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UNIVERSITY OF MYSORE

Estd. 1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

No.AC.2(S)/31/18-19

Dated: 15.06.2018

NOTIFICATION

Sub: Revision of syllabus for Sericulture (UG) as per CBCS pattern from the academic year 2018-19.

Ref: 1. Decision of Board of Studies in Sericulture (UG) meeting held on 3.3.2018.
2. Decision of the Faculty of Science & Technology Meeting held on 21.04.2018.
3. Decision of the Deans Committee meeting held on 22.05.2018.

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The Board of Studies in Sericulture (UG) which met on 03rd March, 2018 has recommended to revise the syllabus for B.Sc. Sericulture as per CBCS pattern from the academic year 2018-19.

The Faculty of Science and Technology and the Deans committee meetings held on 21-04-2018 and 22-05-2018 respectively have approved the above said proposal with pending ratification of Academic Council and the same is hereby notified.

The CBCS syllabus of B.Sc. Sericulture course is annexed. The contents may be downloaded **from the University Website i.e., www.uni-mysore.ac.in**.

Draft approved by the Registrar

Deputy Registrar(Academic)

To:

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Dean, Faculty of Science & Technology, DOS in Physics, Manasagangotri, Mysore.
3. The Chairperson, BOS in Sericulture, DOS in Sericulture, Manasagangotri, Mysore.
4. The Chairperson, Department of Studies in Sericulture, Manasagangotri, Mysore.
5. The Director, College Development Council, Moulya Bhavan, Manasagangotri, Mysore.
6. The Principals of the Affiliated Colleges where UG Program is running in Science stream.
7. The Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
8. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
9. Office file.

UNIVERSITY OF MYSORE

PROFORMA OF INSTRUCTION AND EXAMINATION

UNDER CHOICE BASED CREDIT SEMESTER SYSTEM (CBCSS) AND CONTINUOUS ASSESSMENT GRADING PATTERN (CAGP) OF THE OPTIONAL SUBJECT SERICULTURE IN B.Sc. PROGRAMME

Duration of the Course: 3 Years (6 Semesters)

Semester	Course	Title of the Paper	Instruction Hrs (L:T:P) /Week	Credit	Duration of Exam (Hrs.)	Marks		Total Marks
						I A (C1 + C2)	Final Exam (C3)	
I	DSC-(SER)A Theory	Biology of mulberry and silkworm	4:0:0	4	3	10+10	80	100
	DSC-(SER)A Practical	Biology of mulberry and silkworm	0:0:4	2	3	05+05	40	50
II	DSC-(SER)B Theory	Mulberry Cultivation and Silkworm Rearing	4:0:0	4	3	10+10	80	100
	DSC-(SER)B Practical	Mulberry Cultivation and Silkworm Rearing	0:0:4	2	3	05+05	40	50
III	DSC-(SER)C Theory	Mulberry and Silkworm Crop Protection	4:0:0	4	3	10+10	80	100
	DSC-(SER)C Practical	Mulberry and Silkworm Crop Protection	0:0:4	2	3	05+05	40	50
IV	DSC-(SER)D Theory	Physiology of Mulberry and Silkworm	4:0:0	4	3	10+10	80	100
	DSC-(SER)D Practical	Physiology of Mulberry and Silkworm	0:0:4	2	3	05+05	40	50
V	**Any One**							
	DSE-(SER)A Theory	Mulberry& Silkworm breeding and Silkworm Seed Technology	4:0:0	4	3	10+10	80	100
	DSE-(SER)A Practical	Mulberry & Silkworm breeding and Silkworm Seed Technology	0:0:4	2	3	05+05	40	50
	DSE-(SER)A Theory	Agronomy and Agricultural entomology	4:0:0	4	3	10+10	80	100
	DSE-(SER)A Practical	Agronomy and Agricultural entomology	0:0:4	2	3	05+05	40	50
	SKILL ENHANCEMENT COURSE (SEC)							
	SEC-(SER) PAPER-1	Sericulture Technology	2:0:0	2	3	10+10	80	100
VI	**Any One**							
	DSE-(SER)B Theory	Silk Technology, Vanya Sericulture and Extension	4:0:0	4	3	10+10	80	100
	DSE-(SER)B Practical	Silk Technology, Vanya Sericulture and Extension	0:0:4	2	3	05+05	40	50
	DSE-(SER)B Theory	Entrepreneurship development in sericulture	4:0:0	4	3	10+10	80	100
	DSE-(SER)B Practical	Entrepreneurship development in sericulture	0:0:4	2	3	05+05	40	50
	SKILL ENHANCEMENT COURSE (SEC)							
	SEC-(SER) PAPER-2	Silk Technology	2:0:0	2	3	10+10	80	100

(Prof. BASAVAIAH)
(Chairman- BOS Sericulture)

UNIVERSITY OF MYSORE
Syllabus of SERICULTURE as an Optional in B.Sc. Programme (CBCS & CAGP)
I SEMESTER

DSC – (SER) A: BIOLOGY OF MULBERRY AND SILKWORM

Theory **4 hrs/week x 16 weeks = 64 hrs.**

Unit -1		
1.	Introduction to Sericulture-Origin and history of Sericulture- Silk road, spread of Sericulture to Europe, South Korea, Japan, India and other countries.	4 hrs.
2.	Sericulture map of India and World. Components of Sericulture.	2 hrs.
3.	Sericultural practices in tropical and temperate climate.	2 hrs.
4.	Employment generation in sericulture- Role of women in sericulture.	2 hrs.
5.	Textile fibres: Types- natural and synthetic fibres- types of silk produced in India and their importance.	2 hrs.
6.	Sericultural practices in rain-fed and irrigated conditions; traditional and non-traditional areas.	4 hrs.
Unit -2		
7.	Sericulture organization in India and Karnataka; role of state departments of Sericulture, Central Silk Board, Universities and NGOs in Sericulture development.	2 hrs.
8.	Salient features, economic importance of the family Moraceae. Phytogeography and systematics of the genus *Morus* L. and its species. Botanical description of mulberry.	4 hrs.
9.	Morphology of mulberry: different cultivars of mulberry with special reference to Karnataka. Floral biology of mulberry: Structure of male and female flowers, Catkins.	4 hrs.
10.	Anther and ovule in mulberry; micro- and megasporogenesis; development of male and female gametophytes; pollination, fertilization; development of endosperm, embryo and seed; polyembryony and parthenocarpy in mulberry.	6 hrs.
Unit -3		
11.	Anatomy of mulberry: internal structure of stem, root, petiole and leaf lamina; secondary growth in root and stem. Structure and organization of shoot and root meristems.	6 hrs.
12.	Weeds of Mulberry garden, classification, characteristics, effect on crop plants. Weeding methods- Integrated weed management.	2 hrs.
13.	Characteristic features of the order Lepidoptera; detailed study of the families- Saturnidae and Bombycidae. Classification of sericigenous insects	4 hrs.
14.	Classification of silkworms based on moultinism, voltinism and geographical distribution; popular silkworm breeds and hybrids of Karnataka; their economic traits.	4 hrs.
Unit -4		
15.	Life cycle of *Bombyx mori;* morphology of egg, larva, pupa and adult.	4 hrs.
16.	Morphology and anatomy of digestive, circulatory, excretory, respiratory, nervous system of silkworm larva.	8 hrs.
17.	Morphology and anatomy of reproductive systems of silk moth.	2 hrs.
18.	Morphology and anatomical structure of Silk gland	2 hrs.

