

(National Education Policy – 2020)

**Curriculum Structure and
Syllabus for Under-Graduate
Programme
in
SERICULTURE**

(EightSemester course)

(With effect from the session 2023–2024)



**University of Kalyani,
Kalyani, W.B.
India**

UG syllabus in Sericulture, NEP (2020), University of Kalyani

The Under Graduate syllabus in Sericulture under NEP system (2023-2024) has been placed in the meeting of Board of Postgraduate Studies (UG-BOS) in Sericulture held on 23.09.2024. The members of UG-BOS restructured and recommended the syllabus and the same was subsequently submitted to the Secretary, UG, University of Kalyani, for approval from the Faculty Council and Executive Council of the University. The Faculty Council of the University of Kalyani approved the syllabus on The approved syllabus will be placed in the subsequent meeting of the Executive Council of the University for final approval.

Prof. (Dr.) Kausik Mondal

Chairman,

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India

Preamble

Sericulture, is an applied science dealing with the rational management of activities to produce silk, an exquisite natural fibre. It covers all operations required to rear silkworms and extraction of silk having both farm and off-farm activities.

Indian silkworm breeds are basically multivoltine. Huge progress has been achieved in the productivity of mulberry and silkworm breeds over the years. The adoption of HY mulberry and silkworm hybrids along with technological innovation has made improvements in production has made sericulture a lucrative avocation. With this success, more people have adopted sericulture as an opportunity for additional income. More and more areas are coming under mulberry with active support from the Government. Though India is the second largest producer of silk, total world silk production 93,986 Mt of which Indian produces 38,913 Mt makes it around 41.40%. Still, there is abundant opportunity to extend further due to strong international demand and huge domestic consumption.

The main objective of framing this new syllabus is to give the students a thorough understanding of the subject giving adequate weightages to both the core content and techniques used in Sericulture. Keeping in mind and in tune with the changing nature of the subject, adequate emphasis has been given to new techniques and understanding of the subject. The syllabus has also been framed so that the basic skills of the subject are taught to the students, thus making them employable. Further, there is scope for self-employment and entrepreneurship development.

The entire undergraduate course in Sericulture at this University is designed to impart knowledge about the subject in a phased manner. The course offers Core, Ability Enhancement Compulsory, Discipline Specific (Major), and Discipline Specific (Minor) papers including practical for Core and Discipline Specific papers for students of the disciplines.

With the advancement of knowledge in this branch of science, augmented with phenomenal discoveries directly associated with human welfare, the subject is gaining tremendous attraction from society and a wide range of students.

A curriculum is a holistic approach to establish a better teaching-learning platform in Sericulture for the students, and the teachers, and to generate trained manpower to feed the seri industry and further entrepreneurship development.

Programme Objectives:

The Undergraduate programme in Sericulture aims to equip students with recent advances in Sericulture techniques and industries. It also aims to empower students to understand the challenges of society

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and the country that falls into the realms of Sericulture, such as mulberry cultivation, silkworm rearing, silk reeling, weaving, and marketing.

Keeping with the spirit of NEP, different courses are offered to the students, like Major (theory and practical), Minor, Multidisciplinary Courses, Value Added Courses, and Ability Enhancement Compulsory courses. The undergraduate course is designed to ignite inquisitive minds about learning the basics as well as the advances in Sericulture. It is open for admission to students who have studied Biological science, along with Physics, Chemistry, and allied subjects in their class 10+2 stage.

Programme Specific Outcomes:

After completing semesters of Undergraduate programme, students would sufficiently be skilled and empowered to solve the problems in Sericulture and its allied areas. They would have many job opportunities in the sericulture sectors and entrepreneurship. The bright and ignited mind may also enter into research in the contemporary areas of Sericulture. The broad skills and deeper knowledge in the field would make them highly successful and excellent researchers in advanced areas of study in Sericulture.

COURSE STRUCTURE SERICULTURE (NEP-2020)

University of Kalyani

Syllabus of 3-Year Degree/4-Year Honours in Sericulture

as per guidelines of National Education Policy-2020

With Effect from 2023-2024 Session

SEMESTER I							
Total Credits – 20; Total Class Hours – 25; Total Award – 265.							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-101	Introductory sericulture: Taxonomy, distribution and biology of Mulberry	Major	4	4	15	40	55
SER-MJ-P-101	Introductory sericulture: Taxonomy, distribution and biology of Mulberry	Major	2	2		20	20
ZOO-MI-T-101	Basic idea of animal diversity and taxonomy	Minor-1(Theory)	3	3	10	25	50
ZOO-MI-P-101	Basic idea of animal diversity and taxonomy Lab	Minor-1(Practical)	1	2		15	
SER-MDC-1	Entrepreneurial Opportunities in Sericulture	Multidisciplinary Course	3	3	10	35	45
SER-SEC-T-101	Vermicomposting and its Application	Skill Enhancement Course	3	3	10	35	45
VAC-1	Environmental Education	Value Added Course	4	4	10	40	50
05			20	20	55	210	265

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SEMESTER II Total Credits – 20; Total Class Hours – 23; Total Award – 265							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-201	Taxonomy, distribution and biology of the silkworm, Non-mulberry (Vanya) silk	Major	4	4	15	40	55
SER-MJ-P-201	Biology of silkworm	Major	2	2		20	20
	Syllabus of Botany	Minor-2	4	4	10	40	50
SER-MDC-2	-----	Multidisciplinary Course	3	3	10	35	45
AEC-1	Communicative English	Ability Enhancement Course	4	4	10	40	50
SER-SEC-T-201	Organic farming	Skill Enhancement Course	3	3	10	35	45
SER-SI-201	Summer certificate course/ diploma course for 10 working days from any biological research laboratory, Sericulture centre or from registered farm (Additional for Certificate/Diploma)		4	4			
05			20	20	55	210	265

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SEMESTER III							
Total Credits – 20; Total Class Hours – 23; Total Award – 265							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-301	Principles of Soil Science and Mulberry Production	Major	4	4	15	40	55
SER-MJ-P-301	Principles of Soil Science and Mulberry Prouction	Major	2	2		20	20
ZOO-MI-T-301	Comparative anatomy, Developmental Biology and Ecology	Minor-3(Theory)	3	3	10	25	50
ZOO-MI-P-301	Comparativ e anatomy, Developmental Biology and Ecology	Minor-3(Practical)	1	2		15	
SER-MDC-3	To be added	Multidisciplin aire Course	3	3	10	35	45
SER-SEC-T-301	Technologies of irrigation and water conservation	SkillEnhance mentCourse	3	3	10	35	45
VAC-2	From University listed course	Value Added Course	4	4	10	40	50
05			20	20	55	210	265

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SEMESTER IV Total Credits – 20; Total Class Hours – 20; Total Award – 250							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-401	Silkworm Rearing Technology (Cocoon Production)	Major	4	4	15	40	55
SER-MJ-P-401	Silkworm Rearing Technology (Cocoon Production)	Major	2	2		20	20
SER-MJ-T-402	Crop Protection	Major	4	4	15	40	55
SER-MJ-P-402	Crop Protection	Major	2	2		20	20
	Syllabus of Botany	Minor-4	4	4	10	40	50
AEC-2	As per University syllabus	Ability Enhancement course	4	4	10	40	50
SER-SI-401	Suumer certificate course/ diploma course for 10 working days from any biological research laboratory, Sericulture centre or from registred farm (Additional for Certificate/Diploma)		4	4			
04			20	20	50	200	250

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SEMESTER V							
Total Credits – 20; Total Class Hours – 20; Total Award – 250							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-501	Genetics&Breeding of Mulberry and Silkworm	Major	4	4	15	40	55
SER-MJ-P-501	Genetics&Breeding of Mulberry and Silkworm	Major	2	2		20	20
SER-MJ-T-502	Silkwormseedtechnology	Major	4	4	15	40	55
SER-MJ-P-502	Silkwormseedtechnology	Major	2	2		20	20
	Take from the Syllabus of Zoology Minor	Minor-5 (Theory)	3	3	10	25	50
	Take from the Syllabus of Zoology Minor	Minor-5 (Practical)	1	2		15	
	Take from the Syllabus of Botany Minor	Minor-6	4	4	10	40	50
04			20	20	50	200	250
SEMESTER VI							
Total Credits – 20; Total Class Hours – 20; Total Award – 225							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-601	SilkTechnology	Major	4	4	15	40	55
SER-MJ-P-601	SilkTechnology	Major	2	2		20	20
SER-MJ-T-602	SericultureEconomics and Basic Statistics	Major	4	4	15	40	55
SER-MJ-P-602	SericultureEconomics and Basic Statistics	Major	2	2		20	20
SER-MJ-T-603	VanyaSilk	Major	4	4	15	40	55
SER-MJ-P-603	VanyaSilk	Major	2	2		20	20
SER-SI-601	Outreach or internship for 5 workingdaysfrom anybiologicalresearchlaboratory, Sericulture centre or fromregistredfarm		2				
03			20	20	45	180	225

SEMESTER VII							
Total Credits – 26; Total Class Hours – 26; Total Award – 325							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-701	Seri Marketing	Major	4	4	15	40	55
SER-MJ-P-701	Seri Marketing	Major	2	2		20	20
SER-MJ-T-702	Sericulture Extension Management and Basic Computer application	Major	4	4	15	40	55
SER-MJ-P-702	Sericulture Extension Management and Basic Computer application	Major	2	2		20	20
SER-MJ-T-703	Application of Biotechnological tools and Techniques in sericulture	Major	4	4	15	40	55
SER-MJ-P-703	Application of Biotechnological Tools and Techniques in Sericulture	Major	2	2		20	20
	Take from the Syllabus of Zoology Minor	Minor-7 (Theory)	3	3	10	25	50
	Take from the Syllabus of Zoology Minor	Minor-7 (Practical)	1	2		15	
	Take from the Syllabus of Botany Minor	Minor-8	4	4	10	40	50
05			26	26	65	260	325

