CORE COURSE: 6 I M.COM SEM: II CODE:P2NCMCC6

QUANTITATIVE TECHNIQUES FOR BUSINESS DECISION

OBJECTIVES:

- *To provide basic skills in quantitative techniques.*
- *To acquaint the student with the use of quantitative models in decision making.*
- *To formulate and solve the practical problems in various fields using quantitative techniques.*
- *To enrich the knowledge of the students not only with some of the theoretical concepts in quantitative techniques but will also be concerned with their applications.*
- *To educate the students on the application of quantitative techniques to business and industry related problems.*

UNIT I: QUANTITATIVE TECHNIQUES

Meaning Of Quantitative Techniques – Classification of Quantitative Techniques, Statistical Techniques, Programming Of Operations Research Technique. The Importance Of Operations Research Techniques – Role Of Quantitative Techniques In Business And Industry. Quantitative Techniques And Business Management. Limitation Of Quantitative Techniques, Theoretical Distribution – Binomial Distribution – Poisson Distribution – Normal Distributions – Properties And Simple Problems Only.

UNIT II: TESTING OF HYPOTHESIS

Definition Of Hypothesis – Types Of Hypothesis – Type I Error – Type II Error – Population Mean – Proportion – Difference Between Mean And Difference Between Proportion – ANOVA – Chi – Square Test.

UNIT III: LINEAR PROGRAMMING

Introduction To OR – History Of OR – Basics Concepts And Notations – Standard And Canonical Form Of LPP – Linear Programming Formulation Solution Through Graphical Method – Feasible Solution – Optimal Solution – Unbounded Solution – Infeasible Solution – Simplex Method.

UNIT IV:TRANSPORTATION AND ASSIGNMENT PROBLEM

Initial Basic Feasible Solutions By North West Corner Rule – Minimization Method, Maximization Method – Vogel's Approximation Method – Optimization Test byMODI Method.AssignmentProblems – Introduction – Hungarian Method.

UNIT V: NETWORK ANALYSIS

Preparation Of Network Diagram – Critical Path Method (CPM) – Limitations Of CPM – Program Evaluation Review Technique(PERT) – Advantages And Limitations Of PERT – Similarities And Dissimilarities Between PERT And CPM.

TEXT BOOKS:

[1] "Quantitative Techniques For Managerial Decisions" By V.K.Srivastam, G.V Shenoy, S.C Sharma – New Age International(P) Ltd. Publications.2012

[2] "Operations Research", By KantiSwarup, P.K. Gupta, Man Mohan – Sultan Chand & Sons Publications 1999

Unit I : Chapter 7, Sec 7.1,7.2,7.5 [1]

Unit II :Chapter 9 [1]

Unit III:Chapter 1 & 2 [2]

Unit IV:Chapter 6 & 7 [2]

Unit V :Chapter 21 [2]

REFERENCES:

1. Hamdy A. Taha, Operations Research – An Introduction , Mcmillan
2. Quantitative Methods, D.C.Sancheti, V.K.KapoorAndPL.MehtaSultand Chand Publications.

CORE COURSE:10 II M.C.A SEM: III CODE:P3CACC17

DISCRETE MATHEMATICS

OBJECTIVES:

- *To study the basic concepts of Algebra.*
- *To introduce a number of Discrete mathematics structure found to be serving as tools even today in the development of theoretical Computer science.*
- *To solve problems occurred in the development of programming languages.*
- *To know the importance of discrete structures towards simulation of problems in computer science and engineering in near future.*
- *To provide the knowledge of recurrence relations.*

UNIT – I SETS, RELATIONS AND FUNCTIONS

Basic concepts of set theory – Some operations on Set.Partial ordering relations. Representation of discrete structure – Hasse diagram, functions, Inverse functions, Compositions of functions, Recursive functions.

UNIT – II MATHEMATICAL LOGIC

Statement and notations – Connectives – Well formed, Logic operators, Truth tables - Tautology – Normal forms, Theory of inference and deduction, Mathematical calculus, Predicate calculus predicates and quantifiers.

UNIT – III GROUPS AND SUBGROUPS

Algebraic Structure, Examples and General properties – Group Axioms, Permutation groups, subgroups, cosets, Lagrange's Theorem, Normal subgroups, semi groups, free semi grops and monoids – Definition and examples – Homomorphism of semigroups and Monoids.

