Academic Council

Item No: _____

Devrukh ShikshanPrasarakMandal's

Nya.TATYASAHEB ATHALYE ARTS, Ved. S.R. SAPRE COMMERCE & Vid. DADASAHEB PITRE SCIENCE COLLEGE, DEVRUKH [AUTONOMOUS]

Syllabus for F.Y. B.Com.
Program: B.Com.
Course: Mathematics and Statistics
Credit Based Semester and Grading System with the Effect from
Academic Year 2019-20

B. Com. General (Semester Pattern) B. Com. First Year

MATHEMATICS AND SATISTICS – CURRICULUM

Semester	Paper Code	Paper	Lectures /Practical's	Marks			Credits
				External	Internal	Total	
Semester I	ASPUCMTSI.6	Theory Paper - Mathematical and Statistical Techniques-I	75	70	30	100	03
Semester II	ASPUCMTSII.6	Theory Paper - Mathematical and Statistical Techniques-II	75	70	30	100	03

Semester I Theory Paper I			
Learning Objectives: The students will be able to understand- • The concept of shares and mutual funds. • Ratio, Proportion, Percentage and Partnership. • Different Measures of Central Tendencies and Measures of Dispersions. • Aspects of Permutation and Combination and Linear Programming Problem • The concept of Probability Theory and Random Variable.			
Course Code ASPUBCMTSI.6	**Title**	**Lectures**	**Credits**
Unit	**Mathematical and Statistical Techniques-I**	**75**	**03**
Unit I Shares and Mutual Funds	a. **Shares**: Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples. b. **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.)	15	
Unit II Ratio, Proportion, Percentage ,Partnership and LPP	a. **Ratio, Proportion, Percentage :** Ratio, continued ratio, Inverse ratio, Proportion, Continue Proportion, Simple and compound proportion, Inverse Proportion Simple Examples, Percentage, Simple Examples, Partnership, concept and simple examples. b. **Linear Programming Problem**: 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 using graphical method up to two variables.	15	
Unit III Summarization of Measures	a. **Measures of Central Tendencies:** Definition of Average, Types of Averages: Arithmetic Mean, Median, and Mode for grouped as well as ungrouped data. Quartiles, Deciles and Percentiles. Using Ogive locate median and Quartiles. Using Histogram locate mode. Combined and Weighted mean. b. **Measures of Dispersions**: Concept and idea of dispersion. Various measures Range, Quartile Deviation, Mean Deviation, Standard Deviation, Variance, Combined Variance.	15	
Unit IV	a. **Permutation and Combination**: Factorial Notation,	15	

Elementary Probability Theory	Fundamental principle of counting, Permutation as arrangement, Simple examples, combination as selection, Simple examples, Relation between nCr and nPr, Examples on commercial application of permutation and combination. b. **Probability Theory:** Concept of random experiment/trial and possible outcomes; Sample Space and Discrete Sample Space; Events their types, Algebra of Events, Mutually Exclusive and Exhaustive Events, Complimentaryevents. Classical definition of Probability, Addition theorem (without proof), conditional probability. Independence of Events: $P(A \cap B) = P(A) P(B)$ Simple examples. c. **Random Variable**: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.		
Unit V 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, Minimax regret and Laplace criteria; simple examples to find optimum decision. Formulation of Payoff Matrix. Decision making under Risk, Expected Monetary Value (EMV); Decision Tree; Simple Examples based on EMV. Expected Opportunity Loss (EOL), simple examples based on EOL.	15	

Course Code ASPUBCMTSI.6 Semester I Tutorial List	
Sr. No.	**Tutorials**
1.	Shares
2.	Mutual Funds
3.	Ratio, Proportion
4.	Percentage , Partnership
5.	Measures of Central Tendencies
6.	Measures of Dispersions
7.	Permutation and Combination
8.	Linear Programming Problem
9.	Probability Theory
10.	Probability Random Variable

Semester II Theory Paper I			
Learning Objectives: The students will be able to understand- • Concept of real functions, Derivative of functions and its applications. • Different aspects of Interest and Annuity. • Methods of Correlation Analysis and Regression Analysis. • Time series and Index Numbers. • Decision making techniques and Formulation of Payoff Matrix and its analysis.			
Course Code ASPUBCMTSII.6	**Title**	**Lectures**	**Credits**
Unit	**Mathematical and Statistical Techniques-II**	**75**	**03**
Unit I Functions, Derivatives and Their Applications	**a. Concept of real functions:** constant function, linear function, x^n , e^x, a^x, logx. Demand, Supply, Total Revenue, Average Revenue, Total cost, Average cost and Profit function. Equilibrium Point, Break-even point. **b. Derivative of functions:** i. Derivative as rate measure, Derivative of x^n , e^x, a^x, logx. ii. Rules of derivatives: Scalar multiplication, sum, difference, product, quotient (Statements only), Simple problems. Second order derivatives. iii. Applications: Marginal Cost, Marginal Revenue, Elasticity of Demand. Maxima and Minima for functions in Economics and Commerce. (Examination Questions on this unit should be application oriented only.)	15	
Unit II Interest and Annuity	**a. Interest:** Simple Interest, Compound Interest (Nominal & Effective Rate of Interest),. Calculations involving upto 4 time periods. **b. Annuity:** Annuity Immediate and its Present value, Future value. Equated Monthly Instalments (EMI) using reducing balance method & amortization of loans. Stated Annual Rate & Affective Annual Rate Perpetuity and its present value. Simple problems involving up to 4 time	15	

