

संकाय / विषयवार Elective Paper की जानकारी

S.N.	Class	Subject	Elective Paper Name	Elective Paper No.	Elective Paper code	Remark
1	M.Sc. III <sup>rd</sup> Semester	BOTANY	Molecular plant Pathology - I	01		This paper is permitted in our college
2	M.Sc. III <sup>rd</sup> Semester	BOTANY	Limnology - I	02		Not studied
3	M.Sc. III <sup>rd</sup> Semester	BOTANY	Ethnobotany-I	03		Not studied
4	M.Sc. IV Semester	BOTANY	Molecular plant pathology - II	01		This paper studied in our college
5	M.Sc. IV Semester	Botany	Limnology - II	02		Not studied
6	M.Sc. IV Semester	Botany	Ethnobotany-II	03		Not studied
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40/20  
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हस्ताक्षर

**M.Sc. SEMESTER - IV**  
**PAPER - IV**  
**ELECTIVE PAPER-- MOLECULAR PLANT PATHOLOGY**  
**MAX.MARKS-80**

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**UNIT-I**

1. **Epidemiology and disease forecasting:** form of epidemics, factors responsible for the establishment of an epidemic, disease forecasting.
2. **General principles of plant disease control :** General account; Prophylactic. Chemical (including fungicides, systemic fungicides, fumigants, antibiotics, growth regulators etc.) and biological control; Breeding for disease resistance varieties of host plants, Plant quarantine.

**UNIT-II**

1. **Defense Mechanism-** Defense of host against pathogen, Structural defense; Physiological defense, Biochemical defense-role of phenolic compounds; Phytoalexins Defense through hyper-sensitive reactions.
2. **Resistance and susceptibility:** General account, types of resistance, vertical and horizontal resistance; breeding for disease resistance.

**UNIT-III**

1. **Wilt diseases:** General account, systems of diseases, Mechanism of wilting.
2. **Diseases due to fungi:** Rusts, smuts, Downy mildews powdery mildew diseases, Wilts, Leaf blight, Ergots, Tikka, necrosis, Rots-red rot of sugarcane, Damping off and warts diseases of economically important plants.
3. **Diseases due to Bacteria:** Bacterial blight of Rice, Tundu disease, citrus canker, Crown galls of stone fruits, Angular leaf spots.

**UNIT-IV**

1. **Diseases due to Viruses:** Mosaic of tobacco, Potato and tomato, Leaf curl of tomato & papaya, Yellow vein mosaic of Bhindi, Bunchy top of banana, Grassy shoot disease of sugarcane.
2. **Diseases due to Mycoplasma :** Sandal spike, Little leaf of Brinjal, Grassy shoot disease, Sesamum, phyllody, Citrus greening.
3. **Diseases due to Nematodes:** General characteristics of plants nematodes, Root knot, Malaya disease of Barley, wheat, Citrus nematodes, Ear cockle of wheat.

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### SUGGEST READINGS:

1. Plant Pathology - J.C. Walkar
2. Fungi and plant diseases - B.B. Mundkar
3. Plant Pathology – G.N. Agrios
4. Plant Pathology - Wheeler
5. Plant Pathology (Vol.1-3) – Horsfall & Dimon
6. A text book of Modern Plant Pathology – K.S. Bilgrami and H. S.Dubey
7. Plant Pathology – R.S.singh
8. An introduction to Principles of Plant pathology - R.S.singh
9. Plant Disease of Crop plants in India – N.G. Rangaswamy.
10. Plant Pathology problems and progress- Honfall
11. Essentials of Plant Pathology- V.N. Pathak
12. Plant Pathology – Butter and Jones.
13. Plant Pathology- R.S. Malhotra
14. Crop plant Disease Colender- IARI-India.
15. Physiology of Fungus- – K.S. Bilgrami and H. S.Dubey
16. Micro-organisms in laboratory – G.P. Agarwal and S.K. Hasija.
17. Physiology of fungi – V.G.Lily and H.L.. Barnet.
18. Illustrated Genera of Imperfecti fungi- H.L.. Barnet and.B.B. Hunter.
19. Microbiology and Plant Pathology- P.D.Sharma
20. Plant Pathology- P.D.Sharma
21. Microbiology – P.D.Sharma
22. The Fungi – G. Sumbali
23. Fungicides and crop protection- H.G.Mewitt
24. Fungal diseases of plants- B.M. Duggar
25. Plant Pathology – P.C. Trivedi
26. Plant Pathology – G.P. Gupta
27. Virus and Plant diseases S.R.Mishra
28. Bacterial Diseases- V. Kumar
29. Biotechnology and Plant Pathology- V.K.Jain
30. Laboratory manual of Plant Pathology- D.K.Jha.
31. Modern technology of Plant Pathology- V.Suri.

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M.Sc. SEMESTER – IV (Botany)

PAPER – IV

ELECTIVE PAPER-- LIMNOLOGY-II

MAX.MARKS-80

**UNIT-I**

1. Study of Biota

- (a) Phytoplankton flora-classification of phytoplankton, special distribution of phytoplankton, seasonal distribution and species composition of phytoplankton. Algal blooms effects of salinity and climatic stresses on the distribution of phytoplankton, Phytobenthos-classification.
- (b) Phytoplankton and their inter-relationship with Zooplanktons.
- (c) Aquatic insects, birds and their environmental significance.

