Course Structure and Curriculum of the proposed ***5-year Integrated M. Sc. in Quantitative Economics and Data Science*** course **(**based on CBCS system and OBE model recommended scheme of study)

Undergraduate Programme (Semesters I - VI)								
Semester/ Session of Study		**Category of Structure**	**Course Code**	**Subjects**	**Mode of delivery and credits: L- Lecture T- Tutorial P- Practical**			**Total Credits**
					L (Periods/ week)	**T (Periods/ week)**	**P (Periods /week)**	
FIRST MONSOON/ SEMESTER I	**THEORY**							
		PC (Program Core)	**ED101**	**Introductory Analysis**	**3**	**1**	**0**	**4**
			ED103	**Statistical Methods - I**	**3**	**0**	**0**	**3**
			ED105	**Introduction to Economics and Essential Mathematics**	**3**	**0**	**0**	**3**
			ED107	**Probability I**	**3**	**1**	**0**	**4**
		Generic Elective (GE)	**ED109**	**Introduction to Programing and Data Structure**	**3**	**0**	**0**	**3**
		Humanities and Social Sciences (HSS)	**MT132**	**Communication Skill 1**	**0**	**0**	**3**	**1.5**
	LABORATARIES							
		MC	**MC 105/106/107/ 108**	**Choice of: NCC/NSS/ PT & Games / Creative Arts (CA)**	**0**	**0**	**2**	**1**
		PC	**ED104**	**Statistical Methods – I Lab**	**0**	**0**	**3**	**1.5**
		GE	**ED110**	**Introduction to Programing and Data Structure Lab**	**0**	**0**	**3**	**1.5**
Total (Semester I)								**22.5**

SECOND SPRING/ SEMESTER II	**THEORY**							
		PC	**ED111**	**Intermediate Analysis**	**3**	**1**	**0**	**4**
			ED113	**Statistical Methods II**	**3**	**1**	**0**	**4**
			ED115	**Introductory Microeconomics**	**3**	**1**	**0**	**4**
			ED117	**Linear Algebra andVectors and Matrices**	**3**	**0**	**0**	**3**
		GE	**ED119**	**Programming Language and Data Base Management System**	**3**	**0**	**0**	**3**
		Foundation Science (FS)	**CE101**	**Environmental Science**	**1**	**0**	**2**	**2**
	LABORATORIES							
		MC	**MC 105/106/107/108**	**Choice of: NCC/NSS/ PT & Games / Creative Arts (CA)**	**0**	**0**	**2**	**1**
		PC	**ED114**	**Statistical Methods II Lab**	**0**	**0**	**3**	**1.5**
		PC	**ED120**	**Programming Language and Data Base Management System Lab**	**0**	**0**	**3**	**1.5**
Total (Semester II)								**24**
TOTAL (FIRST YEAR)								***46.5***
THIRD AUTUMN/ SEMESTER III	**THEORY**							
		PC	**ED201**	**Differential Equations**	**3**	**1**	**0**	**4**
			ED203	**Intermediate Microeconomics**	**3**	**1**	**0**	**4**
			ED205	**Introductory Macroeconomics**	**3**	**1**	**0**	**4**
			ED207	**Probability II**	**3**	**1**	**0**	**4**
		GE	**ED209**	**Introduction to Sociology and Political Science**	**3**	**0**	**0**	**3**

		Skill Enhancement Course (SEC)	**ED211**	**Linear Statistical Models and Regression Analysis**	**3**	**0**	**0**	**3**
	LABORATORIES							
		MC	**MC 105/106/107/108**	**Choice of: NCC/NSS/ PT & Games / Creative Arts (CA)**	**0**	**0**	**2**	**1**
		SEC	**ED212**	**Linear Statistical Models and Regression Analysis Lab**	**0**	**0**	**2**	**1**
Total (Semester III)								**24**
FOURTH SPRING/ SEMESTER IV		**THEORY**						
		PC	**ED213**	**Optimization Techniques**	**3**	**1**	**0**	**4**
			ED215	**Intermediate Macroeconomics**	**3**	**0**	**0**	**3**
			ED217	**Stochastic Processes**	**3**	**1**	**0**	**4**
			ED219	**Economic Development and Demography**	**3**	**0**	**0**	**3**
		GE	**ED221**	**Introduction to Psychology**	**3**	**0**	**0**	**3**
		SEC	**ED223**	**Sampling Techniques and Design of Experiments**	**3**	**1**	**0**	**4**
	LABORATORIES							
		MC	**MC 105/106/107/108**	**Choice of: NCC/NSS/ PT & Games / Creative Arts (CA)**	**0**	**0**	**2**	**1**
		PC	**ED218**	**Stochastic Processes Lab**	**0**	**0**	**2**	**1**
		SEC	**ED224**	**Sampling Techniques and Design of Experiments Lab**	**0**	**0**	**2**	**1**

