Integral University, Lucknow

Evaluation Scheme for
B.Sc. (H) Life Sciences

(Revised w.e.f. session 2020-2021)

Department of Biosciences

Department of Biosciences
Evaluation Scheme

B. Sc. Life Sciences Semester – I
Choice Based Credit System (CBCS)

Course Code	Course Title	Type of Paper	Periods/ Week			Evaluation Scheme				Maximum Marks	Credits	Total Credit
			L	T	P							
						UE	TA	Total	ESE			
LN104	Essential Professional Communication	Foundation	3	1	0	40	20	60	40	100	3:1:0	4
MT106	Mathematics	Foundation	3	1	0	40	20	60	40	100	3:1:0	4
PY103	Introductory Physics	Foundation	3	1	0	40	20	60	40	100	3:1:0	4
CH112	Fundamental of Inorganic Chemistry	Core	3	1	0	40	20	60	40	100	3:1:0	4
BS121	Introduction to Biology	Core	3	1	0	40	20	60	40	100	3:1:0	4
CH113	Chemistry Lab-I	Practical	0	0	6	40	20	60	40	100	0:0:3	3
PY105	Physics Lab	Practical	0	0	6	40	20	60	40	100	0:0:3	3
	Total									700		26

Department of Biosciences Evaluation Scheme

B. Sc. Life Sciences Semester – II

Choice Based Credit System (CBCS)

Course Code	Course Title	Type of Paper	Periods			Evaluation Scheme				Maximum Marks	Credits	Total Credit
			L	T	P							
						UE	TA	Total	ESE			
ES115	Fundamentals of Environmental Sciences	Foundation	3	1	0	40	20	60	40	100	3:1:0	4
CH114	Fundamental of Organic Chemistry	Core	3	1	0	40	20	60	40	100	3:1:0	4
BS131	Plant Diversity	Core	3	1	0	40	20	60	40	100	3:1:0	4
BS132	Animal Diversity-1 "Nonchordates"	Core	3	1	0	40	20	60	40	100	3:1:0	4
BS113	Fundamentals of Microbiology	Core	3	1	0	40	20	60	40	100	3:1:0	4
CH115	Chemistry Lab-II	Practical	0	0	6	40	20	60	40	100	0:0:3	3
BS134	Biosciences lab.	Practical	0	0	6	40	20	60	40	100	0:0:3	3
		Total								700	26	26

INTEGRAL UNIVERSITY, LUCKNOW

DEPARTMENT OF BIOSCIENCES

B.Sc. Life Science

L	T	P
3	1	0

B.Sc. Life Sciences 1st year / 1st Semester

Subject: ESSENTIAL PROFESSIONAL COMMUNICATION **Subject Code:LN104**

3	1	0

UNIT I **Introduction to Communication** 4

Definition, Types of Communication, Channels of Communication, Language

UNIT II **Interpersonal Communication** 6

Culture- Definition and Types, Communication and Culture including Cross Cultural Communication

UNIT III **Written Communication** 8

Letter Writing- Informal and Formal - Letters of Enquiry, Letters of complaint, Response to complaints and enquiries, Self Exploration through description

UNIT IV **Grammar through Worksheets** 12

Situational activities and modules- Parts of Speech, Tenses, Articles, Modals, Active and Passive, Subject-Verb Agreement, Direct and Indirect Speech, Degrees of comparison

UNIT V **Grammar through Worksheets Continued** 10

Sentences: Simple, Compound, Complex, Declarative, Assertive, Negative, Interrogative, Exclamatory, Imperative

Recommended books:

1. Wren PC and Martin H, "High School Grammar and Composition", S. Chand and Co.
2. K. Floyd , "Interpersonal Communication: The Whole Story" (2009), McGraw Hill,
3. Greenbaum Sidney and Nelson Gerald, "An Introduction To English Grammar", Pearson
4. Swan Michael, "Practical English Usage" OUP, 2005
5. Raymond Murphy, "Intermediate English Grammar", (2007) Cambridge University Press.

INTEGRAL UNIVERSITY, LUCKNOW
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B.Sc. Life Sciences 1st year / 1st Semester

Subject: MATHEMATICS **Subject Code: MT106**

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8

UNIT I-Set Theory and finite differences: Sets and their representations, finite and infinite sets, subsets, empty set, universal set, complement of a set, difference of sets, Venn diagram, ordered pairs, cartesian product, application. Finite differences, forward and backward differences, Properties of operators,.

