UNIVERSITY OF JAMMU

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

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION

(24/February/Adp./111)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Studies in the subject of **Sericulture** of Semester **Vth, VIth,VIIth and VIIIth for Four Year Under Graduate Programme (FYUGP)** under the **Choice Based Credit System** as per **NEP-2020 (as given in the annexure)** for the examinations to be held in the years as per the details given below:

Subject	**Semester**	**For the examinations to be held in the year**
Sericulture	Semester-V	December 2024, 2025 and 2026
	Semester-VI	May 2025, 2026 and 2027
	Semester-VII	December 2025, 2026 and 2027
	Semester-VIII	May 2026, 2027 and 2028

The Syllabi of the courses are also available on the University website: www.jammuuniversity.ac.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/24/ 14753-14763
Dated: 01/03/2024

Copy for information and necessary action to:

1. Dean Faculty of Life-Science
2. HOD/Convener, Board of Studies in **Sericulture**
3. Sr. P.A.to the Controller of Examinations
4. All members of the Board of Studies
5. Confidential Assistant to the Controller of Examinations
6. Director, Computer Centre, University of Jammu
7. Deputy Registrar/Asstt. Registrar (Conf. /Exams. UG)
8. Incharge University Website for necessary action please

Deputy Registrar (Academic) 29/2/24

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

COURSE FRAMEWORK OF THE FOUR YEAR UNDERGRADUATE PROGRAMME (FYUGP
UNDER NATIONAL EDUCATION POLICY (NEP2020)
UNDERGRADUATE COURSE (SERICULTURE)

PROPOSED COURSE SCHEME FOR SEMESTER-V
EXAMINATION TO BE HELD IN DEC 2024, DEC 2025, DEC 2026

S.No.	COURSE TYPE	COURSE CODE	COURSE TITLE	CREDITS	MAXIMUM MARKS		
					Theory	Practical	Total
1.	Major	UMJSET501	Genetics and Breeding of Silkworm	4	75	25	100
2.	Major	UMJSET502	Genetics and Breeding of Mulberry	4	75	25	100
3.	Major	UMJSET503	Vanya (Non-Mulberry) Sericulture	4	75	25	100
4.	Major	UMJSET504	Mechanization in Sericulture	2	50	-	50
5.	Minor	UMISET505	Principles of Vanya (Non-Mulberry) Sericulture	4	75	25	100
6.	Summer Internship	USESEI506	Summer Internship	2	-	50	50

PROPOSED COURSE SCHEME FOR SEMESTER-VI
EXAMINATION TO BE HELD IN MAY 2025, MAY 2026, MAY 2027

S.No.	COURSE TYPE	COURSE CODE	COURSE TITLE	CREDITS	MAXIMUM MARKS		
					Theory	Practical	Total
1.	Major	UMJSET601	Sericulture Extension Organization and Education	4	75	25	100
2.	Major	UMJSET602	Concepts of Seri-Biotechnology	4	75	25	100
3.	Major	UMJSET603	Sericulture Marketing and Economics	4	75	25	100
4.	Major	UMJSET604	EDP in Sericulture	4	75	25	100
5.	Minor	UMISET605	Basics of Extension Organization in Sericulture	4	75	25	100

COURSE FRAMEWORK OF THE FOUR YEAR UNDERGRADUATE PROGRAMME (FYUGP) UNDER NATIONAL EDUCATION POLICY (NEP-2020) UNDERGRADUATE COURSE (SERICULTURE)

PROPOSED COURSE SCHEME FOR SEMESTER-VII EXAMINATION TO BE HELD IN DEC 2025, DEC 2026, DEC 2027

S.No.	COURSE TYPE	COURSE CODE	COURSE TITLE	CREDITS	MAXIMUM MARKS		
					THEORY	PRACTICAL	TOTAL
1.	Major	UMJSET701	RESEARCH METHODOLOGY AND ETHICS	4	75	25	100
2.	Major	UMJSET702	ADVANCES IN SILKWORM PATHOLOGY	4	75	25	100
3.	Major	UMJSET703	MULBERRY FARM MANAGEMENT	4	75	25	100
4.	Major	UMJSET704	SILKWORM IMMUNOLOGY	4	75	25	100
5.	Minor	UMISET705	SILKWORM TRANSGENESIS	4	75	25	100

PROPOSED COURSE SCHEME FOR SEMESTER-VIII (HONOURS) EXAMINATION TO BE HELD IN MAY 2026,MAY 2027, MAY 2028

S.No.	COURSE TYPE	COURSE CODE	COURSE TITLE	CREDITS	MAXIMUM MARKS		
					THEORY	PRACTICAL	TOTAL
1.	Major	UMJSET801	BIOSTATISTICS IN SERICULTURE	4	75	25	100
2.	Major	UMJSET802	ADVANCES IN MULBERRY PATHOLOGY	4	75	25	100
3.	Major	UMJSET803	CONCEPT OF TOXICOLOGY	4	75	25	100
4.	Major	UMJSET804	ADVANCES IN SERICULTURE EXTENSION	4	75	25	100
5.	Minor	UMISET805	CONCEPTS OF BIOCONTROL	4	75	25	100

PROPOSED COURSE SCHEME FOR SEMESTER-VIII (HONOURS WITH RESEARCH)) EXAMINATION TO BE HELD IN MAY 2026, MAY 2027, MAY 2028

S.No.	COURSE TYPE	COURSE CODE	COURSE TITLE	CREDITS	MAXIMUM MARKS		
					THEORY	PRACTICAL	TOTAL
1.	Major	UMJSET806	COMPUTER APPLICATIONS IN SERICULTURE	4	75	25	100
2.	Minor	UMISET807	MULBERRY TRANSGENESIS	4	75	25	100
3.	SEC	USESET808	DISSERTATION	12	-	-	300

University of Jammu

Syllabi of Sericulture for FYUGP under CBCS as per NEP-2020

SEMESTER-V

(Examination to be held in 2024, 2025, 2026)

Major Course

Course Code: UMJSET-501
Credits: 04 {03(Theory)+01(Practical)}

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Course Title: Genetics and Breeding of Silkworm
Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Major Course

Course Code: UMJSET-502
Credits: 04 {03(Theory)+01(Practical)}

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Course Title: Genetics and Breeding of Mulberry
Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Major Course

Course Code: UMJSET-503
Credits: 04 {03(Theory)+01(Practical)}

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Course Title:Vanya (Non-Mulberry) Sericulture
Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Major Course

Course Code: UMJSET-504
Credits: 02 {01(Theory)+01(Practical)}

Maximum Marks: 50
Theory: 40
Practical/Tutorial: 10

Course Title: Mechanization in Sericulture
Total no. of Lectures: Theory: 15 hours
Practical: 30 hours

Minor Course

Course Code: UMISET-505

Credits: 04 {03(Theory)+01(Practical)}

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Course Title: Principles of Vanya (Non-Mulberry) Sericulture
Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Summer Internship Course

Course Code: USESET506

Credits: 02

Course Title: Summer Internship

Maximum Marks: 50

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(MAJOR COURSE)
UG SEMESTER-V

MAJOR CORE COURSE NO.	: UMJSET501
MAJOR CORE COURSE TITLE	: Genetics and Breeding of Silkworm
CREDITS	: 04 {(03 Theory) + (1 Practical)}
MAXIMUM MARKS	
I) External (University Exam)	: 75
II) Internal Assessment	: 60
DURATION OF UNIVERSITY EXAM	: 15
MAXIMUM MARKS PRACTICALS	: 03 Hours
I) Continuous assessment	: 25
II) Final examination	: 10
	: 15

Objectives and Expected Learning Outcomes

The Course has been designed with an objective to make the students understand about the methods of breeding and genetics involved in silkworm insect, concepts of hereditary traits, inheritance of voltinism and moultinism, chromosomal studies and economical aspects of mutants etc. The knowledge thus gained will be useful for the characterization and authorization of silkworm breeds for the ultimate increase in silk yield.

Unit-1: Basics of Silkworm Genetics and hereditary traits (13 Hours)

1.1 Silkworm as a laboratory tool for genetics studies.

1.2 Heredity, Variation and Environment:

1.2.1. Hereditary and environmental variations.

1.2.2. Genotype and Phenotype.

1.2.3. Pure lines and in-bred lines.

1.3 Hereditary traits in silkworm and effects of environment on - egg, larva, cocoon, pupa and adult characters.

1.4 Concept of multiple alleles.

Unit-2: Inheritance, Sex determination and Mutation (10 Hours)

2.1 Inheritance of cocoon colour and larval marking.

2.2 Inheritance of voltinism and moultnism - environmental influence and hormonal control and maternal inheritance of voltinism.

2.3 Sex determination, Sex limited traits and their special significance in sericulture.

2.4 Chromosome number, polyploidy and parthenogenesis in silkworms.

2.5 Mutation:

2.5.1 Induction of mutation through radiation and chemical mutagens.

2.5.2 Radiation sensitivity in different developmental stages.

2.5.3 Economic utility of induced mutants.

Unit-3: Silkworm Breeding (12 Hours)

3.1 Silkworm Breeding: Aims and Objectives.

3.2 Present status of silkworm breeding in India.

3.3. Breeding methods: line, cross and mutation breeding.

3.4 Selection: mass (collective) and individual selection methods-fixation of characters.

3.5 Concept of Inbreeding and out breeding: inbreeding depression - merits and demerits.

Unit-4: Hybridization, Heterosis and Race authorization (10 Hours)

4.1 Hybridization: concept of single, double and polyhybrids- advantages of the hybrid preparation and need of the farmers.

4.2 Heterosis and hybrid vigour in silkworm.

4.2.1 Theoretical basis of Heterosis.

4.2.2 Utilization of Heterosis in Sericulture.

4.3 Silkworm breeding organization in India.

4.4 Race authorization system of India.

PRACTICALS (30 Hours)

1. Morphological studies of:
   a. Egg Characters.
   b. Larval Characters.
   c. Cocoon Characters.
   d. Pupal Characters.
   e. Adult Characters.
2. Sex determination at larval, pupal and adult stages.

3. Observations of different characteristics in various silkworm breeds
4. Selection of cocoon for breeding based on various characters.
5. Study of mutant silkworm egg, larva, pupa and adult.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment{Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Sarkar, S. (2022). A Textbook on Sericulture. (Ed. 1). Publisher Techno World.
2. Ganga, G. and Chetty, S. (2008) An Introduction to Sericulture. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Ganga, G., (2003) Comprehensive Sericulture- Vol.-2 Silkworm Rearing and Silk Reeling. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Sarker, Dilip De. (1998) The Silkworm Biology, Genetics and Breeding. Vikas Publishing House Pvt. Ltd.
5. Basavraja, H.K., Ashwath, S.K., Suresh kumar, N., Mal Reddy, N. and Kalpana, G.V. (2005) Silkworm Breeding and Genetics. Central Silk Board, Bangalore.
6. Sreerama Reddy, G. (1998) Silkworm Breeding. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi and Calcutta.
7. Anonymous, (1997) Principles and Techniques of Silkworm Breeding. Oxford and IBH publishing Co. Pvt. Ltd, New Delhi.
8. Tazima. Silkworm- an important laboratory tool. Kodansna, Japan.
9. Aruga, H. Principles of Sericulture. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, Bombay and Calcutta.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(MAJOR COURSE)
UG SEMESTER-V

MAJOR CORE COURSE NO.	: UMJSET502
MAJOR CORE COURSE TITLE	: Genetics and Breeding of Mulberry
CREDITS	: 04 {(03 Theory) + (1 Practical)}
MAXIMUM MARKS	: 75
I) External (University Exam)	: 60
II) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

The Course is designed in such a way that it will introduce the students to the theoretical and practical aspects of mulberry breeding and genetics. The knowledge thus gained will guide students to know about the functions of plant genetic resource centers, conservation of germplasm, methods of plant breeding and evolving varieties in different stress conditions, production of different polyploids and latest techniques in the improvement of mulberry.

Unit-1: Genetic and Chromosomal variations in Mulberry (13 Hours)

1.1 Genetic variability in mulberry- sources of variability.

1.2 Chromosomal variations in mulberry (species and varieties) - Method for chromosomal study in mulberry.

1.3 Germ plasm conservation-significance and methods.

1.4 Functions of plant genetic resource centres.

Unit-2: Mulberry Breeding (10 Hours)

2.1 General introduction to plant breeding:

2.1.1 Objectives of mulberry breeding.

2.1.2 Determination of mode of reproduction in mulberry.

2.1.3 Method of plant breeding.

2.2 Parameters associate with growth, yield and quality of mulberry.

2.3 Breeding for resistance to abiotic and biotic factors:

2.3.1 Breeding for disease and pest resistance.

2.3.2 Breeding for drought resistance.

2.3.3 Breeding for stress conditions like salinity and alkanity.

Unit-3: Selection methods in Mulberry (12 Hours)

3.1 Selection for mulberry improvement: Methods of Selection in Mulberry.

3.2 Mass selection

3.2.1 Procedure for mass selection.

3.2.2 Merits of mass selection in mulberry.

3.3 Pure-line selection

3.3.1 Characters of pure lines.

3.3.2 Procedure for pure line selection.

3.3.3 Merits of pure line selection in mulberry.

3.4 Clonal selection

3.4.1 Characters of clone.

3.4.2 Source of clonal variation in mulberry.

3.4.3 Procedure of clonal selection.

3.4.4 Characters and achievements.

Unit-4: Hybridization, Mutation and Polyploidy breeding (10 Hours)

4.1 Hybridization-application and objectives:

4.1.1 Procedure of hybridization in mulberry.

4.1.2. Heterosis.

4.1.3 Selection in F1 progeny.

4.1.4. Advantages, limitations, scope and achievements of hybridization.

4.2 Mutation breeding:

4.2.1 Induction of mutation through radiation and chemical mutagens.

4.2.2 Procedure/Scheme of mutation breeding.

4.2.3 Advantages and limitations of mutation breeding.

4.2.4 Economic utility of induced mutants and achievements in mulberry.

4.3 Polyploidy breeding:

4.3.1 Occurrence and classification of polyploids.

4.3.2 Production of haploid, triploids, and tetraploids in mulberry.

4.3.3 Effects of polyploidy and achievements in mulberry.

4.4 Role of tissue culture in the improvement of mulberry.

PRACTICALS

(30 Hours)

1. Cytological techniques-Preparation of pre-treatment solutions-fixatives and staining procedure.
2. Anatomy of stem and leaf.
3. Commercial characters of mulberry- some evolved varieties
4. Induction of tetraploidy in mulberry by using colchicine (Demonstration).
5. Study of mitosis in mulberry root tip (Permanent Slide Demonstration).
6. Stomata and stomatal chloroplast: number and frequency.
7. Mulberry germplasm and multi-locational trials (field visit).