**UNIT-II**

- 1. Lake Flora-Higher Plants. Categories of aquatic higher plants, zonation of rooted higher plants, some peculiarities of aquatic higher plants.
- 2. Lake Bacteria-occurrence, characteristics and importance.
- 3. Ecological classification of aquatic higher aquatic plants and their significance.
- 4. Biotic relationship and interaction among organisms. Symbiosis, competition among algae, Parasitism of algae, predation of algae, impact of human being on algae.

**UNIT-III**

- 1. Concept of Productivity: Seasonal variation, Primary productivity in freshwater lakes, Estimation of Primary Productivity.
- 2. Bio indicators-Aquatic flora and fauna in relation to water quality in an aquatic environment.
- 3. Use and misuse of inland waters.
- 4. Methods of water quality testing BOD and COD.

**UNIT-IV**

- 1. Sewage-Definition, composition and its treatment.
- 2. Pollution by Domestic and Agriculture sewage, Industrial effluent.
- 3. Causes of pollution of Aquatic Resources, their management and conservation.
- 4. Resource Conservation-Aquatic pollution, control, legislation, regulation on discharge of industrial effluents and domestic wastes in rivers and reservoirs.

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### Suggested Readings:

Anathakrishnan : Bioresources Ecology Goldman: Limnology  
Odum: Ecology  
Pawlosuske : Physico-chemical methods for water Limnology Wetzel :  
Chemical and biological methods for water pollution studies  
Trivedi&Goyal : Chemical and biological methods for water pollution  
studies Welch: Limnology Vols.I-II  
Perkins: Ecology  
Arora : Fundamentals of environmental biology Ghoshe : Toxicology  
Sood : Toxicology

### Suggested laboratory Exercise

1. Sampling of phytoplankton and their qualitative and quantitative analysis.
2. Sampling of periphytes and macrophytes, and their qualitative and quantitative analysis.
3. Sampling of Zooplankton and their qualitative and quantitative analysis.
4. Primary production: Experiment-in-situ by light and dark bottle method.
5. Short-term productivity experiments for the understanding of diel variation in aquatic ecosystems.
6. Analysis of sediments for benthic fauna and flora.

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## Suggested Reading:

1. Adoni, A.D. et al. 1985. Workbook on Limnology. Pratibha Pub. Sagar 216 p.
2. APHA 1981. Standard Methods for the Examination of Water and Waste water. American Public Health Association, Washington.
3. Arber, A. 1920. Water Plants. Cambridge University Press.
4. Barnes, A.K. and K.H. Mann, 1980. Fundamentals of Aquatic Ecosystems. Blackwell Scientific Publication, Oxford.
5. Brown, A.L. 1971. Ecology of Fresh Water. Heinemann, London, 129 p. nd
6. Cole G.A., 1979. Text book of Limnology. 2
7. De, A.K., 1989. Environmental Chemistry. Wiley Eastern Limited, New Delhi.
8. Goldman, C.R. and A.J. Horne, 1983. Limnology. McGraw Hill Inc. Tokyo, 464 p.
9. Golterman H.L., 1975. Physiological Limnology. Elsevier Scientific Publishing Co., Amsterdam, The Netherlands, 489 p.
10. Hutchinson G.E. 1957. A Treatise on Limnology. Vol. I,II,III, John Wiley & Sons, NY.
11. Mackereth, F.J.H., 1963. Some methods of water Analysis for Limnologists. Fresh Water Biological Association. Scientific Publication, No. 21, Ambleside England.
12. Mackereth, F.J.H., J. Heron and J.F. Talling. 1978. Water Analysis : Some Revised Methods for Limnologists. Freshwater Biological Association, Sci. Pub. No. 36.
13. Moss, B., 1980. Ecology of fresh waters. Blackwell Scientific Publications, Oxford, 417 p. rd
14. Odum, E.P. 1971. Fundamentals of Ecology. 3
15. Ruttner, F., 1963. Fundamentals of Limnology, 3 p.
16. Schwoerbel, I. 1987. Handbook of Limnology. Gustav fisher, Verlag.
17. Strickland J.D.H. and T.R. Parson. 1972. A Practical Handbook of Sea Water Analysis. Fisheries Research Board of Canada, Ottawa.
18. Subramanyam, K. 1962. Aquatic Angiosperms C.S.I.R., New Delhi.
19. Welch, P.S. 1935. Limnology. McGraw Hill Co. N.Y., 472 p.
20. Welch, P.S. 1948. Limnological methods. Philadelphia, Blakiston Co. 381p.
21. Wetzel, R.G. 1975. Limnology. W.B. Saunders Co., Phildadelphia, 743 p.

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M.Sc. IV SEMESTER

PAPER -IV

ELECTIVE COURSE – ETHNO BOTANY

MAXIMUM MARKS : 80

**Unit - I**

- Plant Conservation by Tribes & role of Joint Forest Management Programme in Plant Conservation specially People's Protected Area
- Ethnobotany and its role in domestication and conservation of native plant and genetic resources.
- The protection of plant varieties and Intellectual Properties Rights.
- General account of conservation of medicinal plants.
- General role of Aromatic plants.

