UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A' GRADE' UNIVERSITY)
(Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION
(24/February /Adp./112)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the revised Syllabi and Courses of Studies in the subject of **Sericulture** for **Master Degree Programme** of semesters Ist, IInd, IIIrd and IVth under the **Choice Based Credit System (as given in annexure)** for the examinations to be held in the years as per the details given below:-

Subject	**Semester**	**For the examinations to be held in the year**
Sericulture	Semester-I	December 2024, 2025 and 2026
	Semester-II	May 2025, 2026 and 2027
	Semester-III	Dec. 2025, 2026 and 2027
	Semester-IV	May 2026, 2027 and 2028

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/24/ 14764-14774
Dated: 01/03/2024
Copy for information and necessary action to:

1. Dean, Faculty of Life- Science
2. Convener, Board of Studies in **Sericulture**
3. Programmer, Computer Section, Examination Wing
4. Incharge, University Website for Uploading of the notification.

Sumitra Thakur 29/2/2024
Deputy Registrar (Academic)

29/2/24 Today 29/02/24 29/2/24

NO/JU/2001/24/312
Dt. 05/03/24

UNIVERSITYOF JAMMU

COURSE STRUCTURE FOR MASTERS DEGREE PROGRAMMEINSERICULTURE

The Courses of study prescribed for 1st to 4th semesters/ Master's Degree Programme under CBCS in the subject of Sericulture (Session2023-25)

Semester	Course Code	Course Title	Credits	Nature of Course	% of Change
I	PSSETC-101	General Sericulture	4	CORE	5%
	PSSETC-102	Mulberry Biology and Production	4	CORE	10%
	PSSETC-103	Silkworm Biology, Physiology and Biochemistry	4	CORE	15%
	PSSETC104	Silkworm Rearing Technology and Egg production	4	CORE	10%
	PSSEPC-105	Lab Course–I	4	PRACTICAL	10%
	PSSEPC-106	Lab Course–II	4	PRACTICAL	-
		Total credits	**24**		
	PSSEPC-105 Based onTheoryCourseNo.101 &102 PSSEPC-106Based on TheoryCourseNo.103 &104				
II	PSSETC -201	Cell and Molecular biology and Immunology	4	CORE	20%
	PSSETC -202	Genetics & Bio Chemical Techniques	2	CORE	-
	PSSETC -203	Applied Entomology	2	CORE	20%
	PSSETC -204	Breeding & Genetics of Silkworm & Mulberry	4	CORE	5%
	PSSETC -205	Mulberry and Silkworm crop Protection	4	CORE	5%
	PSSEPC-206	Lab Course–I	4	PRACTICAL	20%
	PSSEPC-207	Lab Course–II	4	PRACTICAL	20%
		Total credits	**24**		
	PSSEPC-206Based onTheoryCourseNo.201, 201&203 PSSEPC-207Based on TheoryCourseNo.204 &205				
III	PSSETC-301	Post-Cocoon Technology	4	CORE	25%
	PSSETC-302	Entrepreneurship Development in Sericulture	2	CORE	30%
	PSSETC-303	Biostatistics and Computers	2	CORE	15%
	PSSETC-304	*MOOC through SWAYAM portal	4	MOOC	-
	PSSETE-305	Mulberry, Physiology, Breeding and Genetics	4	CORE	30%
	PSSEPC -306	Lab Course–I	4	PRACTICAL	25%
	PSSEPC-307	Lab Course –II	4	PRACTICAL	20%
		Total credits	**24**		

	PSSEPC -306 Based on TheoryCourseNo.301, 302 PSSEPC-307 Based onTheoryCourseNo.303& 305				
IV	PSSETC-401	Sericulture Extension and Vanya Silks	4	CORE	40%
	PSSETC-402	Advances in Seri biotechnology	4	CORE	10%
	PSSETC-403	On Job Skill Training	4	CORE	-
	Anyone of the following elective e courses				
	PSSETC-404	Entomology	4	ELECTIVE	-
	PSSETC-405	Sericulture and Toxicology	4	SPECIAL OPTIONAL	50%
	PSSEPC-406	Lab Course –I	4	PRACTICAL	15%
	PSSEPC-407	Lab Course –II	4	PRACTICAL	20%
		Total credits	**28**		
	PSSEPC-406Based on TheoryCourseNo.401&402 PSSEPC-407Basedon TheoryCourseNo.404& 405				
	Total credits earned by the students		**100**		

***For students of other Departments.**

(Head of the Department)

Prof. & Head
Department of Zoology
University of Jammu
JAMMU

DAC members

1. 2. 3. 4.

Annexure V

SEMESTER I

SEMESTER I

COURSE NO. PSSETC-101 **Course title: General Sericulture**
CREDITS: 4 **MAXIMUM MARKS: 100**
Duration: 2Hrs and 30 Mins. **a) Minor Test I: 20**
b) Minor Test II: 20
c) Major Test: 60

Syllabus for the examination to be held in

2024, 2025 and 2026.

Course outcomes

CO1: History and distribution of sericulture in India and world.
CO2: Scope and importance of sericulture.
CO3: Characteristics of different types of fibres.
CO4: Properties of silk.
CO5: Mulberry cultivation in different regions.
CO6: Silkworm seed production processes.
CO7: Physical and chemical properties of silk.
CO8: Role of CSB in development of sericulture.
CO9: Economic importance of sericulture bi-products.
CO10: Different types of reeling machines.

UNIT-I

Sericulture: An overview **12hrs.**

1.1. Introduction to Sericulture: Geographical distribution; History, development & status of mulberry & non-mulberry sericulture in India; The silk route

1. 2. Evolution & History of Silk production in world: China, India and Uzbekistan.

1.3. Silk Industry in India –Karnataka, Assam, Chhattisgarh, West Bengal, Jharkhand, Jammu and Kashmir, Tamil Nadu, Andhra pradesh & Telangana.

1.4. Science of Sericulture, Characteristic features of sericulture, Scope, problems and prospects of Sericulture in India and its comparison to other agricultural crops. Role of sericulture in rural development.

UNIT-II

Silk Fiber & its components **12hrs.**

2.1. Introduction to textile fibres: Their types – natural and synthetic fibres. Advantages of silk fibres amongst the other natural fibres.

2.2. Properties of silk: properties of silk in comparison with other fibers such as wool, cotton and jute. Properties of mulberry silk in comparison with other types of silk such as Tasar, Eri and Muga.

2.3. Comparison of silk with synthetic fibers in terms of durability, resistance to insect pest attack and commercial utilization.

2.4. Manipulation of silk fibers for production of colored silk; its merit and demerits.

UNIT-III

Sericulture organization in India **12hrs.**

3.1. Administrative set up, research and training set up in Central Silk Board, Role & responsibilities of State Sericulture Development Department.

3.2. Role of Central Silk Board in research and development of sericulture in different states of India; Sericulture research in India and its impacts.

3.3. Sericulture extension organization at various levels especially CSB policy for development of research and training at National and at state level. Role of NGOs, self help groups and private enterprises in sericulture development

3.4. Sericulture for women: Women's empowerment in sericulture, Mulberry garden and rearing management, silk reeling, weaving and finishing

UNIT-IV

Marketing of cocoon and silk materials **12hrs.**

4.1. Marketing of silk. Markets set-up in different states; Market operation, rules and regulations.

4.2. Silk grading; brief account of silk conditioning and testing.

4.3. Economic importance: By- products and utilization of by-products of mulberry silkworm, pupae and moths; Cocoons and silk in crafts.

4.4. Factors to be considered before setting up of silk reeling, throwing, weaving, dying, printing & spinning.

UNIT –V

Economics of sericulture **12hrs.**

5.1. Cost & return under rain fed& irrigated conditions; leaf cocoon ratio and cost benefit ratio of improved sericulture practices viz a viz traditional practices.

5.2. Cocoon Dfl's ratio, Comparative economics between charkha, cottage basin & multi end basin

5.3. Comparative economics between handloom & powerloom; value addition during printing, dying & finishing.

5.4. Export & import policies, impact of silk import on domestic silk industry, impact of WTO on sericulture industry.

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2 Hrs. & 30 mins.	60

i) Major test will have two sections (A & B)

ii) Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii) Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each)

Books Recommended:

1. Ganga, G. and Sulochana Chetty, J. (2018) *An Introduction to Sericulture*. Oxford and IBH Publishing. Co. Pvt. Ltd. New Delhi.
2. Anantha Narayanan, S.K (2017) *Silkworm Rearing*. Biotech books, New Delhi.
3. Suresh Kumar, N. Harjeet Singh and Saha, A. K., (2015) *A textbook of Silkworm rearing technology*. Dominant and Distribution Publishers, New Delhi.
4. Singh, Amar Dev and Kumar Ravinder (2013) *Sericulture Handbook*. Biotech Books, New Delhi.
5. Patnaik, R.K. (2008) *Sericulture Manual*. Biotech Books, New Delhi.
6. Rajan, R. K. and Himantharaj, H. T. (2005) *Silkworm Rearing Technology*. Central Silk Board, Bangalore.
7. Dandin, S. B. Jayaswal J. and Giridhar K. (2003) *Handbook of Sericulture Technologies*. CSB, Bangalore.
8. Dandin, S. B. and Gupta, V. P. (2002) *Advances in Indian Sericulture Research*. CSR & TI, Mysore.
9. Akira, N. (2000) *Fiber Science and Technology*. Oxford & IBH Publications, New Delhi.
10. Mahadevappa, D.; Halliya, V.G.; Shankar, D.G. and Ravindra Bhandiwad (2000) *Mulberry Silk Reeling Technology*. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi and Calcutta.

SEMESTER I

COURSE NO. PSSETC-102

Course title: Mulberry Biology and Production

CREDITS: 4

MAXIMUM MARKS: 100

Duration: 2Hrs and 30 Mins.

a) Minor Test I: 20
b) Minor Test II: 20
c) Major Test: 60

Syllabus for the examination to be held in

2024, 2025 and 2026.

COURSE OUTCOME

CO1. Taxonomy and morphology of mulberry.
CO2. Classification of soil.
CO3. Soil fertility management practices.
CO4. Essential nutrients required for mulberry growth.
CO5. Different types of biofertilizers.
CO6. Concept of Integrated Plant Nutrient Management.
CO7. Methods of propagation in mulberry.
CO8. Pruning and harvesting methods.
CO9. Mulberry weeds and their management.
CO10. Concept of exclusive chawki garden for chawki rearing.

C. No. PSSETC-102 Mulberry Biology and Production (2024- 2026)

UNIT I

Mulberry biology **13 hrs.**

1. 1. Salient features and morphology of mulberry. Popular mulberry cultivars of India. Medicinal value, by-products utilization and economic importance of mulberry.

1.2. An outline of floral biology of mulberry, flower, fruit & seed development. Transition to flowering, floral meristem & floral development.

1.3. Reproductive biology of mulberry: Microsporogensis and megasporogensis.

1.4. Anatomy of mulberry: leaf, stem and root. Concept of Phyllotaxy in *Morus*.

UNIT II

Soil management **13 hrs.**

2.1. Soil formation, Classification of different types of soil, Major soils of India related to mulberry cultivation. Soil profile & soil survey.

2.2. Properties of soil: Physical properties (Soil texture, color, air and water) and chemical properties- soil reaction, Cation/anion exchange capacity. Soil organic matter and soil organisms. Determination of soil pH for mulberry cultivation.

2.3. Problematic soils and reclamation: Acidic and alkaline soils. Reclamation methods of problematic soils.

2.4. Soil fertility management: soil fertility vs soil productivity. Factors affecting soil fertility. Recommended dosage and schedule for NPK application for mulberry cultivation.

C. No. PSSETC-102 Mulberry Biology and Production (2024- 2026)

UNIT-III Integrated Nutrient Management **13 hrs.**

3.1. Elements/ Nutrients essential for mulberry growth, sources of nutrients elements in the soil: their absorption & utilization. Soil pollution & waste management. Bioremediation and Phytoremediation.

3.2. Manures: organic manure-compost, green manuring and Biofertilizers: recommended dosage, schedule & mode of application for mulberry cultivation.

3.2. Introduction to Vermicompost: preparation and applications. Concept of Biostimulants and its applications in mulberry cultivation.

3.4. Concept of Integrated Plant Nutrient Management (IPNM): its role in mulberry production. Need and scope of IPNM in mulberry cultivation.

Unit- IV Mulberry Production **12 hrs.**

4.1. Principles and practices of mulberry propagation: vegetative and sexual propagation in mulberry: different methods; their merits and de-merits.

4.2. Pruning and harvesting: objectives, types, and schedule of pruning, care at Pruning and harvesting, Evaluation of the mulberry leaf quality, estimation of leaf yields.

4.3. Irrigation and drainage: methods and schedule of irrigation and their advantages and dis-advantages.

4.4. Weeds and their management: common weed flora of mulberry garden. Effect of weeds on mulberry production, identification and control of weeds. Mulching: purpose, methods, surface & sub-soil mulching.

C. No. PSSETC-102 Mulberry Biology and Production (2024- 2026)

UNIT-V Mulberry management **12 hrs.**

5.1. Water requirement of mulberry, water resources, water quality and practical utility in mulberry management.

5.2. Significance and concept of quality for mulberry leaf for determining cocoon quality.

5.3. Exclusive mulberry garden for chawki rearing: establishment of chawki garden under irrigated and rainfed conditions.

5.4. Maintenance of mulberry plots in relation to rearing schedules, Requirements, organization & management of labour.

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i) Major test will have two sections (A & B)

ii) Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii) Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

C. No. PSSETC-102 Mulberry Biology and Production (2024- 2026)

Books Recommended:

1. Singh, T and Singh P. K. (2013) *Mulberry Crop Protection.* DPH publishers, New Delhi.
2. Gupta, P. K. (2011) *A handbook of soil fertilizer and Manure.* Agrobios, Jodhpur.
3. Dandin, S.B. and Giridhar, K. (2010) *Handbook of Sericulture Technologies.* CSB, Bangalore.
4. Dandin, S.B. Jayant J. and Giridhar, K. (2003) *Handbook of Sericulture Technologies.* CSB, Bangalore.
5. Foth, H.D. (1984) *Fundamentals of Soil Science.* John Wiley & Sons, New York.
6. Guidelines for bi-voltine rearing (2009) CSB Bangalore.
7. Handbook of sericulture technologies-(2005) CSB Bangalore.
8. Rajanna, L., Das, P.K., Ravindran, S., Bhogesha, K., Mishra, R.K., Singhvi, N.R., Katiyar, R.S. and Jayaram, H. (2005) *Mulberry Cultivation and Physiology.* Central Silk Board, Bangalore.
9. Silkworm Breeding & Genetics (2006) CSB Bangalore.
10. Tips to successful silkworm cocoon crops, (2006) CSB Bangalore.

SEMESTER I

COURSE NO. PSSETC-103 **Course title: Silkworm Biology, Physiology and Biochemistry**

CREDITS: 4 **MAXIMUM MARKS: 100**

Duration: 2Hrs and 30 Mins.

a) Minor Test I: 20
b) Minor Test II: 20
c) Major Test: 60

Syllabus for the examination to be held in 2024, 2025 and 2026.