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment{Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Sarkar, S. (2022). A Textbook on Sericulture. (Ed. 1). Publisher Techno World.

2. Ganga, G. and Chetty, S. (2008) An Introduction to Sericulture. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Ganga, G., (2003) Comprehensive Sericulture- Vol.-1 Moriculture. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Sarker, Dilip De. (1998) The Silkworm Biology, Genetics and Breeding. Vikas Publishing House Pvt. Ltd.
5. Chaudhuri, H.K. (1971) Elementary Principles of Plant Breeding. Oxford and IBH Publications, New Delhi.
6. Tikader, A., Saratchandra, B., Vijianpillia and Singh R.N. (2014) Mulberry Germplasm Management and utilization. APH Publication Corporation New Delhi-110002.
7. Chandrasekhar, S.N. and Parathasarthy S.V. (1960) Cytogenetic and Plant breeding. Varadachary and Co., Madras.

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SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(MAJOR COURSE)
UG SEMESTER-V

MAJOR CORE COURSE NO.	: UMJSET503
MAJOR CORE COURSE TITLE	: Vanya (Non-Mulberry) Sericulture
CREDITS	: 04 {(03 Theory) + (1 Practicum)}
MAXIMUM MARKS THEORY	: 75
I) External (University Exam)	: 60
II) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

After successful completion of the course the students will be able to know about different types of Vanya silks, their distribution, food plants and rearing of wild silkworms like Tasar, Muga and Eri.. The course may also make the students understand various seed and cocoon production technologies in Vanya Sericulture.

Unit-1: Introduction of Vanaya Sericulture (13 Hours)

1.1 Vanya sericulture- types of vanya silk and silkworms and their distribution in India and other countries.

1.2 History of vanya sericulture.

1.3 Status of vanya silk in India:

1.3.1 Cocoon and raw silk production of vanya sericulture in India.

1.3.2 Vanya sericulture organizational set-up, research and training.

1.3.3 Scope of vanya sericulture.

1.4 Vanya sericulture and its relevance to social forestry schemes.

Unit-2: Distribution of Tasar, Muga and Eri culture (10 Hours)

2.1 Tasar Culture:

2.1.1 Tasar culture and its association with forest tribes.

2.1.2 Distribution of tropical tasar flora -primary and secondary food plants in different states.

2.1.3 Distribution of temperate tasar flora-primary and secondary food plants in different states.

2.2 Muga Culture:

2.2.1 Muga Culture and its endemic nature to Assam

2.2.2 Distribution primary and secondary food plants in different states.

2.3 Eri-Culture:

2.3.1 Distribution primary and secondary food plants in different states.

Unit-3: Vanya silkworm rearing, seed and silk processing (12 Hours)

3.1 Morphology and rearing of vanya silkworms:

3.1.1 Morphology of egg, larva, pupa and adult.

3.1.2 Rearing methods for young & late-age silkworms.

3.1.3 Mounting methods- different kinds of mountages.

3.2 Disinfection; different types of disinfectants.

3.3 Seed Cocoon:

3.3.1 Selection and preservation of seed cocoons.

3.3.2 Synchronization of moth emergence.

3.3.3 Oviposition and transportation of eggs.

3.4 Processing of tasar, muga & eri cocoons (selection, stifling, degumming, cooking, reeling/spinning and re-reeling of cocoons).

Unit-4: Diseases and Pests of Vanya silkworm (10 Hours)

4.1 Diseases of vanya silkworms:

4.1.1 Causative agent, symptoms and control measure of protozoan disease.

4.1.2 Causative agent, symptoms and control measure of bacterial disease.

4.1.3 Causative agent, symptoms and control measure of viral disease.

4.1.4 Causative agent, symptoms and control measure of fungal disease.

4.2 Pests of vanya silkworms- seasonal abundance, nature and extent of damage and their control.

PRACTICALS (30 Hours)

1. Morphological studies of different stages of vanya silkworms:
   a. Egg
   b. Larva
   c. Cocoon

d. Pupa

e. Adult

2. Study of eco-races of tasar silkworms.
3. Study of eco-races of muga silkworms.
4. Study of causative agent and symptoms of protozoan disease.
5. Study of causative agent and symptoms of of bacterial disease.
6. Study of causative agent and symptoms of viral disease.
7. Study of causative agent and symptoms of fungal disease.
8. Visit to temperate and tropical sericulture states of India (Educational tour).

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment {Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Elumalai, D., Mohan Raj, P., Ramamoorthy, R., Mohan, C. and Poovizhiraja, B. (2021) Introduction to Non-Mulberry Silkworm. Jaya Publishing House, N. Delhi.
2. Kavane, R.P. and Sathe, T.V. (2011) Wild Silk Technology. Daya Publishing House, Delhi.

3. Singh, R.N., Sinha, M.K., Bajpeyi, C.M., Sinha, A.K. and Tikader, A. (2014) Tasar Culture. APH Publishing Corporation, New Delhi.
4. Singh, R.N. and Saratchandra, B. (2012) Eri Culture, APH Publication Corporation New Delhi-110002.
5. Sarakar, D.C., Thangavelu, K, *et. al.,* Ericulture in India. Central Silk Board, Banglore.
6. Anonymous. Wild Silk of India (Vol.-I): An Introduction to Vanya Silk. Central Silk Board, Banglore.
7. Goel, R.K., Krishna Rao, J.V. (2004) Oak Tasar Culture. A.P.H. Publishing Corporation, New Delhi.
8. Mohanty, P.K., (1998) Tropical Tasar Culture in India. Daya Publishing House, Delhi.
9. Mohanty, P.K. (2003) Tropical Wild Silk cocoons of India. Daya Publishing House, Delhi.

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UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(MAJOR COURSE)
UG SEMESTER-V

MAJOR CORE COURSE NO.	: UMJSET504
MAJOR CORE COURSE TITLE	: Mechanization in Sericulture
CREDITS	: 02 {(1 Theory) + (1 Practicum)}
MAXIMUM MARKS	: 50
I) External (University Exam)	: 40
II) Internal Assessment	: 10
DURATION OF UNIVERSITY EXAM	: 02 Hours30Minutes

Objectives and Expected Learning Outcomes

The Course is designed with an objective to make the students understand the importance of mechanization in Sericulture with an objective to reduce the dependency of labour to lower the cost of cocoon production. Students may also be able to provide hands-on training of various machines and equipments.

Unit-1: Mechanization in mulberry cultivation (10 Hours)

1.1 Definition of Mechanization, Need and scope for Mechanization in Indian Sericulture

1.2 Mechanization in mulberry cultivation; mulberry cutting preparation machine,

1.3 Brief description of power tillers, power weeders and tractor operated cultivators for mulberry plantation and intercultural operations

1.4 Mechanized spraying of chemicals in mulberry gardens: Self-propelled CSR&TI sprayer, Power tiller mounted sprayer.

1.5 Leaf shoot harvester and Power tiller operated pruner for leaf harvesting/pruning.

1.6 Brief descriptions of Mulberry tools and implements.

Unit-2: Mechanization in silkworm rearing (10 Hours)

2.1 Mechanization in Silkworm rearing

2.1.1 Hand operated gator sprayer, Power sprayers and LPG Flame gun for rearing house, rearing stands and mountages disinfection.

2.1.2 Silkworm separating machine, its advantages.

2.1.3 Hand operated and motorized deflosser for deflossing cocoons.

2.1.4 Tray washing machine and cocoon harvester

2.1.5 Collapsible mountage pressing tool

Unit-3: Mechanization of mulberry farming and sericulture (10 Hours)

3.1 Various mulberry tools and implements

3.2 Different types of machines used in mulberry cultivations and intercultural operations

3.3 Different types of machines used in silkworm rearing

3.4 Importance of mechanization in sericulture industry

3.5 Use of machinery in sericulture operation

3.6 Raising and maintenance of mulberry farm

NOTE FOR PAPER SETTING

Total Marks of the UMJSET-504 is 50 of which 20% marks shall be reserved for internal assessment (10 marks). Remaining 80% of the marks (40 marks) shall be reserved for external examination to be conducted by the University/Colleges.

Internal Assessment Test (10Marks)

Internal Assessment Test (10 Marks)

Internal Assessment Paper of 10 Marks shall consist of Theory Question/s of 5 Marks from Unit I/II and 5 Marks of Practical Exercise from Unit III.

External End semester University/College Examination

External Theory Exam shall be of 40 Marks and consist of 2 sections:

Section A: Four (4) short answer questions representing all Units/Syllabi i.e., at least one question from each unit. Each question shall beof2.5 marks (All Compulsory)

Section B: Six (6) long answer questions (Three to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 10 marks.

Recommended Readings

1. Satish Verma and S.B. Dandin, Mechanization in Sericulture, CSR&TI Mysore, Central Silk Board
2. Chawala, N. K., (2017). Comprehensive Sericulture: Silkworm Rearing and Silk Rearing. Indian Books and Periodicals.
3. M. Madan Mohan Rao, (2019). An Introduction to Sericulture (2nd Edition). B S Publications.
4. Johnson, M. and Kesary, M. Sericulture (1st Edition). Saras Publication.
5. Rajan, R.K., and Himantharaj, M.T. (Ed. 2005) Silkworm Rearing Technology. Central Silk Board, Bangalore.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(MINOR COURSE)
UG SEMESTER-V

MINOR CORE COURSE NO.	: UMISET505
MINOR CORE COURSE TITLE	: Principles of Vanya (Non-Mulberry) Sericulture
CREDITS	: 04 {(03 Theory) + (1 Practicum)}
MAXIMUM MARKS	: 75
I) External (University Exam)	: 60
II) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

After successful completion of the course the students will be able to know about different types of Vanya silks, their distribution, food plants and rearing of wild silkworms like Tasar, Muga and Eri.. The course may also make the students understand various seed and cocoon production technologies in Vanya Sericulture.

Unit-1: Introduction of Vanaya Sericulture (13 Hours)

1.1 Vanya sericulture- types of vanya silk and silkworms and their distribution in India and other countries.

1.2 History of vanya sericulture.

1.3 Status of vanya silk in India:

1.3.1 Cocoon and raw silk production of vanya sericulture in India.

1.3.2 Vanya sericulture organizational set-up, research and training.

1.3.3 Scope of vanya sericulture.

1.4 Vanya sericulture and its relevance to social forestry schemes.

Unit-2: Distribution of Tasar, Muga and Eri culture (10 Hours)

2.1 Tasar Culture:

2.1.1 Tasar culture and its association with forest tribes.

15

2.1.2 Distribution of tropical tasar flora -primary and secondary food plants in different states.

2.1.3 Distribution of temperate tasar flora-primary and secondary food plants in different states.

2.2 Muga Culture:

2.2.1 Muga Culture and its endemic nature to Assam

2.2.2 Distribution primary and secondary food plants in different states.

2.3 Eri-Culture:

2.3.1 Distribution primary and secondary food plants in different states.

Unit-3: Vanya silkworm rearing, seed and silk processing (12 Hours)

3.1 Morphology and rearing of vanya silkworms:

3.1.1 Morphology of egg, larva, pupa and adult.

3.1.2 Rearing methods for young & late-age silkworms.

3.1.3 Mounting methods- different kinds of mountages.

3.2 Disinfection; different types of disinfectants.

3.3 Seed Cocoon:

3.3.1 Selection and preservation of seed cocoons.

3.3.2 Synchronization of moth emergence.

3.3.3 Oviposition and transportation of eggs.

3.4 Processing of tasar, muga & eri cocoons (selection, stifling, degumming, cooking, reeling/spinning and re-reeling of cocoons).

Unit-4: Diseases and Pests of Vanya silkworm (10 Hours)

4.1 Diseases of vanya silkworms:

4.1.1 Causative agent, symptoms and control measure of protozoan disease.

4.1.2 Causative agent, symptoms and control measure of bacterial disease.

4.1.3 Causative agent, symptoms and control measure of viral disease.

4.1.4 Causative agent, symptoms and control measure of fungal disease.

4.2 Pests of vanya silkworms- seasonal abundance, nature and extent of damage and their control.

PRACTICALS (30 Hours)

1. Morphological studies of different stages of vanya silkworms:

a. Egg

b. Larva
c. Cocoon
d. Pupa
e. Adult

2. Study of eco-races of tasar silkworms.
3. Study of eco-races of muga silkworms.
4. Study of causative agent and symptoms of protozoan disease.
5. Study of causative agent and symptoms of of bacterial disease.
6. Study of causative agent and symptoms of viral disease.
7. Study of causative agent and symptoms of fungal disease.
8. Visit to temperate and tropical sericulture states of India (Educational tour).