**Unit-II**

- General ideas of various system of medicine using plants.
- Basic knowledge of Ayurvedic, Homeopathic, Allopathic system of medicine.
- General idea of active principles of Plants.
- Herbal Cosmetics.
- General account of toxic plants and Harmful effect of plants on human society with special reference to allergic plants of Chhattisgarh.

**Unit -III**

- Endemic plants of Chhattisgarh.
- Endangered plants of Chhattisgarh.
- Techniques of cultivation and marketing of Aromatic plants –Podina, Lemon grass Kasturibhindi, Palmarosa.
- Techniques of cultivation ,marketing and importance of mushroom
- Techniques of cultivation, extraction of juice and importance of wheat grass.

**Unit-IV**

- Ethnobotanical study of the following plants with special reference to their medicinal importance-

1. *Allium sativum* (Lahsun) 2. *Aegle marmelos* (Bel) 3. *Terminallia arjuna* (Arjun) 4 *T. bellerica* (Bahera) 5. *T chebula* (Harra) 6. *Calendula officianallis* (Calendula) 7. *Thuja occidentalis* (Vidhya) 8 *Dhatura alba* (Dhatura) 9. *Argemone maxicana* (Pili kateli) 10. *Ephedra* sps. ( Ephedra).

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### Suggested Readings :-

- Baker, H.G. 1978. Plants and Civilization (3<sup>rd</sup> edition). C.A. Wadsworth, Belmont.
- Chandel, K.P.S., Shukla, G. & Sharma, N. 1996. Biodiversity in medicinal and Aromatic Plants in India: Conservation & Utilization. National Bureau of Plant Genetic Resources, New Delhi.
- Chrispeels, M.J. & Sadava, D. 1977. Plants, Food & People. W.H Freeman and Co., San Francisco.
- Ambasta S.P. (ed.) (1986). The Useful Plants of India. Publications & Information Directorate, CSIR, New Delhi India.
- Anon. (1978). The tribes of Madhya Pradesh. Dept. of Tribal Welfare, Govt. of M.P. Bhopal.
- Arnold. J. E. M. & Ruiz Perez, M, (1998). The role of non-timber forest products in conservation and development. In: Wallenberg, Eva. & Andrew Ingles (Eds.) Income from the Forest, CIFOR 1998, Indonesia, pp-17 to 41.
- Asolkar, L.V. (1992). Second Supplement to Glossary of Medicinal Plants, (CSIR) NISCOM, New Delhi, India.
- Bal, S.N. (1984). Catalogue of Medicinal Plant Exhibits. BSI. Bishne Singh Mahendra Pal Singh, Cannought Place, Dehra Dun, India.
- Buch, M.N. (1991). Forest of Madhya Pradesh, Madhya Pradesh Madhyam Bhopal.
- Chopra, R.N.; Badhwar, R.L. & Ghosh, S. (1965). Poisonous Plants of India. Vol. I. 2nd Ed. ICAR, New Delhi, India.
- Cotton C.M, (1996). Ethnobotany: Principals and Applications, John Willey & Sons, Chichester. New York.
- Faulks. P.J. (1958) An Introduction to Ethnobotany: Moredale Publications Ltd. London, England.
- Harshberger, J.W. (1896). Purposes of Ethnobotany Bot. Gaz. 21: 146-154.
- Jain S.K. and Phuipps, R.D. (1991). Medicinal Plants of India Rec. Pub. Algonac USA 2Vols. 1-849.
- Jain, S. K. (1991). Dictionary of India folk medicine and Ethnobotany. Deep publications. NEW DELHI, pp. 1-311.
- Jain, S. K. (1995). In Manual of Ethnobotany (edt. S.K. Jain,) Scientific Pubisher, Jodhpur. 128-134.
- Jain, S.K. & Rao, R.R. (1977). A handbook off field and herbarium methods. New Delhi: Today & Tomorrow's Printers and Publishers.
- Jain, S.K. (1981). Glimpses of Indian Ethnobotany. Oxford & IBH New Delhi, India.
- Jain, S.K. (1989). Methods and Approaches in Ethnobotany. Society of Ethnobotanist. Lucknow.
- Jain, S.K. and Mudgal, Hand Book of Ethanobotany. Bisen pal Singhm Mahendra Pal Singh Publication.
- Vaishnaw T.K. (2004). Chhattisgarh ki Anusuchit Janjatiyan, Adim Jati Anusandhan Avam Prshikshan Sansthan Raipur. Prakashan kramank 2, pp. 1-120
- Varghese, E. S. V D. (1996). Applied Ethnobotany - A case study among the Kharias of Central India. New Delhi. Deep Publications

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- Jajoria, E, V.K. (1998); "The Kamar [A way of life.] Vanya Prakashan., Tribal Research and Development Institute. 35, Shamla Hills, Bhopal., ethnobot. Res.2:303-315.
- Joshi, S.G. (2000). Medicinal Plants, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, India.
- Kirtikar, K. R. & Basu, B.D. (1933-1935). Indian Medicinal plants. Vol.I to VIII (4 Vols. text & 4 vols. plates) Reprint 1994, Dehradun U.P.
- Maheshwari, J.K. Ed. (2000). Ethnobotany and Medicinal Plants of Indian Subcontinent. Scientific Publishers, Jodhpur
- Martin, G.J. (1995). Ethnobotany. Chapman and Hall, London.