COURSE OUTCOME

C01. Characteristic features of Arthropod.
C02. Embryonic development in silkworm.
C03. Physiology of digestion and different types of digestive enzymes.
C04. Silk gland structure and protein synthesis.
C05. Concept of artificial diets and feeding behavior in silkworm.
C06. Metamorphosis in insects and types of metamorphosis.
C07. Structure and functions of amino acids.
C08. Classification and metabolism of proteins.
C09. Classification of carbohydrates.
C010. Mechanism of enzyme action.

UNIT-I

Silkworm biology **13 hrs**

1.1. Classification of insects - general characteristic features of insects; classification of sericigenous insects; characteristic features of order Lepidoptera and families – Bombycidae and Saturnidae.

1.2. Morphology of egg, larva, pupa and adult and life cycle of the silkworm, *Bombyx mori.*

1.3. Spermatogenesis and oogenesis in *Bombyx mori.* Reproductive systems of silk moths.

1.4. Embryonic development in *Bombyx mori.* Oviparity, ovoviviparity and viviparity, polyembryony, parthenogenesis and pseudogenesis.

C. NO. PSSETC-103 Silkworm Biology, Physiology and Biochemistry (2024- 2026)

Unit-II **13 hrs**

Silkworm physiology-I

2.1. Digestion: physiology of digestion, cell types in silkworm gut, mechanism of gut movements, digestive enzymes in phytophagous insects. Silk gland of silkworm.

2.2. Excretion and Respiration: Tracheal respiration and Ventilationin insects. Circulation: Composition and function of haemolymph, accessory pulsatile organs and mechanism of circulation in silkworm.

2.3. Muscular system and Muscle Physiology: Histology of insect muscles, flight muscles in insects, ultra structure of skeletal muscle, mechanism of muscle contraction.

2.4. Neural and endocrine functioning in silkworm:, diapause, osmoregulation and intermediary metabolism.

UNIT-III

Silkworm physiology-II **13 hrs**

3.1. Receptor Physiology: Photoreceptors – compound eyes, mechanism of image formation, Chemo receptors; mechanism of chemo-receptions. Mechanoreceptors and their functions. Insects' integument, segmentation and body regions. Mouth parts of Insects.

3.2. Nutritional physiology: Artificial diets, feeding apparatus, feeding behavior, phagostimulant, feeding deterrents, nutritive requirement of the silkworm.

3.3. Silkworm transgenesis. Historical account, piggyback transposon, transformation methodology and application of silkworm transgenesis.

3.4. Metamorphosis in insects: Importance, types of metamorphosis and hormonal influence

Unit-IV

Biochemistry-I **12 hrs.**

4.1. Cell Environment: Water and gases in cell environment, electrolytes, pH and buffer.

4.2. Amino-acid: Essential and non-essential amino acids, their chemical structure and function. Vitamins: their chemical structure and function.

4.3. Proteins: Primary, secondary and tertiary structure of proteins. Metabolism of proteins. Biosynthesis of silk proteins.

4.4. Pheromones: their types; advantages and dis-advantages.

C. NO. PSSETC-103 Silkworm Biology, Physiology and Biochemistry (2024- 2026)

Unit-V

Biochemistry-II **13 hrs.**

5.1. Carbohydrates: Structure and classification and metabolism of carbohydrates.

5.2. Enzymes; Classification and nomenclature of enzymes. Mechanism of enzyme action. Enzyme inhibition.

5.3. Bioenergetics; Principle, generation of ATP First and second laws of thermodynamics.

5.4. Biological oxidation: Respiratory chain, redox potential and mechanisms of oxidative phosphorylation.

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i. Major test will have two sections (A & B)

ii. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus.

iii. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

Books Recommended:

1. Singh, T. Bhat, M. M and Khan, M. A (2018) *Silkworm Egg Science*. Daya Publishers. New Delhi.
2. Satyanarayan, U. and Chokrapani, U (2017) *Biochemistry*. Daya Publishers. New Delhi.
3. Fatima, D. & others (2013) *Biochemistry*, Kanyakumari, Tamil Nadu.
4. Ragland, A. & Arumugam, N. (2013) Biochemistry & Biotechniques Kanyakumari-Tamil Nadu.
5. Shamsuddin, M. (2009) *Silkworm Physiology*. Daya Publishers. New Delhi.
6. Goldsmith,M.R. and Frantisek Marec (2010) *Molecular Biology and Genetics of the Lepidoptera*, CRC Press Taylor & Francis Group, Broken Sound Parkway NW, USA.
7. *Guidelines for bivoltine rearing* (2009) CSB Bangalore.
8. Govindan, R.; Bharathi, V.P., Sannappa, B. and Ramakrishna Naika (2005) Growth Regulators and Hormones in Sericulture. Seri Scientific Publishers, Bangalore.
9. Tips to successful silkworm cocoon crops, (2006) CSB Bangalore.
10. Silkworm Breeding & Genetics, (2006) CSB Bangalore.
11. Handbook of Sericulture Technologies- (2005) CSB Bangalore.
12. Verma, P.S. and Agarwal, V.K. (2004) *Cell Biology, Genetics, Evolution and Ecology*. Published by S. Chand & Co., New Delhi.

SEMESTER I

COURSE NO. PSSETC-104 Course title: Silkworm Rearing Technology and Egg production
CREDITTS: 4 **MAXIMUM MARKS: 100**

Duration: 2Hrs and 30 Mins.

a) Minor Test I: 20
b) Minor Test II: 20
c) Major Test: 60

Syllabus for the examination to be held in

2024, 2025 and 2026.

COURSE OUTCOME

CO1. Morphology of silkworm egg.
CO2. Estimation of mulberry leaf quality and yield.
CO3. Different methods of disinfection and disinfectants.
CO4. Characteristic features of young age silkworms.
CO5. Different chawki rearing methods
CO6. Characteristic features of late age silkworms.
CO7. Preservation of eggs for different seasons and regions.
CO8. Incubation and different methods of incubation.
CO9. Different bed cleaning methods.
CO10. Silkworm seed organization concept.

UNIT-I

Silkworm rearing technology-I **13 HRS.**

1.1. Handling and preservation of silkworm eggs. Oviposition, ideal conditions for oviposition & calculation of age of egg.

1.2. Prerequisites of silkworm rearing: Mulberry leaves availability of leaves. Rearing house, rearing appliances their uses and quantitative requirements to rear 100 disease Free Laying; Availability of labour. Annual Planning and schedule of silkworm rearing.

1.3. Disinfection: Importance and different methods of disinfection-disinfectants. Different types, composition, action and mode of application. Disinfection of rearing house and equipment's.

1.4. Rearing houses: Types, location and orientation of rearing houses; Rearing houses for young (chawki) and grown up (late-age) silkworms.

UNIT –II

Silkworm rearing technology and Egg production **13 Hrs.**

2.1. Concept of grainage, plan of grainage building & grainage equipments. Egg transportation- time and devices

2.2. Requirement of optimum rearing conditions for chawki and late age rearing. Incubation: Concept of incubation, different methods. Effect of temperature, relative humidity and light on incubation. Black boxing, concept and different types of black boxing

2.3. Chawki rearing: Characteristic features of young age silkworms. Different methods of chawki rearing. Feeding -qualitative and quantitative requirements of mulberry leaves. Spacing concept, density and frequency of spacing. Bed cleaning –Importance, method and frequency of bed cleaning. Concept of cooperative chawki rearing and chawki rearing centres.

2.4. Late age silkworm rearing: Different methods of late age silkworm rearing and their merits and demerits. Feeding-qualitative and quantitative requirements of mulberry leaves-Spacing concept, density and frequency of spacing. Bed cleaning-Importance, method and frequency of bed cleaning.

UNIT-III

Silk worm rearing technology-III **13 HRS.**

3.1. Moulting: Mechanism, symptoms and care at moulting. Harvesting, transportation and preservation of mulberry leaves. Harvesting of cocoons: Harvesting procedure for pure and hybrid cocoons, Cocoon sorting, transportation and marketing.

3.2. Mounting and spacing: Characteristic features of spinning larva, density of mounting. Effect of environmental conditions on spinning. Different types of mountages and their relative influence on quality of cocoons.

3.3. Concept of breeds-Hybrids–Characteristics of hybrids–Seasonal breeds-hybrids for different agro-climatic condition-Authorization. Seed areas, selected seed rearers.

3.4. Mechanization of Sericulture:Machines used in mulberry cultivation &silkworm rearing: their advantages.

UNIT-IV

Silkworm seed technology-I **12 Hrs.**

4.1. Silkworm seed organization concept, silkworm seed organization in Karnataka. Basic seed farms-P4, P3 -stock maintenance, selection criteria for maintenance and multiplication. Management of basic seed farms Seed multiplication farms: P2 and P1 farms, selection criteria for maintenance and multiplication. Management of seed multiplication farms.

4.2. Silkworm egg production center- Grainages reproductive (Govt.) and commercial grainages (Govt. and LSPs) their aims and objectives. Grainages equipments and their uses. NSSO; its mandate and role.

4.3. Sex separation & Gut examination. Emergence of moths and synchronization of moth emergence. Pairing and depairing. Oviposition. Surface sterilization and washing of eggs. Preparation of sheet and loose eggs. Disposal of eggs.

4.4. Acid treatment and cold storage of Bi-voltine eggs. Hot and room temperature acid treatment. Acid treatment after short and long duration chilling. Cold storage of acid treated eggs. Preservation of eggs for different seasons and regions. Hibernation schedule for 6 and 10 months in tropical condition. Preservation of eggs in tropical condition.

UNIT-V

Silkworm seed technology-II **12 HRS.**

5.1. Management of grainages Programme for production of pure and hybrid disease free laying. Management of grainages activities. Interaction with the farmers.

5.2. Diagnosis of hereditary diseases: Moth examination, sample testing, individual and mass moth examination. Dry moth examination. Advanced technique of pebrine detection. Early test for detection of pebrine disease pupal gut examination & forced eclosion test.

5.3. Silkworm seed legislation act: seed areas, seed farmers, seed cocoon markets, marketing and price fixation.

5.4. Procurement and transportation of seed cocoons. Do's and don'ts while packaging and transportation of seed cocoons. Processing and preservation of seed cocoons and sex separation in seed cocoons.

C. No. PSSETC-104 Silkworm Rearing Technology and Egg production (2024- 2026)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i. Major test will have two sections (A & B)

ii. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

Books Recommended:

1. Singh, T. Bhat, M. M and Khan, M. A (2018) *Silkworm Egg Science*. Daya Publishers. New Delhi.
2. Ganga, G. and Sulochana Chetty, J. (2018) *An Introduction to Sericulture*. Oxford and IBH Publishing. Co. Pvt. Ltd. New Delhi.
3. Anantha Narayanan, S.K (2017) *Silkworm Rearing*. Biotech books, New Delhi.
4. Suresh Kumar, N. Harjeet Singh and Saha, A. K., (2015) *A textbook of Silkworm technology*. Dominant and Distribution Publishers, New Delhi.
5. Singh, Amar Dev and Kumar Ravinder (2013) Sericulture Handbook. Biotech Books, New Delhi.
6. Dandin, S.B. and Giridhar, K. (2010) *Handbook of Sericulture Technologies*. CSB, Bangalore.
7. *Guidelines for bivoltine rearing*, 2009. CSB Bangalore.
8. *Silkworm Breeding & Genetics*, (2006). CSB Bangalore.
9. *Tips to Successful Silkworm Cocoon Crops*, (2006). CSB Bangalore.
10. *Handbook of Sericulture Technologies*- CSB Bangalore. 2005.
11. Rajan, R.K. and Himantharaj, H.T. (2005) *Silkworm Rearing Technology*. Central Silk Board, Bangalore.
12. Dandin, S.B. Jayant, J. and Giridhar, K. (2003) *Handbook of Sericulture Technologies*. CSB, Bangalore.

SEMESTER: I

LABORATORY COURSES

PSSEPC-105	Lab course-I, based on theory course no: PSSETC-101 & 102	4 credits
PSSEPC-106	Lab course-II, based on theory course no: PSSETC-103 & 104	4 credits

Practical Semester-I

Lab. Course No. PSSEPC-105

Course Title Laboratory Course-I

(Based on theory course No. PSSETC- 101 & 102)

Credits : 04 **Duration of Exams: 06 hrs.**

Maximum Marks . 100

(a) External Exams: 50

(b) Internal Exams: 50

Syllabus for Laboratory course for the Exam to be held in

2024, 2025 & 2026.

1. Silk Route, Silk Map of India and World.
2. To locate National Active Germplasm Site (CSGRC), CSRTI Mysore, CSRTI Pampore on map of India.
3. To locate various RSRS stations and regional offices of CSB on map of India.
4. Different types of fibers natural and synthetic.
5. Morphology of mulberry.
6. Anatomy of Leaf Blade.
7. Anatomy of steam and root of mulberry.
8. Salient feature of popular mulberry cultivars.
9. Raising of sapling – cutting preparation, plan ting and maintenance of nursery.
10. Grafting (bud, stem and root) and layering in mulberry.
11. Planting methods – Row and pit system and tree planting.
12. Characteristic features of important weeds of mulberry garden.
13. Soil sampling and preparation of soil samples for analysis.
14. Preparation of compost and Vermicompost.
15. Application of organic manures and chemical fertilizers for mulberry.
16. Irrigation methods (surface, sprinkler and drip irrigation) for mulberry.
17. Estimation of leaf yields, leaf shoots and leaf area in mulberry.
18. Estimation of fresh and dry leaf weight, moisture percentage and moisture retention capacity of mulberry leaves.

19. Estimation of leaf yields in mulberry garden.
20. Methods of pruning and harvesting of mulberry.
21. Selection of mulberry for feeding young and late age silkworm.
22. To study soil profile and different soil horizons.
23. Collection of soil sample and study its physical properties.
24. Determination of pH values of samples of soil, compost and Vermicompost.
25. Determination of NPK in the given soil sample.

Note: - Any other need based practical if required shall be incorporated.

Practical Semester-I

Lab. Course No. PSSEPC-106
Course Title: Laboratory Course-II
(Based on Theory Course No. PSSETC-103 & 104)
Credits: 04

Duration of Exam: 06 hrs.
Maximum Marks: 100
External Exam: 50
Internal Exam: 50

Syllabus for the examination to be held in

2024, 2025 and 2026.

1. Protein estimation by Kjeldhaland chlorometric method.
2. Sepatation of amino acid by paper & thin layer chromatography.
3. Estimation of amylase activity in silkworm gut fluid & haemolymph.
4. Demonstration of Agrose gel Electrophoresis.
5. Estimation of glycogen in fat body & ovary of *Bombyx mori.*
6. Estimation of protein content in the fat body/midgut tissue of silkworm.
7. Moulting: Identification of moultng larvae & care.
8. Mounting: Mountages, identification & mounting of spinning larvae.
9. Harvesting & sorting of cocoon.
10. Preparation of crop report & other records in the rearing house.
11. Ground plan of grainage building & equipments.
12. Disinfection & hygiene practices in grainage.
13. Sorting & processing of seed cocoons for egg production.
14. Sexing of pupa & moth.
15. Preparation of loose & sheet eggs.
16. Acid treatment (Hot & cold) of hibernating silkworm eggs & mother-moth examination.
17. Identification of different types of eggs & incubation of eggs.
18. Visit to an egg production centre.
19. Silkworm rearing house- model & plan.
20. Silkworm rearing equipments & their uses.
21. Disinfection of rearing house & equipments.
22. Incubation & black boxing of silkworm.
23. Methods of silkworm brushing.
24. Preservation of mulberry for feeding of young & late age silkworm.
25. Morphology of the silkworm *Bombyx mori;* egg, larva, pupa and adult.
26. Life cycle of mulberry silkworm.

