Ch. Ranbir Singh University, Jind

Scheme of Examination and Syllabus for

Under-Graduate Programme

Subject: Botany

Under Multiple Entry-Exit, Internship and CBCS-LOCF in accordance to NEP-2020w.e.f. 2024-25(in phased manner)

DEPARTMENT OF BOTANY, Ch. Ranbir Singh University, Jind
Scheme of Examination for Under-Graduate Programme
Under Multiple Entry-Exit, Internship and CBCS-LOCF in accordance to NEP-2020 w.e.f. 2024-25
(in phased manner)
Subject: Botany, Scheme-A

SEMESTER-1									
Remarks	**Course**	**Paper(s)**	**Nomenclature of Paper**	**Credits**	**Hours/ Week**	**Internal marks**	**External Marks**	**Total Marks**	**Exam Duration**
Scheme A	**CC-1 4 credit**	**B24-BOT-101**	**Diversity of Microbes, Algae, Fungi and Archegoniates**	**2**	**2**	**15**	**35**	**50**	**3hrs.**
			Practical	**2**	**4**	**15**	**35**	**50**	**4hrs.**
Scheme A	**CC-M1 2credit**	**B24-BOT-103**	**Plant Diversity**	**1**	**1**	**10**	**20**	**30**	**3hrs.**
			Practical	**1**	**2**	**5**	**15**	**20**	**4hrs.**
Scheme A	**MDC-1 3credit**	**B24-BOT-104**	**Fundamentals of Botany**	**2**	**2**	**15**	**35**	**50**	**3hrs.**
			Practical	**1**	**2**	**5**	**20**	**25**	**4hrs.**
Scheme A	**AEC-1 2credit**	**From Available AEC-1 of two credits as per NEP**							
	SEC-1 3credit	**From Available SEC-1of three credits as per NEP**							
	VAC-1 2credit	**From Available VAC-1of two credits as per NEP**							

SEMESTER-2									
Remarks	**Course**	**Paper(s)**	**Nomenclature of Paper**	**Credits**	**Hours/ Week**	**Internal marks**	**External Marks**	**Total Marks**	**Exam Duration**
Scheme A	**CC-2 4credit**	**B24-BOT-201**	**Plant Taxonomy and Ecology**	**2**	**2**	**15**	**35**	**50**	**3 hrs.**
			Practical	**2**	**4**	**15**	**35**	**50**	**4 hrs.**
Scheme A	**CC-M2 2credit**	**B24-BOT-203**	**Plants for Human Welfare**	**1**	**1**	**10**	**20**	**30**	**3hrs.**
			Practical	**1**	**2**	**5**	**15**	**20**	**4hrs.**
Scheme A	**MDC-2 3credit**	**B24-BOT-204**	**Economic Botany**	**2**	**2**	**15**	**35**	**50**	**3hrs.**
			Practical	**1**	**2**	**5**	**20**	**25**	**4hrs.**
Scheme A	**AEC-2 2credit**	**FromAvailable AEC-2 of two creditsasper NEP**							
	SEC-2 3credit	**From Available SEC-2 of three credits as per NEP**							
	VAC-2 2credit	**From Available VAC-2of two credits as per NEP**							
Internship of 4 credits of 4-6weeks duration after 2nd Semester									

Syllabus
Subject: Botany

Session:2024-25			
Part A-Introduction			
Subject	**BOTANY**		
Semester	**1st**		
Name of the Course	**Diversity of Microbes, Algae, Fungi and Archegoniates**		
Course Code	**B24-BOT-101**		
Course Type:(CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	**CC-1**		
Level of the course(As per Annexure-I	100-109		
Pre-requisite for the course(if any)			
Course Learning Outcomes(CLO):	**After completing this course, the learner will be able to:** 1. Students will be able to understand the general characteristics of bacteria, archebacteria, viruses and fungi. 2. Students will develop a conceptual understanding of Phycology. 3. Students will gain knowledge on the concepts of Bryology. 4. Basic understanding of the biology of pteridophytes will be developed by the students. 5* Students will gain the knowledge of practical aspects of microorganisms, algae, fungi, lichens, bryophytes, and pteridophytes.		
Credits	Theory	Practical	Total
	2	2	4
Contact Hours	2	4	6
THEORY			
Max.Marks:50 **Internal Assessment Marks: 15** **End Term Exam Marks: 35**	**Time:3 Hours**		

