

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY
V SEMESTER

(Syllabus under CBCS w.e.f. 2022-23)

Skill Enhancement Courses for Sem - V Structure of SECs for Sem - V
(Candidate has to choose one pair from the three alternative pairs of SECs)

University Code	Course Number	Name of the Course	Hours/Week	Credits	Marks	
					IA	Sem End Theory+ Practical
	6A	Principles & Practices of Sustainable Mulberry Agronomy	3	3	25	75
	6A LAB	Principles & Practices of Sustainable Mulberry Agronomy	3	2	-	50
	7A	Silkworm Rearing & Cocoon Production Technology	3	3	25	75
	7A LAB	Silkworm Rearing & Cocoon Production Technology	3	2	-	50

Or

University Code	Course Number	Name of the Course	Hours/Week T+P	Credits T+P	Marks	
					IA	Sem End Theory+ Practical
	6B	Post - Harvest Cocoon Processing Technology	3	3	25	75
	6B LAB	Post - Harvest Cocoon Processing Technology	3	2	-	50
	7B	Silkworm Seed Technology	3	3	25	75
	7B LAB	Silkworm Seed Technology	3	2	-	50

Or

University Code	Course Number	Name of the Course	Hours/Week T+P	Credits T+P	Marks	
					IA	Sem End Theory+ Practical
	6C	Seri Biotechnology	3	3	25	75
	6C LAB	Seri Biotechnology	3	2	-	50
	7C	Seri Business – extension & economics	3	3	25	75
	7C LAB	Seri Business – extension & economics	3	2	-	50

*** To be taught by Sericulture/Life Sciences Teachers

Note-1: For Semester-V, for the domain subject Sericulture, any one of the three pairs of SECs shall be chosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C. The pair shall not be broken (ABC allotment is random, not on any priority basis).

Note-2: One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented. Hence, teachers shall also impart practical training to students on the skills embedded in syllabus citing related real field situations.

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Course 6 A: Principles and Practices of Sustainable Mulberry Agronomy

(Skill Enhancement Course (Elective), -Credits: 05)

Max. Marks : 100

I. Learning Outcomes:

Students at the successful completion of this course will be able to learn and gain practical knowledge of -

- The influence of various factors in leaf quality and productivity.
- Acquaint with the know-how of mulberry garden establishment under different agro-climatic conditions.
- The various new technologies of mulberry production

II. Syllabus

(Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

Unit-I –Soils Fertility and Soil reclamation

Edaphic factors: Soils of mulberry gardens, types of soil, profile structure, topography, Porosity, aeration, soil water, organic matter and soil micro-organisms.

Soil reaction: salinity, acidity and alkalinity, soil amendments.

Climatic factors: Role of light, temperature, wind velocity, altitude, rainfall, relative humidity on growth and development of mulberry.

Unit-II- Integrated Nutrient Management

Mulching: Mulches and their significance in soil conservation.

Manuring: Organic manures and their application: (FYM, compost, tank silt, night soil, sewage sludge, oil cakes, vermicompost). Method of compost and Vermicompost preparation. Organic Manuring in mulberry cultivation and organic farming.

Green manuring: green manure crops and their relevance in soil productivity.

Biofertilizer: Types (Nitrogen, phosphate, cellulolytic), importance, application and limitation.

Mineral nutrition: Functions of essential macro and micronutrients.

Nutritional deficiency in crop plants-causes.

Nutrition disorders-diagnostic symptoms-Correcting nutrient deficiency.

Mineral toxicity, Chemical fertilizers: Types (straight, compound, complex and complete fertilizers). Chemical composition of different fertilizers. Application methods, dosage, calculation, fertilizer schedules. Merits and demerits.

Unit -III –Mulberry Agronomic principles, practices and meteorology

Land Preparation, Mechanization in mulberry cultivation, Selection of elite varieties for irrigated and rain fed conditions with their characteristic features and yield potentialities.

Planting material (cuttings, saplings, grafts, layers) and their practical utility, Spacing systems and their importance in leaf productivity under different field conditions.

Planting systems: Pit system, row system, paired row system, & Kolar system, Inter-cultivation: objectives, methods, and periodicity,

Weeding: common weeds of mulberry plantations. Problems posed by weeds. Preventive and control methods. Physical, chemical, biological, and integrated weed control measures.

Unit -IV–Mulberry Agronomic principles, practices and meteorology

Irrigation and drainages: Water requirement of mulberry, water resources, water quality, irrigation systems (surface, subsoil, sprinklers, and drip system) and practical utility in mulberry management. Scheduling of irrigation for mulberry.

Pruning: Types, Objectives, methods and practical relevance.

Harvesting: Leaf, branch and shoot harvesting methods in relation to cultivation and rearing practices. Storage, transportation and preservation methods.

Unit -V Mulberry Diseases and Integrated Pest Management (IPM)

Identification of Mulberry Foliar Diseases.

Stem Diseases and Root diseases.

Mulberry pests.

