

BROCHURE

**MANOHARBHAI PATEL COLLEGE OF
ARTS, COMMERCE & SCIENCE DEORI,
DIST. GONDIA 441901**

**VALUE ADDED COURSE: MEDICINAL PLANTS
(12 WEEKS COURSE)**

Intake Capacity: 25 Students Only

Eligibility: 12th Science

OUR PATRONS:

**Smt. Varsha Praful Patel
PRESIDENT**

**Shri. Rajendra Jain
SECRETARY**

**Dr. A. K. Zingare
PRINCIPAL**

**Dr. P. P. Tirpude
CO-ORDINATOR**

**Mis. S. R. Bansule
IN-CHARGE**

Faculty Member

Mr. U. G. Chavhan

Dr. V. R. Bahekar

Dr. R. D. Nasare

Mr. A. S. Gadwe

Contact

**Miss. P. P. Tirpude
Asst. Professor
Department of Botany
M. B. Patel College, Deori-441901**

OBJECTIVES OF COURSE:-

- To identify the medicinally important herbs and to understand their medicinal uses.
- To understand the importance of medicinal plants for developing medicines.
- To prepare herbal formulations
- To know the process and technology development for herbal medicines
- To develop the confidence and skills among the students and utilize their potential as professional herbalist
- To promote the establishment of herbal drug industries at local as well as national level
- To motivate the students in the field of research in herbal medicine
- To educate and create awareness among the peoples regarding importance of herbal medicines
- To develop entrepreneurship among the students

MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: MEDICINAL PLANTS
SCHEME FOR COURSE

1. Duration :-

- i) Course shall be conducted for **12 weeks (3 hours per week)** in each Academic Session shall be suitably utilized for the completion of course.
- ii) Course shall consists of *TWO Theory Papers* of 100 Marks each, Practical's of 100 Marks, Industrial visit & its report 30 Marks, Project 50 Marks, & Viva-voice 20 Marks, thus a Total of 400 Marks.

2. Intake Capacity: 25 Students per year.

3. Eligibility: 12th Science

4. Fees: - NIL

5. Examination:-

- i) The examination shall be conducted by the college itself, after the completion of syllabus of Theory & Practicals.
- ii) The examination scheme is as follows :

S.N.	Heads of Passing	Max. Marks	Minimum Marks of Passing
01.	Theory -I	100	40
02.	Theory -II	100	40
03.	Practicals	100	40
04.	Indst. Visit & Report	30	12
05.	Project	50	20
06.	Viva-voce	20	08
	Total	400	160

6. Syllabus :-

- i) Two theory papers of 100 marks each.
- ii) Each theory papers shall be divided into 10 units of 10 Marks each.
- iii) Appendix **A & B** for theory papers.

7. Practicals :-

- i) There shall be 12 Practicals of Three hours duration.
- ii) Each student shall maintain a Journal as a record of practicals performed by him/her.
- iii) Each journal, shall be certified by the teacher & Head of the Department.
- iv) Appendix **C** for Practical Syllabus.

8.

9. Practical Examination :-

- i) Practical Examination shall be of FIVE hours duration.

ii) The distribution of Experiments shall be as follows-	
1. Two short Experiments of 20 Marks each	40 Marks
2. One long Experiment of 40 Marks	40 Marks
3. Journals (Duly Certified)	20 Marks
Total-	100 Marks

10. Industrial Visit & Report :-

- i) Student shall go for one day Visit to an industry along with Teacher.
- ii) Student shall submit a report of industrial visit with duly certified by Teacher & Head of the Department.

11. Project Work :-

- i) Each student shall undertake a project. (30-40 pages)
- ii) Each project shall be duly certified by Teacher & Head of the Department.

12. Viva Voce :-

- i) Each student shall have to appear for a viva voce exams of 20 marks.
- ii) Viva voce shall be based on Theory paper, Practicals, Industrial visit & Project.
- iii) Viva voce shall be conducted by the Teacher & Head of the Department.

13. Passing Standards :-

- i) A student shall be declared to have successfully passed, when he / she has scored minimum marks in each head of passing.
- ii) If candidate fails to score minimum marks for passing in heads, he / she will be declared unsuccessful.
- iii) Unsuccessful candidates allow to given examination in the heads he / she has failed; in the next examination.
- iv) Only Two attempts are permitted for passing.
- vi) Students may Re-register for course by paying the fees.

MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: MEDICINAL PLANTS

SYLLABUS – THEORY

Appendix - A

PAPER – I

Marks – 100

GENERAL ASPECTS OF MEDICINAL PLANTS

- Unit I:- General Introduction, History, Definition and Scope of Pharmacognosy
- Unit II:- Classification of Crude Drugs. Scheme for pharmacognostic studies of a Crude Drugs.
- Unit III:- Taxonomic Aspect of Medicinal Plants- Definition of Taxonomy, History, Binomial system of Nomenclature, Types of Plant Classification System. Bentham & Hooker system of plant classification.
- Unit IV:- Morphology of plants – Root, Stem, Leaf, Inflorescence, Flower & Fruit.
- Unit V:- Cultivation of crude drugs- Methods of cultivation, Factors affecting cultivation.
- Unit VI:- Collection and processing of crude drugs- Collection, Harvesting , Drying ,Garbling (Dressing), Packing and Storage.
- Unit VII:- Medicinal Plant Biotechnology- Genetics applied to Medicinal Herbs.
- Unit VIII:- Plant Tissue Culture as source of Biomedicinals, Introduction of Biogenesis of Phytopharmaceuticals.
- Unit IX:- Analytical Pharmacognosy- Drug Adultration, Methods of Drug Evaluation, Phytochemical Investigation.
- Unit X:- Phytopharmaceuticals Retrospect and Prospect- Phytopharmaceuticals of Commercial Signification, Current Trend of Market in Medicinal Plants.

MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: MEDICINAL PLANTS
SYLLABUS – THEORY **Appendix - B**
PAPER – II **Marks – 100**
STUDY OF MEDICINAL PLANTS

Unit I:- Carbohydrates and derived products- Classification of carbohydrates.

Plants – *Acacia arabica*, *Macrocystis pyrifera*, *Chondrus cruspus*, *Gellidium amansii*, *Anogeissus latifolia*, *Sterculia urens*, *Astragalus gummifera*, *Cyamopsis tetragonolobus*, *Plantago ovate*, *Citrus limon*, *Zea mays*

Unit II:- Drugs containing Glycosides- Classification of Glycosides.

Plants – *Cassia angustifolia*, *Aloe vera*, *Digitalis purpurea*, *Nerium oleander*, *Glycyrrhiza glabra*, *Panax ginseng*, *Prunus amygdalus*, *Brassica nigra*, *Psoralea coryfolia*, *Andrographis paniculata*, *Crocus sativus*

Unit III:- Drugs containing Tannins- Classification of Tannins.

Plants – *Terminalia chebula*, *Terminalia bellerica*, *Terminalia arjuna*, *Quercus infectoria*, *Acacia catechu*, *Uncaria gambier*, *Saraca indica*

Unit IV:- Lipids (Fixed oils, Fats & Waxes) - Classification of Lipids.

Plants – *Arachis hypogea*, *Ricinus communis*, *Linum usitatissimum*, *Sesamum indicum*, *Carthamus tinctorius*, *Helianthus annuus*, *Oryza sativa*, *Brassica campestris*, *Pongamia pinnata*, *Madhuca indica*

Unit V:- Volatile Oils - Classification of Oils.

Plants – *Cinnamomum camphora*, *Eucalyptus globules*, *Cymbopogon citratus*, *Pinus roxburghii*, *Mentha piperata*, *Carum carvi*, *Elettaria cardamomum*

Unit VI:- Volatile Oils (continued)

Plants – *Foeniculum vulgare*, *Citrus limon*, *Eugenia caryophyllus*, *Myristica fragrans*, *Allium sativum*, *Ocimum sanctum*, *Piper nigrum*, *Vetiveria zizanioides*, *Lavendula officinalis*, *Santalum album*

Unit VII:- Enzymes & Protein Drugs - Classification of Enzymes.

Plants – *Ananas comosus*, *Carica papaya*, *Hordeum distichon*
Proteins – Gelatins, Lectins, Levodopa, Yeast

Unit VIII:- Alkaloid Drugs - Classification of Alkaloids.

Plants – *Claviceps purpurea*, *Strychnos nuxvomica*, *Rauwolfia serpentine*, *Vinca rosea*, *Papaver somniferum*, *Atropa belladonna*

Unit IX:- *Datura metle*, *Cinchona calisaya*, *Areca catechu*, *Adhatoda vasica*, *Thea sinensis*, *Coffea Arabica*, *Withania somniferum*, *Colchicum autumnale*, *Aconitum napellus*

Unit X:- a) Resin Drugs - Classification of Resins.