8

UNIT II-Interpolation and Algebraic & Transcendental Equations: Newton Gregory forward & backward Interpolation formula, Gauss forward and backward formula for equal intervals, Lagrange's formula for unequal intervals, solution of transcendental and algebraic equations by bisection method, iteration method, Newton Raphson method.

8

Unit III-Permutation, Combination and Binomial Theorem: Fundamental principle of counting, Permutations, permutations under certain conditions. Combinations, Combinatorial identities. Binomial theorem (without proof), some applications of Binomial theorem.

8

UNIT IV- Curve fitting and solution of cubic and biquadratic equations: Scatter diagram, curve fitting by the principle of Least squares, reduction of cubic equation to standard form. Different methods of solving cube equations, solution of biquadratic equation.

8

UNIT V- Probability and probability distributions: Random experiment and associated sample space, events definition of probability, algebra of events, addition and multiplication theorems on probability (without proof). Binomial, Poisson and Normal distributions analysis.

Suggested Readings:

1. Seymour Lipschutz, 1981, Set Theory, (Schaum's Outline Series) McGraw-Hill Book Co.
2. Frank Ayres, J.R., 1974, Matrices, (Schaum's Outline Series) McGraw-Hill Inc.
3. Murray R. Spiegel, 1980, Probability and Statistics, Schaum's (Outline Series) McGraw-Hill Book Co.
4. Arora, P.N. and P.K. Malhan, 2002, Biostatistics, Himalaya Publishing House.
5. E. Kreyszig, "Advanced Engineering Mathematics", 5th Edition, Wiley Eastern, 1985.
6. Mathematics, NCERT.
7. Mathematics R.D. Sharma.
8. Higher Engineering Mathematics, B. V. Ramana. Tata McGraw Hill Publishers.
9. Mathematics, R.S. Agarwal

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B.Sc. Life Science

B.Sc. Life Sciences 1st year / 1st Semester

Subject: INTRODUCTRY PHYSICS **Subject Code: PY103**

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3	1	0

UNIT 1 8

Mechanics: Galilean invariance and Newton's Laws of motion. Dynamics of a system of particles, Conservation of momentum and energy, work energy theorem. Conservation of angular momentum, torque, Motion of a particle in central force field. Kepler's Laws, Satellite in circular orbit and applications (Synchronous satellite, GPS, Artificial gravity, apparent weightlessness), Physiological effects of acceleration and angular motion.

UNIT II 8

Theory of Relativity: Constancy of speed of light, postulate of Special theory of relativity, length contraction, time dilation, relativistic velocity addition, Mass-energy momentum relations Electricity: Simple circuit, Ohm's Law. Semiconductors and amplifiers

UNIT III 8

Waves and Oscillations: Simple harmonic motion, damped and driven harmonic oscillator, coupled oscillator, energy relation and energy transfer, normal modes, Wave equation, Travelling waves, superposition principle, pulses, Doppler effect, effects of vibrations in humans, physics of hearing, heartbeat

UNIT IV 8

Modern optics: Two slit Interference, Diffraction, Resolving power, Resolution of the eye, Laser characteristics, Principle, Population inversion, Application of laser in medical science, Polarization of EM wave, Malus Law, Polarizing materials, Polarizer, Analyzer

UNIT V 8

Membrane Systems and Membrane Physics :Micelle and Bilayer formation, structure and function. Physicochemical characterization and analysis of micelles and bilayers. Membrane equlibria and Transport. Thermodynamics of transport process. Ficks', law, Nernst Planck Equations, Diffusion, Osmosis, Donnan effect, permeabilily coefficient Resting potentials, Measurement membrane conductance.

Suggested Reading Materials:

1. Rodney Cotterill; Biophysics : An Introduction, John Wiley & Sons (year)
2. D.S. Mathur , Mechanics, S.Chand & Company Ltd. 2000
3. N.K.Bajaj, The Physics of Waves and Oscillations, Tata McGraw Hill 1988

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B.Sc. Life Sciences 1st year / 1st Semester

Subject: FUNDAMENTALS OF INORGANIC CHEMISTRY **Subject Code: CH112**

8

UNIT I-Inorganic: Chemical bonds and molecules, Shapes of simple molecules, bond energy, bond length, resonance and Hydrogen bond.

8

UNIT II-Radioactivity: Natural and artificial, group displacement law, half life period, binding energy, nuclear reaction equations, isotopes, tracers, radio dating, Application of radioactivity.

