Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Degree Program B.Sc.

Semester-II (B.Sc.)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BSPHU 201	DC	Foundation Course-II	60	20	20	00	00	3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A –Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Objectives:-

1. To develop the comprehensive understanding of English related to communication and behavior and ability to apply them for laying the foundation for research and development.

2. To work ethically as member as well as leader in a diverse team.

Course Outcomes:-

1. Student will be able to understand and solve the problems related to communication .

2. Student will be able to understand and solve the problems related to their behavior.

Syllabus Foundation Course II

Unit 1: Grammar and Its Usage: Prepositions, Determiners, Model Verbs, And Adjectives

Unit 2: Speaking Skills: Debate, Group Discussion, Extempore

Unit 3: Listening: Importance, Difference between Listening and Hearing, Types of Listening

Unit 4: Business Letter Writing: Enquiry, Quotation, Tender, Order, Complaint and Adjustment

Unit 5: Report: Types, Quality of Good Report

Recommended Readings:

- Aruna Koneru.(2015) **English Language Skills.** New Delhi: Tata Mcgraw Hill.
- Mark Lesterr Larry Beason.(2012) **A Hand Book of English Grammar and Usage**(2 edition).McGraw Hill Education.
- Sadhana Gupta.(2008) **Communication Skills and Functional Grammar**. New Delhi: University Science Press
- A.J. Thomson and A.V. Martinet.(1991) **A Practical English Grammar**(4thed). Newyork: Oxford IBH Pub.
- Ashraf Rizvi. (2005). **Effective Technical Communication**. New Delhi:Tata Mc Graw Hill
- Sanjay Kumarm Pushp Lata. **English for Effective Communication**. New Delhi: Oxford University Press India.

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SEMESTER II Life Science

BS. P. LS 202. Ecology, Biodiversity and Evolution

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			End Semester University Exam	Term Two Exam	Teachers Assessment*	University Exam	Teachers Assessment*	th	T	P	CREDITS
BS.P.LS 202	DC	Ecology, Biodiversity and Evolution	60	20	20	30	20	4	1	4	7

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

Course Objective:

1. To give a comprehensive idea of origin and diversity of plants and animals
2. To give a comprehensive idea of ecological principle, natural environment and environmental pollution

Course Outcome:

1. Student will have the knowledge of evolution and diversity of plants and animals
2. Student will have the knowledge of ecological principles and natural environment
3. Student will be able to understand problems related to biological conservation and prevention of environmental pollution

A. Ecology

Unit - I

Ecosystem Concept and Structure; Trophic Levels – Producers, Consumers, Decomposers;
Ecological Pyramids; Pyramids of Number, Biomass and Energy
Energy Flow in Ecosystem; Food Chains and Food Web
Biotic and Abiotic Factors of Ecosystem; Positive and Negative Biotic interactions

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Unit – 2

Ecological adaptations of hydrophytes, xerophytes and halophytes
Ecological succession: Primary and Secondary Succession; Hydrarch and Xerach Succession
Biogeochemical cycles: Nitrogen, Carbon, Sulphur and Phosphorus cycles.

Unit – 3

Air Pollution; Climate Change; Green House Gases and Global Warming; Acid Rain; Ozone Depletion and Solar UV

Water Pollution; BOD; COD; Pollution by Heavy Metals, Pesticides; Waste water treatment

Solid Waste; Domestic, Hospital and Industrial

B. Biodiversity and Evolution

Unit – 4

Theories of Organic evolution: Lamarckism and Neo Lamarckism, Darwinism and Neo Darwinism, Germplasm theory, Mutation theory.
Origin of prokaryotic and eukaryotic cell; Gaia Hypothesis
Gene pool. Random genetic drift, Hardy Weinberg law
Isolation - types and mechanisms; Speciation

Unit – 5

Plant Diversity: Major groups and salient features of Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms
Animal Diversity: Major groups and salient features of Invertebrates and Vertebrates

Books:

1. Environmental Science: *A New Approach* . Dahiya, P.and Ahlawat, M. Narosa Publishers
2. Ecology - Subrahmanyam, N.S. and Sambamurty, A. V. S. S. Narosa Publishing House
3. Concepts of Ecology - Kormondy, E. J. (1996), Prentice Hall, USA, 5th Edition
4. Ecology and Environment - Sharma P. D. (2010), Rastogi Publication, Meerut, India, 8th Edition
5. Biology - Raven P.H., Johnson G.B., Losos J.B. and Singer S.R. (2005), Tata McGraw Hill, Delhi, India

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Semester-II

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BS.P.CH. 203	DC	PHYSICAL CHEMISTRY-II	60	20	20	30	20	3	1	4	6

Legends: L - Lecture; T – Tutorial / Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/ Assignment / Attendance, MST Mid Sem Test.

***Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 mark**

Physical Chemistry- II

COURSE OBJECTIVE:

1. To develop the understanding of fundamentals of Thermodynamics & its applications.
2. To give basic knowledge of Chemical equilibrium and Solution.

COURSE OUTCOMES

After completion of the course the students are expected to be able to demonstratefollowing knowledge, skills and attitude. The students demonstrate capability of understanding :
Theoretical understanding of fundamentals of Thermodynamics & its applications.

Become aware of fundamentals of Chemical equilibrium and Solution.