PRACTICAL

Max.Marks:50 **Internal Assessment Marks: 15** **End Term Exam Marks: 35**	**Time:4Hours**

Part B- Contents of the Course

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit. The candidate will be required to attempt question No.1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	Bacteria: Structure, nutrition, reproduction and economic importance. Viruses: General account of Virus including structure of TMV and Bacteriophages. Algae: General characters and economic importance; Life cycle (excluding development) of *Nostoc* (Cyanophyceae). *Volvox*, (Chlorophyceae), Vaucheria (Xanthophyceae), *Ectocarpus* (Phaeophyceae) and *Polysiphonia* (Rhodophyceae).	08
II	Fungi: General characters and economic importance; Life-history of *Phytophthora, Penicillium* and *Puccinia*. General account of Lichens, types, ecological and economic importance. Bryophytes: General characteristics and economic importance of bryophytes. Life cycle, Alternation of generation, structure and reproduction (excluding development) of Marchantia.	08
III	Pteridophyta: General characters, Ecological and economic importance. Heterospory and seed habit Stelar system, Structure and reproduction (excluding development) of Rhynia and Pteris.	07

IV	**Gymnosperms:** General characteristics, and economic importance Morphology, anatomy and reproduction of *Cycas*, (developmental details not to be included);	07
V*	**Cynobacteria & Algae:** Study of vegetative and reproductive structures of Nostoc, Volvox, Vaucheria, Ectocarpus and Polysiphonia through temporary preparations and permanent slides. **Fungi**: Study of vegetative & reproductive structures of Phytophthora, Mucor, Puccinia, Penicillium; asexual and sexual stages through temporary preparations and permanent slides. **Lichens**: Study of slides/photographs of lichens (crustose, foliose and fruticose). **Marchantia**- Morphology of thallus, V.S. thallus with gemma cup, W.M. gemmae, V.S. antheridiophore, archegoniophore, L.S. sporophyte (temporary/permanent slides). **Funaria**- Morphology, W.M. leaf, rhizoids, operculum, peristome, annulus, spores, slides showing antheridial and archegonial heads, L.S. capsule (temporary /permanent slides). **Equisetum**- Morphology, T.S. internode, L.S. strobilus, T.S. strobilus, W.M. sporangiophore, W.M. spores (wet and dry)(temporary slides); T.S. rhizome (permanent slide). **Pteris**- Morphology, T.S. rachis, V.S. sporophyll, W.M. sporangium, W.M. spores, T.S. rhizome, W.M. prothallus with sex organs and young sporophyte (temporary/permanent slide). **Cycas**- Morphology (coralloid roots, bulbil, leaf, megasporophyll), T.S. coralloid root, T.S. rachis, V.S. leaflet, V.S. microsporophyll, W.M. microspores, L.S. ovule, T.S. root (temporary / permanent slide). **Pinus**- Morphology (long and dwarf shoots, W.M. dwarf shoot, male cones and female cones), W.M. dwarf shoot, T.S. needle, T.S. stem, L.S./T.S. male cone, W.M. microsporophyll, W.M. microspores (temporary slides), L.S. female cone (temporary/ permanent slide). **Excursion Report:** Report on excursion tours with photographs, collection and preservation specimens related to Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms.	60

