



Binod Bihari Mahto Koyalanchal University, Dhanbad

UG Syllabus of the Subject

LIFE SCIENCES

For the Session: 2026-2030 and onwards

Under the

Four-Year Undergraduate Programme (FYUGP)

As per National Education Policy (NEP), 2020

**Applicable to all the Constituent and Affiliated Colleges under the
Binod Bihari Mahto Koyalanchal University, Dhanbad**

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BINOD BIHARI MAHTO KOYALANCHAL UNIVERSITY

Dhanbad, Jharkhand - 826004

E-mail:- registrarbbmku@gmail.com

Notification

In exercise of the powers vested in him under the Jharkhand State Universities Act 2000 as amended up-to-date, the Vice-Chancellor is pleased to reconstitute a Board of Studies (BOS) for the Department of Zoology, comprising of following members for a period of one year from the date of notification :

- | | | |
|--|-------------------|---------------------|
| 1. Dr. Navita Gupta
Head, University Department of Zoology, BBM KU | - Chairperson | <i>Navita Gupta</i> |
| 2. Dr. Rupam Mallik
University Department of Zoology, BBM KU | - Member | <i>Rupam Mallik</i> |
| 3. Dr. Sarita Murmu
University Department of Zoology, BBM KU | - Member | <i>CS</i> |
| 4. Sharmila Kumari
Department of Zoology, P.K.R.M. College, Dhanbad | - Member | <i>Sharmila</i> |
| 5. Cecilia Khusboo Barla
Department of Zoology, K.B. College, Bermo | - Member | <i>C. Barla</i> |
| 6. Narendra Lal
Department of Zoology, B.S.K. College, Maithon | - Member | |
| 7. Dr. Bandana Kumari
Professor, University Department of Zoology,
Ranchi University, Ranchi | - External Expert | |

By order of the Vice-Chancellor

Sd/-

Registrar

Memo No. BBM KU/R/1374/2025

Date 02/08/2025

Copy to :-

1. Persons concerned
2. Concerned Dean, BBM KU
3. Concerned Head, BBM KU
4. Establishment Section, BBM KU, Dhanbad
5. P.A. to VC/PVC/FA/R for information to VC/PVC/ FA/R
6. Guard File

P. Tripathy
Registrar 02/08/25

BBM KU, Dhanbad.

02/08/25

**Members of Board of Studies for preparing Provisional Syllabus of
Four- Year Undergraduate Programme (FYUGP)**

1. Chairman-

Dr. Kalpana Prasad

Associate Professor & Head

University Department of Botany,

Binod Bihari Mahto Koyalanchal University, Dhanbad,
Jharkhand

K. Prasad
31/7/2025

2. Members-

i. Dr. P.C. Thakur

Assistant Professor

Department of Botany

Chas College, Chas

P.C. Thakur
04.07.25

ii. Dr. Pallavi Praveen

Assistant Professor

Department of Botany,

B.S. City College, Bokaro

P. Praveen
04/04/2025

iii. Dr. Kiroom Rashmi Topno

Assistant Professor

Department of Botany,

P.K.Roy Memorial College, Dhanbad

K.R. Topno
04/07/2025

iv. Dr. Monalisha Saha

Assistant Professor

Department of Botany,

S. S. L. N. T. Mahila Mahavidhyalaya, Dhanbad

M. Saha
04/07/2025

Rupam Saha

Binod Bihari Mahto Koyalanchal University, Dhanbad
Four-Year Undergraduate Programme
Department of Life Sciences
NEP UG Syllabus

Board of Studies

Rupam Mahanta

Binod Bihari Mahto Koyalanchal University, Dhanbad**Four-Year Undergraduate Programme****Department of Life Sciences****NEP UG Syllabus****Session: 2026-2030 onwards****COURSE PLAN**