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SEMESTER VIII Total Credits – 24; Total Class Hours – 24; Total Award – 300							
Course Code	Course title	Nature of Course	Credit of Course	Class hour/week	Evaluation		Total
					In-Semester	Semester End	
SER-MJ-T-801	Entrepreneurship And Human resource development	Major	3	3	10	25	50
SER-MJ-P-801	Entrepreneurship And Human resource development	Major	1	2		15	
SER-MJ-T-802	Tools and Technique, & Bio-informatics in Sericulture	Major	3	3	10	25	50
SER-MJ-P-802	Tools and Technique, & Bio-informatics in Sericulture	Major	1	2		15	
SER-MJ-T-803	Research Methodology	Major	4	4	10	40	50
SER-MJ-T-804	Ecology, Biodiversity with Special Reference to Sericigenous Insects and Conservation	Major	4	4	15	40	55
SER-MJ-P-804	Ecology, Biodiversity with Special Reference to Sericigenous Insects and Conservation	Major	2	2		20	20
SER-MJ-T-805	Applied Entomology	Major	4	4	15	40	55
SER-MJ-P-805	Applied Entomology	Major	2	2		20	20
SER-MJ-T-804, SER-MJ-P-804, SER-MJ-T-805 and SER-MJ-P-805 For Honours Without Research Students							
SER-SI-801	One semester Research work from any biological research laboratory, Sericulture centre or from registered farm		12	12			
SER-SI-801 for Honours With Research Students							
05			24	24			300

Full marks of a course, having 6 credits/ 2credits, alongwith distribution of marks:

Full marks of each course of B.Sc. (Hons.), carrying **6 credits**, be **75**

Full marks of each course B.Sc. (Hons.), carrying **2 credits**, be **50**

For practical, distribution of 75 marks be as follows:

Class **Attendance cum InternalAssessment: 20% of 75 marks = 15 marks** of which 5 marks bereserved for theoretical class attendance in the followingmanner:

Attendance **50% &above but below 60%** - **2** marks

Attendance 60% &above but **below 75%** - **3** marks

Attendance 75% &above but **below 90%** - **4** marks

Attendance **90% &above**- **5** marks

And **10 marks**bereserved for **class test/ assignment/ seminar** (theoretical -5 &practical -5).

Semester-end-PracticalExamination of each course = 20 marks, distribution of whichmaybe as under:

a) Lab. Note Book = 05

b) Viva- voce = 05

c) Experiment = 10

Semester-end-TheoreticalExamination of each course = 40 marks, distribution of whichmaybe as under:

a) Answer 05 questions out of 08 carrying 02 marks each = $05 \times 02 = 10$

b) Answer 02 questions out of 04 carrying 05 marks each = $02 \times 05 = 10$

c) Answer 02 questions out of 04 carrying 10 marks each = $02 \times 10 = 20$

However, questions, carrying 5 or 10 marks, need not necessarily to be a single question.

Distribution of 50 marks (for each SEC) be as follows:

InternalAssesment: 20% of 50 marks = **10 marks**bereserved for **class test/ assignment/ seminar**.

40 marks beallotted for Semester-end-TheoreticalExamination of each course, distribution of whichmaybe as under:

a) Answer 05 questions out of 08 carrying 02 marks each = $05 \times 02 = 10$

b) Answer 02 questions out of 04 carrying 05 marks each = $02 \times 05 = 10$

c) Answer 02 questions out of 04 carrying 10 marks each = $02 \times 10 = 20$

However, questions, carrying 5 or 10 marks, need not necessarily to be a single question.

Summer Course/ Internship:

Summer Course/internshipisnecessary for exit aftereither one-year or two-yearstudy. Studentshouldcomplete an internship of 4 credits for a duration of 1 or 2wks. Hands-on training in anyreputed Institute/ Laboratory or anyGovt. / Regd. Farmisideal but equivalencemaybegranted to completioncertificates of online/offline Add-On course/ MOOC/SWAYAM.

AbilityEnhancement Course (AEC):

Two AEC Courses of 4 creditseachneed to becompleted by the student. Course structure, examination and evaluationwillbe as communicated by the University.

1. *Full marks of a course having 6 Credits along with distribution of marks:

Full marks of each course of B.A./ B.Sc./ B.Com. carrying **6 credits**, be **75** out of which **15** marks to be allotted for internal Assessment. In Semester-End-Examination of each course, Question Paper to be set for **60** marks.

In Semester-End-Examination of each course, Question Paper to be set for 60 marks, distribution will be as below:

- a. Answer 10 questions out of 15 carrying 02 marks each = $10 \times 02 = 20$
- b. Answer 04 questions out of 06 carrying 05 marks each = $04 \times 05 = 20$
- c. Answer 02 questions out of 04 carrying 10 marks each = $02 \times 10 = 20$

However, questions, carrying 05 or 10 marks, need not necessarily be a single question.

****Full marks of a course having 4 Credits along with distribution of marks:**

Full marks of each course of B.A./ B.Sc./ B.Com. carrying **4 credits**, be **50** out of which **10** marks to be allotted for internal Assessment. In Semester-End-Examination of each course, Question Paper to be set for **40** marks.

In Semester-End-Examination of each course, Question Paper to be set for 40 marks, distribution will be as below:

- a. Answer 05 questions out of 08 carrying 02 marks each = $05 \times 02 = 10$
- b. Answer 02 questions out of 04 carrying 05 marks each = $02 \times 05 = 10$
- c. Answer 02 questions out of 04 carrying 10 marks each = $02 \times 10 = 20$

However, questions, carrying 05 or 10 marks, need not necessarily be a single question.

*****Full marks of a course having 3 Credits along with distribution of marks:**

Full marks of each course of B.A. / B.Sc./ B.Com. carrying **3 credits**, be **45** out of which **10** marks to be allotted for internal Assessment. In Semester-End-Examination of each course, Question Paper to be set for **35** marks.

In Semester-End-Examination of each course, Question Paper to be set for 35 marks, distribution will be as below:

- a. Answer 05 questions out of 08 carrying 01 marks each = $05 \times 01 = 05$
- b. Answer 02 questions out of 04 carrying 05 marks each = $02 \times 05 = 10$
- c. Answer 02 questions out of 04 carrying 10 marks each = $02 \times 10 = 20$

However, questions, carrying 05 or 10 marks, need not necessarily be a single question.

2. Class Attendance, Internal Assessment/Project Evaluation:

- 15 marks of which 5 marks be reserved for class attendance and 10 marks be reserved for Class Test.
- 10 marks of which 5 marks be reserved for class attendance and 5 marks be reserved for Class Test.

There shall be only one Project Paper of each subject ***instead of*** class test in any one of the semesters and the college authority shall take the final decision regarding the evaluation of the project paper.

3. The questions of the following subjects shall be set in MCQ types.

1. AECC,
2. MDC,
3. VAC

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Abbreviations used in the Syllabus:

SER-MJ- T	–	Sericulture Major Course Theory
SER-MJ- P	–	Sericulture Major Course Laboratory
SER-MI-T	–	Sericulture Minor Course Theory
SER-MU-T	–	SericultureMultidisciplinaryCourseTheory
SER-SEC-T	-	SericultureSkillEnhancementCourse Course Theory
SER-VAC-T	-	SericultureValue Added Course Course Theory
AECC	-	AbilityEnhancement Course
SER-SI	-	Summer Internship (Additional for Certificate/Diploma)

Semester wise Detail Syllabus of Under Graduate in Sericulture Course & Course Credit

SEMESTER I			
SER-MJ- T-101: Introductorysericulture:Taxonomy, distribution, and biology of Mulberry	Creditof Course	Class hour/week	Points
UNIT – I IntroductorySericulture: 1. Sericulture:Origin, history and spread. 2. Types of silks. 3. Life cycle of silkworm. 4. Silk route and sericultural map of India and the World. Production statistics. 5. Progress of the seriindustrythroughdifferent plan periods. 6. Silk and itstrade. 7. Employmentgenerationpotential; Women empowerment and tool for rural developmentthroughsericulture 8. Development of entrepreneurship UNIT- II Characteristics of the Sericulture Industry: 1. Land and agro-based industry 2. Textile fibers: Natural and Syntheticfibres: Advantage of silk fibre over otherfibers 3. International anddomestic demand of silk 4. FunctionofCentral SilkBoard; Role of State Departments; Role of universities and NGOs in sericulture development. 5. Prospects and problems of the sericulture industry in India, UNIT-III:Taxonomy, Distribution, and Biology of Mulberry : 1. Distribution and Systematics of the genus<i>Morus</i> L. 2. Salient features of the family Moraceae. 3. Morphology of mulberryplant;Anatomy of leaf and root. 4. Floral biology: Structure of male and female flowers, catkins. 5. Evolved and high-yielding cultivars of mulberry. 6. Overview of propagation techniques of mulberry.	4	4	55

