Cultivation of Lac: An eco-friendly multiuse wonder product of nature

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Cultivation of Lac: An eco-friendly multiuse wonder product of nature	**2**	**1**	**NIL**	**1**	**Class XII**	**NIL**

Learning Objectives

The Learning Objectives of this course are as follows:

- Understanding the basic principles and concepts of lac cultivation, such as the life cycle of lac insects, methods of propagation, and cultivation techniques.
- Acquiring knowledge of the different species of lac insects, their characteristics, and their ecological requirements.
- Learning about the various methods of harvesting lac, including timing, collection, and processing techniques.
- Developing practical skills in the management of lac plantations, such as pest and disease control, irrigation, and fertilization.
- Understanding the ecological and environmental impacts of lac cultivation and its sustainability.

Learning Outcomes

By the end of the course, the students will be able to:

- understand the basic principles and concepts of lac cultivation, including the life cycle of lac insects, methods of propagation, and cultivation techniques.
- distinguish the different species of lac insects, their characteristics, and their ecological requirements.
- demonstrate proficiency in the methods of harvesting lac, including timing, collection, and processing techniques.
- apply quality control and assurance measures in lac cultivation.
- attain practical skills in the management of lac plantations, such as pest and disease control, irrigation, and fertilization.
- communicate effectively with stakeholders such as farmers, policymakers, and researchers in the field of lac cultivation.
- analyse and evaluate the challenges and opportunities in lac cultivation and proposing innovative solutions.

Skill development and job opportunities

After completion of this course students may be engaged in following job opportunities:

- Entrepreneurship development: Students can start their own entrepreneurship of scientific lac cultivation.
- Lac cultivation and processing industry: Individuals can work in the lac cultivation and processing industry as plantation managers, quality control supervisors, production supervisors, etc.
- NGOs and development agencies: Individuals can work with NGOs and development agencies to promote sustainable lac cultivation practices and provide technical support to small-scale lac farmers.
- Government agencies: Individuals can work with government agencies involved in the promotion and regulation of the lac cultivation industry.
- Academia: Individuals can pursue higher education and research opportunities in the field of lac cultivation in particular and economically important trans-kingdom interactions in general in universities and research institutions.

SYLLABUS

Unit 1: Lac: Composition and their applications **2 hours**

Historical introduction of lac, Types of lac and its composition, industrial applications of lac viz. resin, dye, wax, various chemicals of lac cultivation, Socioeconomic aspects of lac.

Unit 2: Lac production: multiple partners involved and their role **5 hours**

Major and minor lac host pants, Raising major lac host plantations of *Schleichera oleosa*, *Butea monosperma* and *Ziziphus mauritiana*, Selection of suitable host plant, Raising plantations of bushy lac host taxa namely, *Flemingia* sp. and *Calliandra* sp. for intensive lac cultivation, Pruning management of host plants, Integrated nutrient management of host plants. Morphology and lifecycle of lac insect, Crop cycle on host plant, multiparter interactions involving plant host-lac insect- endosymbiont and their role, implications of endosymbionts in lac production.

Practical: **12 hours**

1. How to select suitable lac host plant
2. Scientific pruning techniques of lac host plants
3. Methods and techniques of nutrient management of host plants
4. Study of morphology and life stages of lac insect
5. Crop cycles of lac on different host plants

Unit 3: Pests and diseases in lac ecosystem and their management **1 hours**

Pests and diseases of lac host plants and lac insects; pest management in lac.

Practical: **4 hours**

6. Identification of lac insect pests and diseases
7. Techniques of pest management in lac

Unit 4: Broodlac and inoculation management **2 hours**

Selection, procurement, storing and transport of brood lac, brood Lac Inoculation Methods and inoculation management.

Practical: **4 hours**

8. Methods of determination of brood lac maturity
9. Scientific Brood Lac Inoculation Methods

Unit 5: Scientific lac production methods **4 hours**

Rangini lac production on *Butea monosperma*, Rangini lac production on *Ziziphus mauritiana*, Kusmi lac production on *Schleichera oleosa*, Winter Kusmi lac production on *Ziziphus mauritiana*, Coupe system of lac cultivation, Utilizing multiple lac hosts through coupe system, Intensive lac production on bushy lac host *Flemingia* sp. and *Calliandra* sp., Lac integrated farming system, Alternation of conventional host for sustainable brood lac quality.

Practical: **8 hours**

10. Designing of coupe system of lac cultivation
11. How to formulate lac integrated farming system
    - Students visit to an Institute/Field and Prepare a report.

Unit 6: Harvesting and post-harvest management of lac **1 hours**

Harvesting of lac, harvest management of lac.

Practical: **2 hours**

12. How to harvest lac and harvesting tools
13. Methods of post-harvest management of lac

Recommended Books:

1. Sharma, K.K. & Ramani, R. (Eds.). (2011). *Recent advances in lac culture*. ICAR-IINRG publications.
2. Mathur, P. N., & Lal, S. B. (1993). *Lac Production, Processing and Marketing*. Indian Council of Agricultural Research.
3. Agarwal, J. P., & Gupta, R. K. (2006). *Lac Culture in India*. Daya Publishing House.
4. Agrawal, K. C., & Bhatnagar, S. K. (2009). *Lac Insect and Lac Culture*. Westville Publishing House.
5. Mattu, V. K., & Mathur, P. C. (2005). *Handbook of Lac Production Technology*. Indian Lac Research Institute.
6. Roy, D., & Dasgupta, P. (Eds.). (2016). *Lac Insect (Kerria lacca) Cultivation*, Processing and Uses. CRC Press.

Examination scheme and mode:

Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.