27. Dissect & display the digestive & excretory system in silkworm.
28. Dissect & display the nervous system & silk gland in silkworm.
29. Dissect & display the respiratory system in silkworm.
30. Dissect & display the reproductive system of male & female moth of *Bombyx mori*
31. Microscopic study of different embryonic development stages in silkworm.
32. Visit to P4, P3, P2& P1 Stations.
33. Visit to farmers house during silkworm rearing.
34. Dissect & display the Mouth parts of silkworm.

Note:-Any other need based practical if required shall be incorporated.

SEMESTER-II

Semester II

COURSE NO. PSSETC-201 **Course Title: Cell and Molecular biology and Immunology**

CREDIT: 4 **MAXIMUM MARKS: 100**

Time Duration: 2 Hrs and 30 Mins.

a) Minor Test I: 20

b) Minor Test II: 20

c) Major Test : 60

Syllabus for the examination to be held in 2024, 2025 and 2026.

Course outcomes

CO1: Applications of UV-spectrophotometer & electron microscopy.
CO2: Types of Chromatography.
CO3: Multiple alleles.
CO4: Extensions of Mendelism.
CO5: Linkage & crossing over.
CO6: Alterations of chromosomes.
CO7: Types & causes of Mutation.
CO8: Methods of genetic transfer.

Unit-I

Cell Biology **13 Hrs.**

1.1. The origin and evolution of cell, the structure of Prokaryotic and Eukaryotic cells.

1.2. Structure and function of cell organelles; Nucleolus, Chromatin and chromosomes, Nuclear envelope, Endoplasmic reticulum, Golgi complex, Ribosome, Lysosomes, Mitochondria, Cell membrane, vacuoles, chloroplast and plastids.

1.3. Cell cycle: Mitosis, Meiosis; their regulation, control of cell cycle and steps in cell cycle. Chromosome dynamics during mitosis and meiosis. Regulation of cell cycle & cell division in silk glands of *Bombyx mori.*

1.4. Membrane structure and function: structure of model membrane; lipid bilayer membrane, membrane proteins, diffusion, ion exchange, osmosis and active transport.

C. No. PSSETC-201 Cell and Molecular biology and Immunology (2024- 2026)

Unit-II

Molecular biology-I **12 Hrs.**

2.1. Introduction to nucleic acids: Chemical and physical properties of DNA, helical structure of DNA, Structure and types of RNA.

2.2. DNA replication: repair and recombination in prokaryotes and eukaryotes: Semi - conservative synthesis of DNA, Enzymes in DNA replication.

2.3. RNA synthesis and processing in prokaryotes and eukaryotes.

2. 4. Protein synthesis and processing in prokaryotes and eukaryotes. Genetic code.

Unit-III

Molecular biology-II **12 Hrs.**

3. 1. Gene regulation in prokaryotes: Lac operon, Repressor protein, Promoters, Structural genes and their regulation.

3. 2. Gene organization in eukaryotes: Euchromatin and Heterochromatin, Retrovirus, cancer and cellular oncogenes.

3. 3. Model organisms for molecular biology - Bacteriophages, *E. coli,* Fruit fly and Silkworm *Bombyx mori* L.

3. 4. Aging: Cell death and Apoptosis. Cell signaling.

Unit-IV

Immunology-I **13 Hrs.**

4.1. History, scope and applications of immunology.

4.2. Immunity: Types of immunity, Organs associated with immunity

4.3. Cells associated with immune system: Origin and types of cells.

4.4. Antigens and their features; Immunoglobulins (antibodies) - structure, types, biological properties and functions; monoclonal antibodies. Antigen – antibody reactions: Salient features of antigen-antibody reaction.

C. No. PSSETC-201 Cell and Molecular biology and Immunology (2024- 2026)

Unit-V

Immunology-II **13 Hrs.**

5.1. Immune response in silkworm *Bombyx mori*-mechanism of genetic resistance. Cellular and molecular mechanisms of insect immunity with special reference to silkworm, Lipopolysaccharide (LPS) and Cecropin-B.

5.2. Genetic resistance of the silkworm, *Bombyx mori*, to bacterial and viral diseases. Regulation of host gene expression, inducible anti-bacterial and anti-viral proteins in silkworm. Molecular triggering of anti-bacterial proteins – antibacterial protein gene expression.

5.3. Autoimmune diseases:– Haemolytic anaemia, Rheumatoid arthritis, Thyrotoxicosis, Addison's disease, Hashimoto's disease; Diagnosis and treatment of autoimmune disease. Hypersensitivity and autoimmunity.

5.4. Major histocompatibility complex (MHC): Types of MHC molecules. Transplantation – graft retention and rejection.

C. No. PSSETC-201 Cell and Molecular biology and Immunology (2024- 2026)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i. Major test will have two sections (A & B)

ii. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

Books Recommended:

Arumugam, N & others (2012-2013)-cell Biology Genetics & Biotechnology (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.

Arumugam, N. (2012-2013)-Cell Biology & Molecular Biology (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.

Arumugam, N. (2012-2013)-Cell Biology, Molecular Biology, Genetic, Immunology & Biotechnology (Hard Bound)SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.

Beebec, T. and Burke, J. (1992) *Gene Structure and Transcription*. Oxford University Press, Oxford.

Biotol Series (1993) *Cellular Interactions and Immunobiology*. Butterworth - Heinemann.

Biotol Series (1993) *Technological Applications of Immunochemicals*. Butterworth-Heinemann.

Brown, T.A. (1992) *Genetics a Molecular Approach*. 2nd Edn., Chapman and Hall, London.

Bruce A.; Dennis B.; Jullian L.; Martin R.; Keith R. and James W. (1983) *Molecular Biology of the Cell.* Garland Pub. Inc., New York & London.

De Robertis and De Robertis (1988) *Cell and Molecular Biology*. Lea & Febiger, Hong kong.

Dilip De Sarkar (1998) *The Silkworm – Biology, Genetics and Breeding*. Vikas Publishing House Pvt. Ltd., New Delhi.

Doerfler, W. and Bohm, P. (1986) *Current Topics in Microbiology and Immunology*. Springer – Verlag, New York and London.

Dube, H.C. (1992) *A Textbook of Fungi, Bacteria and Viruses*. Vikas Publishing House Pvt. Ltd., New Delhi.

Fatima D & Arumugam, N (2012-2013)-Immunology (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu

Fatima, D, Mani, A & others (2012-2013)-Immmunology & Microbiology (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu

Fatima, D.; Mani, A.; Narayanan, L.M.; Selvaraj, A.M. and Armugama, N. (1997) *Immunology and Microbiology*. Saras Publication, Nagercoil.

Goldsmith,M.R. and František Marec (2010) Molecular Biology and Genetics of the Lepidoptera, CRC Press Taylor & Francis Group, Broken Sound Parkway NW, USA.

Govindan, R.; Ramakrishna Naika and Sannappa, B. (2004) *Advances in Disease and Pest Management in Sericulture*. Seri Scientific Publishers, Bangalore.

Hames, B.D.; Hooper, N.M. and Haughtan, I.D. (1997) *Instant Notes in Biochemistry*. Viva Books Pvt. Ltd., Chennai.

SEMESTER- II

COURSE NO. PSSETC-202 **Course title: Genetics & Bio Chemical Techniques**

CREDIT: 2 **MAXIMUM MARKS: 50**

Duration: 2 Hrs **a) Minor Test I: 10**

b) Minor Test II: 10

c) Major Test: 30

Syllabus for the examination to be held in 2024, 2025 and 2026.

Course outcomes

CO1: Applications of UV-spectrophotometer & electron microscopy.
CO2: Types of Chromatography.
CO3: Multiple alleles.
CO4: Extensions of Mendelism.
CO5: Linkage & crossing over.
CO6: Alterations of chromosomes.
CO7: Types & causes of Mutation.
CO8: Methods of genetic transfer.

UNIT-I **10 HRS.**

BIO-CHEMICAL TECHNIQUES

1.1. Specrotrophotometry: Principle & biochemical application of UV-spectrophotometry. Light & electron microscopy.

1.2. Chromatography: Introduction-principle & applications of partition chromatography (paper chromatography) & adsorption chromatography (Thin layer chromatography) Gas Liquid chromatography, Ion Exchange chromatography

1.3. Centrifugation: Principle-Types of centrifuge. Differential & density gradient centrifugation. Polymerase Chain Reaction (PCR): Principle and applications of PCR.

1.4. Electrophoresis: Principle, procedure & applications of polyacrylamide gel electrophoresis (PAGE), Sodium dodecyl sulphate- polyacrylamide gel electrophoresis (SDS-PAGE) & Iso electric focusing (IEF).

C. No.PSSETC-202 Course title: Genetics & Bio Chemical Techniques (2024- 2026)

Unit-II

GENTICS **10 HRS.**

2.1. Concept of Gene: Allele, Multiple alleles, pseudo- alleles, complementation tests.

2.2. Extensions of Mendelism: Concept of incomplete dominance & co-dominance, Gene interaction, penetrance & expressivity & pleiotrophy. Genomic impurity and phenocopy.

2.3. Linkage & crossing over, sex linkage, sex limited & sex influenced characters. Inheritance of Mitochondrial & Chloroplast genes. Gene mapping in silkworm.

2.4. Methods of evolving sex-limited breeds in silkworm. Population Genetics: The Hardy-Weinberg principles.

Unit-III

GENETICS **10 HRS.**

3.1. Structural & numerical alterations of chromosomes: Deletion, Duplication, Inversion, Translocation, ploidy & their genetic implications.

3.2. Mutation: Types, causes & detection, mutant types-lethal, conditional, biochemical, loss of function, gain of function, germinal verses and somatic mutants.

3.3. Recombinaton: Homologous & Non-Homologous Recombination including transposition.

3.4. Microbial Genetics: Methods of genetic transfers- transformation, conjugation, transduction & Sex-duction.

C. No. PSSETC-202 Course title: Genetics & Bio Chemical Techniques (2024- 2026)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	10
Minor Test II	21% to 40%	1 Hr.	10
Major Test	41% to 100%	2 Hrs.	30

i. Major test will have two sections (A & B)

ii. Section A is compulsory comprising of 10 questions of 1 mark each and be spread over entire syllabus

iii. Section B comprises of 4 questions from remaining 2 units and candidate has to attempt one question from each unit of 10 marks each.

iv.

C. No. SE PSSETC-202 Course title: Genetics & Bio Chemical Techniques (2023- 2025)

Books Recommended:

Arumugam, N & others (2012-2013)-cell Biology Genetics & Biotechnology (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.

Arumugam, N. (2012-2013)-Cell Biology & Molecular Biology (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.

Arumugam, N. (2012-2013)-Cell Biology, Molecular Biology, Genetic, Immunology & Biotechnology (Hard Bound)SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.

Beebec, T. and Burke, J. (1992) *Gene Structure and Transcription.* Oxford University Press, Oxford.

Biotol Series (1993) *Cellular Interactions and Immunobiology.* Butterworth – Heineman

C. No. PSSETC-202 Course title: Genetics & Bio Chemical Techniques (2024- 2026)

Biotol Series (1993) *Technological Applications of Immunochemicals.* Butterworth-Heinemann.

Brown, T.A. (1992) *Genetics a Molecular Approach.* 2nd Edn., Chapman and Hall, London.

Doerfler, W. and Bohm, P. (1986) *Current Topics in Microbiology and Immunology.* Springer – Verlag, New York and London.

Dube, H.C. (1992) *A Textbook of Fungi, Bacteria and Viruses.* Vikas Publishing House Pvt. Ltd., New Delhi.

Hames, B.D.; Hooper, N.M. and Haughtan, I.D. (1997) *Instant Notes in Biochemistry.* Viva Books Pvt. Ltd., Chennai.

Holborow, E.J. (1973) *An ABC of Modern Immunology.* The Lancet Ltd., London.

Joshi, P. (2000) *Genetic Engineering and its Application.* Agrobios Pvt. Ltd

Livine, L. (1969) *Biology of the Gene.* Saint Louis, Mosby.

Nataraju, B., Sathyaprasad, K., Manjunath, D. and Aswani Kumar, C. (2005) *Silkworm Crop Protection.* Central Silk Board, Bangalore.

Paul, W.E. (1990) *Fundamental Immunology.* Raven Press. New York.

Robert, P.W. (1975) *Genes and Proteins.* Dowden, Hutchinson & Ross Inc., Stroudsburg, Pennsylvania.

Sengupta, K.; Kumar, P.; Baig, M. and Govindaiah (1990) *Handbook on Pest and Disease Control of Mulberry and Silkworm.* ESCAP, UN, Thailand.

Singh, B.D. (1998) *Biotechnology.* Kalyani Publishers, New Delhi.

Stent, G.S. and Calender, R. (1986) *Molecular Genetics.* CBS Publishers, New Delhi.

Twyman, R.M. (1998) *Advanced Molecular Biology.* Viva Book Pvt. Ltd., New Delhi.

SEMESTER II

COURSE NO. PSSETC-203
CREDIT: 2
Duration: 2 Hrs

Course title: Applied Entomology
MAXIMUM MARKS: 50
a) Minor Test I: 10
b) Minor Test II: 10
c) Major Test: 30

Syllabus for the examination to be held in 2024, 2025 and 2026.

Course outcomes

CO1: Origin & Evolution of Insects.
CO2: Collection & preservation of insects.
CO3: Economic importance insects in relation to man.
CO4: Defense mechanism of plants against insects.
CO5: Management of Household insects.
C06. Scanning electron Microscopy

10HRS.

Unit –I

APPLIED ENTOM OLOGY-I

1.1. Origin & Evolution of Insects. Silent features of economically important insects up to order level.

1.2. Elementary knowledge of Collection & preservation of insects.

1.3. Classification of pests: major pest, minor pests, key pests and seasonal pests and their management: storage pests and their management.

1.4. Insect transmitting diseases in plants.

UNIT –II **10HRS.**

APPLIED ENTOM OLOGY-II

2.1. Insects and the abiotic Environment, insect population: Factors affecting Insect population, pest outbreaks: Causes that make the insects as pests; factors causing pest outbreak

2.2. Insect-Plant Interaction: Host plant selection, feeding habit, insects as vectors of plant diseases. Defense mechanism of plants against insects.

2.3. Integrated Pest Management (IPM). Principles and components of IPM, role of IPM in sustainable agriculture.

2.4. Harmful & Beneficial insects in relation to man. Household insects, control & their management.

10HRS.

UNIT –III

Novel Approaches in Entomology-III

3.1. History, Evolution, Principles and Scope of Forensic Entomology.

3.2 Forensic Entomology and the Law. Insects as Weapons and Threats to National Security

3.3 Molecular Methods for Forensic Entomology. Forensic Entomological Investigation methodology.

3.4. Use of insect and insect products in medicines and insect as bio-indicators.

C NO. PSSETC-203, Course title: Applied Entomology (2024-2026)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	10
Minor Test II	21% to 40%	1 Hr.	10
Major Test	41% to 100%	2 Hrs.	30

i. Major test will have two sections (A & B)
ii. Section A is compulsory comprising of 10 questions of 1 mark each and be spread over entire syllabus
iii. Section B comprises of 4 questions from remaining 2 units and candidate has to attempt one question from each unit of 10 marks each.