III. References

1. Bongale, U.D (1995) Fertilizers in mulberry cultivation. Pushpa Sree Publications, Thalaghattapura, Bangalore.
2. Dokuhon, Z.S (1998). Illustrated Textbook on Sericulture. Oxford & IBH publishing Co, Pvt. Ltd, New Delhi, Calcutta.
3. Gupta, R.K & Mittal, R.K (1983) Bibliography of Indian Weeds. Associated Pub. Co. New Delhi.
4. Asao Aruga (1994) Principles of Sericulture (Translated from Japanese) Oxford & IBH publishing Co, Pvt. Ltd, New Delhi.
5. Hortmann and Kesler (1993) Plant Propagation, principles and practices. Prentice Hall, Hemel Nemstead.
6. krishnamurthy, N. (1981) Plant growth substances including application in Agriculture. Tata McGraw Hill Pub. Co. Ltd. New Delhi.
7. Shankar, M.A (1998) Handbook on mulberry Nutrition, Multiplex, Bangalore.
8. Subba Rao, N.S (1998) Biofertilisers in Agriculture. Oxford & IBH Pub. Co, Pvt. Ltd, New Delhi.
9. A text Book on Mulberry Crop Protection. Govindaiah, V.P Gupta, D.D Sharma, S. Rajadurai and V. Nishitha Naik, Published by Central SilkBoard, Bangalore-68, India. 2005.
10. Rajanna L, Das P.K, Ravindra S, Bhogेशha K, Mishra R.K, Singhvi N.R, Katigar R.S and Jayaram H. Mulberry Cultivation and Physiology Central Silk Board, Bangalore, Dec.2005.

Web resources:

1. <http://www.fao.org/3/ad108e/ad108e0a.htm>
2. https://onlinecourses.swayam2.ac.in/cec19_bt05/preview
3. <https://www.skuastkashmir.ac.in/DisplaySInformation.aspx?id=16&pid=20592>
4. <http://www.fao.org/3/x9895E/x9895e04.htm>
5. <https://www.notesonzoology.com/sericulture/moriculture/common-indian-mulberry-plantsand- their-morphological-characteristics/347>

Any other Web resources suggested by the teacher concerned and the college librarian including reading material.

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY

V SEMESTER - W.E.F. 2022-23

COURSE 6 A: PRINCIPLES AND PRACTICES OF SUSTAINABLE MULBERRY

AGRONOMY

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.

(5X5=25M)

1.	
2.	
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(P.T.O)

PART - B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

Course 6A: Principles and Practices of Sustainable Mulberry Agronomy

Practical Syllabus Max. Marks : 50

IV. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Identify the characters of Fresh water cultivable species
- Learn Organic Farming and Eco friendly Self employable Practices.
- Examine the diseases of Mulberry
- Suggest measures to prevent diseases in Moriculture

V. Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

- a. Soil Sampling
- b. Raising Nursery
- c. Planting systems
- d. Preparation of Cuttings
- e. Composting and Vermicomposting through Recycling of Sericultural farm Residues

VI. Lab References :

Rajanna L, Das P.K, Ravindra S, Bhogsha K , Mishra R.K, Singhvi N.R, Katigar R.S and Jayaram H. Mulberry Cultivation and Physiology Central Silk Board, Bangalore, Dec.2005

Any other Web sources suggested by the teacher concerned and the college librarian including reading material

VII. Co-Curricular Activities:

a) **Mandatory:** (Student training by teacher in field skills: total 15hrs, Lab: 10+ field 05):

1. For Teacher: Training of students by the teacher in the laboratory and field for not less than 15 hours on the skills of preparation of Sericulture Map of India – identification of Mulberry plants – plantation - Observation of Silk worm reproductive biology- observation of silk glands
2. For Student: Students shall (individually) visit any local Mulberry Plantation area and Silk worm Rearing center – make observations on plants, procedures and yield. Observations and outcomes shall be submitted as Fieldwork/Project work Report not exceeding 10 pages to teacher in the given format.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.
5. (IE) Unit tests

b) Suggested Co-Curricular Activities

6. Web-based: Collection of additional information of mulberry plants; Charts /Models preparation of silkworm developmental stages
7. Seminar, Invited lecture, Assignment, Group discussion. Quiz, Collection of Material, Video preparation etc.

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COURSE 7 A: SILK WORM REARING AND COCOON PRODUCTION TECHNOLOGY

(Skill Enhancement Course (Elective), -Credits: 05)

Max. Marks : 100

I. Learning Outcomes:

Students at the successful completion of this course will be able to learn and gain practical knowledge in -

- The influence of various factors on silkworm growth and development.
- The new techniques silkworm rearing.
- Identification of Disease Incidence
- Acquire scientific techniques of disinfectant preparations
- Self-employable opportunities

II. Syllabus

Unit -I -Disinfection methods and Disinfectants

1.1 Silkworm rearing technology: Prerequisites for rearing. Rearing house, model rearing house, construction of different types of rearing houses,

Modification to control Uzi fly infestation, sanitation, disinfectants and their effects, and their role in disease management, importance of disinfection-physical, chemical, and gaseous types formalin requirements for effective disinfection.

Rearing equipment for shelf rearing and shoot rearing methods.

