Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Department of Botany

Program: BSc Medical

SCHEME **PAPER-II BIOLOGY AND DIVERSITY OF SEED PLANTS- I**

Course Name	**BIOLOGY AND DIVERSITY OF SEED PLANTS- I**	**Course Type**	**Theory**
Course Code	3.1	**Class**	BSc Medical (Botany) III Sem.
Instruction Delivery	**Per week Lectures: 3, Tutorial:1, Practical:2** **Total No. Classes Per Sem: 70 (L), 42(T), - 28(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	Ms. Pratibha Saini	**Course Instructors**	Theory: Ms. Pratibha Saini Practical: Ms. Pratibha Saini

COURSE OVERVIEW

The paper delves into the in-depth exploration of seed plants, focusing on their biology, diversity, evolutionary history, and ecological significance. Seed plants, which include gymnosperms and angiosperms, are critical to Earth's ecosystems and human civilization. The course will cover their structure, reproduction, development, and evolutionary adaptations that have contributed to their widespread success.

PREREQUISITE

Plant Morphology, Evolution
Cell Biology, Ecology, Plant Physiology,
Biochemistry- Structure and function of biomolecules

COURSE OBJECTIVE

The objective of this course is to acquaint students with following things:-

- In understanding of the biology and diversity of seed plants as well as in learning of evolutionary history and adaptations that have contributed to the success of seed plants.
- Exploring the ecological roles of seed plants and their significance to human life.
- Developing of skills in identifying, classifying, and understanding the structure and function of seed plants.

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

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CO No.	Course Outcomes
1	Explain the Evolution of Seed Plants: • Discuss the evolutionary history of seed plants, including the transition from non-seed-bearing plants to gymnosperms and angiosperms. • Describe major evolutionary events and diversification patterns among seed plants.
2	Analyze Plant Reproduction and Life Cycles: • Understand the alternation of generations in seed plants, including the roles of gametophyte and sporophyte stages. • Explain the processes of pollination, fertilization, seed development, and seed dispersal in gymnosperms.
3	Identify and Classify Major Plant Families: • Recognize and classify key gymnosperm families based on their distinguishing features. • Use plant morphology and reproductive structures to identify major seed plant taxa in field and laboratory settings.
4	Understand the Human Importance of Seed Plants: • Evaluate the economic, medicinal, and cultural significance of seed plants. • Discuss the role of seed plants in agriculture, forestry, and horticulture, as well as their contribution to human nutrition and industry. • Understand conservation issues related to plant diversity and the sustainable use of plant resources.
5	Apply Botanical Knowledge in Practical Contexts: • Use botanical knowledge to identify seed plants in natural habitats or agricultural settings. • Conduct basic laboratory and field research involving seed plant diversity, reproduction, and structure.

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COURSE CONTENT

Content
General characters, origin and evolution of Gymnosperms ,
Geological Time Table; Evolution of Seed Habit.
Pilger and Melchior's (1954) system of classification of Gymnosperms
Palaeobotany- Fossils and Fossilization (Process involved, types of fossils and
importance of fossils);
Reconstruction of the following fossil plants:
Lyginopteris
Williamsonia
Cycadeoidea (= Bennettites)
Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts
including mode of reproduction, life-cycle and economic importance of following
plants:
Cycas
Pinus
Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of *Ephedra*
Economic importance of Gymnosperms
General characters, origin and evolution of Angiosperms

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LESSON PLAN (THEORY AND TUTORIAL CLASSES)

L. No	Topic to be Delivered	Tutorial Plan	Unit
1	General characters of Gymnosperms	Theory test	1
2	General characters of Gymnosperms.		
3	**General characters of Gymnosperms.**		
4	Classification		
5	Classification		
6	Classification	Theory test	1
7	Economic Importance		
8	Evolution & Diversity		
9	Evolution & Diversity		
10	**Evolution & Diversity**		
11	**Evolution of Seed Habit**		
12	Evolution of Seed Habit		
14	**Geological Time Scale**		
15	Geological Time Scale		1
16	Fossilization and Fossils	Theory Test	2
17	Fossilization and Fossils		2
18	**Fossilization and Fossils**		
19	Reconstruction of Fossil Plant: Lyginopteris		
20	Reconstruction of Fossil Plant: Lyginopteris		2

21	Reconstruction of Fossil Plant: Williamsonia		
22	Reconstruction of Fossil Plant: Williamsonia	Theory Test	**2**
23	Reconstruction of Fossil Plant: Cycadeoidea		
24	Cycas		
25	Cycas		
26	Cycas		**3**
27	Cycas	Theory Test	
28	Cycas		
29	Pinus		
30	Pinus		3
31	Pinus		
32	Pinus		
33	Pinus		
34	Ephedra		
35	Ephedra		
36	Ephedra		
37	Ephedra		
38	Ephedra		
39	Primitive Angiosperms		4
40	Primitive Angiosperms		
40	General Characters of Angiosperms	Theory Test	
41	General Characters of Angiosperms		
42	Origin & Evolution of Angiosperms		

Text Book

Modern's Botany ,

Pardeep's Botany vol. IV,

JBD New Concept in Botany.

Reference Books

Bhatnagar, S. and Moitra, A. 1996. Gymnosperms. New Age International Limited, New Delhi.

Sporn, K.R. 1965. The Morphology of Gymnsperms. Hutchinson & Co. Ltd., London.

Steward, W.M. Paleobotany and the Evolution of Plants. Cambridge University Press, Cambridge.

Raven, P.H. Evert, R.F. and Eichhorn, S.E. 1999. Biology of Plants. 5th edition. W.R. Freeman and Co., Worth Publishers, New York.

Web/Links for e-content

- **https://www.youtube.com/watch?v=OOWTAb-9PrU&list=PL1zxEeUFe9lf_k7RHM6urumQIjDnGAwdg&index=15**
- **https://www.youtube.com/watch?v=DzyJ-TLZLdc**
- **https://www.youtube.com/watch?v=BoreO_sFwqU**
- **https://www.youtube.com/watch?v=jAS0UDXdF00**

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PRACTICE QUESTIONS (QUESTION BANK)

1. Describe the anatomical structure of the leaf of Pinus.
2. Give a comparative account of the development of the male and female gametophytes of Pinus and Ephedra.
3. Write a note on the coralloid root of Cycas.
4. State the economic importance of gymnosperms with examples.
5. Differentiate the stem anatomy of Pinus and Cycas.
6. Give general characters of gymnosperms in brief.
7. Describe affinities of Gymnosperms with pteridophytes and angiosperms.
8.Explain technique of Fossilization in detail.
9. What is transfusion tissue? How it works?
10. What is PALEOBOTANY? Give types of fossilization.
11 Explain general morphology of Cycas.
12.Give anatomy of root of Ephedra.
13 Describe life cycle of Ephedra with well labelled diagrams.
14 Draw well labelled diag. of Cycas rachis.
15.Differentiate between Cycas & Pinus ovule.
16. Describe life cycle of Cycas with well labelled diagrams.
17. Differentiate between Cycas & Pinus pollen.
18. Write short note on Lyginopteris stem.
19. Describe life cycle of Pinus with well labelled diagrams.
20. Seeds of gymnosperms carry 3 generations. Elaborate it.
21. Describe female cone of Cycas.
22.Write short note on embryogeny in Pinus.
23. Write short note on male cone of Pinus.
24.Describe characters of Angiosperm.
25.Describe male and female flower of Ephedra.
26.Give origin and evolution of Angiosperm.
27.Short note on ovule of Cycas.
28.Short note on female cone of Pinus.
29. Describe geological time scale in detail.
30.Classify gymnosperms according to Melchior's system of classification.