DSC – (SER) A: BIOLOGY OF MULBERRY AND SILKWORM

Practical **16 Practicals of 4 hrs. each**

1.	Sericulture maps: (a) World maps and Silk Road. (b) Sericulture map of India and Karnataka.	1 Prac.
2.	Preparation of histograms and pie charts on: (a) Production of textile fibres in India. (b) World silk production. (c) Pie chart on mulberry and non-mulberry silk production in India.	2 Prac.
3.	Taxonomic description of mulberry.	1 Prac.
4.	Study of five popular mulberry cultivars of Karnataka (Mysore local, K_2, S_{36}, S_{13} and V_1)	1 Prac.
5.	Mounting of Pollen grains, Ovule and Embryo.	1 Prac.
6.	Anatomy of petiole, leaf lamina, stem and root.	2 Prac.
7.	Weeds of mulberry garden.	1 Prac.
8.	Life cycle of *Bombyx mori*- Morphology of egg, larva, pupa and adult of *Bombyx mori.*	1 Prac.
9.	Sex separation in larva, pupa and adult of the silkworm *Bombyx mori.*	1 Prac.
10.	Dissection and display of: (a) Digestive system of larva. (b) Silk glands. (c) Reproductive system of male and female moths. (d) Mounting of larval mouth parts and spiracle. (e) Nervous system of silkworm larva.	5 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs. **Max. Marks - 40**

Q 1. Taxonomic description of any one of the popular mulberry cultivars
(Mysore Local, M5, S36, V1, S13, G4, etc.,) - 12 marks

Note: Distribution of marks
a) Identification of the variety - 2
b) Diagnostic features - 6
c) Sericultural importance - 4

OR

Sectioning and Mounting of Petiole / Leaf Lamina / Stem / Root.

Note: Distribution of marks
a) Preparation - 6
b) Identification - 2
c) Features and labeled diagram - 4

Q 2. Any one of the following: - 12 marks
Male / Female reproductive system / Silk glands / Digestive system / Nervous system / Sex separation at larval / Pupal / Moth stage.

Note: Distribution of marks
a) Dissection / Sex separation - 8
b) Labeled diagram with description - 4

Q 3. Identify and comment on A, B, C, D and E. - 10 marks
Any FIVE from the practical syllabus.

Q 4. Viva-voce. - 6 marks

II SEMESTER

DSC – (SER) B: MULBERRY CULTIVATION AND SILKWORM REARING

Theory **4 hrs/week x 16 weeks = 64 hrs.**

Unit- 1		
1.	Definition of soil, soil structures, soil textures and soil profile.	3 hrs.
2.	Types of soils in India, soil conservation methods.	3 hrs.
3.	Importance of soils fertility with reference to mulberry cultivation; soil analysis- soil sampling, soil pH, organic carbon and NPK level.	3 hrs.
4.	Propagation of mulberry- seedling, sapling, grafting and layering.	3 hrs.
5.	Establishment of mulberry garden: Areas under mulberry cultivation in India, Species and Varieties under cultivation in India, General Descriptions, Climatic requirements, Soil conditions, mulberry cultivation under rain-fed and irrigated conditions, mulberry cultivation in hilly areas, mixed forming. Special references to tree plantations.	4 hrs.
Unit- 2		
6.	Raising of commercial nursery; Application of root inducing hormones	2 hrs.
7.	Introduction to different types of Manures and fertilizers: Biofertilizers, Foliar nutrition, Plant nutrients (macro and micro nutrients), composting, vermicomposting and Plant Hormones.	6 hrs.
8.	Intercultivation and Mulching practices: Purpose, methods, time and frequency.	2 hrs.
9.	Irrigation: Importance, Source, methods, periodicity and quantity of irrigation, over-irrigation and its effects.	2 hrs.
10.	Leaf harvesting: harvesting methods (leaf and shoot harvests); transportation and preservation of harvested leaf and shoots. Prunning- Objectives, Importance and methods.	2 hrs.
11.	Estimation of leaf yield: Importance of leaf quality.	2 hrs.
Unit- 3		
12.	Rearing house: Location, orientation, plan and utilities; model rearing house; low-cost rearing house.	3 hrs.
13.	Rearing appliances-shelf and shoot rearing; requirements of rearing appliances (per unit rearing of 100 dfls).	3 hrs.
14.	Disinfection of rearing house and rearing appliances; disinfectants (formalin, bleaching powder, chlorine dioxide, slaked lime and iodine compounds); rearing and personal hygiene.	3 hrs.
15.	Selection of silkworm races/breeds for rearing- advantages and disadvantages of bivoltine and multivoltine pure races/ breeds and hybrids.	3 hrs.
16.	Incubation- definition, requirement of environmental conditions, incubation devices; identification of different stages of development; black boxing and its importance.	4 hrs.
Unit- 4		
17.	Chawki rearing: Preparation; brushing and its methods; types of chawki rearing – traditional and improved method; optimum environmental conditions; methods and frequency of feeding; methods of bed cleaning; spacing; moulting and care during moult.	5 hrs.
18.	Late age silkworm rearing: Methods; optimum environmental conditions; feeding quantity and frequency; methods of bed cleaning; spacing; moulting and care during moult.	5 hrs.
19.	Identification of spinning larva; spinning; mounting and mounting density; types of mountages, their advantages and disadvantages; environmental requirements during spinning.	3 hrs.
20.	Harvesting: Time of harvesting; sorting, storage/ preservation, packaging and transport of cocoons; leaf-cocoon ratio; maintenance of rearing records.	3 hrs.

