Report

ICAR Norms for starting Constituent Private College in State Agricultural Universities
Sericulture

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Minimum Standards for Higher Agricultural Education (MSHAE)

Sericulture

Education Division

Indian Council of Agricultural Research

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Introduction

Sericulture is one of the important agro-based crop enterprises in India and plays an important role in improving the socio-economic conditions of the small and marginal farmers. India is the second highest producer of global silk next to China, with production of 19,690 MT of raw silk and being the only country in the world which cultures all the known commercial varieties of silk viz., Mulberry, Tasar, Eri and Muga. Mulberry sericulture is mainly concentrated in the southern states. The sericulture activity has very high employment potential besides supporting allied activities by supplying fodder to dairy and manure to agriculture. Karnataka, Madhya Pradesh, Andhra Pradesh, Jharkhand, Bihar, West Bengal, North-Eastern States and Jammu and Kashmir are the important States practicing sericulture and contributing to the raw silk production of the country (Fig.1). Karnataka is the premier State with area of 82,098ha under mulberry, producing 7,360 MT of raw silk production accounting for major share in silk production.

This agro based industry includes various activities such as cultivation of mulberry, rearing of silkworm, reeling; silk yarn preparatory and weaving. Sericulture education aiming to produce specialized human resource should not only prescribe very vibrant and dynamic syllabi, but adequately equip college/s in terms of faculty and laboratories.

The initiative of the ICAR to work out Minimum Standards for Higher Agricultural Education (MSHAE) in terms of infrastructure for establishing College of Sericulture in Agricultural Universities, ICAR institutes and Deemed Universities is most well-timed and highly praiseworthy. The document prescribing Minimum Standards of Higher Agricultural Education will serve as a bench mark for any Public / Private institutions interested to start college in a particular discipline. The minimum standard prescribed will also enable to deliver high quality education and strengthening research capabilities in the subject.