UNIT – IV LATTICES AND BOOLEAN ALGEBRA

Lattices as a partial ordering sets – Definitions and Examples – Some propertics of lattices – Lattices as algebraic systems, Sub Lattices – Discrete product and homomorphism – Some special Lattices – Boolean Algebra – Definition – sub algebra – Direct product and homomorphism – Boolean functions – Representation and minimization of Boolean functions – Karnaugh Map.

UNIT – V RECURRENCE RELATIONS AND RECURRENCE ALGORITHMS

Introduction – Recurrence Relations – linear Recurrence relation with constant coefficients – Homogeneous solutions – Particular solutions – Total solutions – Solution by the method of Generality.

TEXT BOOKS

[1] Tremly. J.P and Manohar.P.,Discrete Mathematics Structures with Application to computer Science, MCGraw Hill 1987.

[2] C.L.Liu, Elements of Discrete Mathematics, Tata MCGraw Hill – 1987.

UNIT – I : Chapter II – Section 2.1-2.13, 2.2, 2.4, 2.6

UNIT – II : Chapter I - Section 1.1-1.5 [1]

UNIT – III: Chapter III – Section 3.2 and 35 [1]

UNIT – IV: Chapter IV – Section 4.1 – 4.4 [1]

UNIT – V : Chapter X- Section 10.1 – 10.7[2]

REFREENCES

1) James C.Abboh, Sets, Lattices and Boolean Algebra, Allya and Bacon Bortou, 1969.
2) G.S.S BhishmaRao, Discrete Structures and Graph theory, Scitech Publications pvt., Ltd.,

CORE COURSE : 1 I M.Sc., Comp.Sci **SEM: I**

MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

OBJECTIVES

- *To solve problems occurred in the development of Programming languages.*
- *To educate the importance of cryptography.*
- *To design and solve the problem of Decision Making.*
- *Understand how to develop Null and Alternative Hypothesis.*
- *To apply fundamental concepts and working knowledge of Graph Theory for research.*

UNIT – I THEORY OF INFERENCE

Propositions – Evaluation – Precedence rules – Tautologies – Reasoning using equivalence transformation – Law of equivalence – Substitution rules – a natural deduction system. Deductive proofs – inference – proofs – sub proofs.

UNIT – II CRYPTOGRAPHY

Introduction – cryptography – Ceaser cipher coding – Matrix encoding – Scrambled codes – Hamming metric – Hamming distance – Error detecting capability of an encoding.

UNIT – III DECISION ANALYSIS

Introduction – Decision Making Problem – Decision Making Process - Decision Making Environment – Decisions under uncertainity – Decision under risk – Decision Tree Analysis – Decision Making.

UNIT – IV TESTING OF HYPOTHESIS

Testing of hypothesis: Tests based on normal population – Application of Chi-square, Student's t-test, F-distributions – chi-square test – Goodness of fit – Test based on means, Variance, Correlation and regression of coefficients.

UNIT – V GRAPH THEORY

Graph – Directed and undirected graphs – Subgraphs – Chains, Circuits, Paths, Cycles – Connectivity – Relations to Partial ordering – Adjacency and incidence matrices – Minimal paths – Elements of transport network – Trees – Applications.

TEXT BOOKS

[1] 'Discrete Mathematical Structure with application to computer Science', TremblyManohar, McGraw Hill.

[2] 'Science of Programming', David Gries – Narosha Publishing House, New Delhi-1993.

[3] 'Operations Research', KantiSwarup, P.K.Gupta, Man Mohan, Sultan chand& sons 1999.

[4] 'Fundamental of Mathematical statistics', Gupta S.P &Kapoor. V. K – Sultan & Chand sons, New Delhi, 10^{th} Edition – 1983.

[5] 'Graph Theory', V. K.Balakrishnan, Schaum's outline.