DSC – (SER) B: MULBERRY CULTIVATION AND SILKWORM REARING

Practical **16 Practicals of 4 hrs. each**

1.	Determination of soil pH and water holding capacity.	1 Prac.
2.	Farm implements.	1 Prac.
3.	Preparation of land, pits and rows; preparation of rooting media (fieldwork).	1 Prac.
4.	Raising of sapling and seedling (field work).	2 Prac.
5.	Intercultivation, mulching, irrigation, pruning and estimation of leaf yield. (Demonstration and exercise).	2 Prac.
6.	Grafting and Layering in mulberry.	2 Prac.
7.	Harvesting and preservation techniques; leaf selection for different instars.	1 Prac.
8.	Rearing houses- model rearing house and low-cost rearing house.	1 Prac.
9.	Rearing appliances.	1 Prac.
10.	Disinfection- Types of disinfectants- concentration and dosage requirement; preparation of spray formulation of disinfectants.	1 Prac.
11.	Incubation of silkworm eggs- Methods; black boxing; maintenance of temperature and humidity;	1 Prac.
12.	Brushing: Methods; chawki rearing; use of paraffin paper and blue polythene sheet. Bed cleaning: use of bed cleaning net and disposal of bed refuses and silkworm litter.	1 Prac.
13.	Moulting: Identification of moulting larva, care during moulting; mounting and mounting density; harvesting of cocoons; assessment of cocoons; types of mountages; Maintenance of records for silkworm rearing.	1 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs. **Max. Marks - 40**

Q 1. Determination of soil pH / water holding capacity / grafting / layering. - 10 marks

Note: Distribution of marks

a) Procedure - 2

b) Labelled diagramme / Calculation - 3

c) To conduct Experiment - 5

Q 2. Calculations and procedure about disinfection/ brushing/ bed cleaning/ hatching Percentage. - 10 marks

Note: Distribution of marks

a) Procedure/Description - 5

b) To conduct Experiment - 5

Q 3. Identify and comment on the spots A, B, C, D and E. Any FIVE from the practical syllabus. - 10 marks

Q 4. Submission of field work / visit report. - 5 marks

Q 4. Viva-voce. - 5 marks

III SEMESTER

DSC – (SER) C: MULBERRY AND SILKWORM CROP PROTECTION

Theory **4 hrs/week x 16 weeks = 64 hrs.**

Unit-1		
1.	Introduction to plant diseases and importance of plant protection.	1 hr.
2.	Classification of mulberry diseases.	1 hr.
3.	Influence of biotic and abiotic factors on the incidence of plant diseases	1 hr.
4.	Mineral deficiency symptoms in mulberry	3 hrs.
5.	Fungal diseases of mulberry: Occurrence, symptoms, etiology and preventive and control measures of the following diseases : (a) Powdery mildew. (b) Leaf spot.(c) Leaf rust.(d) Leaf blight.(e) Root rot.	5 hrs.
6.	Root-knot disease of mulberry- occurrence, life cycle, symptoms, preventive and control measures.	1 hr.
7.	Viral, bacterial and dwarf diseases of mulberry- their occurrence- symptoms and preventive and control measures.	4 hr.
Unit-2		
8.	Pest: Definition; pest outbreak; pest forecasting .	3 hrs.
9.	Major pests: leaf roller, Bihar hairy caterpillar, mealy bug and thrips – life cycle, nature of damage and their preventive and control measures.	4 hrs.
10.	Minor pests: girdlers, termites and mites- life cycle, nature of damage and their preventive and control measures.	6 hrs.
11.	Pesticides: Forms, formulations, calculation and application.	3 hrs.
Unit-3		
12.	Introduction; classification of silkworm diseases.	1 hr.
13.	Protozoan disease – symptomatology, structure of pebrine spore, life cycle of *Nosema bombycis*, source, mode of infection and transmission, cross infectivity, prevention and control.	3 hrs.
14.	Bacterial diseases - causative agents, symptoms, factors influencing flacherie, source, mode of infection and transmission, prevention and control.	6 hrs.
15.	Viral diseases (grasserie, infectious flacherie, cytoplasmic polyhedrosis, densonucleosis and gattine) - causative agents- symptoms – sources, mode of infection and transmission- prevention and control.	6 hrs.
Unit-4		
16.	Fungal diseases: white and green muscardine and aspergillosis- causative agents- symptoms - structure and life cycle of fungal pathogen- mode of infection and transmission- prevention and control.	4 hrs.
17.	Integrated management of silkworm diseases.	2 hrs.
18.	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 hrs.
19.	Cocoon pests of silkworm: Dermestid beetle- life cycle; nature and extent of damage; Prevention and control measures.	2 hrs.
20.	Predators of silkworm: Cockroaches, ants, lizards and rodents; prevention and control measures.	1 hr.
21.	Brief account of methods of pest control: Cultural, mechanical, physical, legislative (Quarantine), chemical, genetical / autocidal, biological and IPM.	3 hrs.

DSC – (SER) C: MULBERRY AND SILKWORM CROP PROTECTION

Practical **16 Practicals of 4 hrs. each**

1.	Study of powdery mildew, leaf spot and leaf rust through sectioning, staining and temporary mounting.	3 Prac.
2.	Study of root-knot nematode in mulberry.	1 Prac.
3.	Collection, mounting/preservation of insect pests of mulberry (field work).	2 Prac.
4.	Identification of mulberry pests. Study of nature of damage of the following pests: Leaf roller, Bihar hairy caterpillar, scale insect, mealy bug, thrips, beetles, jassids and grasshoppers.	1 Prac.
5.	Study of pesticides, their formulation, applicators (sprayers and dusters	1 Prac.
6.	Identification of different diseased silkworms based on external symptom (grasserie, flacherie, muscardine and pebrine). Identification of pathogens associated with silkworm diseases: Staining and preparation of temporary slides of bacteria, spores of pebrine, polyhedra of nuclear polyhedrosis virus and mycelial mat/spores of muscardine.	4 Prac.
7.	Methods of application of silkworm bed disinfectants for management of silkworm diseases.	1 Prac.
8.	Life cycle of Uzi fly; Identification of uzi-infested silkworms and cocoons.	1 Prac.
9.	Life cycle of dermestid beetles: Dermestid beetle infested silkworm cocoons and estimation of incidence.	1 Prac.
10.	Predators of silkworm.	1 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs. **Max. Marks - 40**

Q 1. Temporary mounting of any one of the following. - 10 marks

Leaf spot/ leaf rust/ powdery mildew/ root knot nematode of mulberry.

Note: Distribution of marks

a) Identification with binomial nomenclature - 2
b) Sectioning, staining and mounting - 5
c) Labelled diagram with description - 3

Q 2. Temporary mounting of any one of the following. - 10 marks

Pebrine spore/ nuclear polyhedral bodies/ mycelia and conidial spores.

