Syllabus

For
Diploma Course
In

Sericulture

To be implemented from Academic Year 2020-2021 Onwards

Arts, Science and Commerce College CIDCO, Nashik-422 008

Affiliated to Savitribai Phule Pune University, Pune

FOR

DIPLOMA (AGRICULTURE)

IN

SERICULTURE

Under Scheme of

B. Voc. of UGC [NSQF]

[Effective from 2020-21]

UGC Sponsored B. Voc Programme

1. Preamble

The Government of India to meet the goal of empowering the youth and also to make education relevant and creating 'industry fit' skilled work force, initiated the B. Voc. programs. Based upon the guidelines for B. Voc. courses issued by AICTE, UGC and also the guidelines of B. Voc. programs in colleges in NSQF (Academic council sub-committee report of SPPU, June 2019) the Board of studies has prepared the admission rules, regulations and syllabus structure common for the programs.

2. Objectives

- To provide judicious mix of skills relating to a profession and appropriate content of general education.
- To ensure that the students have adequate knowledge and skills so that they are work ready at each exit point of the program.
- To provide flexibility to the students by means of pre-defined entry and exit points.
- To integrate NSQF within the UG level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- To provide vertical mobility to students coming out of 10+2 vocational subjects.
- Global mobility of skilled work force from India through international equivalence of NSQF.

The focus is to formulate courses as per the regional skill gap as per the need of

i. Industry in specialized areas
ii. Design curriculum and contents in the areas of skill development.
iii. Pedagogy, assessment for skills development education and training.
iv. Trained faculty to deliver in the areas of skill development and
v. Entrepreneurship development.

3. Duration of the Diploma Programs: 1 years [Two semesters].

4. Eligibility for Admission to the Diploma Programs

i. Type A - Students who have already acquired NSQF certification level 4 in a particular trade and opted
ii. Type B - Students who have passed 10+2 or equivalent in any stream from any recognized board or university without any background of vocational training.
iii. Type C – Students passed 10+2 examination with conventional schooling without any background of vocational training.

While admitting type B and type C students' additional courses for skill intensive training and teaching during the first six months shall be mandatory for such students, who will be assessed and certified for NSQF level 4 of skill competency by concerned CSA at the end of first semester. However, students belonging to type A will not require such certification as they were already having NSQF level 4 certificates in same industry sector / job role required for specified skill credits. All students continuing to Diploma courses or further will be treated at par from second semester onwards. Student may exit after diploma or advanced diploma level courses or above. The academic progression for students in vocational stream after senior secondary level should be as per table 1 and thus the curriculum shall be framed as per these guidelines.

Table 1: Stages and Exit points and Credits

NSQF Level	Skill component credits	General Education Credits	Total credits for Award	Normal duration	Exit points / Awards
5	36	24	60	Two semesters	Diploma

5. Duration of the course
Table2:

Diploma in Sericulture	1 Year

6. Intake Capacity: 50 students

6. COMMON COURSE STRUCTURE AND CREDIT DISTRIBUTION

Table 2: Typical courses and distribution of theory, practical, contact hours and credits.

Course structure of Diploma in Sericulture

(Semester I & II)

Semester I				
Course code	**Name of Subject**	**Theory/Practical**	**Contact hours**	**Credits**
General education component				
BVDSER111G	Personality development and Computer Fundamentals	Theory	60	04
BVDSER112G	Introduction to Sericulture	Theory	60	04
BVDSER113G	Biology of silkworm and silkworm crop protection	Theory	60	04
Skill Based Component				
BVDSER111S	Personality development	Practical	90	06
BVDSER112S	Introduction to Sericulture	Practical	90	06
BVDSER113S	Biology of silkworm and silkworm crop protection	Practical	90	06
	Total		**450**	**30**
Semester II				
General education component				
BVDSER121G	Silkworm Rearing	Theory	60	04
BVDSER122G	Silkworm physiology, breeding and genetics	Theory	60	04
BVDSER123G	Post cocoon technology and silk technology	Theory	60	04
Skill Based Component				
BVDSER121S	Silkworm Rearing	Practical	90	06
BVDSER122S	Silkworm physiology, breeding and genetics	Practical	90	06
BVDSER123S	Post cocoon technology and silk technology	Practical	90	06
	Total		**450**	**30**

a. One credit would mean equivalent of 15 periods of 60 minutes each for theory lectures.

b. For lab course / workshops/ internship/ field work / project, the credit weightage for equivalent hours shall be 50% that for lectures.
c. The courses offered shall be in accordance to the rules / norms of the respective apex body (UGC/AICTE).
d. The number theory papers and practicals shall be decided by each program depending upon the knowledge domains required.