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment{Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Elumalai, D., Mohan Raj, P., Ramamoorthy, R., Mohan, C. and Poovizhiraja, B. (2021) Introduction to Non-Mulberry Silkworm. Jaya Publishing House, N. Delhi.
2. Kavane, R.P. and Sathe, T.V. (2011) Wild Silk Technology. Daya Publishing House, Delhi.
3. Singh, R.N., Sinha, M.K., Bajpeyi, C.M., Sinha, A.K. and Tikader, A. (2014) Tasar Culture. APH Publishing Corporation, New Delhi.
4. Singh, R.N. and Saratchandra, B. (2012) Eri Culture, APH Publication Corporation New Delhi-110002.
5. Sarakar, D.C., Thangavelu, K, *et. al.,* Ericulture in India. Central Silk Board, Banglore.
6. Anonymous. Wild Silk of India (Vol.-I): An Introduction to Vanya Silk. Central Silk Board, Banglore.
7. Goel, R.K., Krishna Rao, J.V. (2004) Oak Tasar Culture. A.P.H. Publishing Corporation, New Delhi.
8. Mohanty, P.K., (1998) Tropical Tasar Culture in India. Daya Publishing House, Delhi.
9. Mohanty, P.K. (2003) Tropical Wild Silk cocoons of India. Daya Publishing House, Delhi.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(SUMMER INTERNSHIP COURSE)
UG SEMESTER-V

COURSE NO.	:	USESEI506
COURSE TITLE	:	SUMMER INTERNSHIP
CREDITS	:	02
MAXIMUM MARKS	:	50

Objectives:

It shall be a short-term internship of 15 days duration in 5th semester for job/professional training in a suitable organization or hands on training or activity-based course at college level in order to gain work experience. All students will undergo internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty and researchers in their own or other HEIs/research institutions during the summer term. Students will be provided with opportunities for internships with local industry, business organizations, health and allied areas, local governments (such as panchayats, municipalities), Parliament or elected representatives, media organizations, artists, crafts persons, and a wide variety of organizations so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability.

Community engagement and service: The curricular component of 'community engagement and service' seeks to expose students to the socio-economic issues in society so that the theoretical learning can be supplemented by actual life experiences to generate solutions to real-life problems. This can be part of summer term activity.

Field-based learning/minor project: The filed-based learning/minor project will attempt to provide opportunities for students to understand the different socio-economic contexts. It will aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situations in rural and urban contexts, and to observe and study actual field situations regarding issues related to socioeconomic development. Students will be given opportunities to gain a first-hand understanding of the policies, regulations, organizational structures, processes, and

programmes that guide the development process. They would have the opportunity to gain an understanding of the complex socio-economic problems in the community, and innovative practices required to generate solutions to the identified problems. This may be a summer term project.

SCHEME OF EXAMINATION

The internship shall be under a college teacher who will be designated as Internship Supervisor. After completion of summer internship students will have to produce a report related to the work carried out signed by internship supervisor and college principal. The internship will be evaluated internally by a Board of Examiners set up by the principal of the college.

Note: The minimum passing criteria for the summer internship is 40%.

Report Guidelines: The interns will write their report as per the format given below:

1. Introduction
2. Materials and Methods
3. Results
4. Discussion
5. Conclusion
6. References

This structure allows participants to gain hands-on experience in various laboratory techniques and apply their knowledge through a project. The project report serves as a valuable component to assess their understanding and application of the learned skills.

Monitoring and Evaluation: The designated Internship Supervisor will monitor the progress and evaluate student's internship course at the end of semester on the basis of Internship Report/Seminar presentation/Viva-voce. The evaluation of the internship course shall be internal.

University of Jammu

Syllabi of Sericulture for FYUGP under CBCS as per NEP-2020

SEMESTER-VI

(Examination to be held in 2025, 2026, 2027)

Major Course

Course Code: UMJSET-601

Course Title:Sericulture Extension Organization and Education

Credits: 04 {03(Theory)+01(Practical)}

Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: UMJSET-602

Course Title:Concepts of Seri-Biotechnology

Credits: 04 {03(Theory)+01(Practical)}

Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: UMJSET-603

Course Title:Sericulture Marketing and Economics

Credits: 04 {03(Theory)+01(Practical)}

Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: UMJSET-604

Course Title:EDP in Sericulture

Credits: 04 {03(Theory)+01(Practical)}

Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Minor Course

Course Code: UMISET-605

Course Title:Basics of Extension Organization in Sericulture

Credits: 04 {03(Theory)+01(Practical)}

Total no. of Lectures: Theory: 45 hours
Practical: 30 hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2025, 2026 & 2027)
(MAJOR COURSE)
UG SEMESTER-VI

MAJOR CORE COURSE NO.	: UMJSET601
MAJOR CORE COURSE TITLE	: Sericulture Extension Organization and Education
CREDITS	: 04 {(03 Theory) + (1 Practical)}
MAXIMUM MARKS	: 75
I) External (University Exam)	: 60
II) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

The course is designed in such a way that it will introduce the students to the theoretical and practical aspects of extension education. This will also enable the students to know the concepts of sericulture extension system, formal and informal education, management policies in extension, community development programs, Sericulture service network.

Unit-1: Extension Education (13 Hours)

1.1 Definition, meaning, origin and growth of extension education.
1.2 Objectives and scope of sericulture extension
1.3 Principles of sericulture extension
1.4 Competencies of extension worker

Unit-2: Extension teaching methods (10 Hours)

2.1. Formal and Informal education.
2.2. Sericultural extension system in India (merits and limitations): Training and visits system,
2.3. Extension teaching methods -Farm and Home visits.
2.4. Farmer's training programme-Lectures, symposium, panel and forum as extension methods.
2.5. Field day and field trips.
2.6. Mass extension methods. -Radio, T. V., Farm publication, Film shows.

Unit-3: Learning and teaching in Sericulture extension (12 Hours)

3.1 Community development programmes -Sericulture as tool for rural development

3 .2 Objectives and needs of training: Elements of training
3.3 Principles of the Learning and teachings; leadership for sericulture extension
3.4 Management policies in sericulture extension

Unit-4: Sericulture extension organizations **(10 Hours)**

4.1 Objectives of extension programme
4.2 Sericulture extension organizations; extension models for sericulture
4.3. Organization at various levels, especially C.S.B. Policy for development, research and training
4.4. Sericulture service net work –B.S.F., seed area, grainages, nurseries, CRC, TSC's, Cocoon market, filature, silk exchanges and cocoon certification centres.

PRACTICALS **(30 Hours)**

1. Form & home visits; panel and forum as extension methods
2. Visit and report preparation of Technical Service Centre, C.R.C's, Cocoon Market, seed area and grainages.
3. Field Trips.
4. Visit to CSR&TI and UT/State Sericulture Extension Units.

NOTE FORPAPERSETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment {Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Khandai, H., Yadav, K. and Mathur, A. (2011) Extension Education. APH Publishing Corpotation, New Delhi.
2. O.P. Dhama and Bhatnagar. Education and Communication for Development. Oxford and IBH publishing Co. Pvt. Ltd, New Delhi.
3. D, Jadev, Kunal (2012) Extention Education. APH Publishing Corporation, New Delhi.
4. Singh, Tribhuwan, Mohan Bhat, Maden and Ashraf Khan, Mohammed (2009) Sericulture Extention Principles and Management. APH Publishing Corporation, New Delhi.
5. Kavane, R.P. and Sathe, T.V. (2011) Wild Silk Technology. Daya Publishing House, Delhi.
6. Singh, R.N., Sinha, M.K., Bajpeyi, C.M., Sinha, A.K. and Tikader, A. (2014) Tasar Culture. APH Publishing Corporation, New Delhi.
7. Singh, R.N. and Saratchandra, B. (2012) Eri Culture, APH Publication Corporation New Delhi-110002.
8. Srinivasa and Kumaresan. P. (2005) Sericulture Extension Management and Economics. Central Silk Board, Banglore.
9. Manoharan, M.P. and Arunaghallam, R (2003) Agricultural Extension. Himalaya Publishing House Mumbai-400004
10. Sarakar, D.C., Thangavelu, K, *et. al.,* Ericulture in India. Central Silk Board, Banglore.
11. Anonymous. Wild Silk of India (Vol.-I) An Introduction to Vanaya Silk. Central Silk Board, Banglore.
12. Goel, R.K., Krishna Rao, J.V. (2004) Oak Tasar Culturre. A.P.H. Publishing Corporation, New Delhi.
13. Mohanty, P.K., (1998) Tropical Tasar Culture in India. Daya Publishing House, Delhi.
14. Mohanty, P.K. (2003) Tropical Wild Silk cocoons of India. Daya Publishing House, Delhi.
15. Supe S.V., An Introduction to Extension Education.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2025, 2026 & 2027)
(MAJOR COURSE)
UG SEMESTER-VI

MAJOR CORE COURSE NO.	: UMJSET602
MAJOR CORE COURSE TITLE	: Concepts of Seri-Biotechnology
CREDITS	: 04 {(03 Theory) + (1 Practical)}
MAXIMUM MARKS	: 75
I) External (University Exam)	: 60
II) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

On successful completion of the course, the students will be able to acquire sound knowledge on the basics and advances in various aspects of Seri-biotechnonology. During the study, students will acquainted with the application of biotechnology in sericulture and other related scientific aspects and mechanism.

Unit-1: Basics of Seribiotechnology (13 Hours)

1.1: Introduction to Seribiotechnology. Scope and applications of biotechnology in sericulture.

1.2:Concept of genomics. Structure and function of the silkworm genome.

1.3:Polymerase Chain Reaction (PCR). Principle and Applications of PCR in silkworm biotechnology.

1.4:Molecular markers and their applications in Seribiotechnology.

Unit-2: Silkworm and mulberry proteomics (10 Hours)

2.1: Introduction to silkworm and mulberry proteomics.
2.2: Structure and functions of silk proteins.

2.3: Mechanism of protein folding and manipulation of silk proteins.

2.4: Concept and applications of mutant proteins.

Unit-3: Biotechnology for silk production (12 Hours)

3.1: Recombinant DNA Technology: cloning and expression vectors.

3.2: Transgenic plants in crop improvement and its applications.

3.3: Culture media for cell and tissues: Culturing procedures.

3.4: Application of biotechnology for improving silk production.

Unit-4: Bioinformatics and Sericulture (10 Hours)

4.1: Overview of Bioinformatics: applications of bioinformatics in sericulture.

4.2: Protein structure prediction tools and techniques.

4.3: Biological databases: Scope and objectives, different types of databases in sericulture.

4.4: Mulberry and silkworm databases and their composition.

PRACTICALS (30 Hours)

1. Preparation of media for plant and animal cell cultures.
2. To study the principle and applications of PCR.
3. Demonstration of gel electrophoresis.
4. Isolation of genomic DNA from silkworm larvae and mulberry leaf tissue.
5. To study principle of spectrophotometer.
6. To study ultra structure of silk proteins.
7. To demonstrate the principle of Recombinant DNA Technology
8. To study different types of vectors and their applications.
9. To study Southern and Northern blotting techniques.
10. To demonstrate the principle of bioinformatics.

NOTE FORPAPERSETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment {Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Advances in Seribiotechnology. Suraksha Chanotra, Muzafar ahmad Bhat and Gurvinder raj Verma. Eliva Press. 2023.
2. Plant Molecular biology. Grierson D.and Lovely S.N.Blackie, London, 1984 Genetic Engineering in plants. KosugeT.Meredith, C.P and Hollender S.Plenum press, New York, 1989.
3. Cellular and molecular biology. Goldberg R B. Alan R.Liss Inc. New York, 1982. Plant biotechnology. Ignacimuthu V.L. Oxford IBH Publishing Company, New Delhi, 1995.
4. Genetic manipulation for crop improvement. Chopra V.L Oxford IBH publishing company, New Delhi, 1985.
5. Molecular Biotechnology. B.R Glick. and Pasbernak. J. J.American Society for molecular biology (ASM press), 1994.
6. Recombinant DNA (2nd Ed.) Watson J.D Gilmanm, workowski J. and Zoller M. Scientific American Books, 1992.
7. Principles of gene manipulation. Old, R.W. and Primrose S.B Blackwell Scientific Publications 1994.
8. Plant Tissue Culture: Applications and Limitations by S.S. Bhojwani (1990), Elsevier, Amsterdam.
9. Plant Cell Culture: A Practical Approach by R.A. Dixon & Gonzales, IRL Press.
10. Plant biotechnology in Agriculture by K. Lindsey and M.G.K. Jones prentice hall, New Jersey 1990.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2025, 2026 & 2027)
(MAJOR COURSE)
UG SEMESTER-VI

MAJOR CORE COURSE NO.	: UMJSET603
MAJOR CORE COURSE TITLE	: Sericulture Marketing and Economics
CREDITS	: 04 (03 Theory) + (1 Practical)
MAXIMUM MARKS	: 75
I) External (University Exam)	: 60
II) Internal Assessment	: 15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

The Course has been designed with an objective to make the students understand about the sericulture marketing and economics. The knowledge thus gained by the students shall be useful for better marketing of seed, cocoons and silk in sericulture industry. Students may also be able to understand traditional and regulated markets, marketing institutions, silk exchanges in India, financing agencies and economics of egg, cocoon and silk production in different conditions.