Unit -II Young age silkworm rearing Technology

Methods and importance of incubation, black boxing techniques, brushing of silkworm,

Characteristics of young age larvae (chawki), and different methods adopted including isolation chamber method, co-operative chawki rearing, and importance of chawki rearing centers.

Unit -III-Late age Silkworm Rearing Technology

Late age silkworm rearing: Characteristics-different methods (shoot and tray rearing), their merits and de-merits, importance in sericulture economics.

Cleaning and Spacing: Objectives and methods of cleaning. Time and frequency of cleaning for different instars, objectives of spacing, optimum spacing for different ages,

Molting, care during molting. Recent/Modern concepts in chawki and late age silkworm rearing (Isolation chamber, single feeding shoot, pit, and floor rearing), merits and demerits. Improved techniques of rearing over traditional practices.

Spinning: Characteristics of spinning larvae, mechanism of silk formation, cocoon formation. Mounting-different methods-merits and limitations, care during mounting, environmental conditions during spinning.

Harvesting of Cocoons: Time of harvesting of Cocoons. Defective cocoons-double, and flimsy. Deformed, stained and melted cocoons-characteristics and their impact on cocoon quality, remedial measures to avoid defective cocoons, cocoon assessment-transportation and marketing of cocoons-leaf cocoon ratio.

Unit.IV: Basic Concepts of Silkworm Diseases

Classification of Silkworm Diseases. Etiology of Silkworm Diseases.

Spread of Silkworm Diseases.

Disease Producing Characteristics of Pathogenic Microbes. Defence Mechanisms of the Host

Unit. V: Varieties of Silkworm Diseases and Integrated Pest Management

Bacterial diseases, Viral Diseases and Fungal diseases.

Protozoan Diseases. Exorista(UZI) and Pediculoides

III. References

1. Charsley, S.R. (1982). Culture and Sericulture. Academic Press Inc., New York, U.S.A
2. Chowdhury, S.N. (1998) Muga Culture. Central Silk Board, Bangalore, India
3. Dokuhon, Z.S. (1998). Illustrated Textbook on Sericulture. Oxford & IBH publishing Co.,

Pvt. Ltd. Calcutta.

4. Hamamura, Y. (2001). Silkworm rearing on Artificial Diet. Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.
5. Hasao Aruga (1994). Principles of Sericulture (Translated from Japanese) Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.
6. Jolly, M.S. Chowdhuty, S.N and Sen. (1975). Non-Mulberry Sericulture in India. Central Silk Board, Bombay, India.
7. Jolly, M.S (1998). Tasar Culture. Central Silk Board, Bangalore, India.
8. Techniques of Silkworm rearing in the tropics. Economic and Social commission of Asia and the Pacific. United Nations, New York. 1993.
9. Veda, K. Nagai, I., Horikomi, M (1997) Silkworm Rearing (Translated from Japanese. Oxford & IBH publishing co., Co., Pvt. Ltd. New Delhi.
10. Wu Pang-Chuan and Chen Da-Chuang. (1994) Silkworm rearing. Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.
11. Proceedings of the 20th Congress of the International Sericulture Commission-2005. Volume-2. Published by Central Silk Board, Bangalore-68,India.
12. Rajan, R.K. Hemanth Raju 2005, Text Book on silkworm rearing, Central Silk Board, Bangalore.

Web Resources:

1. <http://www.fao.org/3/ad108e/ad108e0a.htm>
2. https://onlinecourses.swayam2.ac.in/cec19_bt05/preview
3. <https://www.skuastkashmir.ac.in/DisplaySInformation.aspx?id=16&pid=20592>

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B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY

V SEMESTER - W.E.F. 2022-23

COURSE 7 A: SILK WORM REARING AND COCOON PRODUCTION TECHNOLOGY

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.

(5X5=25M)

1.	
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(P.T.O)

PART - B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

Course 7 A: Silkworm Rearing And Cocoon Production Technology Practical Syllabus
Max. Marks 50

I. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- Appreciate the morphology of silkworm
- Realize the importance of and initiate measures to disinfect the importance of disinfection of rearing houses and rearing appliances
- Differentiate the methods of incubation of silkworm eggs
- Prioritize the records in silkworm rearing

II. Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

1. Estimation of Hatching and brushing Percentage of Silkworm Eggs
2. Estimation of ERR
3. Identification of Silkworm Disease Incidences
4. Estimation of UZIFly infestation during Late age Silkworm rearing

III. Lab References

Hasao Aruga (1994). Principles of Sericulture (Translated from Japanese) Oxford & IBH publishing Co., Pvt. Ltd. New Delhi.

Any other Web resources suggested by the teacher concerned and the college librarian including reading material

IV. Co-Curricular Activities

a) **Mandatory:** (Lab/field training of students by teacher (lab10+filed5))

1. For Teacher: Training of students by the teacher in laboratory and field for not less than 15 hours on the skills/techniques of Rearing of Silk moth
2. For Student: Students shall (individually) visit to Silk worm rearing center and observe all the procedures. He/she shall prepare a Fieldwork/Project work Report on the observations made in the given format not exceeding 10 pages and submit to teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.
5. (IE). Unit tests.

b) **Suggested Co-Curricular Activities**

1. Model Chart preparation of chawki rearing
2. Cocoon collection and observation of characteristics
3. Mountage images / charts preparation
4. Seminar, Invited Lecture, Assignment, Seminar, Group discussion. Quiz, Seminar, Quiz, Collection of Material, Video preparation etc.