7. Examination

a. **Theory Courses** –

i. The assessment of theory subjects shall include continuous internal assessment [CIA] of 50% of total marks which can include midterm test, short quiz, assignment, extension work, project work, seminar, presentations etc. There shall be semester end examination [SEE] of 50% of the total marks.

ii. The student should get minimum 30% marks in CIA and SEE each and minimum 40% in CIA and SEE jointly.

iii. In case of failure in CIA the student shall appear only in the next academic year when the said course is offered in the regular academic session at his/her responsibility. However in case of failure in SEE in particular course(s) exam will be conducted in immediate subsequent semester.

iv. In case a student fails in certain course(S) in a particular semester and the same course(s) are modified / revised/removed from the curriculum in due course, the student will have to appear as per the newly framed curriculum and/or pattern in subsequent semester at his/her own responsibility.

b. **Practical Courses-**

i. The skill component of the course will be assessed and certified by the respective Certified Skill Assessor. The Certified skill assessor for a specific trade is made available by the respective sector skill council or a committee headed by the respective board or prescribed by the concerned regulatory body. Assessment of practical courses / on job training course shall be in equal proportion by the internal and external examiners.

ii. The semester end exam for practical courses shall be conducted at the end of each semester along with the theory exams.

iii. A student must get minimum 40% marks (jointly in internal and external) to pass in the practical courses.

5. Grading System

Table 3: Letter Grades, Points and Marks

Letter Grade	Points	Marks obtained
O: Outstanding	10	80-100
A+: Excellent	9	70-79
A: Very Good	8	60-69
B+: Good	7	55-59
B: Above Average	6	50-54
C: Average	5	45-49
P: Pass	4	40-44
F: Fail	0	0-39
Ab: Absent	0	-

Table 4: Grade point Average

Grade Point Average	Grade
9.00 – 10.00	O
8.50 – 8.99	A+
7.50 – 8.49	A
6.50 – 7.49	B+
5.50 – 6.49	B
4.25 – 5.49	C
4.00 – 4.24	P
0.00 – 3.99	F

6. Computation of SGPA and CGPA

- The semester end grade sheet will contain grades for the course along with titles and SGPA. Final grade sheet and transcript shall contain CGPA.
- SGPA: The performance of a student in a semester is indicated by a number called the semester grade point average (SGPA). The SGPA is the weighted average of grade points obtained in all the courses registered by the student during the semester.

Semester Grade Point Average (SGPA) =

$$\text{SGPA} = \frac{\sum_{i=1}^{p} CiGi}{\sum_{i=1}^{p} Ci}$$

$$= \frac{\sum Grade\ Points\ earned \times Credits\ for\ each\ course}{Total\ credits}$$

SGPA is calculated up to two decimal places by rounding off.

- **CGPA**: The CGPA is the weighted average of the grade points obtained in all the courses (theory Practical courses) of all the semesters till the respective exit point. It is calculated in the same manner as the SGPA. It is calculated based upon the SGPA of the concerned semesters.

7. **OTHER RULES**- University may frame additional rules and regulations or modify these regulations if needed and once approved by the University they would be binding on the students.
8. **External Students**: No external students are allowed for this course
9. **Setting of Question Paper/Pattern of Question paper**: For theory courses end semester Question Papers will be set as per the university instruction

Table 5: Question Paper pattern

Question 1 (20 Marks)	10 compulsory sub-questions, each of 2 marks; answerable in 2-3 lines
Question 2 (20 Marks)	4 out of 6- short answer type questions, each of 5 marks; answerable in 8-10 lines
Question 3 (10 Marks)	2out of 4- discriptive questions based on theory.

12. Verification/Revaluation: There is also provision for verification and revaluation. In case of verification, the existing rules will be applicable. The revaluation result will be adopted if there is a change of at least 10% marks and in the grade of course. There shall be revaluation of answer script of end semester examination, but not of internal assessment papers.