Unit-1: Sericultural Marketing Organization (13 Hours)

1.1 Sericultural marketing organization, their merits and limitation.

1.2 Traditional and regulated markets of seed, cocoon, raw silk and silk fabric.

1.3 Government intervention legislation, implications.

1.4 Marketing institutions - marketing boards -cooperative with special reference to J& K

Unit-2: Cooperative societies and financing agencies (10 Hours)

2.1Definition, types, Sericultural cum farmer's cooperative societies (Cooperative C.R.C., Cooperative farming society, cooperative yarn produces society, silk marketing society credit cooperatives).

2.2 Financing agencies in Sericulture. Short term, mid-term and long-term financing, NABARD. SIDBI, IDBI and Bank.

2.3 Unit cost, importance of credit in sericulture.

2.4 Survey types, merits and limitations. Collection of data and its evaluation.

Unit-3: Economics in sericulture (12 Hours)

3.1 Economics: Principles of economics, classification of costs – explicit and implicit, fixed, variable, marginal, average; profits – gross and net.

3.2 Scope of sericulture in India – visa-vis other agricultural crops - income and employment generation.

3.3 Economics of mulberry production under rainfed and irrigated systems.

3.4 Comparative economics of mulberry production under traditional and improved practices.

Unit-4: Economics of egg, cocoon and silk production (10 Hours)

4.1 Economics of silkworm egg production in government and private grainages.

4.2 Economics of cocoon production for lab and commercial purpose.

4.3 Comparative economics of cocoon production under traditional and improved methods of silkworm rearing.

4.4 Economics of raw silk production in charaka, cottage basin and multi-end reeling units. Introduction to Silk exchanges –structure and function.

PRACTICALS (30 Hours)

1. Visit to cocoon market and anyone regulated agricultural market.
2. Discussion with NABARD, IDBI and a lead bank officer regarding sericulture credit facilities and procedures.
3. Preparation of a project detailing cost and economic in sericulture.
4. Visit to Research and Development Institute or Southern States of India (Educational Tour).
5. Visit to temperate and tropical sericulture states of India (Educational tour).

NOTE FORPAPERSETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment{Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Srinivasa and Kumaresan. P. (2005) Sericulture Extension Management and Economics. Central Silk Board, Banglore.
2. Ramana, D.V. 1987, Economics of Sericulture and Silk Industry in India. Deep and Deep publishers, New Delhi.
3. Sinha, S. 1960, the development of Indian Silk -A wealth of opportunities.
4. Bhattacharya,M 2019 Economics of sericulture.
5. Purohit, A. Sirohi, P.K 2016. Economics of sericulture farming.
6. Reading in Sericulture Economics Marketing And Management K. S. Arun Kumar. 2010

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2025, 2026&2027)
(MAJOR COURSE)
UG SEMESTER-VI

MAJOR CORE COURSE NO.	: UMJSET604
MAJOR CORE COURSE TITLE	:EDP in Sericulture
CREDITS	:04 {(03 Theory) + (1 Practical)}
MAXIMUM MARKS	:75
I) External (University Exam)	:60
II) Internal Assessment	:15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

The course is designed in such a way that it will introduce the students to the basic theoretical and various aspects of entrepreneurship development in sericulture and its management. The study in the subject will help the students in planning the project in sericulture, special schemes for technical entrepreneurs, Seri-business startups,SWOT analysis in Ser-business, market assessment before starting the projects.

Unit-1: Introduction (13 Hours)

1.1 Introduction to Entrepreneurship Development Programme (EDP).

1.2 Objectives of EDP, significance of EDP in sericulture.

1.3 Entrepreneurship Development policies of Central Silk Board.

1.4 Planning and follow-up for EDP: Need, extent and mechanism.

Unit-2: Special scheme for entrepreneurs (10 Hours)

2.1 Entrepreneurship Development through Sericulture.

Scope and future prospective of EDP in sericulture.

2.2 Special schemes for technical entrepreneurs (STED).

2.3. Social responsibility, business ethics and environmental awareness in EDP.

2.4. Biography of Indian Entrepreneurship- status of worldwide Entrepreneurship.

Unit-3: EDP in egg, cocoon, silk reeling and market operations (12 Hours)

3.1. Schemes of CSB for raising mulberry nursery and establishment of rearing house.

3.2. EDP in organization of chawki rearing centers.

3.3. EDP in silkworm egg production and supply of dfls.

3.4. EDP in silk reeling and market operations.

Unit-4: Seri business startups (10 Hours)

4.1. Starting a Seri-Business Startup

4.2. Entrepreneurship activities Framework Model

4.3. Selection of appropriate Seri-business model.

4.4. SWOT analysis in Seri-business.

PRACTICALS (30 Hours)

1. Generation of innovate ideas for startup of seri-business.
2. EDP in raising mulberry nurseryand vermicomposting
3. EDP in organization of chawki rearing centers.
4. EDP in silkworm egg production and rearing.
5. EDP in silk reeling – charkha, cottage basin and multi-end reeling units.
6. EDP in mass production of parasitoids and predators.
7. Selection and training of entrepreneurs in selection.
8. SWOT analysis in seri-business.
9. Policies of CSB for starting EDP in sericulture.
10. Entrepreneurship activities Framework Model.

NOTE FORPAPERSETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1Hr&30Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)

Final examination	-	-	**15**

External End Semester Theory Examination will have two sections (A&B){Totalmarks60}

SectionA:Fourshortanswerquestionsrepresentingallunits/syllabii.e.,atleastonequestion fromeachunit.Eachquestionshallbeof3marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment{Totalmarks15}

Fifteen(15)marksfortheorypaperinasubjectreservedforinternalassessmentshallhaveonelonga nswertypequestionof7marksandfourshortanswertypequestionsof2markseach.

Recommended Readings

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

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

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

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

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

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

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP-2020
(For the Examination to be held in Year 2024, 2025&2026)
(MINOR COURSE)
UG SEMESTER-VI

CORE COURSE NO.	: UMISET605
CORE COURSE TITLE	:Basics of Extension Organization in Sericulture
CREDITS	:04 {(03 Theory) + (1 Practical)}
MAXIMUM MARKS	:75
I) External (University Exam)	:60
II) Internal Assessment	:15
DURATION OF UNIVERSITY EXAM	: 03 Hours
MAXIMUM MARKS PRACTICALS	: 25
I) Continuous assessment	: 10
II) Final examination	: 15

Objectives and Expected Learning Outcomes

The course is designed in such a way that it will introduce the students to the theoretical and practical aspects of Vanya Sericulture. This will also enable the students to know the concepts of the sericulture extension system, formal and informal education, management policies in extension, community development programs, Sericulture service network, and constraints in the production of Vanaya silk.

Unit-1: Extension Education (13 Hours)

1.1 Definition, meaning, origin, and growth of extension education.
1.2 Objectives and scope of sericulture extension
1.3 Principles of Sericulture Extension
1.4 Competencies of Extension Worker

Unit-2: Extension teaching methods (10 Hours)

2.1. Formal and Informal education.
2.2. Sericultural extension system in India (merits and limitations): Training and visits system,
2.3. Extension teaching methods -Farm and Home visits.
2.4. Farmer's training programme, symposium, panel, and forum as extension methods.
2.5. Field day and field trips.
2.6. Mass extension methods. -Radio, T. V., Farm publication, Film shows.

Unit-3: Learning and teaching in Sericulture extension (12 Hours)

3.1 Community development programmes -Sericulture as tool for rural development
3 .2 Objectives and needs of training: Elements of training

3.3 Principles of the Learning and teachings; leadership for sericulture extension
3.4 Management policies in sericulture extension

Unit-4: Sericulture extension organizations **(10 Hours)**

4.1 Objectives of extension programme
4.2 Sericulture extension organizations; extension models for sericulture
4.3. Organization at various levels, especially C.S.B. Policy for development, research and training
4.4. Sericulture service net work –B.S.F., seed area, grainages, nurseries, CRC, TSC's, Cocoon market, filature, silk exchanges and cocoon certification centres.

PRACTICALS **(30 Hours)**

1. Form & home visits; panel and forum as extension methods
2. Visit and report preparation of Technical Service Centre, C.R.C's, Cocoon Market, seed area and grainages.
3. Field Trips.
4. Visit to CSR&TI and UT/State Sericulture Extension Units.

NOTE FOR PAPER SETTING

ExaminationTheory/Practical	Syllabustobe Covered in examination	Time allotted for Exam	Marks
Internal TheoryAssessment	50%	1Hr&30Minutes	15
ExternalTheoryEnd Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on DailyPerformance only)
Finalexamination	-	-	15

External End Semester Theory Examination will have two sections (A&B) {Total marks60}

SectionA:Four short answer questions representing all units/syllabi i.e., atleast one question from each unit. Each question shall be of3marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

InternalAssessment{Totalmarks15}

Fifteen (15)marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Khandai, H., Yadav, K. and Mathur, A. (2011) Extension Education. APH Publishing Corpotation, New

Delhi.

2. O.P. Dhama and Bhatnagar. Education and Communication for Development. Oxford and IBH publishing Co. Pvt. Ltd, New Delhi.
3. D, Jadev, Kunal (2012) Extention Education. APH Publishing Corporation, New Delhi.
4. Singh, Tribhuwan, Mohan Bhat, Maden and Ashraf Khan, Mohammed (2009) Sericulture Extention Principles and Management. APH Publishing Corporation, New Delhi.
5. Kavane, R.P. and Sathe, T.V. (2011) Wild Silk Technology. Daya Publishing House, Delhi.
6. Singh, R.N., Sinha, M.K., Bajpeyi, C.M., Sinha, A.K. and Tikader, A. (2014) Tasar Culture. APH Publishing Corporation, New Delhi.
7. Singh, R.N. and Saratchandra, B. (2012) Eri Culture, APH Publication Corporation New Delhi-110002.
8. Srinivasa and Kumaresan. P. (2005) Sericulture Extension Management and Economics. Central Silk Board, Banglore.
9. Manoharan, M.P. and Arunaghallam, R (2003) Agricultural Extension. Himalaya Publishing House Mumbai-400004
10. Sarakar, D.C., Thangavelu, K, *et. al.*, Ericulture in India. Central Silk Board, Banglore.
11. Anonymous. Wild Silk of India (Vol.-I) An Introduction to Vanaya Silk. Central Silk Board, Banglore.
12. Goel, R.K., Krishna Rao, J.V. (2004) Oak Tasar Culturre. A.P.H. PublishingCorporation, New Delhi.
13. Mohanty, P.K., (1998) Tropical Tasar Culture in India. Daya Publishing House, Delhi.
14. Mohanty, P.K. (2003) Tropical Wild Silk cocoons of India. Daya Publishing House, Delhi.
15. Supe S.V., An Introduction to Extension Education.

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

For the Examination to be held in Year 2025, 2026 & 2027

SERICULTURE COURSE

UG SEMESTER VII

UNDER NEP-2020

University of Jammu
Syllabi of Sericulture for FYUGP under CBCS as per NEP-2020
SEMESTER-VII
(Examination to be held in 2025, 2026, 2027)

Course Code: **UMJSET701**
Credits: 04 {03(Theory) + 01(Practical)}
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course
Course Title: **RESEARCH METHODOLOGY AND ETHICS**
Total no. of lectures: Theory: 45 hours

Course Code: **UMJSET702**
Credits: 04 {03(Theory) + 01(Practical)}
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course
Course Title: **ADVANCES IN SILKWORM PATHOLOGY**
Total no. of lectures: Theory: 45 hours

Course Code: **UMJSET703**
Credits: 04 {03(Theory) + 01(Practical)}
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course
Course Title: **MULBERRY FARM MANAGEMENT**
Total no. of lectures: Theory: 45 hours

Course Code: **UMJSET704**
Credits: 04 {03(Theory) + 01(Practical)}
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course
Course Title: **SILKWORM IMMUNOLOGY**
Total no. of lectures: Theory: 45 hours

Course Code: **UMISET705**
Credits: 04 {03(Theory) + 01(Practical)}
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Minor Course
Course Title: **SILKWORM TRANSGENESIS**
Total no. of lectures: Theory: 45 hours

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2025, 2026 & 2027)

(MAJOR COURSE)

MAJOR CORE COURSE NO.	:	**UMJSET701**
MAJOR CORE COURSE TITLE	:	**RESEARCH METHODOLOGY AND ETHICS**
CREDITS	:	**04 {03 (Theory) + 01 (Practical)}**
MAXIMUM MARKS	:	**75**
I) External (University Exam)	:	**60**
II) Internal Assessment	:	**15**
DURATION OF UNIVERSITY EXAM	:	**03 Hours**
MAXIMUM MARKS PRACTICALS	:	**25**
I) Continuous assessment	:	**10**
II) Final examination	:	**15**

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the course the students will have knowledge about research formulation, thesis and paper writing and will have awareness about the publication ethics and publication misconducts.