### Suggested Laboratory Exercises:-

#### Ethnobotany

1. Description and identification of medicinal plants and its medical properties.
2. Extraction of phytochemicals from various medicinal plants.
3. Preparation medicinal plants herbarium and photographs.
4. Herbal preparation –
  - a. Preparation of digestive powder.
  - b. Mouth freshener of Ajwain.
  - c. Beverage of Tulsi, Bel, Tikhur, Mango.
  - d. Ayurvedic tea preparation.
  - e. Tablet of amla vati.
  - f. Murabba of Awla/Bel.
  - g. Herbal dye
  - h. Shitopladi powder.
5. Identification and study of Ethnobotanical importance of some plants of Raipur.
6. To cultivate at least two medicinal plant in earthen pot.

M.Sc. SEMESTER

- III PAPER - IV

ELECTIVE COURSE-- MOLECULAR PLANT PATHOLOGY-I

MAX.MARKS-80

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**UNIT-I**

1. Introduction and history of plant pathology.
2. General Principles of plant pathology and classification of plant diseases.
3. **Diseases inciting organisms** - Animate Pathogens- fungi, Bacteria, Mycoplasma, Viruses, Nematodes, their general characteristics, heterotrophic behaviour with emphasis on parasitism ability and virulence.

**UNIT-II**

1. **Disease Syndrome and General Symptoms of plant diseases** : Pathogenic and nonpathogenic; Symptoms caused by fungi, Bacteria, Viruses, Mycoplasma and Nematodes.
2. **Sources of Infection** : Seeds, soil, water and airborne diseases of plants; Significance of phyllosphere and rhizosphere studies.
3. **Pathogenesis** - Dissemination of plant pathogens; Mode of infection; Inoculum potential.

**UNIT-III**

1. **Effect of environment on disease development**- Predisposing factors; Survival of fungi; Germination of spores; Disease initiation and Epidemics.
2. **Host Parasites relationship** - Mechanism and physiology of infection, Path of infection, Role of enzymes, growth regulators and toxins in pathogenesis.
3. **Physiological specialization** : General account; Physiological specialization with special reference to smuts and rusts.

**UNIT-IV**

1. **Recurrence of disease** with special reference of recurrence of rust disease in India.
2. **Methods of Studying Plant Diseases**: General account, Macroscopic study, Microscopic study, Koch postulates, Culture technique, Preparation of culture tubes, media preparation, Inoculation, Isolation, Pure culture, Parasitism of obligate parasites, Methods in bacteriology, Techniques required in introductory bacteriology

**Suggested Laboratory Exercises:**

Experiment based on theory syllabus.

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### SUGGESTED READINGS :

1. Plant Pathology - J.C. Walkar
2. Fungi and plant diseases - B.B. Mundkar
3. Plant Pathology – G.N. Agrios
4. Plant Pathology - Wheeler
5. Plant Pathology (Vol.1-3) – Horsfall & Dimon
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10. Plant Pathology problems and progress- Honfall
11. Essentials of Plant Pathology- V.N. Pathak
12. Plant Pathology – Butter and Jones.
13. Plant Pathology- R.S. Malhotra
14. Crop plant Disease Colender- IARI-India.
15. Physiology of Fungus- – K.S. Bilgrami and H. S.Dubey
16. Micro-organisms in laboratory – G.P. Agarwal and S.K. Hasija.
17. Physiology of fungi – V.G.Lily and H.L.. Barnet.
18. Illustrated Genera of Imperfecti fungi- H.L.. Barnet and.B.B. Hunter.
19. Microbiology and Plant Pathology- P.D.Sharma
20. Plant Pathology- P.D.Sharma
21. Microbiology – P.D.Sharma
22. The Fungi – G. Sumbali
23. Fungicides and crop protection- H.G.Mewitt
24. Fungal diseases of plants- B.M. Duggar
25. Plant Pathology – P.C. Trivedi
26. Plant Pathology – G.P. Gupta
27. Virus and Plant diseases S.R.Mishra
28. Bacterial Diseases- V. Kumar
29. Biotechnology and Plant Pathology- V.K.Jain
30. Laboratory manual of Plant Pathology- D.K.Jha.
31. Modern technology of Plant Pathology- V.Suri.

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M.Sc. SEMESTER – III (Botany)  
PAPER – IV  
ELECTIVE COURSE-- LIMNOLOGY-I

MAX. MARKS-80

**UNIT-1**

1. Limnology–Definition, historical development and scope of Limnology.
2. The characteristics of water, Hydrological cycle, Global water balance.
3. Types of fresh water habitats and their ecosystem-  
(a) Ponds, Streams and rivers. (b) Lakes– General characteristics of lakes and classification of lakes. Definition depth of lakes. Retention and replacement of water in lakes, origin of lakes.

**UNIT-II**

1. Morphometry–Use of various morphometric parameters and Zonation. Food Chains, Food webs, Trophic levels and Energy flow in freshwater ecosystems. Eutrophication: Causes, mechanism and significance, Management of freshwater bodies.