Plants – *Zingiber officinale*, *Capsicum annum*, *Curcuma longa*, *Ferula foetida*, *Canabis sativa*, *Citrus colocynthis*, *Pinus palustris*, *Styrax benzoin*, *Commifera mukul*

a) Plant Fibres – Cotton (*Gossypium* sp.), Jute (*Corchorus clitorius*), Hemp (*Canabis sativa*)

NB :- Plants will be studied under following heads

- 1.Name 2.Family 3.Habitat 4.History 5.Cultivation, Collection, Processing for Market & Storage
- 6.Morphological characters 7.Microscopic characters 8.Chemicals constituents 9.Parts used
10. Uses 11. Commercial Drugs

MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: MEDICINAL PLANTS
SYLLABUS – PRACTICALS

Appendix - C

Marks – 100

Practical's based on Theory Paper I & II

- 1. Morphology of Root, Stem, Leaf, Inflorescence, Flower & Fruit.**
- 2. Methods of Cultivation- Sexual method (Seed propagation) & Asexual method (Vegetative Propagation)**
- 3. Study of Soil- Physical & Chemical characteristics.**
- 4. Study of Pests & Pests control.**
- 5. Processing of Crude Drugs.**
- 6. Techniques of Tissue Culture.**
- 7. Drug Adulteration and Evaluation.**
- 8. Chromatography.**
- 9. Chemical tests for Carbohydrates.**
- 10. Chemical tests for Glycosides.**
- 11. Chemical tests for Tannins.**
- 12. Chemical tests for Lipids (Oils) Fats & Waxes.**
- 13. Chemical tests for Volatile Oils.**
- 14. Chemical tests for Enzymes.**
- 15. Chemical tests for Alkaloids.**
- 16. Chemical tests for Resins.**
- 17. Chemical tests for Fibers (Cotton, Jute, Hemp)**
- 18. Study of Medicinal Plants maintained in theory syllabus, at least TWO from Carbohydrates, Glycosides, Tannins, Lipids, Fats, Waxes, Volatile Oils, Enzymes, Alkaloids, Resins and Fibres.**

ADMISSION FORM

Gondia Education Society's

**MANOHARBHAI PATEL COLLEGE OF ARTS, COMMERCE & SCIENCE,
DEORI-441901 DIST : GONDIA (M. S.)**

COLLEGE CODE NO. 715

e-mail: mbpcdeori@gmail.com

Phone No. 07199-225110

VALUE ADDED COURSE : MEDICINAL PLANTS

1) Name of Student (IN CAPITAL): _____

2) Father's / Husband's Name: _____

3) Mother's Name: _____

4) Date of Birth: _____

5) Gender: Male/ Female: _____

6) Religion: _____ 7) Citizen: _____

8) Address for Correspondence _____

9) Permanent Address _____

10) Phone No. _____ 11) Mobile No. _____

12) Educational Details:-

Name of Examination	Name of Board/ University	Name of School/College	Year of Passing	Marks Obtained	Out of	%
12th						

13) Present Admitted Class _____

14) Present Institution. _____

Declaration by the Student

I hereby declare that, I have read the rules related to admission filled in by me in this form is accurate and true to the best of my knowledge. I will be responsible for any discrepancy, arising out of the form signed by me and I undertake that, in absence of any document the final admission will not be granted and/ or admission will stand cancel.

Place:

SIGNATURE OF STUDENT

Date:

Declaration by the Guardian

I have permitted my son/ daughter/ward to join your college. The information supplied by him/her is correct to the best of my knowledge. I have acquainted myself with the rules and fees, dues to my son/ daughter/ ward and see that he/ she observe.

Place:

SIGNATURE OF GUARDIAN

Date:

Remark:-

CO-ORDINATOR: _____ PRINCIPAL _____

Gondia Education Society's
MANOHARBHAI PATEL COLLEGE OF ARTS, COMMERCE & SCIENCE
DEORI-441901, DIST. GONDIA (MAHARASHTRA)

Affiliated to RTM Nagpur University & Accredited by NAAC

Website: www.mbpcdeori.com

email: mbpcdeori@gmail.com

Phone: 07199-225110

Fax: 07199-225180

VALUE ADDED COURSE: MEDICINAL PLANTS

CERTIFICATE

This certificate is awarded to

Mr. /Ms. _____

of Manoharbhair Patel College of Arts, Commerce & Science Deori-441901, Dist. Gondia (Maharashtra)
for successfully completing the **VALUE ADDED COURSE: MEDICINAL PLANTS** (12 Weeks Course),
during session_____. He /She has secured _____marks out of _____.

