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Governed by Kasturba Gandhi National Memorial Trust  
**Kasturbagram Rural Institute**  
**Kasturbagram, Indore (M.P.) - 452020**  
**An Autonomous Women's College, Affiliated to Devi Ahilya University, Indore**



Syllabus – B.Sc. 1st Year – Academic Session 2023-24  
 (Under NEP 2020 & As per Ordinance 14A)

*Scheme of Examination - (IInd Semester)*

Course Nature	Course Code	Course Name	Course Title	Credit	Total Credit Hours	Maximum Marks		Minimum Marks		Total Marks
						External	Internal	External	Internal	
Major I	BSCM2018TT	Botany	Basic Botany	4	64	60	40	21	14	100
	BSCM2012LT	Zoology	Cell Biology, Reproductive Biology & Develop Biology							
	BSCM201CHT	Chemistry	Analytical Chemistry							
	BSCM202BTP	Botany	Botany Practical	2	64	60	40	21	14	100
	BSCM202ZLP	Zoology	Zoology Practical							
	BSCM202CHP	Chemistry	Chemistry Practical							
Minor	BSCM2028TT	Botany	Basic Botany II	4	64	60	40	21	14	100
	BSCM2022LT	Zoology	Cell Biology, Reproductive Biology & Develop. Biology II							
	BSCM202CHT	Chemistry	Analytical Chemistry II							
	BSCM2028TP	Botany	Botany Practical	2	64	60	40	21	14	100
	BSCM202ZLP	Zoology	Zoology Practical							
	BSCM202CHP	Chemistry	Chemistry Practical							
Generic Elective (Any One)	GE203PET	Physical Education	Introduction and concept of Physical Education- II	3	48	60	40	21	14	100
	GE203RDT	Rural Develop. & Extension	Introduction to Extension & Communication II							
	GE203CPT	Computer	Computer							
	GE203PEP	Physical Education	Introduction and concept of Physical Education- II	1	32	60	40	22	14	100
	GE203RDP	Rural Develop. & Extension	Introduction to Extension & Communication II							
	GE203CPP	Computer	Computer							
Skill Enh. Course	-	-	-	-	-	-	-	-	-	-
Ability Enh. Course	FC102EGT	English	Language & Indian Culture	2	32	30	20	11	7	50
	FC104YOT	Yoga & Meditation	Yoga & Meditation	2	32	30	20	11	7	50
Project/ Internship	-	-	-	-	-	-	-	-	-	-
				20						700

*(Signatures)*



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**Syllabus – B.Sc. I st Year – Academic Session 2023-24  
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## SEMESTER II

**SUBJECT – BOTANY (MAJOR)**

**COURSE: BSCM102BTT- BASIC BOTANY**

वनस्पति शास्त्र  
आधारभूत वनस्पतिशास्त्र

**MAXIMUM MARKS : 100 (60+40)**

**TOTAL CREDITS : 04**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

**AIMS**

**AIMS**  
This course is designed with the aim to provide knowledge of botany to the students and develop understanding of basic concepts of Botany.

## OBJECTIVES

- To give an understanding about the basic concepts of Botany.
- To provide guidance to students for better understanding of concepts, thoughts and theories with practical.
- Expansion of knowledge from learning to applicability as well as understanding and identifying applied botany.
- To develop broad thinking and awareness about the necessary concepts and terminologies.

## TEACHING METHODOLOGY

- ### TEACHING METHODOLOGY
- The Teaching Methodology shall be based on the scientifically proven methods of demonstration and Modern Strategies.
  - The Teaching Methodology for the present course would include Lecture, practical and observational. Teaching will be Bilingual.

### COURSE LEARNING OUTCOMES (CLO)

6. Student will understand the role and significance of botany.
7. They will learn the basic aspects of applied botany.
8. They will gain knowledge about employment opportunities in field of botany.
9. They will learn about opportunities social services.
10. They will gain knowledge about best practices.

UNIT	CONTENTS	DURATION
UNIT I	<ol style="list-style-type: none"> <li>1. 1 History of botany and Indian Contributions.</li> <li>1. 2 Morphological Characteristics of lower and higher plants (Angiosperms)</li> <li>1. 3 Types of Leaves, Inflorescence, Flower and Fruit.</li> <li>1. 4 Structure of Plant Cell and Cell Organelles, Prokaryotic and Eukaryotic Cells, types of Cell Division.</li> <li>1. 5 Microscope structure and function of light microscope.</li> <li>1. 6 Various types of Microscopes: Bright field, Phase contrast, SEM and TEM.</li> </ol>	12 Hours
	<ol style="list-style-type: none"> <li>1.1 वनस्पति विज्ञान और भारतीय योगदान का इतिहास</li> <li>1.2 निम्न पादप और उच्च पादप (आवृतबीजी) की आकारिकी</li> <li>1.3 पत्तियों के प्रकार, पुष्प कम, पुष्प और फल</li> <li>1.4 पादप कोषिका और कोषिकांग संरचना – प्रोकेरियोटिक और यूकेरियोटिक कोषिकाएं। कोषिका विभाजन के प्रकार</li> <li>1.5 सूक्ष्मदर्शी संरचना और प्रकाश सूक्ष्मदर्शी का कार्य (आबर्धन) और विभेदन क्षमता।</li> <li>1.6 विविध प्रकार के सूक्ष्मदर्शी, ब्राइट क्षेत्र सूक्ष्मदर्शी, फेस कोनट्रास्ट SEM और TEM</li> </ol>	





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<b>UNIT II</b>	<ol style="list-style-type: none"> <li>Algae –               <ol style="list-style-type: none"> <li>General Characters of Algae.</li> <li>Thallus Organization of Algae and Reproduction</li> <li>Types of Life Cycle in Algae.</li> <li>Role of Algae in Nature and its Economic Importance.</li> </ol> </li> <li>Bryophytes–               <ol style="list-style-type: none"> <li>General Characters of Bryophytes and its Ecology.</li> <li>Range of Thallus Organization, Morphology, Anatomy which include Internal &amp; External Features and Reproduction of any one Bryophyta.</li> <li>Economic Importance of Bryophytes.</li> </ol> </li> </ol>	<b>14 Hours</b>
	<ol style="list-style-type: none"> <li>शैवाल –               <ol style="list-style-type: none"> <li>शैवाल की सामान्य विशेषताएं</li> <li>शैवाल में सुकाय संगठन और प्रजनन</li> <li>शैवाल में जीवन चक्र के प्रकार</li> <li>पृकृति में शैवाल की भूमिका और आर्थिक महत्व</li> </ol> </li> <li>ब्रायोफाइट्स               <ol style="list-style-type: none"> <li>ब्रायोफाइट्स की सामान्य विशेषताएं</li> <li>पारिस्थितिकी, थैलस संगठन, आकारिकी, आंतरिक और बाहरी संरचना और किसी भी एक ब्रायोफाइट्स का प्रजनन</li> <li>ब्रायोफाइट्स का आर्थिक महत्व</li> </ol> </li> </ol>	
<b>UNIT III</b>	<ol style="list-style-type: none"> <li>Pteridophytes               <ol style="list-style-type: none"> <li>General Characteristics and Morphology of Pteridophytes.</li> <li>Stelar Organization in Pteridophytes and Reproduction.</li> <li>Origin of Heterospory and Seed Habit.</li> <li>Economic Importance of Pteridophytes.</li> </ol> </li> <li>Gymnosperms               <ol style="list-style-type: none"> <li>General description and their distribution.</li> <li>Economic Importance of Gymnosperms.</li> </ol> </li> <li>Paleobotany               <ol style="list-style-type: none"> <li>Indian Contribution in Paleobotany.</li> <li>Brief knowledge of Fossils and Geological time scale.</li> </ol> </li> </ol>	<b>14 Hours</b>
	<ol style="list-style-type: none"> <li>टेरिडोफाइट्स –               <ol style="list-style-type: none"> <li>टेरिडोफाइट्स की सामान्य विशेषताएं और अकारिकी</li> <li>रम्भ तंत्र संगठन और प्रजनन</li> <li>विषमबिजाणुकता की उत्पत्ति और बीज प्रवृत्ति</li> <li>आर्थिक महत्व</li> </ol> </li> <li>अनावृत्तबीजी               <ol style="list-style-type: none"> <li>सामान्य विवरण और वितरण</li> <li>आर्थिक महत्व</li> </ol> </li> <li>जीवाण्वीय वनस्पति विज्ञान (पैलियोबोटनी)</li> </ol>	

*(Signature)*

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	3.1 जीवाष्पीय वनस्पति विज्ञान का भारतीय योगदान 3.2 जीवाष्पों का संक्षिप्त ज्ञान और भूवैज्ञानिक समय सारणी	
UNIT IV	1. Fungi 1.1. General Characters of Fungi. 1.2. Cell wall Composition and Mode of Nutrition. 1.3. Types of Reproduction. 1.4. Economic Importance of Fungi. 1.5. Parasexuality and Mycorrhiza  2. Lichen – Brief knowledge of Lichen and its Significance.	12 Hours
	1. ऊतक – 1.1 सामान्य विशेषताएं 1.2 कोषिका भित्ति की संरचना और पोषण का तरीका 1.3 प्रजनन के प्रकार 1.4 आर्थिक महत्व 1.5 पेरासेक्सुअलिटी, कवकमूल  2 लाइकेन और उनके महत्व का संक्षिप्त ज्ञान	
UNIT V	1. Microbes 1.1. Brief outline of Microbes. 1.2. Types of Microbes – Archaeobacteria, Eubacteria, Cyanobacteria, Mycoplasma, Actinomycetes and Virus. 1.3. Benefits and Harmful roles of Microbes.	12 Hours
	1 सूक्ष्मजीव –  1.1 संक्षिप्त रूपरेखा 1.2 सूक्ष्मजीवों के प्रकार, आर्किबैक्टीरिया यूबैक्टेरिया, साइनोबैक्टीरिया, साइनोबैक्टीरिया, माइकोप्लाज्मा, एक्टिनोमाइसेटीस और विषाणु। 1.3 लाभकारी और हानिकारक भूमिकाएं	

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संदर्भ ग्रंथ –

1. ओलाडेल ओगनसेटन, Microbial Diversity: Form and Function in Prokaryotes, बिले ब्लैकवेल, अमरीका 2008
2. पेलजार, एम.जे. एट अल, माइक्रोबायोलॉजी, टाटा मेकग्रा हिल कंपनी, नई दिल्ली
3. प्रेस्कॉट, एल हार्ले, जे.और क्लीन, डी. माइक्रोबायोलॉजी, टाटा मेकग्रा हिल, नई दिल्ली
4. फिट्सएचएफ.ई. The Structure & Reproduction of Algae, Vol I & II, कैब्रिज यूनिवर्सिटी प्रेस, कैब्रिज, यूके
5. स्मिथ, जी.एम. Cryptogamic Botany, Vol.I Algae, Fungi, & Lichens मैकग्रा हि

**SUGGESTED READINGS: -**

1. Oladele Ogunseitan, Microbial Diversity: Form and Function in Prokaryotic, Wiley Blackwell, 2008.
2. Plezar, M.J. et al., Microbiology, Tata McGraw-Hill Co, New Delhi, 5<sup>th</sup> edition, 2001.
3. Presscott, L. Harley, J. and Klein, D. Microbiology, Tata McGraw Hill Co. New Delhi 6<sup>th</sup> Edition., 2005.
4. Fritsch F.E. The Structure and Reproduction of Algae, Vol. I & Vol. II., Cambridge University.

**GUIDELINES & RULES FOR STUDENTS**

- The students are expected to follow the following rules for deriving maximum benefits of the course
- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities
- Take responsibility of your own work Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the student.

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**SEMESTER II**

**SUBJECT – BOTANY (MAJOR)**

**COURSE: BSCM102BTP - BOTANY PRACTICAL**

वनस्पति शास्त्र  
 प्रायोगिक वनस्पतिशास्त्र

**MAXIMUM MARKS : 100 (60+40)**

**TOTAL CREDITS : 02**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

S.No.	PRACTICAL	Duration
	विभिन्न प्रकार की पत्तियों पुष्पकर्मों पुष्प और फलों का अध्ययन। Study various types of Leaves, Inflorescence, Flowers and Fruits.	5 Hours
2	सुक्ष्मदर्शी के विभिन्न भागों को समझाना (सरल और संयुक्त सुक्ष्मदर्शी) Understanding various parts of Microscope (Simple and Compound Microscope)	3 Hours
3	पदप कोशिकाओं का अध्ययन (जैसे प्याज की कोशिका का) Study of Plant Cell (e.g. Onion)	4 Hours
4	समसूत्रीविभाजन और अर्धसूत्रीविभाजन की स्थायी स्लाइडों का अध्ययन। Study of Permanent Slides of Meiosis and Mitosis.	5 Hours
5	स्थायी स्लाइड और आसपास के क्षेत्रों से पानी के अस्थायी माउंट से विभिन्न शैवाल की पहचान करना जैसे – वॉलवॉक्स स्पाइरोगाइरा। Identification of various Algae from specimen, slides and temporary mounts of water from nearby areas like; Volvox, Spirogyra.	5 Hours
6	कुछ ब्रायोफाइट्स का अध्ययन और पहचान जैसे – रिक्सिया मार्कन्शिया और फिल्ड अध्ययन। Study and Identification of Bryophytes like ; Riccia, Marchantia and Field Visit	5 Hours
7	कुछ जीवाश्मों का अध्ययन (प्रदर्शों और स्लाइड) Study of some Fossils (Specimen and Slides)	5 Hours
8	कुछ टेरिडोफाइट का अध्ययन जैसे लाइकोपोडियम सिलेजिनेला मार्सेलिया और किसी भी एक फर्न का अध्ययन। Study of some Pteridophytes like Lycopodium, Sellaginella, and study any one of Fern.	5 Hours
9	टेरिडोफाइट्स और जिम्नोस्पर्म : तना जड़ और पत्तियों का अनुप्रस्थ काट का अध्ययन। Section cutting of Pteridophytes and Gymnosperms: Stem, Root and Leaves.	5 Hours
10	टेरिडोफाइट्स और जिम्नोस्पर्म के शंकु का अध्ययन।	5 Hours





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	Specimen study of Pteridophytes and Gymnosperms Cones.	
11	कवकीय संरचनाओं का अध्ययन और अस्थायी स्लाइड का अध्ययन : राइजोपस यीस्ट एस्पेरजिलस अल्बूगो।  Study of Fungal Structures and preparation of temporary mounts of Rhizopus, Aspergillus, Yeast and Albugo.	5 Hours
12	पोषक पर पकसीनिया की स्थायी स्लाइड का अध्ययन।  Permanent slides of Puccinia on host.	4 Hours
13	विभिन्न कवकीय पौधों के रोगों का अध्ययन।  Study of various fungal plant disease.	5 Hours
14	पौधों पर विषाणु जीवाणु के लक्षणों का अवलोकन।  Observation of symptoms of virus and bacteria on plants.	3 Hours

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## SEMESTER II

SUBJECT – ZOOLOGY (MAJOR)

प्राणीशास्त्र

COURSE : - Cell Biology, Reproductive Biology and Development Biology

MAXIMUM MARKS : 100 (60+40)  
 TOTAL CREDITS : 04

MINIMUM MARKS : (21+14)  
 TOTAL HOURS : 64

### AIMS

This course is designed with the aim to provide knowledge of Zoology to the students and develop understanding of basic concepts of Zoology.