**UNIT-III**

Physical Characteristics of Lake water and their role.

1. Light and Temperature-  
(a) Transmission and absorption of Light, Colour and Transparency of light  
(b) Distribution of heat in lakes, Temperature Radiation, Stratification and Heat Budget.  
Comparative analysis of river, reservoir and lakes.
2. Water movements: Flow of water, surface and internal water movements. Turbidity, Salinity and Total Dissolved Solids.

**UNIT-IV**

3. Chemical characteristics of fresh water with special reference to different parameters-Dissolved gases (Oxygen, Carbon di oxide, Hydrogen Sulphide), Seasonal changes in dissolved gases and pH, Hardness, Alkalinity, Sulphates, Nitrogen, Phosphorus, Iron, Sulphur and Silica cycle, Arsenic, and Fluoride.

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### Suggested Readings:

1. Anathakrishnan : Bioresources Ecology
2. Goldman : Limnology
3. Odum : Ecology
4. Pawlosuske : Physico-chemical methods for water Limnology Wetzel : Chemical and biological methods for water pollution studies
5. Trivedi & Goyal : Chemical and biological methods for water pollution studies
6. Welch : Limnology Vols.I-II
7. Perkins : Ecology
8. Arora : Fundamentals of environmental biology
9. Ghoshe : Toxicology
- 10.Sood : Toxicology

### Suggested Laboratory Exercises

1. Construction of morphometric maps of aquatic systems.
2. Measurement of transparency and temperature.
3. Analysis of different dissolved gases: Dissolved oxygen and Carbon dioxide.
4. Analysis of lake water for bicarbonates, carbonates, total alkalinity, chlorides etc.

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M.Sc.(Botany) III SEMESTER

PAPER -IV

Elective Course –Ethno botany

MAX. MARKS: 80

**Unit I**

- Ethno botany : History, general account and its sub disciplines.
- Interdisciplinary approaches & aim of ethno botany.
- Main world centers of Ethno botanical studies, workers & literature of Ethno botany
- Ethno botany with special reference to Chhattisgarh.
- Ethno botanical Research done in India:
- Ethno botany in relation to national priorities and health care programme.
- Practical application of ethno botany for tribal development programme.

**Unit II**

- Methods and techniques in ethno botany.
- General account of major and minor tribes of Chhattisgarh with special reference to Gond, Kamar, Baiga, Abujhmaria.
- Ethno botanical aspect of Art & literature.
- Abstract ethno botany with special reference to folklore, Taboos, Majico-religious beliefs.

**Unit -III**

- Ethno botanical importance of Bacteria, Algae, Fungi, Bryophyte, Pteridophyta and Gymnosperm.
- Ethnoveterinary medicines from plants.
- Major & Minor Forest Products (NWFPs) of Chhattisgarh.
- Ethno botany in relation to livelihood security reference to tribes.

**Unit- IV**

- Ethnobotanical study of following plants with special reference to their medicinal importance  
1. *Azadirachta indica* (Neem) 2. *Emblica officinalis* (Amla) 3. *Ricinus communis* (Andi) 4. *Madhuca indica* (Mahuaa) 5. *Cassia fistula* (Amaltash) 6. *Ficus religiosa* (Pipal) 7. *Oscimumsanctum* (Tulsi) 8. *Asparagus racemosus* (Satavar) 9. *Aloe vera* (Ghrith kumari) 10. *Andrographis paniculata* (Bhui neem).

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### Suggested Readings:-

- Baker, H.G. 1978. Plants and Civilization (3<sup>rd</sup> edition). C.A. Wadsworth, Belmont.
- Chandel, K.P.S., Shukla, G. & Sharma, N. 1996. Biodiversity in medicinal and Aromatic Plants in India: Conservation & Utilization. National Bureau of Plant Genetic Resources, New Delhi.
- Chrispeels, M.J. & Sadava, D. 1977. Plants, Food & People. W.H Freeman and Co., San Francisco.
- Ambasta S.P. (ed.) (1986). The Useful Plants of India. Publications & Information Directorate, CSIR, New Delhi India.
- Anon. (1978). The tribes of Madhya Pradesh. Dept. of Tribal Welfare, Govt. of M.P. Bhopal.
- Arnold. J. E. M. & Ruiz Perez, M, (1998). The role of non-timber forest products in conservation and development. In: Wallenberg, Eva. & Andrew Ingles (Eds.) Income from the Forest, CIFOR 1998, Indonesia, pp-17 to 41.
- Asolkar, L.V. (1992). Second Supplement to Glossary of Medicinal Plants, (CSIR) NISCOM, New Delhi, India.
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- Buch, M.N. (1991). Forest of Madhya Pradesh, Madhya Pradesh Madhyam Bhopal.
- Chopra, R.N.; Badhwar, R.L. & Ghosh, S. (1965). Poisonous Plants of India. Vol. I. 2nd Ed. ICAR, New Delhi, India.
- Cotton C.M, (1996). Ethnobotany: Principals and Applications, John Willey & Sons, Chichester. New York.
- Faulks. P.J. (1958) An Introduction to Ethnobotany: Moredale Publications Ltd. London, England.
- Harshberger, J.W. (1896). Purposes of Ethnobotany Bot. Gaz. 21: 146-154.
- Jain S.K. and Phuipps, R.D. (1991). Medicinal Plants of India Rec. Pub. Algonac USA 2Vols. 1-849.
- Jain, S. K. (1991). Dictionary of India folk medicine and Ethnobotany. Deep publications. NEW DELHI, pp. 1-311.
- Jain, S. K. (1995). In Manual of Ethnobotany (edt. S.K. Jain,) Scientific Pubisher, Jodhpur. 128-134.
- Jain, S.K. & Rao, R.R. (1977). A handbook off field and herbarium methods. New Delhi: Today & Tomorrow's Printers and Publishers.
- Jain, S.K. (1981). Glimpses of Indian Ethnobotany. Oxford & IBH New Delhi, India.
- Jain, S.K. (1989). Methods and Approaches in Ethnobotany. Society of Ethnobotanist. Lucknow.
- Jain, S.K. and Mudgal, Hand Book of Ethanobotany. Bisen pal Singhm Mahendra Pal Singh Publication.
- Vaishnaw T.K. (2004). Chhattisgarh ki Anusuchit Janjatiyan, Adim Jati Anusandhan Avam Prshikshan Sansthan Raipur. Prakashan kramank 2, pp. 1-120