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(Syllabus under CBCS w.e.f. 2022-23)
Course 6 B: POST-HARVEST COCOON PROCESSING TECHNOLOGY

(Skill Enhancement Course (Elective), -Credits: 05)

Max. Marks : 100

I. Learning Outcomes:

Students at the successful completion of this course will be able -

- To familiarize with the properties of the cocoons.
- To acquaint with the technologies adopted in reeling.
- To acquaint with the importance of raw silk quality.

II. Syllabus: Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

Unit: 1. Silk Industry

1.1 Activities of silk industry in India, China, Japan and S. Korea. Silk production, export and import of silk and silk products.

Cocoons, Cocoon classification, Cocoon characteristics-Mulberry, eri, tasar and muga. - colour, shape, size, compactness, grains, weight, shell ratio, filament length, denier, reliability, raw silk percentage, neatness. Factors influencing cocoon quality.

Composition and structure of mulberry and non-mulberry cocoon filament, Scientific methods of cocoon testing and grading -Methods practiced in India, China and Japan. Estimation of renditta, kakame cost.

Unit: 2. Cocoon drying/stifling

Introduction, objective of cocoon drying/stifling, techniques of drying.

Methods of drying / stifling-sun drying, steaming, hot air-conveyor system, methods. Merits and demerits of different methods.

Cocoon conditioning and its importance. Cocoon sorting and storage.

Unit: 3. Pre-reeling process.

Cocoon Cooking-basic principles, objectives, cocoon cooking equipments and processes-open pan, threepan, pressurized system. Factors influencing cocoon cooking basin.

Chemical reactions in cocoon cooking basin. Evaluation of cooked cocoons.

Cocoon brushing-objectives, various methods of brushing.

Reeling water: Consumption of water in silk reeling, Properties of filature water, Influence of water quality on cooking and reeling efficiency, Water quality standards for silk reeling, Treatment methods.

Unit: 4. Silk reeling technology

Introduction, Direct and Indirect system of reeling, various devices charaka, cottage basin, multiend, automatic reeling machines.

Reeling devices for tasar and muga cocoons. Important parts of the reeling machine and their functions Jetteboute, button, guide pulleys, tension pulley, denier-controlling devices.

Reeling process-Passage of thread in different reeling devices Influencing factors for quality raw silk. Reeling speed, calculation of production efficiency. Silk re-reeling-Objectives, re-reeling machine, pre-treatment, process of re-reeling. Skein finishing and packing.

Unit: 5. Raw silk testing

Introduction to raw silk testing, importance of raw silk testing, Conditioned weight test, boil off test, Quality tests - visual examination, winding, size, evenness, cleanness and neatness, tenacity and elongation, cohesion and exfoliation tests,

Raw silk grading-Aims, BIS and ISA standards,

Yarn numbering-Direct and Indirect systems Dinier, text Count (Ne) By-products, and their utilization in silk industry for value addition.

III. References

1. Anon. 1972 Manual on Sericulture, Vol.3 Silk Reeling FAO, Agriculture Service Bulletin No. 72/3.
2. Byong Ho Kim. 1989. Filature water Engineering, Seoul national University Press, Republic of Korea.
3. Huang Guo Rui. 1988. Silk reeling, Oxford and IBH Publishing Co. Pvt. New Delhi.
4. Mahadeveppa, D., Halliyal, V.g., Shankar, A.G. and Bhandiwad, R. 2000 Mulberry Silk Reeling Technology, Oxford and IBh publishing Co. Pvt. Ltd. New Delhi.
5. Song, K.E and Lee, Y.W. 1973. Modern Silk Reeling Technology. Sericulture Expt. Station, Republic of Korea
6. Sonwalker, T.N. Handbook of silk Technology, New Age International Pvt.,ltd.
7. Yong Woo Lee. 1999. Silk Reeling and Testing Manual, FAO Agricultural services bulletin No. 136, Rome, Italy.

Web Links: https://agritech.tnau.ac.in/sericulture/seri_silkworm5_pest%20cocoon%20tec.html <http://silkwormmori.blogspot.com/p/useful-links.html>

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COURSE 6 B: POST-HARVEST COCOON PROCESSING TECHNOLOGY

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.