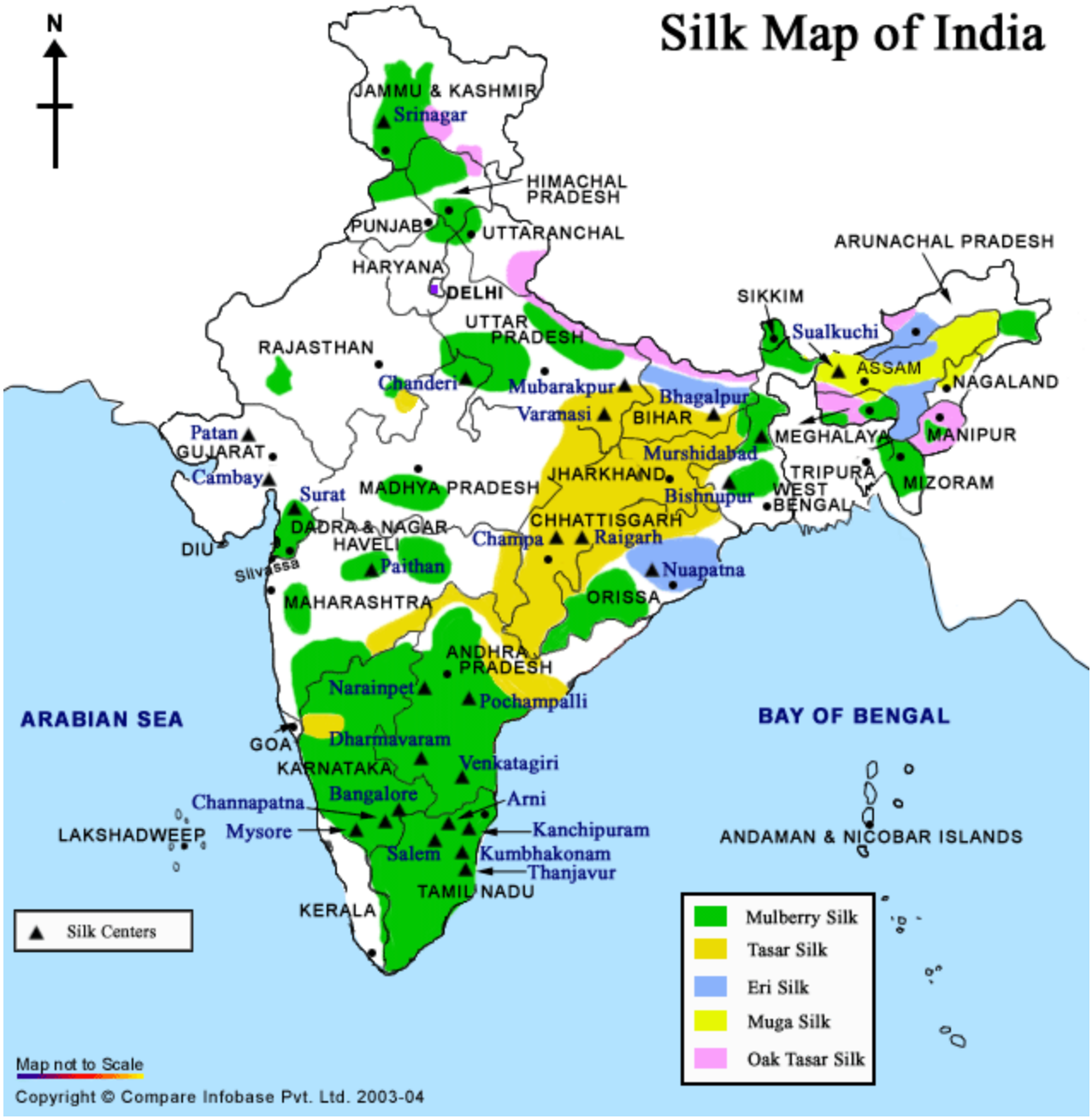


Fig.1 Silk Producing States of India

Sericulture Education

Realizing the need for Sericulture education and its role in rural development, a committee was constituted as early as 1980's to prepare curriculum for sericulture education at college and University level. Karnataka being the pioneer and premier silk producing state in the country is the first State to impart formal education at University of Agricultural Sciences, Bangalore. Later a new course entitled "Sericulture" was developed. A separate postgraduate programme in Sericulture was started to strengthen and expand Sericulture Education and Research.

In view of implementation of Karnataka Sericulture Project-1 funded by World Bank in Karnataka, the Government of Karnataka realized the need for trained and qualified manpower for the development of a separate Department of Sericulture and hence requested the UAS (B) to start Bachelor's degree in Sericulture on the lines of B.Sc. (Agri.). Accordingly, B.Sc. (Sericulture) degree programme under 10+2+4 scheme of education on par with other agricultural degree programmes was started during 1982-83 at UAS, Bangalore. Further, P.G. Diploma course for the benefit of B.Sc. graduates to take up sericulture as self-employment was started. Later, realizing the potential of Sericulture as an industry, a full-fledged "Sericulture College" was started in 1995 by UAS (B) at Chintamani.

Presently, B.Sc. (Sericulture) with four years professional degree curriculum is effectively taught at UAS, Bangalore and TNAU, Coimbatore (Table 1a). The two years M.Sc. (Sericulture) and three years Ph.D Programmes is being offered in 12 traditional Universities and 4 State Agricultural Universities. (Table-2).

Table1: Colleges offering B.Sc. Degree programme in India (with Sericulture as one of the subject)

Sl. No	University/College offering B.Sc.(Seri.)	Duration	University	State
1	***College of Sericulture, UAS (B)Chintamani**	**4 years**	**UAS, Bangalore**	**Karnataka**
2	Sri Krishnadevaraya University Ananthapur, Andhra Pradesh	3 years	Andhra Pradesh	Andhra Pradesh
3	Y. Subbi Reddy Memorial College Kadapa, Andhra Pradesh	3 years	Sri Venkateshwara University, Tirupati	Andhra Pradesh
4	Gogamukh College Gogamukh, Dhemaji, Assam	3 years	Dibrugarh University, Dibrugarh,	Assam
5	Sualkuchi Budram Madhab Satradhikar College ,Sualkuchi Kamrup (Rural) Karimganj, Assam	3 years	Gauhati University Guwahati	Assam

