Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Social Sciences, Humanities and Arts
Choice Based Credit System (CBCS) in Light of NEP-2020
B.A. Honors Economics
Semester V (2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BAHNECO501	CC	Economic Development and Planning	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives:

CEO1: To provide the knowledge about the basic terms of growth and development.
CEO2: To enable students to understand various theories of growth.
CEO3: To help students in identifying various approaches to economic development.
CEO4: To relate human resources with economic development.
CEO5: To summarize various theories of economic development.

Course Outcomes:

Students will be able to:

CO1: Define basic concepts related to growth and development.
CO2: Comprehend various theories of growth.
CO3: Demonstrate the approaches to economic development.
CO4: Link human resources with economic development.
CO5: Discuss various theories of economic development.

Contents

UNIT I: Economic Growth and Development

Economic Growth and Development: Meaning, Definitions, Vicious Circles of Poverty; Measures of Development in Relation to Human Development Index.

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UNIT II: Theories of Growth

Classical Growth Models: Adam Smith; Gunnar Myrdal's Theory of Backwardness and Spread Effect; Rostow's Stages of Economic Growth, Harrod-Domar.

UNIT III: Approaches of Economic Development

Schumpeter's Theory, Balanced and Unbalanced Growth; Low Income Equilibrium Trap, Critical Minimum Hypothesis

UNIT IV: Human Resource and Economic Development

Concept of Intellectual Capital and Human Resource Development; Population Problem and Growth Pattern of Population

UNIT-V: Theories of Development

Mahalonobis Model, Leibenstien's Model, Lewis Model, Sustainable Development, Inclusive Growth

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Name of the Program: B. Sc. (Plain)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA504	DC	**Numerical Methods And Linear Programming**	60	20	20	-	-	4	0	-	4

Course Objective

To introduce the students with the Fundamentals of the Numerical Methods and Linear Programming

Course Outcomes

This course will enable the students to:

1. *Learn about various interpolating and extrapolating methods.*
2. *Apply various numerical methods to obtain numerical solution of definite integration and algebraic and transcendental equations.*
3. *Analyze and solve linear programming models of real-life situations.*
4. *estimate the graphical solutions of linear programming problems with two variables and illustrate the concept of convex set.*
5. *Apply the simplex method.*
6. *Apply transportation, assignment problems to real life problems.*

Course Content

UNIT – I

Approximate numbers, Significant figures, Rounding off numbers. Error –Absolute, Relative and Percentage. **Operators** - Δ ,∇ and E (Definitions and some relations among them).**Interpolation :** The problem of Interpolation, Equispaced arguments – Difference Tables, Deduction of Newton's Forward Interpolation Formula. Remainder term (expression only). Newton's Backward Interpolation formula(statement only) with remainder term. Unequally – spaced arguments –Lagrange's Interpolation Formula (statement only). Numerical problems on Interpolation with both equi and unequally-spaced arguments.

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Name of the Program: B. Sc. (Plain)

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA504	DC	**Numerical Methods And Linear Programming**	60	20	20	-	-	4	0	-	4

UNIT – II

Number Integration: Trapezoidal and Simpson's ⅓rd formula (statement only). Problems on Numerical Integration. **Numerical Solution of Equation:** To find a real root of an algebraic or transcendental equation. Location of root (Tabular method), Bisection method. Newton-Raphson method with geometrical significance. Numerical problems.

UNIT – III

Linear Programming: Motivation of Linear Programming problem. Statement of L.P.P. formulation of L.P.P. Slack and Surplus variables. L.P.P. is matrix form. Convex set, Hyperplane, Extreme points, Convex Polyhedron, Basic solutions and Basic feasible Solutions (B.F.S.) Degenerate and Non-degenerate B.F.S. The set of all feasible solutions of an L.P.P. is a convex set. The objective function of an L.P.P. assumes its optimal value at an extreme point of the convex set of feasible solutions. A B.F.S. to an L.P.P. corresponds to an extreme point of the convex set of feasible solutions.

UNIT – IV

Fundamental Theorem of L.P.P. (Statement only). Reduction of a feasible solution to a B.F.S. Standard form of an L.P.P. Solution by graphical method (for two variables), by simplex method and method of penalty. Concept of duality. Duality theory. The dual of the dual is the primal. Relation between the objective values of dual and the primal problems. Dual problems with at most one unrestricted variable, one constraint of equality.

UNIT – V

Transportation and Assignment problems and their optimal solutions.

