

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

**DEPARTMENT OF BOTANY
COURSE CURRICULUM**

PART- A: Introduction			
Program: Bachelor in Life sciences <i>(Degree/Honors)</i>		Semester - VI	Session: 2024-2025
1	Course Code	BOSC-06 T	
2	Course Title	Plant Physiology and Economic Botany	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will understand to <ul style="list-style-type: none"> ➤ Gain a deep understanding of the fundamental physiological processes in plants, including photosynthesis, respiration, transpiration, and nutrient uptake, and their regulation. ➤ Acquire practical skills in conducting experiments and using various techniques. ➤ Develop a comprehensive understanding of the economic value and utilization of plant resources. ➤ Acquire knowledge and skills to identify and classify economically important plant species. 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Plant-water relations & Mineral nutrition Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation. Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Symptoms of mineral deficiency in major crops, Transport of ions across cell membrane, active and passive transport.		12
II	Photosynthesis and Lipid Metabolism Historical background, photosynthetic pigments and their role photochemical reactions, PSI, PSII, Q cycle, C ₄ pathways; Crassulacean acid metabolism; Factors affecting CO ₂ reduction. Synthesis and breakdown of triglycerides, β-oxidation, glyoxylate cycle, gluconeogenesis and its role in mobilization of lipids during seed germination, α oxidation		11
III	Respiration and Nitrogen Metabolism Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway. Electron transport and mechanism of ATP synthesis; C ₃ , C ₄ and CAM pathways of carbon fixation, Photorespiration. Nitrate assimilation, biological nitrogen fixation, Physiology and biochemistry of nitrogen fixation, Ammonia assimilation (GS-GOGAT), reductive amination and transamination, amino acid synthesis.		11
IV	Economic Botany: Origin of Cultivated Plants, Examples of major plant introductions; Crop domestication and loss of genetic diversity; evolution of new crops/varieties, importance of germplasm diversity. Brief account of crops, millets, legumes, spice, Beverages, oils, drug, fiber, and timber yielding plant.		11
Keywords	Osmosis, Transport, Hill reaction, Genetic diversity.		
Signature of Convener & Members (CBoS) :			

① Prof. ...
 ② ...
 ③ ...
 ④ ...
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 ⑥ ...

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 ⑨ ...
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PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. Taiz, L., Zeiger, E., Møller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
2. B. P. Pandey (2017) Economic Botany. S. Chand Publication, New Delhi.
3. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
4. Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.

Reference Books Recommended-

1. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic Publishers, The Netherlands.
2. Chrispeels, M.J. and Sadava, D.E. 1994 Plants, Genes and Agriculture. Jones & Bartlett Publishers.
3. Harborne, J.B. (1973). Phytochemical Methods. John Wiley & Sons. New York.
4. Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.

Online Resources–

- e-Resources / e-books and e-learning portals
- <https://education.nationalgeographic.org/resource/photosynthesis/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242210/>
- <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/nitrogen-metabolism>
- https://en.wikipedia.org/wiki/Lipid_metabolism

Online Resources–

- e-Resources / e-books and e-learning portals
- www.swayam.ac.in
- www.ignou.ac.in
- www.egyankosh.ac.in
- www.iitm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in
- www.internshala.com
- www.ndl.iitkgp.ac.in

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	

End Semester Exam (ESE): 70	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks
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Name and Signature of Convener & Members of CBoS:

- ① R. Jivara
- ② Ramesh
- ③ Anshu
- ④ M. S.
- ⑤ R. Jivara
- ⑥ R. Jivara
- ⑦ R. Jivara
- ⑧ R. Jivara
- ⑨ R. Jivara
- ⑩ R. Jivara

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY

COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences <i>(Degree/ Honors)</i>		Semester - VI	Session: 2024-2025
1	Course Code	BOSC-06	
2	Course Title	Lab. Course -06 (Plant Physiology and Economic Botany)	
3	Course Type	Laboratory course	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	Acquire practical skills in conducting experiments and using various techniques to measure and analyze plant physiological parameters, enabling students to design and execute experiments in plant physiology research. ○ Acquire knowledge and skills to identify, and classify economically important plant species, and understand their ecological requirements, cultivation techniques, and potential for sustainable utilization. ○ Apply critical thinking and problem-solving skills to analyze and evaluate the impacts of human activities on plant resources, and develop strategies for the conservation, sustainable management, and utilization of plant biodiversity.	
6	Credit Value	1 Credits	Credit =30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	1. Determination of osmosis and plasmolysis. 2. Determination of osmotic potential of plant cell sap by plasmolytic method. 3. Demonstration of the process of transpiration. 4. To find out rate of transpiration by potometer method. 5. To find out stomatal frequency and stomatal index. 6. Chemical separation of photosynthetic pigments. 7. To find out that oxygen evolved during the process of photosynthesis. 8. To study the effect of quality and intensity of light on photosynthesis. 9. To find out the effect of carbon dioxide concentration on the rate of photosynthesis. 10. To find out the Respiratory Quotient of different respiratory substrates by respirometer method. 11. To compare the rate of respiration in different parts of a plant. 12. Study of amylase and catalase enzymes. 13. Morphological features and economic importance of cereals, millets, legumes, oil, spices, drug, fiber, and timber yielding plant.		30
Keywords	Physiology, Economic Botany, Beverages, Enzyme.		

Signature of Convener & Members (CBoS) :

- ① R. Prasad
- ② Kundu
- ③ Adhikari
- ④ M. S.
- ⑤ [Signature]
- ⑥ [Signature]
- ⑦ [Signature]
- ⑧ [Signature]
- ⑨ [Signature]
- ⑩ [Signature]

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

1. . Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.
2. Kochhar, S.L. (2012). Economic Botany in Tropics, MacMillan & Co. New Delhi, India.
3. Wickens, G.E. (2001). Economic Botany: Principles & Practices. Kluwer Academic

Reference Books Recommended –

1. Taiz, L., Zeiger, E., MØller, I.M. and Murphy, A (2015). Plant Physiology and Development. Sinauer Associates Inc. USA. 6th edition.
2. Hopkins, W.G., Huner, N.P., (2009). Introduction to Plant Physiology. John Wiley & Sons, U.S.A. 4th Edition.