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Department of Botany

Program: BSc Medical

SCHEME **PAPER-II PLANT ANATOMY**

Course Name	**PLANT ANATOMY**	**Course Type**	**Theory**
Course Code	3.2	**Class**	BSc Medical (Botany) III Sem.
Instruction Delivery	**Per week Lectures: 3, Tutorial:1, Practical:2** **Total No. Classes Per Sem: 64 (L), 36(T), - 28(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	Ms. Pratibha Saini	**Course Instructors**	Theory: Ms. Pratibha Saini Practical: Ms. Pratibha Saini

COURSE OVERVIEW

The paper delves into the in-depth understanding of the internal structure of plants, focusing on the organization, function, and development of plant cells, tissues, and organs. Students will explore the anatomical features of roots, stems, leaves, flowers, fruits, and seeds, as well as the specialized structures that enable plants to survive in diverse environments.

PREREQUISITE

Plant Morphology, Evolution
Cell Biology, Genetics, Plant Physiology,
Biochemistry- Structure and function of biomolecules

COURSE OBJECTIVE

The objective of this course is to acquaint students with plant anatomy which includes analysis of the microscopic and macroscopic structures of plants, including cells, tissues, and organs, and to understand how these structures contribute to the plant's overall function and adaptation to its environment. Also helps in the identification and classification of plants based on their anatomical features, contributing to the understanding of plant diversity and evolutionary relationships etc.

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

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CO No.	Course Outcomes
1	Understand Plant Structure: • Comprehend the basic organization and architecture of plant cells, tissues, and organs. • Recognize the structural differences between various plant groups.
2	Identify and Describe Plant Tissues: • Accurately identify different types of plant tissues (e.g., meristematic, dermal, vascular, and ground tissues).
3	Analyze Plant Organ Anatomy: • Examine and describe the internal structure of major plant organs, including roots, stems, leaves, flowers, fruits, and seeds. • Understand how the anatomy of these organs relates to their physiological roles.
4	Relate Structure to Function: • Explain how the anatomy of plants is adapted to their environments and ecological niches. • Understand the evolutionary significance of structural adaptations in plants.

COURSE CONTENT

Content
Tissues- meristematic and permanent (simple, complex and secretory) Tissue systems (Epidermal, ground and vascular). The Shoot system- shoot apical meristem and its histological organizations. Cambium- structure and functions. Secondary growth in dicot stem; characteristics of growth rings; sap wood and heart wood, periderm; Anomalous secondary growth (Dracaena, Boerhaavia and Achyranthes) Leaf: Types of leaves (simple and compound); phyllotaxy. Epidermis uniseriate and multiseriate, epidermal appendages and their morphological types. Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves, leaf abscission, Stomatal apparatus and their morphological types. Root system: Root apical meristem; histological organization ,Secondary growth in dicot root. Structural modifications in roots: Storage (Beta), Respiratory (Rhizophora), Epiphytic (Vanda).

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LESSON PLAN (THEORY AND TUTORIAL CLASSES)

L. No	Topic to be Delivered	Tutorial Plan	Unit
1	**Diversity in Plant Forms.**	Theory test	1
2	Diversity in Plant Forms.		
3	**Tissues.**		
4	Tissues		
5	Tissues		
6	Tissues	Theory test	1
7	Tissues		
8	Tissues		
9	Tissues		
10	**Tissue System**		
11	**Tissue System**		
12	Tissue System		
13	The Shoot System:Meristem & Primary Structure		
14	**The Shoot System: Meristem & Primary Structure**		
15	The Shoot System : Cambium		2
16	The Shoot System : Cambium	Theory Test	2
17	The Shoot System : Cambium		2
18	**The Shoot System : Secondary Structure**		
19	The Shoot System : Secondary Structure		2
20	The Shoot System : Secondary		

	Structure		
21	Anamalous Secondary Growth		
22	Anamalous Secondary Growth	Theory Test	3
23	Anamalous Secondary Growth		
24	Leaf		
25	Leaf		
26	Leaf		
27	Leaf		
28	Leaf	Theory Test	4
29	Leaf		
30	The Root System		
31	The Root System		
32	The Root System		
33	The Root System		
34	The Root System		
35	The Root System		
36	Miscellaneous		

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Text Book

Modern's Botany ,

Pardeep's Botany vol. IV,

JBD New Concept in Botany.

Reference Books

Davis, P.H. and Heywood, V.H. 1963. Principles of Angiosperms Taxonomy, Oliver and Boyd. London.

Gifford, E.M. and Foster, A.S. 1988. Morphology and Evolution of Vascular Plants, W.H. Freeman & Company, New York

Cutter, E.G. 1969. Plant Anatomy Part-I, Cells and Tissues, Edward Arnold, London.

Cutter, E.G. 1971. Plant Anatomy: Experiment and Interpretation. Part-II Organs, Edward Arnold London.

Esau, K. 1977. Anatomy of Seed Plants, 2nd edition. John Wiley & Sons, New York.

Fahn, A. 1974. Plant Anatomy, 2nd Edition. Pergamon Press, Oxford.

Web/Links for e-content

- https://www.youtube.com/watch?v=LFV7bNsf7G8&list=PLz-yxFzpe5VEFxwP09V2J0OTk6fUOKkhr&index=6
- https://www.youtube.com/watch?v=yDQKp5AGgCQ&list=PLKlDmF-iIyAlagMsGxXIjklNv4xVMEbfL
- https://www.youtube.com/watch?v=S-h9FB3krio&list=PLKlDmF-iIyAlagMsGxXIjklNv4xVMEbfL&index=17
- https://www.youtube.com/watch?v=L0ofXW5HR-o&list=PLPoL-eo1XIWFb2ghTLvL4M9brEpcGbVfH

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Course Plan

PRACTICE QUESTIONS (QUESTION BANK)

1. Explain the role of meristematic tissue in plant growth.
2. Describe the process of secondary growth in dicot stems.
3. Draw T.S. of Sunflower stem
4. Compare and contrast the structures of parenchyma, collenchyma, and sclerenchyma cells.
5. Draw T.S. of Maize stem.
6. Give detail classification of meristematic tissue.
7. Explain the structural adaptations in xerophyte leaves that help them survive in arid environments.
8. Describe cambium and its types in detail.
9. Briefly explain Xylem in detail with well labelled diagrams.
10. Briefly explain Phloem in detail with well labelled diagrams.
11. A plant is exhibiting signs of water stress. What anatomical features would you examine to determine if the xylem is functioning properly?
12. What are lenticels, and what role do they play in stem anatomy?
13. How secondary growth occurs in Dicot roots.
14. What is Venation? Give its types.
15. Cytohistological zonation in root apex.
16.Give structural modification in respiratory root.
17.Draw T.S. of Dicot root.
18. Write short note on Annual Rings.
19. Write short note on Periderm.
20. Draw T.S. OF Monocot root.
21. Describe anatomy of Dicot leaf.
22. What is Phyllotaxy? Give its type.
23. Explain pinnately compound leaves in detail with well labelled diagrams.
24. Compare Sap wood and Heart wood.
25. Explain palmately compound leaves with diagrams.
26. Describe anomalous secondary growth in Dracena.
27.Give primary and secondary functions of roots.
28. Explain secretory tissue in detail.
29. Compare hard wood and soft wood.
30. Explain epidermal appendages.