Books Recommended:

Alex Fraser (1966) *Heredity, Genes and Chromosomes.* McGraw Hill Book Company, New York.

Allard, R.W. (1976) *Principles of Plant Breeding.* John Wiley & Sons, New York.

Gardner, E.J. (1981) *Principles of Genetics.* 5th Edn., John Wiley & Sons, New York, Chichester Toronto, Singapore.

Hartmann, H.T. and Kaster, D.E. (1961) *Plant Propagation: Principles and Practices.* N.J. Englewood Cliffs, Prentice Hall, New York.

C NO. PSSETC-203, Course title: Applied Entomology (2024-2026)

Ingram, D.S. and Halgeson, J.P. (1980) *Tissue Culture Methods for Plant Pathologists.* Blackwell Scientific Publication, London.

Kumaresan, V. (2012-2013)-Plant Breeding (Hard Bound) SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu

Lehninger, A.L. (1978) *Biochemistry, Molecular Basis of Cell Structure and Function.* 2nd Edn., Ludhiana, Kalyani.

Livine, L. (1969) *Biology of the Gene*. Saint Louis, Mosby.

Meyyan, R. P & Kumaresan. V (2012-2013)-Genetics & Biotechnology (Hard Bound)

Meyyan, R.P (2012-2013)-Genetics & Genetic Engineering (Hard Bound)

Murray, D.R. (1991) *Advanced Methods in Plant Breeding Biotechnology*. CAB, International, Wallingford, Oxon, United Kingdom.

Singh, B.D. (2000) *Plant Breeding - Principles and Methods*. Kalyani Pub., New Delhi.

Singh, R.N.; Samson, M.V. and Datta, R.K. (2000) *Pest Management in Sericulture*. Indian Publishers, Delhi.

Sinnott, E.W.; Dunn, L.C. and Dobzhansky, T. (1958) *Principles of Genetics*. Tata McGraw Hill Pub. Co. Ltd., New York.

Smith and Kaary, P.F. (1975) *Genetic Structure and Function.* Macmillan, London.

Strickberger, M.W. (1976) Genetics. Macmillan, New York.

SEMESTER-II

COURSE NO. PSSETC-204 **Course title: Breeding & Genetics of Silkworm & Mulberry**

CREDIT: 04
Time Duration: 2 Hrs and 30 Mins.

MAXIMUM MARKS: 100
a) Minor Test I: 20
b) Minor Test II: 20
c) Major Test : 60

Syllabus for the examination to be held in 2024, 2025 and 2026.

Course outcomes

CO1: Methods of selection for qualitative and quantitative traits in silkworm.
CO2: Linkage map in silkworm.
CO3: Region and season specific breeds of silkworm.
CO4: Genetics of voltinism and moultinism.
CO5: Sex determination in silkworm.
CO6: Methods of plant breeding.
CO7: Polyplody in mulberry improvement.
CO8: Plant breeding for quality and yield of mulberry.
CO9: Tissue culture techniques.
CO10: Concepts of Polyploid genetics.

UNIT-I

SILKWORM BREEDING **12 HRS.**

1.1. Breeding methods: Inbreeding and out breeding, their merits and demerits. Selection: methods and types of selection for qualitative and quantitative traits

1.2. Hybridization: Theories of heterosis; combining ability - general and specific; line x tester and diallele analysis

1.3. Drought resistant silkworm strains. The concept of season and region-specific silkworm breeds. Sex limited breeds of silkworms and their utility in silkworm breeding.

1.4. Parthenogenesis- cytological studies on parthenogenesis. Linkage map in silkworm.

C. NO. PSSETC-204 Course title: Breeding & Genetics of Silkworm & Mulberry(2024-26)

UNIT-II **13 HRS.**

GENETICS OF SILKWORM

2.1. Heredity and Environment: Interaction of a genotype & environment with reference to silkworm. Hereditary traits of *Bombyx mori*-egg, larva, pupa and adult.

2.2. Genetics of voltinism and moultinism: Maternal inheritance of voltinism, Relationship between voltinism genes and moultinism genes.

2.3. Cocoon colour: Colour variation at different layers, Relationship between blood colour and cocoon colour. Linkage group of cocoon colour. Inheritance of cocoon colour-green, pink, flesh white and yellow. Inheritance of cocoon colour, larval marking. Multiple alleles and E-group alleles

2.4. Sex determination in silkworm: Chromosome theory of sex determination, genetic theory of sex determination. Radiation and chemical mutagenesis in silkworm

UNIT-III **12 HRS.**

Breeding of Mulberry-I

3.1 General introduction to plant breeding: Methods of plant breeding. Objectives of mulberry breeding: Parameters associate with growth, yield and quality of mulberry.

3.2 Pure-line selection: Characters and importance of pure lines and their application in mulberry. Clonal selection-Characters of clone: Source of clonal variation in mulberry. Procedure, characters and achievements.

3.3. Hybridization: Principles, techniques and protocol; types & application of Hybridization, Effect of hybridization & achievements in mulberry.

3.4. Polyploidy breeding-Induction, Identification and evaluation of triploid varieties evolved by polyploidy breeding. Mutation breeding-Physical and chemical mutagens, Induction, identification and evaluation of mutants/varieties evolved by mutation breeding.

C. NO. PSSETC-204 Course title: Breeding & Genetics of Silkworm & Mulberry(2024-26)

UNIT-IV

Breeding of Mulberry-II **13 HRS.**

4.1. Breeding techniques for stress conditions: biotic and abiotic stress. Mechanism of resistance to drought, salinity and mineral toxicity.

4.2. Tissue culture: its components and stages of tissue culture. Micro-propagation techniques in mulberry- Culture media and its types, somaclonal variation: haploid induction, somatic hybridization, in-vitro screening, cryopreservation: its methods and mechanism. Callus Culture & Suspension culture.

4.3. Evaluation techniques of selected mulberry Genotypes– primary - final and multilocational trials (PYT, FYT & MLT) plot experimentation: multiplication & authorization of variety.

4.4. Maintenance of improved varieties and release: seed multiplication and its stages; naming of a variety and distribution to farmers.

UNIT-V

MULBERRY-GENTICS **12 HRS.**

5.1. Concept of Polyploidy-euploidy, aneuploidy & its application in mulberry breeding.

5.2. Polyploid genetics (chromosome and chromatid segregation), meiotic pairing, diploidizing system (Ph1 locus) and role in evolution, utility in crop improvement, segmental poluploidy, synthetic polyploids, brief idea of ancient polyploidy.

5.3. Plant introduction and acclimatization: Plant introduction agencies in India, quarantine and scope. Approaches involving farmers in biodiversity conservation & plant breeding strategies.

5.4. Germplasm Bank, objectives, collection, characterization & introduction of mulberry Germplasm. Resources-conservation its significance and methods. Functions of plant genetic resource centers

C. NO. PSSETC-204 Course title: Breeding & Genetics of Silkworm & Mulberry(2024-26)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i. Major test will have two sections (A & B)

ii. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

C. NO. PSSETC-204 Course title: Breeding & Genetics of Silkworm & Mulberry(2024-26)

Books Recommended:

Alex Fraser (1966) *Heredity, Genes and Chromosomes.* McGraw Hill Book Company, New York.

Basavaraja, H.K., Aswath, S.K., Suresh Kumar, N., Mal Reddy, N. and Kalpana, G.V. (2005) *Silkworm Breeding and Genetics.* Central Silk Board, Bangalore.

COMPENDIUM OF STATISTICS OF SILK INDUSTRY – CSB Bangalore1999

Dilip De Sarkar (1998) *The Silkworm – Biology, Genetics and Breeding.* Vikas Publishing House Pvt. Ltd., New Delhi.

Eikichi Hiratsuka (2000) *Silkworm Breeding.* Oxford & IBH Publications, New Delhi.

Gardner, E.J. (1981) *Principles of Genetics.* 5th Edn., John Wiley & Sons, New York, Chichester Toronto, Singapore.

GUIDELINES FOR BIVOLTINE REARING, CSB Bangalore…2009

HANDBOOK OF SERICULTURE TECHNOLOGIES-(4th Edition) CSB Bangalore…2005

Sturnikov, V.A. (1976) *Control of Silkworm Development and Sex.* MIR Publishers, Moscow.

Swanson, C. P. (1968) *Cytology and Cytogenetics.* Macmillan Co., Bombay.

Tazima, Y. (1964) *Genetics of Silkworm.* Academic Press, London.

TIPS TO SUCCESSFUL SILKWORM COCOON CROPS, CSB Bangalore…2006

Verma, P.S. and Agarwal, V.K. (2004) *Cell Biology, Genetics, Evolution and Ecology.* Published by S. Chand & Co., New Delhi.

White, M.J.D. (1973) *Animal Cytology and Evolution.* 3rd Edn., C.U.P, London.

William J. Shull (1964) *Mutations.* Ann. Arbor, The University of Michigan Press.

Winchester, A.M. (1974) *Genetics.* Oxford & IBH Pub. House, New Delhi.

SEMESTER II

COURSE NO. PSSETC-205 **Course title: Mulberry and Silkworm crop Protection**
CREDITTS: 04 **MAXIMUM MARKS: 100**

Duration: 2Hrs and 30 Mins.

a) Minor Test I: 20
b) Minor Test II: 20
c) Major Test: 60

Syllabus for the examination to be held in 2024, 2025 and 2026.

Course outcomes

CO1: Disease cycle.
CO2: Fungal diseases of mulberry.
CO3: Bacterial diseases of mulberry.
CO4: Minor diseases of mulberry.
CO5 Nematodes of mulberry.
CO6: Microsporadian and Viral diseases of silkworm.
CO7: Non-infectious diseases of silkworm.
CO8: Different types of Disinfectants used for management of silkworm diseases.
CO9: Major and minor pests of mulberry.
CO10: Major and minor pests of silkworm.

Unit-I

Diseases of Mulberry-I **13 hrs.**

1.1. Classification of plant diseases: foliar, stem and root diseases. Categories of diseases on the basis of incidence of outbreak spread: pandemics, epidemics, and endemic diseases. Pathogenesis, parasitism, host-parasitic relationship.

1.2. Disease cycle and its components. Environment: influence of environmental factors on the occurrence and spread of diseases.

1.3. Fungal diseases: Leaf spot, powdery mildew, leaf rust and root rot: their causative agent, symptoms, disease cycle and control.

1.4. Leaf blight, trunk rot, stem canker; their causative agents, symptoms, disease cycle and control.

Unit-II

Diseases of Mulberry-II **13 hrs.**

2.1. Bacterial diseases- causative agents, symptoms and control measures.

2.2. Viral diseases-symptoms, causative agents and control measures of the dwarf disease, Mosaic disease.

2.3. Nematode disease; Root knot nematode- causative agent, symptoms, disease life cycle and control.

2.4. Mineral deficiency symptoms in mulberry and reclamation.

Unit-III

Diseases of Silkworm –I **12 hrs.**

3.1. Diseases of silkworm; Disease: Definition and diagnosis, factors affecting occurrence and spread of silkworm diseases.

3.2. General account of disinfection and relative efficiencies of different disinfectants.

3.3. Microsporadian diseases (Protozoan Diseases): Causative agent, mode of infection, life cycle, symptoms and management.

3.4. Viral diseases: Causative agent, structure, symptoms, prevention and control measures of Nuclear Polyhedrosis (NPV), Cytoplasmic Polyhederosis (CPV), Infectiojus flacherie (IFV) and Densonucleosis (DNV).

Unit-IV

Diseases of Silkworm-II **12 hrs.**

4.1. Bacterial Diseases-Septicemia, Sotto, bacterial disease of the digestive tract; causative agent, life cycle, symptoms and management.

4.2. Fungal Diseases- White and green muscardine, life cycle, symptoms and management

4.3. Aspergillosis, Causative agent, life cycle, symptoms, prevention and control.

4.4. Non-infectious diseases of *Bombyx mori*.

Unit-V

Pests of Silkworm and Mulberry **12 hrs.**

5.1. A brief account of Pests, Predators and Parasitoids. Pest forecasting. Innovate approaches pest control.

5.2. Tachinid flies associated with *Bombyx mori* - classification, distribution, incidence, extent of damage and management strategies with reference to *Exorista bombycis*. Life cycle, Prevention and Control measures of *Exorista bombycis*.

5.3. Dermestid beetles associated with *Bombyx mori* and their management. Distribution, extent of damage, prevention and control measures of Dermestid beetles.

5.4. Pests of mulberry; Major and minor pests of mulberry, their management, Integrated Pest Management.

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i. Major test will have two sections (A & B)

ii. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

C. NO. PSSETC-205, Course title: Mulberry and Silkworm crop Protection(2024-26)

Books Recommended:

Agrios, G.N. (1997) *Plant Pathology.* 4th Edn., Academic Press, New York.

Aruga, H. and Tanaka, Y. (1971) *Cytoplasmic Polyhedrosis Virus of the Silkworm.* University of Tokyo Press, Japan.

Bilgrami, K.S. and Dube, H.C. (1997) A Textbook of Modern Plant Pathology. Vikas Publishing House Pvt. Ltd., New Delhi.

Doerfler, W. and Bohm, P. (1986) *Current Topics in Microbiology and Immunology.* Springer – Verlag, New York and London.

Dr. B. Nataraju , Dr. K. Sathyaprasad Dr. D. Manjunath Mr. C. Aswani Kumar (2005) Silkworm Crop Protection.

Dr. Govindaiah, Dr. V.P. Gupta, Dr. D.D, Sharma, Dr. S. Rajadural & Ms. V. Nishitha Naik (2005) Mulberry Crop Protection

Dube, H.C. (1992) *A Textbook of Fungi, Bacteria and Viruses.* Vikas Publishing House Pvt. Ltd., New Delhi.

Gautam, R.D. (1994) *Biological Pest Suppression.* Westvill Publishing House, New Delhi.

Ghosh, M.R. (1989) *Concepts of Insect Control.* New Age International Publishers, New Delhi.

Govindaiah, Gupta, V.P., Sharma, D.D., Rajadurai, S. and Nishitha Naik (2005) *Mulberry Crop Protection.* Central Silk Board, Bangalore.

Govindan, R.; Narayanaswamy, T.K. and Devaiah, M.C. (1998) *Principles of Silkworm Pathology.* Seri Scientific Publishers, Bangalore.

Govindan, R.; Ramakrishna Naika and Sannappa, B. (2004) *Progress of Research on Disease and Pest Management in Sericulture.* Seri Scientific Publishers, Bangalore.

Huang, E. (2003) *Protection of Mulberry Plants.* Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi and Calcutta.

Khan M. A. et. al., (2004) Pests and Diseases of Mulberry and their Management.

SEMESTER: II

LABORATORY COURSES

PSSEPC-206 Lab course-I, based on theory course no: PSSETC-201,202,203	4 credits
PSSEPC-207 Lab course-II, based on theory course no: PSSETC-204,205	4 credits

Practical Semester-II

Lab. Course No. PSSEPC-206

Title: Laboratory Course-I

(Based on Theory Course No. PSSETC-201,202,203)

Credits: 04

Duration of Exam: 06 hrs. **Maximum Marks: 100**

External Exam: 50

Internal Exam: 50

Syllabus for the Examination to be held in

2024, 2025 and 2026.

