Birla Institute of Technology, Mesra, Ranchi

Course Structure for (Integrated M.Sc. QEDS)
Based on NEP-2020, CBCS and OBE, Effective from 2024-2025

Sr. No.	Semester of Study (Recommended)	Category of Course	Course Code	Subjects	Mode of Delivery & Credits L-Lecture; T-Tutorial; P-Practical			Total Credits
					L (Periods / Week)	T (Periods/ Week)	P (Periods/ Week)	
	FIRST			**THEORY**				
I.1		PC	ED24101	Introductory Analysis	3	1	0	4
I.2			ED24103	Statistical Methods - I	3	0	0	3
I.3			ED24105	Introduction to Economics and Essential Mathematics	3	0	0	3
I.4			ED24107	Probability I	3	1	0	4
I.5		GE	ED24109	Introduction to Programing and Data Structure	3	0	0	3
		HSS	MT24132	Communication Skill 1	0	0	3	1.5
				LABORATORIES				
I.6		PC	ED24104	Statistical Methods —1 Lab	0	0	3	1.5
I.7		GE	ED24110	Introduction to Programing and Data Structure Lab	0	0	3	1.5
I.10		MC	MC24 101/102/103 /104/105	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) /Entrepreneurship	0	0	2	1
				TOTAL (Theory + Labs)				22.5
	SECOND			**THEORY**				
II.1		PC	ED24111	Intermediate Analysis	3	1	0	4
II.2			ED24113	Statistical Methods II	3	1	0	4
II.3			ED24115	Introductory Microeconomics	3	1	0	4
II.4			ED24117	Linear Algebra and Vectors and Matrices	3	0	0	3
II.5		GE	ED24119	Programming Language and Data Base Management System	3	0	0	3
		FS	CE24101	Environmental Science	1	0	2	2
				LABORATORIES				
II.6		PC	ED24114	Statistical Methods II Lab	0	0	3	1.5
II.7		GE	ED24120	Programming Language and Data Base Management System Lab	0	0	3	1.5
II.8		MC	MC 24105/24106/ 24107/24108/ 24110	Choice of: NCC/NSS/ PT & Games / Creative Arts (CA)/ Entrepreneurship	0	0	2	1
				TOTAL (Theory + Labs)				24
				GRAND TOTAL FOR FIRST YEAR				46.5
Vocational Course				Linear Statistical Models and Regression Analysis				3

	THIRD			THEORY				
III.1		PC	ED24201	Differential Equations	3	1	0	4
			ED24203	Intermediate Microeconomics	3	1	0	4
III.2			ED24205	Introductory Macroeconomics	3	1	0	4
III.3			ED24207	Probability II	3	1	0	4
III.4		HSS	ED24209	Introduction to Sociology and Political Science	3	0	0	3
III.5		SEC	ED24211	Linear Statistical Models and Regression Analysis	3	0	0	3
				LABORATORIES				
III.7		SEC	ED24212	Linear Statistic Models and Regression Analysis Lab	0	0	2	1
III.10		MC	MC24 201/202/203 /204 /205	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA) / Entrepreneurship	0	0	2	1
				TOTAL (Theory + Labs)				24
	FOURTH			THEORY				
IV.1		PC	ED24213	Optimization Techniques	3	1	0	4
IV.2			ED24215	Intermediate Macroeconomics	3	0	0	3
IV.3			ED24217	Stochastic Processes	3	1	0	4
IV.4			ED24219	Economic Development and Demography	3	0	0	3
		GE	ED24221	Introduction to Psychology	3	0	0	3
IV.5		SEC	ED24223	Sampling Techniques and Design of Experiments	3	1	0	4
IV.6		MC		Indian Knowledge System				NC
				LABORATORIES				
IV.8		PC	ED24218	Stochastic Processes Lab	0	0	2	1
IV.9		SEC	ED24224	Sampling Techniques and Design of Experiments Lab	0	0	2	1
IV.10		MC	MC 24205/2420 6/24207/242 08/24210	Choice of: NCC/NSS/ PT & Games / Creative Arts (CA)/Entrepreneurship	0	0	2	1
				TOTAL (Theory + Labs)				24
				GRAND TOTAL FOR SECOND YEAR				48
Vocational Course				Basic Econometrics				3
Minimum requirement for Certificate in QEDS (After Second Year)								97.5
	FIFTH			THEORY				
V.1		PC	ED24301	International Trade	3	0	0	3
			ED24303	Multivariate Data Analysis	3	0	0	3
			ED24305	Basic Econometrics	3	0	0	3
V.2			ED24307	Parametric Inference	3	0	0	3
V.3		HSS	MT24133	Communication Skill -II	0	0	3	1.5