(5X5=25M)

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(P.T.O)

PART - B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

Course.6. B: POST HARVEST COCOON PROCESSING TECHNOLOGY
PRACTICAL SYLLABUS

Max.Marks 50

IV. Learning Outcomes:

On successful completion of this practical course, student shall be able to acquire skills related to :

- Assessment of Cocoon Quality
- Price Fixation
- Marketing Skills

V. Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

- 1.Evaluation of cocoons-Sorting of cocoons, percentage determination of good and defective cocoons by weight of different races and varieties.
- 2.Estimation of renditta on the basis of shell percentage and defective cocoons of different varieties.
- 3.Estimation of Filament Length,NBFL.
- 4.Estimation of Denier

VI. Lab References

Silk Reeling FAO Manual (WHO)

Web Links: https://agritech.tnau.ac.in/sericulture/seri_silkworm5_pest%20cocoon%20tec.html <http://silkwormmori.blogspot.com/p/useful-links.html>

Any other Web resources suggested by the teacher concerned and the college librarian including reading material

VII. Co-Curricular Activities

a) **Mandatory:**(Student training by teacher in field skills: Total 15 hrs., Lab:10 + field 05)

1. For Teacher: Training of students by the teacher in laboratory/field for not less than15 hours on Cocoon Commercial Characteristics, Cocoon quality Assessment and Price fixation in Cocoon Markets
2. For Student: Students shall (individually) visit a Cocoon Markets, Research Stations, Silk exchange and report on the same in 10 pages hand written Fieldwork/Project work Report.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.
5. (IE).Unit tests.

b) Suggested Co-Curricular Activities

1. Preparation of Model/Charts of Post Cocoon Technology
2. Preparation of Model Reeling M/Cs
3. Observation of Silk Reeling and Marketing activities in their area (Observation of any activity related Silk Industry in the vicinity of the college/village)
4. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture

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COURSE 7 B: SILKWORM SEED TECHNOLOGY

(Skill Enhancement Course (Elective), -Credits: 05)

Max. Marks : 100

I. Learning Outcomes:

Students at the successful completion of this course will be able –

- To study the process involved in the development of embryo.
- To know the concept of seed area & organization of production of quality Dfls.
- To have a scientific knowledge of producing the quality eggs.

II. Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

Unit 1:Silkworm seed production.

1.1 Seed cocoons-maintenance of basic stocks-characteristics of pure races.

Multiplication-parent seed cocoons of multi and bivoltine varieties-norms of preservation of seed cocoons

Marketing of seed cocoons-norms and price fixation.

Disinfection activities in grainages-significance of disinfection – fumigation, mechanism of action of disinfectants. Model grainage: grainage plan-grainage equipments- description, utilization and maintenance.

Unit: 2 Grainage activities

sorting of cocoons - Synchronization of eclosion-Sex Separation-pupa test-environmental conditions for healthy egg production-moth examination, importance and types (random and individual)

Preparation of eggs and sheet eggs, surface disinfection of eggs - hibernating and non-hibernating eggs, egg cocoon ratio-cold storage of non-diapausing eggs.

Cross breeding production technology. Artificial hatching-hot water electric stimulus, hot and cold acid treatment. Acid treatment after ordinary and short chilling.

Maintenance of diapauses and its termination. Hibernation schedule for 4, 6 & 10 months. Aestivation, intermediate care and its importance.

Unit: 3 Incubation of eggs

Methods of incubation, environmental conditions required for incubation.

Postponement of hatching of eggs by temporary consignment.

Unit: 4. Seed organization Principles

Characteristics of silkworm breeds for seed maintenance of basic stocks.

Three tier seed multiplication programme-norms of maintaining seed cocoons in P3, P2 & P1 stations-seed crop rearing-requirements.

Unit: 5. Grainage activities in non-mulberry silkworm varieties

Techniques of egg production in tropical and temperate Tasar, Muga and Eri varieties (Tropical and Temperate).

Grainage management-importance of productivity and quality-production, planning and control. Role of LSPs.

III. References

1. Anon. (1972). Manual on Sericulture.. Vol. II Silkworm Rearing FAO, Agriculture Services. Bulletin No. 72/2, Rome, Italy.
2. Narasimhanna and Ullal (1978). Handbook of silkworm egg production, CSB Publications.
3. Ullal and Narasimhanna (1978). Handbook of practical sericulture, CSB Publications, Bangalore.
4. Wang San-Wing (1994). Silkworm seed production Vol. III Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
5. Narasimhanna. M.N. (1998). Manual on Silkworm egg Production. CSB., Govt. of India, Bangalore
6. Silkworm egg production, (Translated from Japanese), (1997), Oxford & IBH Publishing Co. New Delhi.
7. Tazima, Y. The silkworm egg.
8. Chapman, R.F. (1992). The Insects: Structure and functions.
9. Agrell, I.P.S (1964). Physiological and Biochemical changes during insect development. Academic Press, New York.
10. Counce S.J. (1973). The Causal analysis of Insect embryogenesis, Academic Press. New York.

Web Links:

<http://silkwormmori.blogspot.com/p/useful-links.html>

<https://sericulture.assam.gov.in/portlets/silkworm-seed-technology>

<https://www.indiascienceandtechnology.gov.in/hi/allstinstitutions/silkworm-seed-technology-laboratory>

Any other Web resources suggested by the teacher concerned and the college librarian including reading material.

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY

V SEMESTER - W.E.F. 2022-23

COURSE 7 B: SILKWORM SEED TECHNOLOGY

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.

