# P.G. DIPLOMA IN SERICULTURE

**APPROVED SYLLABUS (FOR CONFIRMATION BY CIRCULATION)**

<table>
<thead>
<tr>
<th>SEMESTER</th>
<th>SUBJECT</th>
<th>MAXIMUM MARKS &amp; PPW</th>
<th>Hours</th>
<th>Total</th>
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<td>Theory hours Practical</td>
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<td><strong>SEMESTER – I</strong></td>
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<tr>
<td>PAPER – I</td>
<td>General Sericulture</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – II</td>
<td>Sericulture Botany</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – III</td>
<td>Mulberry Agronomy</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – IV</td>
<td>Silkworm, genetics, Breeding and physiology</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – V</td>
<td>Silkworm Rearing Technology</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – VI</td>
<td>Seed Technology &amp; Silkworm pathology</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – VII</td>
<td>Silk Reeling Technology</td>
<td>90</td>
<td>4 Hrs.</td>
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<td>PAPER – VIII</td>
<td>Organisation, Extension and Management</td>
<td>90</td>
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1. History of Sericulture.
2. Types of Silkworms, Distribution in India and other countries.
3. Production of mulberry and non-mulberry silk in India and other countries. Comp. Production efficiencies.
5. Sericulture through five year Plans.
6. Sericulture as rural industry – Employment Potentiality – Comparison with other rural industries.
8. Sericulture Research in India and its impact and also research being carried out in the universities.
PAPER – II  SERICULTURE BOTANY  

Hours: 45

1. History, Origin and geographical distribution of mulberry, its taxonomy, species, varieties cultivated in India and abroad and the climatic conditions required.
2. Morphology, description of stem, phyllotaxy and anatomy of leaf and petiole, types of leaves with regard to hair, cystolith in relation to worm preference, variation and quality and quantity of leaves in various econones.
3. Asexual reproduction. Cuttings and grafts and their plantation maintenance in nurseries under rain-fed and irrigation conditions.
5. Cytology, cytogenetics, genetics, polyploidy, mutation breeding and selection of elite races.
6. Physiology of biomass, productivity with reference to leaf yield.
7. Phytohormones, their role in Vegetative propagation (rooting) physiology of bud, role of foliar nutrition in leaf quality.

PATHOLOGY:

8. Diseases of mulberry caused by fungi, bacteria, viruses and mycoplasma – their prevention and control.
10. 

PAPER – II PRACTICALS  

Hours : 20x2=40

1. Taxonomy of mulberry with reference to various species and varieties grown in India and their identification.
2. Morphology of mulberry plant with reference to various vegetative and floral parts.
3. Anatomy of stem, root, leaf, petiole and bud including leaf epidermis (Stomata and hairs).
4. Propagation methods with reference to cuttings, grafts and layering.
5. Identification of weeds of mulberry in nurseries and field.
7. Hybridization techniques of mulberry.
1. Influence of environmental factors on growth of mulberry.
   
   A. Soil: Soil types, texture, porosity, soil water content organic matter, PH, utilization of slopy and other unsuitable lands for mulberry cultivation. Soil microorganisms in relation to mulberry plants.
   
   B. Mineral nutrition - Role of micro and. macro nutrients, their effects, deficiencies and symptoms.
   
   C. Climatic: Temperature, relative humidity, Light.

2. Mulberry cultivation in rainfed and irrigated conditions with reference to various varieties.
   
   a) Nursery requirements and establishments.
   
   b) Preparation of land, manuring, organic and green manures
   
   c) Planting systems, spacing and its. Importance in relation to productivity.

3. Irrigations:
   
   a) Water sources, principles and methods of irrigation water requirements of mulberry.
   
   b) Inter cultivation its significance inter cultural operation.
   
   c) Weeds in fields of importance weedicides.

4. Prunning and training methods and frequency of prunning,

5. a) Leaf harvest, methods of transportation of leaf.
   
   b) Leaf storage methods.