CO-ORDINATOR

PRINCIPAL

BROCHURE



MANOHARBHAI PATEL COLLEGE OF ARTS, COMMERCE & SCIENCE DEORI, DIST. GONDIA 441901

VALUE ADDED COURSE: FRESHWATER AQUACULTURE

(12 WEEKS COURSE)

Intake Capacity: 25 Students Only

Eligibility: 12th Science



PATRONS

SMT. VARSHA PRAFUL PATEL
PRESIDENT

SHRI. RAJENDRA JAIN
SECRETARY

Dr. A .K. ZINGARE
PRINCIPAL

DR. S. V. BHANDARKAR
CO-ORDINATOR

DR. S.S. CHOURASIA
PROF. IN-CHARGE

FACULTY MEMBER

MR. A. S. GADWE

DR. T. L. LAMBAT

OBJECTIVE OF COURSE

- Explain the importance of fish resources in freshwater ecosystem.
- To impart knowledge is the basic aim of education. The students are expected to acquire the knowledge of animal science with reference to the anatomy and behavior of different fisheries
- Understanding the scientific terms, concepts, facts, phenomenon & their interrelationships with reference to fish farms, Aquaculture and its Management
- To develop skills in practical work, experiments & laboratory materials, instruments for analyzing abilities to apply scientific methods
- To develop interests in the fisheries

CONTACT

DR. S. V. BHANDARKAR (COURSE CO-ORDINATOR)

ASSISTANT PROFESSOR AND HEAD, DEPARTMENT OF ZOOLOGY
MANOHARBHAI PATEL COLLEGE OF ARTS, COM & SCI. DEORI DIST. GONDIA



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MANOHARBHAI PATEL COLLEGE OF ARTS, COMMERCE & SCIENCE DEORI, DIST. GONDIA 441901

VALUE ADDED COURSE: FRESHWATER AQUACULTURE

(12 WEEKS COURSE)

Intake Capacity: 25 Students Only

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OBJECTIVE OF COURSE

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- Understanding the scientific terms, concepts, facts, phenomenon & their interrelationships with reference to fish farms, Aquaculture and its Management
- To develop skills in practical work, experiments & laboratory materials, instruments for analyzing abilities to apply scientific methods
- To develop interests in the fisheries

CONTACT

DR. S. V. BHANDARKAR (COURSE CO-ORDINATOR)

ASSISTANT PROFESSOR AND HEAD, DEPARTMENT OF ZOOLOGY
MANOHARBHAI PATEL COLLEGE OF ARTS, COM & SCI. DEORI DIST. GONDIA





Freshwater Aquaculture

A VALUE ADDED COURSE

The Freshwater Aquaculture is a course to study of freshwater fish farming and regarding essentials. The main aim behind to start this course to get basic and required knowledge about fish farming. As Gondia district is known as District of lakes, about 2000 water bodies are present and more or less all are utilized for fish farming, so that the course will motivate the pupils to engage themselves in the fisheries sector to become independent entrepreneur.

OBJECTIVE OF COURSE

- Explain the importance of fish resources in freshwater ecosystem.
- To impart knowledge is the basic aim of education. The students are expected to acquire the knowledge of animal science with reference to the anatomy and behavior of different fisheries
- Understanding the scientific terms, concepts, facts, phenomenon & their interrelationships with reference to fish farms, Aquaculture and its Management
- To develop skills in practical work, experiments & laboratory materials, instruments for analyzing abilities to apply scientific methods
- To develop interests in the fisheries

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MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: **FRESHWATER AQUACULTURE**

SCHEME FOR COURSE

1. Duration:

- i) Course shall be conducted for **12 weeks (3 hours per week)** in each Academic Session shall be suitably utilized for the completion of course.
- ii) Course shall consists of TWO Theory Papers of 50 Marks each, Practical of 50 Marks, Industrial visit & its report 50 Marks, Project 30 Marks, & Viva-voice 20 Marks, thus a Total of 250 Marks.

2. Intake Capacity: 25 Students per year.

3. Eligibility: 12th Science

4. Fees: - NIL

5. Examination:-

- i) The examination shall be conducted by the college itself, after the completion of syllabus of Theory & Practical.
- ii) The examination scheme is as follows:

S.N.	Heads of Passing	Max. Marks	Minimum Marks of Passing
1	Theory I	50	20
2	Theory II	50	20
3	Practical	50	20
4	Industrial visit and Report	50	20
5	Project	30	12
6	Viva voce	20	08
	Total	250	100

6. Syllabus:

- i) Two theory papers of 50 mark each.
- ii) Each theory papers shall be divided into 5 units of 10 Marks each.
- iii) Appendix A & B for theory papers.