UNIT-1: FUNDAMENTALS OF RESEARCH (13 HOURS)

1.1 Research: concept and Objectives.

1.1.1 Types of research: Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs.Qualitative, Conceptual vs. Empirical

1.1.2 Research methodology.

1.2 Defining and formulating the research problem.

1.2.1 Selecting the problem - Necessity of defining the problem.

UNIT-2: RESEARCH FORMULATION (10 HOURS)

2.1 Literature review: methods of writing review of literature.

2.1.1 Primary and secondary sources of review of literature.

2.1.2 Reviews & treatise.

2.1.3 Monographs

2.2 Patents and its significance.

2.2.1 Web as a source – searching the web.

2.2.2 Critical literature review.

2.3 Identifying gap areas from literature review.

2.3.1 Development of working hypothesis.

UNIT-3: RESEARCH DESIGN AND METHODS (10 HOURS)

3.1 Research design – Basic Principles- Need of research design.

3.1.1 Features of good design.

3.1.2 Observation and Facts and explanation.

3.2 Induction, Deduction, Development of Models.

3.3 Developing a research plan - Exploration, Description, Diagnosis, Experimentation.

3.4 Determining experimental and sample designs.

UNIT-4: THESIS WRITING & ETHICS (12 HOURS)

4.1 Structure and components of scientific reports.

4.1.1 Types of report – Technical reports and thesis – Significance.

4.1.2 Different steps in the preparation.

4.2 Ethics with respect to science and research

4.3 Intellectual property right (IPR).

4.3.1 Scientific misconducts: Falsification, Fabrication and Plagiarism (FFP).

4.3.2 Selective reporting and misrepresentation of data.

4.3.3 Conflicts of interest - Publication misconduct.

4.4 Violation of publication ethics, authorship and contributor ship - Identification ofpublication misconduct, complaints & appeals and consequences.

PRACTICALS (30 Hours)

1. Selection and reparation of research topic based on sericulture.
2. To write review on any relevant topic of sericulture.
3. Demonstration of difference between research and review paper.
4. Preparation of articles on current topics of sericulture.
5. Demonstration of IPR and its significance.
6. To write technical report on any topic of sericulture.
7. To write bibliography for research paper.
8. To writ acknowledgment in research and review paper.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final Practical examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Nicholas H. Steneck. Introduction to the Responsible Conduct of Research. Office of Research Integrity. 2007.
2. The Student's Guide to Research Ethics By Paul Oliver Open University Press, 2003
3. Responsible Conduct of Research By Adil E. Shamoo; David B. Resnik Oxford University Press, 2003
4. Ethics in Science Education, Research and Governance Edited by Kambadur Muralidhar, Amit Ghosh Ashok Kumar Singhvi. Indian National Science Academy, 2019. ISBN : 978-81-939482-1-Anderson B.H., Dursaton, and Poole M.: Thesis and assignment writing, Wiley Eastern 1997.
5. Bijorn Gustavii: How to write and illustrate scientific papers? Cambridge University Press.
6. Bordens K.S. and Abbott, B.b.: Research Design and Methods, Mc Graw Hill, 2008
7. Graziano, A., M., and Raulin, M., L.: Research Methods – A Process of Inquiry, Sixth Edition, Pearson, 2007

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1. https://ori.hhs.gov/sites/default/files/rcrintro.pdf.
2. https://www.enago.com/academy/what-are-the-ethical-considerations-in-research-design/#:~:text=The%20research%20design%20must%20address,specifically%20to%20the%20research%20questions.
3. https://www.scribbr.com/methodology/research-ethics/.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2025, 2026 & 2027)

(MAJOR COURSE)
UG SEMESTER-VII

MAJOR CORE COURSE NO.	:	UMJSET702
MAJOR CORE COURSE TITLE	:	ADVANCES IN SILKWORM PATHOLOGY
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know about concept of silkworm pathology and it also make the students to understand about new techniques, detection and preventive measures taken to prevent diseases.

UNIT-1: INTRODUCTION (13 HOURS)

1.1 History of insect pathology
1.2 Scope and Principles of insect pathology
1.3 Epizootiology, symptomatology and etiology of diseases caused by entomopathogens
1.4 Microbial control and defense mechanisms in insects against pathogens.

UNIT-2: BACTERIAL AND VIRAL ENTOMOPATHOGENS (10 HOURS)

2.1 Baculoviruses and other occluded viruses of silkworm
2.2 Types of entomopathogenic bacteria
2.3 Portals of entry and multiplication
2.4 Advances in detection and prevention of bacterial disease

UNIT-3: MICROSPORIDIAN ENTOMOPATHOGENS (12 HOURS)

3.1 Microsporidian Entomopathogens of silkworm
3.2 Portal of entry and life cycle
3.3 Advances in detection in different stages
3.4 Prevention and control of disease

UNIT-4: FUNGAL ENTOMOPATHOGENS (10 HOURS)

4.1 Fungal Entomopathogens of silkworm
4.2 Types of fungal entomopathogens
4.3 Portals of entry and multiplication
4.4 Advances in detection and prevention of fungal diseases

PRACTICALS (30 HOURS)

1. Equipment used and safety measures to be observed in insect pathology laboratory
2. Identification and symptoms of infection – bacterial insect pathogens
3. Identification and symptoms of infection – fungal insect pathogens
4. Identification and symptoms of infection – viral insect pathogens
5. Extraction, Isolation and Culturing of fungal pathogens from live or dead silkworms.
6. Extraction, Isolation and Culturing of bacterial pathogens from live or dead silkworms.
7. Extraction, Isolation and Culturing of viral pathogens from live or dead silkworms.
8. To know the different laboratory bioassay techniques for evaluation of different insecticides against pathogens.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final Practical examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}
Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}
Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Boucias DG & Pendland JC. 1998. Principles of Insect Pathology. Kluwer Academic Publisher, Norwel.
2. Burges HD & Hussey NW. (Eds). 1971. Microbial Control of Insects and Mites. Academic Press, London.

3. Steinhaus EA. 1984. Principles of Insect Pathology. Academic Press, London.Khan, Md. A., Bhat, M.M and Singh, T. (2011) Silkworm Crop Protection- Concepts and Approaches. Daya Publishing House, Delhi.
4. Singh, R.N. and Saratchandra, B. (2011) Sericultural Entomology. APH Publishing Corporation, New Delhi.
5. B. Nataraju, K Salhyaprasad *et.al.*, (2005) Silkworm crop Protection, Central Silk Board, Bangalore.
6. Govindaiah, Gupta, V.P., Sharma, D.D., Rajadurai, S. and Naik, Nishitta (2005) Mulberry Crop Protection. Central Silk Board, Bangalore.
7. Aruga, H. Principles of Sericulture. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, Bombay and Calcutta.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2025, 2026 & 2027)

(MAJOR COURSE)
UG SEMESTER-VII

MAJOR CORE COURSE No.	:	UMJJSET703
MAJOR CORE COURSE TITLE	:	MULBERRY FARM MANAGEMENT
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know about establishment, maintenance and management of mulberry garden for harnessing successful cocoon crops. The course provides the students an insight to various machines and tools used in different operations of mulberry cultivation that could improve their knowledge for establishment of model mulberry farms.

UNIT-1: ESTABLISHMENT OF MULBERRY GARDEN-I (13 HOURS)

1.1 Soil analysis- soil sampling, soil pH, organic carbon and NPK level.
1.2 Importance of soils fertility with reference to mulberry cultivation.
1.3 Soil conservation methods and Reclamation
  1.3.1 Selection and preparation of soil for mulberry cultivation
  1.3.2 Planting season and direction
  1.3.3 Management of chawki and late age garden
1.4 Mulching: its types, methods and significance.

UNIT-2: ESTABLISHMENT OF MULBERRY GARDEN-II (10 HOURS)

2.1 Establishment of mulberry garden: Bush and tree plantation.
  2.1.1 Areas under mulberry cultivation in India, identification of different mulberryvarieties.
  2.1.2 Mulberry cultivation under rain-fed and irrigated conditions
  2.1.3 Mulberry cultivation in hilly areas.
2.2 Raising of commercial nursery; Application of root inducing hormones
  2.2.1 Common rooting hormones used in mulberry: their merits and de-merits.
  2.2.2 Impact of hormonal applications on quality of mulberry leaf.
2.3 Mulberry based mixed farming system.
  2.3.1 Pruning and training: schedule, methods, frequency and significance.

UNIT-3: MANURES AND FERTILIZERS (10 HOURS)

3.1 Organic manures and their applications: concepts of Biostimulants.
- 3.1.1 Green manuring: Green manure crops and their relevance in soil productivity.
- 3.1.2 Classification- Composition- Properties of major Nitrogenous, Phosphatic and potassic fertilizers and dosage calculation.
- 3.1.3 Foliar nutrition: Foliar nutrient formulations- Mode of applications- Merits and demerits.
- 3.1.4 Biological nitrogen fixation Importance- Applications and limitations.

3.2 Concept of Fertigation: its significance and limitations.

UNIT-4: TOOLS & MACHINE USED IN MORICULTURE (12 HOURS)

4.1 Farm implements utilized in mulberry cultivation and their efficiency.
- 4.1.1 Hand tools used in mulberry cultivation.
- 4.1.2 Machines for tillage in mulberry cultivation.

4.2 Machines for Intercultural Operations

4.3 Machines for application of chemicals in mulberry gardens.
- 4.3.1 Special purpose machines for sericulture
- 4.3.2 Mechanization and its importance in mulberry cultivation.
- 4.3.3 Development of mechanized mulberry gardens

4.4 Economics of mechanization: economic performance & cost of operation of machines.

PRACTICALS (30 HOURS)

1. Determination of soil pH (pH paper and pH meter methods)
2. Determination of water-holding capacity of different soil samples
3. Demonstration of mulching in mulberry nursery.
4. Collection, identification and preparation of herbarium of different mulberry verities
5. Demonstration of mulberry based integrated farming system.
6. Preparation and application of vermicompost.
7. Demonstration of various Farm implements utilized in mulberry cultivation.
8. Calculation of economics of mechanization in mulberry for 1 hectare plot.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous Assessment	-	-	10 (Based on Daily Performance only)
Final Practical Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}
Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}
Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Hand book of Sericultural Technologies Dandin, S.B., J. Jaiswal and K. Gridhar. 2000, CentralSilk Board, Bangalore.
2. Hand book of Sericulture Technologies, Central Silk Board, Bangalore Dandin, S.B. and K. Giridhar. 2010. Central Silk Board, Bangalore.
3. G. Savithri, P.Sujathamma and P. Neeraja (2016) Sericulture Industry –An Overview, Agrobios Publishers, ISBN No. (13): 978-81-7754-589-0.
4. Mulberry crop protection, D D Sharma Central Silk Board, Bangalore.
5. 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.

WEB REFERENCES

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2. https://www.fao.org/ag/aga/agap/frg/mulberry/Papers/HTML/Datta.htm
3. https://agritech.tnau.ac.in/sericulture/seri_mulberry%20cultivation.html
4. https://www.agrifarming.in/mulberry-cultivation
   http://www.csrtimys.res.in/sites/default/files/phamplets/en-33.pdf

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2025, 2026 & 2027)

(MAJOR COURSE)
UG SEMESTER-VII

MAJOR CORE COURSE NO.	:	**UMJSET704**
MAJOR CORE COURSE TITLE	:	**SILKWORM IMMUNOLOGY**
CREDITS	:	**04 {03 (Theory) + 01 (Practical)}**
MAXIMUM MARKS	:	**75**
I) External (University Exam)	:	**60**
II) Internal Assessment	:	**15**
DURATION OF UNIVERSITY EXAM	:	**03 Hours**
MAXIMUM MARKS PRACTICALS	:	**25**
iii) Continuous assessment	:	**10**
iv) Final examination	:	**15**

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know about concept of immunology and it also make the students to understand about different cells and proteins associated with silkworm immunity.

UNIT-1: INTRODUCTION (13 HOURS)

1.1. History, scope and applications of immunology.
1.2 Immunity
  1.2.1 Types of immunity
  1.2.2 Organs associated with immunity
1.3 Cells associated with immune system
1.4. Origin and types of cells

UNIT-2: IMMUNOGLOBULINS (10 HOURS)

2.1 Antigens and their features; Immunoglobulins (antibodies)
  2.1.1 Structure and Types of Immunoglobulins.
  2.1.2 Biological properties and Functions of Immunoglobulins
2.2. Monoclonal antibodies
2.3 Antigen – Salient features of antigen. Antibody reaction

UNIT-3: INSECT IMMUNITY (12 HOURS)

3.1. Immune response in silkworm *Bombyx mori*-mechanism of genetic resistance.
3.2. Cellular and molecular mechanisms of insect immunity
3.3 Immune response of silkworm, Lipopolysaccharide (LPS) and Cecropin-B.
3.4 Genetic resistance of the silkworm, *Bombyx mori*, to bacterial and viral diseases.

UNIT-4: REGULATION OF HOST GENE EXPRESSION (10 HOURS)

4.1 Regulation of host gene expression, inducible anti-bacterial and anti-viral proteins in silkworm.
4.2 Molecular triggering of anti-bacterial proteins – antibacterial protein gene expression.
4.3 Major histocompatibility complex (MHC): Types of MHC molecules.