13. Structure of the course:

Course Code

An eight-character Course code is assigned to each course. The first two characters indicates the discipline, third and fourth character indicates the programme, fifth for year, sixth for semester, seventh characters for serial no of the course, eighth for general or skilled component.

Example: BVDSER111G

BVD: Bachelor of vocation Diploma

SER: Sericulture

1: First year

1: First semester

1: serial number of the course

G/S: General Component (G) / Skill Component (S)

SERICULTURE

Diploma in Sericulture

Semester – I

BVDSER111G: Personality Development and Computer Fundamentals (General)

Total credits: 4 **Teaching Hours-60**

Aim of the course: The aim of the subject is to bring out personality development with regard to the different behavioural dimensions that have far reaching significance in the direction of organizational effectiveness. To facilitate students to study basic IT skills using application software tools in industry and teaching –learning process.

Outcome of the course: Awareness in the participants with regard to the different aspects of interpersonal relations based on the ideas envisaged in Transactional Analysis and their relative significance in the context of the functional effectiveness of organizations. Students will have command on basic IT skills to use computer and internet facilities for their academic and holistic development purpose.

Syllabus

Unit-I: Self-Analysis and Motivation **18 Hours**

SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem. Creativity- Out of box thinking, lateral thinking. Attitude- Factors influencing attitude, Challenges and lessons from attitude, etiquette. Motivation- Factors of motivation, Self-talk, Intrinsic & Extrinsic Motivators. Goal Setting- Wish List, Smart Goals, Blue print for success, Short Term, Long Term, Life Time Goals. Time Management- Value of time, Diagnosing, Weekly Planner to do list, Prioritizing work.

Unit-II: Leadership and Interpersonal Relations **14 Hours**

Introduction to leadership, Leadership Power, Leadership Styles and Leadership in administration.

Introduction to Interpersonal Relations- Analysis of different ego states, Analysis of Transactions, Analysis of Strokes. Introduction to Stress- Causes of Stress, Impact Stress and

Managing Stress. Conflict- Introduction to Conflict and Causes of Conflict.

Unit III: Operating system- MS Office **23 Hours**

Definition & functions, Basic components of windows, types of icons, taskbar, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel -adding and removing software and hardware, setting date and time, screen saver and appearance.

MS-Word - Documentation - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advanced features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

MS-Excel- Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation. Database Management using Excel-Sorting, Filtering, Table, Validation, Goal Seek and Scenario.

MS-PowerPoint - Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds and insertion, Inserting Animated Pictures.

Unit IV: Introduction to concept of Internet **5 Hours**

Internet applications, www, Email, ftp, web browsers (Internet explorer, Google Chrome, Mozilla).

References

1) Lall & Sharma – Personal Growth Training & Development (Excel Books)
2) Janakiraman- Training & Development (Biztantra)
3) Hurlock, Elizabeth B - Personality Development (Tata McGraw Hill, 1st Ed.)
4) Sahu R.K. - Training for Development (Excel Books, 1st Ed.)
5) Prof. Achhru Singh & Dr. Dharminder Singh Ubha, Personality Development and Soft Skills.
6) Petri, H.L. and Govern, J.M., 2013, Motivation: Theory, Research, and Applications, (sixth edition) Wadsworth Cengage Learning: Belmont CA.
7) Soft skills, Career Development Centre, Green Pearl Publications.

8) Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster.
9) Thomas A Harris, I am ok, You are ok , New York-Harper and Row.
10) Daniel Coleman, Emotional Intelligence, Bantam Book.
11) Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers.
12) Russell A. Stultz, Learn Microsoft Office – BPB Publication
13) Microsoft Office – Complete Reference – BPB Publication
14) P.K. Sinha and P. Sinha, Foundations of Computing, First Edition, BPB.
15) Torben Lage Frandsen, Microsoft office word.
16) Chetan Srivastva, Fundamentals of Information Technology, Kalyani Publishers.
17) Turban Mclean and Wetbrete, Information Technology and Management, Second Edition, John Wiley & Sons.
18) Satish Jain, Information Technology, BPB.
19) V. Rajaraman, Fundamental of Computers – (Prentice Hall)
20) P. K. Sinha, Fundamental of Computers – (B.P.B publication)
21) Alexis Leon, Introduction to Information Systems.
22) Dr. S. Chand, Courter, G Marquis, Microsoft Office 2000, Computer Fundamentals & Its Business Applications, Professional Edition. BPB.