8

UNIT III-Periodic table: Modern periodic table, periodicity in properties of elements, atomic radii, ionic and covalent radii, ionization energies, electron affinity, electro-negativity.

8

UNIT IV-Ores and Minerals: Principles involved in the extraction of metals from ores, including their refining and purification, General trends in the Chemistry of S-block elements (Group I A & II A)

8

UNIT V-Physical: Gases: Kinetic theory of gases, van der Waal's equation, critical constants, Liquefaction of gases. Chemical-Kinetics: Velocity of a reaction, Determination of rate constants for first and second order reactions, collision theory of bimolecular reactions. Catalysis: Promoters and Poisons, Le-Chatelier's principle and its applications to physical and chemical equilibria.

Suggested Readings:

1. Advanced Inorganic Chemistry Vol-I & II, Satya Prakash, G.D. Tuli, S.K. Basu, R.D. Madan, S. Chand & Co. Ltd.
2. Test book of Inorganic Chemistry, P.L. Soni, Sultan Chand & Sons
3. Simplified Course in Inorganic Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
4. Concise Inorganic Chemistry, J.D. Lee, Black Well Sciences
5. Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
6. Principles of Physical Chemistry, Puri, Sharma & Pathania, Vishal Publishing Co.
7. Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
8. Physical Chemistry, Vemulapalli, Printice Hall of India.
9. Modern Physical Chemistry, R.K. Rastogi et al., United Book Depot, Allahabad.

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B.Sc.Life Sciences 1st year / 1st Semester

Subject: INTRODUCTION TO BIOLOGY **Subject Code: BS121**

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UNIT I **8**

Origin of life and Evolution:

Origin of life: Theories of Origin of life, Biogenesis and abiogenesis. Evidences of Evolution. Theories of Evolution: Darwinism, Lamarckism.

UNIT II: 8

Classification of organisms:

Properties of living organisms. Whittaker's five-kingdom concept: Monera, Protista, Fungi, Plantae and Animalia. Systematics and binomial System of nomenclature. Aims and objectives of taxonomy. Outline of classification of plants (Thallophyta and embryophyta); Outline of classification of animals (Chrdates and nonchordates).

UNIT III: **8**

Cell Structure and Function

Organization of cell (prokaryotic and eukaryotic); differences between a plant and animal cell; structure and function of cell membrane, nucleus, chloroplast, mitochondria, endoplasmic reticulum, Golgi complex and lysosome, Elementary structure of chromatin and chromosome, Cell cycle, mitosis, meiosis and its significance

UNIT IV: **8**

Economic Zoology

Overview of Sericulture, Apiculture, Lac culture, Poultry culture and Dairy industry

Vermiculture: Introduction and scope, Species of earthworm, Characteristics features of earthworm. Overview of methods of vermicomposting, Role of earthworm in solid waste management. Vermiwash- its importance, Vermicompost as bio-fertilizer

UNIT V: **8**

Economic importance of plants

Plants used as a source of timber, food: cereals, pulses, oils, fruits and vegetables; spices and condiments; beverages and fibre. Medicinal plants and plants used as raw materials for paper and rubber.

Recommended Books

Biodiversity and Quality of Life. Sengupta. Mc Millan India Pvt. Ltd.
Biology: P. H. Raven& G. B. Jhonson
Manju Yadav, Economic Zoology- Discovery publishing house, New Delhi
Pandey,B.P,1998. Economic Botany, S. Chand& Co.,New Delhi.
Environmental studies: D. L. Manjunath, Pearson Education.

INTEGRAL UNIVERSITY, LUCKNOW
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B.Sc. Life Sciences 1st year / 1st Semester
Subject: Chemistry Lab-I **Subject Code: CH113**

LTP006
3 1 0

1. Acid-base titrations
2. Molarity, molality, normality
3. Preparation of solutions, buffers- sensitivity, specificity, accuracy, pH measurements
4. Volumetric analysis: Oxidation-reduction titration using $KMnO_4$ and $K_2Cr_2O_7$
5. Iodometry titrations: Estimation of potassium dichromate and copper sulphate.
6. Preparation of the following inorganic compounds: Prussion blue from iron fillings, chrome alum, cuprammonium sulphate, cuprous chloride
7. Heat of neutralisation of a strong acid and a strong base.
8. Freezing point depression

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Subject: PHYSICS LAB **Subject Code: PY105**