Note: Distribution of marks

a) Identification - 2
b) Staining and mounting - 5
c) Procedure and diagram - 3

Q 3. Identify and comment on the spots A, B, C, D and E.
Any FIVE from the practical syllabus. - 10 marks

Q 4. Submission of field work / visit report. - 5 marks

Q 5. Viva-voce. - 5 marks

IV SEMESTER

DSC – (SER) D: PHYSIOLOGY OF MULBERRY AND SILKWORM

Theory **4 hrs/week x 16 weeks = 64 hrs.**

Unit –1		
1.	Absorption of water and solutes by roots; effect of external conditions; root pressure; ion exchange and active absorption.	3 hrs.
2.	Mineral nutrition- macro and micro nutrients; their physiological role.	2 hrs.
3.	Transpiration: Significance; stomata- mechanism of opening and closing; regulation of water loss by stomata; factors influencing the rate of transpiration.	5 hrs.
4.	Brief account of biological nitrogen fixation; types- importance in mulberry cultivation.	3 hrs.
5.	Biofertilizers, types and its significance.	3 hrs.
Unit-2		
6.	Biochemical composition of mulberry leaf	4 hrs.
7.	Brief account of photosynthesis: Outline of the process; types of carbon fixation (C3 and C4); brief account of photorespiration and its significance.	6 hrs.
8.	Plant growth regulators: Importance and application in mulberry, agriculture and horticulture.	4 hrs.
9.	Role of environmental factors on mulberry growth.	2 hrs.
Unit-3		
10.	Developmental biology: Morphology and structure of silkworm egg, fertilization, cleavage, blastoderm, germ band formation, blastokinesis, eye spot and blue egg; dispause development.	4 hrs.
11.	Digestion: Nutritive requirements of the silkworm, midgut structure and function. Structure and function of digestive system; digestive enzyme; process of digestion.	4 hrs.
12.	Respiration: tracheal systems- spiracles, mechanism of respiration, factors affecting respiration.	4 hrs.
13.	Excretion: structure and function of excretory system and cryptonephrial arrangement and its significance in water regulation.	4 hrs.
Unit-4		
4.	Neuro-endocrine system: Nervous system; Structure and distribution of endocrine glands; role of nervous system in endocrine function.	2 hrs.
15.	Sense organs: Photoreceptors, Chemoreceptors and Mechanoreceptors.	2 hrs.
16.	Circulation: heart beat-role of alary muscles; accessory hearts; blood pressure in open circulatory system. Haemolymph.	2 hrs.
17.	Reproduction: Male and female reproductive systems in insects; role of accessory gland; oviposition.	3 hrs.
18.	Muscle Physiology: Histology of insect muscles, flight muscles in insects, ultra structure of skeletal muscle, mechanism of muscle contraction.	3 hrs.
19.	Integument: Structure, formation and function.	2 hrs.
20.	Metamorphosis- types of insect metamorphosis, theories of metamorphosis.	2 hrs.

DSC - (SER) D: PHYSIOLOGY OF MULBERRY AND SILKWORM

Practical **16 Practicals of 4 hrs. each**

1.	Determination of stomatal size and index	2 Prac.
2.	Kranz Anatomy in relation to photosynthesis.	1 Prac.
3.	Separation of leaf photosynthetic pigments of mulberry through paper chromatography.	1 Prac.
4.	Determination of water potential of potato tubers and osmosis.	1 Prac.
5.	Estimation of mulberry leaf moisture percentage and retention capacity of any two mulberry varieties.	2 Prac.
6.	Hill reaction.	1 Prac.
7.	Study of structure of silkworm egg. Mounting of 7^{th}, 8^{th} and 9^{th} day old embryos.	3 Prac.
8.	Mounting of spiracles and mouth parts.	1 Prac.
9.	Study of haemocytes in silkworm.	1 Prac.
10.	Determination of hatching fecundity and hatching per centage.	1 Prac.
11.	Mounting of larval skin, pupal chitin.	1 Prac.
12.	Mounting of body scales of silk moth	1 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs. **Max. Marks - 70**

Q 1. Separation of photosynthetic pigments / water potential of potato tubers / Stomatal index / Estimation of protein in mulberry leaf. - 12 marks

Note: Distribution of marks

a) Procedure - 3

b) Labeled diagramme / Result - 6

c) To conduct Experiment - 3

Q 2. Estimation of haemolymph amylase/ succinate dehydrogenase / glucose / succinate dehydrogenase / Mounting of silkworm embryo (7^{th} /8^{th} /9^{th} day). - 12 marks

Note: Distribution of marks

a) Procedure - 4

b) Result / Mounting - 8

Q 3. Identify and comment on the spots A, B, C, D and E.
Any FIVE from the practical syllabus. - 10 marks