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SER-MJ- P-101: Introductory Sericulture: Taxonomy, distribution, and biology of Mulberry	Credit of Course	Class hour/week	Points
1. Sericultural 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. Identification of different parts of Mulberry 4. Study of the section of root, and leaf. 5. Study of types of flower. 6. Submission of Laboratory Note Book 7. Viva-voce	2	2	20
Suggested Reading : 1. Anonymous, 1975. Textbook of Tropical Sericulture. Japan Overseas Cooperation, Tokyo. 2. Anonymous, 1976. Report on National commission on agriculture Part-IV, Climate and Agriculture. GoI, Min. of Agriculture & Irrigation. pp.638. 3. Aruga, H. 1994. Principles of Sericulture (Translated from Japanese) Oxford & IBH, New Delhi. 4. Aziz A. and Hanumanappa, HG. 1985. Silk industry- problems and prospects. Ashish Publishing House, New Delhi. 5. G. Savithri, P. Sujathamma and P. Neeraja (2016) Sericulture Industry –An Overview, Agrobios Publishers, ISBN No. (13): 978-81-7754-589-0 6. Ullal, SR and Narasimhahanna. 1987. Handbook of Practical Sericulture. CSB, Bangalore. WEB REFERENCES https://www.fao.org/ag/aga/agap/frg/mulberry/Papers/HTML/Datta.htm https://agritech.tnau.ac.in/sericulture/seri_mulberry%20cultivation.html https://www.agrifarming.in/mulberry-cultivation			
Minor-1: Syllabus taken from minor paper from Zoology	Credit of Course	Class hour/week	Points
ZOO-MI- T-101 : Basic idea of animal diversity and taxonomy & ZOO-MI- P-101 : Basic idea of animal diversity and taxonomy	4	4	50
MDC-1: Entrepreneurial Opportunities in Sericulture	Credit of Course	Class hour/week	Points

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Unit-I: Pre-cocoon Sector (on Farm) 1. Brief introduction to Sericulture. 2. Establishment of Kisan Nursery. 3. Establishment of Chawki Rearing Center. 4. Silkworm Rearing. 5. Waste Recycling Technology. 6. Mass multiplication of Bio-control agents. 7. Services: Disinfection services; Supply of materials related to Sericulture. Unit-II: Silkworm Seed Production 1. Establishment of Silkworm seed production unit. 2. Available Govt. Schemes/ subsidy/ financial assistance for the setting of SW seed production centres. 3. Assessment of demand of Silkworm seeds, and availability of seed cocoons. 4. Procurement of seed cocoons; Production of Silkworm seed (dfl's). 5. Storage and supply of silkworm seed to farmers. 6. Economics of seed production. Unit-III: Byproduct Utilization 1. Byproducts of Mulberry production. 2. Byproducts of Silkworm rearing. 3. Byproducts of Grainge operation. 4. Byproducts of Reeling. Unit- IV: Post-cocoon sector (Off Farm) 1. Establishment of Reeling unit, small scale unit, large unit an overview. 2. Twisting of Silk; Establishment of unit. 3. Weaving; Hand loom/ power loom. 4. Processing of Silk textiles. 5. Marketing chain. Suggested Reading : 1. Hand Book of Silkworm rearing (1972); Fuji Publishing Co., Ltd., Tokyo, Japan. 2. Hiroo, Sibuya-ku. (1975) Textbook of Tropical Sericulture, Japan Overseas Corporation Volunteers 4-2- 24, Tokyo, Japan. 3. Rao, VKRV, 1984. Some Neglected Factors in Integrated Rural Development in Rural Development in India (Eds. Lakshman & Narayanan). Himalaya Publishing House, New Delhi.	3	3	45 35+10 (Field Study: Sericultu re Institute/ Field) = 45
SER-SEC- T-101: Vermicomposting and its Application	Credit of Course	Class hour/week	Points
Unit -I: Introduction to vermiculture 1. Vermiculture - definition, meaning, history, economic importance, role in maintaining soil health, Role as four R's of recycling (reduce, reuse, recycle, and restore).	3	3	45

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2. Role in the biotransformation of the residues generated by human activity and production of organic fertilizers. 3. Humus cycle (product, qualities). Ground population, transformation process in organic matter. 4. Earthworms, local and exotic species of earthworms; complementary activities of auto-evaluation; key to identifying the species of earthworms. Unit -II: Biology of <i>Eiseniafetida</i> 1. Reproduction of Lumbricidae. 2. Vital cycle of <i>Eiseniafetida</i>: alimentation, fecundity, reproducing potential, and limiting factors (gases, diet, humidity, temperature, pH, light, and climatic factors). 3. Complementary activities of auto evaluation. Unit-III: Vermicomposting 1. Small-scale earthworm farming for home gardens 2. Commercial vermicomposting- pit, brick, heap systems, and Kadapa slab method). 3. Earthworm farming, vermicompost harvest, and processing. Vermiwash collection and use 4. Enemies of earthworms, sickness, and enemies; frequent problems – prevention and fixation. Complementary activities of auto evaluation. Unit-IV: Applications of vermiculture 1. Benefits of vermicompost. 2. Basic characteristics of earthworms suitable for vermicomposting. 3. Problems in vermicomposting, vermicomposting of sericultural and dairy waste.				
SER- VA-T-101 : Environmental Education		Credit of Course	Class hour/week	Points
		4	4	50
Total Courses : 05		Total Credit of Course : 20	Total Class hour/week : 20	Total Marks : 265

SEMESTER II			
SER-MJ- T-201: Taxonomy, distribution, and biology of the silkworm, Non-mulberry (Vanya) silk	Credit of Course	Class hour/week	Points
Unit I: Biosystematics (taxonomy) of Silkworm and life-cycle. 1. Distribution of sericigenous insects. 2. Salient features of orders belonging to sericigenous insects. 3. Biology (life cycle) of silkworms and growth stages. 4. Overview of Non-Mulberry (Vanya) silkworms. Unit II: Races and classification of silkworm, <i>Bombyx mori</i>: 1. Geographical races; Classification based on Moulting and Voltinism, Indigenous races 2. Exotic breeds, Evolved breeds, and high-yielding crossbreeds. Unit III: Morphology and Anatomy: 1. Morphology of the egg, larva, pupa, and adult. 2. Digestive system ; nervous system ; respiratory system of Larva 3. Reproductive system of moth. 4. Silk gland; Structure and function. Unit IV: Overview of Non-mulberry (Vanya) silk 1. Distribution of Non-mulberry (Vanya) silkworms in India. 2. Primary and secondary food plants of eri, Muga, and Tasar silkworms. 3. Life cycle of Eri, Muga, and Tasar silkworms. 4. Salient features of cocoon characters of eri, Muga, and Tasar silkworms	4	4	55
SER-MJ-P-201: Biology of Silkworm, <i>Bombyx mori</i>	Credit of Course	Class hour/week	Points
1. Identification of Life Cycle stages of <i>Bombyx mori</i>. a) Morphology of egg, larva, pupa, and adult of silkworm, <i>Bombyx mori</i>. b) Sexual dimorphism of larva, pupa, and adult of silkworm, <i>Bombyx mori</i>. 2. Anatomy of Silkworm a) Dissection of the Digestive, respiratory and nervous system. b) Mounting of larval mouth parts and spiracle.	2	2	20

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c) Silk gland dissection and mounting. d) Reproductive system of male and female moth 3. Cocoon characters. a) Study of the Cocoon characters of multivoltine and bivoltine breeds of <i>B.mori</i>. b) Study of the Cocoon characters of tasar, eri, and mugacocoons. 4. Submission of Laboratory Note Book 5. Viva-voce			
Suggested Reading : 1. Manual on Sericulture. Vol. 2: Silkworm Rearing [1976] Krshinaswami <i>et al.</i> FAO, Rome (Italy). Agricultural Services Div. 2. G. Savithri, P.Sujathamma, and P. Neeraja 2016 Sericulture Industry –An Overview, Agrobios Publishers, ISBN No. (13): 978-81-7754-589-0 Suggested Reading : 3. Madan Mohan Rao, M. 1999. Comprehensive Sericulture Manual. B.S. Publication, Hyderabad. 4. Manual on Sericulture. Vol. 2: Silkworm Rearing [1976] Krishnaswami <i>et al.</i> FAO, Rome (Italy). Agricultural Services Div. 5. Sanappa, B. 2002. Advances in Sericulture. Seri Scientific Publishers, Bangalore, India. 6. Thangavelu, K. (Ed.) 2000. Lessons on tropical Tasar, CTR&TI, CSB. 7. Chaudhury S.N. 1981; Muga Silk Industry, Directorate of Sericulture and Weaving, Government of Assam, Gowhati, Assam. 8. Sarkar D.C. 1980; Sericulture in India, Central Silk Board, Government of India, Bangalore. 9. WEB REFERENCES https://www.agrifarming.in/silkworm-rearing-methods-beginners https://www.researchgate.net/publication/258381833_Management_of_Climatic_Factors_for_Successful_Silkworm_Bombyx_mori_L_Crop_and_Higher_Silk_Production_A_Review http://ndpublisher.in/admin/issues/IJAEBv11n5i.pdf https://egyankosh.ac.in/bitstream/123456789/9078/1/Unit-2.pdf			
Minor-2: Syllabus of Botany minor-1	Credit of Course	Class hour/week	Points
	4	4	50
MDC-2 : Multidisciplinary Course	Credit of Course	Class hour/week	Points
	3	3	45
AEC-1 : Communicative English	Credit of Course	Class hour/week	Points
As per University syllabus of Communicative English	4	4	50