6	Veer Kunwar Singh Univeristy Katira Road, Katira Arraha, Bihar	3 years	Veer Kunwar Singh Univeristy	Bihar
7	Acharya Narendra Dev College Govindpuri, Kalkaji, New Delhi, Delhi	3 years	University of Delhi	Delhi
8	University of Delhi (DU) Delhi	3 years	University of Delhi	Delhi
9	Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir Post box no. 262, Shalimar Campus, Kashmir, Srinagar, Jammu & Kashmir	3 years	Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir	Srinagar, Jammu & Kashmir
10	Ranchi University Shaheed Chowk, Ranchi Jharkhand	3 years	Ranchi University	Jharkhand
11	H.P.P.C. Government First Grade College Chitradurga Road, Challakere, Chitradurga, Karnataka	3 years	Davanagere University	Karnataka
12	J.S.S. College of Arts, Science and Commerce, Ooti Road, Mysore	3 year	Mysore University	Karnataka
13	Maharani Science College for Women Jhansi Lakshmi Bai Road, Mysore	3 years	Mysore University	Karnataka
14	Siddartha First Grade College Saraswathipuram, Tumkur Karnataka	3 years	Tumours University	Karnataka
15	Shivaji University Vidyanagar, Kolhapur, Maharashtra	3 years	Shivaji University	Maharashtra
16	Central Agricultural University Iroisemba Imphal, Manipur	3 years	Central Agricultural University	Manipur
17	*Tamil Nadu Agricultural University (TNAU), Lawley Road, Pappanaicken, Pudur, Coimbatore	4 years	Tamil Nadu Agricultural University (TNAU)	Tamil Nadu
18	Bolpur College Bolpur, Birbhum, West Bengal	3 years	University of Burdwan	West Bengal
19	Dinabandhu Andrews College Baishnabghata, Calcutta	3 years	University of Calcutta	West Bengal
20	University of Kalyani Nadia, Kalyani	3 years	University of Kalyani	West Bengal

***State Agriculture University with four year degree programme**

Table 2: Colleges offering M.Sc. (Seri.) Degree programme in India

Sl. No	College offering B.Sc.(Seri.)	Duration	University	State
1	***College of Agriculture, GKVK , Bangalore**	**2 years**	**UAS, Bangalore**	**Karnataka**
2	Sri Krishnadevaraya University Ananthapur, Andhra Pradesh	2 years	Andhra Pradesh	Andhra Pradesh
3	Kakatiya University, Vidyaranyapuri, Warangal, Andhra Pradesh	2 years	Kakatiya University	Andhra Pradesh
4	*Assam Agricultural University Borbh, Jorhat, Assam	2 years	Assam Agricultural University	Assam
5	*Sher-e-Kashmir University of Agricultural Sciences and Technology Chatha, Jammu, Jammu and Kashmir	2 years	SKUAST	Jammu and Kashmir
6	Bangalore University Jnana Bharathi Campus, Jnana Bharathi Post, Bangalore, Karnataka	2 years	Bangalore University	Karnataka
7	Ganga Kaveri Institute of Science and Management No. 1699(43/1), Dr. Rajkumar Road, 3rd Stage, Rajajinagar, Bangalore Karnataka	2 years	Bangalore University	Karnataka
8	Karnataka University Pavate Nagar Dharwad, Karanataka	2 years	Karnataka University	Karnataka
9	Mysore University Viswavidhyalaya Karyasoudha Crawford Hall, Mysore	2 years	Mysore University	Karnataka
10	*University of Agricultural Sciences, KrishiNagar, Dharwad	2 years	UAS, Dharwad	Karnataka
11	*Tamil Nadu Agricultural University (TNAU), Lawley Road, Pappanaicken, Pudur, Coimbatore	2 years	Tamil Nadu Agricultural University (TNAU)	Tamil Nadu
12	Rashtrasant Tukadoji Maharaj Nagpur University, Chhatrapathi Shivaji Maharaj Administrative Premises, Ravidranath Tagore Marg, Nagpur, Maharastra	2 years	Rashtrasant Tukadoji Maharaj Nagpur University	Maharastra
13	Shivaji University Vidyanagar, Kolhapur Maharashtra	2 years	Shivaji University	Maharashtra
14	Babasaheb Bhimrao Ambedkar University (BBAU) Vidyavihar, Rai Bareily Road Lucknow, Uttar Pradesh	2 years	BBAU, UP	Uttar Pradesh
15	Krishnath College Murshidabad, West Bengal	2 years	University of Kalyani	West Bengal

The Employment status of Sericulture Graduates of UAS (B)

In order to know the employment potential for sericulture graduates, an attempt was made to examine pattern of employment of sericulture graduates of UASB. From 1985 to 2013, nearly 450 students have graduated in Sericulture from UAS (B) and their employment status is presented in Table-3. .