UNIT 1: Chapter 1 [1]

UNIT II: Chapter 2 [2]

UNIT III: Chapter 16 (Sec. 16.1 – 16.8) [3]

UNIT IV: Chapter 13 &14 [4]

UNIT V: Chapter 1 & 2 [5]

REFERNCES

1) James C.Abboh, "Sets, Lattices and Boolean Algebra", Allya and Bacon Bortou, 1969.
2) G.S.S BhishmaRao, Discrete Structures and Graph theory, Scitech Publications pvt., Ltd.,

CORE COURSE:23 II M.C.A SEM: IV CODE:P4NCACC23

PROBABILITY AND STATISTICS

OBJECTIVES:

- To estimate and analyze elementary problem models.
- To explain the limitations of the statistical inferences.
- The students will interpret variation in real – world contents.
- To examine whether the two random variables are inter related.
- The regression line can be used to the best fitting straight line for the RV in the least square.

UNIT I: THEORY OF PROBABILITY

Probability- Addition theorem- Conditional Probability –Multiplications Theorem- Baye's theorem – Random Variables and their Properties – Discrete and Continuous Random Variables.

UNIT II: PROBABILITY DISTRIBUTIONS

Discrete Distributions: Binomial, Poisson and their properties (Definition, Mean, Variance, Moment Generating Functions, Additive Properties)

Continuous Distributions: Normal, Uniform distributions (Definition, Mean, Variance, Moment Generating Functions, Additive Properties)

UNIT III: TESTS OF SIGNIFICANCE

Sample, Population, Statistic, Parameter, Sampling distributions, Standard error, unbiasedness, Efficiency. Testing Hypothesis: Null hypothesis, Critical Region, Level of Significance, Power of the test(definition only) Small sample tests – t test (single and double mean) – Chi square test (Goodness of fit, Independence of Attributes)

UNIT IV: CORRELATION

Correlation : scatter diagram - Karl Pearson's correlation coefficient - Properties of Correlation, Spearman's Rank correlation - limits for Rank correlation (Related Problems)

UNIT V: REGRESSION

Regression : Lines of regression - regression curves - regression coefficients - Properties of regression coefficients (Related Problems)

TEXT BOOKS:

[1] " Probability, Statistics and Random Processes", T. Veerarajan, Tata McGraw Hill (2009)

[2] "Fundamentals of Mathematical statistics" - S.C.Gupta, V.K.Kapoor - Sultan Chand & Sons - New Delhi(1995).

Unit I: Chapter 1, Pg. No. 1-20, [1]

Chapter 2, Pg. No. 33- 49 [1]

Unit II: pg. no 208- 214, 219-233, 239-241, 246 – 270. [1]

Unit III: Chapter 12, sec 12.1- 12.7.3 [2]

Chapter 14, sec 14.2.8- 14.2.10 [2]

Chapter 13, Sec 13.7- 13.7.2 [2]

Unit IV: Chapter 10, Sec 10.1, 10.3.1,10.6-10.6.2, [2]

Unit V: Chapter 10, Sec 10.7-10.7.1, 10.7.3-10.7.4 [2]

Reference Books:

[1] "Mathematical Statistics" - J.N. Kapur, H.C.Saxena - S.Chand& Company Ltd - New Delhi(2011)

[2] "Introduction to Biostatistics" – Sokaland Rohlf – Toppan Co. Japan

[3] " Statistical and Numerical Methods", by P.R. Vittal and V. Malini, Margham Publications

CORE COURSE : 6 I M.B.A. SEM : I

BUSINESS MATHEMATICS AND STATISTICS

OBJECTIVES:

- To update & expand basic knowledge of mathematics.
- To review the basic concept and knowledge in probability and random variables.
- To impart skills to enable students to use mathematics & statistics in business studies.
- The students will be able to apply statistical tools in real life problems as well as research problems
- The student should have understood the concept of correlation and regression.

UNIT I : MATRICES

Matrix Algebra – Arithmetic Operations – Properties – Solutions of Linear Equations by Inverse methods – Cramer's Rule – Discount – Trade - Quantity

UNIT II: PROBABILITY AND RANDOM VARIABLES

Axioms of probability – Conditional Probability – Total Probability – Baye's Theorem – Random Variables – Probability mass functions, Probability Density functions – Properties.

UNIT III: THEORETICAL DISTRIBUTIONS

Binomial Distributions- Mean deviation about mean- Moment generating function- Additive Property. Poisson Distribution – Mode – Moment generating functions. Normal Distributions – Characteristics of Normal Distributions – Median – Moment Generating Function.