Total (Semester IV)								**24**
TOTAL (SECOND YEAR)								***48***
FIFTH MONSOON/ SEMESTER V		**THEORY**						
		PC	**ED301**	**International Trade**	**3**	**0**	**0**	**3**
			ED303	**Multivariate Data Analysis**	**3**	**0**	**0**	**3**
			ED305	**Basic Econometrics**	**3**	**0**	**0**	**3**
			ED307	**Parametric Inference**	**3**	**0**	**0**	**3**
			MT133	**Communication Skill 2**	**0**	**0**	**3**	**1.5**
		Discipline Specific Elective (DSE)	**DSE-1**	**ED309 Topics on Indian Economy/ ED323 Behavioural Economics/ ED325 Economics of Social Sector**	**3**	**0**	**0**	**3**
			DSE-2	**ED311 Public Economics/ ED327 Environmental Economics-I/ ED329 Open Economy Macroeconomy**	**3**	**0**	**0**	**3**
		LABORATORIES						
		PC	**ED304**	**Multivariate Data Analysis Lab**	**0**	**0**	**2**	**1**
			ED306	**Basic Econometrics Lab**	**0**	**0**	**2**	**1**
			ED308	**Parametric inference Lab**	**0**	**0**	**2**	**1**
Total (Semester V)								**22.5**
		PC	**ED313**	**Nonparametric Methods and Decision Theory**	**3**	**1**	**0**	**4**
			ED315	**Applied Econometrics**	**3**	**0**	**0**	**3**

SIXTH SPRING / SEMESTER VI			**ED317**	**Statistical Machine Learning I**	**3**	**0**	**0**	**3**
			ED319	**Game Theory**	**3**	**1**	**0**	**4**
		DSE	**DSE-3**	**ED321 Financial Economics/ ED331 Money and Financial Institutions/ ED333 Entrepreneurial Economics**	**3**	**1**	**0**	**4**
	LABORATORIES							
		PC	**ED314**	**Nonparametric Methods and Decision Theory Lab**	**0**	**0**	**2**	**1**
			ED316	**Applied Econometrics Lab**	**0**	**0**	**3**	**1.5**
			ED318	**Statistical Machine Learning I Lab**	**0**	**0**	**3**	**1.5**
		Dissertation	**ED300**	**Dissertation**	**-**	**-**	**-**	**6**
Total (Semester VI)								**28**
TOTAL (THIRD YEAR)								***50.5***
GRAND TOTAL FOR THE UNDERGRADUATE (B. Sc. (Hons.)) PART OF THE 5-YEAR INTEGRETAED COURSE **Minimum requirement for the award of the degree *B.Sc. Honors in Quantitative Economics and Data Science* (Semesters I-VI)**								**145**

Postgraduate Programme (Semesters VII-X)

Semester/ Session of study		**Category of Structure**	**Course Code**	**Subjects**	**Mode of delivery and credits: L-Lecture T- Tutorial P-Practical's**			**Total Credits**
					L (Periods /week)	**T (Periods /week)**	**P (Periods /week)**	
	THEORY							
		PC	**ED401**	**Advance Analysis**	**3**	**1**	**0**	**4**
			ED403	**Large Sample Theory**	**3**	**0**	**0**	**3**

SEVENTH MONSOON/ SEMESTER VII			**ED405**	**Time Series Econometrics**	**3**	**0**	**0**	**3**
			ED407	**Statistical Machine Learning II**	**3**	**0**	**0**	**3**
			ED409	**Regression Techniques**	**3**	**0**	**0**	**3**
			ED411	**Advance Microeconomics**	**3**	**0**	**0**	**3**
	LABORATORIES							
		PC	**ED404**	**Large Sample Theory Lab**	**0**	**0**	**3**	**1.5**
			ED408	**Statistical Machine Learning II Lab**	**0**	**0**	**3**	**1.5**
Total (Semester VII)								**22**
EIGHTH SPRING/ SEMESTER VIII	**THEORY**							
		PC	**ED413**	**Advance Optimization**	**3**	**0**	**0**	**3**
			ED415	**Categorical Data Analysis and Statistics in Bayesian Paradigm**	**3**	**0**	**0**	**3**
			ED417	**Algorithms For Big Data I**	**3**	**0**	**0**	**3**
			ED419	**Resampling Techniques and Statistical Computation**	**3**	**0**	**0**	**3**
			ED421	**Developmental Economics**	**3**	**0**	**0**	**3**
			ED423	**Advance Macroeconomics**	**3**	**0**	**0**	**3**
	LABORATORIES							
		PC	**ED416**	**Categorical Data Analysis and Statistics in Bayesian Paradigm Lab**	**0**	**0**	**3**	**1.5**