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory (15 Marks)** • Class Participation: 04 • Seminar/presentation/assignment/quiz/class test etc:04 Marks • Mid-Term Exam:07 Marks	35 Marks
➢ **Practicum (15 Marks)** • Class Participation:05 Marks • Seminar/Demonstration/Viva-voce/Lab records etc.:10 Marks • Mid-Term Exam: Nil	35 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Wiley,J.M.,Sherwood,L.M.andWoolverton,C.J.(2019)Prescott'sMicrobiology.11th Edition.McGraw Hill International.
- Lee,R.E.(2018)Phycology.5thEdition.Cambridge University Press.
- Aluwalia,A.S.(2020).Phycology: Principles, Processes and Applications. Daya Publishing House, New Delhi.
- Dube,H.C.(2012).AnIntroductiontoFungi,VikasPublishingHousePvt.Ltd.,Delhi.4th edition.
- Mehrotra,R.S. and Aggarwal, Ashok (2013) Fundamentals of Plant Pathology,Tata McGraw-Hill Publishing company Ltd, New Delhi
- Pelczar,M.J.(2001)Microbiology,5thedition,TataMcGraw-HillCo,NewDelhi.
- Sethi,I.K.andWalia,S.K.(2011).Textbook of Fungi & Their Allies, MacMillan Publishers Pvt.Ltd., Delhi.
- Raven,P.H.,Johnson,G.B.,Losos,J.B.,Singer,S.R.(2005).Biology.Tata McGraw Hill, Delhi, India.
- Sharma,O.P.(2017).Text Book of Pteridophyta , Mc Millan India Ltd.
- Thakur,A.K.and Bassi,S.K.(2008). Diversity of Microbes and Cryptogams. S.Chand& Co.,Delhi.
- Vanderpoorten,A.&Goffinet,B.(2009) Introduction to Bryophytes. Cambridge University Press.
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010).Pteridophyta,S.Chand.Delhi,India.
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010).Gymnosperms,S.Chand. Delhi,India.
- Pandey,B.P.(2001).A Textbook of Botany-Angiosperms,S.Chand.Delhi,India

Session:2024-25			
Part A-Introduction			
Subject	**BOTANY**		
Semester	**1st**		
Name of the Course	**Plant Diversity**		
Course Code	**B24-BOT-103**		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	**CC-M1**		
Level of the course(As per Annexure-I	100-109		
Pre-requisite for the course(if any)			
Course Learning Outcomes(CLO):	**After completing this course, the learner will be able to:** 1. The general characteristics of microorganisms, algae, fungi, and lichens will be understandable to students 2. Students will acquire a conceptual grasp of bryophytes and pteridophytes. 3. Students will acquire knowledge about the fundamental features of gymnosperms. 4. Students will acquire a foundational understanding of angiosperm morphology. 5*. Student will gain the knowledge about the practical aspects related to identification, structure, economic values of microorganisms, algae, fungi, bryophytes, pteridophytes gymnosperms and angiosperms.		
Credits	Theory	Practical	Total
	1	1	2
ContactHours	1	2	3
THEORY			
Max.Marks:30 **Internal Assessment Marks:10** **End Term Exam Marks: 20**	**Time:3Hours**		
PRACTICAL			
Max.Marks:20 **Internal Assessment Marks: 05** **End Term Exam Marks: 15**	**Time:4Hours**		
Part B- Contents of the Course			

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit. The candidate will be required to attempt question No.1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	General characteristics, morphology and economic importance of viruses, bacteria, algae, fungi and lichens.	4
II	General characteristics, morphology and economic importance of Bryophytes and Pteridophytes.	4
III	General characteristics, morphology and economic importance of Gymnosperms.	4
IV	General characteristics, morphology and economic importance of Angiosperms.	3
V*	• Identification of some common algae and fungi. • Morphological study of some common Bryophytes. • Morphological study of some common Pteridophytes. • Morphological study of some common Gymnosperms. • Morphological study of some common Angiosperms.	30