### OBJECTIVES

- To give an understanding about the basic concepts of Zoology.
- To provide guidance to students for better understanding of concepts, thoughts and theories with practical.
- Expansion of knowledge from learning to applicability as well as understanding and identifying applied Zot
- To develop broad thinking and awareness about the necessary concepts and terminologies.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture, practical and observational. Teaching will be bilingual.

### COURSE LEARNING OUTCOMES (CLO)

- Student will understand the role and significance of Zoology.
- They will learn the basic aspects of applied Zoology.
- They will gain knowledge about employment opportunities in field of Zoology.
- They will learn about opportunities social services.
- They will gain knowledge about best practices.

UNIT	CONTENTS	DURATION
UNIT I	<b>Cell Biology</b> <ol style="list-style-type: none"> <li>1.1 Concept of Prokaryotic and Eukaryotic Cells, difference between Prokaryotic and Eukaryotic Cells.</li> <li>1.2 Structure and function of Plasma Membrane.</li> <li>1.3 Structure and functions of Golgi body, Mitochondria, Endoplasmic reticulum, Ribosome and Lysosomes.</li> <li>1.4 Structure and functions of Nucleus.</li> <li>1.5 Structure and functions of Chromosome and special type of chromosomes- Lampbrush and Polytene chromosome.</li> <li>1.6 Cell cycle, Mitotic and Meiotic cell division and their significance.</li> </ol>	14 Hours
	<b>कोशिका विज्ञान</b> <ol style="list-style-type: none"> <li>1.1 प्रोकैरियोटिक एवं यूकेरियोटिक कोशिकाओं की अवधारणा प्रोकैरियोटिक एवं यूकेरियोटिक कोशिकाओं में अंतर।</li> <li>1.2 प्लाज़ा झिल्ली की संरचना एवं कार्य।</li> </ol>	





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	<p>1.3 गालगीकाय माइट्रोक्रोमिडिया एन्डोप्लाज्मिक रेटिकुलम राइबोसोम तथा लाइसोसोम की संरचना एवं कार्य।</p> <p>1.4 केन्द्रक की संरचना और कार्य</p> <p>1.5 गुणसूत्र की संरचना और कार्य विशेष प्रकार के गुणसूत्र लेम्प ब्रश तथा पोलीटीन गुणसूत्र</p> <p>1.6 कोशिका चक्र समसूत्री एवं अर्धसूत्री कोशिका विभाजन तथा उनका महत्व।</p>	
<b>UNIT II</b>	<p><b>Reproduction Biology</b></p> <p>1. 1 Structure of Male reproductive system of Lepus.</p> <p>1. 2 Structure of Female reproductive system of Lepus.</p> <p>1. 3 Histology of Testis, and Ovary of Lepus.</p> <p>1. 4 Gametogenesis- Spermatogenesis and Oogenesis, difference between spermatogenesis and oogenesis.</p> <p>1. 5 Types of Eggs-based on amount and distribution of yolk with examples.</p>	<b>14 Hours</b>
	<p><b>प्रजनन विज्ञान</b></p> <p>1.1 खरहा (खरगोश) के नर जनन तंत्र की संरचना।</p> <p>1.2 खरहा (खरगोश) के मादा जनन तंत्र की संरचना।</p> <p>1.3 खरहा (खरगोश) के वृषण तथा अंडाशय की औतिकी (हिस्टोलॉजी)</p> <p>1.4 युग्मक जनन – शुक्राणु जनन तथा अंडाणु जनन शुक्राणु जनन एवं अंडाणु में अंतर</p> <p>1.5 अंडों के प्रकार – योक्त की मात्रा एवं उनके वितरण के आधार पर तथा उनके उदाहरण।</p>	
<b>UNIT III</b>	<p><b>Recent Assisted Reproductive Technique (ART)</b></p> <p>1. 1 Stem Cell- Types and their uses.</p> <p>1. 2 Gene Bank, Sperm Bank, Superovulation, Cryopreservation</p> <p>1. 3 In Vitro Fertilization (IVF) and Embryo Transfer (ET), Zygote Intra Fallopian Transfer (ZIFT), Intracytoplasmic Sperm Injection (ICSI).</p> <p>1. 4 Placentation- Types, examples and functions.</p> <p>1. 5 Placenta Banking- Placenta preservation benefits.</p>	<b>12 Hours</b>
	<p><b>आधुनिक सहायक प्रजनन तकनीक</b></p> <p>1.1 स्टेम कोशिका – प्रकार एवं उनके उपयोग।</p> <p>1.2 जीन बैंक शुक्राणु बैंक सुपर आव्युलेशन कायोप्रिजरवेशन।</p> <p>1.3 इन विट्रो निषेचन (आई व्ही एफ) तथा भ्रूण स्थानांतरण (ई टी) जाइगोट इंटरा फैलोपियन ट्रांसफर (जेड आई एफ टी) इन्ट्रा साइटोप्लाज्मिक स्पर्म इंजेक्शन (आई सी एस आई)</p> <p>1.4 अपरान्यास – प्रकार उदाहरण तथा कार्य।</p> <p>1.5 प्लेसेन्टा बैंकिंग (अपरा बैंकिंग) अपरा संरक्षण लाभ।</p>	
<b>UNIT IV</b>	<p><b>Developmental Biology</b></p> <p>1. 1 Fertilization</p> <p>1. 2 Embryonic development of frog up to the formation of three germinal layers.</p> <p>1. 3 Fate map construction in frog.</p> <p>1. 4 Metamorphosis of Tadpole Larva.</p> <p>1. 5 Parthenogenesis</p>	<b>12 Hours</b>
	<p><b>परिवर्धन जैविकी</b></p> <p>1.1 निषेचन</p> <p>1.2 मेढक का भ्रूणीय परिवर्धन : तीन जर्म लेयर बनने तक</p> <p>1.3 मेढक का नियती मानचित्र (फेटमैप का निर्माण)</p> <p>1.4 टेडपोल लार्वा का कायान्तरण</p> <p>1.5 अनिषेक जनन</p>	



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UNIT V	<b>Embryonic Development of Chick</b> 1.1 Structure of hen's egg. 1.2 Embryonic Development of chick embryo upto the formation of primitive streak. 1.3 Fate map construction in chick. 1.4 Extra embryonic membranes of Chick: Formation and functions.	
	<b>चिक का भ्रुणिकी परिवर्धन</b> 1.1 मुर्गी के अंडे की संरचना। 1.2 आदि रेखा बनने तक चुजे का भ्रुणीय विकास। 1.3 चूजे (चिक) का नियति मानचित्र (फेटमैप) का निर्माण। 1.4 चूजे की बाह्य गर्भ (एक्स्ट्रा भ्रुणीय) झिल्लियों का निर्माण एवं कार्य।	14 Hours

#### Suggested readings

1. Armugam, "A Text Book of Embryology", Saras Publication, 2005.
2. Balinsky, BI, "An Introduction to Embryology", Cengage Learning, 2012.
3. De Robertis, EDP, De Robertis, EMF, "Cell and Molecular Biology", Eight edition, Lippincott, Williams & Wilkins, Philadelphia, 2006.
4. Gupta, PK, "Cell Biology, Genetics and Evolution", Rastogi Publications, 2013.
5. Haffner, L, "Human reproduction at a glance", BWL Publication, 2001.
6. Larser, "Human Embryology", Churchill Livingstone, 2001.
7. Powar, CB, "Cell Biology", Himalaya Publishing House, 2010.
8. Rastogi, VB, "Introduction to Cytology", KNRN Publication, 1988.
9. Rastogi, VB, "Animal Distribution and Development Biology", KNRN Publication, 2020.
10. Sastry, KV, "Endocrinology and Reproductive Biology", Rastogi Publications, 2018.
11. <https://academic.oup.com>
12. <https://medineplus.gov>
13. <https://ncni.nlm.nih.gov>

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**SEMESTER II**

**SUBJECT – ZOOLOGY (MAJOR)**

प्रायोगिक प्राणीशास्त्र

**COURSE: - BSCM201ZLT -Cell Biology, Reproductive Biology and Development Biology**

**MAXIMUM MARKS : 100 (60+40)**  
**TOTAL CREDITS : 02**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

**COURSE LEARNING OUTCOMES (CLO)**

1. The different stages of mitotic and meiotic cell division and special types of chromosomes.
2. Different stages of embryology.
3. Through squash preparations understand the stages of cell division and structure of polytene chromosome.
4. Enhance collaborative learning and communication skills through practical sessions, team work group discussion, assignments and project.

S.No.	PRACTICAL	Duration
1	<p>कोशिका विज्ञान से संबंधित स्पाटिंग            अ प्रोकेरियोटिक तथा युकेरियोटिक कोषिका            ब समसूत्री कोषिका विभाजन की अवस्थाएं            स अर्द्धसूत्री कोषिका विभाजन की अवस्थाएं            द लेम्पब्रष गुणसूत्र</p> <p><b>Spotting related to the cytology</b></p> <ol style="list-style-type: none"> <li>a. Prokaryotic and Eukaryotic Cell</li> <li>b. Stages of Mitotic cell division</li> <li>c. Stages of Meiotic cell division</li> <li>d. Lamp brush Chromosome</li> </ol>	12 Hours
2	<p>प्रजनन विज्ञान और भ्रूण विज्ञान से संबंधित स्पाटिंग            अ स्तनधारी के वृषण का अनुप्रस्थ काट            ब स्तनधारी के अंडाशय का अनुप्रस्थ काट            स मेढक के भ्रूणीय विकास की अवस्थाएं            द चूजे के भ्रूणीय विकास की अवस्थाएं</p> <p><b>Spotting related to Reproductive biology Embryology</b></p> <ol style="list-style-type: none"> <li>a. T.S. Testis of Mammal</li> <li>b. T.S. Ovary of Mammla</li> <li>c. Developmental stage of Frog embryology</li> <li>d. Developmental stage of Chick embryology</li> </ol>	12 Hours
3	<p>समसूत्री विभाजन की अवस्थाओं को समझने के लिए प्याज के मूलाग्र का स्क्वैश बनाना।</p> <p>Squash preparation of onion root tip to understand the stages of Mitosis.</p>	10 Hours



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4	अर्द्धसूत्री विभाजन की अवस्थाओं को समझने के लिए टिड्डे की वृषक का स्कवेश बनाना। Squash preparation of Grasshopper testis to understand the stage of Meiosis.	10 Hours
5	सेल व्यवहार्यता (जीवितता) का ट्राईपेन ब्लू अपवर्जन परीक्षण। Trypan Blue exclusion test of cell viability.	10 Hours
6	कायरोनोमस लार्वा/ड्रोसोफिला की लार ग्रंथी गुणसूत्र का स्कवेश बनाना। Squash preparation of salivary gland chromosome from Chironomus larva/Drosophila.	10 Hours

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**SEMESTER II**  
**SUBJECT – CHEMISTRY**  
**COURSE: BSCM201CHT– ANALYTICAL CHEMISTRY [MAJOR-2]**  
**विश्लेषणात्मक रसायन विज्ञान**

**MAXIMUM MARKS : 100 (60+40)**  
**TOTAL CREDITS : 04**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

**AIMS**

This course is designed with the aim to provide knowledge of subject to the students and develop understanding of Analytical concepts of Chemistry.

**OBJECTIVES**

- To give an understanding about the Basic concepts of subject.
- To provide guidance to students for better understanding of key concepts, thoughts, theories and practical.
- Expansion of knowledge from learning to applicability as well as understanding of the subject.
- To develop broad thinking and awareness about the necessary concepts, system and terminologies.

**TEACHING METHODOLOGY**

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration, Modern Strategies and laboratory work.
- The Teaching Methodology for the present course would include Lecture cum Discussion, demonstration and practical work. Teaching will be Bilingual.

**COURSE LEARNING OUTCOMES (CLO)**

By the end of this course students will learn the following aspects of Chemistry:

1. Basic concepts of Mathematics for Chemists.
2. Fundamentals of analytical chemistry and steps involved in analysis.
3. Basic knowledge of Computer for chemists.
4. Basic Concepts of Chemical equilibrium.
5. Principal of Chromatography and chromatographic techniques.
6. Various techniques of Spectroscopic Analysis.