Online Resources–

> e-Resources / e-books and e-learning portals

- > www.swayam.ac.in
- > www.ignou.ac.in
- > www.egyankosh.ac.in
- > www.iitm.ac.in
- > www.eskillindia.org
- > www.eschiksha.mp.gov.in
- > www.vlab.co.in
- > www.internshala.com
- > www.ndl.iitkgp.ac.in

Online Resources–

> e-Resources / e-books and e-learning portals

- > <https://education.nationalgeographic.org/resource/photosynthesis/>
- > <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4242210/>
- > <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/nitrogen-metabolism>
- > https://en.wikipedia.org/wiki/Lipid_metabolism

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance - 05 Total Marks - 15	
End Semester Exam (ESE): 35	Laboratory / Field Skill Performance: On spot Assessment	
	A. Performed the Task based on lab. work - 20 Marks	Managed by Course teacher as per lab. status
	B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	

Name and Signature of Convener & Members of CBoS:

- ① R. B. Roy
- ② R. B. Roy
- ③ R. B. Roy
- ④ M. K. Roy
- ⑤ R. B. Roy
- ⑥ R. B. Roy
- ⑦ R. B. Roy
- ⑧ R. B. Roy
- ⑨ R. B. Roy
- ⑩ R. B. Roy

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF BOTANY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Sciences (Honors)		Semester - VII	Session: 2024-2025
1	Course Code	BOSC- 07 T	
2	Course Title	Ecology and Phytogeography	
3	Course Type	Discipline Specific course (DSC)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, students will be able to understand: <ul style="list-style-type: none"> ▪ The interrelationship between organisms and environment. ▪ Methods to study vegetation, community patterns and processes, ecosystem functions, and principles of phytogeography. ▪ Evolving strategies for sustainable natural resource management and biodiversity conservation. ▪ Climatic changes and its restoration ▪ Familiar with sustainable development 	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Ecological Factors and Management : Climatic- light; temperature, air and water, topographic, edaphic, soil formation soil texture, type of soil, soil profile, classification, physio-chemical properties, soil organic matter, biotic factors, interrelationships, major soil type of the world. Ecological management: Concepts, sustainable development, sustainability indicators.		12
II	. Ecosystem Organization : Structure and function, primary production (methods of measurements, global pattern, controlling factors), energy dynamics, trophic organization, energy flow pathways, ecological efficiencies, litter fall and decomposition- mechanism, substrate quality and climate factors, global biogeochemical cycle of C, N, P, S, minerals cycle- pathways, processes, budgets in terrestrial and aquatic ecosystem.		11
III	Community and Eco-Stability Concepts of community and continuum, analysis of communities (analytical and synthetic characters), community coefficients, inter-specific associations, ordination, concept of ecological niche. Vegetation Development: Temporal changes (cyclic and non-cyclic), mechanism of ecological successions (relay floristic and initial floristic composition, facilitation, tolerance and inhibition models), changes in ecosystem properties during succession. Ecological Stability: Concept of resistance and resilience, ecological perturbations (natural and anthropogenic) and their impact on plants and ecosystem, ecology of plant invasion, environmental impact assessment, ecosystem restoration.		11
IV	Phytogeography Pollution, Climatic Changes Phytogeographical regions of India with reference to Chhattisgarh. Pollution : Air, Water, Soil & Sound - kinds, sources, quality parameters, effect on plans and ecosystem. Climate change: Green house gases(CO ₂ , CH ₄ , N ₂ O, CFCs) sources, trends and role, ozone layer and ozone hole, consequences of climate changes, (CO ₂ fertilization, global warming, sea level rise, UV radiation).		11
Keywords	Ecological Factors community and continuum ecosystem ,Phytogeographical ,climate changes		
Signature of Convener & Members (CBoS) :			
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Ecological factors & Management
 Ecosystem organisation

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF BOTANY COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Honors)		Semester - VII	Session: 2024-2025
1	Course Code	BOSE -08 T	
2	Course Title	Growth and Stress Physiology	
3	Course Type	Discipline specific Elective (DSE)	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to 1. understand the role of Physiological and metabolic processes for plant growth and development under stress. 2. Assimilate about biochemical constitution of plant diversity. 3. Get acquired the students with complex interaction between organism and environment 4. Understand about the role of hormones in plant development.	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Plant Growth and Phytohormone ➤ Plant growth curve, sigmoid and J shaped growth. Lag, Log and steady stage. Developmental roles of phytohormones ➤ Auxins, ➤ Gibberellins, ➤ Cytokinins, ➤ ABA, ➤ Ethylene,		12
II	Movements, Dormancy & Responses ➤ Photoperiodism (SDP, LDP, Day neutral plants); ➤ Phytochrome (discovery, structure and functions), ➤ Seed and bud Dormancy causes and breaking, ➤ Vernalization ➤ Senescence, ➤ Plant movements		11
III	Planteco-physiology and Stress Physiology: ➤ Concept of Planteco-physiology. ➤ Plant perception, ➤ physiology of ecological considerations. ❖ Hydrophytic, xerophytic morphological and anatomical adaptations in plants		11
IV	Stress Physiology: Plant responses to biotic and abiotic stress, mechanism of biotic and abiotic tolerance, HR (Hypersensitive Response) and SAR Systemic Acquired Resistance), water deficit and ❖ Drought resistance, ❖ Salinity stress, ❖ metal toxicity, ❖ freezing and heat stress, ❖ oxidative stress.		11
Keywords		Growth, Phytohormone, Eco-physiology, Vernalization.	
Signature of Convener & Members (CBOS) :			

① R. Sivas
 ② S. Sundar
 ③ M. S.

④ S. S.
 ⑤ S. S.
 ⑥ S. S.

⑦ S. S.
 ⑧ S. S.
 ⑨ S. S.
 ⑩ S. S.

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Galston, A.W., (1989) Life Processes in Plants, Scientific American Library. Springer-Verlag, New York, USA.
2. Hopkins, W.G., (1995) Introduction to Plant Physiology, John Wiley and Sons, Inc. New York, USA.
3. Salisbury, F.B. and Ross, C.W., (1992) Plant Physiology. Wadsworth Publishing Co., California, USA.
4. Denis, D.T., Turpin, D.H. Lefebvre, D.D. & Layzell, D.B. (1997) Plant Metabolism. Longman, Essex, England.

Reference Books Recommended -

- 1, Taiz, L. and Zeiger, E. (1998) Plant Physiology. Sinauer Associates, Inc. Pub., Massachusetts, USA.
2. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

Online Resources-

➤ e-Resources / e-books and e-learning portals

<https://link.springer.com/book/10.1007/978-3-030-78420-1>

<https://uou.ac.in/sites/default/files/slm/MSCBOT-601.pdf>

<https://www.researchgate.net/publication/347908867> Stress Physiology in Plants

➤ https://www.esalq.usp.br/lepse/imgs/conteudo_thumb/Plant-stress-physiology.pdf

Online Resources-

➤ e-Resources / e-books and e-learning portals

➤ www.swayam.ac.in

➤ www.ignou.ac.in

➤ www.egvankosh.ac.in

➤ www.iitm.ac.in

➤ www.eskillindia.org

➤ www.eshiksha.mp.gov.in

➤ www.vlab.co.in

➤ www.internshala.com

➤ www.ndl.iitkcp.ac.in

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 70 (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10 Total Marks - 30	
End Semester Exam (ESE): 30	Two section - A & B Section A: Q1. Objective - 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:

① R. B. S. / R. B. S.
② R. B. S. / R. B. S.
③ R. B. S. / R. B. S.
④ R. B. S. / R. B. S.

⑤ R. B. S. / R. B. S.
⑥ R. B. S. / R. B. S.

⑦ R. B. S. / R. B. S.
⑧ R. B. S. / R. B. S.
⑨ R. B. S. / R. B. S.
⑩ R. B. S. / R. B. S.

