

**Course No.** : AEL-SSAC-486  
**Title** : Soil and Water Clinic  
**Credits** : 0+20  
**No. of Student** : 30  
**Department involved** : Soil Science and Agril. Chemistry,  
 Agronomy, Economics and Extension.

Sr. No.	Topics to be covered	No. of Practicals
<b>Soil Science and Agril. Chemistry</b>		
1.	Orientation	4
2.	Visit to soil testing laboratory to study layout, laboratory requirements, working pattern and budget requirement	12
3.	Field visit (Field crops/orchards) to identify nutrient deficiency symptoms in various crops and collection of soil, water and plant samples.	8
4.	Preparation of chromic acid solution for washing laboratory glasswares and acquainting with water distillation unit. Precautions while doing analysis (micro/macro)	8
5.	Preparation and standardization of commonly used acids	4
6.	Preparation and standardization of commonly used bases	4
7.	Processing of soil and plant samples for analysis	8
8.	Analysis of soil samples for pH, EC and interpretation	4
9.	Analysis of soil samples for organic carbon and interpretation	4
10.	Analysis of soil samples for available nitrogen and interpretation	4
11.	Analysis of soil samples for available phosphorus acid, neutral and alkaline soils, interpretation.	8
12.	Analysis of soil samples for available potassium and interpretation	4
13.	Analysis of soil samples for available sulphur and interpretation.	4
14.	Analysis of soil samples for micronutrients (Fe, Zn, Cu and Mn) and interpretation	4
15.	Analysis of soil samples for boron and interpretation	4
16.	Analysis of soil samples for molybdenum and interpretation	4
17.	Analysis of plant samples for N content	8
18.	Analysis of plant samples for P,K, Ca, Mg, S and micronutrient (Fe, Mn, Cu and Zn)	24
19.	Fertilizer recommendation based on STCR and DRIS techniques and interaction with farmers.	8
20.	Visit to organic farming fields and collection of data on different farming practices for evaluation of soil health.	8
21.	Analysis of organic manures (FYM, Vermicompost, GM etc.) for moisture and their nutrient composition (N, P, K, S and micronutrients, C:N ration)	32
22.	Visit to problematic fields (salt-affected / acids soils)	8
23.	Characterization of problematic soils	34
	a) Estimation of pH and EC	
	b) Estimation of water soluble and exchangeable cations	
	c) Estimation of water soluble anions	
	d) Estimation of ESP of soils	
	e) Estimation of gypsum requirement	
	f) Estimation of lime requirement	
	h) Interpretation of analytical data	

24.	Analysis of water samples for salinity and alkalinity hazard (irrigation suitability)	8
25.	Mechanical analysis of soil sample	8
26.	Determination of bulk density	4
27.	Rapid chemical tissue test for N,P,K	4
28.	Use of soil test kit	4
29.	Licensing and legal procedure for establishment soil testing laboratory	8
25.	Report writing and examination	20
	<ul style="list-style-type: none"> <li>• Fertilizer and organic manure recommendation based on soil and plant analytical data</li> <li>• Measures to manage poor quality of water</li> <li>• Ameliorative measures for management of problematic soils</li> <li>• Preparation of soil health card</li> </ul>	
<b>Agronomy</b>		
1	Importance of Agronomy in soil and water resource utilization	2
2	Cropping pattern A] Under irrigated condition B] under dry land condition C] Under problematic soil D] as per land capability class	6
3	Methods of manures and fertilizer application and their classification	4
4	Methods of irrigation A] Irrigated area B] Limited water resources	4
5	Soil and moisture conservation practices/ measures A] Mechanical measures B] Agronomical measures	4
6	Agronomical measures for soil improvement A] Crop rotation, intercropping B] Agroforestry C] Cover crops D] Green manuring, strip cropping	6
7	Quality of water for irrigation A] Parameter of quality water B] Management strategies for utilization of poor quality water	6
	<b>Total</b>	<b>32</b>
<b>Agricultural Economics</b>		
1	Formulation of economical viable soil and water clinic project	10
2	Visit to soil and water clinic laboratories	2
3	Evaluation to be done periodically	2
	<b>Total</b>	<b>14</b>
<b>Agriculture Extension Education</b>		
<b>I</b>	<b>Technology transfer through print media</b>	
1	Effective Extension methods for technology transfer	1
2	Preparation of note on various aspects of Agril. Journalism viz., meaning, nature, scope, importance, role etc.	1
3	Designing and layout and preparation of cover page for various extension literatures viz., a] Farm magazine, b] Booklet c] Leaflet, d] Folder e] Res. Journal	2
4	Techniques of writing news for newspapers	1
5	Techniques if writing, editing and proof reading for	1

	A] News stories, B] Feature articles C] Success stories and D] Experience features etc.	
6	Visit to college development block to document various extension activity viz., news story, feature articles, success stories etc. ( <i>with reference to major subjects</i> )	2
<b>II</b>	<b>Technology Transfer through Electronic Media</b>	
7	Preparation of radio script for different programmes	1
8	Preparation of television script to telecast	1
9	Photo-journalism-concept, scope, importance	1
10	Photo-journalism : its application-photo features, editing, captions etc	2
11	Visit to college development block for photography and its news in reports/articles etc. ( <i>with reference to major subjects</i> )	1
12	Video shooting-production of agricultural video films and its editing and dubbing	2
<b>III</b>	<b>Adoption of Technologies-Documentation and Presentation</b>	
13	Visit to college development block for photography and its news in reports/articles etc. ( <i>with reference to major subjects</i> )	1
14	Preparation of reports	2
15	<i>Viva-voce</i>	1
	<b>Total</b>	<b>20</b>