Level	SEM	Type	Credit	Name of the Paper
Level 100-199 Foundation or Introductory Courses	SEM-I	MJ-1	4	Diversity of life forms, Biosystematics and Taxonomy
		AC-1	4	Chemistry (for Life Sciences)
		MDC-1	3	Environmental Science
		AEC-1	2	Language and Communication Skill (MIL-1 Modern Indian Language, English/Hindi)
		SEC-1	3	Computer Fundamentals & Computer Proficiency
		VAC-1	2	Understanding India
		IKS-1	2	Indian Knowledge system -I/Social Awareness Activities
	SEM-II	MJ-2	4	Diversity of Microbes up to fungi and Animal Diversity up to non-chordates
		AC-2	4	Physics (for Life Sciences)
		MDC-2	3	Physical & Analytical Chemistry for Life Sciences
		AEC-2	2	Language and Communication Skill (MIL-1 Modern Indian Language, English/Hindi)
		SEC-2	3	Cyber -Crime & Cyber Security
		VAC-2	2	Health, Wellness, Yoga & Sports
		IKS-2	2	Social Awareness Activities/ Indian Knowledge system -I
Level 200-299 Intermediate Level Courses	SEM-III	MJ-3	4	Biodiversity of Higher Plants up to Gymnosperms
		MJ-4	4	Animal Diversity (Chordates)
		ELC/MN-1	4	Elective/Minor (Track A1/B1/C1)
		MDC-3	3	Basic Mathematics for Life Sciences
		AEC-3	2	Language and Communication Skill (MIL-1 Modern Indian Language Sanskrit, Urdu, Bengali, including TRL)
		SEC-3	3	Digital Learning & AI Tools
	SEM-IV	MJ-5	4	Cellular Organization and fundamental processes (Cell Biology)
		MJ-6	4	Inheritance Biology (Genetics)
		MJ-7	4	Biochemistry
		ELC/MN-2	4	Elective/Minor (Track A2/B2/C2)
		AEC-4	2	Language and Communication Skill (MIL-1 Modern Indian Language Sanskrit, Urdu, Bengali, including TRL)
		VAC-3	2	Environmental Studies
	SEM-V	MJ-8	4	Plant Anatomy and Animal Histology
		MJ-9	4	System Physiology and Metabolism (Plants)
		MJ-10	4	System Physiology (Human)
		MJ-11	4	Immunology
		ELC/MN-3	4	Elective/Minor (Track A3/B3/C3)
Level 300-399 Intermediate Level Courses	SEM-VI	MJ-12	4	Plant Embryology and Animal Developmental Biology
		MJ-13	4	Evolutionary Biology
		MJ-14	4	Ecology and Behavioral Biology
		MJ-15	4	Applied Biostatistics and Bioinformatics
		ELC/MN-4	4	Elective/Minor (Track A4/B4/C4)

D. B. Singh

P. Praveen

Jabe

Sis

R. P. Mallik

S. Kumar

C. K. Barua

ELECTIVE /MINOR (ELECTIVE/MN) PAPERS**Three Specialization Tracks**

Students must select a Track (A or B or C) and complete all four papers (MN-1 to MN-4) of the selected Track from Semesters III to Semester VI. The chosen tracks count as Minor or Elective paper

SEM	Paper	Track A Botany Specific	Track B Zoology Specific	Track C Biotechnology
SEM-III	ELC-1 /MN-1	Economic Botany and Ethnobotany	Economic Zoology and Applied Entomology	Introduction to Biotechnology and its Applications
SEM-IV	ELC-2 /MN-2	Horticulture, Floriculture and Post-Harvest Technology	Apiculture, Sericulture and Lac Culture	Recombinant DNA Technology
SEM-V	ELC-3 /MN-3	Plant Tissue Culture and Propagation	Aquaculture and Fishery Biology	Animal and Plant Biotechnology
SEM-VI	ELC-4 /MN-4	Fundamental of Forestry	Wildlife Biology and Conservation	Environmental Biotechnology

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Nand Lal

P. Praveen
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Anurag Malvi

Suman

C. H. Bask

SYLLABUS FOR MAJOR PAPERS

Binod Bihari Mahto Koyalanchal University, Dhanbad
Four-Year Undergraduate Programme
Department of Life Sciences
NEP UG Syllabus

Semester I

Major (MJ)-01: Diversity of Life forms, Biosystematics and Taxonomy

Credit: 3

Lectures: 45 Hours

Full marks=75 [Internal examination=15(Written examination=10+ Class Performance & Attendance = 05) + [End semester=60]

PassMarks= [Internal examination= 06] [End Semester=24]

Instructions:

- In all 9 questions to be set there shall be two groups – Group A and Group B.
- Group A is compulsory which shall contain three questions.
- Question no. 1 will be very short answer type consisting of six questions of 1 mark each in the form of MCQ/Fill in the blanks/ True or False etc.
- Question no. 2 & 3 will be of short answer type carrying 3 marks each.
- Group B will contain 6 subjective/descriptive questions*out of which the examinees are required to answer any 4 carrying 12 marks each.
- *Question no.9 will be short answer type. There will be four options of which any two to be answer each carrying equal marks covering the whole syllabus.