1. To study mitosis from mulberry root tips.
2. To study meiosis from mulberry root tips.
3. To study mitosis from developing silkworm larvae.
4. To study meiosis from developing silkworm larvae.
5. To collect and study various model organisms.
6. Preparation of temporary slides of different cell organelles given material.
7. Study of different stages of mitosis and meiosis through prepared slides.
8. To study mechanism of osmosis: active and passive osmosis in plants.
9. To study mechanism of diffusion in plants.
10. To study the process of imbibition in mulberry seeds.
11. To study mechanism of ion exchange in plants.
12. Estimation of heterosis, inbreeding depression for selected traits.
13. Identification of desirable traits for selection of potential parents in silkworm breeding.
14. Collection of insects for preparation of insectarium: beneficial, harmful and social insects.
15. Collection and identification of common forensic insects.
16. Demonstration of PCR and its principle.
17. Demonstration of gel electrophoresis and gel documentation system.
18. Demonstration of spectrophotometer and its principle.
19. Demonstration of chromatography and its principle.

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20. Demonstration of centrifugation and its principle.
21. Modern forensic techniques-SEM, Potassium permanganate staining.

Note:- Any other need based practical if required shall be incorporated.

Practical Semester-II

Lab. Course No. PSSEPC-207

Title: Laboratory Course-II

(Based on Theory Course No. PSSETC-204,205)

Credits: 04

Duration of Exam: 06 hrs.

Maximum Marks: 100

External Exam: 50

Internal Exam: 50

Syllabus for the Examination to be held in

2024, 2025 and 2026.

1. Salient feature of egg, larva, cocoon, pupa and adult of Multivoltine, Bivoltine and hybrids of silkworm.
2. Determination of fecundity and hatching percentage of BV and MV silkworm breeds.
3. Identification of mutants of silkworm.
4. Assessment of Larval and cocoon characters for breeding.
5. Estimation of filament length of bivoltine cocoons.
6. Preparation of breeding plan for evolution of superior breeds.
7. Identification bacterial diseases of silkworm:
8. Identification of Viral diseases of silkworm.

A) NPV
B) CPV
C) DNV
D) IFV

9. Identification of pests of silkworm.
10. Visit to silkworm seeds production canters.
11. Collection and methods of insect preservation.
12. Identification of fungal diseases of mulberry:

(a) Powdery mildew.
(b) Leaf spot
(c) Leaf rust.
(d) Root rot

13. Identification of viral diseases of Mulberry.

(a) Dwarf Disease.
(b) Mosaic Disease

14. Identification of Bacterial disease of mulberry.

(a) Leaf blight.

15. Identification of Nematode disease of mulberry.

(a) Root knot (Preparea T.S.of infected root).

16. Identification of major and minor and minor pest of mulberry (Visit to mulberry farm).

17. Collection and identification of common pests of silkworm.

18. Detection and identification of silkworm diseases through microscopic method.

19. Study of micropropagation techniques used in mulberry breeding.

20. To study preparation of culture media for plant tissue culture.

21. Slide preparation: temporary and permanent slide of mulberry leaf tissues.

22. To explore the stomata form mulberry leaf.

23. Calculation of stomatal frequency and stomatal index from the mulberry leaf.

24. Demonstration of plot experimentation in mulberry field.

25. Identification of desirable traits for selection of potential parents in mulberry breeding.

26. To study mutant characters in established mulberry plants.

27. To study process of hybridization and cross pollination in mulberry.

28. Identification of stages of embryonic development of silkworm based on cytological features.

Note: - Any other need based practical if required shall be incorporated.

SEMESTER-III

SEMESTER-III

COURSE NO: PSSETC-301

Course Title: Post-Cocoon Technology

Credits: 04

Maximum Marks: 100

Duration of exam: 2Hrs and 30 Mins.

a) Minor Test-I: 20

b) Minor Test-II: 20

c) Major Test: 60

Syllabus for the examination to be held in

2025, 2026 and 2027.

Course outcomes/ Understanding of:

CO1. Classification of textile fibres and their properties.

CO2. Different types of silk.

CO3. Assessment and grading of cocoon.

CO4. Objectives and methods of cocoon stifling.

CO5. Storage and preservation of cocoons.

CO6. Cocoon cooking: methods and objectives.

CO7. Importance of reeling industry.

CO8. Reeling process and different types of reeling machines.

CO9. Degumming and Dyeing of silk fiber.

CO10. Weaving of different types of fibres.

Go

C NO: PSSETC-301 ,Course Title: Post-Cocoon Technology(2025-27)

UNIT-I **12hrs.**

1.1.Silk Fiber: Molecular Formation Mechanism, Structure- Properties; Relationship and Advanced Applications. Fine, crystal structure and texture of silk fibres.

1.2. Silk protein assembly. Identification of pure silk. Optimization of mechanical properties of silk fiber. Factors influencing the properties of raw silk.

1.3.Cocoons: Physical and commercial properties of univoltine, bivoltine and multivoltine cocoons. Influence of cocoon quality on reeling and raw silk production.

1.4.Value addition at different levels of silk industry per 100 dfls in Rs. Role of Govt. and NGOs in promotion of value addition in silk industry.

UNIT-II **12 hrs**

2.1. Assessment of cocoon properties: Estimation of effective rate of rearing percentage (ERR%), shell ratio %, filament length, filament size reelability %, Renditta, raw silk % and Kakame cost.

2.2. Cocoon harvesting and deflossing: methods; their merits and de-merits. Different types of defective cocoons, cocoon sorting method, effect of defective cocoons in the reeling.

2.3. Storage and preservation of cocoons: Factors to be considered for ideal storage–effect of faulty storage on cocoon quality.

2.4. Cocoon Stifling: Objectives of stifling, suitable stifling method according to cocoon quality, viz., Multivoltine, Bivoltine etc, Different stifling methods- Sun drying, steam stifling, Hot air-drying, Batch type and conveyer type: Advantages and disadvantages of various methods.

C NO: PSSETC-301 ,Course Title: Post-Cocoon Technology(2025-27)

UNIT-III **12hrs**

3.1. Cocoon Cooking and its objectives - mechanism of cocoon cooking –Selection of cocoon cooking methods according to cocoon quality viz., Multivoltine, Bivoltine etc. Open pan, three pan, pressurized cooking – conveyer cooking. Merits and demerits of cocoon cooking methods.

3.2. Cocoon brushing: Importance of brushing, different devices for brushing; bamboo stick, coconut stick, paddy straw, hand brushing and mechanical brushing.

3.3. Reeling and its objectives: Evolution and history of reeling. Reeling machines; Charka, cottage basin, multi-end and automatic/semiautomatic reeling machines: their advantages and dis-advantages.

3.4. Silk blending: blending of mulberry and non-mulberry silk with other natural and synthetic fibers: their advantages and dis-advantages.

UNIT-IV **12 hrs.**

4.1. Re-reeling and finishing: Importance of re-reeling, re-reeling machine, process of re-reeling.

4.2. Reeling water: Sources and quality, importance in cocoon cooking and raw silk quality; factors influencing water quality; corrective measures.

4.3. Raw silk testing and grading: Raw silk tests-visual, mechanical- winding, size deviation evenness, cleanness and neatness, tenacity and elongation, cohesion strength exfoliation serigraph and seriplane tests.

4.4. Importance of reeling industry for the development of sericulture. Position of Indian reeling industry, problems of reeling industry.

UNIT-V **12 hrs**

5.1. Wet processing: Degumming- principles and methods of degumming; Bleaching principles and methods of bleaching. Dyeing- Principles and methods of dyeing, Dyeing of silk with natural dyes. Chemical finishing of silk fibres.

5.2. Throwing: aims and objectives of throwing, Process of throwing, winding, doubling, twisting and rewinding.

5.3. Weaving: Preparation of warp and weft. Methods of weaving-hand and power looms and their merits and demerits. Weaving process. Different types of fabrics.

5.4. Spun silk- Raw material -hand spinning -Spun silk industry.

Note for paper setting

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	%Weightage (Marks)
Minor TestI	upto20%	1Hr.	20
Minor TestII	21%to40%	1Hr.	20
Major Test	41%to100%	2Hrs.&30mins.	60

i) Major test will have two sections (A&B)

ii) Section-A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii) Section-B comprises of 6 questions (2fromeachunit) from the remaining 3 units and candidate has to attempt one question from each unit (15markseach).

C NO: PSSETC-301 ,Course Title: Post-Cocoon Technology(2025-27)

Books Recommended:

1. Akira, N. (2000) Fiber Science and Technology. Oxford & IBH Publications, New Delhi.
2. Mahadevappa, D.; Halliya, V.G.; Shankar, D.G. and RavindraBhandiwad (2000) Mulberry Silk Reeling Technology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi and Calcutta.
3. Akira Nakamura (2000) Fiber Science and Technology. Oxford & IBH Publications, New Delhi.
4. Anonymous (2000) Silk Dyeing and Finishing Handbook. Oxford & IBH Publishing
5. Dandin, S. B. and Gupta, V. P. (2002) Advances in Indian Sericulture Research. CSR & TI, Mysore.
6. Anonymous (2002) Silk Weaving. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi and Calcutta.
7. Anonymous (2002) Colours from Nature – Silk Dyeing Using Natural Dyes. Vol. I and II, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi and Calcutta.
8. Dandin, S. B. Jayaswal J. and Giridhar K. (2003) Handbook of Sericulture Technologies. CSB, Bangalore.
9. Rajan, R. K. and Himantharaj, H. T. (2005) Silkworm Rearing Technology. Central Silk Board, Bangalore.
10. Patnaik, R.K. (2008) Sericulture Manual. Biotech Books, New Delhi.
11. Singh, Amar Dev and Kumar Ravinder (2013) Sericulture Handbook. Biotech Books, New Delhi.
12. Suresh Kumar, N. Harjeet Singh and Saha, A. K., (2015) A textbook of Silkworm rearing technology. Dominant and Distribution Publishers, New Delhi.
13. Anantha Narayanan, S.K (2017). Silkworm Rearing. Biotech books, New Delhi
14. Ganga, G. and SulochanaChetty, J. (2018) An Introduction to Sericulture. Oxford and IBH Publishing. Co. Pvt. Ltd. New Delhi.

SEMESTER-III

COURSE NO. PSSETC-302

Course Title: Entrepreneurship Development in Sericulture

Credits: 02 **MAXIMUM MARKS: 50**

Duration of exam: 2 hrs. **a) Minor Test-I: 10**

b) Minor Test-II: 10

c) Major Test: 30

Syllabus for the examination to be held in

2025,2026,2027

Course outcomes/ Understanding of:

CO1. Objectives of EDP.

CO2. EDP policies of CSB and other Sericultural organizations.

CO3. EDP in raising Mulberry nurseries and vermicomposting.

CO4. Special schemes for technical entrepreneurs.

CO5. Worldwide status of Entrepreneurship

CO6.To study various aspects of Entrepreneurship Development in Sericulture.

UNIT-I Sericultural Entrepreneurship Development-I **10hrs**

1.1. Entrepreneurship development programme (EDP): Introduction and objectives of EDP, essential qualities to become an entrepreneur; selection of a potential entrepreneur, social responsibility and business ethics in EDP.

1.2. EDP in Human resource management; Leadership, Motivation attitude, communication, Group dynamics, Dedication, Setting of goals, self-assessment Transactional analysis, Creativity in EDP.

1.3. EDP in raising mulberry saplings (Kisan nursery) and vermicomposting. EDP in organization of chawki rearing centres.

1.4. EDP in silkworm egg production and rearing. EDP in silk reeling: charaka, cottage basin and multi-end reeling units.

UNIT- II Sericultural Entrepreneurship Development-II **10hrs**

2.1. Starting a Seri-Business Startup. Selection of appropriate Seri-business model.

C.NO.PSSETC-302CourseTitle:Entrepreneurship Development in Sericulture(2025-2027)

2.2. Entrepreneurship activities Framework Model. SWOT analysis in Seri-business.

2.3. EntreComp: The Entrepreneurship Competence Framework. EntreComp conceptual and progression model.

2.4. Practical entrepreneurial experiences in sericulture: few success stories of potential seri-entrepreneurs.

UNIT-III Sericultural Entrepreneurship Development-III **10hrs**

3.1. Entrepreneurship Development policies of Central Silk Board and other sericultural organizations. Planning for EDP and follow-up for EDP: Need, extent and mechanism. Special schemes for technical entrepreneurs (STED).

3.2. Prospects and problems of rural development and women empowerment in India through EDP.

3.3. Entrepreneurial Prospects through by-Products Generation in Different Stages of Sericulture. Potential and market demand of silk-based handicrafts.

3.4. Scope for Seri-Entrepreneurship in India. Barriers to Seri-Entrepreneurship Development.

C.NO.PSSETC-302CourseTitle:Entrepreneurship Development in Sericulture(2025-2027)

Note for paper setting

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	%Weightage (Marks)
Minor Test-I	upto20%	1Hr.	10
Minor Test-II	21%to40%	1Hr.	10
Major Test	41%to100%	2Hrs.	30

i) Major test will have two sections (A & B)

ii) Section A is compulsory comprising of 10 questions of 1 mark each and be spread over entire syllabus.

iii) Section B comprises of 4 questions from remaining 2 units and candidate has to attempt one question from each unit of 10 marks each.

Books Recommended:

1. Kumaresan, P. and Srinivasa, G. (2005) Sericulture Extension Management and Economics. Central Silk Board, Bangalore.

2. Handbook of Sericulture Technologies-(4th Edition) CSB Bangalore. 2005.

3. SatishVerma& S.B Dandin (2006) Mechanistion in Sericulture.

4. Kumar, K S Arun (2010) Readings in Sericulture Economics Marketing and Management.

5. Koshy, T D (2011) Silk Production and Export Management.

6. Muzafar Ahmad Bhat, Suraksha Chanotra, Abdul Aziz and Mohd. Azam. (2020). Entrepreneurship Development Programme in Sericulture. Innovative Publications, New Delhi.

SEMESTER-III

Semester III

COURSE NO. PSSETC-303 **Course Title: Biostatistics and Computers**

Credits: 02 **Maximum marks: 50**

Duration of Exam: 2 hrs.

a) Minor Test-I: 10
b) Minor Test-II: 10
c) Major Test: 30

Syllabus for the examination to be held in

2025, 2026 and 2027.

Course Outcomes/ Understanding of:

CO1. Application of computer.

CO2. Advantages of power point presentation in present era.

CO3. Statistics.

CO4. Linear co-relation.

CO5. Various Assumptions.

CO6. Uses of statistical software.

UNIT—I Gneral Computers **10 Hrs**

1.1. Introduction to computers: Characteristics, history and evolution, generation and types of computers.

1.2. Introduction to internet: World Wide Web, database, e-mail and chat-GPT.

1.3. Components of computers: Hardware, software, virus, Antivirus, E-paper technology, 4D Visualization, 3D internet. M.S. Office: Word, Excel and Power Point.

1.5.Online learning platforms: module designing; their advantages and limitations. Applications of computer in e-learning.