UNIT IV: SAMPLING AND THEORY OF INFERENCE

Sampling: Introduction - Types of sampling – Random, Simple, Stratified sampling.

Theory of Inference: Statistical Hypothesis – Test of a Statistical Hypothesis- Null Hypothesis –

Alternative Hypothesis – Types of errors.

Large Samples: Test for single proportion, difference of Proportions – Test of significance for single and difference means. *Analysis of variance* – One way classification.

UNIT V: CORRELATION AND REGRESSION

Correlation : scatter diagram - Karl Pearson's correlation coefficient - Spearman's Rank correlation - limits for Rank correlation (Related Problems)

Regression : Lines of regression - regression curves - regression coefficients - Properties of regression coefficients (Related Problems)

Text Books:

[1]" Business Mathematics and Statistics", PA. Navanitham, Jai Publications, 2011.

[2] "Probability and Queueing Theory" , N. Subramanian, SCM offset, 2005.

[3] "Fundamentals of Mathematical statistics" - S.C.Gupta, V.K.Kapoor - Sultan Chand & Sons - New Delhi(2002).

Unit I: Chapter IV, Pg no. 147 – 173 and Pg. No. 328 – 332 [1]

Unit II: Chapter 1, Pg. No. 2 to 66 [2]

Unit III: Chapter 7, Sec-7.2, 7.2.4, 7.2.6, 7.2.7, 7.3, 7.3.3, 7.3.5., 7.3.6

Chapter 8, Sec - 8.2, 8.2.2, 8.2.4, 8.2.5 [3]

Unit IV: Chapter 12, Sec 12.1- 12.2.4, 12.8- 12.14, 12.47

Chapter 16, Sec 16.1- 16.25 [3]

Unit V: Chapter 10, Sec 10.1-10.3, 10.6, 10.7-10.7.4 [3]

Reference Books:

1."Mathematical Statistics" - J.N. Kapur, H.C.Saxena - S.Chand& Company Ltd - New Delhi(2011)

2. "Introduction to Biostatistics" – Sokaland Rohlf – Toppan Co. Japan

3." Statistical and Numerical Methods", by P.R. Vittal and V. Malini, Margham Publications, 2004.

CORE COURSE: 8 I M.B.A SEM: II

CODE:P2NBACC8

OPERATIONS RESEARCH

OBJECTIVES:

- To understand the Scope, Models, Limitations and Applications of OR.
- To introduce the concept of Decision Theory.
- To Solve a problem using Game Theory.
- To maintain the balance between the inventories.
- To analyze the sensitivity of a Decision Variable.

UNIT I: LINEAR PROGRAMMING PROBLEM

Introduction – origin and development of OR – Nature and Features of OR – Scientific Method of OR – Modeling in OR – Advantages and disadvantages of Models - Operations Research and Decision Making – Applications in OR - Linear Programming Problem - Mathematical Formulation of the problem - Graphical Solution.

UNIT II: DECISION ANALYSIS

Introduction – Decision - making problems - Decision - making process – Decision - making environment - Decision - under uncertainty-Decision making under risk – Decision – Tree Analysis - Decision making with utilities.

UNIT III:GAMES AND STRATEGIES

Introduction – Two Person Zero - Sum Games – Some Basic Terms – The Maximin – Minimax Principle – Games without Saddle Points - Mixed strategies – Graphical Solution 2 × n and m × 2 games – Dominance Property – Arithmetic Mean for n × n Games - General Solution of m × n Rectangular Games.

UNIT IV: INVENTORY CONTROL

Introduction – Types of Inventories – Reasons for carrying Inventories – The Inventory Decisions – Objectives of scientific Inventory control – Cost associated with Inventories – Factors affecting Inventory control – An Inventory control problem – The concept of EOQ - Deterministic inventory problems with no shortages - Deterministic inventory problems with shortages– Problems of EOQ with Price Breaks.

UNITV:SIMULATION

Introduction – Why Simulation? – Process of Simulation – Simulation Models – Event – Type Simulation – Generation of Random Numbers - Monte Carlo method – Simulation of Inventory Problems - Simulation of a Queueing System - Simulation of

Maintenance Problems - Simulation of Investment and Budgeting - Simulation of Jobs sequencing - Simulation of Networks - Advantages and disadvantages of Simulation.