SER-SEC-T-201: : ORGANIC FARMING				
Unit-I:Organicmanures 1. Organic farming; definition, history and scope. 2. Nutrient requirements in organicfarming;limitingnutrientlosses. 3. Manures-definition, BulkOrganicManures (BOM), ConcentratedOrganicManures (COM).Organic manures:Farm Yard Manure (FYM), Enrichment of FYM. 4. Compost, and composting methods (Bangalore, Indore, Coimbatore, NADEP). Unit-II: Green manures 1. Green manuring, Classification of green manures (GM). 2. Nutrientstatus of various green manures. 3. Advantages of GM, Desirable characteristics of leguminous GM crops. 4. Recycling of organic residues and classification of organic residues. Unit -III : Bio-fertilizar. 1. Potash mobilizing and Sulphurmobilizingmicro Organisms, Arbuscularmycorrhizal fungi. 2. Azatobacor; nitrogen-fixing microbes and their use. 3. Growth promoting substance excreting microorganisms – methods of application. 4. Use of bio-fertiliser withspecialreference to mulberry production. Unit-VI:Organicpreparations 1.Preparation of different types of compost including industrial waste, coir waste, press mud. 2. Government interventions forpromoting organic farming: NPOF, NPMSHF, NHM, RKVY, KVK and APEDA Suggested Reading : 1. Khurana, A. and V Kumar. 2020. State of Organic and Natural Farming: Challenges and Possibilities, Centre for Science and Environment, New Delhi. 2. Kumar, S.R., Spandana, P., Ramanjaneyulu, A.V. and Srinivas, A. 2019. “Components of organic farming”. In: Organic Farming (Eds. Gopinath, KA and Ramanjaneyulu, A.V.). Daya Publishing House. A division of Astral International Pvt. Lid., New Delhi. 3. Ramanjaneyulu et al. 2020. Promotion of Organic Farming: Roles of key players. Biotica Research Today 2(8): 731-734 4. Yadav AK. n.d. Organic Agriculture — Concept, Scenario, Principals, and Practices. NCOF, Department of Agriculture and Cooperation, Ministry of Agriculture, Gol.		3	3	45
SER-SI- -201: Summer Internship (Additional for Certificate /Diploma)		4	4	
Total Courses : 05		Total Creditof Course : 20	Total Class hour/week : 20	Total Marks : 265

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SEMESTER III			
SER-MJ- T-301: Principles of Soil Science and Mulberry Production	Credit of Course	Class hour/week	Points
Unit I: Introduction to Soil Science. 1. Soil; Formation; Components of Soil; Types of soil and their distribution in India. 2. Physical and Chemical properties of soil; Soil organic matter; 3. Plant nutrients, their classification and source. 4. Importance of humus layer; Soil conservation. 5. Soil analysis; Soil sampling; Soil pH; Organic carbon; NPK level. Unit – II Mulberry Cultivation (Production) 6. Selection of land for mulberry cultivation. Preparation of Land; Application of manures. 7. Introduction of different types of Manures and chemical fertilizers and biofertilizers. 8. Propagation of Mulberry: Seedling, Sampling, Grafting, Layering, Sourcing of planting material. Selection of cultivars. 9. Establishment of mulberry garden; Bush and tree plantation under irrigated, rainfed conditions and hilly areas; climate and soil conditions required for mulberry growth. 10. Chawki gardens, concept, and its importance. 11. Farm implements required and outlines of mechanization for mulberry production, 12. Different types of Plantations: Row; Paired row and different planting geometry, Package of Practices. Integrated Plant Nutrient Management. 13. Foliar Nutrients and PGR application-Overview. 14. Leaf Harvest: Transportation and preservation. 15. Intercropping in Mulberry Garden.	4	4	55
SER-MJ- P-301: Soil Science, Mulberry Cultivation and Mulberry Crop Protection	Credit of Course	Class hour/week	Points
1. Collection and processing of soil samples. Analysis of soil pH, Organic Carbon, EC. 2. Preparation of cutting and sapling raising techniques. 3. Planting techniques. 4. Disease/Pathogen identification, Symptoms. 5. Identification of major/minor Pests and symptoms of infestation. 6. Introduction to Pesticides/ Insecticides : Forms and formulation. 7. Preparation of Pesticide solution : Estimation of requirement; Safe	2	2	20

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period. 8. Submission of Laboratory Note Book 9. Viva-voce			
Suggested Reading : 1. Devaiah M.C et al. (2001); Advances in Mulberry Sericulture. Dept. of Sericulture, UAS, Bangalore. 2. Hiroo, Sibuya-ku. 1975. Textbook of Tropical Sericulture. Japan Overseas Corporation Volunteers 4-2- 24, Tokyo, Japan. 3. Sericulture Manual-1 (Mulberry cultivation) (1972); Food and Agriculture Organization of the United Nations, Rome. 4. Dandin, S.B. and K. Giridhar (Eds.). 2010. Handbook of Sericulture Technologies, Central Silk Board, Bangalore. Central Silk Board, Bangalore. 5. Hiroo, Sibuya-ku. 1975. Textbook of Tropical Sericulture. Japan Overseas Corporation Volunteers 4-2- 24, Tokyo, Japan.			
Minor paper: Syllabus taken from minor paper of Zoology minor-3	Credit of Course	Class hour/week	Poin ts
ZOO-MI- T-301 : Comparative anatomy, Developmental Biology and Ecology & ZOO-MI- P-301 : Comparative anatomy, Developmental Biology and Ecology	4	4	50
MDC-3 :Multidisciplinary Course Syllabus takefromMDCpaper of Physiology	Credit of Course	Class hour/week	Points
	3	3	45
SER-SEC- T-301 : Technologies of irrigation and water conservation	Credit of Course	Class hour/week	Poin ts
Unit-I: Techniques of Irrigation. 1. Irrigation: definition and objectives; Overview of water resources and irrigation development in India; 2. Soil-water and plant-water relationships; Soil water classification, and constants. 3. Crop water requirement, Water use efficiency, evapotranspiration; 4. Irrigation scheduling and criteria. 5. Surface irrigation methods; flood irrigation, drip, micro, and sprinkler irrigation. 6. Selection of irrigation methods based on soil, crop, and water availability. Irrigation efficiencies; Quality of irrigation water; Waterlogging and drainage. 7. Environmental impact of irrigation.	3	3	45
Unit-II: Water Conservation. 1. Introduction, objectives, and perspectives. 2. Different forms of water erosion. Strategies for water conservation; reduction of water loss, use of water-efficient irrigation techniques, avoidance of damaging water quality.			

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3. Water management in agriculture, industry, and household. Recycling and reuse of water. 4. Rainwater harvesting and recharging of groundwater and aquifer. 5. Water conservation challenges in realms of climate change.				
Suggested Reading: 1) Ofori, Solomon; Puškáčová, Adéla; Růžicková, Iveta; Wanner, Jiří (2021). "Treated wastewater reuse for irrigation: Pros and cons". Science of the Total Environment. 760:144026. Bibcode:2021ScTEn.76044026O.doi :10.1016/j.scitotenv.2020.144026. 2) Siebert, S.; J. Hoogeveen, P. Döll, J-M. Faurès, S. Feick, and K. Frenken (November 10, 2006). "The Digital Global Map of Irrigation Areas – Development and Validation of Map Version 4" (PDF). Tropentag 2006 – Conference on International Agricultural Research for Development. Bonn, Germany. 3) Kumar Kurunthachalam, Senthil (2014). "Water Conservation and Sustainability: An Utmost Importance". Hydrol Current Res. 4) Vickers, Amy (2002). Water Use and Conservation. Amherst, MA: Water Plow Press. p. 434. ISBN 978-1-931579-07-0. 5) Pimentel, Berger; et al. (October 2004). "Water resources: agricultural and environmental issues". BioScience. 54 (10): 909. 6) Moorberg, Colby J., ed. (2019). Soil and Water Conservation: An Annotated Bibliography. NPP eBooks. ISBN 978-1-944548-26-1. Online book. 7) Fatta-Kassinos, Despo; Dionysiou, Dionysios D.; Kümmerer, Klaus (2016). Wastewater Reuse and Current Challenges - Springer. The Handbook of Environmental Chemistry. Vol. 44.				
VAC-2 (Value Added Course) TakeFrom University listed course		Credit of Course	Class hour/week	Points
		4	4	50
Total Courses : 05		Total Credit of Course : 20	Total Class hour/week : 20	Total Marks : 265

SEMESTER IV			
SER-MJ- T-401: Silkworm Rearing Technology (Cocoon Production)	Credit of Course	Class hour/week	Points
1. Model Rearing House: Low-cost Rearing House with locally available materials; Orientation of Rearing House. 2. Rearing Appliances: Appliances made from locally available materials. Requirement of appliances for a unit to rear 100 dfls'. 3. Disinfection of Rearing House: Appliances, Disinfectants, Personal Hygiene. 4. Rearing Season; Selection of Breeds/Hybrids. 5. Disinfection of rearing house, different methods of disinfection. 6. Incubation ; Methods and Devices; Black Boxing. 7. Transportation of eggs. 8. Brushing: Methods; Care during brushing. 9. Chawki Rearing: Characteristics of Chawki Worms. Methods of Chawki rearing, Advantages, and Disadvantages. Feeding and selection of leaves. Frequency and Quantum of feed; Spacing and Bed Cleaning; Required environmental conditions. CRC. 10. Lateage Rearing: Characteristics of lateage worms; Methods of lateage rearing; Merits and demerits; Frequency and Quantum of Feed. Environmental conditions required for Lateage rearing. 11. Spinning: Identification of mature larva; Mounting Density; Types of montages; Environmental condition during spinning. 12. Harvesting: Time of harvesting; Sorting of cocoons; Storage; Transportation of Cocoons. 13. Package of practices for silkworm rearing, crop schedule 14. Maintenance of Records: Leaf cocoon ratio; Maintenance of records of input/output	4	4	55
SER-MJ-P-401 : Silkworm Rearing Technology (Cocoon Production)	Credit of Course	Class hour/week	Points