UNIT	CONTENTS	DURATION
UNIT I	<p><b>Mathematics for Chemists</b></p> <p>Straight line equation, Logarithmic relations, curve sketching, linear graphs &amp; calculation of slopes. Differentiation, differentiation of functions like <math>K_x</math>, <math>e^x</math>, <math>x^n</math>, <math>\sin x</math>, <math>\log x</math>, maxima &amp; minima, partial differentiation. Integration of some useful relevant functions.</p> <p><b>Computer for Chemists:</b> Introduction to computer, Introduction to operating systems like -DOS, Windows, Linux and Ubuntu.</p> <p><b>Use of computer programs:</b> Running of standard programs &amp; packages such as MS-word, MS-excel, PowerPoint, Execution of linear regression x-y Plot. Use of softwares for drawing structures and molecular formulae.</p>	12 Hours

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	<p>रसायनज्ञों के लिए गणित: सरल रेखा समीकरण, लघुगणकीय सम्बन्ध, वक्र आलेखन, रेखीय ग्राफ व ढाल का परिकलन अवकलन, <math>K_x</math>, <math>e^x</math>, <math>x^n</math>, <math>\sin x</math>, <math>\log x</math>, फलनों के अवकलन, उच्चिष्ठनिम्निष्ठ आंशिक अवकलन कुछ उपयोगी व्युत्पन्न फलनों के समाकलन.</p> <p>रसायनज्ञों के लिए कंप्यूटर: कंप्यूटर का परिचय, डॉस, विंडोज, लिनक्स और उबंटू जैसे ऑपरेटिंग सिस्टम का परिचय कंप्यूटर प्रोग्राम का उपयोग, एमएसवर्ड, एमएस एक्सेल, पावर पॉइंट जैसे मानक प्रोग्राम और पैकेज को चलाना। रेखीय। प्रतिगमन x-y प्लॉट का निष्पादन। संरचनाओं और आणविक सूत्रों के चित्रांकन हेतु सॉफ्टवेयर का उपयोग।</p>	
UNIT II	<p><b>Basic Analytical Chemistry:</b> Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures. Statistical terms: mean, mean deviation, median. standard deviation, Numerical Problems.</p> <p><b>Calculations used in Analytical Chemistry</b>  <b>Some important units of measurements-</b> SI Units, distinction between mass and weight, mole, milli mole and Numerical Problems.  <b>Solution and their Concentrations-</b>Concept of Molarity, molality and normality. Expressing the concentration in parts per million (ppm), parts per billion (ppb), Numerical Problems.  <b>Chemical Stoichiometry-</b> Empirical and Molecular Formulas, Stoichiometric Calculations, Numerical Problems.</p>	12 Hours
	<p><b>आधारभूत विश्लेषणात्मक रसायन:</b> विश्लेषणात्मक रसायन का परिचय और इसकी अंतर्विषयक प्रकृति प्रतिदर्शी (sampling) की अवधारणा विश्लेषणात्मक मापन में यथार्थता (accuracy), परिशुद्धता (precision) और त्रुटि के स्तरों का महत्व। प्रायोगिक डेटा और परिणामों की प्रस्तुति, सार्थक अंकों के दृष्टिकोण से सांख्यिकीय शब्दावली-माध्य, माध्य विचलन, माधिका, मानक विचलन, संख्यात्मक प्रश्न</p> <p><b>विश्लेषणात्मक रसायन में प्रयुक्त गणनाएं</b>  <b>माप की कुछ महत्वपूर्ण इकाइयाँ-</b> SI इकाइयाँ, द्रव्यमान व भार के बीच अंतर, मोल, मिली मोल व संख्यात्मक प्रश्न।  <b>विलयन और उनकी सांद्रता-</b> मोलरता, मोललता और नॉर्मलता की अवधारणा। भाग प्रति मिलियन (ppm), भाग प्रति बिलियन (ppb) में सांद्रता को व्यक्त करना संख्यात्मक प्रश्न।  <b>रासायनिक रससमीकरणमिति-</b> आनुभविक और आणविक सूत्र, रस समीकरणमिति (Stoichiometric) गणना। संख्यात्मक प्रश्न।</p>	
UNIT III	<p><b>Chemical Equilibrium:</b> Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant; Van'tHoff reaction isochore, Van't Hoff reaction isotherm. Le-Chatelier's principle and its applications.</p>	13 Hours

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	<p><b>रासायनिक साम्य:</b> साम्य स्थिरांक एवं मुक्त ऊर्जा, रासायनिक विभव की अवधारणा, रासायनिक साम्य के नियम की ऊष्मागतिक व्युत्पत्ति, रासायनिक साम्य की ताप पर निर्भरता, वाण्ट हॉफ अभिक्रिया समआयतनिक, वाण्टहॉफ अभिक्रिया समतापी, ले-चेटेलियर का सिद्धांत और उसके अनुप्रयोग।</p>	
UNIT IV	<p><b>Chromatography</b>          Introduction, Principle and Classification. Mechanism of separation: adsorption, partition &amp; ion-exchange.          Development of chromatograms: frontal. elution and displacement methods.          Paper Chromatography (ascending, descending and circular), Thin Layer Chromatography (TLC) and Column Chromatography (CC), Gas Chromatography (GC) and High Pressure Liquid Chromatography (HPLC), types of column and column selection, applications, limitations.  <b>Principle and Applications of:</b>          1. Flash chromatography,          2. Ion-exchange chromatography and          3. Chiral chromatography.</p>	13 Hours
	<p><b>वर्णलेखिकी (क्रोमैटोग्राफी)</b>          परिचय, सिद्धांत और वर्गीकरण पृथक्करण की क्रियाविधि: अधिशोषण, वितरण, आयन-विनिमय।          क्रोमैटोग्राम का विकास: अग्र-भाग, निक्षालन और विस्थापन की विधियाँ। कागज़ वर्णलेखिकी (आरोही, अवरोही और गोलाकार), पतली परत वर्णलेखिकी (TLC) एवं कॉलम वर्णलेखिकी (CC), गैस वर्णलेखिकी (GC) और उच्च दबाव तरल- वर्णलेखिकी (HPLC), कॉलम के प्रकार एवं कॉलम चयन, अनुप्रयोग, सीमाएं।  <b>सिद्धांत और अनुप्रयोग:</b>          • फ्लैश क्रोमैटोग्राफी          • आयन-विनिमय क्रोमैटोग्राफी          • चिरल क्रोमैटोग्राफी</p>	
UNIT V	<p><b>Spectral techniques of analysis</b>  <b>Basics of absorption spectroscopy:</b> Electromagnetic radiation. Spectral range. Absorbance. Absorptivity, Molar Absorptivity, Fundamental Laws of Absorption. Lambert-Beer Law and its limitations. Constitution &amp; working of photometer, spectrometer, colorimeter.  <b>Ultraviolet (UV) absorption spectroscopy-</b>          Presentation and analysis of UV spectra. Types of electronic transitions, Effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, Hyperchromic and hypochromic shifts. UV spectra of conjugated polyenes and enones.  <b>Infra-red (IR) absorption spectroscopy-</b>          Molecular vibrations. Hooke's law, selection rules, intensity and position of IR bands, Measurement of IR spectrum, finger print region. characteristic absorption of various functional groups and interpretation of IR spectra of simple organic compounds.</p>	14 Hours

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विश्लेषण की वर्णक्रमीय तकनीक-

अवशोषण स्पेक्ट्रोस्कोपी का आधारभूत परिचय: विद्युत चुम्बकीय विकिरण, स्पेक्ट्रल परास। अवशोषण, अवशोषकता, आणविक अवशोषकता, अवशोषण के आधारभूत नियम, लैम्बर्ट बीयर नियम व इसकी सीमाएं। फोटोमीटर, स्पेक्ट्रोमीटर, वर्णमापी की संरचना एवं कार्य प्रणाली।

पराबैंगनी (UV) अवशोषण स्पेक्ट्रोस्कोपी-

UV स्पेक्ट्रा की प्रस्तुति और विश्लेषण, इलेक्ट्रॉनिक संक्रमण के प्रकार, संयुग्मन का प्रभाव। क्रोमोफोर और ऑक्सोक्रोम की अवधारणा वर्णोत्कर्ष (वैद्युतक्रोमिक), वर्णापकर्ष (हिप्सोक्रोमिक), वर्णातिशयी (हाइपरक्रोमिक) और वर्णापशयी (हाइपोक्रोमिक) विस्थापन (शिफ्ट)। संयुग्मित पोलिन्स और एनोन का पराबैंगनी वर्णक्रम (UV स्पेक्ट्रा)।

अवरक्त (इन्फ्रा-रेड) अवशोषण स्पेक्ट्रोस्कोपी-

आणविक कंपन, हुक का नियम, वरण नियम, अवरक्त बैंड की तीव्रता और स्थिति, अवरक्त। स्पेक्ट्रम का मापन, फिंगर प्रिंट क्षेत्र विभिन्न क्रियात्मक समूहों का अभिलाक्षणिक अवशोषण और सरल कार्बनिक यौगिकों के अवरक्त स्पेक्ट्रा की व्याख्या।

#### TEXT BOOKS, REFERENCE BOOKS, OTHER RESOURCES

अनुशंसित सहायक पुस्तकें /ग्रन्थ/अन्य पाठ्य संसाधन/पाठ्य सामग्री:

1. कौर, एस., कंप्यूटर फॉर केमिस्ट, नील कमल प्रकाशन, 2017
2. खोपकर, एस.एम. विश्लेषणात्मक रसायन विज्ञान की मूल अवधारणाएँ। न्यू एज, इंटरनेशनल पब्लिशर, 2009
3. कौर एच, विश्लेषणात्मक रसायन विज्ञान, प्रगति प्रकाशन (2008)
4. गुप्ता, अलका एल., एनालिटिकल केमिस्ट्री, प्रगति प्रकाशन (2020)
5. बहल, ए. और बहल, बी.एस. उन्नत कार्बनिक रसायन विज्ञान, एस चंद, 2010।
6. कौर एच, रासायनिक विश्लेषण के वाद्य तरीके, प्रगति प्रकाशन, 2018
7. शर्मा बी.के., क्रोमेटोग्राफी, कृष्ण प्रकाशन, 2019।
8. शर्मा वाई.आर., प्राथमिक कार्बनिक स्पेक्ट्रोस्कोपी, एस चंद, 2013,

हिंदी की प्रकाशित पुस्तकें

9. सिंह, डी. आर., सक्सेना, जी., सिंह, बी., अकार्बनिक रसायन, शिवलाल अग्रवाल एंड कंपनी, आगरा
10. श्रीवास्तव, एस. एस., गहलोत, ए. एस., रसायन विज्ञान, रतन प्रकाशन मंदिर, इंदौर
11. सोनी, पी. एल., कार्बनिक रसायन, सुल्तान चंद एंड संस, दिल्ली
12. सिंह, आर. पी., आधुनिक रसायन, साहित्य भवन, आगरा
13. अग्रिहोत्री, पी.के., साहू, डी
14. पी., पिल्लई, ए., साहू, एम., युगबोध रसायन, युगबोध प्रकाशन, रायपुर

सन्दर्भपुस्तकें:

1. मित्रा सुरभि, हैंडबुक ऑफ कंप्यूटर साइंस एंड आईटी, अरिहंत, 2018
2. हेरिस, डी.सी. मात्रात्मक रासायनिक विश्लेषण। छठा संस्करण, फ्रीमन (2007)

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RECOMMENDED DIGITAL PLATFORM, WEBLINKS

(all URLs accessed in May 2021)

- MOOC: <https://alison.com/course/fundamentals-of-chemistry>
- NPTEL: <https://nptel.ac.in/courses/104/106/104106119/> ;  
<https://nptel.ac.in/courses/104/101/104101121/>
- MIT: <https://ocw.mit.edu/courses/chemistry/5-12-organic-chemistry-i-spring-2005/syllabus/>

GUIDELINES & RULES FOR STUDENTS

- The students are expected to follow the following rules for deriving maximum benefits of the course
- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities
- Take responsibility of your own work Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the students.

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Syllabus – B.Sc. Ist Year – Academic Session 2023-24

(Under NEP 2020 & As per Ordinance 14A)

## SEMESTER II

SUBJECT – CHEMISTRY-II [MAJOR-2]

COURSE: BSCM102CHP – CHEMISTRY PRACTICAL

[Analytical Processes and Techniques]

प्रायोगिक : विश्लेषण प्रक्रियाएं और तकनीक

MAXIMUM MARKS : 100 (60+40)

TOTAL CREDITS : 02

MINIMUM MARKS : (21+14)

TOTAL HOURS : 64

S.No.	PRACTICAL	Duration
1	<b>Basic analytical exercises</b> <ul style="list-style-type: none"> <li>Calibration of different weights and glass apparatus (measuring cylinder, burette, pipette, volumetric flasks).</li> <li>Preparation of solutions of different molarity/normality by weighing and dilution.</li> </ul>	14 Hours
	<b>आधारभूत विश्लेषणात्मक अभ्यास</b> <ul style="list-style-type: none"> <li>विभिन्न भारों और कांच के उपकरणों (मापक सिलेंडर ब्यूरेट, पिपेट, आयतनात्मक फ्लास्क) का प्रमाणीकरण विभिन्न मोलरता / नॉर्मलता का विलयन तौल तनुकरण द्वारा बनाना</li> <li>औद्योगिक भ्रमण</li> </ul>	
2	<b>Quantitative Analysis</b> <ul style="list-style-type: none"> <li><b>Titrimetric Analysis</b></li> <li>Standardization of NaOH with Oxalic acid.</li> <li>Determination of carbonate and hydroxide present in mixture.</li> <li>Determination of carbonate and bicarbonate present in a mixture.</li> <li>Determination of free alkali present in different soaps/detergents.</li> </ul>	14 Hours
	<b>आयतनात्मक विश्लेषण</b> <ul style="list-style-type: none"> <li>ऑक्सैलिक अम्ल के द्वारा NaOH का मानकीकरण।</li> <li>मिश्रण में उपस्थित कार्बोनेट और हाइड्रॉक्साइड का निर्धारण</li> <li>मिश्रण में उपस्थित कार्बोनेट और बाइकार्बोनेट का निर्धारण विभिन्न साबुनों / अपमार्जकों में उपस्थित मुक्त क्षार का निर्धारण</li> </ul>	
3	Quantitative Analysis by Colorimetry	





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	<ul style="list-style-type: none"> <li>• Verification of Lambert-Beer Law</li> <li>• Determination of concentration of coloured compounds (e.g., <math>\text{CuSO}_4</math>, <math>\text{KMnO}_4</math>).</li> </ul>	12 Hours
	<b>वर्णमिति द्वारा मात्रात्मक विश्लेषण</b> <ul style="list-style-type: none"> <li>• लैम्बर्ट-बीयर नियम का सत्यापन</li> <li>• रंगीन यौगिकों की सांद्रता का निर्धारण (जैसे- <math>\text{CuSO}_4</math>, <math>\text{KMnO}_4</math>)</li> </ul>	
4	<b>Qualitative Analysis</b> <ul style="list-style-type: none"> <li>• Systematic identification of organic compound by qualitative analysis.</li> <li>• <b>Chromatography:</b> Identification by determination of the <math>R_f</math> values of the given organic/inorganic compounds by paper/thin layer chromatography.</li> </ul>	12Hours
	<b>गुणात्मक विश्लेषण</b> <ul style="list-style-type: none"> <li>• गुणात्मक विश्लेषण द्वारा कार्बनिक यौगिकों की क्रमबद्ध पहचान</li> <li>• वर्णलेखिकी: पेपरवर्णलेखिकी / पतली परत वर्णलेखिकी द्वारा <math>R_f</math> मान ज्ञात करना व दिए गए कार्बनिक / अकार्बनिक यौगिकों की पहचान</li> </ul>	
5	<ul style="list-style-type: none"> <li>• Industrial visit.</li> <li>• औद्योगिक भ्रमण</li> </ul>	12 Hours

02/06/23

Vishay Ray

Signature

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Signature

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Syllabus – B.Sc. I st Year – Academic Session 2023-24  
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**SEMESTER II**  
**SUBJECT – BOTANY (MINOR)**  
**COURSE : BSCM202BTT- BASIC BOTANY II**

वनस्पति शास्त्र  
 आधारभूत वनस्पति शास्त्र

**MAXIMUM MARKS : 100 (60+40)**  
**TOTAL CREDITS : 04**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

**AIMS**

This course is designed with the aim to provide knowledge of botany to the students and develop understanding of basic concepts of Botany.