Reference website:

1) https://persmin.gov.in/otraining/UNDPProject/undp_modules/Personality%20Dev%20N%20DLM.pdf
2) https://www.scribd.com/doc/39657092/Personality-Development-Study-Material
3) https://mscit.mkcl.org/

BVDSER111S: Personality Development and Computer Fundamentals (Skill based)

Total credits: 6

1. Stress, Anger and Time Management.
2. Communication Skills.
3. CV Writing and Interview Techniques.
4. Teamwork and Leadership.
5. Problem Solving and Conflict Resolution.
6. Presentation Skills.
7. Internet surfing.
8. MS-Windows: features.
9. Documentation Using MS-Word.
10. Electronic Spread Sheet using MS-Excel.
11. Database Management using Excel.
12. Presentation using MS-PowerPoint
13. Creating tables in MS ACCESS using different ways.
14. Import and export data from MS ACCESS.
15. Creating queries in MS ACCESS
16. Creating forms in MS ACCESS
17. Working of Internet with Different Browsers (Internet Explorer, Google Chrome, Mozila).
18. Applications of Internet. (Handling Email accounts.
19. Student Have to Do Following Activities:
    i. How to create Email
    ii. How to send email?
    iii. How to Download the Data?
    iv. How to attach files with email?

BVDSER112G: Introduction to Sericulture (General)

Total credits: 4 **Teaching Hours-60**

Aim of the course: Motivating the farmers to plant high yielding mulberry varieties to increase income and productivity. Imparting training in mulberry cultivation, silkworm rearing and silk reeling. Enhance skill of farmers for increased cocoon productivity and to prevent silkworm diseases.

Outcome of the course: Train the students in identifying the diseases and pests of the mulberry plant. - It also involves giving students a thorough knowledge about the cultivation of mulberry, maintenance of the farm, seed technology, silkworm rearing and silk reeling.

Syllabus

Unit-I: Introduction to Sericulture **18 Hours**

Origin and history of sericulture. Silk route and map of India and World; Temperate and tropical climate for sericulture practice.

Unit 2. Environmental impact of sericulture **10 Hours**

Eco-friendly activity of sericulture;. Employment generation in sericulture and role of women in sericulture.

Unit 3. Characteristics of sericulture industry **9 Hours**

Land and agro based part of industry. Industrial aspect of the industry; Silk reeling as a cottage industry; Handloom and power loom activities.

Unit 4. Textile fibers **8 Hours**

Natural and Synthetic fibers: Advantage of silk fiber over other fibers: International demand of silk. Function Central Silk Board; Role of State Department of Sericulture (Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal); Role of universities and NGOs in sericulture development.

Unit 5. Prospects and problems of sericulture industry **8 Hours**

Unit 6: SWOT Analysis of Sericulture industry **7 Hours**

References: 1. Charsley, S.R. (1982). Culture And Sericulture. Academic Press Inc., New York, U.S.A

2. Fao Manuals- I Mulberry Cultivation. Fao Rome.

3. Foth, H.D. (1984) Fundamentals Of Soil Science. 7th Edn., John Wiley & Sons, New York. 4. Ganga, G., And J. Sulochana Chetty. (1991) An Introduction To Sericulture. Oxford & Ibh Publishing Company.

5. Hasao Aruga (1994). Principles Of Sericulture (Translated From Japanese) Oxford & Ibh Publishing Co., Pvt. Ltd. New Delhi.

6. Kichisaburo M. (1997) Moriculture – Science Of Mulberry Cultivation. Oxford & Ibh

7. Krishnaswami, S.; Narasimhanna, M.N.; Suryanarayan, S.K And Kumararaj, S. (1973) Sericulture Manual-2 - Silkworm Rearing. Agriculture Service Bulletin, Fao, Rome.

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. Rangaswami, G.; Narasimhanna, M.N.; Kasiviswanathan, K., Sastry, C.R. And Jolly, M.S. (1976) Sericulture Manual-1- Mulberry Cultivation. Agriculture Services Bulletin, Fao, Rome.

