



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B.Sc. (Life Science / Biotechnology / Chemistry)

SEMESTER IV

SUBJECT CODE	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*				
BBAI501	Human Values and Professional Ethics	60	20	20	-	-	3	1	-	4

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:

The objective of the course is to disseminate the theory and practice of moral code of conduct and familiarize the students with the concepts of "right" and "good" in individual, social and professional context

Course Outcomes:

1. Help the learners to determine what action or life is best to do or live.
2. Right conduct and good life.
3. To equip students with understanding of the ethical philosophies, principles, models that directly and indirectly affect business.


Course Content:


UNIT I: Human Value


1. Definition, Essence, Features and Sources
2. Sources and Classification
3. Hierarchy of Values
4. Values Across Culture

UNIT II: Morality

1. Definition, Moral Behaviour and Systems
2. Characteristics of Moral Standards
3. Values Vs Ethics Vs Morality
4. Impression Formation and Management


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BBAI501 Human Values and Professional Ethics (for UG Programs)

UNIT III: Leadership in Indian Ethical Perspective

1. Leadership, Characteristics
2. Leadership in Business (Styles), Types of Leadership (Scriptural, Political, Business and Charismatic)
3. Leadership Behaviour, Leadership Transformation in Terms of Shastras (Upanishads, Smritis and Manu-smriti).

UNIT IV: Human Behavior – Indian Thoughts


1. Business Ethics its meaning and definition, need.
2. Types, Objectives, Sources, Relevance in Business organizations.
3. Theories of Ethics, Codes of Ethics.


UNIT V: Globalization and Ethics

1. Sources of Indian Ethos & its impact on human behavior
2. Corporate Citizenship and Social Responsibility – Concept (in Business),
3. Work Ethics and factors affecting work Ethics.

Suggested Readings

1. Beteille Andre (1991), Society and Politics in India, Athlone Press.
2. Chakraborty S. K. (1999), Values and Ethics for Organizations, oxford university press.
3. Fernando, A.C.(2009), Business Ethics - An Indian Perspective, Pearson Education :India.
4. Fleddermann, Charles D. (2012), "Engineering Ethics", Pearson Education / Prentice Hall.
5. Boatright, John R (2012), "Ethics and the Conduct of Business", Pearson Education, New Delhi.
6. Crane, Andrew and Matten Dirk (2015), Business Ethics, Oxford University Press Inc.: New York.
7. Murthy, C.S.V.(2016), Business Ethics – Text and Cases, Himalaya Publishing House Pvt. Ltd.: Mumbai.
8. Naagrajan, R.R (2016), Professional Ethics and Human Values, New Age International Publications: New Delhi.


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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSLS402	DC	Anatomy, Physiology and Developmental Biology of Mammals	60	20	20	30	20	4	0	2	6

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

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Course Objectives:

1. To study the morphology and physiology of mammals
2. To study the developmental stages of mammals

Course Outcomes:

1. Students will be able to understand the structure and functions of various organs of mammals
2. Students will be able to understand the stages of development of mammals

UNIT-I

Digestive system of mammals: Secretory function of alimentary canal. Digestion and absorption of Carbohydrates, Lipids and Proteins.

Excretory System of Mammals: Formation of urea (Ornithine cycle) and Urine (Glomerular filtration, Tubular secretion and Selective re-absorption).

UNIT-II

Respiratory system of mammals: Mechanism of respiration, transport of oxygen and carbon dioxide by blood.

Circulatory system of mammals: Course of blood circulation. Composition and functions of blood; blood clotting.


UNIT-III


Muscular system of mammals: Types, structure and functions of muscles. Muscle contraction.

Nervous system of mammals: Structure of nervous tissue. Mechanism of nerve impulse transmission.

UNIT-IV

Reproductive system of mammals: Structure of male and female reproductive organs. Female reproductive cycles (Menstrual cycle and oestrous cycle).


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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BSBT403	DC	Immunology, Biostatistics and Bioinformatics	60	20	20	30	20	4	0	2	6

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 give an introductory course in Immunology
2. To give an introductory course in Biostatistics and Bioinformatics

Course Outcomes:

1. Students will have a comprehensive idea about basics of Immunology
2. Students will learn about the basic tools of Biostatistics and Bioinformatics

UNIT-I

Origin of Immunology, Concept of Innate and Adaptive immunity, Cell mediated and Humoral Immunity. Basic concept of cytokines. Primary and secondary immune response, Clonal selection of lymphocytes. Structure, Functions and Properties of: Immune Cells – Stem cell, T cell, B cell, NK cell, Macrophage, Neutrophil, Eosinophil, Basophil, Mastcell, Dendritic cell; and Immune Organs – Bone Marrow, Thymus, Lymph Node, Spleen, GALT and MALT.


UNIT-II


Characteristics of antigens (Foreignness, Molecular size and Heterogeneity), antigenicity, immunogenicity, hapten, epitopes, Adjuvant, T-dependent and T- independent antigen. Structure, Types, Functions and Properties of antibodies; Antigenic determinants on antibodies (Isotypic, allotypic, idiotypic); VDJ rearrangements; Monoclonal, Polyclonal and Chimeric antibodies. Antibody mediated effect or functions.