(5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

(P.T.O)

PART - B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

Course.7. B: SILKWORM SEED TECHNOLOGY

PRACTICAL SYLLABUS

Max.Marks 50

IV. Learning Outcomes:

On successful completion of this practical course, student will be able to:

Learn the Process of Loose Egg Preparation.

Learn the Process of Sheet Egg Preparation.

Organize a Private Commercial Grainage.

V. Practical (Laboratory) Syllabus: (30hrs)

1. Model grainage plan and grainage equipments – wooden stand bamboo trays, wooden boxes, ant wells, thermometer, hydrometer, hygrometer, basin stand, cellulose, moth crushing set, microscope, acid treatment equipment.

2. Handling of seed cocoons – selection and storage, sex separation in pupa and moth, moth emergence, refrigeration of male moths. Moth examination –individual and random moth examination-preparation of loose eggs and sheet eggs. – surface disinfection – cold storage hibernation schedule –time of release.

3. Different methods of incubations- black boxing. Cold and Hot acid treatment for silkworm eggs.

4. Identification of Silkworm Eggs-Unfertilized-Diapause, Non diapauses, Dead and Unfertilized Eggs.

5. Determination of fecundity and hatching percentage, maintenance of records for grainage.

VI. Lab References

1. Narasimhanna. M.N. (1998). Manual on Silkworm egg Production. CSB., Govt. of India, Bangalore

2. Silkworm egg production, (Translated from Japanese), (1997), Oxford & IBH Publishing Co. New Delhi.

Web Links:

<http://silkwormmori.blogspot.com/p/useful-links.html>

<https://sericulture.assam.gov.in/portlets/silkworm-seed-technology>

Any other Web resources suggested by the teacher concerned and the college librarian including reading material

VII. Co-Curricular Activities

a..**Mandatory:**(Student training by teacher in field skills: Total 15 hrs., Lab:10 + field 05)

1.For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hrs on Seed Production

2.For Student: Students shall (individually) visit a

Grainage 3.Max marks for Fieldwork/Project work Report:

05.

4.Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.

5.(IE).Unit tests.

b.Suggested Co-Curricular Activities

5. Preparation of Model/Charts of Grainage Building

6. Observation of Grainage activities in their area (Observation of any activity related Grainage in the vicinity of the college/village)

7. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY
V SEMESTER
(Syllabus under CBCS w.e.f. 2022-23)

Course 6 C: SERI BIOTECHNOLOGY

(Skill Enhancement Course (Elective), -Credits: 05)

Max. Marks : 100

I. Learning Outcomes

After taking this course, the student will be able -

- To understand the Principles of biotechnology
- To understand the cell, tissue and organ culture techniques.
- To acquaint with the molecular marker aided breeding techniques

II. Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

UNIT.I. Scope and importance of biotechnology in Sericulture

1.1 Recombinant DNA Technology: cloning and expression of vectors-cloning vectors for recombinant DNA (plasmids, phages, cosmids, virus, transposons, YAC, MAC). Binary and shuttle vectors. Gene transfer methods in plants; Target cells for transformation; Gene transfer techniques using *Agrobacterium*. Selectable and scorable markers; Agro infection and gene transfer in mulberry; DNA mediated gene transfer (DMGT). Transgenic plants in crop improvement, molecular farming and regulated gene expression.

UNIT.II Insect cell and tissue culture

History and scope of animal cell and tissue culture; advantages and disadvantages.

Culture media for cell and tissues: Culturing procedures. Polymerase chain reaction (PCR): Gene amplification, application of PCR in silkworm biotechnology

UNIT.III Plant cell and Tissue culture techniques

Introduction and historical background of plant morphogenesis and tissue culture, laboratory requirement for plant tissue culture, culture media. Cell culture; applications of cell and tissue culture. Application of fundamental principles of biotechnology for improving silk production. Use of translocated W-chromosome for sexing animals-genetic correlation of traits. Making new textile fibres, improvement of silkworm strains, marker assisted breeding. Application of biometrical genetics. Quantitative trait loci (QTL) in silkworm.

UNIT.IV. Genetic resistance of silkworm

Bombyx mori bacterial and viral diseases. Immune response against bacterial and viral diseases in the silkworm, *Bombyx mori* Regulation of host gene expression, inducible anti-bacterial and anti-viral proteins of *Bombyx mori*.

UNIT.V. Non-mulberry silkworm and biotechnology:

5.1 Preservation of endangered non-mulberry silk through bio-technological approach.

III.REFERENCES:

Plant Molecular biology. Grierson D.and Lovely S.N.Blackie, London, 1984

Genetic Engineering in plants. Kosuge T.Meredith, C.P and Hollender S.Plenum press, New York, 1989.Cellular and molecular biology. Goldberg R B. Alan R.Liss Inc. New York, 1982.

Plant biotechnology. Ignacimuthu V.L. Oxford IBH Publishing Company, New Delhi, 1995.

Genetic manipulation for crop improvement. Chopra V.L Oxford IBH publishing company, New Delhi, 1985.

Molecular Biotechnology. B.R Glick. and Pasbernak. J. J.American Society for molecular biology (ASM press), 1994.

Recombinant DNA (2nd Ed.) Watson J.D Gilmanm, workowski J. and Zoller M. Scientific American Books, 1992.