Q 4. Viva-voce. - 6 marks

V SEMESTER

DSE – (SER) A (1): MULBERRY & SILKWORM BREEDING AND SEED TECHNOLOGY

Theory **4 hrs/week x 16 weeks = 64 hrs.**

	Unit-1	
1.	Germplasm bank: Importance; collection, characterization and maintenance.	2 hrs.
2.	Plant introduction and acclimatization; Quarantine.	1 hr.
3.	Mulberry breeding: Objectives; selection methods.	3 hrs.
4.	Hybridization technique and selection.	4 hrs.
5.	Polyploidy breeding and Mutation breeding.	2 hrs.
6.	Breeding for disease and Drought resistance.	2 hrs.
7.	Evaluation of selected genotypes and release of improved varieties.	2 hrs.
	Unit-2	
8.	Silkworm germplasm bank.	1 hr.
9.	Sex determination mechanism in silkworm- importance of ZZ and ZW chromosomes- sex-limited races.	1 hr.
10.	Gametogenesis- Oogenesis and Spermatogenesis	2 hrs.
11.	Genetic of voltinism and moultinism in the silkworm, *Bombyx mori*.	2 hrs.
12.	Silkworm breeding- inbreeding and out breeding concepts- objectives of silkworm breeding. Different types of breeding methods- selection, line breeding, cross breeding and mutation breeding.	3 hrs.
13.	Heriditory traits of silkworm egg, larva,pupa and adult.	3 hrs.
14.	Genetics of cocoon colours- inheritance of cocoon colours.	1 hr.
15.	Heterosis/hybrid vigour-exploitation of heterosis in silkworm- concept of single, double and polyhybrids.	4 hrs.
	Unit-3	
16.	Silkworm seed organisation, significance of seed organization; Basic seed multiplication centres-P4, P3, P2 and P1; Seed areas- identification; concept.	4 hrs.
17.	Concept of selected seed rearers/villages- Seed Legislation Act- maintenance of seed crops.	2 hrs.
18.	Seed cocoon markets- pupal examination, certification of seed cocoon lots- price fixation for seed cocoons.	2 hrs.
19.	Disinfection and hygiene in seed production units.	2 hrs.
20.	Seed production centres (grainages)- types of grainages- organisation and functions of grainages	2 hrs.
21.	Plan for model grainage- grainage equipments and their use - Seed production plan.	2 hrs.
22.	Procurement and transportation of seed cocoons- processing and preservation of seed cocoons- sex separation in seed cocoons.	2 hrs.
	Unit -4	
23.	Moth emergence and 10 ynchronization; sex separation in moth; effect of improper 10ynchronization on egg hatching and quality-safe duration.	3 hrs.
24.	Coupling and decoupling; oviposition; method of egg production; refrigeration of male moths; mother moth examinations- individual and mass methods- dry moth examination; environmental conditions for grainage activity.	3 hrs.
25.	Egg disinfection- handling of multivoltine eggs- preservation of eggs to postpone hatching-ideal embryonic stages for cold storage- maximum duration of cold storage. Handling of bivoltine eggs for early hatching- physical and chemical methods- hot and cold acid treatment.	4 hrs.
26.	Postponement of hatching; hibernation schedule for 3, 4, 6 and 10 month's duration.	1 hrs.
27.	Preparation of layings and loose egg- advantages- handling of loose eggs.	2 hrs.
28.	Incubation of eggs-methods, environmental conditions required for incubation, postponement of hatching of eggs by temporary consignment.	2 hrs.
29.	Grainage management-Role of LSPs. Bye products of grainage and their utilization.	1 hr.

DSE - (SER) A (1): MULBERRY & SILKWORM BREEDING AND SEED TECHNOLOGY

Practical **16 Practicals of 4 hrs. each**

1.	Mulberry germplasm and Mulberry multilocational trials (field visit)	1 Prac.
2.	Evaluation of breeding parameters in different mulberry varieties.	1 Prac.
3.	Study of mitosis in onion root tip/mulberry root tip.	1 Prac.
4.	Hybridization technique in mulberry.	1 Prac.
5.	Study of meiosis in grasshopper and silkworm testis.	1 Prac.
6.	Identification of different races of silkworm cocoons- NB_4D_2, KA, PM, C.Nichi, Nistari, CSR_2 and CSR_4 race/ breeds characters.	1 Prac.
7.	Identification of mutants of silkworm larva- zebra, ursa, knobbed and sex-limited Races.	1 Prac.
8.	Comparative assessment of the hybrids and pure race cocoons.	1 Prac.
9.	Model grainage plan and Grainage equipments.	1 Prac.
10.	Seed cocoon processing/handling- deflossing, sorting and preservation- pupal examination and Sex separation of pupa and moth. Synchronization of emergence.	1 Prac.
11.	Moth emergence- selection of moths- pairing and de-pairing- oviposition- preservation of male moths- preparation of disease free layings- sheet egg and loose egg preparation- Preparation of starch coated paper, washing of loose eggs, Drying- Treatment of eggs with acid-Weighing and packing.	2 Prac.
12.	Pupa and Mother moth examination for Pebrine spores- Individual and Mass moth examination- surface disinfection of silkworm eggs. Preservation and handling of hibernated eggs for 3, 4, 6 and 10 month hibernation schedules	1 Prac.
13.	Acid treatment of bivoltine eggs- hot acid and cold acid treatment. Incubation of acid treated eggs-Calculation of hatching percentage.	1 Prac.
14.	Visit to Germplasm banks (CSGRC, Hosur / CSR&TI, Mysuru), Seed cocoon markets, commercial Grainage and cold storage center to know activities of cocoon markets, preparation of layings and cold storage of eggs - Report submission.	2 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs. **Max. Marks - 40**

Q 1. Evaluation of mulberry breeding genotypes. OR
Temporary squash preparation of mitotic of onion root tip / meiotic chromosomes of grasshopper testis / silkworm testis. - 9 marks

Note: Distribution of marks
- a) Procedure - 2
- b) Staining and preparation of chromosomes - 4
- c) Identification of stages and labelled diagram - 3

Q 2. Assessment of cocoons of pure races or hybrids for cocoon weight, shell weight and other racial characters/Estimation of heterosis/inbreeding depression. - 9 marks

Note: Distribution of marks
- a) Assessment - 5
- b) calculations - 4

Q 3. Cold / hot acid treatment of silkworm eggs / Pupa / Mother moth examination / Sex separation of pupal or moth stage / hatching percentage. - 9 marks

Note: Distribution of marks
- a) Procedure - 4
- b) Experiment - 5

Q 4. Identify and comment on the spots A, B, C and D.
Any FOUR from the practical syllabus. - 8 marks

Q 5. Submission of field visit report. - 5 marks

DSE – (SER) A (2): AGRONOMY AND AGRICULTURAL ENTOMOLOGY

Theory **4 hrs/week x 16 weeks = 64 hrs.**

	Unit-I	
1.	Soil formation: Soil forming factors, influence of soil forming (weathering) factors and soil profile and classification.	4 hrs.
2.	Properties of soil: Physical - structure, texture, colour, permeability, bulk and particle density and porosity; chemical - pH, electrical conductivity, organic carbon, ionic exchange; biological – micro and macro organisms.	4 hrs.
3.	Soil water and air: Importance - physical and biological classification of soil water – soil moisture constants and drainage.	4 hrs.
4.	Soil types in India. Problematic soils and their reclamation. Soil fertility and productivity. Soil sampling and soil testing.	4 hrs.
	Unit - II	
5.	Basic principles of crop production; classification of crops; methods of crop production; farming systems; planting seasons**.**	4 hrs.
6.	Plant nutrient management: Essential plant nutrients – uptake and deficiency symptoms, organic manures, inorganic fertilizers and biofertilizers – importance, classification and application; foliar nutrition, Integrated nutrient management. Composting and vermicomposting.	6 hrs.
7.	Irrigation management: Sources, methods and schedules; conservation of soil moisture in dry land farming.	2 hrs.
8.	Weed management – methods. Farm management – principles and concepts.	4 hrs.
	Unit - III	
9.	Characteristic features of insects. Insects in the service of man and insects as enemies of man.	2 hrs.
10.	Insect pests: Definition, origin, categories and types; pest forecasting and outbreak. Symptoms and injuries caused by insect pests; ETL and EIL.	4 hrs.
11.	Insect pests of agricultural crops: Cereals, pulses, oilseeds and stored grains. Insect pests of horticultural crops: Vegetables, fruits and plantation crops.	6 hrs.
12.	Insect pests of farm animals: Blood sucking flies, myiasis flies, lice and fleas; arachnids. Insect pests of public health importance - mosquitoes, houseflies, sandflies, lice, bedbugs and ratfleas.	4 hrs.
	Unit-IV	
13.	Insect pest control: General considerations and prior information.	2 hrs.
14.	Natural control of insect pests: Climatic factors, natural barriers, natural enemies and diseases.	4 hrs.
15.	Applied control of insect pests: Cultural, mechanical, physical, biological, genetical/autocidal, legal, microbial, pheromonal, hormonal and chemical methods.	6 hrs.
16.	Integrated pest management – goals, principles and concepts, components and benefits.	4 hrs.