Antigen - Antibody interactions: Principles of Precipitation and Agglutination. Precipitation reactions-Radial immune diffusion, double immune diffusion, immune electrophoresis; Agglutination reactions-Hemagglutination, passive agglutination, bacterial agglutination. ELISA, ELISPOT, Western blotting, Immuno fluorescence, Radio Immuno Assay.

UNIT – III

Structure and Functions of major histocompatibility complex MHC I & II molecules; Antigen processing and presentation (Cytosolic and Endocytic pathways). Complement components, function, complement activation- (i) Classical, (ii) Alternate and (iii) lectin pathways (characteristics & functions).


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BSBT403 – Immunology, Biostatistics and Bioinformatics

Immune diseases: Hypersensitivity: definition, types, examples. Auto-Immune disease and Immuno-deficiencies with examples. Vaccines: Active and passive immunization (definition, characteristics, examples and functions). Attenuated and inactivated viral or bacterial vaccines (definition, characteristic, functions, examples).

UNIT – IV

Population and sample designs .Measure of Central tendency – mean, mode and median. Measures of dispersion, standard deviation and standard error. Addition and multiplication theorems and their applications. Test of significance, Chi square test, students t –test, Analysis of variance. Normal distribution and deviation from normality.

UNIT – V


Introduction to Bioinformatics and its Applications. Nucleic acid and protein data bases, Structure, enzyme, protein sequence databases, protein structure database. Sequence alignments for proteins and nucleic acids. Visualization of protein structure. NGS databases and drug databases.


BSBTL 406 Practical:

1. Estimation of hemoglobin
2. Total count of WBC and RBC
3. Differential WBC count
4. Flocculation Reaction – VDRL
5. Agglutination Reaction – Widal test, Blood Grouping
6. Immuno-diffusion Techniques – ODD and RID
7. ELISA
8. NCBI , GenBank and SWISSPROT
9. Sequence alignment with BLAST
10. Visualizing structures with RASMOL

Books:

1. Immunology – Kuby J.
2. Fundamental Immunology – Paul WE.
3. Fundamentals of Immunology – Coleman et al.
4. Immunology – Weir and Steward.
5. Immunology, A Textbook – Rao CV.
6. Lecture notes in Immunology – Todd IR.
7. Essentials of Immunology – Roitt IM.
8. Immunology – Understanding of Immune System – Elgert KD.
9. Principles of Biostatistics – Pagano et.al.
10. Introduction to Biostatistics – Forthoter and Lec.
11. Bioinformatics – Baxevanis.
12. Bioinformatics – Higgins and Taylor.
13. The Internet and the new Biology: Tools for Genomic and Molecular Research – Peruski and Peruski.


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BSCH404	DC	Inorganic Chemistry II	60	20	20	30	20	3	0	4	5

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

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

UNIT-I

Chemistry of Elements of First Transition Series

Characteristic properties of d-block elements.

Binary compounds (hydrides, carbides and oxides) of the elements of the first transition series and complexes with respect to relative stability of their oxidation states, coordination number and geometry.

II. Chemistry of Elements of Second and Third Transition Series

General characteristics, comparative treatment of Zr/Hf, Nb/Ta, Mo/W in respect of ionic radii, oxidation states, magnetic behavior, spectral properties and stereochemistry.

UNIT-II

I. Metal-ligand bonding in Transition Metal Complexes

An elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.


II. Thermodynamic and Kinetic Aspects of Metal Complexes


A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, stability constants of complexes and their determination.

UNIT-III

I. Magnetic Properties of Transition Metal Complexes

Types of magnetic behavior, methods of determining magnetic susceptibility, spin-only formula, L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments.


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BSCH404 INORGANIC CHEMISTRY II

II. Electronic spectra of Transition Metal Complexes

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series, Orgel-energy level diagram.

UNIT-IV

Organometallic Chemistry

Definition, nomenclature and classification of organometallic compounds.

Metal carbonyls: 18 electron rule, preparation, structure and nature of bonding in the mononuclear carbonyls.

UNIT-V

Lanthanoids and actinoids:


Electronic configuration, oxidation states, colour, spectral and magnetic properties of Lanthanoids and actinoids, lanthanide contraction, separation of lanthanides (ion-exchange method only).


Guidelines for Practical:

A two credit lab is to be conducted by covering the most relevant and useful topics from the mentioned syllabus.

Recommended Texts:

1. Huheey, J.E. *Inorganic Chemistry*, Prentice Hall
2. Douglas, B.E. and McDaniel, D.H., *Concepts & Models of Inorganic Chemistry*, Oxford
3. Lee, J.D. *Concise Inorganic Chemistry*, ELBS
4. Shriver & Atkins, *Inorganic Chemistry*, Third Edition, Oxford Press
5. H.W. Porterfield, *Inorganic Chemistry*, Second Edition, Academic Press,
6. Canham, G.R. and Overton, T., *Descriptive Inorganic Chemistry*, Freeman & Co.
7. Cotton, F.A. and Wilkinson, G., *Advanced Inorganic Chemistry*, Wiley, VCH.
8. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company.


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