Texts:

1. Numerical methods – E. Balagurusamy (Tata McGraw Hill).
2. Introduction to numerical analysis – F. B. Hilderbrand (TMH Edition).

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			END SEM	MST	Q/A	END SEM	Q/A				
SMA504	DC	**Numerical Methods And Linear Programming**	60	20	20	-	-	4	0	-	4

3. Numerical Analysis – J. Scarborough.
4. Introduction to numerical analysis – Carl Erik Froberg (Addison WesleyPublishing).
5. Numerical methods for science and engineering – R. G. Stanton (Prentice Hall).
6. Linear Programming : Method and Application – S. I. Gass.
7. Linear Programming – G. Hadley.
8. An Introduction to Linear Programming & Theory of Games – S. Vajda.

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Name of the Program: B. Sc. (Statistics)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSST501	DC	Applied Statistics	60	20	20	0	0	4	0	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
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Course Objective

To introduce the Students with the Fundamentals of the Applied Statistics.

Course Outcomes

After the successful completion of this course students will be able to:

- *Understand the different measures of population.*
- *Calculate the mortality and fertility rates, analyze it and interpret about the output.*
- *Construct the life table for the complete life span of the population.*
- *Understand and calculate the indices to measure price and quantity over period of time.*
- *Demonstrate and understand of the concepts of time series and trend analysis.*
- *Apply Ideas to real time series data and interpret outcomes of the analysis.*
- *Understand and apply the laws of demand and supply, estimate the price elasticity of demand and supply and analyze the income distribution.*

Course Content:

UNIT I

Vital Statistics: Introduction, uses of vital Statistics method of obtaining vital -Statistics: -- Registration method, census-method. , Measurement of Mortality: Crude death rate, Standardized death rates, Age specific death rates, with their relative merits and demerits. Infant Mortality rate. Complete life table and its main components, Uses of life table.

UNIT II

Stationary and stable population, Latka and Dublin's model for stable population. Central mortalit rate, force of mortality. Measurement of Fertility rates: Crude birth rate, (age specific birth rat general fertility rate, total fertility rate, with their merits and demerits. Measurement of

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Name of the Program: B. Sc. (Statistics)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSST501	DC	Applied Statistics	60	20	20	0	0	4	0	0	4

population Growth rates: Crude rare of natural increase and Pearle's vital index, Gross reproduction rate (GRR), Net reproduction rate (NRR).

UNIT III

Index Numbers: Introduction, definition, Problems in constructing Index numbers, Price, quantity and volume relatives, Link and chain relatives, computation of index numbers: Laspeyre's. Paaschc's. Marshal Edgeworth 's and Fisher's index numbers; chain base index number, criteria of a good index number, cost of living Index number.

UNIT IV

Time series: introduction, components of time series, mathematical models for time series, uses of time series, measurement of trends: Graphical method, Method of semi averages, Method of moving average, Method of least squares. Growth curves and their fitting Modified exponential curve and its fitting. Methods of determination of seasonal variation.

UNIT V

Demand Analysis: Introduction, Definition of demand and supply, laws of supply and demand, price elasticity of demand, price elasticity of supply, types of data required for estimating elasticity. Pareto's law of income distribution, curve of concentration, (Lorenz curve and estimation of elasticity from time series data) , log normal distribution.

Suggested Reading: -

1. Mukhopadhyay, P.: Applied Statistics, new Central Book Agency Pvt. Ltd., Calcutta.
2. Srivastava O.S.: A Textbook of Demography, Vikas Publishing House, New Delhi.
3. Goon A.M., Gupta M.K. and Dus Gupta B.: Fundamentals of Statistics. Vol. II, World Press, Calcutta.
4. V. K. Kapoor and S. C. Gupta : Fundamental of Applied Statistics, Sultan Chand and Co
5. Chatfield, C.: The analysis of Time series, Chapman and Hall.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSSTPR503	DC	Statistics Practical V	0	0	0	30	20		0	4	2

List of Practical's

1. Fitting and plotting of modified exponential curve
2. Fitting and plotting of Gompertz curve
3. Fitting of trend by Moving Average Method
4. Measurement of seasonal indices Link Relative method
5. To calculate CDR and Age Specific death rate for a given set of data
6. To find Standardized death rate by:- (i) Direct method (ii) Indirect method
7. To construct a complete life table
8. To fill in the missing entries in a life table.
9. To calculate CBR, GFR, SFR, TFR for a given set of data
10. Calculate GRR and NRR for a given set of data and compare them
11. To calculate the Laspeyre's Index number.
12. To calculate the Paaschc's Index number.
13. To calculate the Fisher's index number.
14. To find the demand analysis in the given data.