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1. Study of Morphology of Egg, Larva, Pupa and Adult of <i>Bombyx mori</i> 2. Sex separation in different stages. 3. Dissection of Digestive and Reproductive. 4. Dissection of Silk gland; Mounting of larval mouthparts. 5. Study of Rearing House; Orientation; Low-cost Rearing House (RH). 6. Disinfection; Calculation for Disinfectant solution requirement; Application/Spray; Bed infectants use. 7. Identification of Cocoon, larvae of different breeds. 8. Rearing: From Brushing to Harvesting of Cocoons. Incubation of eggs: Black boxing; Brushing; Rearing; Spinning: Harvesting and Sorting of Cocoons. 9. Submission of Laboratory Note Book 10. Viva-voce	2	2	20
Suggested Reading : 1. Devaiah M.C et al. (2001); Advances in Mulberry Sericulture. Dept. of Sericulture, UAS, Bangalore. 2. Hand Book of Silkworm rearing (1972); Fuji Publishing Co., Ltd., Tokyo, Japan. 3. Sainosuka Omura (1973); Silkworm Rearing Techniques in Tropics, Overseas Technical Co-operation Agency, Tokyo, Japan. 4. Krishnaswamy <i>et al.</i> 1972. Sericulture Manual-2 (Silkworm rearing). Food and Agriculture Organization of the United Nations, Rome. 5. Hiroo, Sibuya-ku, 1975. Textbook of Tropical Sericulture. Japan Overseas Corporation Volunteers 4-2- 24, Tokyo, Japan. 6. Dandin, S.B. and K. Giridhar. (Eds.) 2003. Handbook of Sericulture Technologies, 2010. Central Silk Board, Bangalore. 7. Jolly, M.S. (Ed.) 1987. Appropriate Sericulture Technologies. ICTRTS, Mysore, India.			
SER-MJ- T- 402: Crop Protection	Credit of Course	Class hour/week	Points
Unit- I: Mulberry Crop Protection 1. Classification of mulberry diseases. 2. Mulberry diseases, fungi, and bacterial origin, symptoms, causal organism, and management. 3. Root-Knot Disease: Symptoms, Causal organism and management. 4. Overview of pests of mulberry; Alternate host plants.	4	4	55

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5. Major Pests; Thrips, Whitefly, Mealybug, Bihar hairy caterpillar, Occurrence, Extent of damage symptoms and management. 6. Minor Pests; Brief account; Nature of damage and management. 7. Pesticides: Essential components; Forms and formulation; Mode of action; Determination and requirement of Pesticides per unit area; Application techniques; Safe period. 8. Integrated Pest Management. 9. Role of environment in incidence of disease/pests. Unit -II Cocoon Crop Protection 1. Overview of Silkworm disease and Pests; Classification of Silkworm Diseases. 2. Microsporidian Disease: Symptoms; Life Cycle of Microsporidia; Disease Cycle; transmission mode, Prevention, and Management. 3. Bacterial Diseases: Casual organisms: Symptoms, Mode of transmission, Prevention and Control Strategy. 4. Viral Diseases: Grasserie, Infectious Flacherie; Cytoplasmic Polyhedrosis; Densovirus, Gattine, Causative agent, symptoms, Transmission, management. 5. Fungal Diseases: White Muscardine, Green Muscardine Aspergillosis, Causal organism, Symptoms, Disease cycle, Mode of transmission, and Control methods. 6. Influence of abiotic factors on the incidence of diseases, Predisposing Factors. 7. Integrated Disease management. 8. Uzifly : Distribution, Bionomics, Biology; Occurrence, Nature, Extent of damage. Control methods: Physical, Cultural, Chemical, and Biological. 9. Dermestid Beetle: Biology, Nature, and Extent of damage, Management strategy.			
SER-MJ-P- 402: Crop Protection	Credit of Course	Class hour/week	Points
1. Mulberry Disease/Pathogen identification, Symptoms. 2. Identification of major/minor Pests of mulberry, and symptoms of infestation. 3. Introduction to Pesticides/ Insecticides ; Forms and formulation. 4. Preparation of Pesticide/ disinfectant solution; Estimation of requirement; Safe period. 5. Different types of sprayers, Spraying techniques; Do's and don'ts of spray. 6. Identification of diseased larvae based on their symptoms. 7. Separation of Pebrine spore and preparation of temporary slides. 8. Preparation of temporary slides of bacteria, Polyhedral bodies; Mycelial mat/ Spores of Beauveria. 9. Application of Beddisinfectant. 10. Identification of Life Stages of Uzifly. Uziinfested Cocoons. 11. Identification of Dermestid Beetle. 12. Submission of Laboratory Note Book 13. Viva-voce	2	2	20

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Suggested Reading :				
1. Chattopadhyay, SB. Principles and procedures of plant protection, Oxford & IBH publishing Co Pvt. Ltd. 2. Devaiah M.C et al. (2001); Advances in Mulberry Sericulture. Dept. of Sericulture, UAS, Bangalore. 3. Handbook of Sericulture Technologies, 2010. Central Silk Board, Bangalore Dandin, S.B. and K. Giridhar. Eds. Central Silk Board, Bangalore. 4. Hiroo, Sibuya-ku, 1975. Textbook of Tropical Sericulture. Japan Overseas Corporation Volunteers 4-2- 24, Tokyo, Japan. 5. Krishnaswamy, S. <i>et al.</i> 1972. Sericulture Manual-2 (Silkworm rearing); Food and Agriculture Organization of the United Nations, Rome. 6. Sathe, TV. Agrochemicals and pest management. Daya Publishing House. 7. Sengupta <i>et al.</i> 1990. Handbook on pest and disease control of mulberry and silkworm. UN Economic and Social Commission for Asia and Pacific, Bangkok, Thailand. 8. Sharma, D D. Mulberry crop protection, Central Silk Board, Bangalore.				
Minor-4 : Syllabus of Botany minor-1		Credit of Course	Class hour/week	Points
		4	4	50
AEC-2 : Ability Enhancement course		Credit of Course	Class hour/week	Points
As per University syllabus		4	4	50
SER-SI- -401: Summer Internship (Additional for Certificate /Diploma)		4	4	
Total Courses : 05		Total Credit of Course : 20	Total Class hour/week : 20	Total Marks : 250

SEMESTER V			
SER-MJ- T-501 : Genetics&Breeding of Mulberry and Silkworm	Credit of Course	Class hour/week	Points
Unit -I Basic concept of Genetics and Breeding 1. Structure of Chromosome; the concept of genetic material; DNA as a genetic material. 2. Mendelian laws of Inheritance, linkage groups; alleles. 3. Breeding; Aims and objectives; selection of breedingmaterial. Unit- II MulberryGenetics and Breeding. 1. Genetic variability of Mulberry; Germplasm resources. 2. Cytological features of Mulberry. 3. Mulberrybreeding; objective; techniques in brief. 4. Breeding techniques for stress tolerance;disease and pest resistance. Unit-III SilkwormGenetics and Breeding 1. Genetic variability of Silkworm;Geographical, Indigenous races. 2. Genetic mechanism of Silkworm and sex determination. 3. Maternal inheritance in Silkworm <i>B. mori</i>. Inheritance of voltinism and moultnism. 4. Breeding of Silkworm; Objectives and scope. Selection of Breeding Material. 5. Study of Heterosis over mid and better parent values 6. Sex-limited breeds of <i>B. mori</i> and their exploitation.	4	4	55
SER-MJ- P-501: Genetics and Breeding of Mulberry and Silkworm	Creditof Course	Class hour/wee k	Point s
1. Cytological techniques: Preparation of temporary slides for the studies of mitotic and meiotic Chromosome. 2. Hybridisation techniques of Mulberry: Floral biology; pollen collection, preservation, and viability studies, Emasculation of Catkins. 3. Study of economic growth parameters of Mulberry. 4. Study on the maternal inheritance in <i>B. mori</i>. 5. Sex-limited breeds: Studies on the sex-limited characters in	2	2	20

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egg(colour); larval markings and cocoon colour. 6. Chi-square test:phenotypes, monohybrid, dihybrid ratio, larval markings, sex ratio. 7. Submission of Laboratory Note Book 8. Viva-voce			
Suggested Reading : 1. Rangaswamy <i>et al.</i> Sericulture Manual-2 (Mulberry Cultivation) (1972); Food and Agriculture Organization of the United Nations, Rome. 2. Tajima Y. 1975. Silkworms an important laboratory tool. 3. Tajima Y. 1984. Genetics and chemical mutagenesis. National Institute of Genetics Mishima, Japan. Environmental Science Research, Vol. 31, 4. Tanaka Y. (1964); Sericology, Central Silk Board Publication, Bangalore. 5. Tazima, Y. 1964.The Genetics of the Silkworm, Logos Press, London, pp. 1 – 253.			
SER-MJ- T-502 : Silkwormseedtechnology	Credit of Course	Class hour/week	Points
1. Overview of silkwormseedproduction;capacity, present production, and demand, production level of Govt. / Privatesector. 2. Seedorganizational setup. Parent stock (P4, P3, P2) maintenance and multiplication norms. SeedLegislationAct. 3. Monitoring and raising of P1 seedcrops. 4. Seed cocoon Market: Certification seed cocoons, Price fixation. 5. Establishment of commercial Grainge: Site selection, model Grainge plan; Infrastructure facilities; equipment; cold storage facilities; disinfection. 6. Commercial seed production;seed cocoon production and procurement, transportation, sorting, pupil examination, sex separation, preservation of cocoons, synchronization, emergence, coupling, Oviposition, mother moth examination, Surface sterilization of eggs. 7. Preservation of eggs;Preservation of cross-breed(CB) eggs, acidtreatment of bivoltine eggs; short-term and long-termpreservation of bivoltine eggs. 8. Loose eggpreparation.	4	4	55

