UNIVERSITY OF MUMBAI
No.UG/ 385 of 2007.

CIRCULAR :-

A reference is invited to the Scheme of Papers at the Bachelor of Commerce (B.Com.) degree course under the revised pattern **vide** this office Circular No.UG/282 of 1996 dated 24th June, 1996 and the Principal of the affiliated colleges in Commerce and Professor-cum-Director, Institute of Distance Education are hereby informed that the recommendation made by the Joint Board of Studies in Mathematics and Statistics at its meeting held on 20th June, 2007 has been accepted by the Academic Council at its meeting held on 10th August, 2007 vide item No. 4.7 and that, in accordance therewith, the syllabus in the subject of "Mathematical and Statistical Techniques" at F.Y.B.Com. examination is revised as per **Appendix** and that the same will be brought into force with effect from the academic year 2008-2009.

MUMBAI-400 032
20th September, 2007

for I/c REGISTRAR

To,
The Principal of the affiliated colleges in Commerce and Professor-cum-Director, Institute of Distance Education

A.C/4.7 /10.08.2007

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No.UG/ 385-A of 2007 29th September, 2007.

Copy forwarded with Compliments for information to :-

1) The Dean, Faculty of Commerce.
2) The Chairmen, Joint Board of Studies in Mathematics and Statistics.
3) The Officer on Special Duty & Controller of Examination.

for I/c REGISTRAR

Copy to :-

The Director, Board of College and University Development, , the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Personal Assistant to the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information .

The Officer on Special Duty and Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enroiment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section),Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education,(10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar,(PRO) , the Assistant Registrar, Academic Authorities Unit (2 copies)and the Assistant Registrar, Executive Authorities Unit (2 copies) . They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT(1 copy), the Deputy Account, Unit V(1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies) .

Nnn/circ/2/25607

Enclosure to Item No.4.7

10.08.07

UNIVERSITY OF MUMBAI

REVISED SYLLABUS FOR MATHEMATICAL & STATISTICAL TECHNIQUES AT THE F.Y.B.COM. EXAMINATION

(With effect from the academic year 2008-2009)

MATHEMATICAL AND STATISTICAL TECHNIQUE

WORKLOAD : Mathematics : 2 lectures per week
Statistics : 3 lectures per week
Tutorial : 1 per week per batch

Tutorial Batch Size : As per prevailing norms of the University

FIRST TERM

MATHEMATICS : (20 marks)

UNIT-I (15 Lectures)

Commission, Brokerage, Discount and Partnership :

Commission and Brokerage : Simple examples on calculation of commission and brokerage.

Discounts : Trade Discount, Cash Discount. Profit and Loss. Sharing of profit in Partnership.

Problems involving mixture of discount. commission and profit are expected.

UNIT-II (15 Lectures)

Shares and Mutual Funds :

Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares Simple examples

Mutual Funds, Simple problems on calculation of Net Income after considering entry load, dividend, change in Net Asset Value (N.A.V) and exit load Averaging of price under the 'Systematic Investment Plan (S.I.P.)'.

Linear Programming Problems :

Sketching of graphs of (i) linear equation $Ax + By + C = 0$ (ii) linear inequalities.

Mathematical Formulation of Linear Programming Problems upto 3 variables.

Solution of Linear Programming Problems by graphical method upto 2 variables

STATISTICS : (30 marks)

UNIT-III (15 Lectures)

Introduction :
Meaning, Scope and Limitations of Statistics.
Basic Statistical Concepts : Population, Sample, Variable, attribute, parameter, statistic
Collection of Data :
Primary and Secondary, Sample and Census, Survey (concept only), Tabulation of data upto 3 characteristics (Simple examples)
Diagrams and graphs :
Given a diagram, interpretation of it. Simple bar diagram, Multiple bar diagram, Percentage bar diagram, Pie diagram.
Drawing of frequency curve, frequency polygon, Histogram (class – intervals of equal lengths only) and ogives.

UNIT-IV (15 Lectures)

Measures of Central Tendency : Arithmetic mean, Weighted mean, Combined mean, Median, Mode – without grouping, Quartiles. (No Example on missing frequency).
Measures of Dispersion : Range, Quartile deviation, Mean deviation from mean Standard deviation and their relative measures. (Concepts of shift of origin and change of scale are not to be done).