**AEL HORT- 488****Title: Protected Cultivation of High Value Horticulture Crops (0+20)****Major Department Horticulture 0+13**

**Associate Departments**

1. Econ 0+1
2. Extn 0+1
3. Ent 0+1
4. Pl.Path 0+1
5. SSAC 0+1
6. Agril. Engg 0+2

Sr. No.	Particulars	No. of practicles
<b>Major Deptt. Horticulture</b>		<b>Credits 0+13</b>
1	Orientation-book keeping, records etc. Field work of establishment -Exposure to Hi-Tech facilities Types of structures viz. GH-1, GH-2, GH-3, shade net house etc.	1-15
2	Preparation of growing media viz. raised beds, cocpeat filling etc.	16-50
3	Soil and media sterilization	51-80
4	Bed and/or media sterilization/fumigation	81-120
5	Disinfection of planting material before planting	121-150
6	Planting in beds and/or growing in media and pots	151-180
7	Aftercare operations like watering, gap filling, weeding, manuring, earthing up, potting and repotting for crops like rose, gerbera, anthurium, orchids etc.	181-200
8	Laying drip irrigation layout, micro-irrigation, fertigation unit, green house roof water harvesting and utilization.	201-210
9	Training, netting, pruning, pinching, disbudding, bending and other special horticultural practices.	211-220
10	Identification of marketable stage of harvest	221-230
11	Post harvest handling operations followed	231-240
12	Visit to commercial floriculture units	241-250
13	Report writing and examination	251-260
<b>Associate Department</b>		<b>1. Econ 0+1</b>
1	Market study: Survey of domestic and export market for high value crops cultivated under protection	1-4
2	Estimation of cost of cultivation and marketing costs	5-10
3	Preparation of project and its evaluation	11-14
4	Study of supply chain of high value crops	15-16
5	Visit to protected cultivation projects	17-18
<b>2. Extn 0+1</b>		
1	Technology transfer through print media	1-8
2	Technology transfer through electronic media	9-16
3	Adoption of technologies- documentation and presentation	17
4	Preparation of reports and viva voce	18-20
<b>3. Ent 0+1</b>		
1	Monitoring of pests of horticultural crops under protected cultivation	1-6
2	Management of pests of horticultural crops under protected cultivation	7-16
<b>4. Pl.Path 0+1</b>		
1	Monitoring of diseases of protected horticultural crops	1-4
2	Management of diseases of protected horticultural crops	4-16
<b>5. SSAC 0+1</b>		
1	Preparation of media for the protective cultivation of crops-gerbera, rose, carnation etc.	1-4
2	Essential nutrients their role- physiological and biochemical for the quality	5-7

	of horticultural plants	
3	Nutrient concentration at various stages of crop growth- gerbera, rose, carnation etc.	8-9
4	Deficiency symptoms observed in protective cultivation of crops- gerbera, rose, carnation etc.	10-12
5	Study of water soluble fertilizers- sources, kind and preparation of solutions in different tanks	13-14
6	Method of application of straight fertilizers and water soluble fertilizers	15
7	Post harvest studies of flowers- quality parameters	16
8	Water quality for protective cultivation of horticultural crops	17
<b>6. Agril. Engg</b>		<b>0+2</b>
1	Study of different types of greenhouses	1-3
2	Study of greenhouse covering and construction materials and erection of green house	4-9
3	Cost of estimation of greenhouse	10-12
4	Study of cooling systems and ventilation of greenhouse	13-14
5	Water requirement for greenhouse crops	15-18
6	Study of instruments for greenhouse	19-22
7	Study of irrigation systems for greenhouse	23-27
8	Visit to commercial greenhouse	28-32

## AEL HORT-486

Title: Vegetable Production (0+20)

Major Department- Horticulture 0+16

Associate Departments	1. Econ	0+1
	2. Ent	0+1
	3. Pl.Path	0+1
	4. SSAC	0+1

Sr. No.	Particulars	No. of practicles
<b>Major Deptt. Horticulture Credits 0+16</b>		
1	Orientation (Book keeping and records) and preparation of inventories	1-4
2	Nursery bed preparation and sowing, seed treatment, and aftercare	5-20
3	Portray nursery and structures for portray nursery	21-30
4	Preparation of main field and incorporation of manures, fertilizers, opening of ridges and furrows	31-70
5	Seedling treatment and transplantation	71-120
6	Weedicide application and mulching for vegetable crops	121-125
7	Aftercare, irrigation and gap filling	126-140
8	Study of irrigation systems for vegetables	141-150
9	Weeding, earthing up and staking	151-170
10	Top dressing and earthing up	171-190
11	Disorders in vegetable crops	191-210
12	Pinching, nipping and training operations	211-230
13	Application of GRS	231-240
14	Harvesting grading and packing	141-300
15	Preparation of project proposal for establishment of commercial units	301-310
16	Visit to commercial vegetable farms	311-316
17	Report writing and examination	317-320
<b>Associate Departments 1. Econ 0+1</b>		
1	Estimation of cost of production of major vegetables	1-6
2	Estimation of cost of marketing	7-10
3	Market study: Survey of domestic and export market for vegetables	11-13
4	Study of marketing channels and price spread	14-16
<b>2. Ent 0+1</b>		
1	Monitoring of pests of vegetables	1-6
2	Management of vegetable pests	7-16
<b>3. Pl.Path 0+1</b>		
1	Monitoring of diseases of vegetable crops	1-4
2	Management of diseases of vegetable crops	5-16
<b>4. SSAC 0+1</b>		
1	Preparation of media for the protective cultivation of vegetable crops	1-4
2	Essential nutrients their role- physiological and biochemical for the quality of vegetables	5-7
3	Nutrient concentration at various stages of crop growth	8-9
4	Deficiency symptoms observed in cultivation of vegetable crops	10-12
5	Method of application of fertilizers	13-14
6	Post harvest studies of vegetables- quality parameters	15-16