PRACTICALS (30 HOURS)

1. To study the applications of immunology.
2. To study the physiological and pathological representation of immune response.
3. To study different cells associated with silkworm immunity.
4. To study anti-bacterial proteins in silkworm.
5. To study anti-viral proteins in silkworm.
6. To study cellular mechanism in silkworm immunity.
7. To study types of MHC molecules.
8. To study the practical application of antibodies.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final Practical examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}
Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}
Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Arumugam, N. (2012-2013)-Cell Biology, Molecular Biology, Genetic, Immunology & Biotechnology (Hard Bound)SARAS PUBLICATION,114.A.R.P.Campus Road,Periavilai, Nagercoli-629002,Kanyakumari-Tamil Nadu.
2. Biotol Series (1993) *Cellular Interactions and Immunobiology.* Butterworth - Heinemann.
3. Biotol Series (1993) *Technological Applications of Immunochemicals.* Butterworth- Heinemann.
4. Brown, T.A. (1992) *Genetics a Molecular Approach*. 2nd Edn., Chapman and Hall, London.
5. Bruce A.; Dennis B.; Jullian L.; Martin R.; Keith R. and James W. (1983) *Molecular Biology of the Cell.* Garland Pub. Inc., New York & London.
6. Dilip De Sarkar (1998) *The Silkworm – Biology, Genetics and Breeding*. Vikas Publishing House Pvt. Ltd., New Delhi

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2025, 2026 & 2027)

(MINOR COURSE)
UG SEMESTER-VII

MINOR CORE COURSE NO.	:	UMISET705
MINOR CORE COURSE TITLE	:	SILKWORM TRANSGENESIS
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know acquire knowledge on silkworm transgenesis which addresses spanning from improving silk production and quality to understanding gene functions and contributing to the development of biotechnological applications. Studying silkworm transgenesis involves the introduction of foreign genes into the silkworm genome to achieve Improved Silk Production, Resistance to Diseases, Pest Resistance, Environmental Adaptations, Biomedical Applications, Functional Genomics Studies, Silkworm as a Model Organism, Genetic Engineering Techniques, Economic Benefits and Conservation of Wild Silkworms.

UNIT-1: INTRODUCTION TO TRANSGENESIS (13 HOURS)

1.1 Definition and Historical Perspective.
1.2 Overview of genetic engineering, Milestones in the development of transgenesis.
1.3 Importance and Applications: Biomedical applications, Industrial applications.
1.4 Ethics and Regulations: Ethical considerations in genetic engineering, Regulatory frameworks for transgenic organisms.

UNIT-2: MOLECULAR BIOLOGY BASICS (10 HOURS)

2.1 DNA Structure and Replication: Double helix structure, DNA replication mechanisms.
2.2 Gene Expression: Transcription and translation, Regulation of gene expression.
2.3 Recombinant DNA Technology: Cloning vectors, DNA manipulation techniques (restriction enzymes, PCR)
2.4 CRISPR/Cas9 Technology: Principles of CRISPR/Cas9, Genome editing applications.

UNIT-3: TECHNIQUES OF TRANSGENESIS (12 HOURS)

3.1 Microinjection: Introduction to microinjection, Microinjection in model organisms.
3.2 Electroporation: Principles and applications.
3.3 Viral Vectors: Overview of viral vectors, Applications in transgenesis.
3.4 Site-directed mutagenesis; mammalian tissue culture; cell line transfections; functional assays.

UNIT-4: SILKWORM TRANSGENESIS (10 HOURS)

4.1 A brief account of transgenic animals: Insect transgenesis – silkworm transgenesis.
4.2 Application of silkworm transgenesis, piggy bac transposon.
4.3 Red fluorescent protein expression in *Bombyx mori*.
4.4 Patenting transgenic organisms and isolated genes and DNA sequences.

PRACTICALS (30 HOURS)

1. Media preparation for silkworm cell lines.
2. Selection of tissue for establishment of silkworm cell lines.
3. Isolating genomic DNA from different silkworm tissues. Agarose gel electrophoresis. Quantifying DNA concentration using spectrophotometry
4. Isolating protein from different silkworm tissues. Polyacrylamide Gel Electrophoresis (PAGE),Quantifying protein concentration using spectrophotometry.
5. Plasmid Design and Construction: Designing a transgenic construct, Cloning the gene of interest into a suitable vector, Transforming *Escherichia coli* with the plasmid.
6. Microinjection Techniques: Preparing microinjection needles, Anesthetizing and aligning silkworm eggs, Microinjecting transgenic constructs into silkworm embryos.
7. Polymerase chain reaction (PCR) to amplify transgene sequences.
8. Gel electrophoresis to confirm transgene integration.
9. Microinjecting CRISPR/Cas9 components into silkworm embryos.
10. Screening for edited genes in the F1 generation.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final Practical examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Brown, T. A. (2016). Gene Cloning and DNA Analysis: An Introduction. John Wiley & Sons.
2. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles And Applications Of Recombinant DNA. Asm Press, Washington.
3. Kundu, S. (ED.). (2014). Silk Biomaterials For Tissue Engineering and Regenerative Medicine. Elsevier.
4. Mark Quentin Benedict. (2019) Transgenic Insects: Techniques and Applications. CABI Publishing
5. Murray, D.R. (1991) Advanced Methods In Plant Breeding Biotechnology. Cab, International, Wallingford, Oxon, United Kingdom.
6. Pevsner, J. (2009). Bioinformatics and Functional Genomics. Ii Edition. John Wiley & Sons.
7. Russell, P. J. (2009). Igenetics- A Molecular Approach. III Edition. Benjamin Cummings.
8. Alfred M. Handler, Anthony A. James. (2020). Insect TransgenesisMethods and Applications. CRC Press.
9. Suraksha Chanotra, Muzafar Ahmad Bhat, Gurvinder Raj Verma. (2023). Advances in Seribiotechnology. ELIVA Press.
10. Muzafar Ahmad Bhat, Suraksha Chanotra, Shahina A. Nagoo, Zafar Iqbal Buhroo (2023). Genetics of Bio-Chemical Techniques. Innovative Publications.

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

For the Examination to be held in Year 2026, 2027& 2028

SERICULTURE COURSE

UG SEMESTER VIII (HONOURS)

UNDER NEP-2020

University of Jammu

Syllabi of Sericulture for FYUGP under CBCS as per NEP-2020

SEMESTER-VIII (HONOURS)

(Examination to be held in 2026, 2027 & 2028)

Major Course

Course Code: **UMJSET801** Course Title: **BIOSTATISTICS IN SERICULTURE**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: **UMJSET802** Course Title: **ADVANCES IN MULBERRY PATHOLOGY**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: **UMJSET803** Course Title: **CONCEPT OF TOXICOLOGY**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: **UMJSET804** Course Title: **ADVANCES IN SERICULTURE EXTENSION**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Minor Course

Course Code: **UMISET805** Course Title: **CONCEPTS OF BIOCONTROL**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MAJOR COURSE)

MAJOR CORE COURSE NO.	:	UMJSET801
MAJOR CORE COURSE TITLE	:	BIOSTATISTICS IN SERICULTURE
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know the context of sericulture empowers individuals to apply statistical methods to address specific challenges in silk production. It facilitates evidence-based decision-making, optimization of practices and contributes to the sustainable and efficient management of sericulture operations. Studying biostatistics in sericulture, which is the cultivation of silk-producing insects, can lead to several specific outcomes that are tailored to the unique challenges and characteristics of sericulture.

Unit-1: Introduction to Biostatistics (13 Hours)

1.1 Biostatistics: Importance, functions and basic concepts.
1.2 Collection, classification and tabulation of data. Techniques of recording observations – mulberry and silkworm rearing..
1.3 Frequency distribution – with and without class intervals, cumulative, relative and per cent relative frequencies.
1.4 Measures of central tendency and dispersion, standard error – variance and co-efficient of variation and probability.

Unit-2: Biostatistics I (10 Hours)

2.1 Population and sample, descriptive and inductive statistics, discrete and continuous variables.
2.2 Graphic presentation of data: Time series graphs and frequency distribution graphs - histogram, frequency polygon and frequency curve.
2.3 Diagrammatic presentation of data: Line diagrams, bar diagrams.
2.4 Pie diagrams, pictograms and cartograms.

Unit-3: Biostatistics II (12 Hours)

3.1 Tests of significance – Chi-square, Student 't' and F-tests; levels of significance.

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3.2 Experimental designs: Basic principles and Analysis of variance. Systematic and randomized designs.
3.3 Design and analysis - CRD, RCBD, LSD and factorial experiments.
3.4 Correlation and regression analysis.

Unit-4: Biostatistics III (10 Hours)

4.1 Use of statistical packages in data analysis, Databases – components and applications.
4.2 Analysis of variance, assumptions, one-way classification, two way classification, equal number of observations per cell, multiple comparisons.
4.3 Computer security: Symptoms, detection and protection from virus, hacking, cybercrime and cyber-security.
4. 4 Use of statistical software's for data analysis.

PRACTICALS (30 Hours)

1. Record of observations on mulberry – growth and yield parameters.
2. Record of observations on silkworm - rearing, cocoon and grainage parameters.
3. Introduction of programming languages. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document.
4. Graphic and diagrammatic presentation of data.
5. Analysis of data though Chi square and Student 't' tests.
6. Analysis of data through CRD and RCBD.
7. Analysis of data through LSD.
8. Analysis of data through factorial experiments.
9. A consolidated report shall be submitted at the end of the course for evaluation towards C-2 component.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be Covered in examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., at least one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. The candidate has to attempt 4 questions selecting one from each unit.

Internal Assessment {Total marks15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Mathur, N. (2012) Algorithms and Data. Structures Publishing Radha Krishan Anand & Co.
2. Arumugam, N. (2013) Basic concepts of Biostatistics. Saras Publication, Kanya kumari-Tamil Nadu.
3. Arumugam, N. (2009) Basic Concepts of Biostatistics. Saras Publication, Nagercoil, T.N.
4. Chap, T. Le, (2003) Introductory Biostatistics. John Wiley & Sons, Inc., Hoboken, New Jersey.
5. Kulkarni, A. P. (2020) Basics of Biostatistics. CBS Publishers and Distributors
6. Surender Singh and Priyanka Singh (2020) Biostatistics and Research Methodology. New Age International Publishers.
7. Banerjee Pranab Kumar (2021) Introduction to Biostatistics. S. Chand Publications.
8. Veer Bala Rastogi (2015) Biostatistics. Medtech Publishers.
9. Abhiram Behera (2015) Practical Use of Biostatistics. Paras Medical Publisher
10. Khan And Irfan A and Atiya Khanum. (1994) Fundamentals of Biostatistics. Ukaaz Publications
11. P Hanmanth Rao and K Janardhan (2019) Fundamentals of Biostatistics. Dreamtech Press
12. Sudhir Kumar Pundir (2021) Biostatistics. CBS Publishers & Distributors
13. P K Banerjee (2007) Introduction to Bio-Statistics. S Chand Publishing
14. Gurumani N (2010) An Introduction to Biostatistics. Mjp Publishers

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MAJOR COURSE)

MAJOR CORE COURSE NO.	:	UMJSET802
MAJOR CORE COURSE TITLE	:	ADVANCES IN MULBERRY PATHOLOGY
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to examine adverse effects of drought on mulberry plant growth and will also be able to examine different mulberry diseases and their management. It will help the learners for proper understating of pathogen behavior, their interaction with host which in turn allow them for development of resistant mulberry cultivars.

UNIT-1: PRINCIPLES OF MULBERRY PATHOLOGY-I (13 HOURS)

1.1 Definitions and concepts of plant diseases.

1.2 History and growth of plant pathology.

1.3 Biotic and abiotic causes of plant diseases;

1.3.1Survival and dispersal of important pathogens of mulberry.

1.3.2 Role of environment and host nutrition on disease development.

1.3.3 Co-evolution of plant pathogens.

1.4 Classification of parasites in mulberry pathology.

UNIT-2: PRINCIPLES OF MULBERRY PATHOLOGY –II (10 HOURS)

2.1 Host parasite interaction, recognition of host by pathogens.

2.1.1Concept of infection

2.1.2 Entry of pathogen into host

2.1.3 Mode of host penetration

2.2 Appressorium & symptomatology

2.2.1 Patthogen offence.

2.2.2 Role of enzymes & toxins in disease development.
2.3 Role of growth regulators and polysaccharides in disease development
2.3.1 Classification, mode of action of various toxins.

UNIT-3: TECHNIQUES IN MULBERRY PATHOLOGY-I (10 HOURS)

3.1 Defense strategies- Physical and biochemical (preformed and post inflectional).
3.1.1 Physiological changes in host after infection.
3.1.2 Genetics for disease resistance.
3.1.3 R genes for disease resistance.
3.1.4 Vertical and horizontal resistance.
3.2 Tissue culture and genetic engineering for disease resistance.

UNIT-4: TECHNIQUES IN MULBERRY PATHOLOGY-II (12 HOURS)

4.1 Genesis, importance and scope of molecular plant pathology.
4.1.1 Study of basic and advanced serological techniques.
4.1.2 Production of monoclonal and polyclonal antibodies
4.2 Detection and diagnosis of plant pathogens by various immunological techniques.
4.3 Molecular techniques in epidemiology.
4.3.1 Bioinformatics in plant pathology.
4.3.2. Gnotobiotic culture.
4.3.3 Nanotechnology in Plant Pathology.
4.4 Advanced computations in molecular techniques.

PRACTICALS (30 Hours)

1. Instrumentation of Molecular Plant Pathology Lab.
2. Use of different equipment.
3. Tissue culture in mulberry pathology.
4. Detection of Plant pathogens in Plants and Plant Parts.
5. Isolation of soil microbes and determination of rhizosphere effect.
6. Survey for root diseases of mulberry in your locality.
7. Survey for leaf diseases of mulberry in your locality.
8. Survey for nutrient deficiency diseases of mulberry in your locality.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60

60

Continuous assessment	-	-	**10 (Based on Daily Performance only)**
Final Practical examination	-	-	**15**

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Mulberry crop protection, D D Sharma Central Silk Board, Bangalore.
2. Experiments in Microbiology,plant pathology,Tissue culture and Mushroom cultivation K R Aneja, New age Publishers.
3. Textbook of Modern Plant PathologyK. S. Bilgrami and H.C. Dube
4. Fundamentals of Plant Physiology,by V. K. Jain 8) Plant Physiology, H. S. Srivastava
5. Ravichandra N.G (2013). Fundamentals of Plant Pathology. Prenticehall India Learning Private Limited.