Table-3 Employment Status of Sericulture Graduates _ Karnataka

Employer	Number	Per cent
Government of Karnataka		
Department of Sericulture	206	45.78
Karnataka State Sericulture Research and Development,	5	1.11
Central Sericulture Research and Training Institute	5	1.11
Agricultural University	25	5.55
Commercial Tax Department	20	4.44
Karnataka State Road Transport Corporation (KSRTC)	03	0.67
Karnataka Police Department	07	1.55
Labour Department	03	0.67
Revenue Department	04	0.89
Judicial Department	04	0.89
Nationalized Bank	15	3.33
Other Departments	20	4.44
Sericulture Enterprise	40	8.89
Non-Government Organizations	50	11.11
Employed Abroad	10	2.22
Other	33	7.33
Total	450	100.00

It may be noted from the Table-3 that 46 percent of sericulture graduates are absorbed by Department of Sericulture, Government of Karnataka. Non Governmental Organisations are the next highest employment providers and nearly nine percent of the graduates have been absorbed in sericulture enterprises. Forty percent of sericulture graduates are seeking employment other than the sericulture sector.

Constitution of the committee by ICAR for Minimum Standards of Higher Agricultural Education (MSHAE) in Sericulture

A committee was constituted by ICAR, New Delhi to work out the Minimum Standards of Higher Agricultural Education (MSHAE) in Sericulture to develop infrastructure, laboratories/field facilities, faculty, manpower and other support so as to firm up guidelines for establishing College of Sericulture in State Agricultural Universities.

Dr. K. Naryana Gowda Vice Chancellor University of Agricultural Sciences Bangalore	Chairman
Dr. K. Jagadeeshwara Dean (Sericulture) College of Sericulture UAS, Bangalore Chintamani	Member
Dr. S. V. Krishnamoorthy Professor and Head Department of Sericulture TNAU, Coimbatore	Member
Dr. R. Govindan Former Dean(Seri) UAS, Bangalore	Member
DDG(Edn), ICAR	Member
ADG(EQR),ICAR	Member Secy.

Committee had a series of meetings to deliberate on the issue. Committee kept the report prepared by Biotechnology group as reference point and adopted the same format. Besides, Fourth Deans Committee Report was also used as reference material to arrive at the manpower requirement and infrastructure facilities required to establish Sericulture College. Report has also considered the rich experience of UASB in managing sericulture education during last three decades. Details worked out are presented in Annexure enclosed to the report.

ANNEXURE – I

MINIMUM STANDARDS FOR ESTABLISHING CONSTITUENT/ PRIVATE COLLEGES OF SERICULTURE AT STATE AGRICULTURAL UNIVERSITIES/ ICAR INSTITUTES/DEEMED UNIVERSITIES

1. Departments /Sections:

I.	**Department of silk worm Host Plant Sciences**
	Agronomy
	Botany, Cytology, Genetics and Breeding
	Host Plant Crop protection
II.	**Department of silkworm Cocoon production**
	Silkworm Rearing
	Silkworm protection
	Silkworm Embryology and Seed production
	Vanya Silk worm cocoon production
III.	**Department of silkworm Improvement**
	Cytology, Genetics and Breeding
	Morphology & Systematics
	Anatomy and Physiology
IV.	**Department of Silk reeling, post reeling Technology and value addition**
	Reeling and post reeling
	Spun silk technology
	Apparel and By-products

2. UNDERGRADUATE AND POSTGRADUATE DEGREE NOMENCLATURE

Undergraduate	B.Sc. (Sericulture)
Post Graduate (Master's and Doctorate)	M.Sc. (Agri.) in Sericulture Ph.D. (Sericulture)