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF ZOOLOGY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science <i>(Diploma / Degree/ Honors)</i>		Semester - IV	Session: 2024-2025
1	Course Code	ZOSC-04T	
2	Course Title	Diversity of Chordates and Comparative Anatomy	
3	Course Type	Discipline Specific Course	
4	Pre-requisite (if, any)	As per Program	
5	Course Learning Outcomes (CLO)	<p>After successfully completing this course, the students will be able to:</p> <ul style="list-style-type: none"> ➤ Develop understanding of the characters used to classify and differentiate the organisms belonging to different taxa and the evolutionary history and relationship between the different classes of chordates. ➤ Acquire knowledge and Develop critical understanding of the comparative anatomy and functioning of complex systems of Pisces to Mammalia. ➤ Learn the comparative account of integument with its derivatives, digestive system and Skeletal and Muscular System. ➤ Understand the Digestive system and its anatomical specializations with respect to different diets and feeding habits and respiratory organs in vertebrates used in aquatic, terrestrial and aerial vertebrates. ➤ Understand the evolution of heart, aortic arches, and Learn the evolution of brain, sense organs and urinogenital system. 	
6	Credit Value	3 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Diversity in Protochordates and Chordates: General characteristics & classification of Chordata up to orders with examples. Cephalochordates: Type study – Amphioxus and its affinities, Agnatha: Comparative account of Petromyzon and Myxine		11
II	Structure and function of integument and skeletal systems Alimentary canal: Structure of integument from fishes to mammals with an account on epidermal and dermal derivatives and their functional significance, Anatomy of Axial skeleton from fishes to mammals. Comparative anatomy of appendicular skeleton: limbs and girdles from fishes to mammals. Comparative account with structure of alimentary canal and digestive glands in vertebrates.		11
III	Comparative anatomy and functional Significance of, Respiratory organs, Heart Aortic Arches and Endocrine Glands: Structure of Gills, Lungs, Air sacs and Swim bladder in Vertebrates, Structure and evolution of heart in vertebrates, Evolution of aortic arches and their significance in vertebrates. Endocrine Glands & their function. Disorders of Thyroid, Adrenal, Pancreas and Pituitary.		11
IV	Comparative anatomy and functional Significance of Urinogenital System, Brain & Sense Organ: Types and development of kidneys and their ducts in anamniotes and amniotes. Nephron- structure, types and their function, Comparative anatomy of Urinogenital system. Comparative anatomy of Brain of vertebrates, Structure of Ear and Eye.		12
Keywords	Chordates, Protochordates, Petromyzon And Myxine, Comparative Anatomy, Integument Lungs, Air Sacs Aortic Arches, Kidney, Brain		
Signature of Convener & Members (CBoS) :			

Signature

Signature

Signature

Signature

Signature

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

- Jordan, E. L. and Verma, P. S. (2013) Chordate Zoology (14th edition).
- Saxena, R. K. and Saxena, S. (2015) Comparative Anatomy of Vertebrates (2nd edition).
- R.L. Kotpal, Modern Text Book of Zoology, Vertebrates, Rastogi Publication, Merut
- Tiwari, V.K. Unified Zoology, B.Sc. Part I, Shivrul Agarwal and Company, Indore

Reference Books Recommended –

- Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
- Weichert, C.K. (1970) Anatomy of Chordates (4th edition).

Online Resources–

e-Resources / e-books and e-learning portal

- <https://swayamias.com/zoology-optional-coaching/>
- <https://www.swayamprabha.gov.in/index.php/program/archive/9>
- <https://www.acsedu.co.uk/Courses/Environmental/VERTEBRATE-ZOOLOGY-BEN104-528.aspx>
- <https://www.nu.edu/degrees/mathematics-and-natural-sciences/courses/bio416/>
- <https://www.youtube.com/watch?v=qSY5iXHHi88>
- <https://www.youtube.com/watch?v=tz8liJXbBCQ>
- <https://www.youtube.com/watch?v=mXECx3s8yEQ>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:











FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF ZOOLOGY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Diploma / Degree / Honors)		Semester - IV	Session: 2024-2025
1	Course Code	ZOSC-04P	
2	Course Title	Diversity of Chordates and Comparative Anatomy	
3	Course Type	Discipline Specific Lab Course	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<p>After successfully completing lab course the students will be able to -</p> <ul style="list-style-type: none"> ➤ Develop understanding on the diversity of life with regard to different classes of vertebrates. ➤ Gain knowledge to identify and classify the animals on the basis of their morphological characteristics. ➤ Acquire the detailed knowledge about evolutionary history and relationship between the different classes of vertebrates through salient features some important animals. ➤ Learn comparative account of various systems in all the classes of vertebrates. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<p style="text-align: center;">List of labs to be conducted</p> <ul style="list-style-type: none"> ➤ Study of animals through models, slides and museum specimens in the laboratory with details on their classification, biogeography and diagnostic features of different class of Vertebrate. ➤ Study of histological slides of different class of Vertebrate. ➤ Study of Axial skeleton of Amphibia, Reptilia, Aves and Mammals. Comparative study of Appendicular skeleton Girdles and limb bones) of Amphibia, Reptilia, Aves and Mammals. ➤ Comparative study of heart of Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts. ➤ Comparative study of Aortic Arches Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts. ➤ Comparative study of brain of Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts. ➤ Comparative study of Urinogenital system of Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts. ➤ Histological study of Endocrine tissue ➤ Study of Vertebrate animals in nature during a survey of a National Park/ Forest area/College campus. ➤ Group discussion/Viva or Seminar presentation on any one of above topics ➤ An “animal album or Practical Record” containing sketches, photographs, cut outs, with appropriate write up about the above mentioned taxa. ➤ Study of some videos to develop understanding on the animals of different taxa. 		30
Keywords	<i>Museum specimens, Histological slides, Alternative of Dissection, Practical Record</i>		
Signature of Convener & Members (CBoS) :			

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

- S.S. Lal, Practical Zoology, Vertebrate. 12th Edition Rastogi Publications, Meerut, New Delhi.
- A manual of practical Zoology. Dr. P.S Verma, S. Chand Publication, New Delhi
- Saxena, R. K. and Saxena, S. (2015) Comparative Anatomy of Vertebrates (2nd edition).
- R.L. Kotpal, Modern Text Book of Zoology, Vertebrates, Rastogi Publication, Merut
- Tiwari, V.K. Unified Zoology, B.Sc. Part I, Shivalal Agarwal and Company, Indore

Reference Books Recommended –

- Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
- Weichert, C.K. (1970) *Anatomy of Chordates* (4th edition).