Principles of gene manipulation. Old, R.W. and Primrose S.B Blackwell Scientific Publications 1994.

Drosophila-A practical Approach. D.B. Roberts, IRL Press, 1989.

Animals with Novel genes. Maclean.N. Cambridge's Univ. Press, London, 1987.

Plant Tissue Culture: Applications and Limitations by S.S. Bhojwani (1990), Elsevier, Amsterdam.

Plant Cell Culture: A Practical Approach by R.A. Dixon & Gonzales, IRL Press.

Plant biotechnology in Agriculture by K. Lindsey and M.G.K. Jones prentice hall, New Jersey 1990.

Plant Molecular biology by D. Grierson & S.N. Covey Blackie, London

Web resources:

https://www.researchgate.net/publication/352205295_Application_of_biotechnology_in_sericulture_Progress_scope_and_prospect

<https://dbtindia.gov.in/silk-biotechnology-programme-significant-achievements>

<https://eprints.iisc.ac.in/35092/>

Any other web resources suggested by the teacher concerned and the college librarian including reading material

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY

V SEMESTER - W.E.F. 2022-23

Course 6 C: SERI BIOTECHNOLOGY

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.

(5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

(P.T.O)

PART - B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

Course 6 C : SERI BIOTECHNOLOGY PRACTICAL SYLLABUS

IV. Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- To understand the Principles of biotechnology
- To understand the cell, tissue and organ culture techniques.
- To acquaint with the molecular marker aided breeding techniques

V. Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

1. Preparation of media for plant and animal cell cultures.
2. Trypan blue exclusion cell viability.
3. Trypsinisation of monolayer and sub culture. (Tissue for cell-separation)
4. Isolation of genomic DNA from microbial, animal and plant cells.
5. Restriction digestion of DNA – agarose gel electrophoresis of DNA fractions.
6. SDS – 2 Dimensional electrophoresis of proteins
7. DNA amplification by PCR and gel documentation.
8. DNA sequencing (Demonstration) DNA finger printing (RAPD & universal primer method)
9. Southern and Northern blotting & DNA cloning
10. Artificial seed production

VI Lab references

1. Plant Cell Culture: A Practical Approach by R.A. Dixon & Gonzales, IRL Press.
2. Plant Molecular biology by D. Grierson & S.N. Covey Blackie, London
3. Recombinant DNA (2nd Ed.) Watson J.D Gilmanm, workowski J. and Zoller M. Scientific American Books, 1992.

Web resources:

https://www.researchgate.net/publication/352205295_Application_of_biotechnology_in_seri_culture_Progress_scope_and_prospect

<https://dbtindia.gov.in/silk-biotechnology-programme-significant-achievements>

<https://eprints.iisc.ac.in/35092/>

Any other web resources suggested by the teacher concerned and the college librarian including reading material

VII.Co-Curricular Activities

a.**Mandatory:**(Student training by teacher in field skills: Total 15 hrs., Lab:10 + field 05)

1.For Teacher:

Training of students by the teacher in laboratory/field for not less than 15 hrs on Principles of Biotechnology

2.For Student:

Students shall (individually) visit a research Institute where tissue culture, transgenic experiments are carried

3.Max marks for Fieldwork/Project work Report: 05

4.Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.

5.(IE).Unit tests.

b. Suggested Co-Curricular Activities

1. Preparation Nutrient Medium

2. Observation of RDNA Research activities in their area (Observation of any activity related to Tissue culture

3. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture

SRI VENKATESWARA UNIVERSITY
B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY
V SEMESTER
(Syllabus under CBCS w.e.f. 2022-23)

Course 7 C: SERI BUSINESS – EXTENSION & ECONOMICS

(Skill Enhancement Course (Elective), -Credits: 05)

Max. Marks : 100

I. Learning Outcomes

At the end of the course, the student will be able -

- To understand the present status and lacunae of the industry.
- To understand the managerial skills and also cost benefit ratio which is helpful for the future entrepreneurs.
- to motivate the students for self employment and to discuss various issues of entrepreneurial opportunities in sericulture industry.
- To apply knowledge gained about economics of sericulture, cost benefit ratio and managerial aspects which are essential to become an entrepreneur

II. Syllabus: (Total Hours: 90 including Teaching, Lab, Field Skills Training, Unit tests etc.)

UNIT I. Entrepreneurship.

1.1 Concept and Characteristic features of entrepreneurship

1.2. Factors contributing to women entrepreneurship in sericulture - Social, cultural and economic factors. Role of family in capacity building of women entrepreneurship

Project formulation – stages and methodology in formulation of a sericulture project, implementation and report writing.

UNIT II. Entrepreneurship Development programmes and institutional support.

2.1. Elements of financial management and marketing management in sericulture

2.2 Women entrepreneurship development – trends, patterns and development

2.3. Role of Central Silk Board and the State to promote Entrepreneurship in Sericulture.

UNIT III Technical knowhow

Sericulture organizational setup: central silk board, RSRS, KVK, NGOs, and universities.