UNIT-V (15 Lectures)

Elementary Probability Theory :
Concept of Random experiment/trial and possible outcomes; Sample Space and Discrete Sample Space; Events and their types, Algebra of Events, Mutually Exclusive and Exhaustive Events; concept of ${}^{n}C_{r}$.
Classical definition of Probability, Addition theorem (without proof);
Independence of Events : $P(A \cap B) = P(A)\,P(B)$
Simple examples.
Random Variable : Probability distribution of a discrete random variable ; Expectation and Variance; Simple examples.
Concept of Normal distribution and Standard Normal Variate (SNV), simple examples.

SECOND TERM

MATHEMATICS : (20 marks)

UNIT-VI (15 Lectures)

Functions. Derivatives and Their Applications

Concept of real functions : constant function, linear function, x^n , e^x, a^x , log x. Demand, Supply, Total Revenue, Average Revenue, Total Cost, Average Cost and Profit function. Equilibrium Point, Break-even point.

Derivative as rate measure.

Derivatives of functions : Constant function, x^n, e^x, a^x, log x

Rules of derivatives : Scalar multiplication, sum, difference, product, quotient, simple problems

Second Order derivatives

Applications : Marginal Cost, Marginal Revenue, Elasticity of Demand. Maxima and Minima for functions in Economics and Commerce.

UNIT-VII (15 Lectures)

Interest and Annuity

Simple Interest and Compound Interest.

Interest Compounded more than once a year. Calculations involving upto 4 time periods.

Equated Monthly Instalments (EMI) using reducing & flat interest system. Present value,Future value.

Annuity Immediate and due : Simple problems with $A = P\left(1+\frac{r}{100}\right)^n$ with $n \leq 4$.

STATISTICS : (30 marks)

UNIT-VIII (15 Lectures)

Bivariate Linear Correlation : Scatter Diagram, Computation of Karl Pearson's Coefficient of Correlation (Case of Bivariate Frequency Table to be excluded), Computation of Spearman's Rank Correlation Coefficient (case of repeated ranks upto 2 repetition only)

Bivariate Linear Regression : Finding Regression lines by method of least squares. Properties of Regression Coefficients – i) $r = \pm\sqrt{b_{xy}\, b_{yx}}$ ii) $(\bar{x}, \bar{y})$ is point of intersection of two regression lines.

UNIT-IX (15 Lectures)

Times Series : Concept and Components of a time series. Estimation of Trend using Moving Average Method & Least Squares Method (only Linear Trend)

Estimation of Seasonal Component using Simple Arithmetic Mean. (For Trend free data only)

Concept of Forecasting using Least Squares Method.

Index Numbers : Concept and uses. Simple and Composite Index Nos. (unweighted, weighted), Laspeyre's Price Index No., Paasche's Price Index No., Fisher;s Price Index No.. Cost of Living Index No., Real Income, Simple Examples.

Concept Wholesale Price Index No.

(Examples on missing values should not be done)

UNIT-X (15 Lectures)

Decision Theory : Decision making situation; Decision maker, Courses of Action, States of Nature, Pay-off and Pay-off matrix; Decision making under Uncertainty, Maximin, Maximax and Laplace criteria; simple examples to find optimum decision.

Decision making under Risk, Expected Monetary Value (EMV) ; Decision tree; simple examples based on EMV.

Reference Books :

1) Mathematics for Economics and Finance: Methods and Modelling
by Martin Anthony and Norman Biggs,
Cambridge University Press, Cambridge low-priced edition, 2000,
Chapters 1, 2, 4, 6 to 9 & 10.

2) Applied Calculus
by Stefan Waner and Steven R. Constenoble,
Brooks / Cole Thomson Learning, Second edition, Chapter 1 to 5.M

3) Business Mathematics
by D.C. Sancheti and V.K. Kapoor,
Sultan Chand & Sons, 2006, Chapter 1, 5, 7, 9 &10.

4) Mathematics for Business and Economics
by J.D. Gupta, P.K. Gupta and Man Mohan,
Tata Mc-Graw Hill Publishing Co. Ltd., 1987, Chapters 9 to 11 & 16.