**OBJECTIVES**

- To give an understanding about the basic concepts of Botany.
- To provide guidance to students for better understanding of concepts, thoughts and theories with practical.
- Expansion of knowledge from learning to applicability as well as understanding and identifying applied botany.
- To develop broad thinking and awareness about the necessary concepts and terminologies.

**TEACHING METHODOLOGY**

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture, practical and observational. Teaching will be Bilingual.

**COURSE LEARNING OUTCOMES (CLO)**

1. Student will understand the role and significance of botany.
2. They will learn the basic aspects of applied botany.
3. They will gain knowledge about employment opportunities in field of botany.
4. They will learn about opportunities social services.
5. They will gain knowledge about best practices.

UNIT	CONTENTS	DURATION
UNIT I	1. Pteridophytes <ol style="list-style-type: none"> <li>1.1 General Characters of Pteridophytes, Classification of Pteridophytes.</li> <li>1.2 Difference between Pteridophytes and Bryophytes, Resemblances of Pteridophytes and Bryophytes.</li> <li>1.3 Gametophyte, Embryo and Alteration of Generation.</li> <li>1.4 Stelar Organization in Pteridophytes.</li> </ol>	14 Hours
	1. टेरिडोफाइट्स <ol style="list-style-type: none"> <li>1 टेरिडोफाइट्स के सामान्य लक्षण एवं वर्गीकरण।</li> <li>2 टेरिडोफाइट्स एवं ब्रायोफाइट्स में अंतर एवं समानता।</li> <li>3 युग्मकोद्भिद् भ्रूण एवं पीढियों का एकान्तरण।</li> </ol>	





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	2 टेरिडोफाइट के रभीय तन्त्र – 1 टेरिडोफाइट के विभिन्न प्रकार के रंभ। 2 टेरिडोफाइट के आर्थिक महत्व। 3 विषम बीजाणुकता एवं बीज स्वभाव की उत्पत्ति।	
UNIT II	1. Gymnosperm Plants – 1.1 General Characters of Gymnosperm and Classification. 1.2 Difference between Gymnosperm and Pteridophytes and Resemblance between them. 1.3 Distribution of Gymnosperms in India. 1.4 Economic Importance of Gymnosperms.	14 Hours
	1 अनावृतबीजी पादप 1 अनावृतबीजी का वर्गीकरण एवं सामान्य लक्षण। 2 अनावृतबीजी और टेरिडोफाइट में अन्तर एवं समानता। 3 भारत में अनावृतबीजी का वितरण। 4 अनावृतबीजीयों का आर्थिक महत्व।	
UNIT III	1. Paleobotany- 1.1 Indian Contribution in Paleobotany. 1.2 Types of Fossils, Fossilization process 1.3 Brief knowledge of Fossils and Geological time scale.	12 Hours
	1 जीवाश्म वनस्पति विज्ञान (पुरावानस्पतिकी) 1 पुरावानस्पतिकी में भारतीयों का योगदान 2 जीवाश्मों के प्रकार और जीवाश्मीभवन की प्रक्रिया 3 जीवाश्मों का संक्षिप्त ज्ञान और भूवैज्ञानिक समय सारणी	
UNIT IV	1. Fungi 1.1 General Characters of Fungi and Cell Wall Composition. 1.2 Mode of Nutrition. 1.3 Types of Reproduction. 1.4 Economic Importance 1.5 Parasexuality and Mycorrhiza. 2. Lichens: Brief knowledge and their significance.	12 Hours
	1 ऊतक – 1 सामान्य विशेषताएं 2 कोशिका भित्ति की संरचना और पोषण का तरीका 3 प्रजनन के प्रकार 4 आर्थिक महत्व 5 पैरासेक्सुअलिटी, कवकमूल 2 लाइकेन और उनके महत्व का संक्षिप्त ज्ञान	
UNIT V	1. Microbes 1.1 Brief outline of various types of Microbes. 1.2 Archaeobacteria, Eubacteria, Cynobacteria, Mycoplasma, Actinomycetes and Virus. 1.3 Beneficial and harmful effects.	12 Hours

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	<p><b>सूक्ष्मजीव –</b></p> <p>1.4 संक्षिप्त रूपरेखा</p> <p>1.5 सूक्ष्मजीवों के प्रकार, आर्किबैक्टीरिया यूबैक्टेरिया, साइनोवैक्टीरिया, साइनोवैक्टीरिया, माइकोप्लाज्मा, एक्टिनोमाइसेटीस और विषाणु।</p> <p>1.6 लाभकारी और हानिकारक भूमिकाएँ</p>	
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संदर्भ ग्रंथ –

1. ओलाडेल ओगनमेटन, Microbial Diversity: Form and Function in Prokaryotes, बिले ब्लैकबेल, अमरीका 2008
2. पेलजार, एम.जे. एट अल, माइक्रोबायोलॉजी, टाटा मेकग्रा हिल कंपनी, नई दिल्ली
3. प्रेस्कॉट, एल हार्ले, जे.और क्लिन, डी. माइक्रोबायोलॉजी, टाटा मेकग्रा हिल, नई दिल्ली
4. फिट्सएचएफ.ई. The Structure & Reproduction of Algae, Vol I & II, कैब्रिज यूनिवर्सिटी प्रेस, कैब्रिज, यू.के
5. स्मिथ, जी.एम. Cryptogamic Botany, Vol.I Algae, Fungi, & Lichens मैकग्रा हि

#### SUGGESTED READINGS: -

1. Oladele Ogunseitan, Microbial Diversity: Form and Function in Prokaryotic, Willey Blackwell, 2008.
2. Plezar, M.J. et. al., Microbiology, Tata McGraw-Hill Co, New Delhi, 5<sup>th</sup> edition, 2001.
3. Prescott, L. Harley, J. and Klein, D. Microbiology, Tata McGraw Hill Co. New Delhi 6<sup>th</sup> Edition, 2005.
4. Fritsch F.E. The Structure and Reproduction of Algae, Vol. I & Vol. II., Cambridge University.

#### GUIDELINES & RULES FOR STUDENTS

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- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities
- Take responsibility of your own work Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the students.

*(Signatures of faculty members)*





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**SEMESTER II**

**SUBJECT – BOTANY II (MINOR)**  
**COURSE : BSCM202BTP - BOTANY PRACTICAL**

**वनस्पति शास्त्र II**  
**प्रायोगिक वनस्पतिशास्त्र**

**MAXIMUM MARKS : 100 (60+40)**  
**TOTAL CREDITS : 02**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

S.No.	PRACTICAL	Duration
1	कुछ टेरिडोफाइट का अध्ययन जैसे लाइकोपोडियम सिलेजिनेला मार्सेलिया और किसी भी एक फर्न का अध्ययन।  Study of some Pteridophytes like Lycopodium, Sellaginella, and study any one of Fern.	10 Hours
2	टेरिडोफाइट्स और जिम्नोस्पर्म : तना जड़ और पत्तियों का अनुप्रस्थ काट का अध्ययन।  Section cutting of Pteridophytes and Gymnosperms: Stem, Root and Leaves.	10 Hours
3	टेरिडोफाइट्स और जिम्नोस्पर्म के शंकु का अध्ययन।  Specimen study of Pteridophytes and Gymnosperms Cones.	10 Hours
4	कवकीय संरचनाओं का अध्ययन और अस्थायी स्लाइड का अध्ययन : राइजोपस यीस्ट एस्पेरजिलस अल्बूगो।  Study of Fungal Structures and preparation of temporary mounts of Rhizopus, Aspergillus, Yeast and Albugo.	10 Hours
5	पोषक पर पकसीनिया की स्थायी स्लाइड का अध्ययन।  Permanent slides of Puccinia on host.	8 Hours
6	विभिन्न कवकीय पौधों के रोगों का अध्ययन।  Study of various fungal plant disease.	8 Hours
7	पौधों पर विषाणु जीवाणु के लक्षणों का अवलोकन।  Observation of symptoms of virus and bacteria on plants.	8 Hours

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## SEMESTER II

SUBJECT – ZOOLOGY (MINOR)

प्राणिशास्त्र

COURSE : - Cell Biology, Reproductive Biology and Development Biology II

MAXIMUM MARKS : 100 (60+40)  
 TOTAL CREDITS : 04

MINIMUM MARKS : (21+14)  
 TOTAL HOURS : 64

### AIMS

This course is designed with the aim to provide knowledge of Zoology to the students and develop understanding of basic concepts of Zoology.

### OBJECTIVES

- To give an understanding about the basic concepts of Zoology.
- To provide guidance to students for better understanding of concepts, thoughts and theories with practical.
- Expansion of knowledge from learning to applicability as well as understanding and identifying applied.
- To develop broad thinking and awareness about the necessary concepts and terminologies.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture, practical and observational. Teaching will be Bilingual.

### COURSE LEARNING OUTCOMES (CLO)

- Student will understand the role and significance of Zoology.
- They will learn the basic aspects of applied Zoology.
- They will gain knowledge about employment opportunities in field of Zoology.
- They will learn about opportunities social services.
- They will gain knowledge about best practices.

UNIT	CONTENTS	DURATION
UNIT I	1.1 Define - In Vitro Fertilization (IVF) and Embryo Transfer (ET), Zygote Intra Fallopian Transfer (ZIFT), Intracytoplasmic Sperm Injection (ICSI). 1.2 Placentation- Types, examples and functions. 1.3 Placenta Banking- Placenta preservation benefits.	
	1.1 परिभाषा – इन विट्रो निषेचन (आई व्ही एफ) तथा भ्रूण स्थानांतरण (ई टी) जाइगोट इंटरा फैलोपियन ट्रांसफर (जेड आई एफ टी) इन्ट्रा साइटोप्लाजमिक स्पर्म इंजेक्शन (आई सी एस आई) 1.2 अपरान्यास – प्रकार उदाहरण तथा कार्य। 1.3 प्लेसेन्टा बैंकिंग (अपरा बैंकिंग) अपरा संरक्षण लाभ।	
UNIT II	<b>Developmental Biology</b> 1.1 Fertilization <ul style="list-style-type: none"> <li>Process of Fertilization</li> <li>Significance of Fertilization</li> </ul> 1.2 Embryonic development of frog up to the formation of three germinal layers. <ul style="list-style-type: none"> <li>Early cleavage</li> <li>Morula Stage</li> <li>Blastula Stage</li> <li>Gastrula Stage</li> </ul>	





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	1.3 Fate map construction in frog	
	परिवर्धन जैविकी 1.1 निषेचन <ul style="list-style-type: none"> <li>निषेचन की प्रक्रिया</li> <li>निषेचन का महत्व</li> </ul> 1.2 मेढक का भ्रूणीय परिवर्धन : तीन जर्म लेयर बनने तक <ul style="list-style-type: none"> <li>प्रारम्भिक विदलन</li> <li>मॉरुला अवस्था</li> <li>ब्लास्टुला अवस्था</li> <li>गैस्टुला अवस्था</li> </ul> 1.3 मेढक का नियती मानचित्र (फेटमैप का निर्माण)	
UNIT III	1.1 Metamorphosis of Tadpole Larva. <ul style="list-style-type: none"> <li>Early development to Tadpole.</li> <li>Early aquatic life of Tadpole.</li> <li>Metamorphosis</li> </ul> 1.2 Parthenogenesis <ul style="list-style-type: none"> <li>Natural Parthenogenesis</li> <li>Artificial Parthenogenesis</li> </ul> 1.3 Advantages of Parthenogenesis	
	1.1 टेडपोल लार्वा का कायान्तरण <ul style="list-style-type: none"> <li>भेकशिशु का प्रारम्भिक विकास</li> <li>जलीय जीवन</li> </ul> 1.2 अनिषेक जनन 1.3 पार्थेनोजेनेसिस का लाभ	
UNIT IV	<b>Embryonic Development of Chick</b> 1.1 Structure of Hen's Egg. 1.2 Embryonic Development of chick embryo upto the formation of primitive streak. <ul style="list-style-type: none"> <li>Cleavage</li> <li>Morula Stage</li> <li>Gastrulation</li> </ul> 1.3 Fate map construction in Chick	
	चिक का भ्रूणिकी परिवर्धन 1.1 मुर्गी के अण्डे की संरचना 1.2 आदि रेखा बनने तक चूजे का भ्रूणीय विकास <ul style="list-style-type: none"> <li>विदलन</li> <li>मोरुला</li> </ul>	

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	<ul style="list-style-type: none"> <li>गैस्टुलाभवन</li> </ul>	
UNIT V	1.1 Fate map construction in Chick. 1.2 Extra Embryonic membranes of Chick: Formation and Function. <ul style="list-style-type: none"> <li>Kinds of Embryonic Membranes</li> </ul>	
	1.1 चूजे का नियति मानचित्र का निर्माण 1.2 चूजे की बाह्य गर्भ झिल्लियों का निर्माण एवं कार्य <ul style="list-style-type: none"> <li>भ्रूणियों झिल्लियों के प्रकार</li> </ul>	

**Suggested Reading:**

1. Beffa, MM, Knight J, "Experiments in Practical Development Biology", First edition, Cambridge University Press, 2011.
2. Chaitnaya, KV, "Cell and Molecular Biology": A Lab manual", PHI, 2013.
3. Keller, LR, Evans, JH, Keller, TCS, "Experimental Developmental Biology", Academic Press, 1998.
4. Tigonayat, MM, Trigonayat, K, "A manual of practical Zoology: Biodiversity, Cell Biology, Genetics & Development biology", Scientific publisher. 2019.