6. a) Fertilizers: types, composition, applications, fertilizers requirements for different regions in India.
   
   b) Bio fertilizers and mulberry productivity.

7. Farm management, different farming systems, labour management, and maintenance of field records.

8. Economics of leaf production.
PAPER – III  PRACTICALS

Hours : 24x2 =48

1. Identification and use of implements required for mulberry cultivation.

2. Methods of soil sampling for nutrient analysis and determination of total salts.

3. Preparation of mulberry nurseries.

4. Methods of planting mulberry under rainfed and irrigated condition.

5. Irrigation, methods, water requirements of mulberry.

6. Pruning methods followed in India.

7. Harvesting methods, Estimation of leaf production, Farm records and their maintenance. Manures and fertilizers, their identification, Dosage application and calculation to a given area-of plantation.

8. Evaluation of chemicals in plant protection.
PAPER – IV SILKWORM GENETICS, BREEDING AND PHYSIOLOGY: Hours: 58

Part – Silkworm Genetics:

2. Genetics of larval markings and cocoon colour – Inheritance of voltinisim and moultinism – maternal inheritance, multiple allele and pleiotropism in silkworm.
3. Chromosome numbers in different silkworms – Hereditary traits in silkworm egg, larva, pupa and moth.

Part – B Silkworm Breedings:

6. Breeding of silkworms – Prerequisite for breeding.

Part – C PHYSIOLOGY:

1. Classification of insects with special reference to the order Lepidoptera – Systematic position of silkworm.
2. Life cycle of different types of silkworm mulberry, Tassar, Eri and Muga.
3. Morphology – Silkworm egg, larva, pupa and moth.
5. Digestive system – Food ingestion, digestion and assimilation. Relationship with quality of feed.
6. Circulation and Respiration in Silkworm and adult

9. Silk glands – Structure and Biosynthesis of silk – other secretory glands, physical properties of silk.

**PAPER – IV PRACTICALS**

Hours: 23x2=46.

1. Morphology – silkworm egg, larva, pupa and moth.
2. Mulberry and non-mulberry silkworms – comparative study at egg. larva, pupa and moth stage.
5. Embryology – identification of different stages in development, mounting of embryo.
6. Quality test of cocoons for breedings.
7. Observation of different races.
SEMMESTER– II

PAPER – V SILKWORM REARING TECHNOLOGY:   Hours: 35

1. Rearing houses – basic requirements – orientation – different designs – utilization
   of locally available materials – vinyl sheds, tile roofed, thatched sheds, mud
   houses and double walled rearing house.
2. Rearing equipment different types and modification.
3. Preparation of rearing – cleaning and disinfection – types of disinfections and
   maintenance of hygienic conditions.
4. Environmental conditions required for rearing – methods to control temperature
   and humidity to suit the different stages/seasons.
5. Incubation – hatching – different methods of brushing young age silkworm
   rearing – methods of rearing – feed for young age worms- moulting – cleaning
   and spacing – organization and cooperative chawki rearing centers.
6. Rearing late age silkworms-- environment - rearing methods - leaf preservation –
   spacing, moulting, cleaning.
7. Mounting and spinning - methods of mounting - different types of mountages -
   mountages from locally available materials -harvesting, cleaning, of cocoons and
   marketing
8. Rearing management to suit different seasons, "seed crop and industrial rearing -
   modification for semi-arid and humid tropics.
9. Assessment of quality of cocoons - maintenance of records, cost of production etc.

PAPER – V PRACTICALS                Hours : 22x2=44

1. Model rearing house - plan.
2. Rearing equipment – rearing stands, Trays -, chop sticks, ant wells, chopping knives -
   Chopping board - Feeding stand foam pads - basin stand - feather - paraffin paper –
   hygrometer and mountages etc.
3. Disinfection of the rearing rooms and appliances - spraying and fumigation - materials required.

4. Brushing -. Methods of brushing - rearing young age worms, feeding, cleaning and spacing schedule for chawki silkworm rearing.

5. Leaf preservation for silk worm rearing.

6. Rearing late instars larvae – feeding, Cleaning, and spacing – temperature, humidity, requirements -. Schedules for rearing of late age silkworms.