7. Practical:

- i) There shall be 3 Practical of Three hour's duration.
- ii) Each student shall maintain a Journal as a record of practical performed by him/her.
- iii) Each journal shall be certified by the course coordinator.
- iv) Appendix C for Practical Syllabus.

8. Practical Examination:

- i) Practical Examination shall be of FIVE hours duration.
- ii) The distribution of Experiments shall be as follows-

1. Two short Experiments of 10 Marks each	20 Marks
2. One long Experiment of 20 Marks	20 Marks
3. Journals (Duly Certified)	10 Marks
Total-	50 Marks

9. Industrial Visit & Report:

- i) Student shall go for one day Visit to an industry along with Teacher.

- ii) Student shall submit a report of industrial visit with duly certified by Teacher & Head of the Department.

10. Project Work:

- i) Each student shall undertake a project. (10-20 pages)
- ii) Each project shall be duly certified by Teacher.

11. Viva Voce:

- i) Each student shall have to appear for a viva voce exam of 20 marks.
- ii) Viva voce shall be based on Theory paper, Practical, Industrial visit & Project.
- iii) Viva voce shall be conducted by the Teacher & Head of the Department.

12. Passing Standards:

- i) A student shall be declared to have successfully passed, when he / she has scored minimum marks in each head of passing.
- ii) If candidate fails to score minimum marks for passing in heads, he / she will be declared unsuccessful.
- iii) Unsuccessful candidates allow to given examination in the heads he / she has failed; in the next examination.
- iv) Only Two attempts are permitted for passing.

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MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: **FRESHWATER AQUACULTURE**
SYLLABUS – THEORY

PAPER-I (Marks-50)

• **INTRODUCTION TO FRESHWATER AQUACULTURE:**

1. Introduction
2. **Fresh Water Culture Systems:** Open culture systems-Cage culture, Pen culture, Raft culture, Rack culture. Semi-Closed Culture Systems-Pond Culture, Raceway culture. Closed Culture System-Water recirculation systems.
3. **Inland Water Bodies Suitable for Culture in India:** Freshwater Bodies-Ponds and Tanks, Swamps, Reservoirs, Floodplain Wetlands.

• **SEED PROCUREMENT:**

1. Introduction
2. **Natural Seed Resources:** Major River Systems-The Ganga river system, The Brahmaputra river system, The Indus river system, East coast river system, West coast river system, Lakes and Reservoirs.
3. **Collection of Seed from natural resources:** Site Selection for Seed Collection, Methods of Seed Collection.
4. **Factors effecting seed collection:** Flood, Water Current, Other Factors.
5. Seeds Segregation:

• **SEED PRODUCTION TECHNOLOGIES-I:**

1. Introduction
2. **Induced Breeding Technology:** Induced Breeding with Pituitary Gland Extraction, Fish Pituitary Gland, Collection of Pituitary Gland, Preservation of Pituitary Glands, Preparation of Pituitary Gland Extract, Technique of Breeding: Dosage of pituitary extract, Method of injection, Breeding hapa and spawning, Stripping, Technique of hatching the eggs, Induced Breeding with H.C.G., Induced Breeding with Ovaprim
3. **Breeding of Common carp:** Factors Effecting Induced breeding- Temperature, Light, Water currents and rain, Hormonal influence,

• **SEED PRODUCTION TECHNOLOGIES-II:**

1. **Carp Hatcheries:** Types of hatcheries-Earthen hatching pits, Earthen pot hatcheries, Cement hatching pits, Hatching hapas, Floating hapas, Tub hatchery, Cemented cisternae hatchery, Vertical jar hatchery, Plastic bin hatchery, Chinese hatchery
4. **Bundh Breeding:** Types of bundhs-Wet bundhs, Dry bundhs, Site selection, Catchment area, Embankment, Factors responsible for spawning, Collection and handling of eggs
5. **Transportation of breeders and Seed:** Fish Mortality during Transportation-Effect of CO₂ and Dissolved Oxygen, Effect of Ammonia, Effect of temperature, Techniques of Transport-Mudpots, Round Tin Carriers, Double tin carriers, Oxygen tin carriers
6. **Carp Brood Management:** Recruitment, Pond Management, Brood Raising Pond Preparation, Stocking, Fertilization, Brood rearing Stocking,

- **FISH FARMING:**

Basic Principles: Planning an aquaculture enterprise

1. **Planning the site and type of fish farm:** Site selection, Criteria for site selection, Water supply, Soil, Topography, The number, shape and size of ponds, Drainage system, Sluice, Water inlet. Type of aquaculture farm, Other methods of fish farming
2. **Fish farming practices:** Selection of fish species, Fish nutrition, Water transparency as water fertility indicator, Health and disease, Reproduction, Harvesting the fish, Maintenance and monitoring.