Objectives:

- To be familiar with the basic concepts and principles of plant and animal systematics.
- To develop a suitable method for correct characterization and identification of plants and animal.
- To understand the importance of taxonomic relationships in research of plant and animal systematics.
- To provide information on various classification systems.

Learning outcomes:

- Understand of the basic principles of systematics, including identification, nomenclature, classification, and the inference of evolutionary patterns from data.
- Validate the ability to handle and analyse plant materials in the laboratory and herbarium and in the field.
- Distinguish the Class, Order, families, Genus and Species level with specific examples and engage themselves scientifically evaluating nature and planet earth's treasures.
- Demonstrate comprehension of basic concepts and the ability to use scientific terminology accurately through effective oral and written communication and the use of dichotomous keys in a regional Flora and Fauna.
- Distinguish dicot and monocot families with specific examples and engage themselves scientifically evaluating nature and planet earth's treasures.

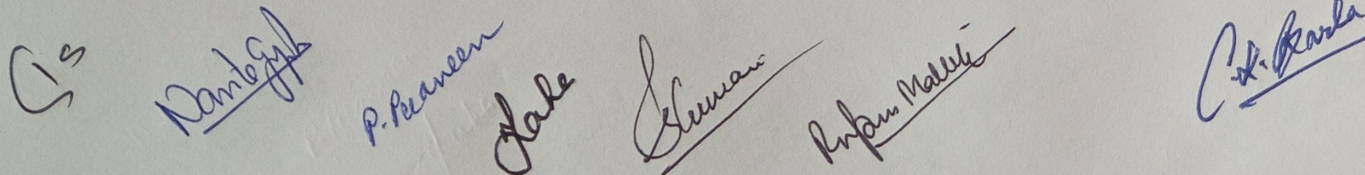
CS
Nanda Sph
P. Ranjan
Jale
Shumari
Anjan Kumar
Ch. B. B. B.

THEORY

Units	Topics	No. of Periods
Unit 1	Diversity of life forms	
1.1	Plant diversity: Basis of Plant classification and levels of organization	4
1.2	Animal Diversity: Basis of animal classification, Levels of Organization, Symmetry, Body cavity and Coelom, Segmentation, Embryonic development.	6
Unit 2	Fundamentals of taxonomy and Nomenclature	
2.1	Concept taxonomy and biosystematics. Alpha, Beta and Gamma taxonomy, Phenon, Taxon.	4
2.2	Principles of Nomenclature. Binomial and Trinomial nomenclature	3
2.3	International Code of Nomenclature (ICN)	2
Unit 3	Taxonomic tools	
3.1	Taxonomic tools for plant diversity study: Herbarium, Virtual/digital herbarium, Botanical Gardens, Seed Banks and Germplasm Banks	5
3.2	Taxonomic tools for animal diversity study: Museum, Aquarium, Zoological Parks, National Parks, Wildlife Sanctuaries	4
Unit 4	Systems of Classification	
4.1	Five kingdom classification (Whittaker)	1
4.2	Three Domain system (Carl Woese)	1
4.3	Bentham and Hooker system of classification	1
4.4	Takhtajan system of classification	1
4.5	Floral description of selected families: Apocynaceae, Euphorbiaceae and Poaceae,	3
Unit 5	Modern trends in Biosystematics	
5.1	Numerical taxonomy (Phenetics): Principles and significance	2
5.2	Cytotaxonomy, Chemotaxonomy, Serotaxonomy	3
5.4	Biochemical taxonomy, Molecular taxonomy	2
5.3	DNA barcoding: Principle and applications	2
Total Lectures/Hours/Periods		45

Books Recommended

1. Animal Diversity – Rupert, E.E., Fox, R.S. & Barnes, R.D.
2. A Textbook of Botany – B.P. Pandey.
3. Biodiversity – E.O. Wilson.
4. Plant Taxonomy – O.P. Sharma.
5. Plant Systematics – Gurcharan Singh.
6. Systematics and Taxonomy of Animals – V.C. Kapoor.
7. Principles of Animal Taxonomy – G.G. Simpson.
8. Modern Taxonomy – R.R. Sokal & P.H.A. Sneath.
9. Molecular Systematics – David M. Hillis, Craig Moritz & Barbara K. Mable.
10. Handbook of the British Flora- G. Bentham & J.D. Hooker.
11. A handbook of field and herbarium methods- S.K. Jain & R.R. Rao.
12. Taxonomy of vascular plants- G.H.M. Lawrence.
13. Taxonomy of Angiosperms- B.P. Pandey.
14. Classification of flowering plants- A.B. Rendle.