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Course Plan

Department of Zoology

Program: B.Sc Medical

Mammalian Physiology

SCHEME

Course Name	**Mammalian Physiology**	**Course Type**	**Theory**
Course Code	**3.2**	**Class**	B.Sc,Medical (Zoology) III Sem.
Instruction Delivery	**Per week Lectures: 5, Tutorial:3, Practical: -2** **Total No. Classes Per Sem: 70(L), 42(T), 28-(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	**Ms. Swati**	**Course Instructors**	Theory: Ms. Swati Practical: Manisha Yadav

COURSE OVERVIEW

This course covers the study of the systems, organs, hormones and their functions that work together to enable basic bodily functions in mammals. Also this course covers how these processes impact health and relationship between them.

PREREQUISITE

Introduction, classification, structure, function and general properties of carbohydrates and lipids.
Introduction, classification, structure, function and general properties of proteins and enzymes.
Nutritional components, carbohydrate, fats, protein, vitamin and minerals. Type of nutrition feeding and steps of feeding.
Digestion. Muscle type, structure, function and their physical properties. Some biochemicalprocess Physical processes and types of cycles, events during muscle contraction. Bone types, structue, Growth and their disorders.

COURSE OBJECTIVE

The course is designed to develop an understanding of the basic concepts of Mammalian physiology as well as related processes and functions of our body. Student can be conversant with scientific literature especially the literature related to Mammalian Physiology. This course provides the core knowledge of the potential impact of different physiological processes. The students can have a visual and hand on experience with biological research materials and methods. By fostering an in-depth

engagement with zoological sciences, it empowers students to contribute meaningfully to the exploration of Physiological processes.

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

CO No.	Course Outcomes
1	Describe characteristics, classification, structure and functions of Carbohydrates and fats.
2	Describe characterstics, classification, structure, general properties and functions of Proteins and Enzymes.
3	Describe the structure, types, physical and functional properties of Muscles.
4	Decribe the structure, types, growth and disordrs of Bones.

COURSE CONTENT

Content
UNIT-I Introduction, Classification, Structure, function and general properties of carbohydrates and lipids. **UNIT-II** Introduction, Classification, Structure, function and general properties of proteins; Nomenclature, Classification and mechanisms of enzyme action. Transport through biomembranes (Active and Passive), buffers **UNIT-III** **Nutrition:** Nutritional components; Carbohydrates, fats, lipids, Vitamins and Minerals. Types of nutrition & feeding, Digestion of dietary constituents, viz. lipids, proteins, carbohydrates & nucleic acids; symbiotic digestion. Absorption of nutrients & assimilation; control of enzyme secretion. **UNIT-IV** **Muscles:** Types of muscles, ultra-structure of skeletal muscle. Bio-chemical and physical events during muscle contraction; single muscle twitch, tetanus, muscle fatigue muscle, tone, oxygen debt., Cori's cycle, single unit smooth muscles, their physical and functional properties. **Bones:** Structure and types, classification, bone growth and resorption, effect of ageing on skeletal system and bone disorders.

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Course Plan

LESSON PLAN (THEORY AND TUTORIAL CLASSES)

L. No	Topic to be Delivered	Tutorial Plan		Unit
1	Introduction of Carbohydrates and Lipids	MCQ test on Characters, classification structure and functions of Carbohydrate and Lipids.	Diagram test	1
2	Classification, structure and Functions of Carbohydrates and Lipids			
3	General properties of Lipids and Carbohydrates.			
4	Introduction of Proteins and Enzymes			2
5	Classification, structure and Functions of Proteins, Enzymes	MCQ test of Structure and functions of Proteins and Enzymes.	Diagram test	
6	General properties of Proteins and Enzymes.			
7	Transport process through biomembrane (Active and Passive).			
8	Buffer system	MCQ test		
9	Nutritiona components, Carbohydrates, fats, lipids, Vitamins and Minerals.	Diagram test on Nutrition, Muscles and Bones.		3&4
10	Types of nutrition & feeding, Digestion of dietary constituents			
11	Structure, types, physical			

	and functional properties of Muscles.		
12	Structure, types, growth and disorder of Bones.		

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Course Plan

Text Book

Sabharwal A. Modern text book of Zoology B. Sc. Part-II, Semester-III: MAMMALIAN PHYSIOLOGY

Reference Books

1. Physiology of Mammals and Other Vertebrates" by P. T. Marshall and G. M. Hughes.
2. "Animal Physiology: Mechanisms and Adaptations" by Eckert and Randal.
3. "Animal Physiology" by Schmidt-Nielsen.
4. "Essentials of Animal Physiology" by S. C. Rastogi.

Web/Links for e-content

- https://www.youtube.com/watch?v=RpSc5bHLURc
- https://www.youtube.com/watch?v=WTogssQUoVg
- https://www.youtube.com/watch?v=nWwrVB592Do
- https://www.youtube.com/watch?v=787-L3NiACk

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Course Plan

PRACTICE QUESTIONS (QUESTION BANK)

S No	Problem
1	What are biomolecules?
2	Define the Carbohydrates and types of Carbohydrates?
3	Define the level of structures in proteins?
4	What are steroids and explain their importance?
5	What are unsaturated and saturated fatty acids?
6	What are androgens? Explain the function of Testosterone.
7	Give the importance of Enzymes?
8	Explain about prosthetic group of conjugated enzyme?
9	What is allosteric inhibition?
10	What do you mean by denaturation of enzymes?
11	Differentiate apoenzyme, cofactor, coenzymes and holoenzyme.
12	Name various buffer systems of Human body.
13	What is facilitated diffusion? Give its significance.
14	Write short note on active transport.
15	Describe the mechanism of absorption of fats in alimentary canal?
16	Explain the role of gastrointestinal hormones?
17	What are vitamins? Explain the types of vitamins.
18	Discuss the role of different parts of alimentary canal in starch digestion.
19	Explain the single muscle twitch?
20	Describe the structure of neuro-muscular junction?
21	Describe the Cori's cycle?
22	Differentiate between red marrow and yellow marrow?
23	Define arthritis. Name its various types?
24	Differentiate between spongy bone and compact bone?
25	Differentiate between modeling and remodeling of bones?

