## CURRICULUM FOR SERICULTURE
### IN UNDER GRADUATE DEGREE PROGRAMME
#### CBCS SYLLABUS SCHEDULE 2016 – 2017

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<th>Semes ter</th>
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<td>Summary of Credits</td>
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**Professor & Chairman**
Board of Studies in Zoology
Department of Zoology
Kakatiya University,
Warangal - 506009

**HEAD**
Department Of Zoology
University College
Kakatiya University,
Warangal - 506009

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590
B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
1 - SEMESTER
Paper-I (Theory)
General Sericulture

Max. Marks: 60

Unit-1: Introduction

1.1 Introduction to Sericulture- Definition, Origin and history of Sericulture- Silk road, spread of Sericulture China to Europe, South Korea, Japan, India and other countries
1.2 Silkworms: Types of silkworms, their food plants and distribution
1.3 Sericulture as rural industry, Role of women in sericulture
1.4 Sericulture practices in tropical and temperate climate;

Unit-2: Sericulture Centers

2.1 Research training and extension.
2.2 Central Silk Board (CSB) : Role in Extension and development
2.3 CSB associate centers and publications sericulture
2.4 Directorate of Sericulture: Extension and development in sericulture on state level.

Unit-3: Economic ability and income generation

3.1 Silk production: Mulberry and non-mulberry cocoon and yarn
3.2 Sericulture map of India and World: Components of Sericulture.
3.3 Prospectus of Sericulture in India: Sericulture industry in different states, employment, potential in mulberry and non-mulberry sericulture
3.4 Future scope in sericulture

Unit-4: Marketing and focuses strategies in sericulture

4.1 Sericulture its commercial values
4.2 Textile fibres: Types- natural and synthetic fibres- types of silk produced in India;
   Importance of mulberry silk.
4.3 Sericulture market centers
4.4 National level silk production

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Korukonda University
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B.Sc. SERICULTURE SYLLABUS UNDER CBCS  
(With effect from 2016-2017) 
I - SEMESTER 
Paper-I (Practical) 
General Sericulture 

Max. Marks: 40

1. Identification of silkworms
   a. Mulberry silkworms
   b. Non mulberry silkworms

2. Preparation of a map showing extension of sericulture in the world.

3. Preparation of a map showing extension of sericulture in India.

4. Graphical representation of cocoon and silk production by various silkworms in India.

5. Graphical representation of earning from indigenous market and export of silk goods.

6. Preparation of the histogram and pie charts
   a. Production of textile fibres in India
   b. World silk production
   c. Pie chart on mulberry and non-mulberry silk production in India.

7. Silk road map

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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
II - SEMESTER
Paper-II (Theory)
Moriculture, Management and Economics of mulberry

Max. Marks: 60

Unit-1: Mulberry plant morphology

1.1 Mulberry- Systemic position and distribution
1.2 Morphology of mulberry: different varieties of mulberry with special reference to Telangana
1.3 Vegetative morphology: Characters of root, stem, bud and leaf.
1.4 Reproductive morphology: Male and female reproductive organs, pollination, fertilization and development of seed, structure of seed and fruit.

Unit-2: Requirement of mulberry cultivation

2.1 Soil : Physical and chemical properties
2.2 Climatic conditions: Temperature, photoperiod, humidity and rainfall
2.3 Manuring : Organic, inorganic, biofertilizer
2.4 Plantation methods: Row and Pit systems, interculture and pruning

Unit-3: Mulberry management

3.1 Land preparation: Soil, Levelling and ploughing.
3.2 Irrigation: Drip irrigation, Sprinkler irrigation, flood irrigation drainage, weeding
3.3 Profitable cultivation: Proper selection of the land, selection of proper varieties of mulberry, regular manuring, weeding and irrigation and leaf harvesting
3.4 Propagation of mulberry

Unit-4: Diseases and pests of mulberry and management

4.1 Varieties of mulberry diseases, etiology
4.2 Mulberry diseases and control
4.3 Mulberry pests and control
4.4 Economics of mulberry production

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Department of Zoology
Gajwel University
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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
II - SEMESTER
Paper-II (Practical)
Moriculture, Management and Economics of mulberry