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- Varghese, E. S. V D. (1996). Applied Ethnobotany - A case study among the Kharias of Central India. New Delhi. Deep Publications
- Jajoria, E, V.K. (1998); "The Kamar [A way of life.] Vanya Prakashan., Tribal Research and Development Institute. 35, Shamla Hills, Bhopal., ethnobot. Res.2:303-3 15.
- Joshi, S.G. (2000). Medicinal Plants, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, India.
- Kirtikar, K. R. & Basu, B.D. (1933-1935). Indian Medicinal plants. Vol.I to VIII (4 Vols. text & 4 vols. plates) Reprint 1994, Dehradun U.P.
- Maheshwari, J.K. Ed. (2000). Ethnobotany and Medicinal Plants of Indian Subcontinent. Scientific Publishers, Jodhpur
- Martin, G.J. (1995). Ethnobotany. Chapman and Hall, London.

### Suggested Laboratory Exercises:-

1. Description and identification of medicinal plants and its medical properties.
2. Preparation of medicinal plants herbarium and photographs.
3. Herbal preparation:-
  - a. Extract of Tulsi leaves.
  - b. Ointment from Neem Leaves.
  - c. Ayurvedic tooth powder.
  - d. Face pack preparation from various herbs.
  - e. Preparation of Triphla.
  - f. Kwath of Triphla.
  - g. Preparation of diabetes controlled powder.
  - h. Preparation of herbal shampoo.
4. To cultivate at least two medicinal plant in earthen pot.
5. Field Study of Forest area or Tribal area.
6. Documentation technique of Ethnobotanical knowledge.
7. To separate active principles from the extract of Medicinal plant.

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संकाय / विषयवार Elective Paper की जानकारी

S.N.	Class	Subject	Elective Paper Name	Elective Paper No.	Elective Paper code	Remark
1	बी. का. 3	Commerce	Optional Group (B)	I	-	
2			Marketing Area	Principle of marketing		
3				II		
4				International marketing		
5						
6	M. Com.	Commerce	Optional Specialization	I	Principle - 401	
7	IV Semester		Group (A)	II	Advertising & Sales Management - 402	
8			Marketing	III	Marketing Research - 403	
9				IV	International Marketing - 404	
10						

  
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**B.COM PART III**  
**OPTIONAL GROUP B (Marketing Area)**  
**TITLE OF PAPER - PRINCIPLES OF MARKETING**  
**PAPER - I**  
**Proposed syllabus**

**OBJECTIVE**

The Objective of this course is to help students to understand the concept of marketing and its applications.

M.M. 75

- UNIT-I** Introduction : Nature and scope of marketing; Importance of marketing as a business function, and in the economy; Marketing concepts - traditional and modern; Selling vs. marketing; Marketing mix; Marketing environment.
- UNIT-II** Consumer Behaviour and Market Segmentation : Nature, scope, and significance of consumer behaviour; Market segmentation - concept and importance; Bases for market segmentation.
- UNIT-III** Product : Concept of product, consumer, and industrial goods; Product planning and development; Packaging role and functions; Brand name and trade mark; after sales service; Product life cycle concept. Price : Importance of price in the marketing mix; Factors affecting price of a product/service; Discounts and rebates.
- UNIT-IV** Distribution Channels and Physical Distribution; Distribution channels - Concept and role; Types of distribution channels. Factors affecting choice of a distribution channel; Retailer and wholesaler; Physical distribution of goods; Transportation, Warehousing, Inventory control; Order processing.
- UNIT-V** Promotion : Methods of promotion; Optimum promotion mix; Advertising media - their relative merits and limitations; Characteristics of an effective advertisement; Personal selling; Selling as a career; Classification of successful sales person; Functions of salesman. Recent development in marketing - social marketing, online marketing, Direct marketing, Services marketing, Green marketing.

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**B.COM PART III**  
**OPTIONAL GROUP B (Marketing Area)**  
**TITLE OF PAPER - INTERNATIONAL MARKETING**  
**PAPER - II**  
**Proposed syllabus**

**OBJECTIVE**

This course aims at acquainting student with the operations of marketing in international environment.