Suggested Evaluation Methods

Internal Assessment:	**End Term Examination:**
➢ **Theory (10 Marks)** • Class Participation: 4Marks • Seminar/presentation/assignment/quiz/class test etc.: Nil • Mid-TermExam:6 Marks	20 Marks
➢ **Practicum (5 Marks)** • Class Participation: Nil • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: Nil	15 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Wiley,J.M.,Sherwood,L.M.andWoolverton,C.J.(2019)Prescott'sMicrobiology.11th Edition. McGraw Hill International.
- Lee, R.E.(2018)Phycology.5thEdition.Cambridge University Press.
- Ahluwalia,A.S.(2020).Phycology:Principles,Processes and Applications. Daya Publishing House, New Delhi.
- Dube,H.C.(2012).An Introduction to Fungi,Vikas Publishing House Pvt.Ltd., Delhi. 4th edition.
- Mehrotra,R.S.and Aggarwal,Ashok(2013)Fundamentals of Plant Pathology,Tata Mc Graw-Hill Publishing company Ltd, New Delhi
- Pelczar,M.J.(2001)Microbiology,5thedition,TataMcGraw-Hill Co,NewDelhi.
- Sethi,I.K.and Walia,S.K.(2011).Textbook of Fungi &Their Allies, Mac Millan Publishers Pvt. Ltd., Delhi.
- Raven,P.H.,Johnson,G.B.,Losos,J.B.,Singer,S.R.(2005).Biology.TataMcGraw Hill, Delhi, India.
- Sharma, O.P.(2017).Text Book of Pteridophyta, McMillan India Ltd.
- Thakur,A.K.andBassi,S.K.(2008).Diversity of Microbes and Cryptogams.S.Chand & Co., Delhi.
- Vanderpoorten,A.&Goffinet,B.(2009)Introduction to Bryophytes. Cambridge University Press.
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010).Pteridophyta,S.Chand.Delhi, India
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010). Gymnosperms, S.Chand. Delhi, India
- Pandey, B.P.(2001).A Textbook of Botany-Angiosperms, S.Chand. Delhi, India

<table>
<tr><td colspan="4">Session:2024-25</td></tr>
<tr><td colspan="4">Part A–Introduction</td></tr>
<tr><td>Subject</td><td colspan="3">BOTANY</td></tr>
<tr><td>Semester</td><td colspan="3">1st</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Fundamentals of Botany</td></tr>
<tr><td>Course Code</td><td colspan="3">B24-BOT-104</td></tr>
<tr><td>Course Type:
(CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)</td><td colspan="3">MDC-1</td></tr>
<tr><td>Level of the course(As per Annexure-I</td><td colspan="3">100-109</td></tr>
<tr><td>Pre-requisite for the course(if any)</td><td colspan="3"></td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. Students will gain a foundational understanding of the biology of microorganisms, algae, fungi and lichens.
2. Students will develop a conceptual understanding of bryophytes and pteridophytes.
3. Students will acquire knowledge about the fundamental characteristics of gymnosperms and the challenges related to their propagation.
4. Students will acquire a basic understanding of angiosperm morphology.
5*.Students will be able to learn the practical aspects of microorganisms, algae, fungi and students will be able to identify the major groups of plants and compare the characteristics of higher plants(angiosperms and gymnosperms) and lower plants(bryophytes and pteridophytes).</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>2</td><td>1</td><td>3</td></tr>
<tr><td>ContactHours</td><td>2</td><td>2</td><td>4</td></tr>
<tr><td colspan="4">THEORY
Max.Marks:50
Internal Assessment Marks: 15
End Term Exam Marks: 35
Time:3Hours</td></tr>
<tr><td colspan="4">PRACTICAL
Max.Marks:25
Internal Assessment Marks: 05
End Term Exam Marks: 20
Time:4Hours</td></tr>
<tr><td colspan="4">Part B-Contents of the Course</td></tr>
</table>