BVDSER112S: Introduction to Sericulture (Skill based)

Total credits: 6

List of Practicals-

1. Sericulture maps : a) World maps and Silk Road b) Sericulture map of India and West Bengal
2. Preparation of histograms and pie charts on:- a) Production of Textile fibers in India b) World Silk Production c) Pie chart on mulberry and non-mulberry silk production in India
3. Organization set up in India :- (Demonstration & Exercise) a) Govt. of India b) Five traditional states viz., Karnataka, Andhra Pradesh, Tamilnadu, West Bengal and Jammu & Kashmir
4. Identification and study of Sericulture products : Cotton and Silk Yarn different types, Pupae, Silk Yarn, Noil Yarn
5. Laboratory Note Book 6. Internal Assessment

BVDSER113G: Biology of silkworm and silkworm crop protection (General)

Total credits: 4 **Teaching Hours -60**

Aim of the course: To enable the students to know the post-harvest management systems and processing technologies for sericulture. To understand the technologies and package of practices for mulberry and silkworm diseases and management of insect pests. This will aid in developing of forewarning systems, disease monitoring system to individuals involved in mulberry cultivation, silkworm seed multiplication and rearing of silkworms

Outcome of the course:

The course helps us to maintain, multiply and supply of bio-control agents to control the insect pests of host plant and silkworm with evaluation and management strategies for prevention and control. Study and understanding of the therapeutic control of fungal, viral and bacterial diseases of silkworm along with the other factors responsible for crop losses. This knowledge can be used in enhancing the productivity of mulberry and silkworm both qualitatively and quantitatively.

Syllabus

Unit 1: Silkworm taxonomy & life-cycle. **6 Hours**

Unit 2: Races & classification of silkworm **8 Hours**

Classification based on the number of Larval Moults, Moultinism and Voltinism. Indigenous pure race& cross breed of India. Races with sex limited Characters

Unit 3: Silkworm morphology **11 Hours**

Morphology of the egg, larva, pupa, adult.

Unit 4: Silkworm Anatomy Digestive system **13 Hours**

Larva, Circulatory system: Larva, pupa, adult, Nervous system: Larva, adult, Silk gland: Larva, Reproductive system: Adult.

Unit 5: Silkworm Diseases **16 Hours**

Protozoan disease, Bacterial disease, Fungal disease, Viral disease, Sotto disease, septicemia, galtine.

Unit 6: Silkworm Pests **6 Hours**

Uzi fly, Ants, Dermestid Beetles.

References:

1. Charsley, S.R. (1982). Culture And Sericulture. Academic Press Inc., New York, U.S.A

2. Ganga, G., And J. Sulochana Chetty. (1991) An Introduction To Sericulture. Oxford & Ibh Publishing Company.

3. Manual-2 - Silkworm Rearing. Agriculture Service Bulletin, Fao, Rome.

4. Madan Mohan Rao, M. (1999) Comprehensive Sericulture Manual. Ps Publications, Hyderabad.

5. S. Morohoshi (2001). Development Physiology Of Silkworms. Science Publishers,U.S.

6. Yataro Tazima (2001). Improvement Of Biological Functions In The Silkworm. Science Publishers

7. M. Amin Masood And Afifa S. Kamili (2000). Principles Of Temperate Sericulture. Kalyani Publisher.

8. Silkworm Crop Protection, Central Silk Board, Bangalore, India.

9. Govindan, R.; Narayanaswamy, T.K. And Devaiah, M.C. (1998) Principles Of Silkworm Pathology. Seri Scientific Publishers, Bangalore.

10. Govindan, R.; Ramakrishna Naika And Sannappa, B. (2004) Advances In Disease And Pest Management In Sericulture. Seri Scientific Publishers, Bangalore

BVDSER113S: Biology of Silkworm and Silkworm Crop Protection (Skill based)

Total credits: 6

List of Practicals:

1. Life Cycle of Bombyx mori: a) Morphology of egg, larva, pupa and adult of silkworm Bombyx mori:
2. Sex separation in larva, pupa and adult of silkworm Bombyx mori
3. Anatomy of Silkworm Dissection and respiratory system a) Digestive and respiratory system b) Mounting of larval mouth parts and spiracle c) Silk gland d) Nervous system of silkworm larva e) Reproductive system of male and female silkworm moth
4. Cocoon characters of popular uni-, bi- and multivoltine races

SILKWORM CROP PROTECTION

1. Identification of different diseased silkworms based on external symptoms (Grasserie, Flacherie, Muscardine and Pebrine)
2. Identification of permanent slide of bacteria, spores of Pebrine, polyhedral of NPV, spores of Muscardine /mycelial mat.
3. Methods of applications of silkworm bed disinfectants for management of silkworm diseases.
4. Predators of silkworms
5. Laboratory Note Book
6. Internal Assessment

Diploma in Sericulture

Semester II

BVDSER121G: Silkworm Rearing (General)

Total credits: 4 **Teaching Hours -60**

Aim of the course: To acquaint the students with fundamental principles and various techniques of Silkworm Rearing.