DSE – (SER) A (2): AGRONOMY AND APPLIED ENTOMOLOGY

Practical **16 Practicals of 4 hrs. each**

1.	Study of agricultural implements and machinery.	1 Prac.
2.	Soil sampling and testing.	1 Prac.
3.	Composting and vermicomposting.	1 Prac.
4.	Study of manures, fertilizers and bio-fertilizers, calculation of NPK dosage.	2 Prac.
5.	Study of nutrient deficiency symptoms in crop plants.	1 Prac.
6.	Study of drip and sprinkler irrigation systems.	1 Prac.
7.	Study of characteristic features of important weeds.	1 Prac.
8.	Collection and identification of insects belonging to orders: Lepidoptera, Coleoptera, Orthoptera, Diptera, Hymenoptera and Homoptera.	2 Prac.
9.	Collection and methods of insect preservation.	1 Prac.
10.	Studies on life cycle of harmful insects: Agricultural and horticultural crops.	2 Prac.
11.	Studies on life cycle of harmful insects: Farm animals and public health.	2 Prac.
12.	Planning the facilities required for establishment of insectary. Production of bio-control agents - insect parasitoids and predators.	1 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs **Max. Marks - 40**

Q 1. Collection and preparation of soil sample in the field / Calculation of fertilizers requirement (as per recommended NPK dose) for a given area of irrigated or rainfed mulberry garden and given type of fertilizers. - 10 marks

a) Procedure – 5 marks; b) Collection / Calculation – 5 marks.

Q 2. Assign the given insect pests / parasitoids to their respective taxonomic group and write on their life cycle and importance. - 10 marks

a) Identification – 4 marks: b) Life cycle and importance – 6 marks.

Q 3. Identify and comment on the spots A, B, C, D and E. - 10 marks

Any FIVE from the practical syllabus.

Q 4. Submission of field work / visit report. - 5 marks

Q 5. Viva-voce. . - 5 marks

SKILL ENHANCEMENT COURSE (SEC) FROM SERICULTURE

SEC – (SER) PAPER-1: SERICULTURE TECHNOLOGY

Theory **2 hrs/week X 16 Wweeks = 32 hrs**.

	Unit-1	
1.	Introduction to Sericulture-Origin and history of Sericulture. Components of sericulture.	1 hr.
2.	Establishment of mulberry garden under rain-fed and irrigated conditions. Spacing.	1 hr.
3.	Package of practices for mulberry under irrigated and rainfed conditions.	2 hrs.
4.	Manuring: Soil sampling and testing, NPK requirements. Intercropping, composting.	2 hrs.
5.	Irrigation: Importance, and methods. Conservation of soil moisture	1 hr.
6.	Leaf harvesting: harvesting; transportation and preservation	1 hr.
	Unit-2	3 hrs.
7.	Fungal diseases of mulberry: Occurrence, symptoms and preventive and control measures of powdery mildew, leaf spot, leaf rust, root rot and stem canker.	3 hrs.
8.	Root-knot disease of mulberry- occurrence, symptoms, preventive and control measures.	1 hr.
9.	Major pests of mulberry: Leaf roller, Bihar hairy caterpillar, mealy bug and thrips – Nature of damage, preventive and control measures. Pest outbreak; pest forecasting.	3 hrs.
10.	Minor pests: -nature of damage, preventive and control measures.	1 hr.
	Unit-3	
11.	Rearing house: model rearing house. Rearing appliances.	1 hr.
12.	Disinfection of rearing house and appliances; disinfectants, rearing and personal hygiene.	1 hr.
13	Silkworm breeds for rearing. Incubation of eggs and black boxing.	1 hr.
14	Chawki rearing: Brushing; optimum environmental conditions; methods and frequency of feeding; methods of bed cleaning; spacing; moulting and care during moult	2 hrs.
15	Late age silkworm rearing: Methods; optimum environmental conditions; feeding quantity and frequency; methods of bed cleaning; spacing; moulting and care during moult.	2 hrs
16	Identification and mounting of spinning larvae; types of mountages and environmental requirements during spinning. Harvesting, sorting packing and transport of cocoons.	1 hr.
	Unit-4	
17	Introduction to silkworm diseases. Protozoan disease – symptomatology, structure of pebrine spore, source, mode of infection and transmission, prevention and control	2 hrs.
18	Bacterial diseases - causative agents, symptoms, mode of infection and transmission, prevention and control.	1 hr.
19	Viral diseases (grasserie, infectious flacherie and cytoplasmic polyhedrosis)- causative gents- symptoms – mode of infection and prevention and control	2 hrs.
20	Fungal diseases: white and green muscardine and aspergillosis- causative agents- symptoms - prevention and control	1 hr.
20.	Indian uzifly; life cycle, nature and extent of damage; prevention and control; integrated management	1 hr.
22	Dermestid beetle - life cycle; nature of damage; prevention and control measures. Predators of silkworm: prevention and control measures.	1 hr.