Max. Marks: 40

1. Soil sampling and analysis of pH and moisture content.
2. External morphology of root, stem and leaf.
3. Reproductive morphology—Inflorescence, flower, male and female reproductive parts.
5. Identification of mulberry varieties
6. Land preparation under irrigated and non irrigated conditions
7. Identification of farm implements
8. Identification and collection of pests and disease of mulberry and control
9. Manures fertilizers and other utilization
10. Estimation of leaf yield harvest methods

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Kaveriya University
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B.Sc. SERICULTURE SYLLABUS UNDER CBCS  
(With effect from 2016-2017)  
III - SEMESTER  
Paper-III (Theory) 
Biology of Mulberry silkworm

Max. Marks: 60

Unit-1: Silkworm taxonomy and distribution

1.1 Classification and Taxonomic characters: Phylum, class, order, family, genus and species.  
1.2. Moultingism and voltinism: Univoltine, bivoltine and multivoltine races.  
1.3. Distribution and Races: Geographical distribution in the world and India and Exotic and indigenous races  
1.4. Life cycle of *Bombyx mori*

Unit-2: Morphology

2.1. Egg: External and internal morphology and colour change.  
2.2 Larvae: Mouth parts, legs, prolegs, spiracles, eyes, claspers and integumentary hair and sexual markings.  
2.3. Pupa: Male and Female Morphology and sexual dimorphism  
2.4. Adult: Mouth parts, antenna, wings, external genitalia.

Unit-3: Anatomy of physiology

3.1. Morphology and anatomy of digestive, circulatory system of silkworm larva.  
3.2. Morphology and anatomy of excretory, respiratory and nervous system of silkworm larva.  
3.3. Morphology and anatomy of reproductive system of silk moth.  
3.4. Morphology and anatomical structure of Silk gland.

Unit-4: Endocrine and Exocrine glands

4.1 Endocrine system: Endocrine glands in lava and pupa and synthesis of hormone.  
4.2. Hormonal control: on metamorphosis, diapause  
4.4. Pheromone: sex attractants and their role in mating.

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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
III - SEMESTER
Paper-III (Practical)
Biology of Mulberry silkworm

Max. Marks: 40

1. Morphology of egg
2. Morphology of larva
3. Morphology of pupa
4. Morphology of moth
5. Dissection of digestive system
6. Dissection of Mouth parts
7. Dissection of reproductive system
8. Dissection of silk glands
9. Sex separation in larva
10. Sex separation in pupa
11. Sex separation in moth

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Professor & Chairman
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Department of Zoology
Karnataka University
Warangal - 506 009.
Unit-1: Silkworm rearing house and appliances
1.1. Rearing house: Construction of ideal rearing house at suitable site and of suitable size, representing CSB model.
1.2. Early age rearing appliances: Rearing appliances for early age rearing
1.3. Late age rearing appliances: Rearing trays, ant-wells, rearing stands and racks, paraffin papers, rubber foam pads, net, chopsticks and feathers.
1.4. Mountages

Unit-2: Disinfectants and feeding appliances
2.1 Disinfectants: Formalin, bleaching powder, RKO,
2.2 Disinfectant appliances: Sprayers and dusters.
2.3. Feeding appliances: Leaf chambers, chopping knife and chopping board.
2.4. Humidity and Temperature control devices: Humidifiers, thermostats, heaters, hygrometers, and conditioners, incubator and BOD incubator, Blowers

Unit-3: Silkworm rearing technology (Early age rearing)
1. Commercial races: Multivoltine, bivoltine and hybrid races used in India.
2. Environmental factors and their impact on silkworm rearing
3. Seed: Collection of disease-free layings (DFLs) and Hatching and Brushing: Uniform hatching and Brushing methods for I instar larvae
4. Rearing of Early instars (Chowki rearing): Feeding and rearing of I, II and III instar larvae

Unit-4: Unit-IV: Late age rearing
4.1. Rearing of Late instars: Rearing, spacing, feeding, cleaning and dusting
4.2. Rearing methods
4.3. Mounting and cocoon production: Types of mountages, transfer of matured silkworms, spinning of cocoons.
4.4. Harvesting and storage of cocoons: Harvesting, preservation, assessment, storage Transportation of Cocoons

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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
III - SEMESTER
Paper-IV (Practical)
Silkworm Rearing Technology

Max. Marks: 40

1. Model rearing houses
2. Identification of rearing appliances
3. Identification of mountages
4. Identification of feeding appliances
5. Identification of commercial races
6. Leaf harvesting methods
7. Disinfection: preparation of formulation of disinfectants
8. Incubation methods
9. Brushing methods
10. Harvesting and storage of cocoons

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598
B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
III - SEMESTER
GE-1 (Theory)
Vanya Sericulture

Max. Marks: 80

1. Introduction to Vanya Sericulture and its Geographical distribution in India - Introduction to Tassar silkworm, host plants, their cultivation and practices.