WEB REFERENCES

1. https://www.researchgate.net/publication/344807694_PHYSIOLOGY_OF_MULBERRY_AND_SIKWORM.
2. https://www.researchgate.net/publication/225351110_Advances_in_mulberry_tissue_culture.
3. https://bsppjournals.onlinelibrary.wiley.com/doi/full/10.1002/ndr2.12196.
4. https://kssrdi.karnataka.gov.in/page/Contributions/Moriculture%20Technologies/Mulberry+Diseases+&+Microbes/en.
5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10378407/.

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MAJOR COURSE)

MAJOR CORE COURSE No.	:	UMJSET803
MAJOR CORE COURSE TITLE	:	CONCEPT OF TOXICOLOGY
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know about different types of formulations of chemicals, how to apply and how to makethe chemical concentrations. The course may also make the students understand various techniques and minimize the diseases to improvise the cocoon production technologies in Sericulture.

UNIT-1: CONCEPTS OF TOXICOLOGY-I (12 HOURS)

1.1. Introduction to toxicology: history, Scope and Principles of chemical control.
- 1.1.1 Insect growth regulators: Microbials, botanicals, new promising compounds etc.
- 1.1.2 Principles of toxicology; evaluation of insecticide toxicity.

1.2. Pesticide and Insecticide use, pesticide industry in India.
- 1.2.1 Formulation of pesticides.
- 1.2.2 Formulation of insecticides.

1.3. Classification of insecticides and acaricides
- 1.3.1 Based on mode of entry, mode of action and chemical nature.
- 1.3.2 Host-plant resistance, agronomic manipulations, physical, chemical and mechanical.

1.4. Physical, chemical and toxicological properties of different group of insecticides.
- 1.4.1 Chlorinated hydrocarbons, organophosphates, carbamates, synthetic pyrethroids, chlordimeform
- 1.4.2 Chitin synthesis inhibitors, avermectins, nitroguandines, phenylpyrrozoles,
- 1.4.3 Botanicals: natural pyrethroids, rotenone, neem products, nicotine and pongamia spp.

UNIT-2: CONCEPTS OF TOXICOLOGY-II (12 HOURS)

2.1. Evaluation of toxicity: methods of toxicity testing.
- 2.1.1 Determination of LC-50, LD-50, LT-50 and RL-50 value.
- 2.1.2 Pharmacology of insect poisons.

2.1.3 Toxicogenic insects and phytotoxemia.

2.2. Pesticide residue in the environment and their dynamics and management.

2.2.1 Selectivity of insecticidal actions; insecticide resistance, mechanism, genetics and management of insecticide resistance.

2.2.2Tritrophic interactions and induced resistance.

2.2.3 Insect resistance to transgenic plants.

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

2.3.1 Commercial and trade name of common pesticides of sericulture industry.

2.4. Metabolism of insecticides: activative and degradative metabolism, detoxification enzymes and their role in metabolism.

2.4.1 Hormonal control: types and functions of insect hormones.

2.4.2 Insect hormone mimics.

2.4.3 Advantages and limitations.

UNIT-3: SERICULTURE AND TOXICOLOGY-III **(12 HOURS)**

3.1. Introduction to toxicology of silkworm

3.1.1 Procedures used in toxicology studies.

3.1.2 Methods of administration of pesticides.

3.1.3 Toxic symptoms in silkworm.

3.2. Basis of resistance: Antixenosis, antibiosis and tolerance.

3.2.1 Biotype development and its remedial measures.

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

3.3.1Chemosterilants, antifeedants, attractants and repellents: their types methods of application, advantages and limitations.

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

3.4.1 Concepts of damage level: ETL and EIL and their determination.

3.4.2 Biocontrol agents utilization; genetic and behavioral control strategy.

UNIT-4: PEST CONTROL APPROACHES IN SERICULTURE-II **(12 HOURS)**

4.1. Mechanism of pathogen transmission: active mechanical transmission and biological transmission

4.1.1 Innovative approaches in pest control.

4.1.2 Behavioral control: pheromones; its types, uses advantages and limitations.

4.2. Common pesticides used in mulberry gardens: appliances (sprayers, dusters, fog generators, smoke generators, soil injecting guns, seed treatment drums, flame throwers etc.).

4.2.1 Power operated sprayers and dusters; types of nozzles and their uses.

4.3. Maintenance of appliances. Aerial application of pesticides, principles of aerial application.

4.3.1 Factors affecting the effectiveness of aerial application.

4.3.2 Equipments required for aerial application: their advantages and disadvantages.

4.4. Dosage and schedule of pesticide application in mulberry. Safe period.

PRACTICALS (30 HOURS)

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

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous Assessment	-	-	10 (Based on Daily Performance only)
Final Practical Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}
Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.
Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Eikichi Hiratsuka (2000) Silkworm Breeding. Oxford & IBH Publications, New Delhi.
2. Verma, P.S. and Agarwal, V.K. (2004) Cell Biology, Genetics, Evolution and Ecology. Published by S. Chand & Co., New Delhi.
3. Verma, P.S. and Agarwal, V.K. (2004) Cell Biology, Genetics, Evolution and Ecology. Published by S. Chand & Co. New Delhi.
4. Handbook of Sericulture Technologies-(4th Edition)(2005) CSB Bangalore.
5. 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.
6. Tips to Successful Silkworm Cocoon Crops, (2006) CSB Bangalore.
7. Silkworm Breeding & Genetics, (2006) CSB Bangalor.
8. Guidelines for bivoltine rearing, (2009) CSB Bangalore.
9. Shamsuddin, M. (2012) Silkworm Physiology, Daya publishing house New Delhi.

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MAJOR COURSE)

MAJOR CORE COURSE NO.	:	UMJSET804
MAJOR CORE COURSE TITLE	:	ADVANCES IN SERICULTURE EXTENSION
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
iii) Continuous assessment	:	10
iv) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know about the objectives of extension education and SWOT analysis.The course may also make the students understand the various Sericulture Extension Organization, Program Evaluation and Review Technique (PERPE) and also know about the Role of NABARD in Sericulture Extension System.

UNIT-1: SERICULTURE EXTENSION & MANAGEMENT (12 HOURS)

1.1. Extension Education: objectives, principles and types.
- 1.1.1 Importance and concept Extension Education.
- 1.1.2 Functions of extension education.

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

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

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

UNIT-2: SERICULTURE EXTENSION SERVICES (13 HOURS)

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

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

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

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

UNIT-3: EXTENSION PROGRAMME, COMMUNICATION AND TRAINING (12 HOUR

3.1. Extension programme: Programme planning, principles of planning, six P's of planning.
- 3.1.1 Criteria for setting up of extension units.
- 3.1.2 Teaching and learning process.

3.2: Communication: definitions, meaning, concept, Functions, models and elements.
- 3.2.1 Importance of communication evaluation.
- 3.2.2 Extension programme management; Sericulture development through plans.
- 3.2.2 Major Extension programme management in Sericulture.

3.3. Training: meaning, principles, methods and training programmes in Sericulture.
- 3.3.1 Adoption and diffusion of innovations.

3.4. Extension services in Sericulture.

UNIT-4: SERICULTURE EXTENSION SYSTEM (12 HOURS)

4.1. Extension teaching methods adopted in sericulture.
- 4.1.1 Use of audio-visual aids in Sericulture.
- 4.1.2 TOT (Transfer of Technology): meaning and systems; role of extension in TOT.

4.2: Sericulture extension system: Extension systems of CSB.
- 4.2.1 State governments voluntary organizations in Sericulture extension system
- 4.2.2 Role of Universities in Sericulture extension system

4.3: Classification of various extension teaching methods.
- 4.3.1 Methods- individual, group, mass contact methods.
- 4.3.2 Scope and limitation of each extension teaching methods

4.4: Role of sericulture extension for the upgradation of Sericulture
- 4.4.1 Strategies and Future implementation for the improvisation of sericulture through Sericulture extension system.
- 4.4.2 Future Prospects of Sericulture extension system.

PRACTICALS (30 HOURS)

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

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

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
Final Practical examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

Recommended Readings

1. P. Kumaresan& Dr. G. Srinivasa (2005) Sericulture Extension Management & Economics.
2. Kumaresan, P. and Srinivasa, G. (2005) Sericulture Extension Management and Economics. Central Silk Board, Bangalore.
3. Jha, U. M. & Daman C. M. (2006) Economics of Silk Weavers.
4. Subramani, T (2008) Sericulture Economics.

5. Singh, T. Bhat, M. M and Khan, M. A (2009) Sericulture Extension: Principles and Management. APH Publications, New Delhi.
6. Dandin, S. B and Ghirdhar, K. (2010) Handbook of sericulture technologies. Central Silk Board, Bangalore

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MINOR COURSE)

MINOR CORE COURSE NO.	:	**UMISET805**
MINOR CORE COURSE TITLE	:	**CONCEPTS OF BIOCONTROL**
CREDITS	:	**04 {03 (Theory) + 01 (Practical)}**
MAXIMUM MARKS	:	**75**
I) External (University Exam)	:	**60**
II) Internal Assessment	:	**15**
DURATION OF UNIVERSITY EXAM	:	**03 Hours**
MAXIMUM MARKS PRACTICALS	:	**25**
i) Continuous assessment	:	**10**
ii) Final examination	:	**15**

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know about Concepts of biological control and it also make the students understand various techniques which are used in biological control

UNIT-1 INTRODUCTION (13 HOURS)

1.1 History, principle and scope of biological control.
1.2 Important groups of parasitoids, predators and pathogens
1.3 Principals of classical biological control.
  1.3.1 Importation
  1.3.2 Augmentation
  1.3.3 Conservation
1.4 Ecology of biological control.

UNIT-2: BIOCONTROL AGENTS-I (10 HOURS)

2.1 Biology, adaptation host seeking behaviour of predators
2.2 Biology, adaptation host seeking behaviour of parasitoids
  2.2.1 Types of parasitism
2.3 Enlist some of insect predators and parasitoids along with their target insect pest.

UNIT-3: BIOCONTROL AGENTS-II (12 HOURS)

3.1 Biology, adaptation and mode of action of pathogens.
  3.1.1 *Bacillus thuringiensis*
  3.1.2 *Nuclear Polyhedral Virus(NPV)*
  3.1.3 *Beauveria bassiana*

3.2. Regulation and commercialization of biopesticides.
3.3 Biological control of weeds by using
  3.3.1 Arthropods
  3.3.2 Pathogens
3.4 Biology of weed pathogens

UNIT-4: TECHNIQUES IN BIOLOGICAL CONTROL (10 HOURS)

4.1 Mass production of quality biocontrol agent-. Techniques, Formulation Ecnomics,Field release and evaluation.
4.2 Successful biological control projects, analysis and future possibilities.
4.3 Importance of natural enemies
  4.3.1 Quartine regulation
  4.3.2 Biotechnology in biological control
  4.3.3. Semiochemical in biological control

PRACTICALS (30 HOURS)

1. Identification of common natural enemies of pests.
2. Identification of common natural enemies of weeds.
3. To study the life cycle of important entomopathogens.
4. To study the life cycle of important predators.
5. To study the life cycle of important parasitoids.
6. Field collection of parasitoids and predators.
7. Visit to biocontrol lab.
8. Registration standards for biocontrol agents

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	% weightage (Marks)
Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous Assessment	-	-	10 (Based on Daily Performance only)
Final Practical Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS

1. Burges HD & Hussey NW.(Eds)1971.Microbial control of insect and mites.Academic Press London.
2. Dhailwal GS & AroraR.2001.Integrated Pest Management: Concepts and Approaches. Kalyani Publ.,New Delhi.
3. Saxena AB.Biological Control of insect Pests. Anmol Publ.,New Delhi.

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

For the Examination to be held in Year 2026, 2027& 2028

SERICULTURE COURSE

UG SEMESTER VIII (HONOURS WITH RESEARCH)

UNDER NEP-2020

University of Jammu

Syllabi of Sericulture for FYUGP under CBCS as per NEP-2020

SEMESTER-VIII (HONOURS WITH RESEARCH)

(Examination to be held in 2026, 2027 & 2028)

Major Course

Course Code: **UMJSET806** Course Title: **COMPUTER APPLICATIONS IN SERICULTURE**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Minor Course

Course Code: **UMISET807** Course Title: **MULBERRY TRANSGENESIS**
Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours
Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Skill Enhancement Course

Course Code: **USESET808** Course Title: **DISSERTATION**
Credits: 12
Maximum Marks: 300

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MAJOR COURSE)

MAJOR CORE COURSE NO.	:	UMJSET806
MAJOR CORE COURSE TITLE	:	COMPUTER APPLICATIONS IN SERICULTURE
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to know acquire knowledge on the computer, its use in support of their studies and the use of computers in sericulture. 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.

UNIT-1: INTRODUCTION TO COMPUTERS (13 HOURS)

1.1 Introduction to computers: Characteristics, history and evolution, generation and types of computers.
1.2 Memory Concepts, Units of Memory.
1.3 Computer architecture; Input and output devices; primary and secondary storage devices; central processing unit.
1.4 Operating system: Types, booting, DOS commands, Windows and its applications.