3. ELIGIBILITY CRITERIA

B.Sc. (Sericulture)	10+2 (PUC) Subjects : PCMB with at least 50% in Aggregate (P-Physics, C-Chemistry, M-Mathematics, B-Biology)
M.Sc. Agri. in (Sericulture)	B.Sc. (Seri.), B.Sc. (Agriculture), B.Sc. (Horticulture), (Degree from Any Agriculture University under 10+2+4 system)
Ph.D. (Sericulture)	M.Sc. (Agri.) in Sericulture / (Degree from Agriculture University)

4. **MEDIUM OF INSTRUCTION** : English

5. **MINIMUM INTAKE :**

Degree	**Discipline**	**Maximum intake /Year**
B.Sc.	Sericulture	40
M.Sc.	Sericulture	8
Ph.D.	Sericulture	3
Total	**Undergraduates**	**40**
	Post graduates	**11**

6. **LAND REQUIREMENTS**

Main Building and Hostels	06 ha
Field Area	30 ha
Play ground	04 ha
Total	**40 ha**

7. MANPOWER REQUIREMENTS

Manpower	**Number**
Dean (Seri.)	1
A. Establishment	
Personal Secretary to Dean (Seri.)	1
Superintendent (Administration)	1
Superintendent (Accounts)	1
Superintendent (Academics)	1
Assistant Examination coordinator	1
Steno / Computer Operator	1
Attendants/Messengers	2
Clerical Staff/(LDC)	2
Electrician	1
Store Keeper	1
Driver (Heavy Vehicle) 2, (Low Motor vehicle-2)	4
Security, Sanitation, garden maintenanceand Landscaping	4
Total	21
B. Central Research and teaching laboratories (2 laboratories)	
Assistant Professor (Computer Science) Assistant Professor (Biotechnology)	2
Laboratory Technicians	2
C. Library	
Asst.Librarian	1
Shelf Assistants	1
Clerk	1
D. Student Welfare	
Assistant Director of Student Welfare	1
E. Hostel (Boys + Girls)	
Wardens	1+1
Clerk (LDC)	2
Attendants	4
Security, Sanitation and Landscaping	4
Total	**20**

8. FACULTY REQUIREMENTS FOR DEPARTMENT/SECTION

Department/Section	Faculty			Total
	Professor	Associate Professor	Assistant Professor	
Department of silkworm Host Plant Sciences	1	2	6	9
Department of silkworm Cocoon production	1	2	4	7
Department of silkworm Improvement	1	2	3	6
Department of Silk reeling, post reeling Technology and value addition	1	2	3	6
Division of Basic /Social Sciences			7	7
Total	4	8	23	35

* As **per the Recommendation of the IV Dean's Committee.**

9. ADMINISTRATIVEAND SUPPORTING STAFF FOR DEPARTMENT / SECTION

Department/ Section	**Steno/PA/ Computer Operator**	**Assistant**	**Attendant/ Messenger**	**Clerk**	**Laboratory Assistant /Attendant**	**Field staff***
Department of silkworm Host Plant Sciences	-	01	01	-	04	06
Department of silkworm Cocoon production	-	01	01	-	04	04
Department of silkworm Improvement	-	01	01	-	02	02
Department of Silk reeling, post reeling Technology and value addition	-	01	01	-	04	02
Total		**04**	**04**		**14**	**14**

* (Field staff can be outsourced)

10. FACULTY EXPERTISE

Department/Section	Faculty Expertise	
	Core	**Associated**
Department of silkworm Host Plant Sciences	▪ Host plant cultivation, production and management. ▪ Host plant botany, cytology, genetics and breeding ▪ Host plant physiology ▪ Host plant protection	▪ Agronomy ▪ Plant Biotechnology ▪ Soil Science and Agril. Chemistry ▪ Crop Physiology ▪ Farm Machinery and Engineering ▪ Forestry and Environmental Science ▪ Horticulture ▪ Agri. Entomology ▪ Plant Pathology ▪ Seed Science & Technology ▪ Genetics and plant breeding
Department of silkworm Cocoon production	▪ Silkworm Rearing ▪ Vanya sericulture ▪ Silkworm egg production ▪ Silkworm protection	▪ Agricultural Microbiology ▪ Animal Science ▪ Plan tBiochemistry ▪ Agri. Economics
Department of silkworm Improvement	▪ Silkworm cytology, genetics and breeding ▪ Silkworm Morphology and Systematic ▪ Silkworm Anatomy and Physiology	▪ Biotechnology ▪ Applied Microbiology ▪ Seri Biotechnology* ▪ Seri Biochemistry* ▪ Seri Physiology*
Department of Silk reeling, post reeling Technology and value addition	▪ Silk reeling and post reeling technology ▪ By-products and value addition ▪ Spun silk production ▪ Industrial Machinery	▪ Business management ▪ Mechanical engineering ▪ Textile engineering ▪ Silk weaving and wet processing*
Basic Sciences, Humanities and Social Sciences		▪ Agricultural Extension ▪ Agricultural Economics ▪ Seri. Business Management ▪ Agricultural Statistics ▪ Computer sciences, ▪ English ▪ Physical Education