## AEL HORT-487

## Title: Nursery Management of Horticulture Crops (0+20)

Major Department- Horticulture 0+15

Associate Departments

1. Econ	0+1
2. Ent	0+1
3. Pl.Path	0+1
4. SSAC	0+1
5. Bot	0+1

Sr. No.	Particulars	No. of practicles
<b>Major Deptt. Horticulture Credits 0+15</b>		
1	Orientation-book keeping, records & preparation of inventories .	1-2
2	Preparing outline of nurseries (map on paper indicating diff. components)	3-15
3	Establishment of nursery structure	16-25
4	Establishment of irrigation system	26-35
5	Establishment of compound, working shade, field preparation	36-50
6	Establishment of nursery pathway and arrangement of electric power.	51-60
7	Establishment of mother orchard & its maintenance	61-80
8	Different types of container, media., tools, plant protection equipments	81-90
9	Selection and preparation of scion materials of commercially important horticulture crops	91-110
10	Selection and raising of rootstock for different horticulture crops	111-125
11	Raising seedling – vegetables, seasonal flower, fruits, ornamental plants, portray nursery	126-150
12	Propagation by cutting of flower and ornamental plants.	151-175
13	Propagation by grafting, layering and budding.	176-190
14	Propagation by specialized plant parts viz. bulbs, corms, rhizomes ect.	191-215
15	Protection for natural calamities excess light, shade, heavy rains, high and low humidity	216-226
16	Application of plant growth regulators	227-240
17	Aftercare of nursery plants	241-260
18	Care during labeling, packaging, transport and sell of plants	261-270
19	Visit to different plant nursery units	271-290
20	Report writing and examination	291-300
<b>Associate Departments 1. Econ 0+1</b>		
1	Economics of commercial nursery unit	1-2
2	Estimation of cost of production and marketing of nursery plants	3-10
3	Seed and nursery act	11-12
4	Preparation of project report of commercial nursery unit	13-16
5	Visit to commercial nursery units	17-18
<b>2. Ent 0+1</b>		
1	Monitoring of pests of mother block of fruit and ornamental plants	1-2
2	Management of pests in mother block of fruit and ornamental plants	3-8
3	Monitoring of pests of nursery plants	9-10
4	Management of nursery pests	11-16
<b>3. Pl.Path 0+1</b>		
1	Monitoring of diseases of horticultural crops	1-4
2	Management of the diseases of horticultural crops	5-16
<b>4. SSAC 0+1</b>		
1	Preparation of media for the nursery for various crops-flower and ornamental crops	1-4
2	Essential nutrients their role- physiological and biochemical for the quality and quantity of horticultural plants grown in nursery	5-7

3	Nutrient concentration at various stages of crop growth, grown in nursery	8-9
4	Deficiency symptoms observed in nursery plants	10-11
5	Study of water soluble fertilizers- sources, kind and preparation of solutions in different tanks	12-13
6	Method of application of straight fertilizers and water soluble fertilizers to crops grown in nursery	14
7	Water quality for protective cultivation of horticultural crops	15-16
<b>5. Bot 0+1</b>		
1	Concept of tissue culture, laboratory organization	1
2	Visit to mother block of banana and Hi-Tech floriculture unit for identification of various explants used in plant tissue culture	2-3
3	Nutritional requirement of in vitro and preparation of stock solution (Different media)	4-7
4	Collection and preparation of explants and various sterilization techniques	8-9
5	Different stages of micro propagation, culture establishment, multiplication of shoots, rooting of shoot lets	10-14
6	Hardening techniques of plantlets, transfer to field	15-16
7	Evaluation (Periodicals)	17-18