7. Mounting Different-types of mountages – methods of mounting

8. Harvesting and cocoon assessment


10. Individual rearing and mass rearing.
PART- A Seed Technology:

1. **Grainage and seed production.**


   Importance of Individual moth examination in pure races – identification of pebrine, flacheria muscardine and grasserie and poor layings in industrial grainages – sampling of moth examination in industrial grainages.

2. **Hibernation of silkworm eggs.**

   Hibernation schedules – importance of temperature and humidity in hibernation.

3. **Acid treatment of silk worm eggs.**

   Diapause of silkworm eggs – various schedules of acid treatment – preservation of eggs.

4. **Incubation of eggs.**

   Incubation of eggs – conditions necessary for ideal incubation and hatching.

5. **Economics of seed production.**

   Equipments for preparation of economically viable unit of ideal grainage – requirement of seed cocoons – ratio of seed cocoon to DFLS, manpower requirement

6 Seed organisation.
Seed areas and their importance – supply of basic seed p3, p2, p1 – organisation of seed supply to the seed areas – seed Act – Care and precautions to be taken in seed areas – extension and its importance – marketing of seed cocoons.

Part – B. Silkworm pathology:

7 Insect pathology – diseases of silkworm – classification.


10 Viral diseases – grasserie or nuclear polyhedrosis – cytoplasmic polyhedrosis, IFV, Causal agents, symptoms – prevention and control.


PART – C ENTOMOLOGY

PAPER-VI PRACTICALS:  Hours : 27x2=54

Part – A. Seed Technology

1. Plan of Grainage.
3. Selection of seed cocoons.
4. Storage, handling and protection of seed cocoons – temperature and humidity requirements during storage.
5. Identification of male and female pupae.
7. Synchronization of emergence – refrigeration of cocoons and moths.
9. Moth examination – Purpose and observations.
10. Disinfection and washing of layings.
11. Acid treatment of eggs.
12. Preservation and refrigeration of laying – necessity of cold storage – time of releasing etc.
13. Hibernation schedule

Part – B. Silkworm Pathology:

15. Pathogens causing pebrine and flacherie in silkworm
16. Fungal disease in silkworm – morphology and methods of infection – control
measures.
17. Viral diseases – external symptoms and microscopic test.

PAPER VII  SILK REELING TECHNOLOGY    Hours :45

1. Introduction – Evolution of silk reeling – importance of reeling industry – interdependence with other branches of sericulture industry – main problems of the reeling industry.
7. Bye products: Silkwaste – pupa – different types of silkwaste produced – India spun
1. Cocoon testing and estimation of renditta.
   a) Silk Content
   b) Filament length and denier
   c) Reelability percentage
   d) Defective cocoon percentage
   e) Calculated renditta

2. Reeling technique and cocoon cooking.
   a) Open pan system
   b) Three pan system
   c) Pressurised cooking system


4. Silk re-reeling – lacing – skeining- book making

5. Spinning.
   a) Spinning of plerced/cut cocoons
   b) Degumming.
   c) Spinning on pedal wheels


PAPER – VIII. ORGANISATION, EXTENSION AND MANAGEMENT.

Part – A Organization:

1. Organization of sericulture co-operatives – Incentives and controls – Management for effective participation of farmers and beneficiaries.
2. Organization of seed areas – Grainages – Reeling Industry – Machinery for quality control and regular review of requirements breeds and seeds etc.

Part-B Extension:

4. Extension methods – Criteria for setting up extension units – Demonstration and training to the farmers.
5. Organization of technical man power – labour management – Mulberry planting material & Silk worm eggs.

Part – C Project formulation and Management.

10. Farm Management – Different farming system – Labour management equipment for establishing and maintaining large scale farm economics of production – Maintenance of field records.

PRACTICAL TRAINING:

Three Months intensive practical training in seed production, farm management and extension. Based on an assessment certificates on the sericulture officer and project report, marks will be awarded.