



**Vivekanand Education Society's
College of Arts, Science and Commerce
(Autonomous)**

Sindhi Society, Chembur, Mumbai, Maharashtra– 400 071.

Accredited by NAAC "A Grade" in 3rd Cycle - 2017

Best College Award – Urban Area, University of Mumbai (2012-13)

Recipient of FIST Grant (DST) and STAR College Grant (DBT)

Affiliated to the

University of Mumbai

Syllabus for

Program: B.Com. (Mathematical & Statistical Techniques)

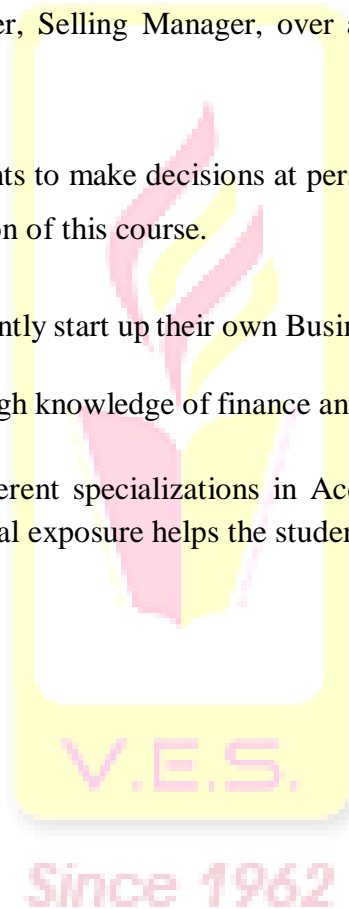
(Program code: VESUCMT)

**As per Choice Based Semester and Grading System (CBSGS)
with effect from Academic Year 2022 - 2023**

Program Outcomes (PO):

A learner completing B.Com will be able to:

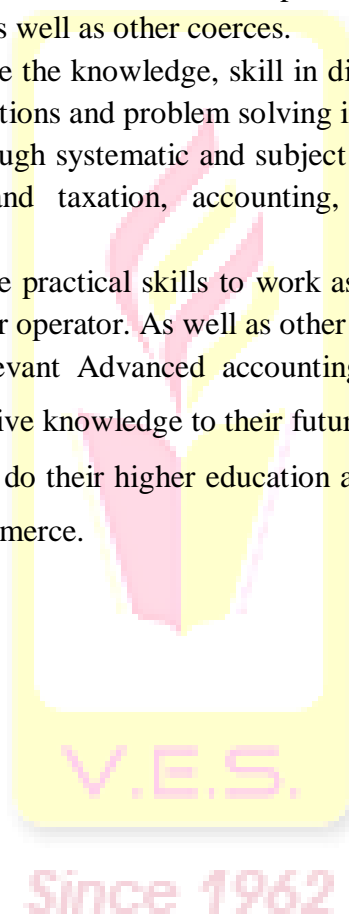
- PO1 This program could provide Industries, Banking Sectors, Insurance Companies, Financing companies, Transport Agencies, Warehousing etc., well trained professionals to meet the requirements.
- PO2 After completing graduation, students can get skills regarding various aspects like Marketing Manager, Selling Manager, over all Administration abilities of the Company.
- PO3 Capability of the students to make decisions at personal & professional level will increase after completion of this course.
- PO4 Students can independently start up their own Business.
- PO5 Students can get thorough knowledge of finance and commerce.
- PO6 The knowledge of different specializations in Accounting, costing, banking and finance with the practical exposure helps the students to stand in organization.



Program Specific Outcomes (PSO's)

On completion of B. Com. program, learners will be enriched with knowledge and be able to

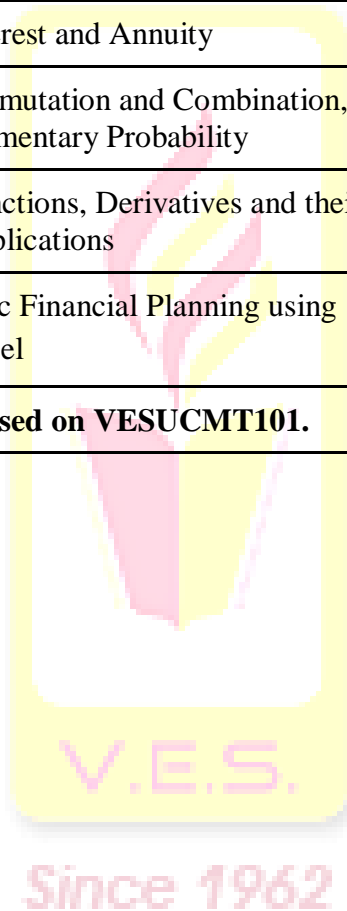
- PSO1 The students can get the knowledge, skills and attitudes during the end of the B.com degree course.
- PSO2 By goodness of the preparation they can turn into a Manager, Accountant , Management Accountant, cost Accountant, Bank Manager, Auditor, Company Secretary, Teacher, Professor, Stock Agents, Government employments and so on
- PSO3 Students will prove themselves in different professional exams like C.A. , C S, CMA, MPSC, UPSC. As well as other coerces.
- PSO4 The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day business activities.
- PSO4 Students will gain thorough systematic and subject skills within various disciplines of finance, auditing and taxation, accounting, management, communication, computer.
- PSO4 Students can also get the practical skills to work as accountant, audit assistant, tax consultant, and computer operator. As well as other financial supporting services
- PSO4 Students will learn relevant Advanced accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.
- PSO4 Students will be able to do their higher education and can make research in the field of finance and commerce.