		PC	**ED418**	**Algorithms For Big Data I Lab**	**0**	**0**	**3**	**1.5**
		PC	**ED420**	**Resampling Techniques and Statistical Computation Lab**	**0**	**0**	**2**	**1**
Total (Semester VIII)								**22**
TOTAL (FOURTH YEAR)								***44***
MONSSON/ SEMESTER IX		**THEORY**						
		PC	**ED501**	**Design and Analysis of Algorithms**	**3**	**0**	**0**	**3**
			ED503	**Randomized Control Trials**	**3**	**0**	**0**	**3**
			ED505	**Cross- section and Panel Econometrics**	**3**	**0**	**0**	**3**
		PE	**Subject Codes would be decided based on selection.**	**Track I Track II Track III**	**3**	**0**	**0**	**3**
			Subject Codes would be decided based on selection.	**Track I Track II Track III**	**3**	**0**	**0**	**3**
	LABORATORIES							
		PC	**ED502**	**Design and Analysis of Algorithms Lab**	**0**	**0**	**3**	**1.5**
			ED504	**Randomized Control Trials Lab**	**0**	**0**	**3**	**1.5**
Total (Semester IX)								**18**
		THEORY						
		PC	**ED511**	**Project**	**2**	**2**	**0**	**4**

TENTH SPRING/ SEMESTER X								
		PE	**Subject Codes would be decided based on selection.**	**Track I Track II Track III**	**3**	**0**	**0**	**3**
			Subject Codes would be decided based on selection.	**Track I Track II Track III**	**3**	**0**	**0**	**3**
			Subject Codes would be decided based on selection.	**Track I Track II Track III**	**3**	**0**	**0**	**3**
			Subject Codes would be decided based on selection.	**Track I Track II Track III**	**3**	**0**	**0**	**3**
	LABORATORIES							
		PC	**ED512**	**Project Lab**	**0**	**0**	**4**	**2**
Total (Semester X)								**18**
TOTAL (FIFTH YEAR)								***36***
GRAND TOTAL FOR THE POSTGRADUATE (M. Sc.) PART OF THE 5-YEAR INTEGRETAED COURSE **Minimum requirement for the award of the degree '<u>M.*Sc. in Quantitative Economics and Data Science*</u>' (Semesters VII-X)**								**80**
Minimum requirement for the award of the degree '5-Year Integrated <u>M.*Sc. in Quantitative Economics and Data Science*</u> (Semesters I-X)								**225**

The three **Tracks of Specializations** in the two semesters of the Final year are:

1. **Economics**
2. **Finance**
3. **Data Analytics**.

The lists of courses under these three tracks are the following.

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

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

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

Track I Economics		**Track II Finance**		**Track III Data Analytics**	
ED507	**Public Policy**	**ED527**	**Quantitative Finance**	**ED535**	**Data Mining and Data Visualization**
ED509	**Health Economics**	**ED529**	**Computational Finance**	**ED537**	**Digital Signal and Image Processing**
ED513	**Environmental Economics II**	**ED531**	**Corporate Finance**	**ED539**	**Social and Economic Networks: Theory and Applications**
ED515	**Agricultural Economics**	**ED533**	**Financial Econometrics**	**ED541**	**Algorithms for Big Data II**
ED517	**Industrial Economics**			**ED543**	**Business Intelligence and Data Engineering**
ED519	**Growth Theory**			**ED545**	**Foundations of Data Science**
ED521	**Labour Economics**			**ED547**	**Big Data Analytics**
ED523	**International Macroeconomics and Policies**			**ED549**	**Introduction to Artificial Intelligence**
ED525	**International Finance**			**ED551**	**Probabilistic Machine Learning**
				ED553	**Deep Learning**

('International Finance' is listed in both Tracks I and II keeping in mind its relevanceand importance in both 'Economics' and 'Finance' specialisations.)

The students of Final year are required to take a total of six courses from these courses in the last two semesters. They have to choose first any two Tracks of Specializations from these three Tracks, and then one course from each of the chosen two tracks in Semester IX and two courses from each of the chosen two tracks in Semester X.