VI SEMESTER

DSE – (SER) B (1): SILK TECHNOLOGY, VANYA SERICULTURE AND EXTENSION

Theory **4 hrs/week x 16 weeks = 64 hrs.**

	Unit-I	
1.	Textile fibres. Physical and commercial characteristics of cocoons: cocoon colour, shape, size, hardness, grain/wrinkle, weight of cocoon, weight of cocoon shell, shell ratio.	2 hrs.
2.	purchase of cocoon in open auction in cocoon market; grading and sorting of Cocoon.	2 hrs
3.	Cocoon stifling: Definition, objectives, different methods-conventional and modern techniques- steam stifling. Hot air drying- Batch type and conveyer type.	2 hrs
4.	Cocoon cooking/boiling: Definition and objectives, different methods of cocoon boiling-Mono pan, three pan and pressurized cocoon boiling methods.	2 hrs
5.	Cocoon brushing: Definition and objectives; methods of brushing.	2 hrs
6.	Reeling water: quality required for silk reeling, hardness, pH; corrective measures.	2 hrs
7.	Reeling: Objective; devices-country charaka, cottage basin, multi end reeling machine, auto and semi-automatic, improved CSTRI reeling devices.	2 hrs
8.	Re-reeling and packing: Objectives, process; lacing, skeining, booking and baling.	2 hrs
	Unit-II	
9.	Raw silk properties- physical, chemical and biological. Uses of raw silk.	2 hrs.
10.	Raw silk testing and grading; Visual inspection. Mechanical tests; Supplementary tests-conditioning weight, scouring loss, exfoliation tests.	3 hrs.
11.	Silk throwing: Introduction, objectives; soaking, winding, doubling, twisting, rewinding.	3 hrs.
12.	Silk weaving: Warp preparation, Weft preparation; pirn winding methods. Powerloom and handloom weaving. Flow chart of weaving; weaving defects .	3 hrs.
13.	Chemical processing of silk yarns and fabric: Degumming- methods. Silk bleaching; Silk dyeing-Acidic and basic dyeing processing; dyes and chemicals used for silk dyeing.	3 hrs.
14.	Spun silk industry- various steps involved, flow chart, spun silk yarn and noil yarn.	2 hrs.
15.	Introduction to by-products of sericulture industry and their utilization.	
	Unit-III	
16.	Non-mulberry silkworms - their distribution in India and other countries and taxonomy	2 hrs.
17.	Cultivation of *Terminalia arjuna,, Machilus bombycina* and *Ricinus communis*.	3 hrs.
18.	Life cycle of Tasar, Eri and muga silkworms.	2 hrs.
19.	Important diseases and pests of primary food plants and their management.	2 hrs.
20.	Rearing of non-mulberry silkworms. Ecological conditions required- improved rearing methods for young and late age tasar, eri and muga silkworms. Mounting methods.	3 hrs.
21.	Seed cocoons- Procurement, preservation and production of disease free eggs.	2 hrs.
22.	Diseases of non-mulberry silkworms- protozoan, bacterial, viral and fungal diseases. Symptoms- causative agents-preventive and control measures.	2 hrs.
	Unit-IV	
23.	Extension education- meaning ,objectives and importance, Principles and concepts	2 hrs.
24.	Extension programmes- concepts and principles, role of extension personnel and farmers in programme planning Transfer of technology.	2 hrs.
25.	Communication- definition, types. Training- concepts and definition- methods	2 hrs.
26.	TSC's and Co-Operative chawki rearing centers: Role and Importance.	3 hrs.
27.	Mulberry cultivation–Cost and returns under irrigation and rainfed condition.	1 hr.
28.	Economics of egg production: Expenditure and income	2 hrs.
29.	Economics of silkworm rearing: Investment and returns.	1hrs.
30.	Economics of silk reeling: Cost and returns for different types of reeling establishments.	2 hrs.
31.	Silk exchange, KSMB and KSIC.	1 hr.

DSE – (SER) B (1): SILK TECHNOLOGY, VANYA SERICULTURE AND EXTENSION

Practical **16 Practicals of 4 hrs. each**

1.	Identification of silk, cotton, wool and synthetic fibre (viscose/nylon/polyester) by physical method- flame and microscopic test, chemical and confirmatory tests.	1 Prac.
2.	Sorting of cocoons- calculation of percentage of each type.	1 Prac.
3.	Cocoon stifling- different methods and determination of degree of drying.	1 Prac.
4.	Reeling water: Determination of total and permanent hardness, alkalinity and pH.	1 Prac.
5.	Determination of commercial characters of cocoon- cocoon wt., shell wt., shell %, average filament length, reelability, raw silk recovery, renditta and denier.	1 Prac.
6.	Study of charaka, cottage basin, multi-end silk reeling machine.	1 Prac.
7.	Degumming of raw silk and estimation of sericin and fibroin percentage.	1 Prac.
8.	Silk dyeing to obtain different shades using acid dye stuff.	1 Prac.
9.	Identification of different types of silk waste; floss, cooker, reeler, basin refuse and re-reeling waste, dupion silk.	1 Prac.
10.	Taxonomic features of non-mulberry food plants (*Terminalia arjuna*, *Terminalia catapa*, *Ricinus communis*, *Michelia champaca*, *Quercus* sp., *Bauhinia vareigata* and *Manihot utilissima*).	1 Prac.
11.	Life cycle and morphology of egg, larva, pupa, cocoon and moths of different non- mulberry silkworms. Non-mulberry rearing and grainage appliances and uses.	2 Prac.
12.	Preparation of audio visual aids- Charts, handouts, pamphlets- film shows – arranging and conducting of panel discussion with the rearers.	1 Prac.
13.	Presentation of statistical data - Bar chart and graph, pie chart of raw silk, cocoon, area under mulberry cultivation, import and exports.	1 Prac.
14.	Visit to reeling units, filature, Power and handloom. Visit to TSC, Research institutes and CRC's - Submission of report.	2 Prac.

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs **Max. Marks - 40**

Q 1. Estimation of filament length/ reelability/ raw silk % / renditta /denier (any two) / from the given cocoons / Sorting of cocoons / Estimation of fibroin and sericin %. - 10 marks

a) Procedure – 5 marks; b) Experiment / Calculation – 5 marks.

Q 2. Any one of the following: - 9 marks

Assign the given food plant of non-mulberry silkworms to its respective family. Write its sericultural importance / Estimation of sericin and fibroin from the Eri cocoons.

a) Procedure – 3 marks: b) Experiment – 6 marks.

Q 3. Prepare a photo chart on sericulture extension methods / Prepare an economic model for the production of silk from different reeling machines. - 8 marks

Q 4. Identify and comment on the spots A, B, C and D. - 8 marks

Any FOUR from the practical syllabus.