F.Y.B.Com. (Mathematical & Statistical Techniques)

(SEMESTER I)

Course Code	Title	Credits & Lectures per Semester	Lectures per Week
VESUCMT101	Mathematical & Statistical Techniques I	03	05
	Unit I: Shares and Mutual Fund	15 Lectures	
	Unit II: Interest and Annuity	15 Lectures	
	Unit III: Permutation and Combination, Elementary Probability	15 Lectures	
	Unit IV: Functions, Derivatives and their Applications	15 Lectures	
	Unit V: Basic Financial Planning using Excel	15 Lectures	
	Tutorials based on VESUCMT101.		01



F.Y.B.Com. (Mathematical & Statistical Techniques)

(SEMESTER II)

Course Code	Title	Credits & Lectures per Semester	Lectures per Week
VESUCMT102	Mathematical & Statistical Techniques II	03	05
	Unit I: Decision Theory and Time Series	15 Lectures	
	Unit II: Statistical description of data, Central Tendencies	15 Lectures	
	Unit III: Dispersion, Correlation and Regression(basics)	15 Lectures	
	Unit IV: Probability Distributions	15 Lectures	
	Unit V: Data Analysis using Excel	15 Lectures	
	Tutorials based on VESUCMT102.		01



Detailed Syllabus: Unit wise / Module wise with number of lectures

Course title: Mathematical & Statistical Techniques I

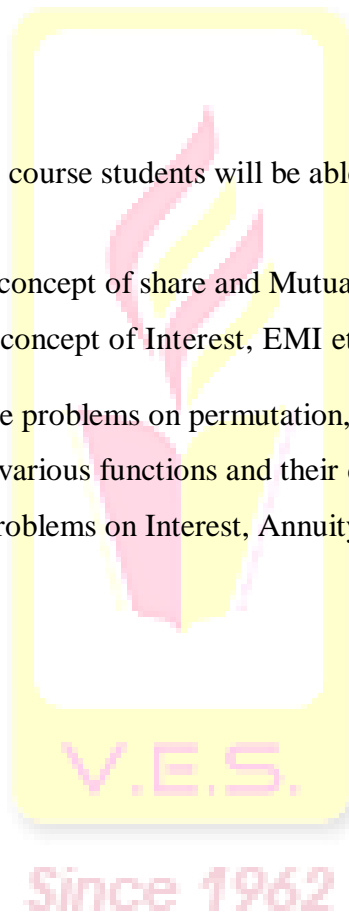
Course code: VESUCMT101

Objective: To understand and develop competence in use of Mathematical & Statistical Techniques

Learning Outcomes (LO):

On successful completion of this course students will be able to:

- LO1 To understand and use concept of share and Mutual Fund
- LO2 To use and understand concept of Interest, EMI etc
- LO3 To understand and solve problems on permutation, combination & Probability
- LO4 To use and understand various functions and their derivatives in business
- LO5 To use excel to solve problems on Interest, Annuity etc.



Unit no.	Details of topics	No of lectures
1	<p>Shares: Concept of share, face value, market value, dividend, equity shares, preferential shares, bonus shares. Simple examples.</p> <p>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.), Types of Mutual funds</p>	15 Lectures
2	<p>Interest: Simple Interest, Compound Interest (Nominal & Effective Rate of Interest),. Calculations involving upto 4 time periods.</p> <p>Annuity: Annuity Immediate and its Present value, Future value. Equated Monthly Instalments (EMI) using reducing balance method & amortization of loans. Stated Annual Rate & Effective Annual Rate Perpetuity and its present value. Simple problems involving up to 4 time periods.</p>	15 Lectures
3	<p>Permutation and Combination: Factorial Notation, Fundamental principle of counting, Permutation as arrangement, Simple examples, combination as selection, Simple examples, Relation between ${}^n C_r$ and ${}^n P_r$. Examples on commercial application of permutation and combination</p> <p>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, Complementary events. Classical definition of Probability, Addition theorem (without proof), conditional probability. Independence of Events: $P(A \cap B) = P(A) P(B)$. Simple examples.</p>	15 Lectures
4	<p>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.</p> <p>Derivative of functions:</p> <ol style="list-style-type: none"> i. Derivative as rate measure, Derivative of x^n, e^x, a^x, $\log x$. 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 	15 Lectures
5	<p>To learn how to find the following in Excel:</p> <ul style="list-style-type: none"> ● Simple, Compound interest ● Present value, future value, period, rate of return of Annuities ● EMI breakup, SIP ● Rate of return of portfolio 	15 Lectures