**AEL-Bot-489**  
**Title :- Plant Tissue Culture**  
**Practical Schedule**

**Credits: 0+20**

<b>Sr. No.</b>	<b>Name of the exercise</b>	<b>BOT</b>	<b>ECON *</b>	<b>PATH *</b>	<b>ENTO *</b>	<b>HORT *</b>	<b>TOTAL</b>
1	Concept of tissue culture, Laboratory Organization;	2	-	-	-	-	02
2	Visit to mother block of Banana and Hi-tech floriculture unit for identification of various explants used in plant tissue culture	3	-	-	-	03	06
3	Laboratory management, safety rules and factors affecting in vitro culture	4	-	02	02	-	08
4	Maintenance of pest and disease free mother orchard/stock	-	-	03	05	-	08
5	Sterilization techniques and handling of equipment.	09	-	02	-	-	11
6	Nutritional requirement of in vitro and preparation of stock solution (Different Media),	19	-	-	-	-	19
7	Collection and preparation of explant and various sterilization techniques.	06	-	-	-	03	09
8	Inoculation and subculture techniques	12	-	-	-	-	12
9	Callus culture and somatic embryogenesis in sugarcane	09	-	-	-	-	09
10	Micro propagation techniques; Meristem culture, Shoot tip culture, anther culture, somatic embryogenesis	09	-	-	-	-	09
11	Different stages of micro propagation; Culture establishment, Multiplication of shoots, Rooting of shoot lets,	12	-	-	-	-	12
12	Pest and diseases and their management in field and hardening unit	-	-	03	07	-	10
13	Hardening techniques of plantlets, Transfer to field	09	-	-	-	09	18
14	Meristem and shoot tip culture of banana	12	-	-	-	-	12
15	Shoot tip culture of pomegranate	12	-	-	-	-	12
16	Meristem and shoot tip culture of sugarcane	12	-	-	-	-	12
17	Shoot tip culture of strawberry	12	-	-	-	-	12
18	Shoot tip culture of gerbera and carnation	14	-	-	-	-	14
19	Shoot tip culture of chrysanthemum	12	-	-	-	-	12
20	Shoot tip culture of shatavari /sarpagandha / Lemon grass/ Citronella	12	--	-	-	-	12
21	Embryo ovule culture for effecting	05	-	-	-	-	05

	interspecific hybridization						
<b>22</b>	Regeneration studies in cotton	<b>05</b>	-	-	-	-	<b>05</b>
<b>23</b>	Isolation of genomic and plasmid DNA	<b>08</b>	-	-	-	-	<b>08</b>
<b>24</b>	Quantification of genomic and plasmid DNA	<b>03</b>	-	-	-	-	<b>03</b>
<b>25</b>	Gene transfer techniques using Agro bacterium	<b>05</b>	-	-	-	-	<b>05</b>
<b>26</b>	Gene amplification using PCR & confirmation of transgenic plants by PCR using specific primers	<b>05</b>	-	--	-	-	<b>05</b>
<b>27</b>	Somaclonal variation and confirmation by molecular tools	<b>05</b>	-	-	-	-	<b>05</b>
<b>28</b>	Virus classification and management of viral disease	-	-	<b>02</b>	-	-	<b>02</b>
<b>29</b>	Virus indexing by ELISA	<b>06</b>	-	<b>03</b>	-	-	<b>09</b>
<b>30</b>	Molecular Breeding	<b>07</b>	-	-	-	-	<b>07</b>
<b>31</b>	Visit to commercial plant tissue culture laboratories	<b>10</b>	-	-	-	-	<b>10</b>
<b>32</b>	Project formulation and submission of economically viable of tissue culture project	-	<b>15</b>	-	-	-	<b>15</b>
<b>33</b>	Evaluation (Periodical)	<b>12</b>	<b>02</b>	<b>02</b>	<b>02</b>	<b>02</b>	<b>20</b>
	<b>Total</b>	<b>251</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>17</b>	<b>318</b>

\* **Associated Department**

AEL –ASDS- 487

Credits : 0 + 20

Title : Milk and Milk Products

## PRACTICAL SCHEDULE

Sr. No.	Name of the exercise	ASDS (Major)	ECON *	EXTN *	PATH *	SSAC *	TOTAL
1	Studies and handling of modern dairy equipments (Pasteurizer, cream separator, homogenizer etc.)	10	-	-	-	-	10
2	Cleaning and sanitization of dairy processing premises.	04	-	-	-	02	06
3	Quality analysis of raw milk – platform tests, fat and SNF etc.	11	-	-	02	02	15
4	Cleaning and sanitization of dairy equipments	10	-	-	-	02	12
5	Detection of adulteration in milk (urea, sugar, starch, detergents etc.)	15	-	-	-	-	15
6	Procurement and pricing policy of milk	02	02	-	-	-	04
7	Processing of milk – collection, chilling, pasteurization, homogenization, sterilization, packaging, storage and disposal of milk	30	-	-	-	-	30
8	Determination of microbial load in milk (SPC, coliform, yeast and mould)	04	-	-	06	-	10
9	Use of permissible preservatives in milk	05	-	-	-	-	05
10	Guidelines for setting up of mini dairy plant (plan, layout and installation)	10	-	-	-	-	10
	<b>Manufacture, packaging, shelf life and economics of various dairy products</b>						
11	Fermented milk products - <i>Dahi, Lassi, Chakka, Shrikhand</i> etc.	20	04	-	01	02	27
12	Acid coagulated milk products - <i>Channa, Paneer, Rasogolla, Rasmalai</i> etc.	16	02	01	01	02	22
13	Heat dessicated milk products - <i>Basundi, Rabri, Khoa, Peda, Burfi, Kalakand, Gulabjamun</i> etc.	25	02	01	02	02	32
14	Fat rich products - Cream, Butter and <i>Ghee</i>	15	01	01	01	02	20
15	Frozen dairy product – <i>Kulfi</i> and Ice-cream	10	01	01	02	01	15
16	Detection of adulterants in various milk products	08	-	-	-	02	10
17	Visit to model dairy plant	30	-	-	-	-	30
18	Case study of co-operative, private and government structure of dairy	12	-	12	-	-	24

	industry						
19	Project report of dairy processing and product manufacturing plant	-	04	-	-	-	04
20	Evaluation (Periodical)	13	01	01	01	01	17
	<b>Total</b>	<b>250</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>18</b>	<b>318</b>