*[Handwritten signatures and initials in blue ink]*





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**SEMESTER II**  
**SUBJECT – ZOOLOGY II**  
**COURSE : BSCM202ZLP**

प्राणिशास्त्र प्रायोगिक

Course Name- Cell Biology, Reproductive Biology and Development Biology

MAXIMUM MARKS : 100 (60+40)  
 TOTAL CREDITS : 2

MINIMUM MARKS : (21+14)  
 TOTAL HOURS : 64

S.No.	PRACTICAL	Duration
1	<p>कोशिका विज्ञान से संबंधित स्पाटिंग            अ प्रोकेरियोटिक तथा युकेरियोटिक कोषिका            ब समसूत्री कोषिका विभाजन की अवस्थाएं</p> <p><b>Spotting related to the cytology</b>            a. Prokaryotic and Eukaryotic Cell            b. Stages of Mitotic cell division</p>	12 Hours
2	<p>कोशिका विज्ञान से संबंधित स्पाटिंग            अ अर्द्धसूत्री कोषिका विभाजन की अवस्थाएं            ब लेम्पब्रश गुणसूत्र</p> <p><b>Spotting related to the cytology</b>            a. Stages of Meiotic cell division            b. Lamp brush Chromosome</p>	12 Hours
3	<p>प्रजनन विज्ञान और भ्रूण विज्ञान से संबंधित स्पाटिंग            अ स्तनधारी के वृषण का अनुप्रस्थ काट</p> <p><b>Spotting related to Reproductive biology Embryology</b>            a. T.S. Testis of Mammal</p>	10 Hours
4	<p>प्रजनन विज्ञान और भ्रूण विज्ञान से संबंधित स्पाटिंग            अ स्तनधारी के अंडाशय का अनुप्रस्थ काट</p> <p><b>Spotting related to Reproductive biology Embryology</b>            a. T.S. Ovary of Mammal</p>	10 Hours
5	<p>मेढक के भ्रूणीय विकास की अवस्थाएं</p> <p>Developmental stage of Frog embryology</p>	10 Hours
6	<p>चूजे के भ्रूणीय विकास की अवस्थाएं</p> <p>Developmental stage of Chick embryology</p> <p>• Preparation of E-Content by the students.</p>	10 Hours



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### SEMESTER-II

SUBJECT – CHEMISTRY

COURSE: BSCM202CHT- ANALYTICAL CHEMISTRY-II [MINOR-2]

विश्लेषणात्मक रसायन विज्ञान-II

MAXIMUM MARKS : 100 (60+40)  
 TOTAL CREDITS : 04

MINIMUM MARKS : (21+14)  
 TOTAL HOURS : 64

### AIMS

This course is designed with the aim to provide knowledge of subject to the students and develop understanding of Analytical concepts of Chemistry.

### OBJECTIVES

- To give an understanding about the Basic concepts of subject.
- To provide guidance to students for better understanding of key concepts, thoughts, theories and practical.
- Expansion of knowledge from learning to applicability as well as understanding of the subject.
- To develop broad thinking and awareness about the necessary concepts, system and terminologies.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration, Modern Strategies and laboratory work.
- The Teaching Methodology for the present course would include Lecture cum Discussion, demonstration and practical work. Teaching will be Bilingual.

### COURSE LEARNING OUTCOMES (CLO)

By the end of this course students will learn the following aspects of Chemistry:

1. Basic concepts of Mathematics for Chemists.
2. Fundamentals of analytical chemistry and steps involved in analysis.
7. Basic knowledge of Computer for chemists.
8. Basic Concepts of Chemical equilibrium.
9. Principal of Chromatography and chromatographic techniques.
10. Various techniques of Spectroscopic Analysis.

UNIT	CONTENTS	DURATION
UNIT I	<b>Chromatography</b> Introduction, Principle and Classification. Mechanism of separation: adsorption, partition & ion-exchange. Development of chromatograms: frontal. elution and displacement methods. Paper Chromatography (ascending, descending and circular), Thin Layer Chromatography (TLC) and Column Chromatography (CC), Gas Chromatography (GC) and High Pressure Liquid Chromatography (HPLC), types of column and column selection, applications, limitations.  <b>वर्णलेखिकी (क्रोमैटोग्राफी)</b> परिचय, सिद्धांत और वर्गीकरण पृथक्करण की क्रियाविधि: अधिशोषण, वितरण, आयन-विनिमय।	14 Hours





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	क्रोमैटोग्राम का विकास: अग्र-भाग, निक्षालन और विस्थापन की विधियां। कागज़ वर्णलेखिकी (आरोही, अवरोही और गोलाकार), पतली परत वर्णलेखिकी (TLC) एवं कॉलम वर्णलेखिकी (CC), गैस वर्णलेखिकी (GC) और उच्च दबाव तरल- वर्णलेखिकी (HPLC), कॉलम के प्रकार एवं कॉलम चयन, अनुप्रयोग, सीमाएं।	
<b>UNIT II</b>	<b>Principle and Applications of:</b> Flash chromatography, Ion-exchange chromatography and Chiral chromatography.  <b>सिद्धांत और अनुप्रयोग:</b> • फ्लैश क्रोमैटोग्राफी • आयन-विनिमय क्रोमैटोग्राफी • चिरल क्रोमैटोग्राफी	<b>14 Hours</b>
<b>UNIT III</b>	<b>Spectral techniques of analysis</b> <b>Basics of absorption spectroscopy:</b> Electromagnetic radiation. Spectral range. Absorbance. Absorptivity, Molar Absorptivity, Fundamental Laws of Absorption. Lambert-Beer Law and its limitations. Constitution & working of photometer, spectrometer, colorimeter.  <b>विश्लेषण की वर्णक्रमीय तकनीक</b> <b>अवशोषण स्पेक्ट्रोस्कोपी का आधारभूत परिचय:</b> विद्युत चुम्बकीय विकिरण, स्पेक्ट्रल परास। अवशोषण, अवशोषकता, आणविक अवशोषकता, अवशोषण के आधारभूत नियम, लैम्बर्ट बीयर नियम व इसकी सीमाएं। फोटोमीटर, स्पेक्ट्रोमीटर, वर्णमापी की संरचना एवं कार्य प्रणाली।	<b>14 Hours</b>
<b>UNIT IV</b>	<b>Ultraviolet (UV) absorption spectroscopy-</b> Presentation and analysis of UV spectra. Types of electronic transitions, Effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, Hyperchromic and hypochromic shifts. UV spectra of conjugated polyenes and enones.  <b>पराबैंगनी (UV) अवशोषण स्पेक्ट्रोस्कोपी-</b> UV स्पेक्ट्रा की प्रस्तुति और विश्लेषण, इलेक्ट्रॉनिक संक्रमण के प्रकार, संयुग्मन का प्रभाव। क्रोमोफोर और ऑक्सोक्रोम की अवधारणा वर्णोत्कर्ष (वैथोक्रोमिक), वर्णापकर्ष (हिप्सोक्रोमिक), वर्णातिशयी (हाइपरक्रोमिक) और वर्णापशयी (हाइपोक्रोमिक) विस्थापन (शिफ्ट)। संयुग्मित पोलिन्स और एनोन का पराबैंगनी वर्णक्रम (UV स्पेक्ट्रा)।	<b>14 Hours</b>
<b>UNIT V</b>	<b>Infra-red (IR) absorption spectroscopy-</b> Molecular vibrations. Hooke's law, selection rules, intensity and position of IR bands, Measurement of IR spectrum, finger print region. characteristic absorption of various functional groups and interpretation of IR spectra of simple organic compounds.  <b>अवरक्त (इन्फ्रा-रेड) अवशोषण स्पेक्ट्रोस्कोपी-</b> आणविक कंपन, हुक का नियम, चयन नियम, अवरक्त बैंड की तीव्रता और स्थिति, अवरक्त   स्पेक्ट्रम का मापन, फिंगर प्रिंट क्षेत्र विभिन्न क्रियात्मक समूहों का अभिलाक्षणिक अवशोषण और सरल कार्बनिक यौगिकों के अवरक्त स्पेक्ट्रा की व्याख्या।	<b>14 Hours</b>

TEXT BOOKS, REFERENCE BOOKS, OTHER RESOURCES

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अनुशंसित सहायक पुस्तकें /ग्रन्थ/अन्य पाठ्य संसाधन/पाठ्य सामग्री:

1. गौर, एस., कंप्यूटर फॉर केमिस्ट, नील कमल प्रकाशन, 2017
  2. खोपकर, एस.एम. विश्लेषणात्मक रसायन विज्ञान की मूल अवधारणाएँ। न्यू एज, इंटरनेशनल पब्लिशर, 2009
  3. कौर एच, विश्लेषणात्मक रसायन विज्ञान, प्रगति प्रकाशन (2008)
  4. गुप्ता, अलका एल., एनालिटिकल केमिस्ट्री, प्रगति प्रकाशन (2020)
  5. बहल, ए. और बहल, बी.एस. उन्नत कार्बनिक रसायन विज्ञान, एस चंद, 2010।
  6. कौर एच, रासायनिक विश्लेषण के वाद्य तरीके, प्रगति प्रकाशन, 2018
  7. शर्मा बी.के., क्रोमेटोग्राफी, कृष्ण प्रकाशन, 2019।
  8. शर्मा बाई.आर., प्राथमिक कार्बनिक स्पेक्ट्रोस्कोपी, एस चंद, 2013,
- हिंदी की प्रकाशित पुस्तकें
9. सिंह, डी. आर., सक्सेना, जी., सिंह, बी., अकार्बनिक रसायन, शिवलाल अग्रवाल एंड कंपनी, आगरा
  10. श्रीवास्तव, एस. एस., गहलोत, ए. एस., रसायन विज्ञान, रतन प्रकाशन मंदिर, इंदौर
  11. सोनी, पी. एल., कार्बनिक रसायन, मुल्तान चंद एंड संस, दिल्ली
  12. सिंह, आर. पी., आधुनिक रसायन, साहित्य भवन, आगरा
  13. अग्रिहोत्री, पी.के., साहू, डी
  14. पी., पिल्लई, ए., साहू, एम., युगबोध रसायन, युगबोध प्रकाशन, रायपुर

सन्दर्भपुस्तकें:

1. मित्रा सुरभि, हैंडबुक ऑफ कंप्यूटर साइंस एंड आईटी, अरिहंत, 2018
2. हेरिस, डी.सी. मात्रात्मक रासायनिक विश्लेषण। छठा संस्करण, फ्रीमैन (2007)

FOR STUDENTS

GUIDELINES & RULES

- The students are expected to follow the following rules for deriving maximum benefits of the course
- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities
- Take responsibility of your own work Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the students.

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**SEMESTER II****SUBJECT – CHEMISTRY [MINOR-2]****COURSE: BSCM202CHP – CHEMISTRY PRACTICAL****[Analytical Processes and Techniques-II]****प्रायोगिक : विश्लेषण प्रक्रियाएं और तकनीक-II**

**MAXIMUM MARKS : 100 (60+40)**  
**TOTAL CREDITS : 02**

**MINIMUM MARKS : (21+14)**  
**TOTAL HOURS : 64**

S.No.	PRACTICAL	Duration
1	<b>Quantitative Analysis by Colorimetry</b> <ul style="list-style-type: none"> <li>• Verification of Lambert-Beer Law</li> <li>• Determination of concentration of coloured compounds (e.g., <math>\text{CuSO}_4</math>, <math>\text{KMnO}_4</math>).</li> </ul> <b>वर्णमिति द्वारा मात्रात्मक विश्लेषण</b> <ul style="list-style-type: none"> <li>• लैम्बर्ट-बीयर नियम का सत्यापन</li> <li>• रंगीन यौगिकों की सांद्रता का निर्धारण (जैसे- <math>\text{CuSO}_4</math>, <math>\text{KMnO}_4</math>)</li> </ul>	12 Hours
2	<b>Qualitative Analysis</b> <ul style="list-style-type: none"> <li>• Systematic identification of organic compound by qualitative analysis.</li> <li>• गुणात्मक विश्लेषण द्वारा कार्बनिक यौगिकों की क्रमबद्ध पहचान</li> </ul>	14 Hours
3	<ul style="list-style-type: none"> <li>• <b>Chromatography:</b></li> <li>• Identification by determination of the <math>R_f</math> values of the given organic/inorganic compounds by paper/thin layer chromatography.</li> <li>• वर्णलेखिकी: पेपरवर्णलेखिकी / पतली परत वर्णलेखिकी द्वारा <math>R_f</math> मान ज्ञात करना व दिए गए कार्बनिक / अकार्बनिक यौगिकों की पहचान</li> </ul>	12 Hours
4	<ul style="list-style-type: none"> <li>• Industrial visit.</li> <li>• औद्योगिक भ्रमण</li> </ul>	12 Hours
5	<b>preparation of e-content of practical work and assignment</b> <b>व्यावहारिक कार्य और असाइनमेंट की ई-सामग्री तैयार करना</b>	14 Hours

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## SEMESTER II

SUBJECT – Physical Education

COURSE CODE-GE102PET

COURSE: - Introduction and Concept of Physical Education - II

MAXIMUM MARKS: 100 (60+40)

TOTAL CREDITS: 3

MINIMUM MARKS: 35 (21+14)

TOTAL HOURS: 36

### AIMS

This course aims to provide the students with knowledge of Physical Education and develop an understanding of Basic concepts of the subject.

### OBJECTIVES

- Give students an understanding of the fundamental concepts of physical education.
- To assist students in comprehending Physical Education and Sports.
- To broaden one's thinking and awareness of the concepts of Physical Education and Sports with the objective to become a healthy individual.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture cum Discussion and Demonstration.
- Teaching will be Bilingual.

### COURSE LEARNING OUTCOMES (CLO)

1. Know Physical Education and Sports better and may excel in this area in their personal, social, and professional life.
2. The students will learn about the role of Physical Activity and Sports for Fitness, Health, and Wellness and may adopt them in their lifestyle and society.
3. They will understand the Structure of Physical Education in India and at the international level especially the role of the United Nations International Children's Emergency Fund (UNICEF) concept of "Sports for all."
4. Students will be able to identify the health-related and skill-related components of fitness and will be able to know the benefits of warming and cooling down and develop their concepts regarding nutrition and a balanced diet.
5. This course will help the students to develop awareness regarding sports-related events, persons, and other related areas that will help them in competitive exams like Public Service Commission (PSC) exams.