UNIT-II Biostatistics-II **10 hrs**

2.1. Different statical software's used in sericulture: advantages and limitations.

2.2. Population and sample, descriptive and inductive statistics, discrete and continuous variables.

2.3. Frequency distribution, preparation of frequency table, relative and cumulative frequency, frequency distribution, histogram, polygon, frequency curves and ogives.

2.4. Measurement of central tendency and dispersion. Linear correlation and regression.

UNIT-III Biostatistics-III **10 hrs**

3.1. Experimental designs, CRD (Completely Randomized Design), RBD (Randomized Block Design) and LSD (Latin Square Design) and their applications.

3.2. Elementary sampling theory; Analysis of variance, assumptions, one-way ANOVA, two-way ANOVA and its derivation on SPSS.

3.2. Standard errors (SE), Standard Deviation (SD) and Critical Deviation (CD) and its derivations on SPPS.

3.4. Tests of significance: normal students 't' test, chi-square test and 'F' test and their application in data analysis.

C NO. PSSETC-303,Course Title: Biostatistics and Computers(2025-27)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	10
Minor Test II	21% to 40%	1 Hr.	10
Major Test	41% to 100%	2 Hrs.	30

i) Major test will have two sections (A & B)

ii) Section A is compulsory comprising of 10 questions of 1 mark each and be spread over entire syllabus

iii) Section B comprises of 4 questions from remaining 2 units and candidate has to attempt one question from each unit of 10 marks each

Books Recommended

1. Mathur, N. (2012) Algorithms and Data. Structures Publishing Radha Krishan Anand& Co.

2. Gurm, J.S Data. (2013)Communication Networks A Technological Approach, Publishing Radha Krishan Anand& Co.

3. Ahmed, T.Cyberlaws E-Commerce & M-Commerce. Publishing Radha Krishan Anand& Co.

4. Mathur, N.Web Programming. Publishing Radha Krishan Anand& Co.

5. R . N. Web Technology Srivasatava. Publishing Radha Krishan Anand& Co.

6. Kadam S. C.Programming A Practical. Prospective Publishing Radha Krishan Anand& Co.

7. Arumugam, N. (2013) Basic concepts of Biostatistics.Saras Publication, Kanya kumari-Tamil Nadu.

8. Gopi, A; Meena, A & others (2013) Biostastistics, Instrumentation, computer Applications and Bioinformatics. Saras Publication, Kanyakumari-Tamil Nadu.

Course No. PSSETE-304 **Course Title: MOOC through SWAYAM**

CREDITS: 04 Course Description: One 04 credit MOOC (Massive Open Online Course) selected from SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) UGC (University Grant Commission) portal. SWAYAM is a programme initiated by Government of India to achieve the three cardinal principles of Education policy viz, access, equity and quality. Course Objectives:• To provide the students high quality learning experience using multimedia on anytime, anywhere basis.• To acquaint the students with online mode of learning using ICT platform.• To diverse the knowledge of students through open learning and help them to access different disciplines online and thus promoting interdisciplinary knowledge.• To provide the students a hybrid model of learning that adds to the quality of classroom teaching.Course Selection Guidelines for Students:

• The students are required to enroll and qualify any one of the MOOC course from SWAYAM (UGC) portal that should of 04 credits.• The course can be selected from the SWAYAM platform depending upon the availability of courses as notified by UGC generally on predefined dates, 1st June or 1st November respectively, every year.

• The students are required to enroll for the SWAYAM course immediately after the commencement of 1st Semester as per notified dates by UGC for SWAYAM courses.• The course should be completed before the completion of 3rd Semester of M.Sc.• Student ideally should not select self-paced MOOCs, and the courses selected must be different from one offered in the course curriculum of semesters in order to duplication.

• The student must fill an undertaking form, as given in the brochure, and submit the same after duly filled form to their respective Departments/ Colleges for future reviews and record purposes.• SWAYAM Examination fees (if any), or any other fee prescribed, shall be borne by the students only.Course Content: To be provided by the Course Coordinator of SWAYAM Course through online mode.

Examination: To be conducted by the host Institution offering SWAYAM course selected by the student. The students are required to submit the qualifying mark sheet/certificate to the office of the P. G. Department of Sericulture, Poonch Campus, University of Jammu.

Semester III

COURSENO.PSSETE-305

Course Title: Mulberry Physiology, Breeding and Genetics

Credits: 04 **Maximum marks: 100**

Duration of exam: 2 Hrs and 30 Mins.

a) Minor Test-I: 20

b) Minor Test-II: 20

c) Major Test: 60

Syllabus for the examination to be held in

2025, 2026 and 2027

Course outcomesCO1. History of plant breeding.CO2. Biodiversity and its significance.CO3. Physiology of flowering.
CO4. Biological Nitrogen fixation.CO5. Growth regulators.
CO6. Objectives of mulberry breeding.CO7. Plant and water relations.Co8. Transpiration and translocation.
CO9. Geographical distribution of mulberry.CO10. Cytological techniques.

UNIT-I Plant Breeding **12 hrs.**

1.1. History of Plant Breeding: Pre and post Mendalian era. Patterns of Evolution in Crop Plants, Centre's of Origin-biodiversity and its significance.1.2. Genetic basis of breeding self- and cross-pollinated crops including mating systems and response to selection - nature of variability, components of variation.

1.3. Heritability and genetic advance: Genotype-environment interaction; General and specific combining ability; Types of gene actions and implications in plant breeding.

1.4. Plant introduction and role of plant genetic resources in plant breeding.

UNIT-II Plant Physiology-I **12 hrs**

2.1. Stress physiology; Water stress and physiological consequences, salinity stress, alkalinity stress. Chilling injury, drought resistance, concept and adaptations, high temperature stress.

2.2. Physiology of flowering: Photoperiodism and vernalization. Phytochrome – concept. Senescence, dormancy and seed germination.

2.3. Biological Nitrogen fixation; symbiotic, non-symbiotic and associative mechanis.

2.4. Growth regulators. Auxins, Gibberlic Acid, Cytokinins and Ethylene .

UNIT-II Plant Physiology-II **12 hrs**

3.1. Concept of plant ideo-type and its role in crop improvement. Transgressive breeding.

3.2. Plant and water relations: Concept of water potential. Absorption of water-active and passive absorption; absorption of minerals. Translocation of solutes; mechanism of translocation and factors affecting translocation. Source and sink relationship.

3.3. Transpiration: Significance, types; mechanism of stomatal opening and closing: Anti-transpirants; guttation, factors affecting rate of transpiration.3.4. Photosynthesis. Mechanism of electron transport, Co_2 fixation, C3, C4 and CAM pathway.

UNIT-III Mulberry Cytogenetics-I **12 hrs**

4.1. Cytogenetics of mulberry: Cytological techniques of mulberry breeding and its scope in mulberry improvement.

4.2. Studies on basic chromosome number, ploidy level, chromosomal association and configuration and meiotic behavior in mulberry (*Morus* spp.).

4.3. Karyotyping: history, types and process of karyotyping in plants. Representation and applications of karyotyping with special reference to mulberry.

4.4. Chromosome banding techniques: Cytogenetic characterization of polyploid mulberry species.

UNIT-V Mulberry Cytogenetics-II **12 hrs**

5.1. Chromosome identification: Pre-treatment, fixation, staining, observation under Microscope. Chiasma frequency, cytophotometry and flowcytometry.

5.2. Chromosome morphology and dynamics: molecular organization of nucleosome, centromere and Gaussian network model to modeling chromatin dynamics.

5.3. Variation in chromosome behaviour - somatic segregation and chimeras - endomitosis and somatic reduction.

5.4. Chromosome mapping, genetic markers and concept of molecular maps.

C.NO.PSSETE-305, Course Title:MulberryPhysiology, Breeding and Genetics(2025-27)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	%Weightage (Marks)
Minor Test-I	upto20%	1Hr.	20
Minor Test-II	21%to40%	1Hr.	20
Major Test	41%to100%	2Hrs.&30mins.	60

i) Major test will have two sections (A&B)

ii) Section-A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii) Section-B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15marks each).

Books Recommended:

1. Eikichi Hiratsuka (2000) Silkworm Breeding. Oxford & IBH Publications, New Delhi.

2. Verma, P.S. and Agarwal, V.K. (2004) Cell Biology, Genetics, Evolution and Ecology. Published by S. Chand & Co., New Delhi.

3. Verma, P.S. and Agarwal, V.K. (2004) Cell Biology, Genetics, Evolution and Ecology. Published by S. Chand & Co., New Delhi.

4. Basavaraja, H.K., Aswath, S.K., Suresh Kumar, N., Mal Reddy, N. and Kalpana, G.V. (2005) Silkworm Breeding and Genetics. Central Silk Board, Bangalore.5. Handbook of Sericulture Technologies (4th Edition) CSB Bangalore. 2005.

6. Silkworm Breeding & Genetics, CSB Bangalore. 2006

7. Tips to Successful Silkworm Cocoon Crops, CSB Bangalore. 2006.

SEMESTER: III

LABORATORY COURSES

PSSEPC-306

Lab-Course –I

Based on the theory course no: PSSETC-301 and 302

4 credits

PSSEPC-307

Lab-Course-II

Based on theory course no. PSSETC- 304 and 305

4 credits

Semester-III

Lab. Course No: PSSEPC-306
Title: Laboratory Course-I (Based on Theory Course No. PSSETC-301 & 302)
Credits: 04
Duration of Exam: 06 hrs. **Maximum Marks: 100**
External Exam: 50
Internal Exam: 50

Syllabus for the Examination to be held in

2025,2026,2027

1. Study of physical and commercial characters of cocoon in Multivoltine and Bivoltine races/ breeds.
2. Techniques of Sporting of cocoon – identification of good and defective cocoon.
3. Process of Cocoon stifling and cooking.
4. Determination of alkalinity and hardness of reeling water by titration methods.
5. Demonstration of mechanism of silk reeling on Epprouvette.
6. Demonstration of mechanism of silk reeling on Charkha, Cottage basin.
7. Dyeing of Multivoltine and Bivoltine silk using acidic, basic and compound dyes.
8. Study of different types of reeling establishment.
9. Estimation of Remitter, Cocoon shall ratio and raw silk percentage.
10. Raw silk testing and grading (Seriplane and Serigraph test).
11. To find the average filament length, non-broken filament length and Denier of the cocoons.
12. Estimation of effective rate of rearing percentage (ERR%).
13. Assessment and grading of cocoon.
14. To study molecular formation mechanism, structure and Properties of silk fiber.
15. To study fine, crystal structure and texture of silk fibres.
16. Identification of pure silk fabric.
17. Cocoon harvesting and deflossing: methods; their merits and de-merits.
18. Silk blending: blending of mulberry and non-mulberry silk with other natural and synthetic fibers.
19. Selection of appropriate Seri-business model.

20. Entrepreneurship activities Framework Model.

21. SWOT analysis in Seri-business.

22. Identification of successful seri-entrepreneurs of your area.

23. Preparation of silk-based handicrafts.

Note: Any other need based practical if required shall be incorporated.

Semester-III

Lab. Course No. PSSEPC-307

Title: Laboratory Course-II (Based on Theory Course No. PSSETC-304, 305 & 306)

Credits: 04

Duration of Exam: 06 hrs.

Maximum Marks: 100

External Exam: 50

Internal Exam: 50

Syllabus for the Examination to be held in

2025, 2026, 2027

1. Study of various EDP policies of CSB & other sericulture organizations.
2. Internet browsing, surfing, e-mail & chatting.
3. Anti-virus & its applications.
4. Role of Rural banks for the upliftment of Sericulture in rural areas.
5. M.S. Word, M.S. Power-point & its applications.
6. Use of statistical soft-wares-like Microsoft excel, SPSS, Mathematics.
7. To prepare frequency tables & frequency distribution.
8. To prepare Histogram, polygon, frequency curves & oogives.
9. Measurement of central tendency & dispersion.
10. To study various physical parameters like: soil color& texture.
11. Visit to chawki rearing canters.
12. Planning for raising Mulberry saplings (Kisan Nursery & vermin-compositing).
13. Collection & conservation of Mulberry Germplasm.
14. Hybridization studies in Mulberry: Floral Biology, Pollen viability, pollen collection, artificial pollination, bagging & handling the crossed fruits.
15. Polyploidy breeding: Induction & identification of varieties evolved.
16. Tissue culture techniques: Preparation of culture media, Inoculation of ex-plants.
17. To study micro-propagation in mulberry breeding.
18. Determination of transpiration rate of Mulberry.
19. Role of growth regulators on Mulberry production.

20. Production of haploids & their application in Mulberry breeding.
21. Fixative preparation and fixing specimen for light microscopy studies in mulberry cytogenetics.
22. Preparation of temporary and permanent slides of mulberry catkins.
23. To study principle of Microtomy and steps in involved microtomy.
24. To study polyploidy level in common mulberry cultivars.
25. To study morphology of chromosome in mulberry.
26. Representation of mulberry karyotype.
27. Chromosome identification: Pre-treatment, fixation, staining, observation under Microscope.
28. Demonstration of gene mapping in mulberry.
29. Demonstration of Smear Technique for Plant Chromosomes.
30. Chiasma frequency, cytophotometry and flowcytometry.

Note: Any other need based practical if required shall be incorporated

SEMESTER-IV

SEMESTER IV

COURSE NO. PSSETC-401 **Course Title: Sericulture Extension and Vanya Silks**

Credits: 04 **Maximum marks: 100**

Durationofexam:2hrs.and 30Mins.

a) MinorTest-I:20

b) Minor Test-II: 20

c) Major Test: 60

Syllabus for the examination to be held in

2025, 2026 and 2027.

Course outcomes/ Understanding of:

CO1. Objectives of extension education.CO2. SWOT analysis.

CO3. Sericulture Extension Organization

CO4.Program Evaluation and Review Technique (PERPE)

CO5. WTO's Agreement on Agriculture.

CO6. Role of NABARD.

CO7. Introduction to Vanya sericulture.

CO8. Seed organization in vanya sericulture.

CO9. Life cycle of tasar, eri and muga silkworms.

CO10. Diseases and pests of non-mulberry silkworms.

UNIT-ISericultureExtension&Management **13 hrs.**

1.1. Extension Education: principles, types and concept. Extension programme: Programme planning, principles of planning, six P's of planning, criteria for setting up of extension units.

C. NO. PSSETC-401,Course Title: Sericulture Extension and Vanya Silks(2025-27)

1.2. Organization of extension services in India; Training &Visit system, Broad based extension system. Role and responsibility of different categories of extension workers.

1.3. Role of co-operatives and Non-Government Organizations in sericulture extension. Extension services available in sericulture for the establishment of Chawki Rearing Centers, Basic Seed Farms, Grainages and Markets. Concept of SWOT analysis in sericulture.

1.4. Management: principles and Concept. Staffing: Meaning & steps in staffing. Budgeting & Controlling: Meaning and types of budgets, role of budgeting in effective management. Meaning and role of controlling in achieving management goals.

UNIT- II Sericulture Extension Services **13 hrs.**

2.1. Program Evaluation and Review Technique (PERT). Organization of sericulture extension system and its management.

2.2. Tele-Agri-Advisory Services for Farmers: Kisan Call Centre, Common Service Center and other Managerial Abilities of Women Headed Households. Working of Extension functionaries associated with sericulture.