\* Associated Departments

Course No. AEL-ENT-486

Credits = 0 + 20

Title : Mass production of bioagents and biopesticides

Major Department : Agril. Entomology

Associated subjects : Economics, Extension Education

## Schedule of Practicals

Sr. No.	Title of the topic	No. of Practicals required
<b>1. Agril. Entomology</b>		
1	Introduction, General requirements for establishing biocontrol unit.	12
2	Mass production of <i>Trichogramma</i> a) Mass rearing of fictitious host, <i>Corcyra cephalonica</i> in laboratory b) Preparation of trichocard c) Packaging and storage of Trichocard and procedure for release	102
3	Mass production of <i>Cryptolaemus</i> a) Mass rearing of mealy bugs on red Pumpkin in laboratory as a fictitious host b) Release of <i>Cryptolaemus</i> for mass production c) Packaging and storage of <i>Cryptolaemus</i> and its care during release	55
4	Mass production of HaNPV/ SNPV a) Collection of <i>Helicoverpa armigera</i> ( Hubner) from field and mass rearing of <i>Helicoverpa armigera</i> in Laboratory b) Inoculation of virus to the <i>Helicoverpa armigera</i> larvae and its production c) Packaging and storage of HaNPV and its care during application in field d) Collection of <i>Spodoptera litura</i> ( Walker) from field and mass rearing of <i>Spodoptera litura</i> in Laboratory e) Inoculation of virus to the <i>Spodoptera litura</i> larvae its production f) Packaging and storage of SNPV and its care during application in field	64
5	Mass production of <i>Metarhizium</i> / <i>Nomuraea</i> a) Isolation of <i>Metarhizium</i> and media preparation b) Purification <i>Metarhizium</i> and large scale multiplication on media c) Packaging and storage of <i>Metarhizium</i> and its care during application in field d) Isolation of <i>Nomuraea</i> and media preparation e) Purification of <i>Nomuraea</i> f) Packaging and storage of <i>Nomuraea</i> and its care during application in field h) Testing of quality parameters and standardization of biopesticides.	63

6	Visits to Commercial biocontrol units and Krishi Seva Kendra.	25
<b>2. Economics</b>		
7	Cost of production and marketing of bio- agents and bio- pesticides	6
8	Govt. schemes and Subsidies	2
9	Preparation of project proposals	4
10	Study of supply chain in bio- agents and bio- pesticides	4
<b>3. Agril. Extension Education</b>		
11	Technology transfer through print media: Effective Extension methods for technology transfer. Preparation of note on various aspects of Agril. Journalism viz., meaning, nature, scope, importance, role etc. Designing and layout and preparation of cover page for various extension literatures viz. a] Farm magazine, a] Booklet c] Leaflet, d Folder e] Res. Journal Techniques of writing news for newspapers. Techniques if writing, editing and proof reading for A] News stories, B] Feature articles C] Success stories and D] Experience features etc. Visit to college development block to document various extension activity viz., news story, feature articles, success stories etc. ( <i>with reference to major subjects</i> )	08 01
12	Photo-journalism-concept, scope, importance. Photo-journalism: its application-photo features, editing, captions etc. Visit to college development	05
13	block for photography and its news in reports/articles etc. ( <i>with reference to major subjects</i> ). Video shooting-production of agril. video films and its editing and dubbing	
14	Adoption of Technologies-Documentation and Presentation: Visit to college development block for photography and its news in reports/articles etc. ( <i>with reference to major subjects</i> ).	02
15	Preparation and submission of the report for the assessment.	20
16	Final assessment of the report.	08

Course No. : AEL ENT-487

Credits: 0 + 20 = 20

**Title: Mulberry Sericulture****Major Department:** Agril. Entomology**Associated Departments:** Agronomy, Plant Pathology, Agril. Economics  
Agril. Extension Education and Agril. Engineering.**Schedule of Practicals**