Online Resources–

- <https://www.youtube.com/watch?v=W4gQxADeryw>
- <https://www.youtube.com/watch?v=Ts9GsrBviI8>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance - 05 Total Marks - 15	
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:



FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF ZOOLOGY
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in Life Science (Diploma / Degree/Honors)		Semester -IV	Session: 2024-2025
1	Course Code	ZOSE-02T	
2	Course Title	Ecology and Wildlife Conservation & Management	
3	Course Type	Discipline Specific Elective	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<p>After successfully completing this course, the students will be able to:</p> <ul style="list-style-type: none"> ➤ Understand the concepts of fundamental ecological principles, including energy flow, nutrient cycling, and population dynamics. ➤ Apply the knowledge of ecology to understand equilibrium of nature. ➤ Analyze the strategies of Populations to survive and sustain. ➤ Evaluate the significance of biodiversity and its conservation. ➤ Create awareness about wildlife and nature. 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	<p>An overview of Ecology and Biomes: Aims and scope of Ecology. Difference between Auto-ecology and Synecology. Abiotic & Biotic factors. Ecosystem and Ecological Pyramids. Bio-geo chemical cycles. Energy flow in ecosystem: Trophic levels. Food Chain, Food Web, Food chain in fresh water ecosystem. Laws of limiting factor: Leibig's Law of Minimum, Shelford Law of tolerance. Major Biomes of the world. Biogeographic zones of India.</p>		11
II	<p>Population ecology: Population characteristics: Density, Measurement of Population Density (Quadrat method and tagging method) Mortality, Natality, Age Pyramids, Migration and Dispersal. Life tables: Survivorship curves. Population Growth: Types of Population Growth, Growth Curves (S shaped & J shaped), Mathematical Expression of population growth: logistic & stochastic. R and K strategies. Carrying Capacity. Population Regulation: extrinsic & intrinsic factors.</p>		12
III	<p>Biotic community and Environmental degradation: Biotic community characteristics and attributes: Stratification; Dominance, diversity, species richness, abundance, Evenness, Similarity. Ecotone and edge effect. Ecological succession. Species interaction: Positive interactions: commensalism, proto-cooperation and mutualism. Negative interactions: parasitism. Competition: Interspecific and Intraspecific, Lotka Volterra Model, Gause's Principle. Prey-Predator Model. Environmental degradation: Air, water and noise pollution and their control. Natural resources: Mineral, water and forest, their significance and conservation.</p>		11
IV	<p>Biodiversity & Wildlife management: Biodiversity: Concept and characteristics. Levels of Biodiversity (Genetic Diversity, Species Diversity & Ecosystem Diversity), Hotspots of Biodiversity. Major National Parks of Chhattisgarh and their biodiversity. Endemic animal species of Chhattisgarh. IUCN red list categories and criteria. Conservation of Biodiversity (In Situ, & Ex Situ Conservation). Major international & national treaties, laws and regulations for conserving biodiversity. Important conservation projects undertaken in India: Project Tiger & Project Elephant. Tiger Census and Estimation (Techniques and Findings). Cheetah re-introduction plan. Captive breeding and Propagation: Founder population, rehabilitation, education, utilization, gene banks. GIS and other technologies in Forest & Wild life conservation.</p>		11
<p>Keywords Ecology, Biome, Abiotic, Biotic factors, Nutrient Cycle, Population, Wildlife conservation, In Situ & Ex Situ</p>			
Signature of Convener & Members (CBoS) :			

Signature of Convener & Members (CBoS) :

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

- Sharma, P.D. Ecology and Environment, Rastogi Publication.
- Kumar Pranav, Meena Usha. Fundamentals of Ecology and Environment.
- Mathur Reena. Wildlife Conservation and Management, Rastogi Publication.
- Singh S.K., Text book of Wildlife Management, CBC Publishers and Distributors

Reference Books Recommended –

- Chapman, J.L.& M.J. Reiss. 1998. Ecology: Principles and Applications. Cambridge Univ. press. 2nd edition.
- Odum, E. P. (2004). Fundamentals of Ecology, Oxford and IBH Publishing Co. Pvt. Ltd.
- Smith, TM and Smith RL 2015. Elements of Ecology, Pearson Education, India.

Online Resources–

- https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000035ZO/P000891/M020617/ET/1498712980Ecosystemprocesses-IPart-1Quad1.pdf
- https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000035ZO/P000891/M020612/ET/1498710746CommunitycharacteristicsstratificationPart4Quad1.pdf
- http://ndl.iitkgp.ac.in/he_document/swayam_prabha/cao2zsydjqu

Online Resources–

- <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1788373>
- https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000032SW/P001702/M020403/ET/14969150701-

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	

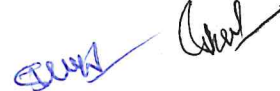
End Semester Exam (ESE):	Two section – A & B
	Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks
	Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks

Name and Signature of Convener & Members of CBoS:









FOUR YEAR UNDERGRADUATE PROGRAM(2024 – 28)
DEPARTMENT OF ZOOLOGY
COURSE CURRICULUM

PART-A: Introduction			
Program: Bachelor in Life Science <i>(Diploma / Degree/ Honors)</i>		Semester -IV	Session: 2024-2025
1	CourseCode	ZOSE-02P	
2	CourseTitle	Ecology and Wildlife Conservation & Management	
3	CourseType	Discipline Specific Elective Lab Course	
4	Pre-requisite(if, any)	<i>As per Program</i>	
5	Course Learning Outcomes(CLO)	<p>After successfully completing this course, the students will be able to:</p> <ul style="list-style-type: none"> ➤ Understand practical fieldwork skills, including sampling techniques, data collection and methods of analysis used in ecological research. ➤ Learn to design and implement ecological experiments. ➤ Understand soil profile and characteristics. ➤ Analyse chemical parameters of various water bodies. ➤ Create awareness about local fauna and evaluate biodiversity of an area. 	
6	CreditValue	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	TotalMarks	Max.Marks:50	Min Passing Marks:20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics(Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> • Study of biodegradable and non-biodegradable pollutants in the locality. • Study of a representative type of ecosystem. • Determination of pH of water samples from various water bodies. • To determine the transparency of water of Pond ecosystem by Secchi disc. • To study the profile of soil in the field/ Soil sampling by V- cut method. • To study the zooplankton communities in a fresh water ecosystem. • To prepare a checklist of birds/Insects in and around college campus. • Estimation of ecological density, diversity and frequency of college premises by quadrat method. • Estimation of Shannon – Weiner index of a given area. • Estimation of Simpson– biodiversity index of a given area. • Study of strategy for preventing and managing human-wildlife conflicts. • Project Work / Quiz / Poster / Model preparation/Viva. • Practical Record 		30
Keywords	<i>Density, Diversity, Frequency, Biodegradable, Non- biodegradable, Pollutants, Sechhi disc,</i>		
Signature of Convener & Members (CBoS):			

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended –

- Yadaw Vikas, Yadaw Parul; 2022 Modern Practical Zoology; Kedar Nath Ram Nath.
- Verma P.S. A Manual of Practical Zoology Chordates, S.Chand.
- Lal S.S. Practical Zoology Vertebrate; Rastogi Publications.
- Jayasurya, Arumugam N.: Practical Zoology: Saras Publication.

Reference Books Recommended –

- Odum, E.P. 1971 Fundamentals of Ecology; W.B. Saunders
- Beard, J.M. 2013 Environmental Chemistry in Society (2nd Edition). CRC Press.