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PHYSIOLOGY PRACTICALS:

1. Qualitative tests for identification of simple sugars, disaccharides and polysaccharides.

2. Study of human salivary amylase activity: Effect of temperature, pH, Concentration.

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Course Plan

Department of Zoology

Program: B.Sc Medical

Animal Diversity of Chordates

SCHEME

Course Name	**Animal Diversity of Chordates**	**Course Type**	**Theory**
Course Code	**3.1**	**Class**	B.Sc,Medical (Zoology) IIIrd Sem.
Instruction Delivery	**Per week Lectures: 5, Tutorial:3, Practical: -2** **Total No. Classes Per Sem: 70(L), 42(T), 28-(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	**Manisha Yadav**	**Course Instructors**	Theory: Manisha Yadav Practical: Manisha Yadav

COURSE OVERVIEW

Chordates are defined as organisms that possess a structure called a notochord, at least during some part of their development. The notochord is a rod that extends most of the length of the body when it is fully developed. The prevailing view holds that the phylum Chordata consists of three subphyla: Urochordata (Tunicata), Cephalochordata and Vertebrata.

PREREQUISITE

General Characters, classification and evolution of chordates.
General Characters, classification and type study of Urochordata:
Herdmania – type study ;Cephalochordata; *Amphioxus* – type study
General Characters, classification and type study of Urochordata:
Cyclostomes: Classification and ecological significance ;Type study of *Petromyzon.*
Pisces: *Scales & Fins, Parental care in fishes, fish migration; Types study of Labeo*

COURSE OBJECTIVE

The course is designed to develop an understanding of the basic insect biology as well as natural history and evolutionary reflationary of chordates orders and family. Student can be conversant with scientific literature especially the literature related to chordate biology. This course provides the core knowledge of the potential impact of different chordate species. The students can have a visual and hand on experience with biological research materials and methods. By fostering an in-depth

engagement with zoological sciences, it empowers students to contribute meaningfully to the exploration of chordates diversity.

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

CO No.	Course Outcomes
1	Describe characteristics and classification from Urochordates to Pisces
2	Describe the differentiation between different systems of *Herdmania, Amphioxus, Pertromyzon* and *Labeo*
3	Describe the diversity in all the chordates
4	Decribe the evolutionary relationship between the chordates

COURSE CONTENT

Content
UNIT-I **Chordates:** Principles of classification; Origin and Evolutionary tree; Role of amnion in evolution; Salient features of chordates; Functional morphology of the types with examples emphasizing their biodiversity, economic importance and conservation measures where required. **UNIT-II** General characters and classification of phyla upto orders with examples emphasizing their biodiversity, economic importance and conservation measures where required. Protochordates: Systematic position, distribution, ecology, morphology and affinities Urochordata: *Herdmania* – type study Cephalochordata; *Amphioxus* – type study **UNIT-III** General characters and classification of phyla upto orders with examples emphasizing their biodiversity, economic importance and conservation measures where required. Cyclostomes: Classification and ecological significance Type study of *Petromyzon.* **UNIT-IV**

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General characters and classification of all phyla upto orders with examples emphasizing their biodiversity,
economic importance and conservation measures where required.
Pisces: Scales & Fins, Parental care in fishes, fish migration.
Types study of Labeo

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LESSON PLAN (THEORY AND TUTORIAL CLASSES)

L. No	Topic to be Delivered	Tutorial Plan		Unit
1	Salient features of chordates	MCQ test on Characters, and Evolution of Chordates	Diagram test	1
2	Principles of classification; Origin and Evolutionary tree; Role of amnion in evolution			
3	Morphology of the types with examples emphasizing their biodiversity;Economic importance and conservation			
4	Introduction to phylum Urochordata			2
5	Type study *Herdmania.*	MCQ test on Characters, classification and type of Urochordata & Cephalochordata	Diagram test	
6	Introduction to phylum Cephalochordata.			
7	Type study *Amphioxus*			
8	Protochordates: Systematic position, distribution, ecology, morphology and affinities	Diagram test on type study of Pertromyzon		3
9	Cyclostomes: Classification and ecological significance			
10	Type study of *Petromyzon.*			
11	General characters and classification of all phyla upto orders with examples emphasizing their biodiversity			4
12	Economic importance and conservation measures where required.			
13	Pisces: Scales & Fins, Parental care in fishes, fish migration. Types study of *Labeo*	Diagram test on type study of Parental care in fishes and fish migration		

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Course Plan

Text Book

Sabharwal A. & Shekhar C. Modern text book of Zoology B. Sc. Part-II, Semester-III: Life and Diversity of Chordates and Mammalian Physiology Vol.II

Reference Books

1. R.L.Kotpal. Modern Textbook of Zoology
2. E.L. Jordan and Verma. Chordate Zoology.
3. Barrington, E.J.W. The Biology of Hemichordata and Protochordata. Oliver and Boyd, Edinbourgh.
4. Walters, H.E. and Sayles, L.D. Biology of vertebrates. MacMillan & Co., New York.
5. Kent, C.G. Comparative anatomy of vertebrates.

Web/Links for e-content

https://www.youtube.com/watch?v=9AeNGFcis2o&t=4s

https://www.youtube.com/watch?v=arvcg9YI82w

https://www.youtube.com/watch?v=8Cho9P5nUjQ&t=9s

https://www.youtube.com/watch?v=7IW3Kysc6IU

PRACTICE QUESTIONS (QUESTION BANK)

S No	Problem
1	Define proto chordate .
2	Define Hemichordate.
3	Define urochordate.
4	Define cephalochordate.
5	State two general characters of hemichordate.
6	State two general characters of urochordate.
7	State two general characters of cephalochordate.
8	Define retrogressive metamorphosis.

9	State two significance of tornaria larva.
10	State two significance of tadpole larva.
11	State fundamental chordate characteristics.
12	State fundamental chordate characteristics.
13	State two advance features of vertebrates over protochordates.
14	State two general characteristics of cyclostomatous.
15	State two peculiar characters of myxine .
16	State two peculiar characters of petromyzon.
17	State two general characters of chondrichthyes.
18	State two general characters of osteichthyes.
19	Define migration.
20	What is osmo regulation ?
21	Define parental care ?
22	What are uses of scales ?
23	Give an brief account on digestive system of Herdmania.
24	Explain circulatory system of Herdmania.
25	What is retrogressive metamorphosis ? describe the process of retrogressive metamorphosis in herdmania ?
26	State general characters of cyclostomata ?

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Department of Chemistry

Program: BSc IInd

Physical Chemistry (CH-402)

SCHEME

Course Name	**Physical Chemistry**	**Course Type**	**Theory**
Course Code	**CH-402**	**Class**	BSc III Sem.
Instruction Delivery	**Per week Lectures: 2, Tutorial:1, Practical: -** **Total No. Classes Per Sem: 32(L), (T), -(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	Dr Manish Kumar	**Course Instructors**	Theory: Dr Manish Kumar Practical: -- Dr Manish Kumar

COURSE OVERVIEW

Thermodynamics is a branch of physics that deals with heat, work, and temperature, and their relation to energy, entropy, and the physical properties of matter and radiation. The behavior of these quantities is governed by the four laws of thermodynamics which convey a quantitative description using measurable macroscopic physical quantities, but may be explained in terms of microscopic constituents by statistical mechanics. Thermodynamics applies to a wide variety of topics in science and engineering, especially physical chemistry, biochemistry, chemical engineering and mechanical engineering, but also in other complex fields such as meteorology.