2.3. Applications of Social Network Analysis in Human Resource Development. Opinion and Preferences of Farmers regarding the services of Private Extension Service Providers and it's role in improving extension services.

2.4. Functions of NABARD and Gramin Bank. Schemes and loans offered by banks and cooperative bodies for agriculture ventures. Scope and need of improvement in functioning of extension service agencies for promotion of sericulture.

UNIT-III Sustainable Development **13 hrs**

3.1. Sustainable agriculture: definition, scope and objectives, Natural resources, their characterization and management.

3.2. Sustainable cropping and farming systems in agriculture in relation to environmental degradation, Research needs on sustainable agriculture.

3.3. Developmental issues, poverty, inequality, unemployment and environmental degradation. Models of Agricultural Development. 3.4. Globalization and the relevance of development policy analysis. WTO's Agreement and its role in agriculture.

UNIT- IV Vanya Sericulture-I **13 hrs**

4.1. History of non-mulberry sericulture: status of vanya silks in India. Host plants of vanya silkworms: primary and secondary host plants, state wise distribution in India and economic importance of vanya sericulture.

4.2. Comparative account on morphological features of egg, larva, pupa and moth of non-mulberry silkworms.

4.3. Selection of plantation, preparation of rearing site, cleaning, disinfection, maintenance of hygienic conditions. Incubation, Hatching and brushing: Effect of temperature, humidity and light on hatching of eggs; Fecundity, hatching percentage. Brushing of silkworm larvae in vanya culture. Rearing of tasar, eri and muga silkworms and their life cycle.

4.4. Mounting and Spinning: Maturation of silkworm; Hammock formation; Ring, peduncle and cocoon formation in Tasar; Collection of matured Muga silkworms and mounting on jali; density regulation of Muga silkworms; Care during spinning. Cocoon formation in eri culture and its harvesting.

UNIT- V Vanya Sericulture-II **13 hrs**

5.1. Assessment of cocoon quality: Harvesting and sorting/grading of cocoons of Tasar, Eri and Muga.

C. NO. PSSETC-401,Course Title: Sericulture Extension and Vanya Silks(2025-27)

5.2. Concept and importance of seed production: Seed organization; Elite, basic and commercial seeds; Model seed multiplication set-up; Seed Act 2006, Adopted Seed Rearers concept, Seed cocoon certification, Seed certification, Role of Seed analyst and Seed Officer. ISO certification; Selection of seed cocoons and transportation.

5.3. Pests and diseases of primary host plants of vanya silkworms and their management.

5.4. Disease of vanya silkworms: Protozoan, bacterial viral and fungal diseases, symptoms, causative agent preventive and control measures. Moth examination: Moth crushing and slide preparation, identification of pathogens in vanya sericulture.

C. NO. PSSETC-401,Course Title: Sericulture Extension and Vanya Silks(2025-27)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	%Weightage (Marks)
Minor Test-I	upto20%	1Hr.	20
Minor Test-II	21%to40%	1Hr.	20
Major Test	41%to100%	2Hrs.&30mins.	60

a. Major test will have two sections (A&B)
b. Section-A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus
c. Section-B comprises of 6 questions (2fromeachunit) from the remaining 3 units and candidate has to attempt one question from each unit (15markseach).

Books Recommended:

1. Mohanty, P. K. (2003) Tropical wild silk cocoons of India. Daya publishing house Delhi.

2. P. Kumaresan& Dr. G. Srinivasa (2005) Sericulture Extension Management & Economics.

3. Kumaresan, P. and Srinivasa, G. (2005) Sericulture Extension Management and Economics. Central Silk Board, Bangalore.

4. Jha, U. M. & Daman C. M. (2006) Economics of Silk Weavers.

5. Subramani, T (2008) Sericulture Economics.

6. Singh, T. Bhat, M. M and Khan, M. A (2009) Sericulture Extension: Principles and Management. APH Publications, New Delhi.

7. Singh, T. Bhat, M. M and Khan, M. A (2009) Sericulture Extension: Principles and Management. APH Publications, New Delhi.

8. Dandin, S. B and Ghirdhar, K. (2010) Handbook of sericulture technologies. Central Silk Board, Bangalore

9. Sathe and kavane, R.PM (2011) Wild Silk. Daya publishing house Delhi.

SEMESTER-IV

COURSE NO. PSSETC-402 **Course Title: Advances in Seribiotechnology**

Credit: 04

Duration of exam: 2 hrs. and 30 Mins.

Maximum marks: 100

a) Minor Test-I: 20

b) Minor Test-II: 20

c) Major Test: 60

Syllabus for the examination to be held in

2025, 2026 and 2027.

Course outcomes/ Understanding of:CO1. Genomic studies of silkwormCO2. Genome mappingCO3. Concept of molecular markersCO4. Gene coding

CO5. Proteomics of silkworm and mulberryCO6. Artificial intelligence (AI)CO7. Silk biomaterialsCO8. Nanotechnology in Sericulture

CO9. SeribiotechnologyCO10. Seribiotechnology and human welfare.

UNIT-I Genomics **13 hrs.**

1.1. Structure, function and evolution of the silkworm genome. Strategies for large scale sequencing projects. Whole genome sequencing in silkworm.

1.2. Molecular markers and their applications in silkworm and mulberry genomics.

1.3. Molecular linkage and genetic map- construction based RFLP, RAPD, AFLP, SSR and ISSE markers.

1.4 Physical map- construction based on clone (BAC-FISH), ESTs, STSs. Long range restriction mapping with special reference to silkworm.

C. NO. PSSETC-402,Course Title: Advances in Seribiotechnology(2025-27)

UNIT-I1 Functional Genomics **13 hrs.**

2.1. A brief account on *Bombyx mori* genome projects and their applications in Sericulture improvement. Gene variations and SNPs and disease association, repetitive and coding sequences. Silkworm and mulberry genome database.

2.2. Techniques-Whole transcriptome shotgun sequencing, Serial analysis of gene expression (SAGE), Whole-genome microarray construction. Analysis for differentially expressed mRNAs. Silkworm transcriptome analysis (mRNA extraction, cDNA library construction and sequencing analysis, validation through RT-PCR).

2.3. DNA chip and micro array in functional genomics. Synthesis and super secondary structure of fibrion and sericin proteins.

2.4. Relationship between protein structure and functions. Concept of Prions. Mechanism of protein folding and formation of oligomers.

UNIT–III Proteomics **12 hrs**

3.1. Proteomics: Principles and methods of protein separation (1-DE and 2-DE), purification, immunoblot assay. Amino acid sequencing-chemical and enzymatic methods, Mass spectrometry - MALDI-TOF, MS-MS, LC-MS and ion trap.

3.2. Heat shock proteins and their application in silkworm strain improvement program. Concept and applications of mutant proteins. Use of computer simulations and knowledge- based methods in the design process.

3.3. De- novo design, making use of database of sequence and structure in silkworm proteomics.

3.4. Fundamentals of silkworm and mulberry proteomics and it's scope for future improvement of silkworm and host plant. Practical implications of silkworm and mulberry proteomics.

UNIT-IVBioinformatics and Artificial Intelligence **13 hrs**

4.1. Introduction, history and scope of Bioinformatics. Sequence alignment methods-global, local, pairwise-dot-matrix methods, dynamic programming, and word methods). Multiple sequence alignment- conserved sequence and its evolutionary significance. Phylogenetic tree construction.

4.2. Biological databases sequence retrieval methods - NCBI, DDBJ, EMBL. Sequence similarity search tool-BLAST and its types. Unknown protein identification tools and databases- ExPASy and Matrix Science. Protein Structure prediction methods and tools-comparative modeling (SWISS-MODEL), threading (PHYRE) & Ab-initio (ROSETTA).

4.3. Concept of artificial intelligence (AI) in silkworm improvement. Applications of AI techniques in Sericulture.

4.4. Introduction, concept and scope of Nanotechnology in Sericulture. Applications of nanotechnology in silkworm and mulberry improvement.

UNIT-V Silk Bio-materials **13 hrs.**

5.1. Fundamental, types and processing of silk biomaterials.

5.2. Applications of silk biomaterials in tissue engineering and regenerative medicine. 5.3. Electro-spun silk: sericin nano-fibers for biomedical applications. Silk as bio-steel.

5.4. Properties and behavior of silk biomaterials. Recent advances in recycling silk biomaterials. Role of Seri-biotechnology in human welfare.

C. NO. PSSETC-402,Course Title: Advances in Seribiotechnology(2025-27)

Note for paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	% Weightage (Marks)
Minor Test I	up to 20%	1 Hr.	20
Minor Test II	21% to 40%	1 Hr.	20
Major Test	41% to 100%	2Hrs. & 30 mins.	60

i) Major test will have two sections (A&B)

ii) Section-A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

iii) Section-B comprises of 6 questions (2fromeachunit) from the remaining 3 units and candidate has to attempt one question from each unit (15markseach).

Books Recommended:

1. Asakura, T., Mille, T., (2013) Biotechnology of Silk, Springer Science & Business Media.

2. Brown, T. A. (2016). Gene cloning and DNA analysis: an introduction. John Wiley & Sons.

3. Gautham, N., (2006) Bioinformatics: Databases and Algorithms, Alpha Science. 4. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington. 5. Harisha, S., Harisha, S., (2010) Fundamentals of Bioinformatics. I. K. International Pvt Ltd.

6. Kundu, S. (Ed.). (2014). Silk biomaterials for tissue engineering and regenerative medicine. Elsevier.

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7. Mount, D.W., (2004) Bioinformatics: Sequence and Genome Analysis, CSHL Press. 8. Murray, D.R. (1991) Advanced Methods in Plant Breeding Biotechnology. CAB, International, Wallingford, Oxon, United Kingdom.

9. Mussig, J., (2010) Industrial Applications of Natural Fibres: Structure, Properties and Technical Applications, John Wiley & Sons.

10. Pevsner, J. (2009). Bio-informatics and Functional Genomics. II Edition. John Wiley & Sons. 11. Rajkhowa, Rangam, Wang, Xungai (2014) Silk Biomaterials for Tissue Engineering and Regenerative Medicine, Elsevier, Amsterdam, The Netherlands. 12. Ramalingam, M., Vallittu, P., Ripamonti, U., Li, W.J., (2012) Tissue Engineering and Regenerative Medicine: A Nano Approach. CRC Press. 13. Russell, P. J. (2009). iGenetics- A Molecular Approach. III Edition. Benjamin Cummings.

14. Xiong, J., (2006) Essential Bioinformatics, Cambridge University Press.

SEMESTER- IV

COURSE NO. PSSETC- 403 **Course Title: On Job Skill Training**

Credit: 4 **Maximum marks: 100**

a) External Examiner: 80Project work (4-6weeks)

b) Internal Examiner: 20

1. Dissertation/project work to be done at Department of Zoology University of Jammu.
2. Dissertation/project work to be done at Department of Sericulture, Poonch campus, University of Jammu.
3. Central Silk Board, Bangalore/ CSR & TI, Mysore/Department of Sericulture, Government of J&K.
4. SKUAST- Jammu/Kashmir.
5. RSRS Miran Sahib, Jammu
6. SSPC Udhampur
7. CSR&TI, Pampore, Kashmir.
8. Any Sericulture Firm/ Technical Service Centers within/outside the state.
9. State Filature J&K.
10. Silk Weaving, Dyeing and printing units within/outside the state
11. Any other nearby textile mill or factory.
12. Nearby JKEDI or KVIC departments.

Candidates shall undertake the skill-based project under the guidance of the faculty member. One or two Faculty members of the department of Sericulture will maintain liaison with the organization/units/research institutes/Universities etc. in planning the training. The candidate shall be under administrative control of that organization implanting skill training. Every candidate shall be required to maintain a daily attendance and work done/ experience acquired during the training. The Head of the organization will furnish a confidential report regarding attendance and the assessment of the performance in respect of every student to the Department of Sericulture, Poonch campus on completion of the training which will be taken into account at the time of final evaluation. The candidates shall have to submit two copies of bound and typed report on the training undertaken by him/her along with the certificate of the allotted guide from the department

of sericulture of Poonch Campus, endorsed by the Director of the Campus. The evaluation of the project work will be assessed as per the following norms. The skilled project report shall have to be submitted to the department at least 15 days before the commencement of the University Examination which will be jointly evaluated by the internal examiner having a weightage of 20% and External examiner having the weightage of 80% of the total weightage of the Skill Based Project.

SEMESTER- IV

COURSE NO. PSSETE-404 (Elective Course) **Course Title: Entomology**

Credit: 04 **Maximum marks: 100**

Duration of exam: 2 Hrs and 30 Mins.

a) Minor Test-I: 20

b) Minor Test-II: 20

c) Major Test: 60

Syllabus for the examination to be held in

2025, 2026,and 2027.

Course outcomes/Understandings of:

CO1: importance of beneficial and non-beneficial insects.CO2: Applied aspects of insects and their services to human welfare.CO3: Insect behavior

CO 4: Insect plant interactions

CO 5: Insect pest management

CO6: Control measures for pest infestation

CO7: Economic insects

CO8: Insect as pollinators

CO9: Coloration defense

CO10: Mimicry

Unit-I:Important insect pests with special reference to J&K **12hrs**

1.1 Fruit & vegetable pests, stored grain & household pests, Forest pests, pest of fibrous crops, insect Pest control & Management: Cultural control and Chemical control

1.2. Hazards of insecticides, insecticidal resistance. Modern techniques of Insect control and Hormonal and Pheromonal control

1.3 Biological control. Sterile Insect & genetic tactics in insect control and Plant Resistance to insects

1.4 Biotechnological approach in pest management for sustainable development.

Unit-II Insects of medical Importance **12 hrs**

2.1 Insects as vectors of human diseases. Mode of transmission and epidemiology of major vector borne diseases such as Malaria, yellow fever, kalazar, typhus, plague, filiariasis.

2.2 Insects of commercial Importance & products2.3. Economic importance of Honey bees. Important species of honey bees and their culturing techniques.

2.3 Economically important species of Silkworms and it's demand in national and international market.

2.4 Lac insects and it's economic importance. Methods of culturing and processing.

Unit-III: Major Ecological Role of Insects **12 hrs**

3.1 Insects as herbivores, Insect as pollinator. Aquatic insects and insects as parasites and predators

3.2 Role of insects in forensic science. Ground dwelling insects. Commonly used model insects for research purpose. 3.3. Insect biotic potential and environmental resistance. Insect as human food. Role of insects in balancing the ecological balance. Concept of endangered and extinct species. Insect Plant Relationship:3.4 Host selection and plant characteristics in host plant selection. Behavioral and physiological components in insect plant relationship

Unit-IV:Insect communication **12 hrs**

4.1 Social Insects and Social organization

4.2 Caste differentiation and evolution of social instinct. Termites and ants as social units.

4.3 Insect communication and Chemical communication

4.4 Audio & tactile communication. Visual communication and Luminescent insects

C. NO. PSSETE-404 (Elective Course),Course Title: Entomology(2025-2027)

Unit-V: Defense Mechanism **12 hrs**

5.1 Insect Defense mechanism.

5.2 Behavioral& structural defense

5.3 Concept of Chemical defense

5.4 Concept of Coloration defense

5.5 Concept of Mimicry

C. NO. PSSETE-404 (Elective Course),Course Title: Entomology(2025-2027)

Note for paper setting

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	%Weightage (Marks)
Minor Test-I	upto20%	1Hr.	20
Minor Test-II	21%to40%	1Hr.	20
Major Test	41%to100%	2Hrs.&30mins.	60

1. Major test will have two sections (A & B)

2. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

3. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

Recommended Books

1. Wigglesworth, V.B. (1976). Insect and the life of Man. London Chapman & Hall.2. Hermann, H.R. (1982). Social Insects (Vol-III). Academic Press, London.