5) Quantitative Methods – Part – I
by S. Saha and S. Mukerji,
New Central Book Agency, 1996, Chapters 7 & 12.

6) Mathematical Basis of Life Insurance
by S.P. Dixit, C.S. Modi and R.V. Joshi,
Insurance Institute of India. Chapter 2: Units 2.6, 2.9, 2.20 & 2.21.

7) Securities Laws & Regulation of Financial Market:
Intermediate Course Paper 8,
Institute of Company Secretaries of India, Chapter 11

8) Investments
by J. C. Francis & R. W. Taylor,
Schaum's Outlines, Tata McGraw-Hill Edition. 2000, Chapters 2, 4 & section 25.1

9) Indian Mutual Funds Handbook
by Sundar Shankaran,
Vision Books, 2006, Sections 1.7, 1.8.1, 6.5 & Annexures 1.1 to 1.3

10) STATISTICS
by Schaum Series

11) Operations Research
by Gupta & Kapoor

12) Operation Research
by Schaum Series

Tutorial :
At least two tutorials be conducted on each unit. At least two tutorial tests be conducted per term during the tutorial classes.
The marks of the tutorial tests be added and converted to 10 marks. The fractional part of the converted marks be rounded of to next integer.

Examination :
Each of the two 'Term End Examination' will be of 50 marks and will be converted to 45 marks. The fractional part of the converted marks be rounded of to next integer.
Thus the total of the two term end examinations will be of 90 marks and 10 marks will be for the 'Tutorial Test' making a total of 100 marks.

Question Paper Pattern :
FOR REGULAR STUDENTS:
1) All question are compulsory
2) All questions of the type
Solve
(a), (b),...
OR
Solve
(p), (q),...
3) All questions will carry equal marks i.e. 10 marks

First Term
Q.1: Based on Unit-I
Q.2: Based on Unit-II
Q.3: Based on Unit-III
Q.4: Based on Unit-IV
Q.5: Based on Unit-V

Second Term
Q.6: Based on Unit-VI
Q.7: Based on Unit-VII
Q.8: Based on Unit-VIII
Q.9: Based on Unit-IX
Q.10: Based on Unit-X

FOR A.T.K.T. EXAMINATION:
Section-I : Attempt any two quetions out of four
Q.1: Based on Unit-I
Q.2: Based on Unit-II
Q.3: Based on Unit-VI
Q.4: Based on Unit-VII
Section-II: Attempt any three quetions out of six
Q.5: Based on Unit-III
Q.6: Based on Unit-IV
Q.7: Based on Unit-V
Q.8: Based on Unit-VIII
Q.9: Based on Unit-IX
Q.10: Based on Unit-X

The committee recommends a one day workshop to Discuss the "New Topics Introduced at F.Y.B.Com. MATHEMATICAL & STATISTICAL TECHNIQUES"

Proposal for Workshop

(A) No. of Participants : 100

(B) Details of workshop Expenditure :-

Sr.No.	Particulars	Amount in Rs.
1.	Tea/Coffee, Snacks, lunch @ Rs.150/- per day per participant for one day	15,000/-
2.	Stationery, Typing, Xeroxing @ Rs.100/- per participant	10,000/-
3.	Administrative Expenses (Telephones, Postage, Fax etc.)	2,000/-
4.	Honorarium to Four Resource persons @ Rs.250/- per person	1,000/-
5.	Portfolio bags to the participants	4,000/-
6.	Contingencies	3,000/-
	Total Rs...	*35,000/-*

(C) Resources for expenditure.

(1) Rs. 10,000/- of the total expenditure will be borne by the University and the same will be paid to the Principal, Kirti College, where the workshop will be held.

(2) Rs.25,000/- will be collected from the teacher participants @ Rs.250/- per participant.

(D) Proposed venue of workshop :

Kirti College of Arts, Science & Commerce, Dadar, Mumbai-400 028

(E) Proposed Co-ordinator

Prof. S.M.Patil, Head, Dept. of Statistics, Kirti College.

(F) Duty Leave

The participant teachers will be entitled for duty leave for 1 day.

Further that an amount of Rs.10,000/- be sanctioned and paid to Principal, Kirti College for conducting the workshop.