PREREQUISITE

Thermodynamics, Distribution law, Chemical equilibrium and Extensive and Intensive properties

COURSE OBJECTIVE

The objective of this course is to study the Basic terms used and Ist law of thermodynamics which give idea about conversion of different forms of energy. It reflects about the internal energy and conversion of heat and work which helps to understand the conversion of different forms of energy. It also helps in study calculation of different terms in isothermal and adiabatic processes.

This Course helps in understanding the formation of different reversible reaction and chemical equilibrium constant, It also helps to understand solubility of different substances in polar and non-polar solvents.

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

CO No.	Course Outcomes
1	Remember the type of system and various thermodynamical properties.

2	Remember the work, heat, heat capacity, enthalpy C_p, C_v and work and heat of different thermodynamical process.
3	Understand the equilibrium constant in terms of pressure, conc. And activity.
4	Understand the distribution of solute in polar and non-polar solvents.

COURSE CONTENT

Content
Thermodynamics-I Definition of thermodynamic terms: system,surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work. Zeroth Law of thermodynamics, First law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – Joule – Thomson coefficient for ideal gass and real gas: and inversion temperature. **Thermodynamics-II** Calculation of w.q. dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reve rsible process, Temperature dependence of enthalpy, Kirchoffs equation. Bond energies and applications of bond energies. **Chemical Equilibrium** Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant; Van't Hoff reaction isochore, Van't Hoff reaction isotherm. Le-Chatetier's principle and its applica tions Clapeyron equation and Clausius – Clapeyron equation its applications. **Distributioln Law** Nernst distribution law – its thermodynamic derivation, Modification of distribution law when solute undergoes dissociation, association and chemical combination. Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride. (ii) Determination of equilibrium constant of potassium tri-iodide complex and process of extraction.

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

LESSON PLAN (THEORY AND TUTORIAL CLASSES)

L. No	Topic to be Delivered	Tutorial Plan	Unit
1	system,surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials	Practice Questions on different thermodynamic properties and processes.	1
2	Thermodynamic process. Concept of heat and work. Zeroth Law of thermodynamics		
3	First law of thermodynamics: statement, definition of internal energy and enthalpy.		
4	Heat capacity, heat capacities at constant volume and pressure and their relationship	Practice Questions on Joules law and Inversion temperature.	
5	Joule's law – Joule – Thomson coefficient for ideal gass and real gas: and inversion temperature.		
6	Questions on Ist law of thermodynamics		1
7	Questions on Joules law	Practice Questions on work and heat.	
8	Questions on Work done in different process.		
9	Calculation of work, heat, internal energy and enthalphy.	Practice questions on work done of Isothermal and adiabatic process	2
10	Reversible isothermal process with different properties		
11	Adiabatic reversible process and irreversible process		
12	Temperature dependence of enthalphy		
13	Kirchoffs equation		
14	Bond energies and application		
15	Questions on isothermal reversible process		
16	Questions on Bond energy and applications	Practice questions on Equilibrium constant and free energy	3
17	Equilibrium constant and free energy,		
18	Thermodynamic derivation of law		

	of chemical equilibrium		
19	Temperature dependence of equilibrium constant		
20	Van't Hoff reaction isochore, Van't Hoff reaction isotherm	Practice questions on Le-chatliers principle	
21	Le-Chatetier's principle and its applications		
22	Clausius – Clapeyron equation its applications		
23	Questions on Equilibrium constant		
24	Questions on Le-Chatetier's principle		
25	Nernst distribution law and its derivation	Practice questions on Nernst distribution law	4

26	Modification of distribution law when solute undergoes dissociation, association and chemical combination	Practice questions on degree of hydrolysis Practice questions on solubility of compounds in different medium.	
27	Applications of distribution law		
28	Determination of degree of hydrolysis		
29	Determination of equilibrium constant of potassium tri-iodide complex		
30	process of extraction		
31	Question on Distribution law		
32	Question on Degree of hydrolysis		

Text Book

A text book of Physical Chemistry, Vol III by K.L.Kapoor,
A Text-Book Of Physical Chemistry Vol II by K.L.Kapoor
Essentials of Physical Chemistry by B.R. Bahl, B.S. Bahl, and G.D. Tuli

Reference Books

Principal of Physical Chemistry by Puri Sharma Pathania
Physical Chemistry 3rd edition by Thomas Engel and Philip Reid

Physical Chemistry 2nd edition by Atkins

Web/Links for e-content

- https://en.wikipedia.org/wiki/Thermodynamics#Introduction

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

- https://youtu.be/ITwqsPnSLZ0?si=iMIVowZ4sgjAsqrQ
- https://youtu.be/R-EgSYeZGQU?si=hnLjPj4hcSljT3p9

PRACTICE QUESTIONS (QUESTION BANK)

S No	Problem
1	What is 1st law of thermodynamics?
2	What do you understand by extensive and Intensive properties?
3	Define State functions and path functions.
4	What is zeroth law of thermodynamics?
5	How do heat and work are related to each other?
6	Define internal energy change and its conventions?
7	Work and heat are path functions. Explain by taking examples of different processes.
8	What is joule's law and state inversion temperature.
9	What is work done and heat in an isothermal reversible expansion?
10	Calculate different thermodynamic properties in adiabatic reversible expansion.
11	Discuss the Kirchoff's law and equation.
12	Define bond energies and how it is been calculated for a thermodynamic process.
13	Differenciate reversible and irreversible processes.
14	How does temperature effect the enthalpy of a reaction.
15	Discuss heat capacity
16	Prove that $C_p - C_v = R$.
17	Describe Equilibrium constant and calculate it in terms od pressure, conc. And activity.

18	What is chemical potential?
19	What is law of chemical equilibrium?
20	Explain Van't Hoff isotherm
21	Explain Van't Hoff isochore.
22	Derive expression of Clausius – Clapeyron equation
23	State applications of Clausius – Clapeyron equation
24	What is Le-Chatetier's principle?
25	What are the effect of the various factors on equilibrium constant?
26	State and explain Nernst distribution law
27	Derive an expression of Nernst distribution law
28	Derive an expression for solute undergoes association, dissociation and solvation.
29	Discuss Degree of hydrolysis and calculate hydrolysis constant.

30	Discuss effect of temperature on solubility.
31	Discuss degree of hydrolysis of aniline hydrochloride.
32	Determine equilibrium constant of potassium tri-iodide complex.

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Department of Chemistry

Program: B.Sc.(Non medical & Medical)

Inorganic Chemistry (CH-301)

SCHEME

Course Name	Inorganicl Chemistry	**Course Type**	**Theory**
Course Code	CH-301	**Class**	B.Sc 3rd sem
Instruction Delivery	**Per week Lectures: 2,Tutorial -1, Practical: -** **Total No. Classes Per Sem: 72(L), 28(T), -(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	Mrs. Ritu	**Course Instructors**	Theory: Mrs. Ritu Practical: --

COURSE OVERVIEW

Inorganic chemistry is concerned with the quantum mechanics, spectroscopy & molecular structure.

PREREQUISITE

Basics of chemistry, Knowledge of inorganic chemistry terms, periodic table & coordination chemistry.

COURSE OBJECTIVE

The objective of this course is to explore the knowledge of d- block elements. This course will also provide us knowledge of co-ordination chemistry & non aqueous chemistry.