Detailed Syllabus: Unit wise / Module wise with number of lectures

Course title: Mathematical & Statistical Techniques II

Course code: VESUCMT102

Objective: To understand and develop competence in use of Mathematical & Statistical Techniques

Learning Outcomes (LO):

On successful completion of this course students will be able to:

- LO1 have greater insight into decision-making processes, use that insight to make more effective decisions, understand better how people perceive and decide about risk.
- LO2 To understand and use measures of central tendency
- LO3 To understand and use the measures of dispersion and also correlation and regression
- LO4 To understand and solve the problems based on Probability and Probability distributions
- LO5 To understand and use excel to create charts etc

Unit no.	Details of topics	No of lectures
1	<p>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</p> <p>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</p>	15 Lectures
2	<p>Textual, Tabular & Diagrammatic representation of data Frequency Distribution, Graphical representation of frequency distribution – Histogram, Frequency Polygon, Ogive</p> <p>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 to locate median and Quartiles. Using Histogram locate mode. Combined and Weighted mean</p>	15 Lectures
3	<p>Range, Quartile deviation, Standard deviation, Quarterly deviation, Correlation - Scatter diagram, coefficients of correlation Regression- least squares method</p>	15 Lectures
4	<p>Random Variable: Probability distribution of a discrete random variable; Expectation and Variance of random variable, simple examples on probability distributions.</p> <p>Probability Distributions: i. Discrete Probability Distribution: Binomial, Poisson (Properties and applications only, no derivations are expected) ii. Continuous Probability distribution: Normal Distribution. (Properties and applications only, no derivations are expected)</p>	15 Lectures
5	<p>To learn how to find the following in Excel:</p> <ul style="list-style-type: none"> ● Creating Different charts in Excel ● Interpreting charts in Excel ● Calculating measures of central tendency and dispersion using excel ● Plotting a linear trend graph 	15 Lectures

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 Stephen Waner and Steven Constenoble, Brooks/Cole Thomson Learning, second edition, Chapter 1 to 5.
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, Chapter 11.
8. Investments By J.C. Francis & R.W. Taylor, Schaum's Outlines, Tata Mc-Graw 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 1.1to 1.3.
10. STATISTICS by Schaum Series

Additional references:

11. Operations Research by Gupta and Kapoor
12. Operations Research by Schaum Series
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 of India)
16. Statistics Theory, Method & Applications D.S.Sancheti & V. K. Kapoor.
17. Modern Business Statistics (Revised} B. Pearles & C. Sullivan –Prentice Hall of India.
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.

Modality of assessment

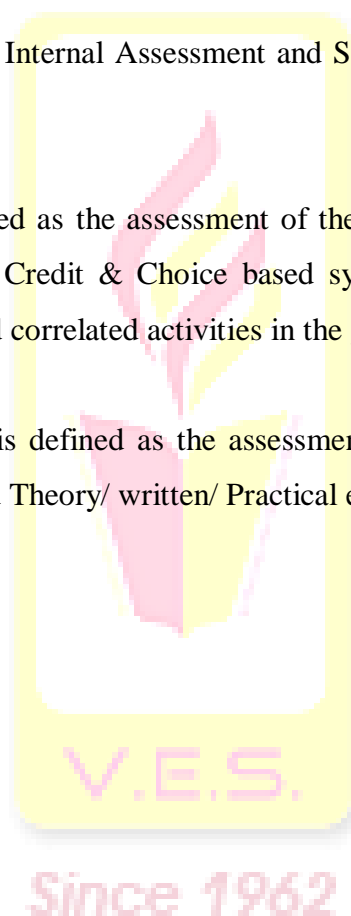
The performance of the learners shall be evaluated into two parts. The learner's performance shall be assessed by Internal Assessment with 25% marks in the first part & by conducting the Semester End Examinations with 75% marks in the second part.

Student will have to score 40% of marks in Internal assessment as well as End Sem examination to pass the course.

The allocation of marks for the Internal Assessment and Semester End Examinations are as shown below:-

Internal Assessment: It is defined as the assessment of the learners on the basis of internal evaluation as envisaged in the Credit & Choice based system by way of participation of learners in various academic and correlated activities in the given semester of the programme.

Semester End Assessment : It is defined as the assessment of the learners on the basis of Performance in the semester end Theory/ written/ Practical examination.



Overall Examination and Marks Distribution Pattern

SEMESTER I

Course	VESUCMT101	Grand Total
Theory	75	100
Internal	25	

SEMESTER II

Course	VESUCMT102	Grand Total
Theory	75	100
Internal	25	

A. Theory - Internal assessment 25%

25 marks

Sr No	Evaluation type	Marks
1.	Tutorial attendance and participation	5
2.	2 Tests Minimum, Maximum 3 - 10 Marks each	20

B. Theory - External examination - 75%

75 marks

Semester End Theory Assessment

Duration - Each paper shall be of 2.5 hours duration.

Theory question paper pattern :-

1. 5 questions of 15 Marks each unit
2. First four units, any three out of five (5 marks each question)
3. For Unit 5 questions will consist of 7 objective questions (two marks each. Attempt any 5 out of 7) and 2 subjective questions (5 marks each, attempt any 1 out of 2)