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**SEMESTER II**

**SUBJECT – Physical Education**

Theory Syllabus – सैधांतिक पाठ्यक्रम

UNIT	CONTENTS	DURATION
UNIT I	<p>Role of UNICEF in the Development of Physical Education and Sports</p> <ul style="list-style-type: none"> <li>○ UNICEF Concept of "Children Rights in Sports Principles."</li> <li>○ UNICEF Concept of "Child Focused Sports for Development"</li> <li>○ UNICEF Concept of "Recreation Kit in a Carton"</li> </ul>	06 Hours
इकाई I	<p>शारीरिक शिक्षा एवम् खेलकूद के विकास में यूनिसेफ की भूमिका</p> <ul style="list-style-type: none"> <li>• यूनिसेफ की परिकल्पना- "चिल्ड्रन राइट्स इन स्पोर्ट्स प्रिंसिपल्स"</li> <li>• यूनिसेफ की परिकल्पना- "चाइल्ड फोकस्ड स्पोर्ट्स फॉर डेवलपमेंट"</li> <li>• यूनिसेफ की परिकल्पना- "रिक्रिएशन किट इन अ कार्टन"</li> </ul>	06 घंटे
Unit II	<p><b>Health-Related and Skill-Related Fitness</b></p> <ul style="list-style-type: none"> <li>• Health-Related Fitness - Meaning, Importance, and Components</li> <li>• Skill-Related Fitness – Meaning, Importance, and Components</li> </ul>	07 Hours
इकाई II	<p>स्वास्थ्य संबंधी एवं कौशल संबंधी फिटनेस</p> <ul style="list-style-type: none"> <li>• स्वास्थ्य संबंधी फिटनेस – अर्थ, महत्व एवं घटक</li> <li>• कौशल संबंधी फिटनेस - अर्थ, महत्व एवं घटक</li> </ul>	07 घंटे
UNIT III	<p>Concept of Nutrition, Nutrients, and Balance Diet</p> <ul style="list-style-type: none"> <li>• Definition of Nutrition and Balanced Diet</li> <li>• Concept of Nutrients and their functions</li> <li>○ Carbohydrate</li> <li>○ Fats</li> <li>○ Protein</li> <li>○ Vitamins</li> <li>○ Minerals</li> </ul>	06 Hours
इकाई III	<p>पोषण, पौष्टिक तत्व एवं संतुलित आहार की अवधारणा</p> <ul style="list-style-type: none"> <li>• पोषण एवम् संतुलित आहार की परिभाषा</li> </ul>	06 घंटे

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**SEMESTER II**

**SUBJECT – Physical Education**

	<ul style="list-style-type: none"> <li>पौष्टिक तत्वों की अवधारणा एवम् कार्य <ul style="list-style-type: none"> <li>कार्बोहायड्रेट</li> <li>वसा</li> <li>प्रोटीन</li> <li>विटामिन</li> <li>खनिज लवण तत्व</li> </ul> </li> </ul>	
Unit IV	<b>Physical Education and Sports Institutions India</b> <ul style="list-style-type: none"> <li>Introduction and Contribution of Physical Education Institutions:</li> <li>Young Men Christian Association college of Physical Education (YMCA)</li> <li>Lakshmibai National College of Physical Education (LNIPE)</li> <li>Sports Authority of India (SAI)</li> <li>Neta Subhash National Institute of Sports (NSNIS)</li> </ul>	07 Hours
इकाई IV	<b>भारतीय शारीरिक शिक्षा एवं खेलकूद संस्थान</b> <ul style="list-style-type: none"> <li>शारीरिक शिक्षा संस्थाओं का परिचय एवं योगदान-</li> <li>यंग मेन क्रिस्चियन एसोसिएशन कॉलेज ऑफ फिजिकल एजुकेशन (YMCA)</li> <li>लक्ष्मीबाई नेशनल इंस्टिट्यूट ऑफ फिजिकल एजुकेशन (LNIPE)</li> <li>भारतीय खेल प्राधिकरण (SAI)</li> <li>नेताजी सुभाष नेशनल इंस्टिट्यूट ऑफ स्पोर्ट्स (NSNIS)</li> </ul>	07 घंटे
Unit V	<b>Sports General Awareness (Self-Learning Mode)</b> <ul style="list-style-type: none"> <li>Sports Personalities (International Renowned athletes / Indian Athletes at International Level)</li> <li>Concept of Indigenous Sports of India – Kabaddi / Kho-Kho</li> </ul>	10 Hours
इकाई V	<b>खेलकूद संबंधित सामान्य ज्ञान</b>	10 घंटे

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**SEMESTER II**

**SUBJECT – Physical Education**

	<ul style="list-style-type: none"> <li>• अंतरराष्ट्रीय खेल विभूतियाँ (अंतरराष्ट्रीय खिलाड़ी एवं अंतरराष्ट्रीय स्तर पर भारतीय खिलाड़ियों का परिचय)</li> <li>• भारत के स्वदेशी खेलों की अवधारणा- कबड्डी, खो-खो</li> </ul>	
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**Suggested Readings:**

- Kamlesh, M.L., "Foundations of Physical Education." New Delhi: Sports Pub. 2013, (3<sup>rd</sup> ed)
- Kamlesh, M.L., "Principles and History of Physical Education." New Delhi: Sports Pub. 2005
- कमलेश, एम्.एल., "शारीरिक शिक्षा के मूल तत्व." नई दिल्ली: स्पोर्ट्स पब्लिकेशन., 2015.
- Singh, Yadvinder., "Sociology in Sports." New Delhi: Sports Pub. 2005
- Pearce Evelyn Clark, "Anatomy and Physiology for Nurses" Calcutta: Oxford University, 1980
- पिअर्स इवलिन क्लार्क, शरीर और शरीर क्रिया विज्ञान, कलकत्ता: ऑक्सफोर्ड यूनिवर्सिटी प्रेस, 1983
- Uppal A.K., "Foundation of Physical Education" Delhi Friends Publication, 1994
- खन्ना, नीरज.बी.; सिंह, सोनाली; मेहरा, नीरज कुमार, "शारीरिक शिक्षा का इतिहास." नई दिल्ली: स्पोर्ट्स पब्लिकेशन., 2019.
- सिंह. भीष्म; मेहरा. साहिल; कुमार, नीरज., "शारीरिक शिक्षा में शारीर रचना और शारीर क्रिया विज्ञान." नई दिल्ली: खेल साहित्य केंद्र. 2019.
- दुबे, अजय; सिंह, नीरज प्रताप., "शारीरिक शिक्षा का इतिहास, सिद्धान्त तथा मूलधार." नई दिल्ली: स्पोर्ट्स पब्लिकेशन. 2019

**2. Suggestive digital platforms web links**

- Getting into the Game- Understanding the Evidence for Child Focused Sports for Development UNICEF Document Pdf
- Children Rights in Sports Principles, UNICEF Document Pdf
- <https://www.healthline.com/health/how-to-check-heart-rate#target-heart-rates>
- Getting into the Game- Understanding the Evidence for Child Focused Sports for Development Unicef Document Pdf
- Children Rights in Sports Principles, UNICEF Document Pdf
- <https://www.unicef.org/supply/media/676/file/recreation-kit-guidance-UNICEF-education-kits-user-handbook.pdf>

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**SEMESTER II**

**SUBJECT – Physical Education**

**COURSE CODE-GE102PEP**

**COURSE: - Introduction and Concept of Physical Education - II**

MAXIMUM MARKS: 100 (60+40)

TOTAL CREDITS: 1

MINIMUM MARKS: 35 (21+14)

TOTAL HOURS: 36

**AIMS**

This course aims to provide the students with knowledge of Physical Education and develop an understanding of Basic practical concepts of Physical Education and sports.

**OBJECTIVES**

- Give students an understanding of the fundamental concepts of physical education.
- To assist students in comprehending practical aspects of Physical Education and Sports.
- To broaden one's thinking and awareness of the concepts of Physical Education and Sports with the objective to become a healthy individual.

**TEACHING METHODOLOGY**

- The Teaching Methodology shall be based on scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture cum Discussion and Demonstration.
- Teaching will be Bilingual.

**COURSE LEARNING OUTCOMES (CLO)**

- Students will be able to measure Heart / Pulse Rate and Blood Pressure.
- Students will be able to measure Body Mass Index (BMI), and Body Fat Percentage which will be useful to individuals and the community for assessment.
- They will learn to conduct recreational activities for the community or can organize play day activities in their institution.
- They will learn any one games/sport that will help them to continue in their life and keep themselves fit, and they will learn knowledge of major games.

Practical Syllabus – प्रायोगिक पाठ्यक्रम

UNIT	CONTENTS	DURATION
UNIT I	<ul style="list-style-type: none"> <li>• Measurement of Heart Rate / Pulse Rate</li> <li>• Measurement of blood pressure</li> <li>• Measurement of Body temperature</li> </ul>	07 Hours
इकाई I	<ul style="list-style-type: none"> <li>• हृदय गति / पल्स दर का मापन</li> </ul>	07 घंटे

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**SEMESTER II**

**SUBJECT – Physical Education**

	<ul style="list-style-type: none"> <li>• रक्तचाप का मापन</li> <li>• शरीर के तापमान का मापन</li> </ul>	07 Hours
Unit II	<ul style="list-style-type: none"> <li>• Calculation of BMI (Body Mass Index)</li> <li>• Calculation of Body fat using a vernier calipers</li> <li>• Calculation of Body Fat using the US Navy method</li> </ul>	07 घंटे
इकाई II	<ul style="list-style-type: none"> <li>• बीएमआई की गणना</li> <li>• अमेरिकी नौसेना पद्धति का उपयोग कर शरीर में वसा की गणना</li> </ul>	07 Hours
UNIT III	<ul style="list-style-type: none"> <li>• Conducting community recreation activities</li> <li>• Organisation of recreational activities / Play Day</li> </ul>	07 घंटे
इकाई III	<ul style="list-style-type: none"> <li>• सामुदायिक मनोरंजन गतिविधियों का आयोजन करना</li> <li>• मनोरंजक गतिविधियों / खेल दिवस का आयोजन</li> </ul>	07 Hours
Unit IV	<ul style="list-style-type: none"> <li>• Visit to Physical Education Dept. Devi Ahilya University, Indore.</li> <li>• Visit to Sports Dept., grounds, and athletic track of Devi Ahilya University, Indore.</li> </ul>	07 घंटे
इकाई IV	<ul style="list-style-type: none"> <li>• शारीरिक शिक्षा विभाग, देवी अहिल्या विश्वविद्यालय, इंदौर का भ्रमण।</li> <li>• देवी अहिल्या विश्वविद्यालय, इंदौर के खेल विभाग, मैदान और एथलेटिक ट्रैक का भ्रमण।</li> </ul>	07 Hours
Unit V	<ul style="list-style-type: none"> <li>• Practice of any one game / Sport as per available facility in the Institution / College as per the list of Association of Indian Universities (AIU): Basic Skills, Basic Rules, and Ground Marking</li> </ul>	07 घंटे
इकाई V	<ul style="list-style-type: none"> <li>• एसोसिएशन ऑफ इंडियन यूनिवर्सिटीज (एआईयू) की सूची के अनुसार संस्थान/कॉलेज में उपलब्ध सुविधा के अनुसार किसी एक खेल/खेल का अभ्यास: बुनियादी कौशल, बुनियादी नियम और ग्राउंड मार्किंग</li> </ul>	07 घंटे

**Suggested Readings:**

- Pearce Evelyn Clark, "Anatomy and Physiology for Nurses" Calcutta: Oxford University, 1980.
- Rana, Naresh., "Complete Book of Badminton." New Delhi, Anmol Pub, 2006.

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## SEMESTER II

### SUBJECT – Physical Education

- शर्मा, ओ.पी., " खेल के मैदानों की माप और निर्माण की विधि." नई दिल्ली, खेल साहित्य केंद्र, 2005.
- सपरा, चारू., " क्रीडा अधि शिक्षा एवम् निर्णयन." नई दिल्ली, स्पोर्ट्स पब्लिकेशन, 2004.
- पिअर्स इवलिन क्लार्क, शरीर और शरीर क्रिया विज्ञान, कलकत्ता: ऑक्सफोर्ड यूनिवर्सिटी प्रेस, 1983

### Suggestive digital platforms web links

- <https://www.healthline.com/health/how-to-check-heart-rate#target-heart-rates>
- <http://www.playday.org.uk/about-playday/whats-playday/>
- [https://www.nhlbi.nih.gov/health/educational/lose\\_wt/BMI/bmicalc.htm](https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm)
- <https://www.wikihow.com/Measure-Body-Fat-Using-the-US-Navy-Method>

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Syllabus – B.H.Sc. Ist Year – Academic Session 2023-24  
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**B.Sc./B.H.Sc SEMESTER II**

**SUBJECT – RURAL DEVELOPMENT AND EXTENSION**

**COURSE TITLE: INTRODUCTION TO EXTENSION AND COMMUNICATION - II**

**COURSE: GE203RDT प्रसार एवं संचार का परिचय - II**

**Theory Syllabus**

**MINIMUM MARKS: (21+14)**

**TOTAL HOURS: 48**

**MAXIMUM MARKS: 100 (60+40)**

**TOTAL CREDITS: 03**

### AIMS

This course is designed with the aim to provide knowledge of subject to the students and develop understanding of Basic concepts of Extension Education and Communication.

### OBJECTIVES

- To give an understanding about the Basic concepts of subject.
- To provide guidance to students for better understanding of key concepts, thoughts, theories & practical.
- Expansion of knowledge from learning to applicability as well as understanding and identifying Communication Process and Extension Education.
- To develop broad thinking and awareness about the necessary concepts, system and terminologies.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration, field work and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture cum Discussion, demonstration, field work, visit at Adopted Villages and practical work. Teaching will be Bilingual.

### COURSE LEARNING OUTCOMES (CLO)

Communication plays key role in Extension Work. This course would empower students to be a good communicator and extension worker. The students will be able to:

- Gain knowledge of need and importance of communication in each and every field of extension.
- Analyse the effective communication and communication media according to requirements.
- Perceive the importance of communication in extension education.
- Acquire knowledge of various teaching materials and their application.