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9. Transportation of eggs. 10. Grainage Management.				
SER-MJ- P-502 : SilkwormSeedTechnology		Credit of Course	Class hour/week	Points
1. Demonstration of grainage equipment. 2. Cocoon handling; sorting, preservation; sex separation, coupling and decoupling, and storage of moths. 3. Moth examination; surface sterilization, washing of eggs. 4. Loose egg preparation; different steps. 5. Acid treatment of bivoltine eggs. 6. Embryological studies of the developing larval stages. 7. Submission of Laboratory Note Book 8. Viva-voce		2	2	20
Suggested Reading :				
1. Devaiah M.C et al. (2001); Advances in Mulberry Sericulture. Dept. of Sericulture, UAS, Bangalore. 2. Dandin, S.B., Jaisawal and K. Giridhar. Eds. 2003. Handbook of Sericulture Technologies, Central Silk Board, Bangalore Central Silk Board, Bangalore. 3. Seri Business, A users' guide (Farm Sector). 2003. Central Silk Board, Bangalore. 4. Krishnaswamy <i>et al</i> 1972 Sericulture Manual-2, Silkworm Rearing, Food and Agriculture Organization of the United Nations, Rome. 5. Tanaka, Y. 1964. Sericology. Reprint by CSB, Bangalore.				
Minor paper : Syllabus taken from minor paper of Zoology minor-3		Credit of Course	Class hour/week	Points
Minor paper : Syllabus taken from minor paper of Zoology minor		4	4	50
Minor paper : Syllabus taken from minor paper of Botany minor		Credit of Course	Class hour/week	Points
		4	4	50
Total Courses : 04		Total Credit of Course : 20	Total Class hour/week : 20	Total Marks : 250

SEMESTER VI			
SER-MJ- T-601 : SilkTechnology	Creditof Course	Class hour/week	Points
1. Textile fiber- Natural and Man-made fibers. Physical and Chemical properties of silk. 2. Physical and commercial character of cocoons on raw silk quality. 3. Sorting of cocoons;effect of defective cocoons on reeling and silk. 4. Cocoon testing and grading. 5. Stifling of the cocoon:Objectives; different methods. Storage and preservation of cocoon. 6. Cocoon cooking and brushing. 7. Reeling and re-reeling. 8. Twisting and weaving of silk in brief. 9. Testing and grading of silk.	4	4	55
SER-MJ- P-601 :SilkTechnology	Creditof Course	Class hour/week	Points
1. Cocoon testing, determination of defective cocoon percentage, Shell ratio % calculation. 2. Assessment of Filament length (FL), and non-breakable Filament length (NBFL). Reelabilitypercentage,Renditta estimation. 3. Cocoon cooking and brushing of cocoons. 4. Studies on reeling machines,reeling of raw silk. 5. Raw silk testing and grading, cohesion test. 6. Submission of Laboratory Note Book 7. Viva-voce	2	2	20
Suggested Reading : 1. Charles J. Huber. 1929. The Raw Silk Industry of Japan. The Silk Association of America, Inc. 2. Dandin, Jayaswal and Girdhar, (Eds.). 1993. Handbook of sericulture Technologies. Central Silk Board. 3. H. Panda (2010) The Complete Book on Textile Processing and Silk Reeling Technology, ASIA PACIFIC BUSINESS PRESS Inc.			

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4. Jolly, MS (Ed.). 1987. Appropriate Sericulture Technologies. ICRTS, Mysore, India. 5. Sericulture Manual-3. Silk Reeling.1972. Food and Agriculture Organization of the United Nations, Rome. 6. Tammanna N. Sonwalkar (1993) Handbook on Silk Technology, New Age International (p) limited publishers.			
SER-MJ- T-602: SericultureEconomics and Basic Statistics	Credit of Course	Class hour/week	Points
Unit- I Economics 1. Production and cost:Basic concepts of different types of costs, marginal, average, fixed cost, total variable cost, average variable cost marginal cost, etc. 2. Gross and Net return. 3. Tools for farm management analysis:farm management, farm planning; characteristics of good farmplanning. Farmbudgeting. 4. Farm Management :Farm Financing: Need for farm finance; credit, its types. Role of co-operatives and financial institutions. Unit II Basic Statistics 1. Introduction to Statistics: Basic Concepts, Attributesand variables, parameters, types and sources of data, 2. Survey: Objective, production/sample survey, steps ofsample survey, sampling techniques.Concepts of Sampling Errors and Non-sampling Errors 3. Frequency distribution, different types of presentations.Simple parametric representation:Measurement of central tendency; arithmetic, geometric, median, mode, harmonic. Measurement of dispersion. 4. Correlation and Regression: Simple Correlation and Regression. 5. Bivariatedata: Scatter diagram, regression equation. 6. Test of Significance:Hypothesis, decision-making, degree of freedom. 7. Application of t-test and chi-square test.	4	4	55
SER-MJ- P-602: Economics and Basic Statistics	Credit Course	Class hour/week	Points
1. Comparative and graphical representation of different costs and returns. 2. Project preparation for establishing a model sericulture farm. 3. Comparative profitability of sericulture with the cash crops. 4. Diagrammaticrepresentation of data. 5. Construction of Frequency Distribution from Ungrouped and Grouped Data and measurement of central tendency. 6. Calculation of simple correlation coefficient; Application of t-test, chi-square, in different statistical problems. Plotting of scatter diagram with regression line. 7. Submission of Laboratory Note Book 8. Viva-voce	2	2	20

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Suggested Reading : 1. Aziz A. and Hanumanappa, H.G. 1985. Silk Industry- Problems and Prospects. Ashish Publishing House, New Delhi. 2. Bhattacharya D and Roychowdhury S. 2007. Statistics, Theory, and Practice. Un Dhar & Sons Pvt. Ltd. 3. Jerome D <i>et al.</i> 2003. A Management Guide to PERT/CPM. Prentice Hall of India Pvt. Ltd. 4. Gun AM, Gupta, MK, Dasgupta B. 2008. Fundamentals of Statistics, Vol I &II. World Press Pvt. Ltd.			
SER-MJ- T-603 : VanyaSilk	Credit of Course	Class hour/week	Points
1. Types of Vanyasilk : Distribution and comparative productivity. 2. Organizational set up for Research and Training for Vanya Silk. Employment potential and exploitation of forest resources. 3. Tasarsilk_: Tropical and temperateTasar. Host plants, primary and secondary, morphology of different stages of the life cycle. Rearing practices, and requirement ecological conditions. 4. Mugasilk_: Host plants, primary and secondary food plans. Morphology of different stages of the life cycle. Required ecological condition for the rearing, Rearing cycle. Seed and commercial crops. 5. Erisilk : Host plants, primary and secondary Racial variation; Morphology of different stages of the life cycle. Indoor rearing, environmental conditions. Rearing cycle. 6. Reeling of Vanyasilkcocoons, Basic differences of reeling methods, traditional methods of reeling/ spinning of Vanyasilkcocoons. 7. Pest and predators of Vanyasilkworm.	4	4	55
SER-MJ- P-603 : VanyaSilk	Credit of Course	Class hour/week	Points
1. Identification of host plants of Tasarsilkworm. 2. Identification of eggs larva, pupa, and moths of Tasarsilkworms. 3. Identification of host plants of MugaSilkworm. 4. Identification of egg, larva, pupa, and moth of Mugasilkworm. 5. Identification of host plants of Eri silkworm. 6. Identification of egg, larva, pupa, and moth of Eri silkworm. 7. Identification of different types of filaments in Vanyasilk.	2	2	20

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8. Visit of Vanya silk area. 9. Submission of Laboratory Note Book 10. Viva-voce				
Suggested Reading : 1. Chaudhury S.N. (1981); Muga Silk Industry, Directorate of Sericulture and Weaving, Government of Assam, Guwahati, Assam. 2. Sanappa, B. 2002. Advances in sericulture. Seri Scientific Publishers, Bangalore, India. 3. Sarkar D.C. (1980); Sericulture in India, Central Silk Board, Government of India, Bangalore. 4. Sericulture Manual- 4, Non-Mulberry, 1972. Food and Agriculture Organization of the United Nations, Rome. 5. Thangavelu, K.(Ed.) 2000. Lessons on tropical Tasar, CTR&TI, CSB.				
SER-SI- -601: Outreach or internship for 5 working days from any biological research laboratory, Sericulture centre or from registered farm		2	2	
Total Courses : 05		Total Credit of Course : 20	Total Class hour/week : 20	Total Marks : 225

SEMESTER VII			
SER-MJ- T-701 : Seri Marketing	Credit of Course	Class hour/week	Points
1. General Marketing Management – Marketing- definition, Marketing Process, Need for marketing, Role of marketing, Marketing functions, Classification of markets, Marketing channels. Price spread. Marketing Efficiency, Integration , Constraints in marketing of agricultural produce. Market intelligence, Concept of future market 2. Sericultural markets and their kinds. Marketing problems in the silk industry 3. Law of demand and supply, price determination, problems of cocoon market, price stabilization 4. Marketing of cocoons and by-products. Regulated and Non-regulated cocoon market. 5. Seed cocoon market. 6. Role of Silk Exchange in Sericulture Marketing. 7. Cocoon and Silk Marketing System in Karnataka and West Bengal.	4	4	55
SER-MJ- P-701 : Seri Marketing	Credit of Course	Class hour/week	Points
1. Visit of cocoon market and demonstration. 2. Field Note Book. 3. Internal assessment 4. Submission of Laboratory Note Book 5. Viva-voce	2	2	20
SER-MJ-T-702: Sericulture Extension Management & basic Computer application	Credit of Course	Class hour/week	Points
Unit-I Extension Management 1. Meaning, objective and importance of sericulture extension. Principle and Objectives of Extension Education. 2. Extension systems in India: various extension/ sericulture development	4	4	55

