UNIVERSITY OF MUMBAI

No.UG/ 139 of 2010

CIRCULAR: -

A reference is invited to the Ordinances, Regulations and syllabus relating to the B.Sc. degree course **vide** this office Circular No.UG/177 of 1999 dated 24th May, 1999 and the Principals of the affiliated Colleges in Science are hereby informed that the recommendation made by the Board of Studies in Statistics at its meeting held on 3rd February, 2010 has been accepted by the Academic Council at its meeting held 3rd March, 2010 **vide** item No.4.31 and that, in accordance therewith, the syllabus of Elements of Operations Research (Applied Component)at T.Y.B.Sc. is revised as per the **Appendix** and that the same has been brought into force with effect from the academic year 2010-2011.

MUMBAI-400 032
29th June, 2010

L.R. Mane
Offg. Registrar

To,

The Principals of the affiliated colleges in Science.

A.C./4.31/03/03/2010

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No. UG/ 139 -A of 2010, MUMBAI-400 032 29th June, 2010

Copy forwarded with compliments for information to:

1) The Dean, Faculty of Science.
2) The Chairman, Board of Studies in Statistics
3) The Controller of Examinations.
4) The Co-ordinator, University Computerization Center.

(D. N. Jadhav)
Ag. Deputy Registrar
UG/PG Section

Copy to :

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

The controller of examinations (10 copies), the Finance and Accounts officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrollment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical, Affiliation Section (2 copies), the Professor-cum-Director, Institute of Distance and Open Learning (IDOL), (10 copies) the Directo 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 th Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action take report on th

Enclosure to Item No. 4.31
~~26/02/2010~~
3-03-2010

UNIVERSITY OF MUMBAI

Revised Syllabus
For
T.Y.B.Sc

ELEMENTS OF OPERATION RESEARCH

(APPLIED COMPONENT)

(with effect from the academic year 2010 - 2011)

REVISED SYLLABUS
FOR T.Y.B.Sc. ELEMENTS OF OPERATION RESEARCH
[APPLIED COMPONENT]

PAPER- I

UNIT-I [15 L]
LINEAR PROGRAMMING

Simplex Method [with /without artificial variable]
Duality. Dual Simplex Algorithm.
Sensitivity analysis (1) Variation of the price vector "c"
(2) Variation in the requirement vector "b"
(3) Addition of a new variable to the problem
(4) Addition of a new constrain to the problem.

UNIT-II [15 L]
INTEGER PROGRAMMING

Introduction with two variables and two constraints
Methods of solution
(1) Graphical Method
(2) Branch and Bound Method
(3) Gomory's Method

UNIT-III [15 L]
SIMULATION

Scope of simulation application. Monte Carlo technique.
Generation of random numbers using (1) Mid-square method
(2) Multiplicative Congruential method.
Sampling from probability distribution by inverse method for
(1) Uniform distribution
(2) Exponential distribution

SECURITIES MARKET

Concept of stock market, share, face value, market value, dividend , equity share, preferential shares bonus and right shares, public offer (IPO), index, nifty, beta value,
Earning pre share (EPS), price earning ratio (PE). Simple problems.

UNIT-IV [15 L]
MATHEMATICS OF FINANCE

Simple and compound interest. Present value. Annuities. Present value of an annuity. Application to investment decisions. (a)Payback Method (b) Average Rate Of Return Method (c)Net Present Value Method (NPV) (d) Internal Rate of Return Method (IRR)

FUTURES & OPTIONS

Introduction F&O market . Difference between Forward and Futures contracts. Factors influencing the market.
Concept of CRR, Repo and Reverse Repo rate . Hedging. Arbitrage . Open Interest.

OPTIONS TERMINOLOGY

Index option, Stock option, American option, European option, Expiry date, Strike price, Buyer of an option, Writer of an option, Call option, and Put option

PAPER-II

UNIT-I [15 L]

PROBABILITY

Random experiment. Sample Space , Event. Addition law of probability. Conditional law of probability. Random Variables (1) Discrete (2) Continuous. Mean and Variance of a random variable.