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

CO No.	Course Outcomes
1	Remember the basic concept of d- block elements.
2	Understand the 1st,2nd & 3rd transition series.
3	Apply the various concepts of co-ordination compounds.
4	Analyze the application of Non-aqueous solvents.

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

COURSE

CONTENT

Content
Definition of transition elements, position in the periodic table, Generall characteristic and properties of d- block elements, structure and properties of some compounds of transition elements - Tio2, VoCl2, FeCl3, CuCl2 & NiCo4.Comparison of properties of 3d- elements with 4d and 5d elements with reference only to ionic radii, Oxidation State ,magnetic and Spectre properties and stereochemistry. coordination compounds- Werner's theory of coordination compounds, effective atomic number, Chelates, Nomenclature of coordination compounds, isomerism in coordination compound, valence bond theory of transition metal complexes. Non Aqueous solvents- physical properties of solvent ,types of solvent and their general characteristics ,reactions in non aqueous solvent with reference to liquid Ammonia and liquid sulphur dioxide.

LESSON PLAN (THEORY AND TUTORIAL CLASSES

L. No	Topic to be Delivered	Tutorial Plan	Unit
1	Definition of transition elements position in the periodic table		1
2	Electronic configuration of 3d,4d and 5D series.		
3	General characteristics and properties of 3d series elements		
4	Structure and properties of Tio2, VoCl2		
5	Structure and properties of FeCl3, CuCl2 and NiCo4		

6	Comparison of properties of 3D element with 4d and 5d element with reference to ionic radii ,Oxidation State.	Discussion of previous year questions	
7	Magnetic and spectral properties and stereochemistry.		2
8	Revision of 3d -series		
9	Revision of 4d and 5d series		3
10	Coordination compounds,Werner's theory of coordination compound		
11	Effective atomic number and chelates		
12	Nomenclature of coordination		
13	Isomerism in coordination compounds		
14	Valance bond theory of transition metal complexes		
15	Revision of coordination compound		
16	Non aqueous solvent physical properties of solvent		
17	Types of solvent	Practice of VBT	4

18	General characteristics of solvent		
19	Reactions in liquid ammonia		
20	Reactions in liquid ammonia		
21	Reactions in liquid SO2		

22	Reactions in liquid SO2	Discussion of previous year questions paper		
23	Revision of non aqueous solvent			
24	Revision of non aqueous solvent			
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Text Book

"Modern approach to Inorganic chemistry by Dr. S.P.Jauhar"

"Inorganic chemistry by Pardeep publication"

Reference Books

- " Advance in inorganic chemistry by S.K.Agarwal".
- "Inorganic chemistry by Dr.S.K.Bansal"

Web/Links for e-content

- https://youtu.be/IV4wQMI_EG4?si=gXlbITQYM6vyFXic

- https://youtu.be/VlpNYNhudko?si=6RTZHa0kXJYhOg2k
- https://youtu.be/C2RoCtcgM1o?si=5AMB3ooEVuUsgOPk

PRACTICE QUESTIONS (QUESTION BANK)

S No	Problem
1	Describe the geometry of NiCo4.
2	Explain the properties of Tio2.
3	Discuss the anomalous high ionization energy of Copper and chromium.
4	Why 3d series complexes are mainly high spin while 4d and 5d transition series complexes are of low spin?
5	Discuss the variation of radii of atoms and ions of 2nd and 3rd transition series in comparison with first transition series.
6	Why d- block elements are called transition elements?
7	What are basic postulates of Werner's coordination theory?
8	What are non aqueous solvent? Discuss their classification.
9	Discuss the important advantages of liquid sulphur dioxide as solvent in spite of its toxic nature.
10	Discuss the advantage of liquid ammonia.
11	Draw the structure of VoCl2.
12	

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Department of Chemistry

Program: B.Sc.(Non medical & Medical)

Organic Chemistry (CH-303)

SCHEME

Course Name	Organic Chemistry	**Course Type**	**Theory**
Course Code	CH-303	**Class**	B.Sc 3rd sem
Instruction Delivery	**Per week Lectures: 2,Tutorial -1, Practical: -** **Total No. Classes Per Sem: 72(L), 28(T), -(P)** **Assessment in Weightage: Sessional (20%), End Term Exams (80%)**		
Course Coordinator	Mrs. Ritu	**Course Instructors**	Theory: Mrs. Ritu Practical: --

COURSE OVERVIEW

Organic chemistry is concerned with the application of UV Spectroscopy & Alcohols, phenols & acids.

PREREQUISITE

Basics of chemistry, Knowledge of organic chemistry terms, knowledge of alcohols, phenols & acids.

COURSE OBJECTIVE

The objective of this course is to explore the knowledge of Alcohols, phemols & Carboxylic acids. This course will also provide us knowledge of UV spectroscopy .

COURSE OUTCOMES (COs)

After the completion of the course, the student will be able to:

CO No.	Course Outcomes
1	Remember the basic of alcohols & epoxides.
2	Understand the concept of Phenols.
3	Apply the various concepts of UV spectroscopy.
4	Analyze the application of Carboxylic acid & acid derivatives.

COURSE

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

CONTENT

Content
Alcohols -monohydric alcohol nomenclature ,methods of formation by reduction of aldehydes, ketones ,carboxylic acid and esters. Hydrogen bonding, acidic nature ,reactions of alcohols, Dihybric alcohols-nomenclature ,method of formation ,chemical reactions of vicinal glycols, oxidative clevage ,Pinacol-pinacolone rrangemeant.Synthesis of epoxides, Acid & base catalyzed ring opening of epoxides ,orientation of epoxide ring opening, reactions of Grignard and Organolithium reagents with epoxides, Phenols -nomenclature ,structure and bonding, preparation of phenols ,physical properties and acidic character, comparative acidic strength of alcohols and phenols, resonance, stabilization of phenoxide Ion, Reaction of phenols -electrophilic aromatic substitution ,mechanism of Fries rearrangement, Claisen rearrangement ,Reimer-Tiemann reaction , Kolbes reaction, and Schotten Baumann reactions, Ultraviolet absorption spectroscopy -Absorption laws (Beer- Lambert law),molar absortivity, presentation and analysis of UV spectra, type of electronic transitions ,effect of conjugation, concept of chromophore and auxoochrome, Bathochromic ,hypsochromic & hypochromic shifts. UV spectra of conjugated enes & enones. Woodward fiser rule, calculation of Max. wavelength of simple conjugated dienes & Alpha ,Beta -unsaturated ketone, application of UV Spectroscopy in structure elucidation of simple organic compounds,Carboxylic acids and acid derivatives -nomenclature of carboxylic acid, structure and bonding ,physical properties of carboxylic acid, acidity of carboxylic acid ,prepartions of Carboxylic acid, Reactions of Carboxylic acid, HVZ reaction, reduction of Carboxylic acid ,mechanism of decarboxylation, structure ,nomenclature and preparation of acid Chloride , esters,amides & acid anhydrides, relative stability of acyl derivatives, physical properties ,inter conversion of acid derivative by nucleophilic acyl substitution ,mechanism of esterisification and hydrolysis (acidic and basic).