Binod Bihari Mahto Koyalanchal University, Dhanbad
Four-Year Undergraduate Programme
Department of Life Sciences
NEP UG Syllabus

Semester I

Major (MJ) 01: Diversity of life forms, Biosystematics and Taxonomy
Practical

Credit-1 Lectures-30 hours

Full Marks= 25 (There is no internal examination in practical)

Pass Marks= 10 [End Semester=10] Time: 3 Hours

Sl.No.	List of Practical	Marks
1.	Study of floral characters of any one family suggested in the syllabus Poaceae, Apocynaceae, Euphorbiaceae.	4
2.	Study of given animal phyla based on body symmetry, germ layers, body cavity and segmentation (Through photographs)	4
3.	Spotting (Two each) a. Plant (write taxonomic hierarchy) b. Animal (write taxonomic hierarchy)	2 X 4: 8
4.	Class Record & Project/Model	4
5.	Viva voce	5
	Total marks	25

Suggested practical:

1. Herbarium preparation Techniques.
2. Study of a few endangered or endemic species of Plants/Animals of Jharkhand.
3. Study of a Floral characters of family Apocynaceae, Euphorbiaceae and Poaceae.
4. Report on visits to National/International Herbaria, Botanical Gardens, National Parks or Sanctuaries.
5. Identification of the given invertebrate specimen. Write down its complete taxonomic hierarchy from Kingdom down to Species.
6. Study of given animal phyla based on body symmetry, germ layers, body cavity and segmentation.
7. Report on the visit to Zoological Museum, National Park, Wildlife Sanctuary, Zoological Park.

Binod Bihari Mahto Koyalanchal University, Dhanbad
Four-Year Undergraduate Programme

ESTD: 2017

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**Department of Life Sciences
NEP UG Syllabus**

Semester – II

Major (MJ) 02: Diversity of Microbes up to fungi and Animal Diversity up to Non-chordates

THEORY

Credit: 3

Lectures: 45 Hours

Full marks=75 [Internal examination=15 (Written examination=10+ Class Performance & Attendance = 05) + [End semester=60]

Pass Marks= [Internal examination= 06] [End Semester=24]

Instructions:

- In all 9 questions to be set there shall be two groups – Group A and Group B.
- Group A is compulsory which shall contain three questions.
- Question no. 1 will be very short answer type consisting of six questions of 1 mark each in the form of MCQ/Fill in the blanks/ True or False etc.
- Question no. 2 & 3 will be of short answer type carrying 3 marks each.
- Group B will contain 6 subjective/descriptive questions* out of which the examinees are required to answer any 4 carrying 12 marks each.
- *Question no.9 will be short answer type. There will be four options of which any two to be answer each carrying equal marks covering the whole syllabus.

Course Objectives:

On completion of this course, the students will be able to understand

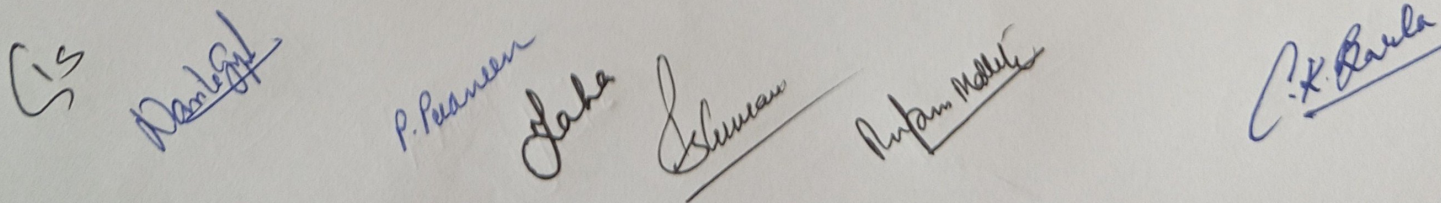
1. To gain knowledge of diversity, life forms, life cycles, morphology and importance of microorganisms.
2. To gain knowledge of diversity, life forms, life cycles, morphology of Bacteria, Virus, Algae, Fungi, symbiotic associations, Lichens and diseases of plants and their control.
3. To introduce students with general characters and life cycle of Microbes up to Fungi and their usefulness to mankind.
4. To understand the general characters, classification and unique features of major non-chordate phylum