Outcome of the course: On successful completion of the programme, student will be able to 1. Acquire sound knowledge on the basics and advances in various aspects of sericulture and seri-biotechnology. 2. Gain confidence with the practical training obtained during the course to undertake sericulture as an entrepreneur and/or guide farmers. 3. Get acquainted with the allied aspects of biological/agricultural sciences to prepare for competitive examinations. 4. Get exposed to various scientific equipments and learn their usage that was quite useful towards research.

Syllabus

Unit 1: **Silkworm Rearing** **12 Hours**

C.S.B. proposed model rearing house

Unit 2: Rearing appliances **12 Hours**

, disinfection, disinfectants, bed cleaning, feeding of worms

Unit 3: Maintainence **12 Hours**

Maintaining optimum condition of rearing, brushing, frequency of spacing, care during moulting

Unit 4: Mounting **8 Hours**

Mounting and mountage, process of spinning, cocoon harvesting

Unit 5: Rearing method **10 Hours**

chawki rearing or young age worm rearing.

Unit 6: Late age Silkworm rearing. **6 Hours**

References:

1. Ganga, G., And J. Sulochana Chetty. (1991) An Introduction To Sericulture. Oxford & Ibh Publishing Company.

2. Krishnaswami, S.; Narasimhanna, M.N.; Suryanarayan, S.K And Kumararaj, S. (1973) Sericulture Manual-2 - Silkworm Rearing. Agriculture Service Bulletin, Fao, Rome.

BVDSER121S: Silkworm Rearing (Skill based)

Total credits: 6

LIST OF PRACTICAL

1. Rearing houses: Model rearing house and low-cost rearing house. (Demonstration and Exercise); Rearing Appliances (Estimation of rearing appliances for 100df/s)
2. Disinfection: Types of disinfectants; Concentration and dosage requirement; Preparation of spray formulation of disinfectants (For 100df/s)
3. Rearing Techniques: Harvesting and preservation technique; leaf selecting for different instants; mulberry leaf estimation; Identification of moulting larva, care during moulting, mounting and mounting density, types of mountages; Harvesting of cocoons, assessment of cocoons.
4. Maintenance of records for silkworm rearing/Internal Assessment/Local silkworm rearing field visit.
5. Laboratory Note Book.
6. Internal Assessment

BVDSER122G: Silkworm Physiology, Breeding and Genetics (General)

Total credits: 4 **Teaching Hours -60**

Aim of the course: To acquaint the students with fundamental principles and various techniques of Breeding and Genetics.

Outcome of the course: On successful completion of the programme, student will be able to 1. Acquire sound knowledge on the basics and advances in various aspects of sericulture and seri-biotechnology. 2. Gain confidence with the practical training obtained during the course to undertake sericulture as an entrepreneur and/or guide farmers. 3. Get acquainted with the allied aspects of biological/agricultural sciences to prepare for competitive examinations. 4. Get exposed to various scientific equipments and learn their usage that was quite useful towards research. 5. Know through the project work undertaken - how to choose research topic of current interest and way to execute and compile it.

Syllabus

Unit1: Digestion **12 Hours**

Artificial diets, feeding apparatus, feeding behaviour. Structure and function of digestive system, digestive enzyme, process of digestion

Unit2: Respiration **8 Hours**

tracheal systems, spiracles, mechanism of respiration, factor affecting respiration

Unit3: Excretion **6 Hours**

Structure and function of excretory system. Sense organ: Photoreceptor, Chemoreceptor and Mechanoreceptor

Unit4: Nervous system **6 Hours**

Circulation systems. Haemolymph

Unit5: Reproduction **10 Hours**

Male and female reproductive system; Metamorphosis and types.

Unit6: Silkworm germplasm bank **10 Hours**.