L T P
3 1 0

1. To determine the wavelength of monochromatic light by Newton‟s ring.
2. To determine the wavelength of monochromatic light with the help of Fresnel‟s biprism.
3. To determine the focal length of two lenses by nodal slide and locate the position of cardinal points.
4. To determine the specific rotation of cane sugar solution using half shade polarimeter.
5. To determine the specific resistance of the material of given wire using Carey Foster‟s bridge.
6. Determination of the acceleration due to gravity using pendulum
7. To determine the viscosity of a liquid.
8. Determination of the frequency of an electrically maintained tuning fork by Melde's experiment
9. Verification of Beer Lamberts Law

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B.Sc. Life Sciences 1st year / 1I nd Semester

L	T	P
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Subject: Fundamentals of Environmental Studies **Subject Code: ES115**

UNIT I- **(10hrs)**

Environment its components & segments, Physical, Chemical and biological study of Environment, Multidisciplinary nature of environmental studies, Concept of Sustainable development & Sustainable life styles, Public awareness & Environmental movements like Chipko, Silent valley, Narmada Bachao Andolan.6

Natural Resources:

Renewable and non-renewable resources: Natural resources and associated problems.

a. **Forest resources**: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forest and tribal people.
b. **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c. **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources.
d. **Food resources**: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
e. **Energy resources**: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources.
f. **Land resources**: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT II- **(8hrs)**

Ecosystems:

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:
  a. Terrestrial Ecosystem
  b. Aquatic ecosystems

UNIT III- **(8hrs)**

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 mega-diversity nation.
- Hot-sports of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

UNIT IV- **(8hrs)**

Environmental Pollution

Definition:

- Cause, effects and control measures of
  a) Air pollution
  b) Water pollution
  c) Soil pollution
  d) Marine pollution
  e) Noise pollution
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Diaster management : floods, earthquake, cyclone and landslides.

UNIT V- **(6 h r s)**

Social Issues and the Environment:

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns, case studies.
- Environmental ethics : Issues and possible solutions.
- Green house effect and global warming, effects of acid rain and their remedial measures and ozone layer depletion.
- Ill-effects of fire works
- Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of Environmental legislation. Case studies.

Human Population and the Environment:

- Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights.
- Value Education.
- HIV/AIDS. Women and Child Welfare.

Suggested Reading:

1. Environmental Studies by Benny Joseph, Tata McGraw Hill, 2005.
2. Environmental Studies by Dr. D.L. Manjunath, Pearson Education, 2006.
3. Principles of Environmental Science and Engineering by P. Venugopal Rao, Prentice Hall of India.
4. Environmental Science and Engineering by Meenakshi, Prentice Hall of India.

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B.Sc. Life Sciences

B.Sc. Life Sciences 1st year / IInd Semester

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Subject: FUNDAMENTALS OF ORGANIC CHEMISTRY **Subject Code: CH114**

3 1 80

UNIT I-Inorganic: Acid and Bases: Elementary idea of Bronsted-Lowry and Lewis concept of acids and bases (Proton-donor acceptor and electron donor acceptor systems), Relative strengths of Lewis acids bases and the effect of substitutes and the solvent on them.

8

UNIT II-General properties of 3rd group elements & Co-ordination Compounds: Molecular compounds, Werners coordination theory, IUPAC system of nomenclature of coordination compounds. Discussions of outer and inner orbit complexes. Role of tracer elements (Ne, K, Mg, Ca Mn, Fe, Co, Ca, Xn, Cr, P,S, Cl, and I) in biological systems.

8

UNIT III-General trends in the Chemistry of p-block elements: Preparation, properties, uses and structure of the following compounds. Tin Chlorides, hydrazine, hydroxylamine and acids, Oxides, Oxyacids hydrogen sulphide (analytical applications), Oxides and Oxyacids of sulphur,

8

UNIT IV- Physical: Liquids: Vapor pressure, variation of vapour pressure of liquids with temperature, Solutions: Henry's Law, Raoult's Law, critical solutions temperatures, fractional distillation and steam distillation.Osmosis and measurement of osmotic pressure. Effect of solutes on boiling points and freezing points of solutions.

8

UNIT V-Heterogenous equilibria: Phase rule, phase diagrams of water and sulphur system. Nernst distribution law, solvent extraction.