Course Learning Outcomes:

On successful completion of this course the student should know:

1. Students would understand the classification, characteristic features, cell structure and growth and reproduction in viruses, bacteria and economic importance.
2. Students would understand the general characteristics, morphology, life cycle under classification of algae proposed by Fritsch.
3. Students would understand the classification of fungus given by Ainsworth, lichens as symbiotic associations.
4. Student would understand general characteristics, silent feature and classification of non-chordate phyla up to class level
5. Students would understand the details of structure and unique features/systems of each phylum with examples

THEORY



Unit	Topic	Lecture
Unit 1	Virus and Bacteria	
1.1	Viruses (Viroid, Virion and Prion)	1
1.2	DNA Virus and RNA Virus	2
1.3	Bacteriophages: Lytic and lysogenic cycle	2
1.4	Bacteria: General morphology, diversity, type (Gram positive and Gram negative) and significance	2
1.5	Reproduction in Bacteria: vegetative, asexual and recombination (Conjugation, Transformation and Transduction).	3
Unit 2	Algae	
2.1	General characteristics of algae; Thallus organization and reproduction	2
2.2	Classification (Fritsch) and Economic importance of Algae	2
2.3	Life cycle of algae viz., <i>Nostoc</i> , <i>Chlamydomonas</i> , <i>Polysiphonia</i> and <i>Sargassum</i>	3
Unit 3	Fungi, Lichen and Mycorrhiza	
3.1	General characteristics, classification (Anisworth) and Economic importance of Fungi	2
3.2	Lifecycle and Reproduction: <i>Synchytrium</i> , <i>Penicillium</i> , <i>Puccinia</i> , <i>Alternaria</i>	3
3.3	Lichens: General account, ecological and economic importance.	2
3.4	Mycorrhiza: General account, types and significance	1
Unit 4	Protozoa, Porifera and Coelenterate	
4.1	General Characters and Classification of Protozoa (up to class), Locomotion and Reproduction in Protozoa	3
4.2	General Characters and Classification of Porifera (up to class), Canal System	2
4.3	General Characters and Classification of Coelenterate (up to class), Metagenesis	2
Unit 5	Platyhelminthes, Nematelminthes and Annelida	
5.1	General Characters of Platyhelminthes and Nematelminthes	2
5.2	Structure and Life cycle of <i>Taenia solium</i> , <i>Ascaris</i> , Parasitic Adaptation in helminths	3
5.3	General Character and Classification of Annelida (up to class), and Metamerism	2
Unit 6	Mollusca, Arthropoda and Echinodermata	

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Unit	Topic	Lecture
6.1	General Characters and Classification of Mollusca (up to class), Torsion and Detorsion in Gastropods	2
6.2	General Characters and Classification of Arthropoda (up to class), Metamorphosis of insects and larval forms of crustacea	3
6.3	General Characters and Classification of Echinodermata (up to class), Water Vascular System	2
	Total	45

Suggested readings:

Plant Diversity

1. Alexopoulos, C.J., Mims, C.W, Blackwell, M. (1996). Introductory Mycology, John Wiley & Sons (Asia) Singapore, 4th edition.
2. Gangulee, H.C. and Kar, A.K. (2011). College Botany Volume-II. (Algae+Fungi+Bryophyta + Pteridophyta), New Central Book Agency, Kolkata.
3. Lee, R.E. (2008). Phycology, Cambridge University Press, Cambridge. 4th edition.
4. Pelczar, M.J. (2001). Microbiology, 5th edition, Tata McGraw-hill Co, New Delhi.
5. Prescott, Harley and Klein's Microbiology 7th edition (2008). Mc GRAW Hill. Singapore.
6. Sethi, I.K. and Walia, S.K. (2011). Textbook of Fungi and their Allies, Macmillan Publishers India Ltd.
7. Sharma, P.D. (2014). Microbiology. Rastogi Publication, Meerut.
8. Singh, Pande, Jain, A Textbook of Botany, (2010). (Algae+Fungi+Bryophyta+Pteridophyta), Rastogi Publication, Meerut.
9. Talaro, K.P., Chess, B., 2011. Foundation in Microbiology. 8th edition. McGraw-Hill.
10. Vashishta, B.R., Singh, V.P., and Sinha A.K. (2014). Botany for Degree Students (Algae) S. Chand & Company Ltd.
11. Webster, J. and Weber, R. (2007). Introduction to Fungi, Cambridge University Press, Cambridge, 3rd edition.