LESSON PLAN (THEORY AND TUTORIAL CLASSES

L. No	Topic to be Delivered	Tutorial Plan	Unit
1	Alcohol -monohydric alcohol, nomenclature		1
2	Method of formation by reduction of aldehyde and ketone		
3	Reduction of carboxylic acid and Ester ,hydrogen bonding, acidic nature		
4	Reactions of alcohols ,dihydric alcohol- nomenclature		
5	Methods of formation, chemical reactions of vicional glycols		

6	Oxidative cleavage and pinacol -Pinacolone rearrangement ,synthesis of epoxide	Discussion of previous year questions	
7	Acid and base catalyzed ring opening of epoxide ,orientation of epoxide ring opening		
8	Reactions of Grignard and organo- Lithium reagents with epoxide		
9	Phenols- nomenclature ,structure and bonding		2
10	Preparation of phenols,physical properties and acidic character.		
11	Comparative acidic strength of alcohol and phenols,resonance stabilization of phenoxide ion		
12	Electrophilic aromatic substitution, Fries rearrangement and Claisen rearrangement		
13	Reimer- Tieman reaction, Kolbes reaction and schotten - Baumann reaction		
14	Ultraviolet absorption spectroscopy introduction		
15	Beer-Lambert law,molar absorptivity		
16	Presentation and analysis of UV spectra, types of electronic transition		

17	Effect of conjugation, concept of chromophore, auxochrome, Bathochromic, hypsochromic, hyperchromic and hypochromic shifts.	Practice of numericals based on UV spectra	3
18	UV spectra of conjugated enes and enones.		
19	Woodward -Fieser rules,calculation of maximum wavelength of simple conjugated dienes and Alpha Beta-unsaturated ketones.		
20	Application of UV spectroscopy		
21	Carboxylic acid -nomenclature, structure and bonding ,physical properties		

22	Acidity of carboxylic acid, effect of substituent on acid strength, preparation of carboxylic acid	Discussion of previous year questions paper	4	
23	Reactions of carboxylic acid, HVZ reaction , reduction of carboxylic acid ,mechanism of decarboxylation			
24	Structure ,nomenclature and preparation of acid chloride, Ester			
	Amides and acid anhydride, relative stability of acyl derivative			
	Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution			
	Mechanism of esterification and hydrolysis (acidic and basic)			

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

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Text Book

"Modern approach to Organic chemistry by Dr. J. M. Sehgal"

"Organic Chemistry by S. L Vashishta"

Reference Books

- " Advance Organic chemistry by S. Chand".
- "Advance Organic Chemistry by Jagdamba Singh".

Web/Links for e-content

- https://youtu.be/J4vEsZLZnyA?si=NlU3cMp2vadRMrjN
- https://youtu.be/cNGPBZk3Qxw?si=PtDJPVEhMOe6ZQ2O
- https://youtu.be/nmvyZF0RyRg?si=3lNK-Y7H_W6wL-UN

PRACTICE QUESTIONS (QUESTION BANK)

S No	Problem
1	Explain with mechanism dehydration of alcohol with concentrated sulphuric acid.
2	Explain with mechanism pinacol- pinocolone rearrangement.
3	Why phenols are more acidic than alcohols?
4	Describe fries rearrangement.
5	Explain the relative acidic strength of Ortho, meta and para nitrophenol.

6	Differentiate Chromophone and Auxochrome.
7	Define Beer lambert's law and molar absorptivity.
8	What is the difference between red shift and blue shift?
9	Describe the important applications of UV spectroscopy.
10	Why amides are least reactive of all acid derivative towards nucleophilic acyl substitution reaction?
11	Explain the relative acidic strength of formic acid, benzoic acid and acetic acid.
12	Explain the mechanism of hydrolysis of Ester in acidic and basic medium.

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Sh. L. N. Hindu College, Rohtak (Haryana)
Course Plan

Department of Hindi

Program: Bsc.

हिंदी (compulsory)

SCHEME

Course Name	हिंदी	**Course Type**	**Theory**
Course Code		**Class**	Bsc.3rd. sem.
Instruction Delivery	**Per week Lectures: 5, Tutorial:1, Practical: -** **Total No. Classes Per Sem: 20(L), 15(T)** **Assessment in Weightage: Sessional (10%), End Term Exams (40%)**		
Course Coordinator	Mrs. Kiran Devi	**Course Instructors**	Mrs. Kiran Devi

COURSE OVERVIEW

इस कोर्स के अंतर्गत साहित्य की गद्य विधा **संस्मरण ,पत्र एवं तार लेखनतथा पारिभाषिक शब्दावली** का **संकलन** किया गया है | हिंदी साहित्य की इन विधाओं के द्वारा **राष्ट्रीयता** ,युगीन समस्याओं, संवेदना,प्रेम,सामाजिक समस्याओं का निरूपण किया गया है|

PREREQUISITE

हिंदी की **काव्य** विधा से परिचित होना|
हिंदी **के पत्र एवं तार लेखन की** सामान्य जानकारी होना|
हिंदी की **निबंध** विधा के बारे में जानकारी होना|

COURSE OBJECTIVE

1.हिंदी कविता के माध्यम से समाज की संस्कृति,मूल्य,समस्या से परिचित कराकर समाधान के लिए प्रेरित करना|
2.विद्यार्थियों के तार्किक चिंतन लेखन एवं अभिव्यक्ति कौशल का विकास करना

COURSE OUTCOMES (COs)

CO No.	Course Outcomes
1	भारतेंदु हरिश्चंद्र, मैथिलीशरण गुप्त, माखनलाल चतुर्वेदी, सूर्यकांत त्रिपाठी निराला, महादेव वर्मा, रामधारी सिंह दिनकर, हरिवंश राय बच्चन, व दुष्यंत कुमार के लेखन से चिंतन व कौशल की जानकारी हुई।
2	निबंध लेखन के माध्यम से शिक्षा, राजनीतिक ,समाज, विज्ञन, कंप्यूटर, इंटरनेट आदि की

	जानकारी हुई।
3	पत्र लेखन के माध्यम से पत्र लेखन कला का विकास हुआ।
4	पारिभाषिक शब्दावली के माध्यम से शब्दों का ज्ञान हुआ।

COURSE CONTENT

Content
भारतेंदु हरिश्चंद्र, मैथिलीशरण गुप्त, माखनलाल चतुर्वेदी ,सूर्यकांत त्रिपाठी निराला, महादेवी वर्मा, रामधारी सिंह दिनकर, हरिवंश राय बच्चन व दुष्यंत कुमार का साहित्यिक परिचय व उनकी काव्य रचनाओं का संकलन। महिलाधिकार ,गांधी दर्शन, शिक्षा और राजनीति ,आकाशवाणी ,कंप्यूटर तथा इंटरनेट आदि निबंधों का संकलन। सरकारी पत्र एवं तार लेखन का संकलन। पारिभाषिक शब्दावली का अर्थ वह स्वरूप।

LESSON PLAN (THEORY AND TUTORIAL CLASSES)

L. No	Topic to be Delivered	Tutorial Plan	Unit
1	भारतेंदु हरिश्चंद्र का साहित्यिक परिचय।		1
2	भारतेंदु की कविता निज भाषा उन्नति की सप्रसंग व्याख्या एवं समीक्षा।		
3	भारतेंदु हरिश्चंद्र की कविता गंगा वर्णन की सप्रसंग व्याख्या ,वाचन		