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit. The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	General characteristics, morphology and economic importance of viruses, bacteria algae, fungi and lichens.	7
II	General characteristics, morphology and economic importance of Bryophytes and Pteridophytes.	7
III	General characteristics, morphology and economic importance Gymnosperms.	8
IV	General characteristics, morphology and economic importance of Angiosperms.	8
V*	• Cynobacteria & Algae: Study of slides of *Nostoc* and *Volvox* Through permanent slides. • *Penicillium*: Asexual stage and sexual structures through permanent slides. • *Agaricus*: Specimens of button stage and full grown mushroom. • *Marchantia* & *Funaria*-morphology of thallus through permanent slides. • *Selaginella* &*Equisetum*-morphology specimen study. • *Cycas* & *Pinus* –morphology specimen study. • Study of vegetative and floral characters of the one or two members of some important families • Excursion Report: Report on excursion tours with photographs,collection, preservation and preparation of herbarium sheets and specimens related to Archegoniates and Angiosperms. Mounting of a collected, properly dried and pressed specimen of minimum 20 wild plants with herbarium label.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory (10 Marks)** • Class Participation: 4Marks • Seminar/presentation/assignment/quiz/class test etc.: Nil • Mid-TermExam:6 Marks ➢ **Practicum (5 Marks)** • Class Participation: Nil • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: Nil	**End Term Examination:** 35 Marks 20 Marks

PartC-LearningResources

RecommendedBooks/e -resources/LMS:

- Wiley,J.M.,Sherwood,L.M.andWoolverton,C.J.(2019)Prescott'sMicrobiology.11thEdition.McGraw HillInternational.
- Lee,R.E.(2018)Phycology.5thEdition.Cambridge UniversityPress.
- Ahluwalia,A.S.(2020).Phycology:Principles,ProcessesandApplications.DayaPublishing House, NewDelhi.
- Dube,H.C.(2012).AnIntroductiontoFungi,VikasPublishingHousePvt.Ltd.,Delhi.4th edition.
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- Pelczar,M.J.(2001)Microbiology,5thedition,TataMcGraw-HillCo,NewDelhi.
- Sethi,I.K.andWalia,S.K.(2011).Textbook of Fungi & Their Allies, MacMillan Publishers Pvt. Ltd., Delhi.
- Raven, P.H., Johnson,G.B.,Losos,J.B.,Singer,S.R. (2005).Biology. Tata McGraw Hill, Delhi, India.
- Sharma,O.P.(2017).Text Book of Pteridophyta, McMillan India Ltd.
- Thakur,A.K.andBassi,S.K.(2008).Diversity of Microbes and Cryptogams.S. Chand & Co.,Delhi.
- Vanderpoorten,A.&Goffinet,B.(2009)Introduction to Bryophytes. Cambridge University Press.
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010).Pteridophyta,S.Chand.Delhi, India
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010). Gymnosperms,S.Chand.Delhi,India
- Pandey, B.P.(2001).A Textbook of Botany-Angiosperms,S.Chand. Delhi, India

SECONDSEMESTER **Session:2024-25**			
Part A- Introduction			
Subject	**BOTANY**		
Semester	**2nd**		
NameoftheCourse	**Plant Taxonomy and Ecology**		
Course Code	**B24-BOT-201**		
CourseType:(CC/ MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	**CC-2**		
Level of the course(As per Annexure-I			
Pre-requisite for the course(if any)			
Course Learning Outcomes(CLO):	**After completing this course, the learner will be able to:** 1. Students will gain knowledge about taxonomy, including the rules of nomenclature and other essential aspects. 2. Students will acquire a conceptual understanding of angiosperm classification systems and the diversity of families within them. 3. Students will gain knowledge about Ecology and Environmental interactions. 4. Students will acquire a conceptual understanding of ecosystem structure, environmental pollution and biodiversity conservation. 5*. Students will gain the knowledge about the diagnostic features, morphology, internal structure, economic value of angiosperms and ecological concepts and biodiversity indices.		
Credits	Theory	Practical	Total
	2	2	4
ContactHours	2	4	6
THEORY			
Max.Marks:50 **Internal Assessment Marks: 15** **End Term Exam Marks: 35**	**Time:3Hours**		
PRACTICAL			
Max.Marks:50 **Internal Assessment Marks:15 End Term Exam Marks: 35**	**Time:4Hours**		
Part B-Contents of the			