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MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: **FRESHWATER AQUACULTURE**
SYLLABUS – THEORY

PAPER-II: (Marks-50)

• **Management of Culture:**

1. Types of fish farms, Types of ponds, Hatching ponds, Nursery ponds, Rearing ponds, Stocking ponds, Pre-stocking pond management, Green manuring in the pond,
2. Eradication of aquatic weeds and predators, Liming, Watering, Manuring, Eradicating insects and other harmful biota. Stocking, Post-stocking pond management, Feeding, Harvesting,

• **Stocking Pond Management:**

1. Pre-stocking management, Conditioning the pond, Control of aquatic weeds, Eradication of undesirable organisms, Liming, Watering, Manuring,
2. Aquatic weeds and their control, Reasons for control of weeds, Advantages of weeds, Weeds as food for fish, Types of aquatic weeds, Methods of weed control, Manual and mechanical method, Chemical control, Biological control.

• **Water Quality Management:**

1. **Physical factors:** Water depth, Water temperature, Turbidity, Light, Water colour, Chemical factors, pH, Dissolved oxygen, Alkalinity, Hardness, Salinity, Carbon dioxide, Dissolved ammonia and its compounds, Hydrogen sulphide,
2. **Biological factors:** Plankton-water quality. Disease causing agents-water quality, Aquatic weeds - water quality, Role of aerators in the water quality management.

• **FEED MANAGEMENT:**

1. Natural fish food organism, Classification of food and feeding habits of fishes, Plankton, Phytoplankton, Zooplankton, Supplementary Feeding, Management of feeding.
2. Fish diseases: Methods for disease diagnosis, Types of Fish Diseases: Parasitic Diseases in Fishes, Viral diseases in fishes, Bacterial diseases in fishes, Fungal diseases, Protozoan diseases, Helminthes diseases, Leeches diseases, Crustacean diseases, Algal disease. Treatment and Management.

• **CARPS AND OTHER FISHES CULTURE:**

1. **Carp Culture:** different carp species, common carp: Egg production and production, Indian and Chinese Carp: Egg production and production. Tilapia Culture: Egg production, grow out pond, feed and fertilizer, stocking density and production level, Catfish culture: Egg production, grow out pond, hatcheries.
2. **Composite and Integrated fish culture:** Principle of composite fish culture, Fishes used in composite fish culture, stocking density, Feeding, Harvesting yield, Drawbacks. Integrated fish farming: Paddy - cum - fish culture, Fish cum horticulture, Azolla-aquaculture, integrated fish-cum-poultry farming, integrated fish-cum-duck farming.

Appendix-C

MANOHARBHAI PATEL COLLEGE OF ARTS COMMERCE & SCIENCE, DEORI
VALUE ADDED COURSE: FRESHWATER AQUACULTURE

SYLLABUS – PRACTICAL / Marks – 50

1. Study of museum Specimen: Catla, Rohu, Mrigal, Common carp, Grass carp, Notopterus (Chital), Tilapia, Clarius (Magur), Walago attu (Lachi), Ophiocephalus (Sneke Head), Enguilla (Eel), Anabus (Climbing pearch), Mystus seenghala, Ompak bimaculatus (Butter fish). Macrobrachium rosenbergii (Gaint fresh water prawn), Macrobrachium molcolmsonii (River Prawn), Penaeus monodon (Tiger Prawn), Penaeus indicus (White Prawn).
2. Identification of Scales: Cycloid Scales, Placoid Scales, Ganoid Scales, Ctenoid Scales
3. Dissections of fish: Fish-Digestive system, Fish-Nervous system
4. Identification of food materials in gut of fish
5. Estimation of length- weight relation in fish
6. Physico-Chemical Parameters of Water: pH, Temperature, Dissolved Oxygen, Free Co₂, Hardness, Nitrate, Phosphate, Calcium, Magnesium, Chloride.
7. Study of Soil types and Estimation of Soil parameters:

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