Suggested Readings:

1. Advanced Inorganic Chemistry Vol-I & II, Satya Prakash, G.D. Tuli, S.K. Basu, R.D. Madan, S. Chand & Co. Ltd.
2. Test book of Inorganic Chemistry, P.L. Soni, Sultan Chand & Sons
3. Simplified Course in Inorganic Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
4. Concise Inorganic Chemistry, J.D. Lee, Black Well Sciences
5. Essentials of Physical Chemistry, Bahl & Tuli, S. Chand & Co. Ltd.
6. Principles of Physical Chemistry, Puri, Sharma & Pathania, Vishal Publishing Co.
7. Simplified course in Physical Chemistry, Madan & Tuli, S. Chand & Co. Ltd.
8. Atkin's Physical Chemistry, Atkin, Oxford Press.
9. Physical Chemistry, Vemulapalli, Printice Hall of India

INTEGRAL UNIVERSITY, LUCKNOW
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Subject: PLANT DIVERSITY **Subject Code: BS131**

3 1 0

Unit I: Algae 8

General features, Classification, Range of thallus organization, Reproduction, Economic importance and life Cycle with special reference to *Spirogyra, Chara* and *Polysiphonia.*

Unit II: Fungi 8

General features, Classification, Reproduction, economic importance, life Cycle with special reference to *Pythium, Morchella, Puccinia* and Lichens.

Unit III: Bryophytes 8

General features, Classification, Thallus organization, Reproduction, Economic importance life Cycle with special reference to *Marchantia* and *Funaria.*

Unit IV: Pteridophytes 8

General features, Classification, Stelar organization. Homospory and Heterospory , Economic importance and life Cycle with special reference to *Pteris*

Unit V: Gymnosperms 8

General Characterstics of Gymnosperms, resemblances and differences of Gymnosperms with Pteridophytes and Angiosperms. Economic importance and life Cycle with special reference to *Cycus*.

Recommended Books

1. Chapman V.J & Chapman D.J, The Algae, Macmillan India Ltd.
2. Fritsch F. B 1945, Structure and Reproduction of Algae Vol.I & II.Cambridge University Press.
3. Smith G.M 1955, Cryptogamic Botany Vol.I and II, McGraw Hill.
4. Vashishta B.R 1990, Botany for Degree Students, Vol 1,2 and 3. S.Chand & Co.
5. Singh V., Pandey P.C and Jain D.K 1998, A Text book of Botany for Undergraduate Students, Rastogi Publications.
6. Alexopoulos C.J & MIMS C.V 1988. Introductory Mycology, John Wiley & Sons.
7. Webster J 1970, Introduction to Fungi, Cambridge University Press.
8. Parihar N.S 1967, An Introduction to Embryophyta Vol I & II, General Book Depot.
9. Prempuri 1973, Bryophytes - A Broad perspective. Atmaram & Sons.
10. Sporne K.R 1976, Morphology of Pteridophytes, B1 Publications.
11 Sharma O.P: Text book of Pteridophyta II edition:McMillan India Ltd.
12. Bhatnagar, S.P. and Moitra1996. Gymnosperms. New Age International Limited, New Delhi.

INTEGRAL UNIVERSITY, LUCKNOW
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Subject: Animal Diversity I "Nonchordates" **Subject Code: BS132**

3 1 0

UNIT I **8**

Outline of classification of animals (Chordates and non chordates).
Protozoa: General characters and classification; *Plasmodium* species, *Entamoeba histolytica, Euglena* and*Paramicium*- Structure, Life cycle and Control

UNIT II: 8
Porifera : - General characters and classification; Sycon: Morphology, Different types of cells in sycon, canal system in Porifera.

Coelenterata: - General characters and classification; Obelia: - Morphology of Obelia colony, Development of Hydra, Polymorphism in coelenterates.

UNIT III: 8
Helminths : - General characters and classification; *Fasciola hepatica*, *Taenia solium* and *Ascaris lubricoides*: - Structure, Life cycle, Pathogenecity & control measures.

Annelida: - General characters and classification with special reference to Earthworm and Leech

UNIT IV: 8
Arthropoda: - General characters and classification with special reference to Prawn and Cockroach.

Mollusca: - General characters and classification with special reference to *Unio* and *Pila*.

UNIT V: 8
Echinodermata : - General characters and classification; *Asterias* (Sea Star): - Morphology and water vascular system.

General characters and affinities of Protochordata and Hemichordata.