Propagation of Technical know-how pertaining to:

Mulberry cultivation, Seed production, Chawki rearing, Silkworm rearing, Reeling and twisting, Weaving
Technical management – criteria for product selection and development;
Choice of technology, plant and equipment; Critical Path Method (CPM) & Project Evaluation Review Techniques (PERT) as planning tools for Small Scale Industry.

UNIT IV. Entrepreneurship opportunities in Sericulture

SWOT analysis

Management techniques – planning, budgeting, coordinating, controlling, decision making, Stress management; Reinforcement, recruitment, selection and training.

Management of seri-entrepreneurship activities. Production of vermicompost, disinfect, Biofertilizers and grainages. (ii). Mulberry and cocoon production, seed production, chawki rearing, silk reeling and weaving

UNIT V. Human Resource Management in Sericulture Industry

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

Achievements in sericulture by progressive farmers.

III. REFERENCES:

1. David E. Gumpert, How to Create a successful Business Plan, Inc. Publishing, 1990.
2. Robert D. Hisrich and Michael P. Peters, Entrepreneurship: Starting, Developing, and Managing a New Enterprise, 3rd edition, Irwin, 1995.
3. Ronald E. Merrill and Henry D. Sedgwick, The New Venture Handbook: Everything you Need to Know to start and Run Your Own Business, new and updated edition, AMACOM, 1993.
4. Karl, H. Vesper, (1990) New Venture Strategies, revised edition, Prentice Hall.
5. Entrepreneurial development by S.S khanka, S.chand publishing
6. Entrepreneurship development by A.nirjar, sanbun publishers
7. Human resource management by VSP Rao, taxmann
8. Marketing management analysis, planning, implementation & control by Philip Kotler Pearson

Web resources:

<http://dspace.vnbrims.org:13000/jspui/bitstream/123456789/3567/1/Sericulture%20-%20An%20Entrepreneurial%20Spark%20for%20Indian%20Farmer-Srujan.pdf>

http://researchjournal.co.in/upload/assignments/5_188-190.pdf

<https://www.businesskashmir.com/2021/06/05/seri-business-emerging-entrepreneurship-model-in-sericulture/>

Any other web resources suggested by the teacher concerned and the college librarian including reading material

SRI VENKATESWARA UNIVERSITY

B.Sc. DEGREE COURSE IN SERI CULTURE TECHNOLOGY

V SEMESTER - W.E.F. 2022-23

Course 7 C: SERI BUSINESS – EXTENSION & ECONOMICS

MODEL QUESTION PAPER

Time: 3 hours

Marks: 75 marks

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer one full question (A or B) from each unit (i.e., Q.No 9 from Unit – I, Q.No 10 from Unit – II, Q.No 11 from Unit – III, Q.No 12 from Unit – IV, Q.No 13 from Unit – V). Each question carries 10 marks.

PART – A

Answer any *Five* of the following question.

(5X5=25M)

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

(P.T.O)

PART - B

Answer All The Questions. Each question carries 10 marks (5X10= 50M)

9.	(A) OR (B)
10.	(A) OR (B)
11.	(A) OR (B)
12.	(A) OR (B)
13.	(A) OR (B)

Course 7 C - SERI BUSINESS – EXTENSION & ECONOMICS

PRACTICAL SYLLABUS:

IV. Learning Outcomes:

On successful completion of this practical course, student shall be able to acquire skills related to :

- Silkworm Seed Production as a business opportunity
- Commercial Silkworm Rearing - the shortest duration crop with monthly income plan
- Production of disinfectants used in sericulture
- Production of Bio-control agents for pest control in Sericulture

V. Practical (Laboratory) Syllabus: (30hrs) (Max.50Marks)

1. Estimation of quantity of requirement of disinfectant solution for the rearing house and method of disinfection
2. Demonstration of management of practices against silkworm pests
3. Preparation of different disinfectant solutions recommended in Sericulture

VI. Lab References

1. Deshpande M.V. (1984) Entrepreneurship of Small-Scale Industries: Concept, Growth & management, Deep & Deep Publication, D-1/24, Rajouri Garden, New Delhi.
2. Practical Manual Certificate course in sericulture BLP-003 Indira Gandhi national open university School of Agriculture

Web Links

<https://www.businesskashmir.com/2021/06/05/seri-business-emerging-entrepreneurship-modelin-sericulture/>

Web resources suggested by the teacher concerned and the college librarian including reading material

VII. Co-Curricular Activities

a. **Mandatory:** (Student training by teacher in field skills: Total 15 hrs., Lab:10 + field 05)

1. For Teacher: Training of students by the teacher in laboratory/field for not less than 15 hrs on Seed Production
2. For Student: Students shall (individually) visit a Grainage
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work: Title page, student details, index page, details of place visited, observations made, findings and acknowledgements.
5. (IE). Unit tests.

b. Suggested Co-Curricular Activities

4. Preparation of Model/Charts of Grainage Building
5. Observation of Grainage activities in their area (Observation of any activity related Grainage in the vicinity of the college/village)
6. Assignments, Group discussion, Seminar, Quiz, Collection of Material, Video preparation etc., Invited lecture