Online Resources–

- <https://www.statology.org/simpsons-diversity-index/>
- <https://www.statology.org/shannon-diversity-index/>

Online Resources–

- https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000014ER/P000280/M026066/ET/1520505951paper10 Module27 etext.pdf

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

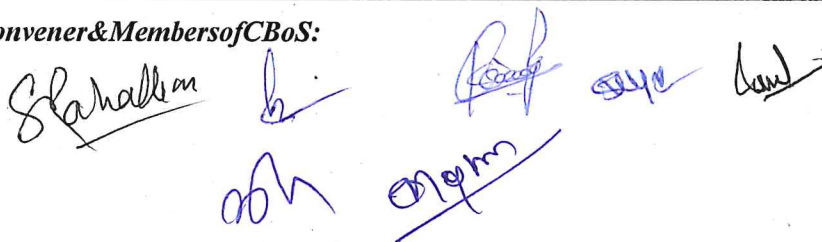
Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance- 05 Total Marks -15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:



FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

Department of Biochemistry

Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science (Diploma / Degree / Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BCSC-04 T	
2	Course Title	Intermediary Metabolism	
3	Course Type	Discipline Specific Theory	
4	Pre-requisite (if, any)	As Per the Course	
5	Course Learning Outcomes (CLO)	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> ➤ Acquire the knowledge of energy production in living systems by the degradation of fatty acids. ➤ Explain the various pathways of fatty acid synthesis in living systems. ➤ Explain the mechanism of the machinery system involved in carbohydrate metabolism. ➤ Describe breakdown and synthesis of Amino acids and nucleotides in humans and recognize its relevance with respect to nutrition and human diseases. 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Carbohydrate Metabolism : Reactions and energetics of glycolysis. Alcoholic and lactic acid fermentations. Reactions and energetic of TCA Cycle. Gluconeogenesis, glycogenesis and glycogenolysis. Reaction and Physiological significance of pentose phosphate pathway. Regulation of Glycolysis and TCA cycle.		12
II	Electron Transport Chain and Oxidative Phosphorylation : Structure of mitochondria, sequence of electron carriers, sites of ATP production, inhibitors of electron transport chain. Hypothesis of mitochondrial Oxidative phosphorylation. Transport of reducing potentials into mitochondria.		09
III	Lipid Metabolism : Introduction, hydrolysis of triacylglycerols, transport of fatty acids into Mitochondria, β oxidation saturated fatty acids, ATP yield from fatty acid Oxidation. Biosynthesis of saturated and unsaturated fatty acids. Metabolism of Ketone bodies, oxidation of unsaturated and odd chain fatty acids. Biosynthesis of triglycerides and important phospholipids, glycolipids.		12
IV	Amino acid Metabolism: General reactions of amino acid metabolism: transamination, oxidative Deamination and decarboxylation. Urea cycle. Degradation and biosynthesis of Amino acids. Glycogenic and ketogenic amino acids. Nucleotide Metabolism: Sources of the atoms in the purine and pyrimidine molecules. Biosynthesis and Degradation of purines and pyrimidines .		12
Keywords		Glycolysis, Oxidative Phosphorylation, Oxidation, Urea cycle, Nucleotides, Porphyrins.	

Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended –		
<ul style="list-style-type: none"> ➤ Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman and Company (New York), ISBN:13:978-1-4641-0962-1 / ISBN:10:1-4641-0962-1. ➤ Textbook of Biochemistry with Clinical Correlations (2011) 7th ed., Devlin, T.M., JohnWiley& Sons, Inc. (New Jersey), ISBN:978-0-470-28173-4. ➤ Biochemistry (2012) 7th ed., Berg, J.M., Tymoczko, J.L. and Stryer L., W.H. Freemanand Company (New York), ISBN:10:1-4292-2936-5, ISBN:13:978-1-4292-2936-4. 		
Online Resources–		
e-Resources / e-books and e-learning portals		
<ul style="list-style-type: none"> ➤ https://www.britannica.com/science/metabolism ➤ https://www.sciencedirect.com/science/article/pii/S0009912013001677 ➤ https://pubmed.ncbi.nlm.nih.gov/23720291/ ➤ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243375/ 		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		100 Marks
Continuous Internal Assessment (CIA):		30 Marks
End Semester Exam (ESE):		70 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20 Assignment / Seminar - 10 Total Marks - 30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark ; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit- 4x10=40 Marks	

Name and Signature of Convener & Members of CBOS:




FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science (Diploma / Degree/ Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BCSC- 04 P	
2	Course Title	Intermediary Metabolism	
3	Course Type	Discipline Specific Course (Practical)	
4	Pre-requisite (if, any)	As Per the Program	
5	Course Learning Outcomes (CLO)	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> ➤ Describe the importance of lipids as storage molecules and as structural component of biomembranes. ➤ Explain the importance of high energy compounds , synthesis of ATP under aerobic and anaerobic conditions. ➤ Explain the role of TCA cycle in central carbon metabolism, importance of anaplerotic reactions and redox balance. ➤ Explain perturbations in the carbon metabolism can lead to various disorders such as diabetes and cancer. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> ➤ To understand the concepts of preparation of buffers. ➤ To estimate biomolecules such as glucose, proteins, cholesterol in clinical samples. ➤ To isolate of lipids from egg. ➤ Estimation of salivary amylase ➤ Separation of Blood Plasma and Serum ➤ Estimation of proteins from serum by biuret and Lowry methods. ➤ Estimation of bilirubin (conjugated and unconjugated) in serum. ➤ Estimation of cholesterol in serum. ➤ Estimation of blood urea nitrogen from plasma. ➤ Preparation of starch from potato and its hydrolysis by salivary amylase. ➤ Determination of achromatic point in salivary amylase. ➤ Effect of sodium chloride on amylases. 		30
Keywords	Serum, Plasma, lipids, enzymes estimation, quantitative		




Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources		
Text Books, Reference Books and Others		
<i>Text Books Recommended –</i>		
<ul style="list-style-type: none"> ➤ Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman and Company (New York), ISBN:13:978-1-4641-0962-1 / ISBN:10:1-4641-0962-1. ➤ Textbook of Biochemistry with Clinical Correlations (2011) 7th ed., Devlin, T.M., John Wiley & Sons, Inc. (New Jersey), ISBN:978-0-470-28173-4. ➤ Biochemistry (2012) 7th ed., Berg, J.M., Tymoczko, J.L. and Stryer L., W.H. Freeman and Company (New York), ISBN:10:1-4292-2936-5, ISBN:13:978-1-4292-2936-4. 		
Online Resources–		
<ul style="list-style-type: none"> ➤ e-Resources / e-books and e-learning portals ➤ https://link.springer.com/article/10.1007/s00217-008-0998-4 ➤ https://www.cdc.gov/nchs/data/nhanes/nhanes_03_04/113_c_met_lipids.pdf 		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50 Marks		
Continuous Internal Assessment (CIA): 15 Marks		
End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS:




FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum


PART- A: Introduction			
Program: Bachelor in Science <i>(Diploma / Degree/Honors)</i>		Semester - IV	Session: 2024-2025
1	Course Code	BCSE-02 T	
2	Course Title	Biology of Infectious Diseases	
3	Course Type	Discipline Specific Elective (Theory)	
4	Pre-requisite (if, any)	As Per Program	
5	Course Learning Outcomes (CLO)	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> ➤ Understand various classes of microbial infectious agents, their mode of action, biology of the diseases, transmission of diseases, the concepts of treatment, and drug resistance for various antimicrobial agents. ➤ Demonstrate molecular basis of diagnosis and treatment of diseases as well as strategies for development of vaccines against these diseases. ➤ Explain the details of important infectious diseases such as tuberculosis, AIDS, malaria, filariasis, etc. ➤ Understand the significance of hygiene, sanitation, vaccination in prevention of infectious diseases. 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	Infectious diseases: Classification, Nosocomial infections; Past and present emerging and re-emerging infectious diseases and pathogens. Source, reservoir and transmission of pathogens. Safety measures when working with pathogens, biosafety levels, infection and evasion. Fungal diseases: Etiology, characteristics and diagnosis of Candidiasis, Sporotrichosis, Aspergillosis and Ring worm.		09
II	Bacterial diseases: classification of bacterial pathogens, virulence factors and host pathogen interaction. Bacterial toxins, enterotoxins and their mode of action, diarrhea, cholera; Tuberculosis, infection and pathogenicity, diagnostics, therapeutics and vaccines, drug resistance. Other bacterial diseases such as - Typhoid, Tetanus, Anthrax and Pneumonia; their virulence factors and host pathogen interactions.		14
III	Viral diseases: Structure and classification of viruses, viral virulence factors, host pathogen interactions; AIDS: history, causative agent, pathogenesis, diagnostics, drugs; Other viral diseases such as Hepatitis, Influenza, Rabies, Dengue and Polio; Chicken Pox, Herpes Virus.		12
IV	Parasitic diseases: Classes of parasites and diseases caused by them, Malaria: causative agents, vectors, etiology, diagnostics, drugs, vaccine development. Role of drugs, vaccines and sanitation in prevention and treatment of infectious diseases.		10
Keywords	Infection, Disease, Prevention, Precaution		

Name and Signature of Convener & Members of CBoS:




PART-C: Learning Resources								
Text Books, Reference Books and Others								
Text Books Recommended –								
<ul style="list-style-type: none"> ➤ Jawetz, Melnick and Adelbergs Medical Microbiology 27th ed., McGraw Hill Education ➤ Klien's Microbiology (2008) 7th ed., Prescott, Harley, Wiley, J.M., Sherwood, L.M., Woolverton, C.J. McGraw Hill International Edition (New York) ➤ Sherris Medical Microbiology: An introduction to infectious diseases (2010) 4. Kenneth J. Ryan, C., George Ray, Publisher: McGraw-Hill. E-learning Resources 								
Online Resources–								
e-Resources / e-books and e-learning portals								
<ul style="list-style-type: none"> ➤ https://www.britannica.com/science/metabolism ➤ https://www.sciencedirect.com/science/article/pii/S0009912013001677 ➤ https://pubmed.ncbi.nlm.nih.gov/23720291/ ➤ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243375/ 								
PART -D: Assessment and Evaluation								
Suggested Continuous Evaluation Methods:								
Maximum Marks:		100 Marks						
Continuous Internal Assessment (CIA):		30 Marks						
End Semester Exam (ESE):		70 Marks						
Continuous Internal Assessment (CIA): (By Course Teacher)	<table border="1"> <tr> <td>Internal Test / Quiz-(2):</td> <td>20 +20</td> </tr> <tr> <td>Assignment / Seminar -</td> <td>10</td> </tr> <tr> <td>Total Marks -</td> <td>30</td> </tr> </table>	Internal Test / Quiz-(2):	20 +20	Assignment / Seminar -	10	Total Marks -	30	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
Internal Test / Quiz-(2):	20 +20							
Assignment / Seminar -	10							
Total Marks -	30							
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks							

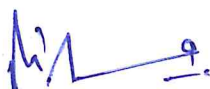
Name and Signature of Convener & Members of CBoS:




FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science (Diploma / Degree/ Honors)		Semester - IV	Session: 2024-2025
1	Course Code	BCSE- 02 P	
2	Course Title	Biology of Infectious Diseases	
3	Course Type	Discipline Specific Elective- Practical	
4	Pre-requisite (if, any)	As Per the Program	
5	Course Learning Outcomes (CLO)	<ul style="list-style-type: none"> ➤ Students will acquire the knowledge to isolate bacteria from water/sewage samples, to stain bacteria, fungi, acid fast bacilli and to perform important diagnostic tests for infectious diseases such as WIDAL test. ➤ Students will be exposed to permanent slides of pathogens in order to get hands-on training to know nature of various pathogens causing diseases. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> ➤ Grams staining for bacteria ➤ Isolation and culture of bacteria from water/sewage samples. ➤ Demonstration of various media for bacterial culture ➤ Isolation and enumeration of bacteriophages (PFU) from water/sewage samples ➤ WIDAL test ➤ Acid fast staining ➤ Permanent slides of pathogens: Mycobacterium tuberculosis, Leishmania, Plasmodium falciparum ➤ Fungal staining 		30
Keywords	Diagnostic tests, Infection identification, Methods		

Name and Signature of Convener & Members of CBOS:




PART-C: Learning Resources**Text Books, Reference Books and Others****Text Books Recommended –**

- Klien's Microbiology (2008) 7th ed., Prescott, Harley, Wiley, J.M., Sherwood, L.M., Woolverton, C.J. McGraw Hill International Edition (New York)
- Jawetz, Melnick&Adelbergs Medical Microbiology 27th ed., McGraw Hill Education

Online Resources–**e-Resources / e-books and e-learning portals**

- <https://link.springer.com/article/10.1007/s00217-008-0998-4>
- https://www.cdc.gov/nchs/data/nhanes/nhanes_03_04/113_c_met.pdf

PART -D: Assessment and Evaluation**Suggested Continuous Evaluation Methods:****Maximum Marks: 50 Marks****Continuous Internal Assessment (CIA): 15 Marks****End Semester Exam (ESE): 35 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance - 05 Total Marks - 15	
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment Performed the Task based on lab. work - 20 Marks Spotting based on tools & technology (written) – 10 Marks Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status




Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-A: Introduction			
Program: Bachelor in Science <i>(Certificate / Diploma / Degree)</i>		Semester - II/IV/V/VI	Session: 2024-2025
1	Course Code	CHSEC	
2	Course Title	GREEN CHEMISTRY	
3	Course Type	SEC	
4	Pre-requisite(if, any)	<i>As per Program</i>	
5	Course Learning Outcomes(CLO)	<ul style="list-style-type: none"> ➤ <i>Understand needs, goals, and obstacles in green chemistry.</i> ➤ <i>Understand and application of twelve principles of chemistry.</i> ➤ <i>Design green solvents and green reactions.</i> ➤ <i>To interpret and execute case study, survey, and projects on Green Chemistry.</i> 	
6	Credit Value	2 Credits (1C + 1C)	<i>Credit = 15 Hours –Theoretical learning and = 30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max.Marks:50	Min Passing Marks:20
PART -B: Content of the Course			
Total No.of Teaching–learning Periods: Theory–15 Periods (15 Hrs.) and Lab. or Field learning/Training 30Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Theory Contents	<p>Introduction to Green Chemistry: What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry.</p> <p>Principles of Green Chemistry and Designing a Chemical synthesis: Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following:</p> <ul style="list-style-type: none"> • Designing a Green Synthesis using these principles; Prevention of Waste/ by products; maximum incorporation of the materials used in the process into the final products, Atom Economy, addition, substitution, and elimination reactions. • Prevention/ minimization of hazardous/ toxic products reducing toxicity, and risks (hazard × exposure); waste or pollution prevention hierarchy. • Green solvents– supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solventless processes, immobilized solvents and how to compare greenness of solvents. <p>Future Trends in Green Chemistry: Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; Green chemistry in sustainable development.</p>		15
Lab./Field Training Contents	<ul style="list-style-type: none"> • Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis). • Microwave assisted reactions in water: Hofmann elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents Diels-Alder reaction and Decarboxylation reaction. • Right fit pigment: synthetic azo pigments to replace toxic organic and inorganic pigments. • An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn. 		30

	Case study/Project Case study/Project on Green chemistry, Role of green chemistry in lab safety, and implications of green chemistry.	
Keywords	<i>Green chemistry, Green synthesis, Green solvents, Green reactions, principles of Green chemistry, Hofmann elimination, Diels-Alder reaction, oxidation, and reduction.</i>	

Signature of Convener & Members (CBoS):

PART-C: Learning Resources

Text Books, Reference Books and Others

Textbooks Recommended-

1. Ahluwalia, V.K. (2013). *Green chemistry: A textbook.* Alpha Science International.
2. Shukla, S., Gulati, S., & Batra, S.K. (2020). *A textbook of green chemistry: benign by design.* Shree kala Prakashan.
3. Kumar, V. (2013). *An introduction to green chemistry.* Vishal publishing Co.
4. Lancaster, M. (2020). *Green chemistry: an introductory text.* Royal society of chemistry.

Reference books Recommended:

1. Perosa, A., & Zecchini, F. (2007). *Methods and reagents for green chemistry: an introduction.* John Wiley & Sons.
2. Clark, J. H., & Macquarrie, D. J. (Eds.). (2008). *Handbook of green chemistry and technology.* John Wiley & Sons.
3. Ameta, S. C., & Ameta, R. (Eds.). (2023). *Green Chemistry: Fundamentals and Applications.* CRC press.
4. Anastas, P. T. (Ed.). (2013). *Handbook of green chemistry (Vol. 1).* Wiley-VCH.

Online Resources- e-Resources / e-books and e-learning portals

- https://www.mygreenlab.org/uploads/2/1/9/4/21945752/gc_green_chem_guide_beyond_benign_my_green_lab.pdf
- <https://www.organic-chemistry.org/topics/green-chemistry.shtm>
- <https://royalsocietypublishing.org/doi/10.1098/rsos.191378>
- <https://www.gvsu.edu/labsafety/green-chemistry-99.htm>

PART-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment(CIA):15 Marks

End Semester Exam(ESE): 35Marks

Continuous Internal Assessment(CIA): (By Course Coordinator)	Internal Test / Quiz-(2): 10 & 10	Better marks out of the two Test / Quiz +obtained marks in Assignment shall be considered against 15 Marks
	Assignment/Seminar +Attendance- 05 Total Marks -15	
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment	
	A. Performed the Task based on learned skill - 20 Marks	Managed by Coordinator as per skilling
	B. Spotting based on tools (written) - 10 Marks	
C. Viva-voce (based on principle/technology) - 05 Marks		

Name and Signature of Convener & Members of CBoS:

Indira, K. L., A. K., K. S., A. S., S. S., S. S.

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Certificate/Diploma/Degree)		Semester - II/ IV/V/VI	Session: 2024-25
1	Course Code	MBSEC-01	
2	Course Title	Mushroom Cultivation	
3	Course Type	Skill Enhancement Course (SEC)	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – <ul style="list-style-type: none"> ➤ explain nutritional and medicinal values of mushroom ➤ relate the types of mushrooms and their spawn preparation ➤ examine the methods of cultivation and economic aspects ➤ attain expertise using different Agro-residues for cultivation of mushrooms ➤ observe post-harvest management of mushrooms 	
6	Credit Value	02 Credits (1C + 1C)	Credit = 15 Hrs. Theoretical Learning and = 30 Hrs. Laboratory or field learning/ Training
7	Total Marks	Max. Marks: 50	Minimum Passing marks: 20

PART – B: Content of the Course

Total No. of Teaching-Learning Periods:		
Theory – 15 Periods (15 Hrs.) and Lab. or Field Learning / Training 30 Periods (30 Hours)		
Module	Topics (Course Contents)	No. of Period
Theory Contents	<p>Introduction and Life cycle: Classification and identification of edible and nonedible mushrooms. Nutritional and medicinal value of mushroom, Scope of mushroom cultivation. Taxonomic position and Life cycle of mushroom. Types of mushrooms; Button mushroom (<i>Agaricus biporus</i>), Milky mushroom (<i>Calocybe indica</i>), Oyster mushroom (<i>Pleurotus sajor kaju</i>) and paddy straw mushroom (<i>Volvariella volvacea</i>). (Observation).</p> <p>Principles and Requisites: Sterilization and disinfection of substrates, growth medium, isolation, spawn production and maintenance. (Observation)</p> <p>Techniques of Cultivation: Structure and construction of low-cost mushroom huts, layout of Traditional and Green house method. Maintenance of proper condition in mushroom huts, Composting, bed and polythene bag preparation, Spawning-casing-cropping. (Observation).</p>	15
Lab./Field Training Contents	<p>1.Preparation of laboratory Glassware (Chemical washing, cleaning and drying). 2.Basic information about autoclave, hot air oven, laminar air flow 3.Sterilization and sanitation of mushroom house, instruments etc. 4.Identification of edible and poisonous mushrooms. 5.Preparation of Mother Culture. Spawn- media preparation, Inoculation, and incubation. 6.Preparation of different types of bed for cultivation. 7.Cultivation of Mushroom using compost/ paddy straw/agricultural wastes. 10.Harvesting and post-harvest management of crops. (Observation & Practice)</p>	30
Key Words	Mushroom, Spawning, Compost, Harvesting	

Name and Signature of Convener and Members of CBoS

Paul
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Devi
20/6/24

Sudhakar
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Roshni
10.6.24

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Dr. Swetha

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Dr. Swetha

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Nita Bhal. (2000). Hand book on Mushrooms. 2nded. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Tewari, S. C., Pankaj Kapoor, (1988). Mushroom Cultivation. Mittal Publication, New Delhi.
3. Biotechnology, V. Kumaresan.