M.M. 75

- UNIT-I** International Marketing : Nature, definition, and scope of international marketing;  
Domestic marketing vs. International marketing; International environment external and internal.
- UNIT-II** Identifying and Selecting Foreign Market: Foreign market entry mode decisions. Product Planning for international Market: Product designing; Standardization vs. adaptation; Branding and packaging; Labeling and quality issues; After sales service. International Pricing: Factors influencing International price; Pricing process-process and methods; International price quotation and payment terms.
- UNIT-III** Promotion of Product/Services Abroad: Methods of international promotion; Direct mail and sales literature; Advertising; Personal selling; Trade fairs and exhibitions.
- UNIT-IV** International Distribution: Distribution channels and logistics decisions; Selection and appointment of foreign sales agents.
- UNIT-V** Export Policy and Practices in India: Exim policy - an overview; Trends in India's foreign trade; Steps in starting an export business; Product selection; Market selection; Export pricing; Export finance; Documentation; Export procedures; Export assistance and incentives.  
Marketing Control Process

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एम.कॉम. चतुर्थ सेमेस्टर –(M. Com. Fourth Semester)

विशिष्टिकरण : (A) विपणन

Specialization: (A) Marketing

(1) विपणन के सिद्धान्त (प्रश्नपत्र –: A – प्रथम)


PRINCIPLE OF MARKETING (Paper –: A - First)

M.M.: 80

**OBJECTIVE-**

The Objective of this course is to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.

<b>Unit - I</b>	Introduction - Meaning, nature, scope and importance of marketing; Marketing concept and its evolution; Marketing mix; Strategic marketing planning - an overview.
<b>Unit - II</b>	Market Analysis and Selection - Marketing environment - macro and micro components and their impact of marketing decisions; Market segmentation and positioning; Buyer behavior; Consumer versus organizational buyers; Consumer decision - making process.
<b>Unit - III</b>	Product Decisions - Concept of a product; Classification of products; Major product decisions; Product line and product mix; Branding; Packaging and labeling; Product lifecycle - strategic implications; New product development and consumer adoption process.
<b>Unit - IV</b>	Pricing Decisions - Factors affecting price determination; Pricing policies and strategies; Discounts and rebates.
<b>Unit - V</b>	Distribution Channels and Physical Distribution Decisions - Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions; Retailing and wholesaling. Physical Distribution Management.

  
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(1) विज्ञापन एवं विक्रय प्रबन्ध – (प्रश्नपत्र : A – द्वितीय)  
ADVERTISING & SALES MANAGEMENT (Paper: A – Second)

M.M.:80

<b>Unit - I</b>	Introduction: Concept, Scope, Objectives and Functions of Advertising. Role of Advertising in marketing mix and the advertising process. Legal, ethical and social aspect of advertising.
<b>Unit - II</b>	Pre-launch Advertising Decision: Determination of target audience, Advertising Media and their choice. Advertising messages, Layout of advertisement and Advertising Appeal, Advertising Copy.
<b>Unit - III</b>	Promotional Management: Advertising Department, Role of Advertising Agencies and their Selection, Advertising Budget, Evaluation of Advertising Effectiveness.
<b>Unit - IV</b>	Personal Selling: Meaning and Importance of Personal Selling, - Difference between Personal Selling, Advertising and Sales Promotion. Methods and Procedure of Personal Selling.
<b>Unit - V</b>	Sales Management: Concept of Sales Management, Objectives and Functions of Sales Managements. Sales Organization, Management of Sales force and Sales force objectives, Sales force Recruitment: - Selection, Training, Compensation and Evaluation.

  
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(3) विपणन अनुसंधान (प्रश्नपत्र A – तृतीय)  
MARKETING RESEARCH (Paper: A – Third)

M.M.:80

<b>Unit - I</b>	Marketing Research: An Introduction; Marketing Decisions; Marketing Research and Information System.
<b>Unit - II</b>	Marketing Research Methodology, Research Design.
<b>Unit - III</b>	Organization of Marketing Research. Specialized areas of application of marketing research.
<b>Unit - IV</b>	Specialized Techniques of Marketing Research. Motivation Research.
<b>Unit - V</b>	Advertising Research: Planning and Procedure, New Product Research.

  
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संकाय / विषयवार Elective Paper की जानकारी

S.N.	Class	Subject	Elective Paper Name	Elective Paper No.	Elective Paper code	Remark
1	B.Sc III	Maths	Discrete Mathematics	III	0901	
2	M.Sc III	Maths	fuzzy Set theory and its application	III (L)		
3	- " -	- " -	Operations Research	IV (A)		
4	- " -	- " -	Programming in C (with ANSI features)	V (A)		
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हस्ताक्षर

H.C.D.

Deptt. of Mathematics

Gout. G.S.G.P.G. College

BALOD. (C.G.)

✦ PAPER - III - (OPTIONAL)

(II) DISCRETE MATHEMATICS (Paper Code-0901)

**UNIT-I** Sets and Propositions - Cardinality. Mathematical Induction, Principle of Inclusion and exclusion.

Computability and Formal Languages - Ordered Sets. Languages. Phrase Structure Grammars. Types of Grammars and Languages. Permutations. Combinations and Discrete Probability.