(1) Uniform distribution
(2) Binomial distribution
(3) Poisson distribution
(4) Exponential distribution
(5) Normal distribution

Simple problems based on above distribution.

UNIT-II [15 L]

DECISION ANALYSIS

Decision environments. Decision making under certainty. Decision making under risk. Expected value criterion . Decision tree analysis.
Decision making under uncertainty.

(1) The Laplace criterion
(2) The Minimax (Maximin) criterion
(3) The Savage minimax regret criterion
(4)The Hurwicz criterion

UNIT-III [15 L]

INFORMATION THEORY

Introduction. Fundamental Theorem of Information Theory. Measures of Information. Properties of Entropy Function. Communication System. Memoryless Channel, Binary Symmetric Channel, Channel Matrix, Joint, Marginal and Conditional Entropies.

$H(X,Y) = H(X/Y) + H(Y) = H(Y/X) + H(X)$

$H(X) \geq H(X/Y)$

Channel Capacity, Efficiency and Redundancy
Encoding
Shannon-Fano Encoding Procedure

UNIT-IV [15 L]

NETWORK MODELS

Objective and outline of CPM / PERT techniques. Diagrammatic representation of activities in a project. Critical path computations. Slack and float times .Probability consideration in project scheduling. Project cost analysis. Updating of project.

REFERENCES

1. Taha H.A. : Operation Research- An introduction . Sixth edition [software TORA] Prentice – Hall of India
2. Bronson R : Operations Research. Second edition. Schaum's outline series
3. Hogg R.V and Tanis E.A. : Probability and Statistical Inference
4. Gupta R.K : Liner Programming. Second edition. Krishna Prakashan Mandir.
5. Gupta M.P and Sharma J.K :Liner Programming for Management. First edition. National Publishing House.
6. Vohra N.D : Quantitative Techniques In Management. Third edition. Tata McGraw- Hill
7. Seymour L: Theory and Problems Of Probability. First edition. Schaum's outline series.
8. Hull John C : Options, futures, and other Derivatives. Seventh Edition. Prentice Hall
9. Hull John C : Fundamentals of Futures and Options Markets. Six edition. Prentice Hall.
10. Kapoor V.K: Operations Research Techniques for Manegment. Seventh edition. Sultan Chand & Sons.
11. Kantiswarup, Gupta P. K & Manmohan. Operations Research. Ninth edition . Sultan Chand & Sons
12. Sharma S. D: Operations Research . Eighth edition . Kedarnath, Ramnath & Company
13. Srinath L S : PERT & CPM –Principles and Applications. Third edition .Affiliated East-West Press Pvt .Ltd
14. Prasanna Chandra: Financial Management. Fifth edition. Tata McGraw- Hill
15. Kishore R. M: Financial Management – Problems and Solutions. First edition. Taxmann Allied Services (P) Ltd.

The journal should contain the practicals related to all the above topics from Paper I & II, It should also include TEN outputs sheets obtained by using the software TORA, for the following topics [at least THREE problems per topic]

1. Linear Programming
2. Integer Programming
3. Network Models.

WORKLOAD

Theory : 4 periods per week.
Practical : 4 periods per week per batch.

EXAMINATION

Theory examination will consist of TWO papers [1 & 2] each carrying 60 marks and having 3 hours duration.

Practical examination will consist of TWO paper [1 & 2] each carrying 30 marks and having 2 hours duration.

JOURNAL – 10 MARKS. COMPUTER OUTPUT USING TORA – 10 MARKS

QUESTION PAPER PATTERN FOR THEORY EXAMINATION [PAPER -1 & 2]

All questions are compulsory.
There will be FIVE questions of 12 marks each.
Q.1 Based on unit no. 1, 2, 3 & 4
Q.2 Based on unit no.1
Q.3 Based on unit no.2
Q.4 Based on unit no.3
Q.5 Based on unit no.4
Each question will be set for 18 marks with internal option.