Q 5. Submission of field visit report. . - 5 marks

DSE – (SER) B(2): ENTREPRENEURSHIP DEVELOPMENT IN SERICULTURE

Theory **4 hrs/week x 16 weeks = 64 hrs.**

	Unit-I	
1	Entrepreneurship development programme (EDP): Emergence and objectives of EDP, essential qualities to become an entrepreneur; selection of a potential entrepreneur.	4 hrs.
2	Planning for EDP: Objectives, selection of a centre, purpose of pre-training promotional work.	3 hrs.
3	Follow-up for EDP: Need, extent and mechanism; facilitating follow-up; approach to competence development.	3 hrs.
4	Project formulation (project appraisal): Meaning and purpose, personnel / agencies interested in project appraisal, market feasibility of the project, technical and market analysis, means of finance, profitability, risk analysis and liquidity management; agencies supporting sericulture projects.	4 hrs.
5	Marketing: Approach and essence; market assessment – demand; steps involved in market study.	2 hrs.
	Unit-II	
6	EDP in raising mulberry saplings (Kisan nursery).	3 hrs.
7	EDP in organization of chawki rearing centres.	3 hrs.
8	EDP in silkworm egg production and rearing.	3 hrs.
9	EDP in silk reeling – charaka, cottage basin and multi-end reeling units.	4 hrs.
10	EDP in preparation of handicrafts from cocoons.	3 hrs.
	Unit-III	
11	Mass production of insect pathogens: Culturing of hosts / preparation of culture substrates, inoculation; isolation, purification and storage of pathogens.	4 hrs.
12	Mass production of parasitoids: Culturing of host insects, oviposition of parasitoids, emergence, collection, feeding and storage of parasitoid adults.	4 hrs.
13	Mass production of insect predators: Culturing of prey insects, release of adults of predators on the colony of prey insects, collection, feeding, storage of predator adults.	4 hrs.
14	EDP in composting and vermicomposting for the management of mulberry garden and rearing wastes.	4 hrs.
	Unit-IV	
15	Mechanization: Objectives, principles, technology and productivity, characteristic features, advantages and limitations.	3 hrs.
16	Mechanization in mulberry cultivation, silkworm egg production and silkworm rearing - activities, scope and economics.	4 hrs.
17	Advances in silk reeling technology - activities, scope and economics.	4 hrs.
18	Contract farming and its scope in sericulture.	3 hrs.
19	Occupational health hazards in sericulture.	2 hrs.

DSE – (SER) B(2): ENTREPRENEURSHIP DEVELOPMENT IN SERICULTURE

Practicals **16 Practicals of 4 hrs. each**

1	Planning the facilities required for establishment of insectary.	1 Prac.
2	Observations on insect pathogens and symptoms.	1 Prac.
3	Observations on insect parasitoids and predators.	1 Prac.
4	Planning for raising mulberry saplings (Kisan nursery) and vermicomposting.	1 Prac.
5	Planning for establishment of chawki rearing centers.	1 Prac.
6	Planning for establishment of silkworm egg production centres.	1 Prac.
7	Planning for establishment silk reeling - charka, cottage basin and multi-end reeling units.	2 Prac.
8	Assessment of Benefit – Cost ratio under traditional and mechanized systems of mulberry cultivation and silkworm egg production.	1 Prac.
9	Assessment of Benefit – Cost ratio under traditional and mechanized systems of silkworm rearing and silk reeling units.	1 Prac.
10	Visit to units for mass production of parasitoids and predators.	2 Prac.
11	Visit to grainage / silk reeling units to study the health related problems among the concerned personnel.	2 Prac.
12	Visit to chawki rearing centres.	2 Prac.
	A report shall be submitted at the end of the course for evaluation.	

SCHEME OF PRACTICAL EXAMINATION

Duration-3 hrs **Max. Marks - 40**

Q 1. Write on the EDP of Kisan nursery / silkworm rearing / egg production / silk reeling and its importance. - 10 marks
a) Procedure – 6 marks; b) Importance – 4 marks.

Q 2. Prepare a project plan for establishment of chawki rearing centres (capacity: 10 Lakhs dfls brushing per year) - 10 marks
a) Requirements – 4 marks: b) Plan – 6 marks.

Q 3. Submission of field visit report. - 10 marks

Q 4. Viva-voce. . - 10 marks

SKILL ENHANCEMENT COURSE (SEC) FROM SERICULTURE

SEC – (SER) PAPER-2: SILK TECHNOLOGY

Theory **2 hrs/week X 16 Wweeks = 32 hrs**.

	Unit-1	
1.	Introduction to different textile fibres.	1 hr.
2.	Physical and commercial characteristics of cocoons.	2 hrs.
3.	Cocoon marketing- Government cocoon markets, purchase of cocoon in open auction; grading of cocoons- visual inspection and selection.	2 hrs.
4.	Cocoon sorting: Objectives and procedure, types of defective cocoons.	1 hr.
5.	Cocoon stifling: Objectives and methods - conventional and modern techniques. Conditioning and preservation of stifled cocoons.	2 hr.
	Unit-2	3 hrs.
6.	Cocoon cooking: Objectives and methods - mono pan, three pan and pressurized.	2 hrs.
7.	Cocoon brushing: Objectives; methods - hand and mechanical brushing.	1 hr.
8.	Reeling water: Quality required for silk reeling total and permanent hardness, optimal pH; corrective measures.	1 hr.
9.	Reeling: Objectives and devices - country charaka, cottage basin, multi end reeling machine, auto and semi-automatic, improved CSTRI reeling devices; advantages and disadvantages	3 hr.
10.	Re-reeling and packing: Objectives, process; lacing, skeining, booking and bale making	1 hr.
	Unit-3	
11.	Raw silk properties- physical, chemical and biological. Uses of raw silk	1 hr.
12.	Raw silk testing and grading; Objectives and visual inspection and mechanical tests.	2 hrs.
13	Silk throwing: Introduction, objectives soaking, winding, doubling, twisting, heat/steam setting, rewinding.	3 hrs.
14	Silk weaving: Warp preparation- warp and weft preparation - Powerloom and handloom weaving.	2 hrs.
	Unit-4	
15	Chemical processing of silk yarns and fabric: Objectives of degumming and methods. Silk dyeing - acidic and basic dyeing processing, different classes of dyes and chemicals used for silk dyeing.	3 hrs.
16	Spun silk industry - steps involved, flow chart, spun silk yarn and noil yarn.	2 hrs.
17	Silk finishing: Objectives, methods- Mechanical and chemical finishing.	1 hr.
18	By-products of sericulture industry and their utilization.	2 hrs.

INTERNAL ASSESSMENT

For Theory

C1 = One assignment / presentation (5 marks) and one test (5 marks)
C2 = One assignment / presentation (5 marks) and one test (5 marks)

For Practical

C1 = Performance of student at every practical (2.5 marks) / field work or test (2.5 marks)
C2 = Performance of student at every practical (2.5 marks) / practical record (2.5 marks)

QUESTION PAPER PATTERN (THEORY: C3 EXAMINATION)

I-VI SEMESTER

Sl. No	Type of question	Marks / Question	No. of Questions to be asked	No. of Questions to be answered	Total
1	Define / Mention / Expand, etc. - the following	1	05	05	05
2	Write short notes on the following	3	07	05	15
3	Give brief answers on the following	5	08	06	30
4	Write in detail / explain the following	10	04	03	30
				Total	**80**

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