2. Tassar silkworm life-cycle, biology, cocoon production, pests and diseases.

3. Tassar seed production and cocoon reeling process.

4. Introduction to Eri silkworm, host plants, their cultivation and practices.

5. Eri silkworm-life cycle, biology, cocoon production, pests and diseases.

6. Eri seed production and cocoon reeling process.

7. Introduction to Muga silkworm, host plants, their cultivation, practices.


9. Muga seed production and cocoon reeling process.


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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
V- SEMESTER
Paper-V (Theory)
Diseases and Pests of Silkworm and their Management

Max. Marks: 60

Unit-1: Basic concepts of silkworm diseases and Protozoan disease

1.1. Introduction; classification of silkworm diseases.
1.2. Pathogenesis of diseases.
1.3. Protozoan disease – symptomaticology, structure of pebrine spore, life cycle of Nosema bombycis, source.
1.4 Mode of infection and transmission, cross infectivity, prevention and control of pebrine

Unit-2: Bacterial and viral diseases

2.1. Bacterial diseases - causative agents, symptoms, factors influencing flacherie, source.
2.2. Mode of infection and transmission prevention and control.
2.3. Viral diseases (grasserie, infectious flacherie, cytoplasmic polyhedrosis, densonucleosis and gattine)- causative agents- symptoms – sources,
2.4. Mode of infection and transmission prevention and control. Of viral diseases

Unit-3: Fungal disease and IPM

3.1. Fungal diseases: white and green muscardine and aspergillosis- causative agents symptoms - structure and life cycle of fungal pathogen
3.2. Mode of infection and transmission prevention and control of fungal diseases.
3.3. Integrated management of silkworm diseases.
3.4. Influence of environment and nutrition on the incidence of diseases.

Unit-4: Pests of silkworms

4.1. Life cycle of Indian uzifly; seasonal occurrence; oviposition and host-age preference; nature and extent of damage; prevention and control; integrated management of Indian uzifly.
4.2. Cocoon pests of silkworm: Dermestid beetle- life cycle; nature and extent of damage; Prevention and control measures.
4.3. Predators of silkworm: Cockroaches, ants, lizards and rodents; prevention and control measures.
4.4. Brief account of methods of pest control: Cultural, mechanical, physical, legislative (Quarantine), chemical, genetical / autodal, biological and IPM.

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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
V- SEMESTER
Paper-V (Practical)
Diseases and Pests of Silkworm and their Management

Max. Marks: 40

1. Identification of Protozoan disease of silkworms
2. Identification of Bacterial diseases of silkworms
3. Identification of Viral diseases of silkworms
4. Identification of Fungal disease of silkworms
5. Microscopic study of pebrine spores
6. uzi infection identification and control methods
7. Life cycle of dermested beetles
8. Methods of application of silkworm bed disinfects
9. Control methods of diseases
10. Control methods of pests.
B.Sc. SERICUTLURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
V- SEMESTER
Paper-V (Theory)
Silkworm Seed technology

Max. Marks: 50

Unit-1: Principles of Seed Technology

1.1 A general account of silkworm seed, grainages, production and demand trends.
1.1.Silkworm seed organisation, significance of seed organization; Basic seed multiplication centres- P4, P3, P2 and P1; Seed areas- identification, concept of selected seed rearers/
1.2.Disinfection and hygiene in seed production units.
1.3.Procurement and transportation of seed cocoons- processing and preservation of seed cocoons- sex separation in seed cocoons.

Unit –2: Grainage equipment and management:

2.1 Grainages : Plan of model grainages—infrastructure, cold storage, facility and equipment, maintenance of grainage conditions.
2.2 Grainage management: Staff component, labour maintenance of grainage good cocoons, layingration.
2.3. Distribution of eggs: precautions and preventive measures
2.4. Protective measure and maintenance of records ion grainage.