	व समीक्षा ।		
4	भारतेंदु हरिश्चंद्र की कविता प्रेम माधुरी व होली की सप्रसंग व्याख्या, वाचन व समीक्षा।		
5	मैथिलीशरण गुप्त का साहित्यिक व जीवन परिचय।		
6	मैथिलीशरण गुप्त द्वारा रचित रचना भारत भारती के अतीत खंड की सप्रसंग व्याख्या, वाचन व समीक्षा।	भारतेंदु हरिश्चंद्र का जीवन व साहित्यिक परिचय।	1
7	मैथिलीशरण गुप्त द्वारा रचित रचना मातृ मंदिर वह मानिनी यशोधरा की सप्रसंग व्याख्या , वाचन व समीक्षा।		
8	महादेवी वर्मा का जीवन व साहित्यिक परिचय।		
9	महादेवी की कविता अली से, कीर का प्रिय आज पिंजर खोल दो कविता की सप्रसंग व्याख्या वाचन व समीक्षा।		
10	रामधारी सिंह दिनकर का जीवन व साहित्यिक परिचय।		
11	राम धारी सिंह दिनकर की कविता कविता की पुकार की सप्रसंग व्याख्या, वाचन व समीक्षा।		
12	रामधारी सिंह दिनकर की रचना गीत गीत की सप्रसंग व्याख्या ,वाचन में समीक्षा।		
13	रामधारी सिंह दिनकर की रचना प्रभाती की सप्रसंग व्याख्या ,वाचन व समीक्षा।		
14	माखनलाल चतुर्वेदी का जीवन व साहित्यिक परिचय ।		
15	माखनलाल चतुर्वेदी की रचना पुष्प की अभिलाषा,पुष्प की मनुहार रचनाओं की सप्रसंग व्याख्या वाचन		

	व समीक्षा।		
16	माखनलाल चतुर्वेदी की रचना सिपाही व बेटी की विदा कविता की सप्रसंग व्याख्या वाचन व समीक्षा।		
17	सूर्यकांत त्रिपाठी निराला का जीवन व साहित्यिक परिचय।		
18	सूर्यकांत त्रिपाठी निराला की कविता वीणावादिनी वर दे व भजन कर कविता की सप्रसंग व्याख्या, वाचन व समीक्षा।		
19	सूर्यकांत त्रिपाठी निराला की कविता संध्या सुंदरी व विधवा की सप्रसंग व्याख्या वाचन व समीक्षा।		
20	हरिवंश राय बच्चन का जीवन व साहित्यिक परिचय।		
21	हरिवंश राय बच्चन की कविता लहरों का निमंत्रण की सप्रसंग व्याख्या, वाचन व समीक्षा।		
22	हरिवंश राय बच्चन की कविता नीम के दो पेड़ की समीक्षा , सप्रसंग व्याख्या व वचन		
23	हरिवंश राय बच्चन की कविता चार चने की सप्रसंग व्याख्या, वाचन व समीक्षा।		
24	दुष्यंत कुमार का जीवन व साहित्यिक परिचयपरिचय		
25	दुष्यंत कुमार की कविता एक आशीर्वाद की सप्रसंग व्याख्या , वाचन व समीक्षा।		
26	दुष्यंत कुमार की कविता राह खोजेंगे की सप्रसंग व्याख्या , वाचन व समीक्षा।		2
27	दुष्यंत कुमार की कविता छत पर एक अनुभूति की सप्रसंग व्याख्या, वाचन व समीक्षा।		
28	दुष्यंत कुमार की कविता सरस्वती वंदना की सप्रसंग		

	व्याख्या, वाचन व समीक्षा।		
29	सरकारी पत्र लेखन।		
30	तार लेखन।	केंद्र सरकार के शिक्षा मंत्रालय की ओर से सचिव शिक्षा मंत्रालय, हरियाणा सरकार को पत्र लिखें जिसमें राज्य में नई शिक्षा नीति लागू होने के लिए कहा गया हो।	

31	पारिभाषिक शब्द।	कोई 10 पारिभाषिक शब्द लिखिए।	2	
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Text Book

1. आठ अर्वाचीन कवि संपादक डॉ. लालचंद गुप्त मंगल और मदन गुलाटी कुरुक्षेत्र विश्वविद्यालय प्रकाशन।

Reference Books

1. निबंध सौरभ: तन सुखराम गुप्त, सूर्य भारती प्रकाशन, दिल्ली।
2. पत्र व्यवहार निर्देशिका :डॉक्टर भोलानाथ तिवारी वाणी प्रकाशन दिल्ली।

Web/Links foe-content

1. https://www.sankritiias.com
2 .https://www.parentsassembly.com.

PRACTICE QUESTIONS (QUESTION BANK)

S No	Problem
1	भारतेंदु हरिश्चंद्र का जीवन व साहित्यिक परिचय।
2	मैथिली शरण गुप्त का जीवन व साहित्यिक परिचय।
3	माखनलाल चतुर्वेदी का जीवन व साहित्यिक परिचय।
4	सूर्य सूर्यकांत त्रिपाठी निराला का जीवन व साहित्यिक परिचय।
5	हरिवंश राय बच्चन का जीवन व साहित्यिक परिचय।
6	दुष्यंत कुमार का जीवन व साहित्यिक परिचय।
7	मानवाधिकार विषय पर निबंध लिखिए।
8	मद्य निषेध विषय पर निबंध लिखिए।
9	वैज्ञानिक प्रगति में भारत का योगदान विषय पर निबंध लिखिए।
10	दूरदर्शन विषय पर निबंध लिखिए।
11	नैतिक शिक्षा विषय पर निबंध लिखिए।
12	वैश्वीकरण और विज्ञान विषय पर निबंध लिखिए।
13	महिलाधिकार विषय पर निबंध लिखिए।

14	गांधी दर्शन विषय पर निबंध लिखिए।
15	शिक्षा और राजनीति विषय पर निबंधलिखिए।
16	विज्ञान और पर्यावरण प्रदूषण विषय पर निबंध लिखिए।
17	आकाशवाणी विषय पर निबंध लिखिए।
18	कंप्यूटर तथा इंटरनेट विषय पर निबंध लिखिए।
19	जनसंख्या विस्फोट विषय पर निबंध लिखिए।
20	उप सचिव मानव संसाधन विकास मंत्रालय भारत सरकार की ओर से, उपसचिव, वाणिज्य मंत्रालय को एक फाइल के विषय में अर्द्ध सरकारी पत्र लिखिए।
21	उपनिदेशक, आकाशवाणी की ओर से निदेशक दूरदर्शन विभाग, दिल्ली को सामाजिक कार्यक्रमों के संदर्भ में अर्द्ध सरकारी पत्र लिखिए।
22	एक फर्म का माल भेजा जा चुका है परंतु उसने भुगतान नहीं किया शीघ्र भुगतान के लिए तार भेजिए।
23	निम्नलिखित शब्दों के हिंदी पारिभाषिक शब्द लिखिए- 1. Infection 2. Membrane 3. Parasite 4. Photo catalyst 5. Physiology 6. Hydration 7. Plasma 8. Projection 9. Velocity 10. Pollution
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