UNIT	CONTENTS	DURATION
UNIT I	<b>Extension Teaching Methods:-</b> <ol style="list-style-type: none"> <li>Extension Teaching Methods- Meaning and Definition               <ol style="list-style-type: none"> <li>Personal Contact Approaches – Home visit, Field visit, Telephone call, Office call, Individual letter etc.</li> <li>Group Contact Approaches – Method demonstration, Result demonstration, Field Days, Group Discussion, Penal Discussion, Workshop, Training, Village Camp etc.</li> <li>Mass Contact Approaches – Printed materials, Fair, Campaign, Camp, Radio, Television and Internet etc.</li> </ol> </li> <li>Selection of Extension Teaching Materials</li> <li>Elements/Factors Affecting Selection of Approaching Methods</li> </ol>	10 Hours

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	<p><b>प्रसार शिक्षण विधियां (संपर्क विधियां)–</b></p> <ol style="list-style-type: none"> <li>1. प्रसार शिक्षण विधियां का अर्थ, परिभाषा            अ. व्यक्तिगत संपर्क विधियां - घर पर संपर्क, खेत पर संपर्क, टेलीफोन कॉल, ऑफीस कॉल, व्यक्तिगत पत्र आदि।            ब. सामूहिक संपर्क विधियां - विधि प्रदर्शन, परिणाम प्रदर्शन, प्रक्षेत्र भ्रमण, समूह चर्चा, पैनल चर्चा, कार्यशाला, प्रशिक्षण, ग्राम शिविर आदि।            स. विराट जनसंपर्क विधियां - छपित एवं मुद्रित सामग्रियां, मेला, अभियान, शिविर, रेडियो, दूरदर्शन व इंटरनेट, इत्यादि।</li> <li>2. प्रसार शिक्षण सामग्रियों का चयन</li> <li>3. संपर्क विधियों के चयन को प्रभावित करने वाले तत्व/कारक</li> </ol>	
<b>UNIT II</b>	<p><b>Principles of Teaching and Learning:</b></p> <ol style="list-style-type: none"> <li>1. Learning: Meaning, Definition, Rules and Process</li> <li>2. Laws of Learning – Law of Readiness, Law of Exercise, Law of Effect, Law of Relations</li> <li>3. Methods of Learning – Learning by Trial and Error, Learning by Observation, Learning by Insight, Learning by Imitation</li> <li>4. Factors Effecting Learning</li> </ol>	
	<p><b>शिक्षण तथा अधिगम के सिद्धांत –</b></p> <ol style="list-style-type: none"> <li>1. अधिगम (सीखने) का अर्थ एवं परिभाषा</li> <li>2. अधिगम (सीखने) के नियम - तत्परता का नियम, अभ्यास का नियम, प्रभाव का नियम संबंध का नियम</li> <li>3. अधिगम (सीखने) की विधियाँ - प्रयास एवं त्रुटि द्वारा सीखना, अवलोकन द्वारा सीखना, अंतर्दृष्टि या सूझ द्वारा सीखना, अनुकरण द्वारा सीखना</li> <li>4. अधिगम (सीखने) को प्रभावित करने वाले कारक</li> </ol>	
<b>UNIT III</b>	<p><b>Communication: Process, Types and Models</b></p> <ol style="list-style-type: none"> <li>1. Communication Process – One way communication and Two way communication</li> <li>2. Models of Communication – Aristotle's model, Shannon-Weaver's model, Berlo's model,</li> <li>3. Types of Communication – Verbal Communication, Non-verbal Communication, Formal Communication, Informal Communication, Intrapersonal, Interpersonal Communication, Group Communication, Social Communication and Mass Communication</li> </ol>	<b>08 Hours</b>
	<p><b>संचार : प्रक्रिया, प्रकार एवं प्रतिमान</b></p> <ol style="list-style-type: none"> <li>1. संचार की प्रक्रिया - एकमार्गीय संचार एवं द्विमार्गीय संचार</li> <li>2. संचार के प्रतिमान (मॉडल) - अरस्तू मॉडल, लासवेल मॉडल, शैनन वीवर मॉडल, बर्लो मॉडल, दहामा मॉडल, डॉ. रणजीत सिंह मॉडल</li> <li>3. संचार के प्रकार - शाब्दिक संचार, अशाब्दिक संचार, औपचारिक संचार, अनौपचारिक संचार, वैयक्तिक संचार, पारस्परिक संचार, सामूहिक संचार, सामाजिक संचार एवं जनसंचार</li> </ol>	

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UNIT IV	<b>Communication Media in Extension:</b> 1. Electronic Media – Meaning, Characteristics, Radio, Television, Film etc., usage in Extension 2. Print Media – Meaning, Characteristics, Newspaper, Magazines etc., usage in Extension 3. Folk Media – Meaning, Characteristics, Major Indian folk forms, their importance and usage in Extension 4. Advantages and Limitations of Communication Media	
	<b>प्रसार में संचार माध्यम—</b> 1. इलेक्ट्रॉनिक माध्यम - अर्थ, विशेषताएँ, रेडियो, टेलीविजन, फिल्म इत्यादि, प्रसार में उपयोग। 2. प्रिंट माध्यम - अर्थ, विशेषताएँ, समाचार-पत्र, पत्रिकाएँ, पुस्तकें इत्यादि, प्रसार में उपयोग। 3. लोक माध्यम - अर्थ, विशेषताएँ, रेडियो, मुख्य भारतीय लोक रूप एवं उनका महत्व, प्रसार में उपयोग। 4. संचार माध्यमों के लाभ एवं सीमाएँ	
UNIT V	<b>Effective Communication</b> 1. Factors related to Effective Communication 2. Functions of Communication 3. Skills for Effective Communication- Dialogue, Listening, Positive Attitude, Body Language etc. 4. Concepts relating to Communication – Perception, Fidelity, Communication Gap	10 Hours
	<b>प्रभावी संचार –</b> 1. प्रभावी संचार से संबंधित कारक 2. संचार के कार्य - सूचना और समाचार देना, निर्देशित करना, शिक्षित करना, मनोरंजन करना, विमर्श और वार्ता, प्रोत्साहन, प्रभाव डालना 3. प्रभावी संचार के लिए कौशल - संवाद, सुनना, सकारात्मक अभिवृत्ति, शारीरिक हाव-भाव इत्यादि 4. संचार से संबंधित अवधारणाएँ - अनुभूति, निष्ठा एवं संचार अंतराल	

**TEXT BOOKS, REFERENCE BOOKS, OTHER RESOURCES**

**REFERENCE BOOKS:**

- 1- Dubey V.K. Extension : Education and Communication, New Age Publication Pvt Ltd., New Delhi, 2008
- 2- Harks J.D. : Mass Communication – An Introduction Survey, Wn. C. Brown Publishers, London, 1990
- 3- Ray, G.L. : Extension Communication Management, Nayar Publication, Calcutta
- 4- हरपालानी बी.डी.: गृह विज्ञान में प्रसार शिक्षा, स्टार पब्लिकेशन, आगरा
- 5- बक्शी बी.के.: प्रसार शिक्षा तकनीक तथा कार्यक्रम, श्री विनोद पुस्तक मंदिर, आगरा
- 6- सिंह बृन्दा, : प्रसार शिक्षा, पंचशील प्रकाशन, जयपुर
- 7- मिश्र विनोद, शुक्ल नरेन्द्र : व्यवसायिक सम्प्रेषण, साहित्य भवन पब्लिकेशन, आगरा
- 8- शॉ गीता पुष्प, शॉ जायस शीला : प्रसार शिक्षा, श्री विनोद पुस्तक मंदिर, आगरा
- 9- श्रीवास्तव जे.पी. : प्रसारिकी, अमन पब्लिशिंग हाउस, मेरठ
- 10- श्रीवास्तव डी.एन.: सतृ शिक्षा एवं संचार, एस बी पी डी पब्लिशिंग हाउस, आगरा

**RECOMMENDED DIGITAL PLATFORM, WEBLINKS**

1. <https://www.everyday41.com/2020/04/drshy-shravy-samamagree-arth-paribhaasha-mahatav-siddhaant.html>
2. <https://www.testsuccesskey.com/2015/01/audio-visual-aids-in-hindi.html>
3. [https://apps.worldagroforestry.org/Units/Library/Books/Book%2006/html/12.3\\_extension\\_methods.htm?n=127](https://apps.worldagroforestry.org/Units/Library/Books/Book%2006/html/12.3_extension_methods.htm?n=127)
4. [https://en.wikipedia.org/wiki/Extension\\_method](https://en.wikipedia.org/wiki/Extension_method)
5. <https://www.topper.com/guides/business-studies/directing/communication/>



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#### GUIDELINES & RULES FOR STUDENTS

- The students are expected to follow the following rules for deriving maximum benefits of the course
- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities
- Take responsibility of your own work Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the students.

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*B.Sc./B.H.Sc SEMESTER II*

**SUBJECT – RURAL DEVELOPMENT AND EXTENSION**

**COURSE TITLE: INTRODUCTION TO EXTENSION AND COMMUNICATION - II**

**COURSE: GE203RDP प्रसार एवं संचार का अनुप्रयोग - II**

**Practical Syllabus**

**MAXIMUM MARKS: 100 (60+40)**

**TOTAL CREDITS: 01**

**MINIMUM MARKS: (21+14)**

**TOTAL HOURS: 32**

S.No.	PRACTICAL	DURATION
1	Interaction with villagers and understand the felt and unfelt need. ग्रामीणों के साथ अंतःक्रिया करना और उनकी आवश्यकताओं को समझना।	5 Hours
2	Preparation of Audio Visual Teaching Aid and its application. दृश्य, श्रव्य, शिक्षण सामग्री को तैयार करना एवं उसका उपयोग करना।	5 Hours
3	ग्रामीण स्थानीय संस्थाओं जैसे- ग्राम पंचायत, आंगनवाडी, विद्यालय इत्यादि का भ्रमण एवं जानकारी एकत्र करना। Visiting Rural Institutions like Gram Panchayat, Anganwadi, School etc. and collecting information.	7 Hours
4	Prepare Radio talk. रेडियो वार्ता करना।	5 Hours
5	Conduct Workshop/Symposium/Panel Discussion कार्यशाला/संगोष्ठी/पैनल चर्चा का संचालन करना।	5 Hours
6	Developing innovative methods and materials for extension projects. प्रसार परियोजनाओं के लिये नवाचारी विधियों और सामग्रियों का विकास करना।	5 Hours



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**SEMESTER II****SUBJECT – FOUNDATION COURSE (ENGLISH)****COURSE : – FC102EGT- ENGLISH LANGUAGE AND INDIAN CULTURE****MAXIMUM MARKS: 50 (30+20)****TOTAL CREDITS: 02****MINIMUM MARKS: (11+7)****TOTAL HOURS: 32****AIMS**

This course is designed with the aim to provide knowledge of subject to the students and develop understanding of Basic concepts of subject.

**OBJECTIVES**

- To give an understanding about the Basic concepts of subject.
- To provide guidance to students for better understanding of key concepts, thoughts and theories.
- Expansion of knowledge from learning and understanding English language.

**TEACHING METHODOLOGY**

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture cum Discussion and demonstration.

**COURSE LEARNING OUTCOMES (CLO)**

Through this course students will be able to:

- Prepare for various competition exams by developing their English language competence.
- Promote their comprehensive skill by being exposed to a variety of texts and their interpretations.
- Build and enhance their vocabulary.
- Develop their communication skills by strengthening grammar and usages.

UNIT	CONTENTS	DURATION
UNIT I	<b>Reading, writing and Interpretation Skills:</b> Where the Mind is Without Fear- Rabindranath Tagore National Education- M.K. Gandhi The Axe- R.K. Narayan The Wonder That Was India- A.L. Basham Preface to Mahabharata- C. Rajagopalachari	8 Hours
UNIT II	<b>Comprehension Skill:</b> Unseen Passage followed by multiple choice questions	6 Hours
UNIT III	<b>Basic Language Skills:</b> Vocabulary Building: Suffix, Prefix, Synonyms, Antonyms, Homophones, Homonyms and One-word substitution	6 Hours
UNIT IV	<b>Basic Grammar:</b> Noun, Pronoun, Adjective, Verb, Adverb, Prepositions, Articles, Time and Tense	6 Hours
UNIT V	<b>Letter Writing:</b> Formal and Informal	6 Hours

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**TEXT BOOKS, REFERENCE BOOKS, OTHER RESOURCES**

**Suggested Readings:**

- Essential English Grammar – Raymond Murphy, Cambridge University Press.
- Practical English Grammar Exercises 1- A.J. Thomson & A.V. Martinet, Oxford India.
- Practical English Usage – Michael Swan, Oxford
- English Grammar in Use – Raymond Murphy, Cambridge University Press.

**RECOMMENDED DIGITAL PLATFORM, WEBLINKS**

**RECOMMENDED ONLINE COURSE**

**GUIDELINES & RULES FOR STUDENTS**

- The students are expected to follow the following rules for deriving maximum benefits of the course
- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities
- Take responsibility of your own work. Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the students.



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Syllabus – B. A./B.H.Sc./B.Com./B.Sc. I Year – Academic Session 2023-24  
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**SEMESTER II**  
**SUBJECT-ABILITY ENHANCEMENT COURSE**

**COURSE CODE- FC104YOT**  
**COURSE: - Yoga Avm Dhyana**  
**Yoga and Meditation**

MAXIMUM MARKS: 50  
 TOTAL CREDITS: 2

MINIMUM MARKS: 17  
 TOTAL HOURS: 30

**AIMS**

This course aims to provide the students with knowledge of the basics of Yoga and Dhyana and develop an understanding of the Basic concepts of the subject.

**OBJECTIVES**

- Give students an understanding of the fundamental concepts of Yoga
- To assist students in comprehending Yoga and Meditation.
- To broaden one's thinking and awareness of the concepts of Yoga and meditation and take care of their own physical, mental, emotional, social, and spiritual health, with the objective to become a healthy individual.

**TEACHING METHODOLOGY**

- The Teaching Methodology shall be based on scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture cum Discussion and Demonstration.
- Teaching will be Bilingual.

**COURSE LEARNING OUTCOMES (CLO)**

1. Know Yoga and Dhyana better and may excel in this area in their personal, social, and professional life.
2. The students will learn about the role of Yoga and Dhyana for Fitness, Health, and Wellness and may adopt them in their lifestyle and society.
3. They will understand the basic concept of yogic postures, yogic breathing, Surya namaskar, and relaxation exercises."
4. Students will be able to understand and identify the basics of pranayama – Anuloma -Vilom, Sheetal, and Bhramari .
5. They will understand the basic concept of yogic meditation, mudra and bandh, and om mediation.