					L	T	P	C
V.4			Major (DSE-1) (Anyone	ED309 Topics on Indian Economy/ ED323 Behavioural Economics/ ED325 Economics of Social Sector	3	0	0	3
V.5			Major (DSE-2) (Anyone)	EC311 Public Economics Economics/ ED327 Environmental Economics-1/ ED329 Open Economy Macroeconomy	3	0	0	3
			LABORATORIES					
V.7		PC	ED24304	Multivariate Data Analysis Lab I	0	0	2	1
V.8			ED24306	Basic Econometrics Lab	0	0	2	1
V.9			ED24308	Parametric inference Lab	0	0	2	1
			TOTAL (Theory + Labs)					22.5
	SIXTH		THEORY					
VI.1		PC	ED24313	Nonparametric Methods and Decision Theory	3	1	0	4
VI.2			ED24315	Applied Econometrics	3	0	0	3
VI.3			ED24317	Statistical Machine Learning I	3	0	0	3
VI.4			ED24319	Game Theory Analysis	3	1	0	4
VI.5			Major (DSE-3) (Anyone)	ED321 Financial Economics/ ED331 Money and Financial Institutions/ ED333 Entrepreneurial Economics	3	1	0	4
			LABORATORIES					
VI.6		PC	ED24314	Nonparametric Methods and Decision Theory Lab	0	0	2	1
VI.7			ED24316	Applied Econometrics Lab	0	0	3	1.5
VI.8			ED24318	Statistical Machine Learning I Lab	0	0	3	1.5
VI.9			ED24300	Dissertation				6
			TOTAL (Theory + Labs)					28
			GRAND TOTAL FOR THIRD YEAR					50.5
Minimum requirement for the award of the degree B.Sc. in Quantitative Economics and Data Science (Semesters I-VI)								145
	SEVENTH		THEORY					
VII.1		PC	ED24401	Advance Analysis	3	1	0	4
VII.2			ED24403	Large Sample Theory	3	0	0	3
			ED24405	Time Series Econometrics	3	0	0	3
VII.3			ED24407	Statistical Machine Learning II	3	0	0	3
VII.4			ED24409	Regression Techniques	3	0	0	3
VII.5			ED24411	Advance Microeconomics	3	0	0	3
VII.6		PC	ED24404	Large Sample Theory Lab	0	0	3	1.5
VII.7			ED24408	Statistical Machine Learning II Lab	0	0	3	1.5
			TOTAL (Theory + Labs)					22

VIII.1			ED24400A	Research project I	-	-	-	6
Total (Semester VII for B.Sc. Hons. with Research)								28
	EIGHTH			THEORY				
VII.1		PC	ED24413	Advance Optimization	3	0	0	3
VII.2			ED24415	Categorical Data Analysis and Statistics in Bayesian Paradigm	3	0	0	3
			ED24417	Algorithms For Big Data I	3	0	0	3
VII.3			ED24419	Resampling Techniques and Statistical Ccomputation	3	0	0	3
VII.4			ED24421	Developmental Economics	3	0	0	3
			ED24423	Advance Macroeconomics	3	0	0	3
				LABORATORIES				
		PC	ED24416	Categorical Data Analysis and Statistics in Bayesian Paradigm Lab	0	0	3	1.5
		PC	ED24418	Algorithms For Big Data I Lab	0	0	3	1.5
		PC	ED24420	Resampling Techniques And Statistical Computation Lab	0	0	2	1
			ED24400B	Research project I	-	-	-	6
TOTAL (Theory + Labs)								22
Total (Semester VIII for B.Sc. Hons. With Research*)								28
GRAND TOTAL (FOURTH YEAR)								189
(B.Sc. QEDS (Honors) 189) (B.Sc. QEDS (Honors with research) 201)								
@NOTE: The students wiling to avail Hons. with research will do 12 Credit research projects in Sem VII and VIII								
	NINETH			THEORY				
VII.1		PC	ED24501	Design and Analysis of Algorithms	3	0	0	3
VII.2			ED24503	Randomized Control Trials	3	0	0	3
			ED24505	Cross- section and Panel Econometrics	3	0	0	3
VII.4		PE		Track I/ Track II/ Track III	3	0	0	3
				Track I/ Track II/ Track III	3	0	0	3