Sr. No.	Exercise (s)	No. of Prac.
<b>(1) Agril. Entomology:</b>		
1	Components of sericulture; role of CSB and silkworm's hybrids; moulting and diapause in silkworm; grainage and packaging & transportation of eggs.	12
2	Role of plant nutrients in obtaining good quantum & quality mulberry leaves that in turn leads to procuring internationally accepted grade of silk filament.	08
3	Pests and techniques of plant protection of mulberry plants.	18
4	Demonstration of diseases and pests of silkworm and techniques involved in the ideal of the disease-pest management.	24
5	Rearing management technology for quality cocoon production: Disinfectants; calibration of inside-area of the rearing houses & estimating quantum of the disinfectant; executing actual process of disinfection within the rearing houses and/on rearing appliances and preparation of the plan for executing disinfection programme around the year.	24
6	Lifecycle of silkworm; maintenance of ideal environment within rearing house; sequential larval rearing operations; different methods of rearing; prime importance of initiation & ending larval moults along with the techniques of handling silkworms during moulting-phases and commonly used silkworm's rearing appliances.	20
7	Preparation of plan for executing rearing programme around the year and estimating budget for cultivation, rearing & cocoon- marketing.	04
8	Dissection of silk glands at each of the larval instars.	05
9	Techniques involved in incubating eggs by using 'Black-boxing' method; brushing of newly hatched 'Black-ants' and technology of rearing the early instars of silkworm within <i>chawki</i> -centre.	12
10	Techniques involved in bed-cleaning; bed-spacing & mounting ripe-worms on mountages and the role of proper larval-feeding in procuring targeted marketable cocoons.	10
11	Reeling and Pre-reeling operations and central / state government schemes for the mulberry sericulture. Visit to sericulture units	05
12	Visits to nearest grainage, <i>chawki</i> -centre and commercial project; preparation of bank-proposal for small, medium and large scale silk production and case studies of successful entrepreneurs.	15
13	Rearing of Mv x Bv and double hybrids of silkworm: Procurement of saplings/ cuttings and cultivation of V <sub>1</sub> variety of mulberry; procurement of industrial silkworm seed of both Mv x Bv and double hybrid; incubating eggs with black-boxing technique; brushing of black-ants rearing early instars of silkworm within <i>chawki</i> -house rearing the late instars in rearing house and mounting ripe worms on <i>netrikas</i> and rotary mountages; cocoon harvesting and marketing of the harvested cocoons.	30
<b>(2) Agronomy:</b>		
14	Moriculture: CSB's recommended mulberry varieties for rain-fed, irrigated & <i>chawki</i> -garden; varietal differentiating characters; CSB's recommended	05

	cultivation practices for rain-fed and irrigated gardens alongwith the package of practices advocated for Maharashtra state and inter-culturing operations.	
15	Techniques involved in raising mulberry plantation and <i>chawki</i> -garden. Techniques of raising mulberry-saplings.	03
16	Preparation of the land for both plantation & <i>chawki</i> -garden Utilization of manures, bio-fertilizers, fertilizers & green-manuring.	04
17	Techniques of fertigation to both plantation and garden. Techniques of macro and/or micro irrigations to both plantation and garden.	02
18	Technology of increasing leaf productivity with 'seriboost' and micronutrients. Techniques of pruning the mulberry plants.	02
19	Techniques involved in leaf- and shoot- harvesting of mulberry.	02
<b>(3) Plant Pathology:</b>		
20	Monitoring of diseases of mulberry plants.	04
21	Management of diseases of mulberry plants.	12
<b>(4) Agril. Engineering:</b>		
22	Preparation of the plan; specification, designing, & estimating the cost for both early & late larval instars rearing houses.	16
<b>(5) Agril. Economics:</b>		
23	Estimation of cost of cultivation of mulberry.	03
24	Economics of rearing and silk production.	03
25	Market-criteria and marketing of harvested cocoons.	03
26	Formulation of project proposal- a case study- profit & failure.	05
<b>(6) Agril. Extension Education:</b>		
27	Technology transfer through print media: Effective Extension methods for technology transfer. Preparation of note on various aspects of Agril.Journalism viz., meaning, nature, scope, importance, role etc. Designing and layout and preparation of cover page for various extension literatures viz. a) Farm magazine, a) Booklet c) Leaflet, d) Folder e) Res. Journal Techniques of writing news for newspapers. Techniques if writing, editing and proof reading for A) News stories, B) Feature articles C) Success stories and D) Experience features etc. Visit to college development block to document various extension activity viz., news story, feature articles, success stories etc. ( <i>with reference to major subjects</i> )	08 01
28	Photo-journalism-concept, scope, importance. Photo-journalism: its application-photo features, editing, captions etc. Visit to college development block for photography and its news in reports/articles etc. ( <i>with reference to major subjects</i> ). Video shooting-production of agril. video films and its editing and dubbing	05
29	Adoption of Technologies-Documentation and Presentation: Visit to college development block for photography and its news in reports/articles etc. ( <i>with reference to major subjects</i> ).	02
30	Preparation and submission of the report for the assessment.	10
31	Final assessment of the report.	02



**Course No. :** AEL.AGRO-4813

**Credits :** 0+20= 20

**Title :** Seed Production of field crops and processing

**Major department :** Agronomy,

**Associate department :** Botany, Agril.Engineering, Entomology,  
Pathology, Agril. Economics and Extension  
Education