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**SEMESTER II**  
**SUBJECT-ABILITY ENHANCEMENT COURSE**

Theory Syllabus – सैधांतिक पाठ्यक्रम

UNIT	CONTENTS	DURATION
UNIT I	Introduction to Yoga and Yogic Practices: 1. Yoga: Derivation, Definitions, Aims, Objectives, and Misconceptions. 2. Yoga: Its Origin, History, and Development 3. Subjects and regulations to be followed by yoga practitioners 4. Introduction to Yoga Practices 5. Shatkarma: Meaning, purpose, and their importance in Yoga practice 6. Introduction to Yoga Relaxation and Surya Namaskar	10 Hours
इकाई I	योग और योगिक अभ्यासों का परिचय : 1. योग: व्युत्पत्ति, परिभाषाएं, उद्देश्य, उद्देश्य और गलत धारणाएं 2. योग: इसकी उत्पत्ति, इतिहास और विकास 3. योग अभ्यासकर्ताओं द्वारा पालन किए जाने वाले नियम और विनियम 4. योग प्रथाओं का परिचय 5. षट्कर्म: योग साधना में अर्थ, उद्देश्य और उनका महत्व 6. योगिक शिथिलीकरण और सूर्य नमस्कार का परिचय	10 घंटे
UNIT II	Breathing Exercises and Pranayama: 1. Sectional breathing (abdominal, thoracic, and clavicular) 2. Yogic Deep Breathing 3. Concept of Purak, Rechak, and Kumbhak 4. Concept of Bandha and Mudra 5. Anulom Vilom / Nadi Shodhan 6. Sheetli and Bhramari	10 Hours
इकाई II	श्वांस अभ्यास और प्राणायाम : 1. अनुभागीय श्वांस (पेट, थोरेसिक, क्लेवीक्यूलर) 2. योगिक गहरी श्वांस 3. पुरक, रेचक और कुंभक की अवधारणा 4. बंध और मुद्रा की अवधारणा	10 घंटे

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## SEMESTER II

### SUBJECT-ABILITY ENHANCEMENT COURSE

	5. अनुलोम विलोम/नाडी शोधन 6. शीतली एवं भ्रामरी	
UNIT III	Meditation Practice:  1. Recitation of Pranav Mantra 2. Recitation of mantras, invocations, and prayers 3. Difference Silence 4. Breathe Meditation 5. Om Meditation	10 Hours
इकाई III	ध्यान अभ्यास :  1. प्रणव मंत्र का पाठ 2. मंत्रों का पाठ, मंगलाचरण और प्रार्थना 3. अंतर मौन 4. श्वास, ध्यान 5. ओम ध्यान	10 घंटे

### Suggested Readings –

1. Singh S.P. & Yogi Mukesh: "Foundation of Yoga", Standard Publication, New Delhi 2010
2. Swami Dharendra Brahmchari: "Yogasana Vijnana", Dharendra Yoga Publication, New Delhi, 1966
3. Saraswati, Swami Sadananda: "Asana, Pranayama, Mudra, Bandha (APMB)", Yoga Publication Trust, Munger, 2013
4. H.R. Nagendra: "Asana, Pranayama, Mudra, Bandha", Swami Vivekananda Yog Prakashan, Bangalore, 2002
5. Ishwar Bhardwaj, "Saral Yogasana", Satyam Publishing House, New Delhi - 2018

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## SEMESTER II

**SUBJECT-ABILITY ENHANCEMENT COURSE**

**COURSE CODE- FC104YOP**

**COURSE: - Yoga Avm Dhyana  
Yoga and Meditation**

AIMS

This course aims to provide the students with knowledge of the basics of Yoga and Dhyana and develop an understanding of the basic practical concepts of the subject.

## OBJECTIVES

- Give students an understanding of the fundamental concepts of Yoga
- To assist students in comprehending Yoga and Meditation.
- To broaden one's thinking and awareness of the concepts of Yoga and meditation and take care of their own physical, mental, emotional, social, and spiritual health, with the objective to become a healthy individual.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on scientifically proven demonstration and modern technology methods.
- The Teaching Methodology for the present course would include Lecture cum Discussion and Demonstration.
- Teaching will be Bilingual.

**COURSE LEARNING OUTCOMES (CLO)**

1. The students will learn about the role of Yoga and Dhyana for Fitness, Health, and Wellness and may adopt them in their lifestyle and society.
2. They will be able to learn the basic practical concept of yogic postures, yogic breathing, Surya namaskar, and relaxation exercises.
3. Students will be able to learn the basic practical concept of pranayama.
4. They will be able to learn the basic practical concept of Kapalbhathi and Jalneti kriya.
5. Students will be able to learn the basic concept of OM chanting and meditation

### Practical Syllabus – प्रायोगिक पाठ्यक्रम

UNIT	CONTENTS	DURATION
	1. Introduction to Yoga Relaxation 2. Introduction to Yoga Practices 3. Introduction to Surya Namaskar	05 Hours

3. Introduction to Surya Namaskar



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**Kasturbagran Rural Institute**

Kasturbagran, Indore (M.P.) - 452020  
An Autonomous Women's College, Affiliated to Devi Ahilya University, Indore



Syllabus – B. A./B.H.Sc./B.Com./B.Sc. I Year – Academic Session 2023-24  
(Under NEP 2020 & As per Ordinance 14A)

**SEMESTER II**

**SUBJECT-ABILITY ENHANCEMENT COURSE**

	4. Introduction to Yoga Practices Shatkarma: Kapalbhathi, Jalneti.	
इकाई I	1. योग विश्राम का परिचय 2. योगाभ्यास का परिचय 3. सूर्य नमस्कार का परिचय 4. षट्कर्म का परिचय: कपालभाति, जलनेति	05 घंटे
UNIT II	1. Sectional breathing (abdominal, thoracic, and clavicular) 2. Yogic Deep Breathing 3. Concept of Purak, Rechak, and Kumbhak 4. Concept of Bandha and Mudra 5. Anulom Vilom / Nadi Shodhan 6. Sheetli and Bhramari	06Hours
इकाई II	1. अनुभागीय श्वास (पेट, पोरेसिक और क्लैविक्यलर) 2. योगिक गहरी श्वास 3. पुरक, रेचक और कुंभक की अवधारणा 4. बंध और मुद्रा की अवधारणा 5. अनुलोम विलोम/नाडी शोधन 6. शीतली एवं भ्रामरी	06 घंटे
UNIT III	Meditation Practice 1. Breathe Meditation 2. Om Meditation	02 Hours
इकाई III	ध्यान अभ्यास 1. श्वास, ध्यान 2. ओम ध्यान	02 घंटे

**Suggested Readings –**

6. Singh S.P. & Yogi Mukesh: "Foundation of Yoga", Standard Publication, New Delhi 2010
7. Swami Dharendra Brahmchari: "Yogasana Vijnana", Dharendra Yoga Publication, New Delhi, 1966

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# Kasturbagram Rural Institute

Kasturbagram, Indore (M.P.) - 452020

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Syllabus – Generic Elective Year– Academic Session 2023-24  
(Under NEP 2020 & As per Ordinance 14A)

## SEMESTER II

SUBJECT – COMPUTER

COURSE : GE203CPT – COMPUTER FUNDAMENTAL-II

MAXIMUM MARKS : 100 (60+40)  
TOTAL CREDITS : 03

MINIMUM MARKS : (21+14)  
TOTAL HOURS : 36

### AIMS

It focuses on such computer literacy that prepares students for life-long learning of computer concepts and skills. Students discover why computers are essential components in education, business and society in this course.

### OBJECTIVES

- To understand basics of computer and working with OS.
- To develop working skills with productivity tools, graphics designing and Internet.
- To acquire basic programming skills.
- To apply computing in problem solving.

### TEACHING METHODOLOGY

- The Teaching Methodology shall be based on the scientifically proven methods of demonstration and Modern Strategies.
- The Teaching Methodology for the present course would include Lecture cum Discussion and demonstration. Teaching will be Bilingual.
- Provide visuals. Support student understanding with visual examples, instructions, and explanations. Start with lots of scaffolding, and gradually remove it as students' progress.
- Leverage peer-to-peer support. Assign roles to students working in groups. Individual accountability and group rewards can increase success of students with learning disabilities. Prepare students for collaboration by explicitly teaching strategies and language for asking peers for help and offering support.

### COURSE LEARNING OUTCOMES (CLO)

- To understand the fundamentals of computer.
- To use computer in his daily life as well as can do assigned official work with ease.
- Troubleshoot, issues related to working with computer and internet.
- To communicate through internet as well as can use IT for day-to-day work.
- Students will develop skills for productivity software and OS.
- Students will develop interests in using computer for professional work.
- Students will be able to discover their interests in programming.
- Formulate opinions about the impact of computers on society.





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## Kasturbagram Rural Institute



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UNIT	CONTENTS	DURATION
UNIT I	<b>MS Word:</b> MS word Introduction, windows 2007 Interface, Customizing the word Application. Document Views, Creating & Editing Document. Selecting, Deleting, Replacing Text Copying text to another file. Insert. Formatting text and paragraph. Using the Font. Dialog Box, Paragraph Formatting using Bullets and Numbering in Paragraphs, Checking, Spelling, Line spacing, Margins, Space before and after paragraph. Basic Formatting in MS Word 2007 Advanced Formatting, navigating through a Word Document, Performing a mail merge, A Quick Look at Macros Printing Documents, Print Preview.	09 Hours
UNIT II	<b>Excel &amp; Power Point:</b> Excel 2007 Introduction, workbook, Worksheet. formatting in excel MS Power: Introduction Creating a Presentation.	07 Hours
UNIT III	<b>Internet:</b> Introduction to Internet, WWW and Web Browser. Basic of Computer networks. LAN, WAN, Concept of Interest, Applications of Interest: Applications of Interest, connecting to interest. What is ISP: knowing the interest, Basic of Interest connectivity related troubleshooting, Web Browsing software's, Search Engines: Understanding URL; Domain name. IP Address, Using e-governance website.	05 Hours
UNIT IV	<b>Basics of electronic mail:</b> Getting and email account: Sending and receiving emails: Accessing sent emails: Using Emails: Document collaboration: Instant Messaging: Netiquettes (Interest etiquette).	05 Hours
UNIT V	Useful Google tools such as drive, sheet, doc, meet, etc. Firewall, Computer Virus and Anti-Virus Software, Internet Security & Privacy Basics of Electronic Data Interchange (EDI) and electronic payment system (EPS) Types of payment system: Digital Cash, Electronic Cheque. Smart Card Introduction to Digital Signature and Digital Certificate.	09 Hours
<b>Suggested Readings:</b> <ul style="list-style-type: none"> <li>Computer Fundamentals: Concepts, System &amp; Application: Priti Sinha, Pradeep K., Sinha, BPB Publications</li> <li>Fundamentals of Information technology: Alexis Leon &amp; Mathew Leon, Vikas Publication House, New Delhi</li> <li>Fundamentals of Computer, Saurabh Agrawal, SBPD Publishing House, Agra.</li> <li>Fundamentals of computer Science &amp; Information Technology, Gaurav Agrawal, Shiva Prakashan, Indore</li> </ul> <b>Suggested Digital Platforms, Weblinks:</b> <ol style="list-style-type: none"> <li><a href="https://edu.gcfglobal.org/en/computerbasics/">https://edu.gcfglobal.org/en/computerbasics/</a></li> <li><a href="https://edu.gcfglobal.org/en/subjects/office">https://edu.gcfglobal.org/en/subjects/office</a></li> <li><a href="https://vikaspedia.in/education/digital-literacy/it-literacy-courses-in-associating-with-msup/computer-fundamentals">https://vikaspedia.in/education/digital-literacy/it-literacy-courses-in-associating-with-msup/computer-fundamentals</a></li> <li><a href="https://onlinecourses.swayam2.ac.in/nou20_cs03">https://onlinecourses.swayam2.ac.in/nou20_cs03</a></li> <li><a href="https://www.tutorialspoint.com/computer_fundamentals/index.htm">https://www.tutorialspoint.com/computer_fundamentals/index.htm</a></li> <li><a href="https://edu.gcfglobal.org/en/topics/googleapps">https://edu.gcfglobal.org/en/topics/googleapps</a></li> <li><a href="https://onlinecourses.swayam2.ac.in/cec19_cs06/preview">https://onlinecourses.swayam2.ac.in/cec19_cs06/preview</a></li> <li><a href="https://nptel.ac.in/courses/106/106/106106092">https://nptel.ac.in/courses/106/106/106106092</a></li> <li><a href="https://vikaspedia.in/education/digital-literacy/it-literacy-courses-in-associating-with-msup/computer-fundamentals">https://vikaspedia.in/education/digital-literacy/it-literacy-courses-in-associating-with-msup/computer-fundamentals</a></li> </ol>		



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## SEMESTER II

SUBJECT – COMPUTER

COURSE : GE203CPP – COMPUTER FUNDAMENTAL-II

MAXIMUM MARKS : 100 (60+40)

TOTAL CREDITS : 01

MINIMUM MARKS : (21+14)

TOTAL HOURS : 36

TOPIC	DURATION
<ul style="list-style-type: none"> <li>- To create a document and insert header and footer, page title, page numbers.</li> <li>- Insert table, picture, clip art and chart into the document.</li> <li>- To create a document, set the margins, orientation, size, column, water mark, page color and page borders.</li> <li>- Creating editing saving printing, securing &amp; protecting operations of an excel spreadsheets.</li> <li>- To prepare different types of charts in Excel.</li> <li>- To prepare an attendance sheet of 10 students for any 6 subjects of your syllabus. To calculate their total attendance, total percentage of attendance of each student &amp; average of attendance.</li> <li>- Applying themes and layouts to power point slides and inserting pictures, graphics, shapes and table into presentations.</li> <li>- To create a professional slide for presentation in Power Point.</li> <li>- To create power point slide make using transitions and animation. Working with master slides.</li> <li>- To create email account on any email service provider</li> <li>- To Send and Received Mail</li> <li>- Work on google Apps (Google Drive, Google Form, Google sheet, Doc etc.)</li> </ul>	36 Hours

### GUIDELINES & RULES FOR STUDENTS:

- The students are expected to follow the following rules for deriving maximum benefits of the course.
- Don't leave the campus without permission. In case of emergency, written permission from the Course Coordinator is required. Be punctual and attend all sessions, Lectures and other activities.
- Take responsibility of your own work Follow the timetable, home assignments and projects should be submitted within the stipulated time period.
- A minimum of 75% attendance is compulsory for all the Learners.