3. Fryer, J.C.F. (2008). Insect Pests of Fruit Crops.Biotech Books, Delhi.4. Pedigo, L.P. and Rics, M.E. (2009). Entomology and Pest Management (VI Edi.) PHI Learning Private Limited.

5. Bhargava, M.C. and Kumawat, K.C. (2010). Pests of Stored Grains and their Management.New India Publishing Agency.6. Cotton, R.T. (2011). Insect Pests of Stored Grains and Grains Products: Identification, Habits and Methods of Control Biotech Books, Delhi.

SEMESTER-IV

COURSENO.PSSETC-405 (Special Optional)

Course Title: Sericulture and Toxicology

Credit: 04 **Maximum marks: 100**

Duration of exam: 2Hrs and 30 Mins.

a) Minor Test-I: 20

b) Minor Test-II: 20

c) Major Test: 60

Syllabus for the examination to be held in

2025, 2026 and 2027.

Course outcomes/ Understanding of:

CO1. Introduction to toxicology.

CO2. Formulation of insecticides.

CO3. Classification of insecticides.

CO4. Insecticide Act.CO5. Metabolism of insecticides.

CO6. Genetics of resistance.

CO7. Innovative approaches in pest control.

CO8. Concepts of damage level

CO9. Mechanism of pathogen transmission:

CO10. Safe period.

UNIT-I Concepts of Toxicology-I **12 hrs.**

1.1. Introduction to toxicology: history, scope and principles of chemical control. Pesticide use and pesticide industry in India. Insect growth regulators: Microbials, botanicals, new promising compounds etc. principles of toxicology; evaluation of insecticide toxicity.

1.2. Classification of insecticides and acaricides: Based on mode of entry, mode of action and chemical nature. Formulation of insecticides.

1.3. Physical, chemical and toxicological properties of different group of insecticides; chlorinated hydrocarbons, organophosphates, carbamates, synthetic pyrethroids, chlordimeform, chitin synthesis inhibitors, avermectins, nitroguandines, phenylpyrrozoles, botanicals: natural pyrethroids, rotenone, neem products, nicotine and pongamia spp.

1.4. Combination insecticide. Problems of pesticide hazards and environmental pollution. Insecticide Act, registration and quality control of insecticides; safe use of insecticides; diagnosis and treatment of insecticide poisoning.

UNIT-II Concepts of Toxicology-II **12 hrs.**

2.1. Evaluation of toxicity: methods of toxicity testing, determination of LC-50, LD-50, LT-50 and RL-50 value.

2.2. Pesticide residue in the environment and their dynamics and management. Pharmacology of insect poisons.

2.3. Mode of action of different groups of insecticides: neuroactive; axonal and synaptic poisons and respiratory poisons.

2.4. Metabolism of insecticides: activative and degradative metabolism, detoxification enzymes and their role in metabolism. Selectivity of insecticidal actions; insecticide resistance, mechanism, genetics and management of insecticide resistance.

UNIT-III Sericulture andToxicology-III **12 hrs.**

3.1. Introduction to toxicology of silkworm: Procedures used in toxicology studies, methods of administration of pesticides, toxic symptoms in silkworm.

3.2. Basis of resistance: Antixenosis, antibiosis and tolerance. Biotype development and its remedial measures. Tritrophic interactions and induced resistance.

3.3. Genetics of resistance: vertical resistance, horizontal resistance, oligogenic resistance and polygenic resistance.

C.NO.PSSETC-405 (Special Optional) Course Title: Sericulture and Toxicology(2025-27)

3.4. Biotechnological approaches and development of transgenic insect resistance plants, its advantages and limitations. Insect resistance to transgenic plants.

UNIT-IVPest Control Approaches in Sericulture-I **12 hrs.**

4.1. Innovative approaches in pest control. Behavioral control: pheromones; its types, uses advantages and limitations.

4.2. Hormonal control: types and functions of insect hormones, insect hormone mimics, advantages and limitations.

4.3. Chemosterilants, antifeedants, attractants and repellents: their types methods of application, advantages and limitations.

4.4. Host-plant resistance, agronomic manipulations, physical, chemical and mechanical. Biocontrol agents utilization; genetic and behavioral control strategy. Concepts of damage level: ETL and EIL and their determination.

UNIT-V Pest Control Approaches in Sericulture-II **12 hrs.**

5.1. Mechanism of pathogen transmission: active mechanical transmission and biological transmission. Toxicogenic insects and phytotoxemia.

5.2. Common pesticides used in mulberry gardens: appliances (sprayers, dusters, fog generators, smoke generators, soil injecting guns, seed treatment drums, flame throwers etc.). Power operated sprayers and dusters; types of nozzles and their uses.

5.3. Maintenance of appliances. Aerial application of pesticides, principles of aerial application, factors affecting the effectiveness of aerial application. Equipments required for aerial application: their advantages and disadvantages.

5.4. Dosage and schedule of pesticide application in mulberry. Safe period. Commercial and trade name of common pesticides of sericulture industry.

C.NO.PSSETC-405 (Special Optional) Course Title: Sericulture and Toxicology(2025-27)

Note for Paper setting:

Examination Theory	Syllabus to be covered in Examination	Time allotted for Exam	%Weightage (Marks)
MinorTestI	upto20%	1Hr.	20
MinorTestII	21%to40%	1Hr.	20
MajorTest	41%to100%	2Hrs.&30mins.	60

1. Major test will have two sections (A & B)

2. Section A is compulsory comprising of 10 questions of 1.5 marks each and be spread over entire syllabus

3. Section B comprises of 6 questions (2 from each unit) from the remaining 3 units and candidate has to attempt one question from each unit (15 marks each).

Books Recommended:

1. Eikichi Hiratsuka (2000) Silkworm Breeding. Oxford & IBH Publications, New Delhi.

2. Eikichi Hiratsuka (2000) Silkworm Breeding. Oxford & IBH Publications, New Delhi.

3. Verma, P.S. and Agarwal, V.K. (2004) Cell Biology, Genetics, Evolution and Ecology. Published by S. Chand & Co., New Delhi.4. Verma, P.S. and Agarwal, V.K. (2004) Cell Biology, Genetics, Evolution and Ecology. Published by S. Chand & Co. New Delhi.5. Handbook of Sericulture Technologies-(4th Edition)(2005) CSB Bangalor.

6. Basavaraja, H.K., Aswath, S.K., Suresh Kumar, N., Mal Reddy, N. and Kalpana, G.V. (2005) Silkworm Breeding and Genetics. Central Silk Board, Bangalore.

7. Tips to Successful Silkworm Cocoon Crops, (2006) CSB Bangalor.8. Silkworm Breeding & Genetics, (2006) CSB Bangalor.9. Guidelines for bivoltine rearing, (2009) CSB Bangalor. 10. Shamsuddin, M. (2012) Silkworm Physiology, Daya publishing house New Delhi.

11. Chanotra S., Bhat. M. A., Aziz. A. and Azam. M. (2021). Breeding and Genetics of Mulberry and Silkworm. Innovative Publications. New Delhi.

SEMESTER: IV

LABORATORY COURSES

PSSEPC-406	Laboratory course-I
Based on theory course no. PSSETC-401 and 402	4 credits
PSSEPC-407	Laboratory course-II
Based on theory course no. PSSETC-404 and 405	4 credits

Semester-IV

Lab. Course No. PSSEPC-406

Title: Lab Course-I (Based on Theory Course No. PSSETC-401& 402)
Credits: 04

Duration of Exam: 06 hrs.

Maximum Marks: 100
External Exam: 50

Internal Exam: 50

Syllabus for the examination to be held in

2025, 2026 and 2027.

1. Study of extension activities of J&K State Sericulture Development Department, Centre Silk Board, SKUAST-J & K, S.S.P.C. Udhampur.2. Study of extension activities of NGOs working for sericulture promotion.3. Study of sericulture extension programme of department of sericulture.

4. Practical exercise on participatory rural appraisal and rapid rural appraisal. 5. Preparation of flex, flash card, model, poster, leaflets, pamphlets and bulletin.6. Conducting method demonstration.7. Preparation of an interview schedule/ questionnaire based on sericulture extension. 9. Construction of Knowledge test- rating and ranking scale.10. Developing a research proposal.11. Visit to cocoon market and any other regulated agricultural market.12. Visit to nearby NABARD or Gramin Bank.

13. Organization of Kissan melas or farmers meet in adopted village.

14. Visit to temperate and tropical research institutes and silk producing states of India Educational Tour.15. Morphology of different non-mulberry silk worms: Egg, Larva, Pupa, Cocoon and Adult.

16. Life cycle of tasar, eri and muga silkworms.17. Comparison and characteristics features of Tasar, Muga, Eri, Silk threads.19. A visit to silk reeling factory: Filature, Reeling machine, Yarn passage diagram, Cooking & Reeling of vanya silks.

20. Determination of Reelability. Average filament length. Raw silk percentage. Renditta. Silk waste percentage in vanya silks.

21. Detail study of multi-end silk reeling machine, automatic and semi-automatic reeling machine and hand spinning devices used in vanya silk culture practical demonstration.

21. Visit to spun silk mill.22. Study of silk dyeing and printing unit- visit to practical centres.23. Study the permanent slide of the different natural and man-made fibers.24. Preparation of herbarium of the locally available mulberry & non mulberry host plants.25. To study principle and working of PCR.

26. To study principle and working of gel electrophoresis and gel documentation.

27. To study different types of molecular markers and their applications in sericulture.

28. To study linkage and physical map of silkworm.

29. To study database of silkworm and mulberry.

30. To study super secondary structure of fibroin and sericin proteins.

31. Demonstration of Bioinformatics and its applications in Sericulture.

32. To study Artificial Intelligence (AI) and its applications in sericulture.

33. To study nanotechnology its applications in sericulture.

34. To study applications of silk biomaterials in tissue engineering.

Note: Any other need based practical if required shall be incorporated.

Semester-IV

Course No. PSSEPC-407

Title: Laboratory Course-II (Based on Theory Course No. PSSETC-404 & 405)
Credits: 04

Duration of Exam: 06 hrs. **Maximum Marks: 100**

ExternalExam:50
Internal Exam: 50

Syllabus for the examination to be held in

2025, 2026 and 2027.

1. To study general classification of pesticides, herbicides fungicides, insecticides, pesticides in the environment.
2. To study the bio-magnification of pesticides.
3. To study different insecticidal Acts.
4. Preparation of organic based botanicals for application in mulberry pest control.
5. Preparation of synthetic pesticides for application in mulberry pest control.
6. Determination of LC-50 and LD-50 value of senitech and serichlor chemicals.
7. Determination of LT-50 and RL-50 value of senitech and serichlor chemicals.
8. To study toxic site reclamation.
9. To study he incidence of pest outbreak and pest resurgence in mulberry garden.
10. To study Chemosterilants, antifeedants, attractants and repellents used in sericulture.
11. Determination ETL and EIL of the common chemicals used in sericulture.
12. To study common pesticides used in mulberry gardens and their relative efficiency.
13. To study the working principle of sprayers, dusters, fog generators and smoke generators.
14. To study the working principle of soil injecting guns, seed treatment drums and flame throwers.
15. To study the working principle of Manual sprayers and dusters
16. To study the working principle of Power operated sprayers and dusters.
17. To study different types of nozzles and their uses.

18. Demonstration of maintenance of toxicological appliances.
19. Demonstration of Aerial application of pesticides in mulberry.
20. To study dosage and schedule of pesticide application in mulberry.
21. Calculate the safe period of common pesticides used in mulberry fields.

Note: Any other need based practical if required shall be incorporated.

UNIVERSITY OF JAMMU

COURSE STRUCTURE FOR MASTERS DEGREE PROGRAMME IN SERICULTURE

The Courses of study prescribed for 1st to 4th semesters/ Master's Degree Programme under CBCS in the subject of Sericulture (Session 2023-25)

Semester	CourseCode	Course Title	Credits	NatureofCourse	%ofChange
I	PSSETC-101	General Sericulture	4	CORE	5%
	PSSETC-102	Mulberry Biology and Production	4	CORE	10%
	PSSETC-103	Silkworm Biology, Physiology and Biochemistry	4	CORE	15%
	PSSETC104	Silkworm Rearing Technology and Egg production	4	CORE	10%
	PSSEPC-105	Lab Course–I	4	PRACTICAL	10%
	PSSEPC-106	Lab Course–II	4	PRACTICAL	-
		Total credits	**24**		
	PSSEPC-105 Based onTheoryCourseNo.101 &102 PSSEPC-106Based on TheoryCourseNo.103 &104				
II	PSSETC -201	Cell and Molecular biology and Immunology	4	CORE	20%
	PSSETC -202	Genetics & Bio Chemical Techniques	2	CORE	-
	PSSETC -203	Applied Entomology	2	CORE	20%
	PSSETC -204	Breeding & Genetics of Silkworm & Mulberry	4	CORE	5%
	PSSETC -205	Mulberry and Silkworm crop Protection	4	CORE	5%
	PSSEPC-206	Lab Course–I	4	PRACTICAL	20%
	PSSEPC-207	Lab Course–II	4	PRACTICAL	20%
		Total credits	**24**		
	PSSEPC-206Based onTheoryCourseNo.201, 201&203 PSSEPC-207Based on TheoryCourseNo.204 &205				
III	PSSETC-301	Post-Cocoon Technology	4	CORE	25%
	PSSETC-302	Entrepreneurship Development in Sericulture	2	CORE	30%
	PSSETC-303	Biostatistics and Computers	2	CORE	15%
	PSSETC-304	*MOOC through SWAYAM portal	4	MOOC	-
	PSSETE-305	Mulberry, Physiology, Breeding and Genetics	4	CORE	30%
	PSSEPC -306	Lab Course–I	4	PRACTICAL	25%
	PSSEPC-307	Lab Course –II	4	PRACTICAL	20%
		Total credits	**24**		
	PSSEPC -306 Based on TheoryCourseNo.301, 302 PSSEPC-307 Based onTheoryCourseNo.303& 305				

IV	PSSETC-401	Sericulture Extension and Vanya Silks	4	CORE	40%
	PSSETC-402	Advances in Seribiotechnology	4	CORE	10%
	PSSETC-403	On Job Skill Training	4	CORE	-
	Anyone of the following elective courses				
	PSSETC-404	Entomology	4	ELECTIVE	-
	PSSETC-405	Sericulture and Toxicology	4	SPECIAL OPTIONAL	50%
	PSSEPC-406	Lab Course –I	4	PRACTICAL	15%
	PSSEPC-407	Lab Course –II	4	PRACTICAL	20%
		Total credits	**28**		
	PSSEPC-406Based on TheoryCourseNo.401&402 PSSEPC-407Basedon TheoryCourseNo.404& 405				
	Total credits earned by the students		**100**		

*For students of other Departments

(Head of the Department)

Head
Deptt. of Zoology
University of Jammu

DAC members

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