Recommended Books

1. Biodiversity and Quality of Life. Sengupta. Mc Millan India Pvt. Ltd.
2. Biology: P. H. Raven& G. B. Jhonson
3. Barnes, B.D. (1987). Invertebrate Zoology. 5th Edition, Saunders College Publishing.
4. Kotpal, R. L. (1988). Protozoa. Rastogi Publications
5. Marshall, A.J. and Williams, W.D. (1979). Text Book of Zoology Vol. I-Invertebrates, Macmillan.
6. Noble, E. R. and Noble, G. A. (1982). Parasitology-The Biology of Animal Parasites, Lea and Febiger, Philadelphia.
7. Ruppert, E.E. and Barnes, R.D. (1994). Invertebrate Zoology. 6th Edition, Saunders College Publishing.
8. Webb, J.E., Wallwork, J.A. and Elgood, J. H. (1981). Guide to Invertebrate Animals, English Language Book Society and Macmillan.

INTEGRAL UNIVERSITY, LUCKNOW
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B.Sc. Life Science

Subject: FUNDAMENTALS OF MICROBIOLOGY **Subject Code: BS113**

3 1 0

8

UNIT I-History and classification of microbiology: Pasteur's experiments, Various forms of microorganisms (bacteria, fungi, viruses, protozoa, PPLOs); Nutritional classification of microorganisms; Nature of the microbial cell surface, gram positive and gram negative bacteria; Growth curve.

8

UNIT II- Control of Microorganisms: Physical agents (Autoclave, Hot air oven, Laminar airflow and membrane filter.), chemical agents (Alcohol, Halogens and Gaseous agents, antibiotics), Radiation Methods (UV rays). **Pathogenesis of microorganisms:** Some common pathogenic microorganisms: Bacterial (tuberculosis, gall), viral (SARS, TMV), fungal (red rot of sugar cane, dermatitis) and protozoan (malaria).

8

UNIT III- Microbes in extreme environments and microbial interactions: The thermophiles alkalophiles, acidophiles and symbiosis and antibiosis among microbial population, N_2 fixing microbes in agriculture and forestry.

8

UNIT IV- Recombination in Prokaryotes: Photophosphorylation, Transformation, Conjugation and Transduction.

UNIT V-Bacteriophage: Lytic and lysogenic cycle. Stains and staining techniques: Principles of staining, Types of stains – simple stains, structural stains and Differential stains.

Suggested Reading:

1. Introduction to Microbiology, Ingraham, 2ed.
2. Brock Biology of Microorganisms, Madigan et al, 9th ed.
3. General Microbiology, R.Y. Stanier, J.L. Ingraham, M.L.Wheelis and P.R. Painter, Macmillian
4. Microbiology VI Edition, M.J. Pelczar, E.C.S. Chan and N.R. Kreig, Tata McGraw Hill
5. Principles of Microbiology, R.M. Atlas, Wm C. Brown Publisher.
6. The Microbial World, Roger Y. Stanier, Prentice Hall
7. Howe.C. (1995) Gene Cloning and manioulation, Cambridge University Press, USA
8. Lewin, B., Gene VI New York, Oxford University Press.
9. Sambrooket al (2000) Molecular cloning Volumes I, II, & III Cold spring Harbor Laboratory Press, New York, USA
10. Walker J.M. and Gingold, E.B. (1983) Molecular Biology & Biotechnogy (Indian Edition) Royal Society of Cemistry U.K

INTEGRAL UNIVERSITY, LUCKNOW
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PRACTICALS **L T P**
0 0 6

Subject:CHEMISTRY LAB-II **Subject Code: CH115**

1. Qualitative analysis of inorganic mixtures, containing not more than four ionic species (excluding insoluble substances) out of the following : Pb^{2+}, Ag^{+}, Cu^{2+}, Cd^{2+}, As^{3+}, Sn^{2+}, Fe^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}, NH_4, Co_3^{2-}, S^{2-}, NO_3^-, SO_4^{2-}, PO_4.
2. Purification of Organic compounds by crystallization (from water or alcohol) and distillation.
3. Detection of functional groups in mono-functional Organic Compounds.

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L T P 0 0 6

Subject: Biosciences Lab **Subject Code: BS134**

1. Microscopic Preparation and Study of Algae
2. Microscopic Preparation and Study of fungi.
3. Study of the morphology, reproductive structures and anatomy of Bryophytes.
4. Study of the morphology and reproductive structures of fern.
5. Study of the morphology and reproductive structures of Gymnosperm.
6. Study of whole mount of *Euglena*, *Amoeba* and *Paramecium*
7. Examination of pond water collected from different places for diversity in protista
8. Study of adult *Fasciola hepatica*, *Taenia solium* and their life cycles (Slides/microphotographs)
9. Study of adult *Ascaris lumbricoides* and their life cycles (Slides/microphotographs)
10. Study of lab specimens of Cockroach, *Asterias, Unio* and *Pila*