Sex determination mechanism in silkworm: importance of ZZ and ZW chromosome; Parthenogenesis in silkworm. Gametogenesis: oogenesis and Spermatogenesis; Genetics and inheritance of cocoon colour. Linkage group in Bombyx mori; Method of selection, fixation of character.

Unit7: Evolution of new breeds **8 Hours**

race authorization. Heterosis/hybrid vigour; Exploitation of heterosis in silkworm – concept of single double and polyhybrids.

References:

1. 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.
2. Dilip De Sarkar (1998) The Silkworm – Biology, Genetics And Breeding. Vikas Publishing House Pvt. Ltd., New Delhi.
3. Nataraju, B., Sathyaprasad, K., Manjunath, D. And Aswani Kumar, C. (2005) Silkworm Crop Protection. Central Silk Board, Bangalore
4. Tazima, Y. (1964) Genetics Of Silkworm. Academic Press, London.
5. Ather H. Siddiqi (1982) Experimental Physiology. Oxford & Ibh Publishing Co. Pvt. Ltd., New Delhi And Calcutta.
6. Eikichi Hiratsuka (2000) Silkworm Breeding. Oxford & Ibh Publications, New Delhi.
7. Elcio P. Guimaraes, John Ruane, Beate D. Scherf, Andrea Sonnino And James D. Dargie (2007) Marker-Assisted Selection, Fao, Rome
8. Wigglesworth, V.B. (1956) Insect Physiology. 5th Edn., Rev. Methuen, London.
9. Amitabha Sarkar (2009). Mulberry Breeding. Kalyani Publishers

BVDSER122S: Silkworm Physiology, Breeding and Genetics (Skill based)

Total credits: 6

1. Estimation of proteins in haemolymph/egg

2. Estimation of glycogen in fat body/ovary of silkworm

Silkworm Breeding & Genetics:-

3. Identification of different races of silkworm – NB4D2, PM, C. Nichi, KA, CSR2 and CSR4 race/breed characters.

4. Comparative assessment of the hybrids and pure race cocoon.

5. Estimation of heterosis and inbreeding depression.

6. Laboratory Note Book.

7. Internal Assessment.

BVDSER123G: Post Cocoon Technology and Silk Technology (General)

Total credits: 4 **Teaching Hours - 60**

Aim of the course: To understand the technology for handling, processing Post Cocoon Technology and Silk Technology. - It also involves giving students a thorough knowledge about the cultivation of mulberry, maintenance of the farm, seed **technology**, silkworm rearing and **silk** reeling.

Outcome of the course: To follow proper technology of rearing silkworm larvae and using disinfection methods so that to get healthy cocoons

*The course also aims to teach post cocoon techniques like stifling, reeling, and utilization of byproducts

*Above all the sustainability to get a steady and reasonable income to growers and Sericulture farmers and improving rural economy are the ultimate outcome of the course.

Syllabus

Unit1: Cocoon Harvesting **12 Hours**

Cocoon stifling (sun drying, steam stifling, hot air stifling), storage of cocoon, sorting of cocoons

Unit2: Cocoon Processing **12 Hours**

Deflossing, cocoon riddling, mixing or blending, cocoon cooking, brushing

Unit3: Reeling **12 Hours**

Concept of difference reeling machines, reeling operation, reeling end formation

Unit4: Silk Yarn **8 Hours**

Degumming, bleaching, dyeing of silk yarn

Unit5: Raw Silk Material **10 Hours**

Twisting, Reeling, Re-reeling, lacing, skeining and testing of raw silk material

Unit6: Weaving of silk. **6 Hours**

References:

1. Anon. 1972 Manual On Sericulture, Vol.3 Silk Reeling Fao, Agriculture Service Bulletin No. 2/3.

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.

BVDSER123S: Post Cocoon Technology and Silk Technology (Skill based)

Total credits: 6

List of Practicals:

1. Identification of silk, cotton, wool and synthetic fiber (nylon/polyester)by physical method-flame and microscopic test, chemical test.
2. Determination of average size, Size deviation and maximum deviation of the given sample of silk. 3. Determination of good cocoon and defective cocoon percentage
4. Determination of silk ratio percentage and estimated of Rendition
5. Epprouvatte reeling and determination of average filament length and filament denier.
6. Reeling sector visit and demonstration
7. Internal assessment

(Dr. J. D. Sonkhaskar)

Principal