TextBooks:

[1] "Operations Research"-Kantiswarup,PK.Gupta,Manmohan-Sultan Chand& sons.

Unit I : Chapter 1 Sec: 1.1- 1.6, 1.9, 1.10, Chapter 2 sec : 2.1 – 2.3, Chapter 3 sec : 3.1 – 3.2

Unit II :Chapter 16 Sec: 16.1 - 16.8[1]

Unit III:Chapter 17 Sec: 17.1 – 17.9[1]

Unit IV:Chapter 19 Sec: 19.1 - 19.12 [1]

Unit V :Chapter 22 Sec: 22.1 to 22.14

References:

1) Operations Research - An Introduction - HamdyA.Taha - McMillan.
2) Fundamentals of Operation Research for Management-Gupta and cozzlino-Hodeday,IUC.

CORE COURSE:28 III M.C.A SEM: V

CODE:P5CACC28

OPTIMIZATION TECHNIQUES

OBJECTIVES:

- To describe the need and importance of operations research.
- To discuss the basic concepts and techniques for solving particular OR problem.
- To develop a research proposal using the general approach for operations research.
- To obtain the best solution when there is a solution with many feasible solution which satisfy the equation.
- To maximize the utility of limited resources.

UNIT I - LINEAR PROGRAMMING PROBLEM

Introduction – origin and development of OR – Nature and Features of OR – Scientific Method of OR – Modeling in OR – Operations Research and Decision Making – Applications in OR - Linear Programming Problem - Mathematical Formulation of the problem - Graphical Solution - General LPP - Canonical and standard forms of LPP.

UNIT II –SOLUTION OF LINEAR PROGRAMMING PROBLEM

Introduction – Fundamental Properties of Solutions – The computational Procedure – Simplex method - Use of Artificial variables - Big M method – Duality in Linear Programming Problem – General Primal and Dual Pair–Formulating a Dual Problem - Duality and Simplex method.

UNIT III - REPLACEMENT PROBLEMS

Introduction - Replacement of Equipments/ Asset that Deteriorates Gradually - Replacement of equipment that fails suddenly.

UNIT IV - INVENTORY CONTROL

Introduction – Types of Inventories – Reasons for carrying Inventories – The Inventory Decisions – Objectives of scientific Inventory control – Cost associated with Inventories – Factors affecting Inventory control – An Inventory control problem – The concept of EOQ - Deterministic inventory problems with no shortages - Deterministic inventory problems with shortages– Problems of EOQ with Price Breaks.

UNIT V - QUEUING THEORY

Introduction - Queuing system –Elements of a Queuing system – Operating characteristics of a Queuing system – Deterministic Queuing system – Probability

distributions in Queuing systems - Classifications of queuing models –Definition of Transient and Steady states – Poisson Queuing systems (Model I – IV only).

TEXT BOOK:

[1] KantiSwarup, Gupta and Manmohan : "Operations Research". Sultan Chand & sons, New Delhi

Unit I : Chapter 1, sec : 1.1- 1.5, 1.9, 1.10 Chapter 2 sec : 2.1 – 2.3 Chapter 3 sec : 3.1 – 3.5 [1]

Unit II : Chapter 4, sec : 4.1 to 4.4, Chapter 5 sec :5.1 – 5.3, 5.7 [1]

Unit III : Chapter 18, sec : 18.1 to 18.3 [1]

Unit IV : Chapter 19, 19.1 - 19.12 [1]

Unit V : Chapter 21, 17.1 to 17.6, 17.8.1., Model I and Model III [1]

REFERENCES:

1) Operations Research -HamdyA.Taha - Prentice Hall of India, New Delhi.
2) Operations Research and Quantitative analysis - P.K. GuptadD.S.Hira - Schand& Company Ltd - New Delhi.
3) Operations Research Methods and Application -P.Marriappan - New Century Book House Pvt. Ltd.