SYLLABUS:

Unit-I: Chemical Thermodynamics- I :

Intensive and extensive variables; state and path functions; isolated, closed and open systems. First law: Concept of heat, Q, work, W, internal energy, U, and statement of first law; enthalpy, H, relation between heat capacities, calculations of Q, W, ΔU and ΔH for reversible, irreversible and free expansion of gases (ideal and van der Waals) under isothermal and adiabatic conditions. Thermochemistry: Heats of reactions: standard states; enthalpy of formation and enthalpy of combustion and its applications; effect of temperature (Kirchhoff's equations) and pressure on enthalpy of reactions. Second Law:Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics. Calculation of entropy change for reversible and irreversible processes.

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Unit-II: Chemical Thermodynamics- II :

Third Law: Statement of third law, concept of residual entropy, calculation of absolute entropy of molecules. Free Energy Functions: Gibbs and Helmholtz energy; variation of S, G, A with T, V, P; Free energy change and spontaneity. Relation between Joule- Thomson coefficient and other thermodynamic parameters; inversion temperature; Gibbs-Helmholtz equation; Maxwell relations; thermodynamic equation of state. Systems of Variable Composition: Partial molar quantities, dependence of thermodynamic parameters on composition; Gibbs Duhem equation, chemical potential of ideal mixtures, change in thermodynamic functions in mixing of ideal gases.

Unit-III: Thermodynamic Equilibrium:

Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases. Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient. Equilibrium constants and their quantitative dependence on temperature, pressure and concentration (Le Chatelier Principle, Quantitatively)). Free energy of mixing and spontaneity. equilibrium between ideal gases and a pure condensed phase.

Unit-IV: Solutions and Colligative Properties-I:

Ideal solution-Thermodynamics of Ideal solutions; Raoult's Law- derivation of Raoult's Law; NonIdeal or real solutions; activity and activity coefficeent; colligatives properties: (i) relative lowering of vapour pressure- determinaton of molecular weight; osmotic pressure- osmosis, measurment of osmotic pressure, Law of osmotic pressure and determinaton of molecular weight.

Unit-V: Solutions and Colligative Properties-II:

Elevation in boiling point: Thermodynamic derivation of relation between molecular weight and elevation in boiling point, determinaton of molecular weight.
Depression of freezing point: Thermodynamic derivation of relation between molecular weight and depression of freezing point, determinaton of molecular weight.
Abnormal molarmass- Degree of dissositation and degree of association; Van't Hoff factor (i).

Reference Books:

1. Peter, A. & Paula, J. de. Physical Chemistry 9th Ed., Oxford University Press (2011).
2. Castellan, G. W. Physical Chemistry 4th Ed., Narosa (2004).
3. Engel, T. & Reid, P. Physical Chemistry 3rd Ed., Prentice-Hall (2012).
4. McQuarrie, D. A. & Simon, J. D. Molecular Thermodynamics Viva Books Pvt. Ltd.: New Delhi (2004).

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Semester – II Biotechnology

BS. P. BT. 204: Genetics and Molecular Biology

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			End University Exam	Term Two Exam	Teachers Assessment*	University Exam	Teachers Assessment*	Th	T	P	CREDITS
BS.P.BT 204	DC	Genetics and Molecular Biology	60	20	20	30	20	4	1	4	7

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

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

Course Objectives:

1. To have the knowledge of principles of genetics
2. To have the knowledge of molecular biology and the role of macromolecules in transfer of genetic information

Course Outcomes:

1. Student will be able to understand the classical experiments of genetics that laid the foundations of genetic principles
2. Student will be able to understand the molecular nature of genes and techniques of transferring genes

A. Genetics

Unit – I

Mendelian Laws of genetics, Dominance, Segregation, Independent Assortment; Epistasis, Complementary ratio and supplementary ratio. Cytoplasmic inheritance; plastid and kappa particles.

Linkage and crossing over (Coupling and repulsion hypothesis) Mechanism of crossing over and its significance.

Mechanism of sex determination (Chromosomal theory), sex linked inheritance.

Unit-II

Structural and numerical chromosomal aberrations.

Chromosome related disorders: Kleinfelter's syndrome, Turner's syndrome, Down's syndrome and Cri-du-chat syndrome

Mutations- Spontaneous and induced, Chemical and physical mutagens

Molecular basis of mutation.

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B. Molecular Biology

Unit-III

Transformation, Conjugation and transduction in bacteria; Gene mapping in bacteria; Transcription, Translation, Processing of m-RNA, Splicing, DNA and RNA polymerases Prokaryotic and Eukaryotic Translation - Mechanism of initiation, elongation and termination

Gene regulation in eukaryotic system – Promoters, enhancers elements and gene amplification.

Unit-IV Genetic engineering: Isolation of genomic and plasmid DNA from bacteria, Isolation of genomic DNA from plant and animal cells.

Recombinant DNA technology – cloning vectors (pUC 19, phage λ, cosmid and M13); Restriction enzymes, introduction of DNA into living cells, methods of gene transfer, expression and detection of clones.

Unit - V

Introduction to blotting technique: Western , Southern and Northern Blots.

Introduction to PCR , RAPD and RFLP

Transgenic organisms, methods of gene transfer

Books

1. Lewin, B. [2000] – Genes VII, Oxford University Press
2. Strickberger M, W. [2002], Genetics - Prentice Hall, India
3. Brown T. A., [1998], Genetics; a molecular approach – Chapman & Hall, London
4. Friefelder, D., [1993] – Molecular Biology, Jones & Barltlett Publishers

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