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programmes of Central Silk Board/ State Deptt., Universities and NGO's. - Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes, Role of extension personnel and farmers in extension programme. - Transfer of Technology; concept and models, linkages with research organisation and its linkage with client system, TAVT, IVLP programmes, capacity building of extension personnel - Training: meaning, classification, individual, group, and mass contact methods methods of training, and teaching aids, Training institutes. - Communication: concept, elements and process, channels, models and barriers to communication, communication gap. - Diffusion and adoption of innovation: concept and meaning, process and stages of adoption. Unit II Computer Application : - Computer fundamentals; Definition and Characteristics of computers; Organization of computers; Computer Generations; Classifications of Computers; - Data representation in Computer, Word and character representation; Hardware and software; Operating system, Computer memory, and permanent storage devices, Input and output devices. - WINDOWS Operating Systems; MS Word; MS Excel; MS Power Point. - Internet and World Wide Web (WWW), Concepts and components, HTML, and IP. LAN, WAN. Internet applications: Web Browsing, Creation, and operation of e-mail account.			
SER-MJ-P-702: Sericulture Extension Management & Computer application	Credit of Course	Class hour/ week	Points
Sericulture Extension Management ; - A visit to the village to understand the problems being encountered by the villagers/ farmers - Visit to rearers' house and panel discussion with farmers - Visit to TSC and CRC: Preparation of a survey-based questionnaire on a given problem. - Presentation of statistical data – Bar Chart and Graph, Pie Chart of raw silk/ cocoon production area - Research Institute Visit. Computer Application : - Practical for word processing, creating documents and tables and printing of documents, MS Excel, electronic spreadsheets, application of inbuilt statistical functions, and formula bar. MS PowerPoint presentation, presentation of slides, and slide show. - Introduction of Internet and World Wide Web (WWW), HTML,	2	2	20

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and IP. LAN, WAN. Internet applications: Web Browsing, Creation, and operation of e-mail account. 8. Submission of Laboratory Note Book 9. Viva-voce			
Suggested Reading : 1. Roy, GL.1991. Extension Communication and Management. 5th Edition, Kalyani Publishers, ISBN, 81-222-1170-2. 2. Ram B, 2011. Computer Fundamentals. 4th Ed. New Age International Publishers.			
SER-MJ-T-703: Application of Biotechnological tools and Techniques in Sericulture	Credit of Course	Class hour/week	Points
1. Introduction, scope, and importance of plant biotechnology. Plant cell and tissue culture techniques, laboratory equipments, Totipotency and Morphogenesis, application of cell and tissue culture in mulberry. 2. Insect transgenesis: Silkworm transgenesis, application of silkworm transgenesis. Silkworm cell culture, Establishment of primary and secondary cell lines, composition and preparation of media for cell culture. 3. Principle of Polymerase Chain Reaction (PCR), and its application in silkworm and mulberry genetic studies. 4. Recombinant DNA Technology: Cloning vectors for recombinant DNA, Cloning and expression of vector, Transgenic plants and their role in crop improvement, molecular farming and regulating gene expression. 5. Application of biotechnology in silk fibre improvement and marker-assisted breeding of both silkworm and mulberry.	4	4	55
SER-MJ-P-703: Application of Biotechnological tools & Techniques in sericulture	Credit of Course	Class hour/week	Points
1. Separation and identification of amino acids by chromatography. 2. Procedure for sterilization and preparation of culture media. 3. Study of callus, embryogenesis, and organogenesis in mulberry – <i>in vitro</i>. 4. Studies on protein/enzyme through PAGE in mulberry (Demonstration). 5. Media preparation for silkworm cell lines. 8. Selection of tissue for establishment of silkworm cell lines. 9. Calorimetric estimation of RNA in the silk gland of silkworm. 10. Submission of Laboratory Note Book 11. Viva-voce	2	2	20
Minor paper : Syllabus taken from minor paper of Zoology minor-7	Credit of Course	Class hour/week	Points
	4	4	50
Minor paper : Syllabus taken from minor paper of Botany minor	Credit of Course	Class hour/week	Points

		4	4	50
Total Courses : 04		Total Credit of Course : 26	Total Class hour/week : 26	Total Marks : 325
SEMESTER VIII				
SER-MJ-T- 801:Entrepreneurship and Human Resource Development		Credit of Course	Class hour/week	Points
Unit -I Entrepreneurship Development 1. Entrepreneur- meaning, characteristics, functions, and types. Entrepreneurship, meaning, objectives, obstacles, factors stimulating entrepreneurship. Role of entrepreneurship in economic development. 2. Entrepreneurship development programmes (EDP) meaning, objectives, Institutions for EDP: NIESBUD, NAYE, and TCOS, problems in EDP, Women entrepreneurs, their problems, and remedies. 3. Project identification – Meaning and steps, project classification. Unit -II Human Resources Development(HRD) 1. Human resource development (HRD)- Meaning, Need, Scope, Individual, organizational, social, and National. 2. Characteristics of HRD, Principles and Scope 3. Problems of HRD in India. 4. Goals of HRD, New directions of HRD. 5. Impact of Globalization on HRD.		3	3	35
SER-MJ-P- 801:Entrepreneurship and Human Resources Development		Credit of Course	Class hour/week	Points
1. EDP in raising mulberry saplings (Kisan nursery) and vermicomposting 2. EDP in the organization of chawki rearing centres. 3. EDP in silkworm egg production and rearing. 4. EDP in silk reeling – charaka, cottage basin, and multi-end reeling units. 5. EDP in mass production of parasitoids and predators. 6. Submission of Laboratory Note Book 7. Viva-voce		1	2	15

Suggested Reading : 1. Handbook of Sericultural Technologies Dandin, S.B., J. Jaiswal and K. Gridhar. 2000, Central Silk Board, Bangalore. Hand book of Sericulture Technologies, Central Silk Board, Bangalore Dandin, S.B. and K. Giridhar. 2010. Central Silk Board, Bangalore. 2. G. Savithri, P.Sujathamma and P. Neeraja (2016) Sericulture Industry –An Overview, Agrobios Publishers, ISBN No. (13): 978-81-7754-589-0 3. G. Savithri, P.Sujathamma and P. Neeraja (2016) Sericulture Industry –An Overview, Agrobios Publishers, ISBN No. (13): 978-81-7754-589-0 4. H. Panda (2010) The Complete Book on Textile Processing and Silk Reeling Technology, ASIA PACIFIC BUSINESS PRESS Inc. 5. Hand book of Sericultural Technologies Dandin, S.B., J. Jaiswal and K. Gridhar. 2000, Central Silk Board, Bangalore. 6. Manual on sericulture. V. 1: Mulberry cultivation [1976] Rangaswami, G.; Narasimhanna, M.N.; Kasiviswanathan, K.; Sastry, C.R.; et al. FAO, Rome (Italy). Agricultural Services Div. 7. Tammanna N. Sonwalkar (1993) Handbook on Silk Technology, New Age International (p) limited publishers 8. Aziz A. and Hanumanappa, HG. 1985. Silk industry- problems and prospects. Ashish Publishing House, New Delhi. 9. Jerome D. <i>et al.</i> 2003. A management guide to PERT/CPM. PHI Pvt. Ltd. 10. Roy, GL.1991. Extension Communication and Management. 5th Edition, Kalyani Publishers, ISBN, 81-222-1170-2. 11. Rao, VKRV, 1984. Some neglected factors in Integrated Rural Development in Rural development in India (Eds. Lakshman & Narayanan). Himalaya Publishing house, New Delhi.			
SER-MJ- T-802: Tools and Technique, &Bio-informatics in Sericulture	Credit of Course	Class hour/week	Points
1. Techniques for Cell Study: i. Basic Concepts of Microscopy: Magnification, Resolution, Types of microscopies: Bright Field Microscopy, Dark Field Microscopy, Phase Contrast Microscopy and Differential Interference Contrast Microscopy: Fluorescent Microscopes, Confocal microscopy. ii. Electronic Imaging Systems- Electron Microscopy, TEM Vs. SEM. Different fixation and staining techniques for EM, freeze-etch and freeze-fracture methods for EM iii. Basic concept of flow cytometry. 2. Basic Concepts of Cell Fractionation Methods: i) Ultracentrifugation ii) Gradient Centrifugation. 3. Basic Concepts of Separation of Cell Constituents: i) Chromatography: ion exchange; gel filtration and HPLC. ii) Electrophoresis-PAGE, SDS-PAGE (One and Two dimensional).	3	3	35

