	4	100	0	0	100
III.4	Option Pool 3-1: (Pick one)	3	4	0	7	100	100	0	200
III.4.1	Physics of Motion	3	4	0	7	100	100	0	200
III.4.2	Understanding 'New Biology': convergence and experimentation	3	4	0	7	100	100	0	200
III.4.3	Understanding Economic Behavior: The micro level	3	4	0	7	100	100	0	200
Engineering Kitchen: Innovation Lab									
Activity Module::									
III.5	Project Work	0	0	7	7	0	0	100	100
IV.6*	Creative Writing equally distributed over the first four semesters	4	0	0	4	100	0	0	100
Grand Total		13	12	7	32	400	300	100	800

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Semester IV

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
IV.1	Does Nature play dice?: The amazing world of probability and statistics	3	4	0	7	100	100	0	200
IV.2	Communication in Digital Networks	3	4	0	7	100	100	0	200
IV.3	Data Modeling and Design	3	4	0	7	100	100	0	200
IV.4	Option Pool 4-1: (Pick one)	4	0	0	4	100	0	0	100
IV.4.1	Logic and Functions through Digital Electronics	4	0	0	4	100	0	0	100
IV.4.2	Exploring the Organization of Cells	4	0	0	4	100	0	0	100
IV.4.3	Understanding Economic Behaviour: The macro level	4	0	0	4	100	0	0	100
Engineering Kitchen: Innovation Lab									
Activity Module::									
IV.5	Summer Internship : projects drawn from the world around us	0	0	7	7	0	0	100	100
IV.6*	Creative Writing equally distributed over the first four semesters	4	0	0	4	100	0	0	100
Grand Total		13	12	7	32	500	300	100	900

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Semester V

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
V.1	Discretizing and understanding real life situations through a mathematical lens	3	4	0	7	100	100	0	200
V.2	Digital Signal Processing	3	4	0	7	100	100	0	200
V.3	Option Pool 5-1: (Pick one)	4	0	0	4	100	0	0	100
V.3.1	Heat and Thermodynamics	4	0	0	4	100	0	0	100
V.3.2	Language of Cellular Communication & Interactions	4	0	0	4	100	0	0	100
V.3.3	Environmental Management	4	0	0	4	100	0	0	100
V.4	Option Pool 5-2: (Pick one)	3	4	0	7	100	100	0	200
V.4.1	Design your system: The digital way	3	4	0	7	100	100	0	200
V.4.2	Design & Flow of Information in living systems	3	4	0	7	100	100	0	200
V.4.3	Management Principles	3	4	0	7	100	100	0	200
Engineering Kitchen: Innovation Lab									
Activity Module::									
V.5	Project in Industry, Society and Villages	0	0	7	7	0	0	100	100
Grand Total		13	12	7	32	400	300	100	800

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Semester VI

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
VI.1	Algorithms for Continuous Mathematics: Numerical methods	3	4	0	7	100	100	0	200
VI.2	Addressing real world complexities: Logic systems	3	4	0	7	100	100	0	200
VI.3	Option Pool 6-1: (Pick one)	4	0	0	4	100	0	0	100
VI.3.1	Control Systems	4	0	0	4	100	0	0	100
VI.3.2	Methods for studying Biological Informational Molecules	4	0	0	4	100	0	0	100
VI.3.3	eBusiness: Organization & Strategy	4	0	0	4	100	0	0	100
VI.4	Option Pool 6-2: (Pick one)	3	4	0	7	100	100	0	200
VI.4.1	Engineering at Molecular Scale: Devices and Nanotechnology	3	4	0	7	100	100	0	200
VI.4.2	Computational Methods for Structure & function Prediction in Biology	3	4	0	7	100	100	0	200
VI.4.3	Innovation Management	3	4	0	7	100	100	0	200
Engineering Kitchen: Innovation Lab									
Activity Module::									
VI.5	Industrial mini project	0	0	7	7	0	0	100	100
Grand Total		13	12	7	32	400	300	100	800

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Semester VII

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
VII.1	Understanding Signals: The mathematical and computational way	3	4	0	7	100	100	0	200
VII.2	Digital Security: Compression and Encryption	3	4	0	7	100	100	0	200
VII.3	Option Pool 7-1: (Pick one)	4	0	0	4	100	0	0	100
VII.3.1	Circuit Analysis and Synthesis	4	0	0	4	100	0	0	100
VII.3.2	Biological Networks and Oscillations (Molecular, Cellular, and Neuronal Networks)	4	0	0	4	100	0	0	100
VII.3.3	Theory in Practice: The art of project management	4	0	0	4	100	0	0	100
VII.4	Option Pool 7-2: (Pick one)	3	4	0	7	100	100	0	200
VII.4.1	Robotics: Design, Construct and Operate <i>eYantra with IIT Bombay</i>	3	4	0	7	100	100	0	200
VII.4.2	Systems Biology and Synthetic Biology	3	4	0	7	100	100	0	200
VII.4.3	Operations and Technology Management	3	4	0	7	100	100	0	200
Engineering Kitchen: Innovation Lab									
Activity Module::									
VII.5	Industrial mini project, Simulation of real time cases	0	0	7	7	0	0	100	100
Grand Total		13	12	7	32	400	300	100	800

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Semester VIII

Paper No.	Interactive Learning Modules (Paper Title)	Credits				Marks			
		T	L	P	Total	T	L	P	Total
VIII.1	Fluidity in nature: computational interpretations	3	4	0	7	100	100	0	200
VIII.2	Creativity in Digital World: Graphics and Multimedia	3	4	0	7	100	100	0	200
Engineering Kitchen: Innovation Lab									
Activity Module::									
VIII.3	Industrial major project	0	0	18	18	0	0	100	100
Grand Total		6	8	18	32	200	200	100	500