Course		
Instructions for Paper-Setter 1. Nine questions will be set in all. All questions will carry equal marks. 2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit . The candidate will be required to attempt question No. 1 and four more questions selecting one question from each unit.		
Unit	**Topics**	**Contact Hours**
I	Botanical nomenclature and major rules of ICBN; Keys to identification of plants. General introduction and importance of herbaria and botanical gardens. Types of inflorescence, flower and parts of flower.	8
II	Artificial, natural and phylogenetic classification systems. Bentham and Hooker system of classification (upto series) Diagnostic features and economic importance of the following families: Brassicaceae, Malvaceae, Euphorbiaceae, Solanaceae and Poaceae	8
III	Ecology: Definition; scope and importance; levels of organization. Environmental factors- climatic factors, edaphic factors, topographic; and Biotic factors. Population Ecology: Basic concept; characteristics; biotic potential, growth curves; ecotypes and ecads.	7
IV	Ecosystem: Structure and functions (trophic levels, food chains, food webs, ecological pyramids and energy flow). Environmental Pollution: Sources, types and control of air and water pollution. Global Change: Greenhouse effect and greenhouse gases; impacts of global warming. Biodiversity: levels, types, significance, threat and conservation.	7

V*	• Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/ hygrometer, rain gauge and lux meter. • Determination of pH, and analysis of two soil samples for carbonates, chlorides and sulphates by rapid field test. • Comparison of bulk density, porosity and rate of infiltration of water in soil of three habitats. • To determine inorganic carbon content of given soil samples. • To determine organic carbon content of given soil samples by acid dilution method. • (a)Study of morphological and anatomical adaptations of hydrophytes and Xerophytes (four each). (b)Study of biotic interactions of the following: Stem parasite (*Cuscuta*), Root parasite (*Orobanche*), Epiphytes (Orchid) and Predation (Insectivorous plants) using museum specimens/live plants. • Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus or nearby fields by species area curve method (species to be listed). • Quantitative analysis of herbaceous vegetation in the college campus or nearby fields for frequency and comparison with Raunkiaer's frequency distribution law. • Study of vegetative and floral characters of the one or two member of each family Brassicaceae, Malvaceae, Euphorbiaceae, Solanaceae and Poaceae (Description, V.S. flower, section of ovary, floral diagrams, floral formula and systematic position according to Bentham &Hooker's system of classification). • Excursion Report: Report on excursion tours with photographs, collection, preservation and preparation of herbarium sheets and specimens related to Angiosperms. Mounting of a collected, properly dried and pressed specimen of minimum 20 wild plants with herbarium label.	60

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory (15)** • Class Participation: 04 • Seminar/presentation/assignment/quiz/classtestetc:04 Marks • Mid-TermExam:07 Marks ➢ **Practicum (15 Marks)** • Class Participation:05 Marks • Seminar/Demonstration/Viva-voce/Labrecordsetc.:10 Marks • Mid-TermExam: Nil	**End Term Examination:** 35 Marks 35 Marks

Part C-Learning Resources

RecommendedBooks/e-resources/LMS:

- Singh,G.(2021).Plant Systematics: An Integrated Approach, CRC Press.
- Sharma,O.P.(2017).Plant Taxonomy, Mc Graw Hill Publication.
- Levetin,E.&McMahon,K.2015.PlantsandSociety,McGraw-HillEducation.7thedition.
- Smith,T.M.&Smith,R.L. 2014.Elementsof Ecology. Pearson. 9th edition.
- Gangulee,DasandDatta (2011).College Botany Volume 1,New Central Book Agency
- Gangulee,DasandDatta (2011).College Botany Volume 2,New Central Book Agency
- Vashishta,P.C.,Sinha,A.K.,Kumar,A.,(2010). Gymnosperms, S.Chand.
- Taylor,E.L.,Taylor,T.N.,Krings,M.(2009).Paleobotany:The Biology and Evolution of Fossil Plants, Academic Press.
- Pandey, B.P.(2001).A Textbook of Botany-Angiosperms, S.Chand.
- Pandey, B.P.(2001).A Textbook of Botany-Angiosperms, S.Chand.
- Chapman,J.L.&Reiss,M.J.1999.Ecology:Principles and Applications.Cambridge University Press.
- Odum E.P. (1971):Fundamentals of Ecology 3rd edition. Saunders College Publishing/Harcourt Brace.

Session:2024-25			
Part A-Introduction			
Subject	**BOTANY**		
Semester	**2nd**		
Name of the Course	**Plants for Human Welfare**		
Course Code	**B24-BOT-203**		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	**CC-M2**		
Pre-requisite for the course (if any)			
Course Learning Outcomes(CLO):	**After completing this course, the learner will be able to**: 1. Students will acquire a foundational understanding of plant diversity 2. Students will develop a conceptual grasp of plants utilized for human welfare. 3. Students will gain knowledge about the origins of certain cultivated plants. 4. Students will acquire a conceptual understanding of the utilization of fruits, nuts, and other plant components for human welfare. 5*. Students will acquire the knowledge about the economic valuable plants and their products.		
Credits	Theory	Practical	Total
	1	1	2
Contact Hours	1	2	3

THEORY

Max.Marks:30
Internal Assessment Marks: 10
End Term Exam Marks: 20

Time:3Hours

PRACTICAL

Max.Marks:20
Internal Assessment Marks: 05
End Term Exam Marks: 15

Time:4Hours

Part B- Contents of the Course

Instructions for Paper-Setter

1. Nine questions will be set in all. All questions will carry equal marks.
2. QuestionNo.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit . The candidate will be required to attempt questionNo.1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	Level of plant diversity, agrodiversity. Values and uses of Biodiversity.	3
II	Role of plants in relation to Human Welfare; Economic and ecological Importance of agro and social forestry. Ornamental plants of India.	4
III	Origin of Cultivated Plants Morphology and economic importance of: Food plants - Cereals (Rice, Wheat and Maize).Pulses -Gram, Arhar and Pea.	4
IV	Fruits and nuts: Important fruit crops and their commercial importance. Spices and condiments. Wood and its uses.	4
V*	• Identification and study of some important medicinal plants. • Identification and study of some common ornamental plants. • Identification and study of some important cereals. • Identification and study of some important pulses. • Identification and study of some important spice yielding plants. • Study of different types of woods. • Study of different fruit types.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory (10 Marks)** • Class Participation: 04Marks • Seminar/presentation/assignment/quiz/class test etc.: Nil • Mid-TermExam:06 Marks ➢ **Practicum (05 Marks)** • Class Participation: Nil • Seminar/Demonstration/Viva-voce/Lab record setc.: 05 Marks • Mid-Term Exam: Nil	**End Term Examination:** 20 Marks 15 Marks

PartC-LearningResources

Recommended Books/e-resources/LMS:

- Singh,V.,Pande,P.C.,Jain,D.K. 2018.Economic Botany, Rastogi Publications.
- Kocchar,S.L.2016.Economic Botany:A Comprehensive Study,5Ed,CambridgeIndia.
- Wickens,G.E.2001.Economic Botany: Principles and Practices, Springer.
- Singh,V.,Pande,P.C.,Jain,D.K. 2018.EconomicBotany,Rastogi Publications.
- Daubenmire,R.F.Plants & Environment (2ndEdn.,)John Wiley & Sons., New York 22
- Odum, E.P. 2005.Fundamentals of Ecology(5ndEdn.,) Saunders &Co., Philadelphia
- S.SundarRajan-2007.CollegeBotanyVol-V,Part1:Taxonomy and Economic Botany Himalaya Publishing House.
- Susil Kumar Mukharjee-2004.College Botany Vol-III. New Central Book agency, London