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4. Methods for analysis of gene expression at RNA and protein level, large scale expression, such as micro array based techniques.			
5. Spectroscopy (Basic Concepts): UV- spectroscopy, Circular Dichroism, surface plasma resonance methods.			
6. Blotting Methods: Southern, Northern & Western blotting. RFLP, RAPD and AFLP techniques.			
8. Database search tool (Basic Concepts); Sequence alignment and database searching; Computational tools and biological databases, NCBI, EMBL, PDB, Sequence similarity tools; Blast and FASTA Phylogenetic analysis with the program PHYLIP, DISTANCES, and GROWTREE.			
SER-MJ- P-802: Tools and Technique, & Bio-informatics in Sericulture	Credit of Course	Class hour/week	Points
1. RAPD and electrophoresis/ DNA fingerprinting by PCR	1	2	15
2. Colorimetric estimation of Protein (Lowry's method), DNA/RNA.			
3. Homology sequence analysis using BLAST.			
4. Centrifugation technique: Differential centrifugation for separation of nuclei, cell debris, mitochondria.			
5. Submission of Laboratory note book			
6. Viva voce			
Suggested Reading :			
1. Biochemistry Laboratory: Modern Theory and Techniques, 2 nd Edition, ISBN-13: 9780136043027			
2. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology 2018, ISBN: 9781316677056			
3. Biochemistry Laboratory: Modern Theory and Techniques, Latest Edition, Rodney Boyer, Pearson Prentice Hall™ is a trademark of Pearson Education, Inc. ISBN-10: 0			
4. Pevsner, J (2009). Bioinformatics and Functional Genomics. II Edition Wiley-Blackwell			
SER-MJ-T-803: Research Methodology	Credit of Course	Class hour/week	Points
1. Introduction to Research Methodology: Research – Definition, Importance, Characteristics – Types of Research - Research question – Importance of Survey of Literature – formulation of research question and objectives – Formulation of hypothesis – types of hypothesis - Research process – research design – developing a research plan - Types of research	4	4	50

methods 2.Types of data - Sources of data - Methods of collecting data – Sampling methods 3.Qualitative Research Methods - Various qualitative research methods – Ethnography, Narrative, Phenomenological, Grounded theory. 4.Quantitative research methods: Frequency distribution – Presentation of data – Descriptive statistics – Correlation analysis 5. Ethical Aspects of Undertaking Research Research Philosophy, Approaches to Theory Development in Research, Ethical Judgements in Research 6. Managing Scientific Conduct Concept of Academic Integrity: Integrity Concepts, Academic integrity; Scientific Misconduct and Research Fraud (Falsification, Fabrication and Plagiarism) 7. Publication Ethics Concept of Publication Ethics, Research Ethics: Concept and Objectives, Ethics Committee 8. Scientific Writing Structure and components of Scientific Reports, Preparation of Project Proposal, Preparation of manuscript for Seminar Presentation and Publication of Research paper. 9. Data Science & Statistical Tools: Statistical packages (R, SPSS)			
Suggested Reading : 1. C.R. Kothari, Gaurav Garg (2019) Research Methodology: Methods and Techniques 2. Callahan D. & Bok S., 1996, Ethics Teaching in Higher Education. Plenum Press, New York, USA. 3. David B. Resnik, 1998, The Ethics of Science: An Introduction. Routledge publisher, USA. 4. Kapur J.N., 1996, Ethical Values for Excellence in Education and Science, WishwaPrakashan, New Delhi. 5. Tripathi A.N., 2008, Human Values. New Age International Publishers, New Delhi.			
SER MJ-T-804: (Ecology, Biodiversity with Special Reference to Sericigenous Insects and Conservation)	Credit of Course	Class hour/week	Points
Unit-I Ecology. 1. Concept and scope of study. 2. Stability and management of the ecosystem and. Population ecology.	4	4	55

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3. Food chain and ecological pyramid, principles of thermodynamics, and energy flow in the ecosystem. 4. Concept of niche and food chain. Structure of biotic community. Unit-II Biodiversity with Special Reference to Sericigenous Insects and Conservation. 1. Biodiversity, concept, and types of biodiversity. Biodiversity loss and its impact on the environment. 2. Biodiversity hotspots, biosphere reserve. 3. Biodiversity of sericigenous insects and their utilization 4. Conservation, concept, and scope of study. Protection and restoration techniques. In-situ ex-situ conservation. 5. Role of ICAR- NBPGR in managing germplasm resources of plants. National parks and wildlife sanctuaries. International Union for Conservation of Nature (IUCN) and national law of conservation; An overview. 6. Conservation and sustainable livelihood. 7. Conservation of sericigenous insects; Strategies, Role of Central Sericultural Germplasm Resource Centre in conservation. <i>In situ</i> conservation of Tasar and wild Muga silkworms			
SER MJ- P -804: (Ecology, Biodiversity with Special Reference to Sericigenous Insects and Conservation)	Credit of Course	Class hour/week	Points
1. Basic methods of studies on the aquatic and terrestrial fauna. 2. Studies on the water quality. 3. Survey and collection of wild silk moths and their developmental stages, their preservation, identification, and recording. 4. Study tour report. 5. Submission of Laboratory notebook 6. viva voce.	2	2	20
Suggested Reading: 1. Begon, M., Harper, J. L. and Townsend, C. R. (2006) Ecology: Individuals, Populations and Communities. 4th ed. Blackwell Science. 2. Enger, E. D. and Smith, B. F. (2008). Environmental Science: A study of Interrelationships. 11th ed. McGraw-Hill Higher Education. 3. Kormondy, E. J. (2002). Concepts of Ecology. 4th Indian Reprint, Pearson Education. 4. Odum, E. P. and Barret, G. W. (2005). Fundamentals of Ecology. 5th ed. Thompson Brooks/Cole. 5. Smith, T. M and Smith, R. L. (2006). Elements of Ecology. 6th ed. Pearson Education. 6. Barlow, H.S. 1982. An introduction to the moths of South East Asia. <i>Malayan Nature Society</i>, Kaulalumpur, pp.1-305; pls. 1-50. 7. Hirobe, T. 1968. Evolution, differentiation, and breeding of the silkworm - The Silk Road, past and present. Genetics in Asian countries. <i>XII International Congress of Genetics</i>. 8. Krishna Rao, S. 1997. History of silkworm races. In <i>Silkworm Breeding</i>. Edt. G. Sreerama Reddy. Oxford & IBH Publishing. Co. Pvt. Ltd. New Delhi, pp 3-17.			

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9. Rana, R.S. 1995. Conservation of Plant Genetic Resources in India. In: <i>Plant Germplasm Conservation: Biotechnological approaches</i>, Edt. Rana, R.S., Bhat, S.R., Karihaloo, J.L., Chandal, K.P.S., Mondal, B.B., Bhat, K.V., and Pandey, R. National Bureau of Plant Genetic Resources, Indian Council of Agricultural Research, New Delhi, pp 1-16. 10. Thangavelu, K., Mukherjee, P., Sinha, R.K., Mahadevamurthy, T.S., Kumaresan, P., Rajarajan, P.A., Mohan, B., Sekar, S., 1997. <i>Catalogue on silkworm (Bombyx mori L.) germplasm</i>. Volume. I, 1997. Silkworm and Mulberry Germplasm Station, Hosur, Kanteerava Offset Printers, Bangalore, India pp. 1-138. 11. Tikader, A 2001. Occurrence of wild mulberry silkworm in Uttaranchal. <i>Indian Silk</i> 40 (3): 19-20.			
SER-MJ-T-805: (Applied Entomology)	4	4	55
Unit- I Apiculture: Objectives, Introduction, Conservation of important Bee Flora for Forage, Types of honeybees, Organization of bee Colony, Life history and behaviour of Bees, Diseases of Honeybees, Beekeeping Methods, Equipment and tools, Apiary Management, Controlling Swarming, Handling of Bees, Extraction of Honey and Wax and other Bee Products, Role of honey Bee in Crop Pollination. Unit -II Lac culture: Objectives, Introduction, Lac Insect and its Life History, Host Plant Management, Strains of Lac Insects, Propagation of Lac Insects, Lac Crop Management, Natural Enemies of Lac Insects and their Management, Lac extraction. Unit -III Biological Control: Introduction, Objectives, Parasites, Parasitoids, Predators, Methods for using biocontrol agents, Classical biological control, Augmentation, and inundative release techniques, Conservation of biological control agents, Microbial control (virus, bacteria, and fungi) and their limitations in field of sericulture, Behavioural control, Types of pheromones, Uses of pheromones in pest management (monitoring, mass trapping, and mating disruption), Genetic and biotechnological control. Unit- IV Forest Entomology with special reference to host plants of sericigenous insects Indian forest types, their distribution, and importance, forest insects (pests) - damage and manifestation categories. Insect pests of host plants of			

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sericigenous insects; Sal – <i>Shorea robusta</i> ; Arjun <i>Terminalia arjuna</i> , temperate Oak <i>Quercus</i> spp. Bionomics and nature of damage of Borers – <i>Hoplocerambyx spinicornis</i> , Defoliators – <i>Hapalia machaeralis</i> . Soil insects and their damage to forest plants and their management. General issues in forest entomology: Insect damage in plantation of natural forests, Pest problems in monoculture and mixed plantations.				
SER-MJ-P-805: (Applied Entomology)		Credit of Course	Class hour/week	Points
1. Visit of apiary, identification of different species of bees, acquaintance with different tribes of bees, hands-on training on beekeeping, isolation of queen bee, preparation of bee hives, extraction of honey, wax. 2. Study tour in lac growing areas, acquaintance with lac insects, different steps of inoculation, crop protection, and harvesting. 3. Survey of forest area comprising host plants of tropical and temperate Tasar growing belts to the forest ecology. Studies on the insect pests viz. stem borer, defoliator, gall-forming insects. 4. Study tour report. 5. Submission of Laboratory notebook 6. Viva-voce.		2	2	20
Suggested Reading: 1. David, B. V. and Ananthakrishnan, T. N. (2006). General and Applied Entomology. Tata McGraw-Hill Publishing. 2. Forests and Forestry, K.P. Sagreiya, (1st Ed. 1 January 1967), National Book Trust, India. 3. Indian Forestry, K. Manikandan S. Prabhu, (7th edition 1 February 2021); Jain Brothers New Delhi.				
SER-MJ-T-804, SER-MJ-P-804, SER-MJ-T-805 and SER-MJ-P-805 For Honours Without Research Students				
SER-SI- -801:One semester Research work from any biological research laboratory, Sericulture Institute, or from registered farm for six months (SER-SI- -801 for Honours With Research Students)		12	12	
RESEARCH PROJECT AND SUBMISSION OF DISSERTATION PROJECT PRESENTATION AND VIVA – VOCE				
Total Courses : 05		Total Credit of Course : 24	Total Class hour/week : 24	Total Marks : 300