Animal Diversity (Non-Chordates)

1. Ruppert and Barnes, RD (2006) Invertebrate Zoology, VIII edition. Holt Saunders International edition
2. Barnes, R.S.K., Calow, P. Olive., Golding, D.W. and Spicer, J.L.I. (2002) The Invertebrates; E.J.W, III Edition, Blackwell Science
3. Nigam: Biology of non-chordates (1997, S Chand)
4. Miller and Harley: zoology (6th Ed. 2005, W.C. Brown)
5. Parker & Haswell: Textbook of Zoology, Vol. I (2005, Macmillan)

Binod Bihari Mahto Koyalanchal University, Dhanbad

Four-Year Undergraduate Program
Department of Life Sciences
NEP 2020 UG Syllabus
Semester – II

MJ-02: Diversity of Microbes up to fungi and Animal Diversity up to Non-chordates

Practical

Credit-1

Lectures-30 hours

Full Marks= 25 (There is no internal examination in practical)

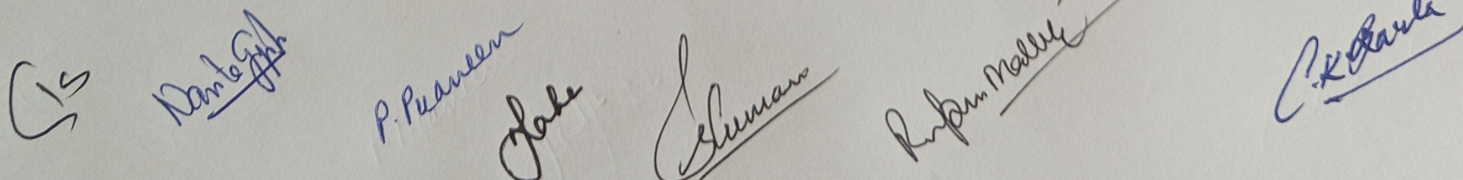
Pass Marks= 10 [End Semester=10]

Time: 3 Hours

Sl. No.	List of Practical	Marks
1	Study of TMV/bacteria by slide/photographs	04
2	Preparation of temporary slides of Algae/ non-chordates	04
3	Spotting (two microbes up to fungi and two from non-chordates)	(2×4) = 08
4	Class record & Collection / Model	04
5	Viva-voce	05
	Total	25

Suggested Practical

- Study of permanent slides/ Museum specimens as mentioned in the theory.
- Preparation of temporary slides as mentioned in the theory.
- Study of structure of TMV, different forms of lichen and Mycorrhiza by photographs.
- Study of Bacteria by slides/photographs.
- Museum specimens:** Sycon, Physalia, Metridium, Fasciola, Taenia solium, Nereis, Aphrodite, Pheretima, Lingula, Chiton, Pila, Unio, Sepia, Loligo, Octopus, Eupagurus, Limulus, Millipedes, Centipedes, Palaemon, Antedon, Asterias, Echinus, Holothuria
- Permanent slides:** Paramecium (W.M), Conjugation of Paramecium, Obelia colony, Medusa, Gemmules of Sponges, T.S of Earthworm through various region, Ovary of earthworm Miracidium larva, Sporocyst larva, Redia larva, Cercaria larva, Trochophore larva, Glochidium larva, Nauplius, Zoea larva, Mysis larva, Megalopa larva, Bipinnaria larva, Echinopluteus larva, Ophiopluteus larva.



ASSOCIATED CORE (AC)

LIFE SCIENCES

(for Semester-I/II only)

Binod Bihari Mahto Koyalanchal University, Dhanbad

Four-Year Undergraduate Programme

Department of Life Sciences

NEP UG Syllabus

Semester I/II

Associated Core (AC) Paper

Life Sciences

Credit-3

Lectures-45 Hours

Full Marks: 75 [End Semester=60] + [Internal Examination=15 (Written Examination = 10+Class Performance & Attendance = 05)]

Pass Marks: [End Semester=24] [Internal Examination= 06]

Instructions:

- In all 9 questions to be set there shall be two groups – Group A and Group B.
- Group A is compulsory which shall contain three questions.
- Question no. 1 will be a very short answer type consisting of six questions of 1 mark each in the form of MCQ/Fill in the blanks/True or False etc.
- Question no. 2 & 3 will be of short answer type carrying 3 marks each.
- Group B will contain 6 subjective/descriptive questions* out of which the examinees are required to answer any 4 carrying 12 marks each.