**Schedule of practicals**

Sr. N.	Name of Exercise	No. of practicals	Associated department
1	Orientation to seed production technology	6	Agronomy
2	Scope of seed production, role of agricultural universities, seed village concept	4	Agronomy
3	Relationship of seed science & technology with other disciplines	2	Agronomy
4	Planning and organization of seed programme	6	Agronomy
5	Agronomic principles of seed production	6	Agronomy
6	Stages of seed multiplication	4	Agronomy
7	Selection of land and land preparation	4	Agronomy
8	Seeds and sowing	4	Agronomy
9	Visit to seed production plot	4	Agronomy
10	Visit to seed processing plant	6	Agronomy
11	Registration of seed plot		
12	Seed production technique in wheat	4	Agronomy
13	Seed production technique in sorghum	4	Agronomy
14	Seed production technique in maize	4	Agronomy
15	Seed production technique in chickpea	4	Agronomy
16	Seed production technique in chilli	4	Agronomy
17	Seed production technique in okra	4	Agronomy
18	Certifying agency and filling of application forms and registration fees etc.	3	Agronomy
19	Harvesting with special care for male and female	4	Agronomy
20	Threshing of harvested produce	4	Agronomy
21	Seed drying	3	Agronomy
22	Seed grading	3	Agronomy
23	Raw sealing with seed certification agency	3	Agronomy
24	Seed treatment	4	Agronomy
25	Seed testing for germination	3	Agronomy
26	Seed quality	4	Agronomy
27	Bagging / tagging of produce	3	Agronomy
28	Storage of produce	4	Agronomy
29	Future magnitude of seed industry	3	Agronomy
30	Report writing and presentation	4	Agronomy
31	Semester end examination	2	Agronomy
32	Concept of seed technology	6	Botany
33	Seed structure and development	3	Botany
34	Genetic principles of seed production	6	Botany
35	Botanical terminology in relation to seed technology	3	Botany
36	Seed acts, essential commodity acts	8	Botany
37	Prospects of plant variety act	2	Botany
38	Plant breeders right in relation to seed production	3	Botany
39	Certification standards for seed production of different	6	Botany

	field crops		
40	Visit to seed testing lab	4	Botany
41	Hybrid seed production technique in sorghum	6	Botany
42	Hybrid seed production technique in maize	6	Botany
43	Hybrid seed production technique in chilli	4	Botany
44	Hybrid seed production technique in okra	4	Botany
45	Roguing off types	4	Botany
46	Identification of morphological characters of true to type/ off types	4	Botany
47	Field inspection procedure/methods	8	Botany
48	Seed testing for moisture content	3	Botany
49	Seed health testing	3	Botany
50	Seed viability	3	Botany
51	Purity analysis	3	Botany
52	Seed dormancy	3	Botany
53	Seed sampling	4	Botany
54	Determination of moisture by oven method	1	Agril.Engg.
55	Study of mechanical dryers (I)	5	Agril.Engg.
56	Study of mechanical dryers (I)	2	Agril.Engg.
57	Study of drying cost of raw paddy by mechanical dryer	1	Agril.Engg.
58	Study of bulk storage structures	3	Agril.Engg.
59	Study of seed processing plant & its machinery i) Basic flow pattern ii) Analysis operation iii) Prime mover iv)Seed moving equipment	4	Agril.Engg.
60	Study of scalper	1	Agril.Engg.
61	Study of debearler and scarifier	1	Agril.Engg.
62	Study of air screen cleaner	1	Agril.Engg.
63	Study of seed treaters	1	Agril.Engg.
64	Study of grain cleaners i) Screen ii) Vibratory air screen cleaner iii) Rotary screen cleaner iv) Single and double rotary screen	3	Agril.Engg.
65	Study of specific gravity separator	1	Agril.Engg.
66	Study of disk separator	1	Agril.Engg.
67	Study of material handling equipment i) Belt conveyor ii) Screw conveyor iii) Bucket elevators	2	Agril.Engg.
68	Study of pulse milling	1	Agril.Engg.
69	Study of processing sequences to cleaning of wheat, groundnut and sorghum	1	Agril.Engg.
70	Study of oil expellers	1	Agril.Engg.
71	Monitoring of pests in different seed production programme	4	Entomology
72	Management of pests in different seed production programme	12	Entomology
73	Monitoring of the diseases in seed production plots of field crops	4	Pl.Pathology
74	Management of the diseases in seed production plots of field crops	12	Pl.Pathology
75	Economics of seed production of field crops and	3	Agril.Econ.

	processing		
76	Marketing of seeds: price spread	3	Agril.Econ.
77	Supply chain management in seed	3	Agril.Econ.
78	Seed industry in Maharashtra, National Seed Corporation, State Seed Corporation, National Seed Project and State Farms and their role in seed production	3	Agril.Econ.
79	Problems in marketing management of seeds	3	Agril.Econ.
80	Visit to seed organization : NSC, Mahabeej , NSC	3	Agril.Econ.
81	Agriculture journalism for technology transfer	16	Extension education

1. Course No. AEL-PATH- 486

Credits:0+20=20

2. Title : Mushroom Production

3. Major Department: Plant Pathology and Agricultural Microbiology

4. Associated Departments: Entomology, Agril. Extension and Agril Economics.

**Schedule of practicals**

Sr.No	Exercise	Nos of practicals
<b>1.Plant Pathology and Agricultural Microbiology</b>		
1	Introduction of Mushroom.	2
2	Morphological studies of different mushrooms.	3
3	Studies of different species of edible and poisonous mushrooms.	3
4	Nutritive value of different mushrooms	3
5	Laboratory techniques for preparation of artificial culture medias for isolation of different mushrooms.	20
6	<b>Oyster cultivation</b> Introduction of oyster cultivation: Isolation and preparation of mother culture of <i>Pleurotus</i> Mushroom. Preparation of spawn for commercial oyster cultivation. Studies on selection of different straws for oyster cultivation. Studies of different methods of straw sterilization. Spawning and bag filling of oyster mushroom. Crop management, harvesting and marketing of oyster mushroom. Visit to oyster mushroom production units	80
7	<b>Button Cultivation : ( practical)</b> Introduction of button cultivation. Selection of straw for button cultivation. Preparation of compost for button mushroom cultivation. Pasteurization of compost. Preparation of spawn for commercial production of button mushroom. Spawning of and bag filling in button cultivation. Preparation and use of casing material in button mushroom cultivation. Crop management, harvesting and marketing of button cultivation. Studies on crop management. Harvesting, packaging and storage of mushroom. Visit to button mushroom production units	95
8	<b>Milky Mushroom :</b> Introduction of Milky mushroom cultivation. Isolation and preparation of mother culture of milky Mushroom. Studies on selection of different straws for milky cultivation. Studies of different methods of straw sterilization. Spawning and bag filling of milky mushroom. Crop management, harvesting and marketing of milky mushroom Visit to milky mushroom production unit	60
<b>2. Agril Entomology</b>		
9	Monitoring of mushroom pests	8
10	Management of mushroom pests	8
<b>3. Agril. Extension</b>		
11	Effective Extension Methods for Technology Transfer	1
12	Preparation of note on various aspects of Agril. Journalism Viz. meaning, nature, scope, importance, role etc.	1
13	Designing of layout and preparation of cover page for various	2