**UNIT-II** Relations and Functions - Binary Relations, Equivalence Relations and Partitions. Partial Order Relations and Lattices. Chains and Antichains. Pigeon Hole Principle. **Graphs and Planar Graphs** - Basic Terminology. Multigraphs. Weighted Graphs. Paths and Circuits. Shortest Paths. Eulerian Paths and Circuits. Travelling Salesman Problem. Planner Graphs.

**TREES.**

**UNIT-III** Finite State Machines - Equivalent Machines. Finite State Machines as Language Recognizers. Analysis of Algorithms - Time Complexity. Complexity of Problems. Discrete Numeric Functions and Generating Functions.

**UNIT-IV** Recurrence Relations and Recursive Algorithms - Linear Recurrence Relations with Constant Coefficients. Homogeneous Solutions. Particular Solution. Total Solution. Solution by the Method of Generating Functions. Brief review of Groups and Rings.

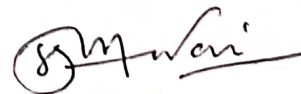
**UNIT-V** Boolean Algebras - Lattices and Algebraic Structures. Duality, Distributive and Complemented Lattices. Boolean Lattices and Boolean Algebras. Boolean Functions and Expressions. Propositional Calculus. Design and Implementation of Digital Networks. Switching Circuits.

**REFERENCES :**

C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science Series, 1986.







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**M.Sc./M.A. Course (Third Semester)**  
**PAPER-III (C)**  
**Fuzzy Set Theory and Its Applications (I)**

Max Marks - 80

- UNIT-I** Fuzzy sets-Basic definitions,  $\alpha$ -level sets. Convex fuzzy sets. Basic operations on fuzzy sets. Types of fuzzy sets. Cartesian products, Algebraic products. Bounded sum and difference, t-norms and t-conorms.
- UNIT-II** The Extension Principle- The Zadeh's extension principle. Image and inverse image of fuzzy sets. Fuzzy numbers. Elements of fuzzy arithmetic.
- UNIT-III** Fuzzy Relations on Fuzzy sets, Composition of Fuzzy relations. Min-Max composition and its properties.
- UNIT-IV** Fuzzy equivalence relations. Fuzzy compatibility relations. Fuzzy relation equations. Fuzzy graphs, Similarity relation.
- UNIT-V** Possibility Theory-Fuzzy measures. Evidence theory. Necessity measure. Possibility measure. Possibility distribution. Possibility theory and fuzzy sets. Possibility theory versus probability theory.

**REFERENCES :**

1. H. J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G. J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall of India, New Delhi, 1995.

  
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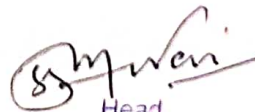
**M.Sc./M.A. Course (Third Semester)**  
**PAPER -IV (A)**  
**Operations Research (I)**

Max. Marks 80

- Unit-I** Operations Research and its Scope. Necessity of Operations Research in Industry. Linear Programming-Simplex Method. Theory of the Simplex Method. Duality and Sensitivity Analysis.
- Unit-II** Other Algorithms for Linear Programming-Dual Simplex Method.
- Unit-III** Parametric Linear Programming. Upper Bound Technique. Interior Point Algorithm. Linear Goal Programming.
- Unit-IV** Transportation and Assignment Problems.
- Unit-V** Network Analysis-Shortest Path Problem. Minimum Spanning Tree Problem. Maximum Flow I Problem. Minimum Cost Flow Problem. Network Simplex Method. Project Planning and Control I with PERT-CPM.

**Books Recommended :**

1. F. S. Hillier and G.J. Ueberman. Introduction to Operations Research (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadly, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H. A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.

  
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**\* M.Sc./M.A. Course (Third Semester)**  
**PAPER -V (A)**  
**Programming in C (with ANSI features) Theory and Practical (I)**

Max. Marks. 100  
(Theory-70 +Practical-30)

- Unit-I** An overview of programming. Programming language, Classification. C Essentials-Program Development. Functions. Anatomy of a C Function. Variables and Constants. Expressions. Assignment Statements. Formatting Source Files. Continuation Character. The Preprocessor.
- Unit-II** Scalar Data Types-Declarations, Different Types of Integers. Different kinds of Integer Constants. Floating-Point Types. Initialization. Mixing Types. Explicit Conversions-Casts. Enumeration Types. The Void Data Type. Typedefs. Finding the Address of an object. Pointers.
- Unit-III** Control Flow-Conditional Branching. The Switch Statement. Looping. Nested Loops. The break and continue Statements. The goto statement. Infinite Loops.
- Unit-IV** Operators and Expressions-Precedence and Associativity. Unary Plus and Minus operators. Binary Arithmetic Operators. Arithmetic Assignment Operators. Increment and Decrement Operators. Comma Operator. Relational Operators. Logical Operators. Bit - Manipulation Operators. Bitwise Assignment Operators. Cast Operator. Size of Operators. Conditional Operator. Memory Operators.
- Unit-V** Arrays -Declaring an Array. Arrays and Memory. Initializing Arrays. Encryption and Decryption.

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