*Question no. 9 will be short answer type. There will be four options of which any two to be answer each carrying equal marks covering the whole syllabus

Learning Outcomes:

- Develop understanding on the diversity of life with regard to plants and animals.
- Group animals on the basis of their morphological characteristics/ structures.
- Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
- Examine the diversity and evolutionary history of a taxon.
- Understand how morphological change due to change in environment helps drive evolution over a long period of time.
- The project assignment will also give them a flavour of research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills.
- It will further enable the students to think and interpret individually due to different animal species chosen.

SIS

Nand Gopal

P. Praveen
Jabe

Suman

Rupam Mallick

C. K. Barua

Units	Topics	Period
Unit 1	Diversity of Life: Plant Diversity	
1.1	Algae & Fungi: General Characters, Morphology and Life Cycle of <i>Nostoc</i> ; General Characters, Morphology and Life Cycle of <i>Puccinia</i>	5
1.2	Bryophyta & Pteridophytes: General Characters, Morphology, Anatomy of <i>Marchantia</i> ; General Characters, Morphology, Anatomy and reproduction of <i>Selaginella</i>	5
1.3	Gymnosperms: General Characters, Morphology, Anatomy and Reproduction of <i>Pinus</i>	4
Unit 2	Diversity of Life: Animal Diversity	
2.1	Non – Chordates: General Characters of Protozoa, Porifera and Coelenterate; General Characters of Annelida and Arthropoda; General Characters of Mollusca and Echinodermata	4
2.2	Chordata: General Characters of Pisces and Amphibia; General Characters of Reptiles, Aves and Mammals	4
Unit 3	Plant Physiology	
3.1	Transpiration - Mechanism and Significance.	2
3.2	Ascent of Sap – Root Pressure Theory and Transpiration Pull Theory.	1
3.3	Photosynthesis – Photophosphorylation, C ₃ , C ₄ -Cycle	4
3.4	Growth hormone- Auxin, Gibberellin	2
Unit 4	Human Physiology	
4.1	Digestion: Digestion of Food (Carbohydrate and Protein)	2
4.2	Respiration: Structure of Lung; Transport of Gases	4
4.3	Circulation: Structure of Heart and Double Circulation	4
4.4	Excretion: Structure of Nephron; Urine Formation	4
	Total Lectures/Hours/Periods	45

Recommended readings:

1. Bhatnagar, S.P. & Moitra, A. (1996), Gymnosperms, New Age International(P) Ltd Publishers, New Delhi, India.
2. Vashishta, B.R., Singh, V.P., and Sinha A.K. (2014) Botany for Degree Students (Algae) S. Chand & Company Ltd.
3. Hopkins, W.G. and Huner, A. (2008). Introduction to Plant Physiology. John Wiley and Sons.
4. Miller & Harley: Zoology (6th ed. 2005, W.C. Brown)
5. Nigam: Biology of Non-chordates (1997, S Chand)
6. Nigam: Biology of Chordates (1997, S Chand)
7. Ruppert and Barnes, RD (2006) Invertebrate Zoology, VIII edition. Holt Saunders International edition
8. C. C. Chatterjee Medical physiology
9. Guyton – a book on medical physiology

CS

D. K. Bhatnagar

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S. Kumar

R. K. Bhatnagar

C. K. Bhatnagar

Binod Bihari Mahto Koyalanchal University, Dhanbad

Four-Year Undergraduate Programme

Subject: Life Science

NEP UG Syllabus

Semester I/II

Associated Core (AC) Paper

Life Sciences**Practical**

Credit-2 Lectures-30 Hours

Full Marks=25 [End Semester=25] [There is no internal examination in practical]

Pass Marks = [End Semester=10]

Time: 3 Hours

Sl. No.	Practical	Marks
1	Plant Physiology Experiment	04
2.	Animal Physiology Experiment	04
2	Spotting: a. Plant Diversity (2) b. Animal Diversity (2)	2x4= 08
3	Class Record & Project/ Model	04
4	Viva voce	05
	Total	25

Suggested Practical**a. Plant Diversity:**

- Museum Specimens: *Lichens* (Thallus), *Marchantia* (Thallus), *Selaginella* (whole plant) *Pinus* (Needle leaf, female cone)
- Permanent Slides: *Nostoc* (Colony), *Puccinia* (Uredospore, Teliospore), *Marchantia* (T.S. Of thallus, Sporophyte), *Selaginella* (whole mount leaf with ligule, strobilus L.S.) *Pinus* (T.S. needle and stem, microspores)

b. Animal Diversity:

- Museum Specimens (Non-Chordates): *Sycon*, *Pheretima*, *Prawn*, *Pila*, *Asterias*
- Museum Specimens (Chordates): *Torpedo*, *Hippocampus*, *Alytes*, *Chameleon*, *Pteropus*.
- Permanent Slides ((Non-Chordates): *Paramecium* (W.M.), *Obelia* Colony
- Permanent Slides (Chordates): *Amphioxus* (W.M.)

c. Plant Physiology:

- To determine the rate of transpiration by Ganong's photometer.
- Experiment showing that O_2 evolved during photosynthesis.
- Experiment showing that light is essential for photosynthesis.

d. Animal Physiology:

- Demonstration of Blood Pressure by Sphygmomanometer
- Preparation of Haemin Crystal

G.S.

Nand Gyl

P. Praveen
Joshi

Shuman

Rupin Mallik

R.K. Barla

Multidisciplinary Course

LIFE SCIENCES

(for Semester-I/II/III only)

Binod Bihari Mahto Koyalanchal University, Dhanbad
 Four-Year Undergraduate Programme
 Department of Life Sciences
 NEP UG Syllabus
 Semester I/II/III

Multidisciplinary Course (MDC)
LIFE SCIENCES

Lectures: 45Hours

Credit: 3

Full Marks: 75 [End Semester=75] [No Internal Examination and no Practical's]

Pass Marks: 30[End Semester=30]

Instructions:

- In all 9 questions to be set there shall be two groups – Group A and Group B.
- Group A is compulsory which shall contain three questions.
- Question no. 1 will be a very short answer type consisting of six questions of 1 mark each in the form of MCQ/Fill in the blanks/True or False etc.
- Question no. 2 & 3 will be of short answer type carrying 3 marks each.
- Group B will contain 6 subjective/descriptive questions* out of which the examinees are required to answer any 4 carrying 12 marks each.

*Question no. 9 will be short answer type. There will be four options of which any two to be answer each carrying equal marks covering the whole syllabus

Course Objectives

On completion of this course, students will be able to:

- Understand the basic concepts of life sciences.
- Explain the structure and functions of cells, plants, and animals.
- Understand the principles of genetics, evolution, and environmental sustainability.
- Recognize the applications of life sciences in agriculture, health and conservation.

Learning Outcomes

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

- Describe the diversity and classification of living organisms.
- Explain the structure and functions of cells and major organ systems.
- Apply life science concepts to sustainable protection, and human welfare

15

Nanaji

P. Prasenjit

Sharma

Rupam Mallick

Chandra

Unit	Topic	Period
Unit 1	Diversity of Life and Cell Biology	
1.1	Classification of plants and animals: Five kingdom classification.	3
1.2	Cell structure and function	3
1.3	Cell division (Mitosis and Meiosis)	3
Unit 2	Human physiology	
2.1	Digestion and Respiration: Digestion of food, Mechanism of breathing and transport of gases.	3
2.2	Circulation and Excretion: Blood, lymph, structure of human heart, double circulation, human excretory system and urine formation.	3
2.3	Nervous and Reproductive system: Structure and types of neurons, male female reproductive system, gametogenesis and fertilization.	3
Unit 3	Genetics and evolution	
3.1	Mendel's law of inheritance	2
3.2	Molecular basis of inheritance: DNA, RNA, Overview of gene expression.	4
3.3	Evolution: Lamarckism. Darwinism	3
Unit 4	Plants, Environment and Human health	
4.1	Plant diversity, biodiversity conservation and ecosystem services.	3
4.2	Medicinal plants, Nutraceuticals and Traditional Healthcare Systems	3
4.3	Climate change, Sustainable development and Green technologies.	3
Unit 5	Plants in Agriculture, Biotechnology and Entrepreneurship	
5.1	Plant biotechnology, tissues culture and Genetic Engineering.	3
5.2	Food security. Organic farming and Nutritional importance of crops.	3
5.3	Economic Botany, Plant-based Industries and Entrepreneurship Development.	3
	Total Lectures/Hours/Periods	45

GS

D. S. G. S.

P. Praveen
Jabe

Shuman

Rupam Mallick

C. K. Barua