Suggested Reading: -

1. Mukhopadhyay, P.: Applied Statistics, new Central Book Agency Pvt. Ltd., Calcutta.
2. Srivastava O.S.: A Textbook of Demography, Vikas Publishing House, New Delhi.
3. Goon A.M., Gupta M.K. and Dus Gupta B.: Fundamentals of Statistics. Vol. II, World Press, Calcutta.
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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA505(A) **BSST502**	DC	**Elective-I** **Group A: Analytical Dynamics** **Group B: Game Theory**	60	20	20	-	-	3	-	-	3

(1) Analytical Dynamics

Course Objective

To introduce the students with the Fundamentals of the Analytical Dynamics

Course Outcomes

After the successful completion of this course students will be able to:

1. *understand and solve problems of the motion of a particle.*
2. *solve the problems of the motion under forces.*
3. *understand and apply the concepts of the motion in 2D.*

Course Content:

UNIT – I

Velocity and Acceleration of a particle. Expressions for velocity and acceleration in rectangular Cartesian and polar co-ordinates for a particle moving in a plane. Tangential and normal components of velocity and acceleration of a particle moving along a plane curve.

UNIT – II

Concept of Force: Statement and explanation of Newton's laws of motion. Work, power and energy. Principles of conservation of energy and momentum. Motion under impulsive forces. Equations of motion of a particle (i) moving in a straight line, (ii) moving in a plane.

UNIT – III

Study of motion of a particle in a straight line under (i) constant forces, (ii) variable forces (S.H.M., Inverse square law, Damped oscillation, Forced and Damped oscillation, Motion in an elastic string). Equation of Energy. Conservative forces.

UNIT – IV

Motion in two dimensions : Projectiles in vacuo and in a medium with resistance varying linearly as velocity. Motion under forces varying as distance from a fixed point.

UNIT – V

Central orbit. Kepler's laws of motion. Motion under inverse square law.

Texts:

1. An Elementary Treatise on the Dynamics of a Particle & of Rigid bodies – S. L. Loney (Macmillan).

2. Dynamics of Particle and of Rigid Bodies – S. L. Loney.

(2) Game Theory

Course Objective

To introduce the students with the Fundamentals of the Game Theory

Course Outcomes

After the successful completion of this course students will be able to:

1. *understand the basic terminology in game theory.*
2. *solve the problems of game to find the optimal solution.*
3. *know the graphical solution of the game problem.*
4. *Know the solution of general game by algebraic method.*
5. *understand and apply the concepts of linear programming to solve the two person zero sum game problem.*

Course Content:

Unit 1

Definition and explanation of some important Term in games. Characteristic of game theory. Major limitation of game theory. Co-operative and Non co-operative games, zero-sum & non-zero-sum games. Examples Types of strategies: pure strategies and mixed strategies. Maximin and minimax principles. Fundamental theorem of game.

Unit II

Saddle point (Equilibrium) point, rules of determining a saddle point. Optimal strategies and value of the game. (2×2) two –person zero-sum without saddle points, value of a game, fair and strictly determinable games.

Unit III

Concept of dominance in games, Inferior and superior strategies, dominance property. Generalized dominance property. Reduction of size of game. Graphical method for $(2\times n)$ and $(m\times 2)$ games. A short cut method for $(n \times n)$ games.

Unit IV

Algebraic method for the solution of a general Game. Iterative method for approximate solution of a game. Symmetric games.

Unit V

Linear Programming, Canonical and standard forms. Simplex method. Duality in linear programming, principles of duality. Importance of duality. Solution of two-person, zero-sum game by transforming into linear programming. Prisoner's dilemma (Examples). Elementary concept of Shapely value and nucleolus in games. Some applications of the games.

Texts:

1. Operation Research, by: W.L. Winston, Thomson Publishers
2. Mathematical Methods and Theory in Games, Programming and Economics, by: S. Karlin, Dover Publications, Mineola, NY
3. Game Theory, by: G. Owen, 3rd Ed., Academic Press, San Diego, 1995
4. Game Theory, by: D. Fudenberg and J. Tirole, MIT Press, Cambridge
5. Mathematical Programming Techniques, by: N.S. Kambo, Affiliated East-West Press (1984)

Game Theory: Analysis and Conflicts, by: R.B. Meyerson, Harvard Univ. Press, Cambridge, MA 1991.