UNIT-2: MICROSOFT OFFICE, VIRUS AND INTERNET (10 HOURS)

2.1 M.S. Office: Word, Excel and Power Point.
2.2 Computer virus: Symptoms, detection and protection.
2.3 Introduction to internet: World Wide Web, database, e-mail and chat.

UNIT-3: COMPUTER SCIENCE & SERI-INFORMATICS I (12 HOURS)

3.1 Information and communications technology (ICT). Role and use of computers in sericulture
3.2 Basic Computer networks. Editing and Formatting a document, Database, concepts and types, creating database.

3.3 Introduction to Computer-controlled devices (automated systems) for Seri-input management, Smartphone apps in Sericulture.
3.4 Introduction to GIS and its applications in Sericulture.

UNIT-4: COMPUTER SCIENCE & SERI-INFORMATICS II (10 HOURS)

4.1 Management Information Systems (MIS)
4.2 Decision Support System and its applications in Sericulture.
4.3 Computer security: Symptoms, detection and protection from virus, hacking, cybercrime and cyber-security.
4.4 Demonstration of Seri-information system.

PRACTICALS (30 HOURS)

1. Introduction of different operating systems such as DOS and WINDOWS.
2. Creating Files & Folders.
3. Introduction of programming languages. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document.
4. MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.
5. MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Seri-information system.
6. Introduction to World Wide Web (WWW). Demonstration of HTML page design of e-Sericulture.
7. Silkworm data-base, Kaikobase, Clustal omega.
8. Omics database of NCBI searching and accessing genome sequences and protein sequences, alignment of two genome sequences and alignment of two protein sequences.
9. Uses and applications of computers in sericulture.

NOTE FOR PAPER SETTING

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Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

RECOMMENDED READINGS.

1. Arora, S. (2023) Computer Applications: A Textbook. Dhanpat Rai & Co. (P) Ltd.
2. Dixit, P.G. and Rayarikar A.V. (2019) Computer Applications In Statistics. Niraliprakashan.
3. Nagpal, D.P. (1999) Computer fundamentals: Concepts, systems and applications. S. Chand and Company Ltd. New Delhi.
4. Rajesh Hongal (2009) Computer Concepts. Eastern Book Promoters. Belgaum.
5. Venkatachalam, S. (1999) The Computer Revolution. Pitamber Pub. Co. Pvt. Ltd., New Delhi.
6. Hem Chand Jain, (2022) Basics of Computer Application in Business. Taxmann Publications
7. Murugun K. (2022) Fundamentals of Computers. Sunstar Publishers.
8. Pinky Gupta. (2021) Computer Applications Textbook, BPB Publications

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN SERICULTURE

UNDER CBCS AS PER NEP - 2020

(For the Examination to be held in Year 2026, 2027 & 2028)

(MINOR COURSE)

MINOR CORE COURSE NO.	:	UMISET807
MINOR CORE COURSE TITLE	:	MULBERRY TRANSGENESIS
CREDITS	:	04 {03 (Theory) + 01 (Practical)}
MAXIMUM MARKS	:	75
I) External (University Exam)	:	60
II) Internal Assessment	:	15
DURATION OF UNIVERSITY EXAM	:	03 Hours
MAXIMUM MARKS PRACTICALS	:	25
i) Continuous assessment	:	10
ii) Final examination	:	15

OBJECTIVES AND EXPECTED LEARNING OUTCOMES

After successful completion of the course the students will be able to understand the implications of modern tools for successful transformation of existing genetic stocks in mulberry. It will help the learners for achieving new goals in the direction of biotechnological advancements that could provide a platform for producing improved mulberry varieties for achieving higher silk production.

UNIT-1: FUNDAMENTALS OF GENOMICS (13 HOURS)

1.1 Genomics: Definition, origin, Scope and its applications.

1.2 Genome organization and diversity.

1.3 Fundamentals of cloning

1.3.1 Restriction endonucleases, ligases, vectors.

1.3.2 Genomic library: DNA and cDNA library.

1.3.3 DNA sequencing methods- Maxam & Gilbert and Sanger method.

1.4 Whole-genome shotgun and next generation sequencing.

UNIT-2: MOLECULAR APPROACES IN TRANSGENSIS (10 HOURS)

2.1 Growth in relation to morphogenesis.

2.1.1 Cell and organ differentiation.

2.1.2 Dedifferentiation and re-differentiation

2.1.3 Cell competence; concept of totipotency; regeneration.

2.2 Micropropagation.

2.2.1 Somatic embryogenesis.

2.2.2 Multiple shoot formation.

2.3 Somaclonal variations
2.3.1 Synthetic seeds in mulberry.

UNIT-3: TECHNIQUES IN MULBERRY TRANSGENESIS-I (10 HOURS)

3.1 Preservation and screening of germplasm for abiotic and biotic stress resistance in mulberry.
3.1.1 Embryo and endosperm culture.
3.1.2 Bioreactors.
3.2 Concept of Recombinant DNA technology
3.3 Cloning vectors for recombinant DNA: their properties and applications.
3.4 Cloning and expression of vectors: their properties and applications.

UNIT-4: TECHNIQUES IN MULBERRY TRANSGENESIS-II (12 HOURS)

4.1 Gene transfer methods in plants; target cells for transformation.
4.1.1 Gene transfer techniques using *Agrobacterium*; selectable and scanable markers.
4.1.2 Agro infection and gene transfer in mulberry.

4.2 Transgenic plants and their role in crop improvement.
4.3 Molecular farming and regulated gene expression.
4.3.1 Targeting of foreign protein into chloroplast and mitochondria
4.3.2 Transgenic mulberry verities: developed by, their properties and applications.
4.3.3 Patenting transgenic organisms and isolated genes and DNA sequences.
4.4 Plant breeder's rights (PBRs) and farmers' rights.

PRACTICALS (30 HOURS)

1. Isolation of genomic DNA from mulberry and estimation by spectrophotometry.
2. Isolation of genomic DNA from mulberry and estimation by biophotometer.
3. Isolation of genomic DNA from mulberry and estimation by gel electrophoresis.
4. Micropropagation in mulberry pathology.
5. Demonstration of gene transfer methods in mulberry.
6. Demonstration of r-DNA technology in mulberry.
7. Collection and preservation of transgenic mulberry varieties as herbarium.
8. Applications of transgenic mulberry varieties in sericulture.

NOTE FOR PAPER SETTING

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Internal Theory Assessment	50%	1 Hr. and 30 Min.	15
External Theory End Semester	100%	3 Hours	60
Continuous assessment	-	-	10 (Based on Daily Performance only)

Final Practical examination	-	-	**15**

External End Semester Theory Examination will have two sections (A & B) {Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. The Mulberry Genome. Belaghihalli N. Gnanesh and Kunjupillai Vijayan. Compendium ofPlant Genomes ISBN 978-3-031-28477-9.
2. Advances in Seribiotechnology. Suraksha Chanotra, Muzafar Ahmad Bhat and Gurvinder Raj Verma. Eliva Press. 2023.
3. Mulberry: Genetic Improvement in Context of Climate Change. Maharaj Krishen Razdan, Dennis T. Thomas · 2021.
4. Evaluation of Transgenic Mulberry Expressing the Transcription Activator Atshni for Abiotic Stress Tolerance. N. Pallavi · 2015.

WEB REFERENCES

1. https://www.researchgate.net/publication/369362030_The_Mulberry_Genome.
2. https://www.researchgate.net/figure/Genetic-transformation-and-development-of-mulberry-transgenic-plants-to-express-AtSHN1_fig1_315116949.
3. https://www.jstage.jst.go.jp/article/jibs/72/3/72_3_177/_pdf.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN SERICULTURE
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2026, 2027 & 2028)
(SKILL ENHANCEMENT COURSE)

CORE COURSE NO.	:	**USESET-808**
CORE COURSE TITLE	:	**DISSERTATION**
CREDITS	:	**12 {8 (Dissertation) + 4 (Viva)}**
MAXIMUM MARKS	:	**300**
I) Dissertation	:	**200**
II) Presentation of PPT and viva	:	**100**

Objectives and Expected Learning Outcomes

The primary objectiv e of this project work course is to facilitate the application of theoretical knowledge in solving real-world problems, fostering research competencies among undergraduate students. Through hands-on projects, students will develop critical thinking skills, and proficiency in data analysis. The course aims to cultivate a problem-solving mindset, enhance self-directed learning, and provide a platform for the acquisition of advanced knowledge through project-based study. Upon completion of the project work course, students will gain practical experience in applying academic concepts to real-life situations. They will develop strong research competencies, including data collection and analysis, literature review skills, and will be able to draw meaningful conclusions. Additionally, students will hone their communication, teamwork, and time management skills, preparing them for the challenges of their future careers or advanced academic pursuits. Overall, the course aims to equip students with the necessary skills and knowledge to thrive in professional and research-oriented environments.

Scheme of Research Project and Dissertation

Allotment of Supervisor:
Each student shall carry out a project work in one of the broad areas of Sericulture in the semester VIII under the supervision of a t faculty of the department.

Research Work and Dissertation Writing:

1. After the approval of the proposal, the student will carry out the proposed research (field/lab. work) and post-completion of the research work, students will write the dissertation. During the field/lab. Work as well as during the compilation of the dissertation the student will work under continuous guidance of the supervisor who will maintain the regular attendance of the student.
2. Student will submit 2 hard copies of the final dissertation in the department along with a soft copy of the same.

Format for dissertation is given below:

The dissertation should be presented chapter wise. Each chapter will have a precise title as given below. A chapter can be subdivided into sections, and sub-section so as to present the content discretely and with due emphasis.

Abstract
Content Page
List of Figures
List of Tables
Acknowledgement
List of Abbreviations

Chapter 1: Introduction:

It shall justify and highlight the problem posed, define the topic and explain the aim and scope of the work presented in the dissertation. This chapter also include objective of the research work. It may also highlight the significant contributions from the investigation.

Chapter 2: Review of Literature:

This Chapter presents a critical appraisal of the previous work published in the literature pertaining to the topic of the investigation.

Chapter 3: Material and Methods:

This chapter deals with a detail methodology/technique/theory by which researcher used to carry out the research work.

Chapter 4: Results and Discussion:

This chapter includes a thorough evaluation of the investigation carried out and brings out the contributions from the study. The discussion shall logically lead to inferences and conclusions as well as scope for possible further future work.

Chapter 5: Summary and Conclusion

A brief report of the work carried out shall form the first part of the Chapter. Conclusions derived from the logical analysis presented in the results and discussions chapter shall be presented and clearly enumerated, each point stated separately. Scope for future work should be stated lucidly in the last part of this chapter.

Chapter 6: References/Bibliography:

The candidates shall follow the style for references as mentioned below.

For journal:

Dave, Bhavana J., and Warren G. Sanger. "Role of cytogenetics and molecular cytogenetics in the diagnosis of genetic imbalances." In *Seminars in pediatric neurology*, vol. 14, no. 1, pp. 2-6. WB Saunders, 2007 (Chicago style)

TYPE -SETTING, TEXT PROCESSING AND PRINTING

1. The text shall be printed employing using a standard text processor. The standard font shall be Times New Roman of 12 pts with 1.5 line spacing.
2. **Binding** Spiral or hard Binding
3. **Front Covers:**The front covers shall contain the following details:

a. Full title of dissertation in 6 mm/22 point's size font properly centered and positioned at the top.

b. Full name of the candidate in 4.5 mm 15 point's size font properly centered at the middle of the page.

c. 40 mm wide replica of the College and University emblems followed by the name of department, name of the College, name of the University and the year of submission, each in a separate line and properly centered and located at the bottom of page.

4. **Title Sheet:** This shall be the first printed page of the thesis and shall contain the submission statement: the dissertation submitted in partial fulfilment of the requirements of the B.Sc. (Honours) Sericulture, the name, Registration No. and University Roll No. of the candidate, name(s) of the Supervisor, Department, College, University and year of submission.
5. **A Declaration of Academic Honesty and Integrity by Candidate:**A declaration ofAcademic honesty and integrity is required to be included along with every dissertation. The format of this declaration is given in **Annexure-I** attached.
6. **Certificate from Supervisor (Annexure-II)**:
7. **Abstract:**The 500 word (maximum) abstract shall highlight the important features of the dissertation.

Evaluation of the dissertation:

1. The project report/dissertation shall be evaluated by the external expert from other University/Colleges to be nominated by the Principal out of the panel supplied by the College Research Committee (CRC) in accordance with Guidelinesfor FYUGP issued by the University of Jammu.

2. The students shall be declared pass in the research project course if she/he secures minimum 40% marks (Dissertation and viva).

ANNEXURE-I

CERTIFICATE

The work embodied in this dissertation entitled " .... " (*write the title in capital letters*) has been carried out by me under the supervision of .... (*give the name of the Guide).*

This work is original and has not been submitted byme for the award of any other degree of University of Jammu or any other University. I also declare that no chapter of this manuscript in whole or in part is lifted and incorporated.

.....
.....
(Signature and Name of the Candidate)

Date : .....
Place : .....

ANNEXURE-II

CERTIFICATE OF DISSERTATION GUIDE/SUPERVISOR

I certify that the candidate /Mr./Ms./Mrs ..... has planned and conducted the research study entitled "..... ....." under my guidance and supervision and that the report submitted herewith is a genuine, original, and bonafide work done by the candidate in ..... (Place) from..... to ..... *(Dates)*.

.....

.....

(Signature and Name of the Supervisor)

Date : .....

Place : .....

.....

.....

Name, Signature of HoD