



## Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

### ML-301 ENVIRONMENT AND ENERGY STUDIES

SUBJECT CODE	CATEGORY	SUBJECT 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*				
ML-301	Compulsory	Environment and Energy Studies	60	20	20	0	0	4	0	0	4

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

**\*Teacher's Assessment** shall be based upon following components: Quiz/Assignment/Project/Participation in Class, given that no component shall exceed more than 10 marks.

#### Course Objectives :

1. Understand sources of information required for addressing environmental challenges.
2. Identify a suite of contemporary tools and techniques in environmental informatics.
3. Apply literacy, numeracy and critical thinking skills to environmental problem-solving.

#### Course Outcomes

1. Apply the principles of ecology and environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community.

**Unit I: Environmental Pollution and Control Technologies** - Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

**Unit II: Natural Resources** - Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources:

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Growing energy needs, renewable energy source, case studies.

**Unit III: Ecosystems:** Definition, Scope and Importance ecosystem. Classification, Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, Ecosystem Value, Devices and Carrying Capacity, Field visits.

**Unit IV: Biodiversity and its Conservation** - Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a megadiversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man wild life conflicts; Conservation of biodiversity: In-situ and Ex-situ conservation. National Biodiversity Act.

**Unit V: Environmental Policy, Legislation & EIA** - Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP)

### Recommended Readings:

1. Agarwal, K.C. (2001). *Environmental Biology*. Bikaner: Nidi Pub. Ltd.
2. Brunner, R.C. (1993). *Hazardous Waste Incineration*. New Delhi: McGraw Hill Inc.
3. Clank, R.S. (2001). *Marine Pollution*. New York: Oxford University Press.
4. De, A.K. (2001). *Environmental Chemistry*. New Delhi: Wiley Western Ltd.
5. Bharucha , Erach (2005). *Environmental Studies for Undergraduate Courses*. New Delhi: University Grants Commission.
6. Rajagopalan, R. (2006). *Environmental Studies*. New York: Oxford University Press.
7. AnjiReddy, M. (2006). *Textbook of Environmental Sciences and Technology*. BS Publication.
8. Wright, Richard T. (2008). *Environmental Science: towards a sustainable future* .New Delhi: PHL Learning Private Ltd.
9. Gilbert M. Masters and Wendell P. Ela .(2008). *Environmental Engineering and science*. University Kindom: PHI Learning Pvt Ltd.
10. Botkin ,Daniel B. & Edwards A. Keller(2008). *Environmental Science*. New Delhi: Wiley INDIA edition.
11. Kaushik ,Anubha (2009). *Environmental Studies*. New Delhi: New age international publishers.

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Indore

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSST303	DC	Statistical Inference	60	20	20	50	-	3	1	2	6

## Course Objective

*To introduce the students with the Fundamentals of the Statistical Inference*

## Course Outcomes

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

- 1. understand and apply the basics of the Estimation theory.*
- 2. know the principle of test of significance.*
- 3. solve the problem related to non-parametric test.*
- 4. solve the problems of the large and small sample test.*

## Course Content:

### UNIT – I

Theory of Estimation: Definition of a random sample, Parameter and Statistic. Concepts of point and interval estimation, criterion of a good estimator; Unbiasedness, Consistency, efficiency and sufficiency; Mean square error of-an estimate, Method of maximum likelihood estimation. Cramer - Rao inequality and its applications confidence interval.

### UNIT – II

Concept of Test of Significance, Null and alternative hypothesis, Simple and composite hypothesis. Type I and II errors, Critical region and level of significance. One and two tailed tests, Neymann Pearson lemma for construction of most powerful tests for simple null versus simple alternative for the parameters of Binomial, Poisson and Normal distributions. Likelihood ratio test, Likelihood ratio test for single mean.

### UNIT – III

Non parametric Tests: Order statistics: Definition, distributions of single, joint and marginal density functions. Advantages and disadvantages of non-parametric methods. Run test for randomness, sign tests for univariate and bivariate distribution, Wilcoxon's signed ranked test for univariate and bivariate distribution, Mann-Whitney U test, Wald-Wolfowitz run test, Median test (Applications only).

## UNIT – IV

Sampling Distribution Sampling distribution of a statistic, definition of standard error and some examples. Sampling distribution of Sum of binomial and poisson variates. Sampling distribution of mean of normal distribution. Derivation of Chi-Square, Student's t, Fisher's t and F distributions with their properties, relation between Chi-Square, t and F.