CORE COURSE:4 II M.Sc., BIO CHEMISTRY/ BIOTECHNOLOGY SEM: III

CODE:P3BCEC4

PRINCIPLES OF BIO – STATISTICS

OBJECTIVES

- To study about the Correlation and its real life applications.
- To estimate Regression Analysis.
- Calculate descriptive statistics related to public health.
- Enables graphical ideas to descriptive statistics.
- To analysis the results by testing hypotheses

UNIT I - CORRELATION

Introduction to Biostatistics - *Correlation Analysis: correlation* – Correlation coefficient – Scatter Diagram – spearman's rank correlation coefficient. *(Related problems)*

UNIT II - REGRESSION

Regression Analysis: Regression – Regression coefficient – properties – Linear Regression line. *(Related problems)*

UNIT III :PROBABILITY DISTRIBUTION

Theoretical Distribution – Binomial , Poisson and Normal Distributions.

UNIT IV : SAMPLING

Basic Concepts of Sampling – Simple random sample, stratified sample and systematic sampling. Sample statistic.Sampling distribution and standard error. Tests of significance – Test for mean and difference of means.

UNIT V :TESTING OF HYPOTHESIS

Student t – test, Chi – Square test, F-test, ANOVA : one way and two way classification,

TEXT BOOK

[1] " Biostatistics" – P.N.Arora and P.K. Malhan, Himalaya Publication House,2006.

Unit I : Chapter 8:8.1,8.4-8.7

Unit II : Chapter 9: 9.1-9.3,9.5

Unit III: Chapter 11: 11.1 to 11.5, 11.9, 11.11- 11.13,11.15, 11.17-11.21.

Unit IV: Chapter 12 : 12.1 to 12.5.

Unit V : Chapter 13: 13.8,13.9.13.10 ; Chapter 14: 14.7,14.8; Chapter 15: 15.4: Chapter 8: 8.1 and 8.6 and Chapter 9: 9.1 and 9.2.

References

[1] "Fundamentals of BioStatistics" Veer BalaRastogi, Ane Books Pvt. Ltd, 2009.

[2] "Biostatistics" - P.Ramakrishnan - Saras Publications,1995.

CORE COURSE:10 II M.SC., BOT/MIC BIO SEM:III CODE:P3NBTCC10

RESEARCH METHODOLOGY

OBJECTIVES

- Describe basic concepts of probability, random variation and commonly used statistical probability distributions.
- Calculate descriptive statistics related to public health.
- To analysis the results by testing hypotheses.

UNIT I : MEASURES OF CENTRAL TENDENCY, DISPERSION, SKEWNESS AND KURTOSIS

Introduction to Biostatistics- Collection of data – Graphical Representation-Bar Diagram and Pie Diagram.*Measures of Central Tendency:* Arithmetic Mean – Median – Mode.

Measures of Dispersion : Range – Mean Deviation – Standard Deviation – Coefficient of Variance – Skewness and Kurtosis.

UNIT II :DISTRIBUTIONS AND TESTING OF HYPOTHESIS

Inferential Statistics – Theoretical Distribution – Binomial , Poisson and Normal Distributions- Hypothesistesting:Student t – test, Chi – Square test, F-test, ANOVA : one way and two way classification, Correlation and Regression.

TEXT BOOKS:

[1] " Biostatistics" – P.N.Arora and P.K. Malhan, Himalaya Publication House,2006.

[2] " Fundamentals of Biostatistics" ,VeeraBalaRastogi, Ane Books Pvt. Ltd,2009.

Unit I: Chapter 1 : 1.5, 1.6[1]; Chapter 4: 4.5 ,4.6[1] ;Chapter 5: 5.1 to 5.4[1];
Chapter 6: 6.2 to 6.7, 6.13[1]; Chapter 7 : 7.1, 7.2, 7.5, 7.6, 7.8, 7.9, 7.13[1].

Unit II : Chapter 11 : 11.1 -11.5, 11.9, 11.11-11.13, 11.15, 11.17, 11.18-11.21 [1];
Chapter13 : 13.1 – 13.12[1]
Chapter 14 : 14.1 - 14.10[1]
Chapter 15: 15.1 – 15.4[1]
Chapter 11: fully [2]
Chapter 8 : 8.1, 8.4 - 8.6[1]
Chapter 9 : 9.1 to 9.3, 9.5[1].

REFERENCES :

1. “Biostatistics” - P.Ramakrishnan - Saras Publications,1995.

2. “Introduction to Biostatistics” Sokal and Rohlf – Toppan Co. Japan.