				Track I/ Track II/ Track III	3	0	0	3
		PC		Project I				6
				LABORATORIES				
		PC	ED24502	Design and Analysis of Algorithms Lab	0	0	3	1.5
			ED24504	Randomized Control Trials Lab	0	0	3	1.5
				TOTAL (Theory + Labs)				27
	TENTH			**THEORY**				
VII.1			ED24511	Project II /Industry Internship				7
VII.2			ED24512	Comprehensive Viva				9
				TOTAL (Theory + Labs)				27

GRAND TOTAL FOR THE POSTGRADUATE (M. Sc.) PART OF THE 5-YEAR INTEGRETAED COURSE Minimum requirement for the award of the degree 'M.Sc. in Quantitative Economics and Data Science' (Semesters VII-X)	80
Minimum requirement for the award of the degree '5-Year Integrated M.Sc. in Quantitative Economics and Data Science' (Semesters I-X)	**225**

The students of Final year are required to take a total of three courses from the below listed courses in the Ninth semester.

Track I: Economics: - Public Policy, Health Economics, Environmental Economics II, Agricultural Economics, Industrial Economics, Growth Theory, Labour Economics, International Macroeconomics and Policies, and International Finance.

Track II: Finance: -Quantitative Finance, Computational Finance, Corporate Finance, Financial Econometrics, and International Finance.

Track III: Data Analytics: - Data Mining and Data Visualizations, Digital Signal & Image Processing, Social and Economic Network: Theory and Applications, Algorithms for Big Data II, Business Intelligence and Data Engineering, Foundations of Data Science, Big Data Analytics, Introduction to Artificial Intelligence, Probabilistic Machine Learning, Deep Learning

Track I Economics		Track II Finance		Track III Data Analytics	
ED24507	Public Policy	ED24527	Quantitative Finance	ED24535	Data Mining and Data Visualization
ED24509	Health Economics	ED24529	Computational Finance	ED24537	Digital Signal and Image Processing
ED24513	Environmental Economics II	ED24531	Corporate Finance	ED24539	Social and Economic Networks: Theory and Applications
ED24515	Agricultural Economics	ED24533	Financial Econometrics	ED24541	Algorithms for Big Data II
ED24517	Industrial Economics			ED24543	Business Intelligence and Data Engineering
ED24519	Growth Theory			ED24545	Foundations of Data Science
ED24521	Labour Economics			ED24547	Big Data Analytics

ED24523	International Macroeconomics and Policies			ED24549	Introduction to Artificial Intelligence
ED24525	International Finance			ED24551	Probabilistic Machine Learning
				ED24553	Deep Learning

In Summary, the following criteria needs to be completed for the awards/degrees at different levels.

Awards/Degrees	Credits
1-Year Programme: Certificate	49.5 (46.5 + 3)
2-Year Programme: Diploma	97.5 (94.5 + 3)
3-Year Programme: B.Sc.	145
4-Year Programme: B. Sc. QEDS (Honours)/B.Sc. QEDS (Honours with research)	201 (189+ 12)
2 Year M.Sc. QEDS	80
5-Year Programme: Integrated M.Sc. QEDS	225

Head
CQEDS

Dean (UGS)