	Extension literature viz, a. farm magazine b. Booklet c. Leaflet d. Folder e. Res. Journal	
14	Techniques of writing news for newspapers	1
15	Techniques of writing, editing and proof reading for a. news stories b. Feature articles c. Success stories d. Experience features etc.	1
16	Visit to College Development Block to document various extension activities viz. news story, feature articles, success stories etc.	2
17	Preparation of radio script for different programmes	1
18	Preparation of television script to telecast	1
19	Photo Journalism - Concept, scope, importance	1
20	Photo Journalism– its application, photo features, editing, captions.	2
21	Visit to College Development Block for photography and its use in reports/articles etc.	1
22	Video Shooting – Production of agricultural video films & its editing & dubbing	2
<b>4. Agril. Economics</b>		
23	Estimation of cost of production of mushrooms	3
24	Marketing management of mushrooms	3
25	Estimation of marketing cost and price-spread of mushrooms.	3
26	Formation of project proposal of economically viable mushroom project.	4
27	Visit to commercial mushrooms units.	3
28	Preparation and submission of the report of assessment	10
29	Final assessment of the report	2

1. Course No. AEL-PATH- 487

Credits:0+20=20

2. Title : Biofertilizer production

3 .Major Department: Plant Pathology and Agricultural Microbiology

4.Associated departments: Agril. Extension and Agril Economics.

### Practical Schedule

Sr. No.	Practical(s)	No. of Prac.
<b>Plant Pathology and Agricultural Microbiology.</b>		
1	Importance of biofertilizer in agriculture and organic farming system	3
2	Micro organisms as a biofertilizers	3
3	Types of biofertilizers A) Lignite base B) Liquid biofertilizers	3
4	Preparation of media for different organisms	3
5	Isolation, identification of Azatobacter biofertilizer microbes from soil and rhizosphere and mass multiplication.	30
6	Isolation, identification of Azospirillum biofertilizer microbes from soil and rhizosphere and mass multiplication	30
7	Isolation, identification of Acetobacter biofertilizer microbes from soil and rhizosphere and mass multiplication.	30
8	Isolation, identification of Beijerinckia biofertilizer microbes from soil and rhizosphere and mass multiplication.	30
9	Isolation, identification of Rhizobium biofertilizer microbes from soil and rhizosphere and mass multiplication.	30
10	Isolation, identification of Blue Green Algae biofertilizer microbes from soil and rhizosphere and mass multiplication.	30
11	Isolation, identification of Azolla biofertilizer microbes from soil and rhizosphere and mass multiplication.	33
12	Isolation, identification of Phosphate solubilizing-fungi microbes from soil and rhizosphere and mass multiplication.	30
13	Isolation, identification of Actinomycetes microbes from soil and rhizosphere and mass multiplication.	15
14	Isolation, identification of cellulotic micro organism for decomposing culture fungi mass multiplication.	6
15	Quality standards of different kinds of biofertilizers	3
16	Strategies of marking	3
17	Preparation and submission of the report of assessment	10
18	Final assessment of the report	2
<b>2. Agril. Extension</b>		
17	Effective Extension Methods for Technology Transfer	1
18	Preparation of note on various aspects of Agril. Journalism Viz. meaning, nature, scope, importance, role etc.	1
19	Designing of layout and preparation of cover page for various Extension literature viz, a. farm magazine b. Booklet c. Leaflet d. Folder e. Res. Journal	2
20	Techniques of writing news for newspapers	1
21	Techniques of writing, editing and proof reading for a. news stories b. Feature articles c. Success stories d. Experience features etc.	1
22	Visit to College Development Block to document various extension activities viz. news story, feature articles, success stories etc.	2
23	Preparation of radio script for different programmes	1

24	Preparation of television script to telecast	1
25	Photo Journalism - Concept, scope, importance	1
26	Photo Journalism– its application, photo features, editing, captions.	2
27	Visit to College Development Block for photography and its use in reports/articles etc.	1
28	Video Shooting – Production of agricultural video films & its editing & dubbing	2
<b>3.Agril Economics</b>		
19	Estimation of cost of production of biofertilizer	3
20	Marketing management of biofertilizer	3
21	Estimation of marketing cost and price-spread of biofertilizers	3
22	Formation of project proposal of economically viable biofertilizer unit	4
23	Visit to commercial biofertilizer units	3