Session:2024-25			
Part A-Introduction			
Subject	**BOTANY**		
Semester	**2nd**		
Name of the Course	**Economic Botany**		
Course Code	**B24-BOT-204**		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	**MDC-2**		
Level of the course(As per Annexure-I			
Pre-requisite for the course(if any)			
Course Learning Outcomes(CLO):	**After completing this course, the learner will be able to:** 1. Students will gain a foundational understanding of the origins of significant cultivated plants. 2. Students will develop a conceptual understanding of important plants that yield vegetables, fiber, and oil. 3. Students will acquire knowledge about the cultivation techniques of essential plants. 4. Students will gain a conceptual understanding of the processing methods applied to economically significant plants. 5*. Students will be able to gain the knowledge of economic values of cereals, legumes, spices, oil & fibre yielding plants.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
THEORY			
Max.Marks:50 **InternalAssessmentMarks:15** **End Term Exam Marks: 35**	**Time:3Hours**		
PRACTICAL			
Max.Marks:25 **InternalAssessmentMarks:05** **End Term Exam Marks: 20**	**Time:4Hours**		
Part B-Contents of the Course			
Instructions for Paper-Setter			

1. Nine questions will be set in all. All questions will carry equal marks.
2. Question No.1 will be short answer type covering the entire syllabus and will be compulsory. The remaining eight questions will be set unit wise selecting two questions from each unit . The candidate will be required to attempt questionNo.1 and four more questions selecting one question from each unit.

Unit	Topics	Contact Hours
I	Origin of Cultivated Plants Morphology and economic importance of: Food plants - Cereals (Rice, Wheat and Maize).Pulses -Gram, Arhar and Pea.	7
II	Vegetables: Potato, Tomato and Onion. Fibers: Cotton Oils: Mustard and Coconut.	7
III	Morphology and economic importance of the Following: Spices: Black pepper, Coriander, Ginger, Cloves, saffron. Medicinal Plants: *Cinchona*, *Atropa*, Opium, *Cannabis*, Neem.	8
IV	Botanical description and processing of: Beverages: Tea and Coffee. Types of wood.	8
V*	• Study of economically important plants: Wheat, Rice, Maize, Gram, Pea, Arhar, Black pepper, Ginger, Clove, Tea, Coffee, Cotton, Coconut, Mustard and different types of wood. • Collection and preparation of reports on various crops and economically important plants being cultivated/ wildly available in your area.	30

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory (10 Marks)** • Class Participation: 4 Marks • Seminar/presentation/assignment/quiz/class test etc.: Nil • Mid-TermExam:6 Marks ➢ **Practicum (5 Marks)** • Class Participation: Nil • Seminar/Demonstration/Viva-voce/Lab records etc.: 05 Marks • Mid-Term Exam: Nil	**End Term Examination:** 35 Marks 20 Marks

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Singh,V.,Pande,P.C.,Jain,D.K.2018.EconomicBotany, Rastogi Publications.
- Kocchar,S.L.2016.Economic Botany: A Comprehensive Study,5Ed,Cambridge India.
- Wickens,G.E.2001.Economic Botany: Principles and Practices, Springer.
- Singh,V.,Pande,P.C.,Jain,D.K.2018.Economic Botany, Rastogi Publications.
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- S.SundarRajan-2007.CollegeBotanyVol-V,Part1:Taxonomy and Economic Botany Himalaya Publishing House.
- Susil Kumar Mukharjee-2004.CollegeBotanyVol-III. New Central Book agency, London