## UNIT – V

Large Sample Tests: Test of significance of single proportion, z-test of significance for single mean and for difference of means. **Small Sample Test:** t- Test for single mean, and difference of means, paired t-test, F- test for equality of population variances. Conditions for the validity of Chi-square test for goodness of fit, test for independence of attributes: (Contingency table). Fisher's Z-transformations and their applications.

### SUGGESTED READINGS:

1. Goon A.M., Gupta M.K.: Das Gupta.B. (2005), Fundamentals of Statistics, Vol. I, World Press, Calcutta.
2. Rohatgi V. K. and Saleh, A.K. Md. E. (2009): An Introduction to Probability and Statistics. 2<sup>nd</sup> Edn. (Reprint) John Wiley and Sons.
3. Miller, I. and Miller, M. (2002) : John E. Freund's Mathematical Statistics (6th addition, low price edition), Prentice Hall of India.
4. Dudewicz, E. J., and Mishra, S. N. (1988): Modern Mathematical Statistics. John Wiley & Sons.
5. Mood A.M, Graybill F.A. and Boes D.C.: Introduction to the Theory of Statistics, McGraw Hill.
6. Bhat B.R, Srivenkatramana T and Rao Madhava K.S. (1997) Statistics: A Beginner's Text, Vol. I, New Age International (P) Ltd.
7. Snedecor G.W and Cochran W.G.(1967) Statistical Methods. IOWA State University Press.

### List of Practical

1. Unbiased estimators (including unbiased but absurd estimators)
2. Consistent estimators, efficient estimators and relative efficiency of estimators.
3. Cramer-Rao inequality and MVB estimators
4. Sufficient Estimators – Factorization Theorem, Rao-Blackwell theorem, Complete Sufficient estimators
5. Lehman-Scheffe theorem and UMVUE
6. Maximum Likelihood Estimation

7. Asymptotic distribution of maximum likelihood estimators
8. Estimation by the method of moments, minimum Chi-square
9. Type I and Type II errors
10. Most powerful critical region (NP Lemma)
11. Uniformly most powerful critical region
12. Unbiased critical region
13. Power curves
14. Likelihood ratio tests for simple null hypothesis against simple alternative hypothesis
15. Likelihood ratio tests for simple null hypothesis against composite alternative hypothesis
16. Asymptotic properties of LR tests.

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 304	DC	Integral Calculus	60	20	20	-	-	3	1	-	4

## Course Objective

*To introduce the students with the Fundamentals of the Integral Calculus*

## Course Outcomes

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

- 1. evaluate some standard integrals.*
- 2. know and apply various properties of the Definite Integral.*
- 3. find length, surface area and the volume by single and the multiple integrals.*

## Course Content:

### UNIT – I

**Integration:** Integration of the form :  $\int \frac{dx}{a \cos x + b \sin x + c}$ ,  $\int \frac{a \cos x + b \sin x + c}{p \cos x + q \sin x + r} dx$  and

Integration of Rational functions, six important integral, Reduction formulae of  $\int \sin^m x \cos^n x dx$ ,  $\int (\sin^m x / \cos^n x) dx$ ,  $\int \tan^n x dx$  and associated problems (m and n are non-negative integers).

### UNIT – II

**Definite Integral:** Evaluation of definite integrals, Properties of integral Calculus, Integration as the limit of a sum (with equally spaced as well as unequal intervals), summation of series.

### UNIT – III

**Definition of Improper Integrals:** Statements of (i)  $\mu$ -test, (ii) Comparison test (Limit form excluded) – Simple problems only. Use of Beta and Gamma functions (convergence and important relations being assumed).

### UNIT – IV

**Rectification:** Length of Plane Curve, Intrinsic Equation of a Curve, Quadrature, Working knowledge of Double integral, Application of Double integral, Change Order of integration.

## **UNIT – V**

**Volume and Surfaces of Revolution:** Volume and Surface areas of solids formed by revolution of plane curve and areas Problems only.

### **Texts:**

- 1 Integral Calculus – Shanti Narayan & P. K. Mittal (S. Chand & Co. Ltd.)
- 2 Integral Calculus – H. S. Dhani (New Age International)
- 3 Integral Calculus – B. C. Das & B. N. Mukherjee (U. N. Dhur)
- 4 Differential & Integral Calculus (Vols. I & II) – Courant & John.
- 5 Differential & Integral Calculus (Vol. I) – N. Piskunov (CBS Publishers & Distributors)
- 6 Integral Calculus – Shantinayakan.