	periods.		
Unit III Bivariate Linear Correlation and Regression	**a. Correlation Analysis:** Meaning, Types of Correlation, And Determination of Correlation: Scatter diagram, Karl Pearson's method of Correlation Coefficient (excluding Bivariate Frequency Distribution Table) and Spearman's Rank Correlation Coefficient. **b. Regression Analysis:** Meaning, Concept of Regression equations, Slope of the Regression Line and its interpretation. Regression Coefficients (excluding Bivariate Frequency Distribution Table), Relationship between Coefficient of Correlation and Regression Coefficients , Finding the equations of Regression lines by method of Least Squares.	15	
Unit IV Time series and Index Numbers	a. **Time series**: Concepts and components of a time series. Representation of trend by Freehand Curve Method, Estimation of Trend using Moving Average Method and Least Squares Method (Linear Trend only). Estimation of Seasonal Component using Simple Arithmetic Mean for Additive Model only (For Trend free data only). Concept of Forecasting using Least Squares Method. b. **Index Numbers:** Concept and usage of Index numbers, Types of Index numbers, Aggregate and Relative Index Numbers, Lasperye's, Paasche's, Dorbisch-Bowley's, Marshall-Edgeworth and Fisher's ideal index numbers, Test of Consistency: Time Reversal Test and Factor Reversal Test. Chain Base Index Nos. Shifting of Base year. Cost of Living Index Numbers, Concept of Real Income, Concept of Wholesale Price Index Number. (Examples on missing values should not be taken)		
Unit V Elementary Probability Distributions	a. Discrete Probability Distribution: Binomial, Poisson (Properties and applications only, no derivations are expected) simple examples. b. Continuous Probability distribution: Normal Distribution. (Properties and applications only, no derivations are expected) simple examples.		

Course Code ASPUBCMTSII.6 Semester II Tutorial List	
Sr.No.	**Tutorials**
1.	Different Real Functions.
2.	Applications of Derivative.
3.	Simple and Compound Interest.
4.	Problems based on annuity.
5.	Correlation Analysis.
6.	Regression Analysis.
7.	Time series.
8.	Index Numbers.
9.	Payoff matrix and its analysis.
10.	EMV and EOL

Reference Books

1. Mathematics for Economics and Finance Methods and Modelling by Martin Anthony and NormanBiggs,CambridgeUniversityPress,Cambridgelow-pricededition,2000,Chapters1,2, 4, 6 to 9 &10.
2. Applied Calculus: By Stephen Waner and stevenConstenoble, Brooks/Cole Thomson Learning, second edition, Chapter 1 to5.
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 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, Chapters 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, Chapter11.
8. Investments By J.C. Francis & R.W. Taylor, Schaum's Outlines, Tata Mc-Graw Hill Edition 2000, Chapters 2,4& section25.1.
9. Indian Mutual Funds Handbook: By Sundar Shankaran, Vision Books, 2006, Sections1.7,1.8.1, 6.5 & Annexures 1.1to 1.3.
10. STATISTICS by Schaum Series.
11. Operations Research by Gupta andKapoor
12. Operations Research by SchaumSeries
13. Fundamentals of Statistics - D. N.Elhance.

14. Statistical Methods - S.G. Gupta (S. Chand &Co.
15. Statistics for Management - Lovin R. Rubin D.S. (Prentice Hall ofIndia)
16. Statistics - Theory, Method & Applications D.S.Sancheti& V. K.Kapoor.
17. Modern Business Statistics - (Revised}-B. Pearles& C. Sullivan –Prentice Hall ofIndia.
18. Business Mathematics & Statistics : B Aggarwal, Ane Book Pvt.Limited
19. Business Mathematics : D C Sancheti& V K Kapoor, Sultan Chand &Sons
20. Business Mathematics : A P Verma, Asian Books Pvt.:Limited.

Evaluation Pattern

External evaluation: Internal evaluation (70:30)

Theory:-External evaluation (70 Marks) Question Paper Pattern

Time: 2.5 hours

Paper pattern:(Course: ASPUBCMTSI.6 and Course: ASPUBCMTSII.6)

No.	Question Pattern	Marks
Q.1	Contains five sub questions out of student have to attempt any 3 (based on Unit I)	12
Q.2	Contains five sub questions out of student have to attempt any 3 (based on Unit II)	12
Q.3	Contains five sub questions out of student have to attempt any 3 (based on Unit III)	12
Q.4	Contains five sub questions out of student have to attempt any 3 (based on Unit IV)	12
Q.5	Contains five sub questions out of student have to attempt any 3 (based on Unit V)	12
Q.6.	Fill in the blanks by choosing appropriate options (10 MCQs)	10
Total		70

Theory:-Internal evaluation (30 Marks)

Description	Marks
Class Test	10
Assignment/Tutorial	10
Active Participation / Overall conduct	10
Total	**30**

Expected Learning Outcomes

(Programme Outcomes, Programme Specific Outcomes, Course Outcomes)

B.Com. Mathematics and Statistics

PO1. Acquires the ability to understand and analyze the problems.

PO2. Develops the skill to think critically on abstract concept of mathematics

PO3. Acquire the ability to think independently paving way for lifelong learning.

PO4. Analyses the situation, make a mathematical problem and find its solution.

PO5. Enhance logical reasoning skills, arithmetic skills, aptitude skills, communication skills, self confidence for better employability.

PO6. Formulates and develops mathematical arguments in logical manner.

PO7. Provide a systematic understanding of the concepts and theories of mathematical and computing their applications in the real world.

Programme Outcomes

PO1. Making familiar with statistical tools which are relatively used in business.

PO2. Imparting the ability to collect present, analyze and interpret data.

PO3. Ability to predict trend values by using list square methods in regression.

Programme Specific Outcomes: (PSO)s of B.Com. Mathematics and Statistics

Course Outcomes of B.Com. Mathematics and Statistics:

After completion of course following learning outcomes are expected.

Students will learn and understand the syllabus.