Reference Books:

1. Stamets, Paul, and J.S. Chilton. 1983. The Mushroom Cultivator. Agarikon Press, Olympia, WA. 415 p.

Online Resources – e-Resources/ e-Books and e- learning portals

- [https://nios.ac.in/media/documents/vocational/mushroom production \(revised\)\(618\)/Lesson-01.pdf](https://nios.ac.in/media/documents/vocational/mushroom%20production%20(revised)(618)/Lesson-01.pdf)
- [https://agriportal.cg.nic.in/horticulture/PDF/Download/Mushroom%20Project Part%201.pdf](https://agriportal.cg.nic.in/horticulture/PDF/Download/Mushroom%20Project%20Part%201.pdf)
- <http://nhb.gov.in/pdf/Cultivation.pdf>

PART: D ASSESSMENT AND EVALUATION

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test/ Quiz – (2): 10 & 10 Assignment/ Seminar + Attendance: 05 Total Marks: 15	Better Marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 15 Marks
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End Semester Exam (ESE):	Laboratory/ Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work – 20 Marks B. Spotting based on tools & technology (written) - 10 Marks C. Viva-voce (based on principle/ technology) – 05 Marks	Managed by Coordinator as per skilling
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Name and Signature of Convener and Members of CBoS

Sus
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Roshmi
10.6.24

Dr. K. V. Reddy
10.6.24

Dr. Nelson
Dr. Nelson

Plab
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Leelavathi
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FOUR YEAR UNDERGRADUATE PROGRAM (2024 –28)
DEPARTMENT OF English
COURSE CURRICULUM

PART- A: Introduction			
Program: Bachelor in-Arts/Science/Commerce (Diploma)		Semester -IV	Session: 2024-2025
1	Course Code	AEC- 04	
2	Course Title	Communicative English and Soft Skills	
3	Course Type	AEC [Ability Enhancement Course]	
4	Pre-requisite (if, any)	As per program	
5	Course Learning Outcomes (CLO)	After completion of this course, the students will be able to: <ul style="list-style-type: none"> ➤ Learn deviant use of English both in written and spoken forms. ➤ Understand the importance of communication in English. ➤ Apply the ability to improve competence in using English language. ➤ Analyze the importance of reading skills. ➤ Develop language for speaking with confidence. 	
6	Credit Value	2 Credits	Credit = 15 Hours - learning & Observation
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)		
Unit	Topics (Course contents)	No. of Period
I	What is communication? <ul style="list-style-type: none"> • Purpose of Communication, • Types of Communication (Verbal and Non- Verbal), • The motivating factors (Intrinsic and Extrinsic) • Barriers of Communication (Internal and External). 	08
II	Building Vocabulary <ul style="list-style-type: none"> • Use of Dictionary, • Building Vocabulary through synonyms and antonyms, • Use of Phrasal Verbs, Idioms and Phrases • Unseen passage 	07
III	Conversation in English (Performance Based) <p>A) Reading: Very short stories (Gift of Magi, Cinderella, The Selfish Giant, Stories from Panchatantra), Newspaper reports / Fact- based articles, Diction and tone, Identifying topic sentences, Reading aloud: Reading an article/report.</p> <p>B) Spoken English for the Real world and Situational Dialogues) (any four)</p> <ul style="list-style-type: none"> • Call Center: Talking to service Providers, Professional Enquiries, Talking with peers/ seniors. • Bank: for opening an account (seeking information on loans/FDs/other schemes. • Office: (seeking information regarding job vacancy) • Market (asking for price of an object, discount etc), • Restaurant: (asking for the special dish, offerings in the menu and ordering for food) 	08

A collection of handwritten signatures and dates in blue ink, including names like 'Frank', 'Surya', 'S. P. S.', and dates such as '10-6-24', '10/6/24', and '10/6/24'.

	<ul style="list-style-type: none"> At the Railway Station/ Bus Station enquiry: (Arrival and departure of buses/ trains) Hotel: Booking a room, asking tariff rate Travel agency: (Asking to book tickets fares, finding vacancies in hotels) <p>C) Greetings and Common Etiquettes: Introducing oneself; Invitation; Making Requests; Expressing Gratitude; Complimenting and Congratulating; Expressing Sympathy; Apologizing; Complaining and Expressing Regret</p>	
IV	<p>Presentation skills (Performance Based):</p> <p>Effective oral presentation, Characteristics of good oral presentation. Use of quotations and anecdotes. Ways of Oral Presentation (Seminar, Viva -voce, Interview, Power Point etc.) Gestures/ Mannerism during oral presentation. Media methods used for effective oral presentation, Body Language, Attire.</p>	08
Key words	Communication, Vocabulary, Conversation, Reading, Presentation.	

Signature of Convener & Members (CBoS) :

PART-C: Learning Resources
Text Books, Reference Books and Others
<p>Text Books Recommended - Suggested Reading:</p> <ul style="list-style-type: none"> ➤ Fluency in English - Part II, Oxford University Press, 2006. ➤ Enrich Your English, OUP, SR Inthira and V. Saraswathi, CIEFL, 1997 ➤ Oxford A-Z of English Usage, ed. Jeremy Butterfield, OUP, 2007. ➤ Longman Dictionary of Common Errors, N.D. Turton and J.B. Heaton, Longman, 1998 ➤ Contemporary Communicative English, S Chand ➤ Malhotra Perna, Deb Dulal Halder, (2019) Communication Skills: Theory and Practice, Eighth Edition, BookAge Publications, New Delhi.
<p>Online Resources-</p> <ul style="list-style-type: none"> ➤ Applying Communication Theory for Professional Life: A Practical Introduction. Dainton and Zolley, http://tsime.uz.ac.zw/claroline/backends/download.php?url=L0ludHJvX3RvX2NvbW11bmljYXRpb25f ➤ https://web.sol.du.ac.in/my_modules/type/cbcs-41-2/data/root/B.Com/Semester%202/ABILITY-ENHANCEMENT%20COMPULSORY%20COURSE-AECC/English%20Communication%20A-B-C/Unit%201-5.pdf ➤ https://archive.org/details/personality-development-book/mode/1up ➤ https://www.coursera.org/articles/presentation-skills ➤ https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/ ➤ https://benjaminball.com/blog/good-body-language-best-visual-aid-talks/ ➤ https://blog.moderngov.com/importance-of-body-language-in-presentations-good-bad-examples
PART -D: Assessment and Evaluation
<p>Suggested Continuous Evaluation Methods:</p> <p>Maximum Marks: 50 Marks</p> <p>Continuous Internal Assessment (CIA): 15 Marks</p> <p>End Semester Exam (ESE): 35 Marks</p>

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Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Q1. Objective/ MCQs to be asked only from Unit I (1 x5= 05 Mark) Q2. I Vocabulary: (5Marks) II Unseen Passage (5 Marks) Q3. Particles from Unit 3 & 4 consisting of 20 marks.	

Name and Signature of Convener & Members of CBoS:

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