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSMA 305	DC	Differential Equation	60	20	20	-	-	3	1	-	4

## Course Objective

*To introduce the students with the Fundamentals of the Differential Equation*

## Course Outcomes

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

- 1. solve first order and first degree differential equation.*
- 2. find the solution of first order and higher degree differential equation.*
- 3. apply the techniques of the orthogonal trajectories.*
- 4. know the solution of the second order linear differential equation.*
- 5. solve Euler's Homogeneous equations.*

## Course Content:

### UNIT – I

**Differential equation of first degree and first order:** Order, degree and solution of an ordinary differential equation (ODE) in presence of arbitrary constants, Formation of ODE, First order equations, Variables separable, Homogeneous equations and equations reducible to homogeneous forms, Exact equations and those reducible to such equation, Euler's and Bernoulli's equations (Linear).

### UNIT – II

**Equation of the first order but not of the first degree:** Equation solvable for P, Equation solvable for X, Equation solvable for y, Clairaut's Equations (General and Singular solutions).

### UNIT – III

**Orthogonal Trajectories:** Definition, Cartesian coordinates, polar coordinates, Self Orthogonal families.



## **UNIT – IV**

**Second order linear equations:** Second order linear differential equations, with constant coefficients, operator, Rule of finding particular integral.

## **UNIT – V**

**Homogeneous equations:** Euler's Homogeneous equations, Equation reducible to homogeneous form.

### **Texts:**

1. Differential Equations – Lester R. Ford (McGraw Hill).
2. Differential Equations – S. L. Ross (John Wiley).
3. Differential Equations – H. T. H. Piaggio.
4. A Text Book of Ordinary Differential Equations – Kiseleyev, Makarenko & Krasnov (Mir).
5. Differential Equations – H. B. Phillips (John Wiley & Sons).
6. Differential Equations with Application & Programs – S. Balachanda Rao, H. R. Anuradha (University Press).
7. Text Book of Ordinary Differential Equations (2nd Ed.) – S. G. Deo, V. Lakshmikantham & V. Raghavendra (Tata McGraw Hill).
8. An Elementary Course in Partial Differential Equation – T. Amarnath (Narosa).
9. An Introductory Course on Ordinary Differential Equation – D. A. Murray.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## B.A.

Batch: 2019-22

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BA305	Compulsory	Macroeconomics-I	5	-	-	5	60	20	20	-	-

**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 Objectives:**

1. To understand the microeconomics and familiarise the students with the different concepts of microeconomics in social scenario.

**Course Outcomes :**

1. Understand the basic concepts in Macroeconomics.
2. Learn the definition, measurement of the macroeconomic variables.
3. Explain the various theories of determining GDP in the short run.

**Syllabus:**

**UNIT I Introduction**

Macro vs. Micro Economics; Why Study Macroeconomics? Limitations of Macroeconomics; Stock and Flow variables, Equilibrium and Disequilibrium, Partial and General Equilibrium Statics – Comparative Statics and Dynamics

**UNIT II National Income Accounting**

Concepts of GDP and National Income; measurement of national income and related aggregates; nominal and real income, limitations of the GDP concept.

**UNIT III Theory of Multiplier and Accelerator**

The concept of Investment Multiplier, Accelerator, Working of Multiplier Leakages in multiplier process, paradox of thrift, Static and Dynamic Multiplier. Theory of Accelerator

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## B.A.

Batch: 2019-22

### Unit IV Money

Functions of Money, Supply of Money, High Powered Money, Money Multiplier  
Quantity Theory of Money – Cash Transactions, Cash Balances and Keynesian  
Approaches.

### Unit V Inflation and Unemployment

Inflation – Meaning, methods of measuring Inflation Types of Inflation- Demand – pull  
inflation, Cost push Inflation, Effects of Inflation, Policy Measures to control Inflation.  
Meaning, measurement and kinds of unemployment.

### Text Books:

1. H L Ahuja (2018). *Principles of Macroeconomics*, S. Chand Publication; New Delhi.
2. D N Dwivedi (2015), *Macroeconomics Theory and Policy*, McGraw Hill Education (India) Pvt Limited, New Dehli

### Reference Books:

1. Case, Karl E. & Ray C. Fair.(2007). *Principles of Economics*, Pearson Education, Inc.,  
8 th edition.
2. Sikdar, Shoumyen, *Principles of Macroeconomics*, 2nd Edition, Oxford University  
Press, India.