Unit-3: Seed production:

3.1. Eclosion of moths: Synchronization of emergence of moth, collection and selection, coupling, decoupling and storage of male moth.
3.2. Egg laying : Ideal condition for egg laying, methods of egg laying, disinfection of eggs and packing of egg cards.
3.3. Mother moth examination for disease infection: Types of examination, green moth and dry moth examination, individual and mass examination.
3.4. Precautions during moth examination

Unit-4: Handling and Preservation of eggs

4.1 Handling of bivoltine eggs : Physical and chemical methods for early hatching hot and cold acid treatments.
4.2 Advantages and disadvantages of hot and cold acid treatments.
4.3 Handling of multivoltine eggs : Preservation of ..................hatching—ideal embryonic stages for cold storage, duration of cold storing.
4.4. Economics of seed production: Cost benefit ration in relation to man-power equipment and maintenance.

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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
V- SEMESTER
Paper-VI (Practical)
Silkworm Seed technology

Max. Marks: 30

1. Model grainage plan
2. Identification of grainage equipment
3. Seed cocoon processing- handling
4. Seed cocoon processing-deflossing
5. Seed cocoon processing-sorting
6. pupal examination
7. Sex separation of pupa and moth.
8. Moth emergence and selection of moths –pairing and depairing
9. oviposition- preparation of DFLS
10. Mother moth examination of for pebrine spores

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B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
VI- SEMESTER, GE-2 (Theory)
Sericulture and Entrepreneurial Development

Max. Marks: 80

Unit 1: Sericulture-Scope of Entrepreneurship.

1.1 General Introduction to Sericulture and its distribution in India. Sericulture organization in India.
1.2 Insect and non-insect fauna producing silk; types of silk produced in India; status of mulberry and non-mulberry Sericulture in India
1.3 Scope of Sericulture in India, employment potential and income generation.
1.4 Entrepreneurship development programme (EDP) for new enterprise creation; emergence and objectives.

Unit 2: Mulberry-Entrepreneurship

2.1 Host plant of mulberry silkworm, mulberry varieties for irrigated and rainfed conditions.
2.2 Soils, location and climate for mulberry cultivation. Package of practices for mulberry cultivation under rainfed and irrigated conditions.
2.3 Pests and diseases of mulberry and their management.
2.4 Entrepreneurship development in mulberry - Kisan nursery, Vermicompost, Bio-fertilizer and Biogas.

Unit 3: Silkworm-Entrepreneurship

3.1 Silkworm seed organization and its significance; importance of seed areas (bivoltine and multivoltine) and silkworm seed legislation act.
3.2 Grainage operations: Grainage building, Procurement and preservation of seed Cocoons, sexing, moth emergence, mating, oviposition- sheet and loose egg preparation, mother moth examination, surface sterilization of eggs, acid treatment of hibernating eggs, packing and sale of eggs. Entrepreneurship development in silkworm egg production
3.3 Rearing operations: Life cycle of the silkworm, Bombyx mori; transportation and incubation of eggs, disinfection, brushing, young and late-age rearing, environmental requirements, feeding, cleaning, spacing, care during moult, hygiene maintenance, mounting and spinning, cocoon harvesting, transportation, marketing and cocoon markets.
3.4 Entrepreneurship development in silkworm rearing - chawki rearing units, mass disinfection units, polyclinics and production of bio-control units.
Unit-4: Silk-Entrepreneurship


4.2 Reeling water – quality and its importance; silk reeling, different reeling – units – charaka, cottage, basin, multi-end, semi-automatic and automatic; re-reeling and packing - objectives and operations – Entrepreneurship development in silk reeling establishment of reeling units.

4.3 Introduction to textile fibres: Types – natural and synthetic fibres; importance of silk fibre; silk production. Properties of mulberry silk, silk testing and grading – objectives; Silk Exchange; weaving and dyeing.

4.4 Entrepreneurship development in bye-products utilization – mulberry silkworm larva, pupa, moth, silk reeling and handicrafts.
B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
VI- SEMESTER
Paper-VII (Theory)
Silk Technology

Max. Marks: 50

Unit-1: Selection of Cocoon for reeling

1.1. Evolution of silk reeling industry and its present status.
1.2. Quality of cocoon : Cocoon shell ratio, cocoon shell reeling rate, silk filament length, cocoon reellability, factors affecting reelability.
1.3. Physical and chemical properties of silk fibre.
1.4. Raw materials for silk reeling : Selection of cocoon for reeling. Assessment of renditta, cocoon gradation, cocoon procurement and transportation.

Unit –2: Cocoon processing

2.1 Cocoon drying: Different methods, conventional and modern techniques steam stifling, hot air dryer, sun drying and others, advantages and disadvantages.
2.2 Cocoon sorting and preservation: Separation of defective cocoons, deflossing, methods of storing and preservation of cocoons.
2.3 Cocoon cooking: Principles of cocoon cooking.
2.4 Cocoon cooking equipment and brushing: open pan, three pan boiling methods, cocoon brushing hand and mechanical brushing.

Unit-3: Raw silk manufacture (Reeling and re-reeling)

3.1 Reeling appliances: Concept of silk reeling, Country charkha, Domestic machine, Cottage machine, Multi-end reeling machine, Automatic machine.
3.2 Reeling operations : Formation of reeling end, jettebout, croissance, reels, speed of reels, traverse or distributors.
3.3 Re-reeling : Re-reeling machine, lacing, denier, skeining, booking and storage.
3.4 Water quality and silk reeling : Use of water in silk reeling, water quality, relationship between water quality and silk reeling, water quality standards.

Unit-4

4.1. Raw silk testing and grading : Methods of testing, standard testing appliances and equipment methods of grading of raw silk.
4.2. Silk throwing and twisting : Throwing preparation for twisting, Twisting of yarn, soaking, dressing, drying, winding, doubling and twisting.
4.3. Chemical processing of silk yarns and fabrics : Degumming, bleaching, dyeing, printing of silk yarns and fabrics.
4.4. silk byproducts and their use

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1. Identification of reeling equipment
2. Categorization of different types of cocoons- good and defective cocoons calculation of percentage of each type.
3. Cocoon stiffing- different methods and determination of degree of drying.
4. Cocoon cooking- different methods and determination of degree of drying.
5. Identification of silk, cotton, wool and synthetic fibre (viscose/nylon/polyester) by physical method-
6. Study of charaka, cottage basin, multi-end silk reeling machine, automatic and semi-automatic reeling machine-practical demonstration. (visit to private reeling unit and filature)
7. Determination of commercial characters of cocoon
   a. shell ratio
   b. filament length
   c. denier
   d. reelability
   e. renditta
Unit-1: Marketing and extension

1.1. Principles and importance of extension education in sericulture
1.2. Project formulation and role of credit co-operative and financing agencies in sericulture: NAARD, IDBI, Banks, IRDP, etc.
1.3. Silk demand all over the world
1.4. Marketing institutions: Marketing boards, co-operatives and stabilization of price

Unit-2: Non-Mulberry Sericulture

2.1 Types of non-mulberry silkworms and their distribution in India and other countries
2.2 Life cycle of tasar silkworm
2.3 Life cycle of eri silkworm
2.4. Life cycle of muga silkworm

Unit-3: Tasar culture

3.1 Tropical tasar: Distribution, life cycle, morphology of egg, larva, pupa, cocoon, moth larval behavior.
3.2. Anatomy: Silk gland, digestive in larva and moth.
3.3. Respiratory, reproductive system in larva and moth.
3.4. Food plants: Primary and secondary food plants, distribution, taxonomy, morphology, propagation and plantation.
3.5. Rearing: Rearing operations—brushing, maintenance of larval population, improved rearing techniques for young and late age tasar.

Unit-4: Grainage (Seed production)

4.1 Tasar seed protection-grainage
4.2 Tasar Diseases and pests: Types, incidences, preventive and control measures.
4.3 Tasar cocoons reeling: Character of the ecoraces, selection and hybridization.
4.4 Tasar culture tribal welfare

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Board of Studies in Zoology
Department of Zoology
Karnataka University
Wanagal - 506 009.
B.Sc. SERICULTURE SYLLABUS UNDER CBCS
(With effect from 2016-2017)
VI-SEMESTER
Paper-VIII (Practical)
Silk Marketing and Non-mulberry Sericulture

Max. Marks: 30

1. Morphology of eri silkworm
2. Morphology of muga silkworm
3. Morphology of tasar silkworm
4. Presentation of statistical data- Bar chart and graph, pie chart of
   a. raw silk
   b. cocoon
   c. area under mulberry cultivation,
   d. import and
   e. exports.
5. Presentation of statistical data-tasar products
6. Dissection of tasar silk glands and digestive system