***extra courses planned**

B.Sc (Sericulture) course syllabus from UAS (B), TNAU, Coimbatore, Nagpur University is given in Annexures

11. CENTRAL/DEPARTMENT/SECTION LABORATORIES (AS PER REQUIREMENT OF THE TEACHING AND RESEARCH WORK OF THE COLLEGE)

Department/Section	Laboratory
• Central Research and Teaching Laboratories (Central instrumentation)	• Computer lab • Biotechnology lab
Department of silkworm Host Plant Sciences	• Field lab • Pathology lab (Host Plant) • Agril. Engineering Lab • Soil Science and Agril. Chemistry lab • Entomology lab • Plant Physiology lab • Genetics & breeding lab
Department of silkworm Cocoon production	• Pathology lab (Silkworm) • Grainage lab **Field labs** • Silkworm rearing house. • Commercial silkworm rearing house • Chawki rearing house • Mounting hall
Department of silkworm Improvement	• Biochemistry lab
Department of Silk reeling, post reeling Technology and value addition	• Silk Reeling lab • Raw Silk testing Lab • Silk dyeing & Printing Lab • Silk weaving Lab • By-product value addition Lab
	• Audio-Visuals

12. FLOOR SPACE REQUIREMENT

A. CENTRAL FACILITY

SL. No.	Details	Number of rooms	Dimensions
1.	Dean office	1	20'×24'
2.	PA room	1	20'×12'
3.	Committee room with video conferencing facility	1	20'×48'
4.	Administrative officer room	1	20'×12'
5.	Admin. Staff rooms	3	20'×36' each
6.	Examination cell	1	20'×12'
7.	Evaluation room	1	20'×36'
8.	Faculty room	20	20'×12'each
9.	Placement cell	1	20'×48'
10.	Smart Lecture rooms	6	Seating Capacity - 50
11.	Auditorium	1	Seating Capacity – 300
12.	Library/Book bank	1	30'×72'
13.	Examination hall	1	Seating Capacity - 60
14.	Multipurpose room	1	20'×36'
15.	Laboratories	17	30'×48' each
16.	Hostel	2	UG & PG (Boys& Girls) Accommodating 3 students in a room
17.	Generator shed	1	20'×36'
18.	Canteen	1	20'×12' (Kitchen) & 20'×36' (Setting room)
19.	Toilets	-	4 sets each (Girls & Boys)
20.	Parking space	As per requirement (APR)	For college & hostels
21.	Vehicles ▪ Officer car ▪ Staff car/Jeep ▪ Bus ▪ Mini bus ▪ Ambulance	 1 2 1 1 1	

B. DEPARTMENT / SECTION

S. No.	Details	Number of rooms	Dimensions
1.	Office of the Head of the Department	4 (for 4Departments)	20'×24' each
3.	Faculty room	20	As specified in Sl. No. 8
4.	Rooms for Research Scholars	4(for 4Departments)	20'×24' each
6.	Smart Lecture cum seminar room	2	Seating capacity – 50 each
7.	Laboratories (no. of laboratories as per requirement and include UG teaching laboratory		
8.	Department of silkworm Host Plant Sciences	7	30 x 60 (one) 30 x 40 (six)
9	Department of silkworm Cocoon production	2	30 x 60 (one) 30 x 40 (one)
10	Departmentof silkworm Improvement	1	30 x 60 (one)
11	Department of Silk reeling, post reeling Technology and value addition	5	30 x 60 (one) 30 x 40 (four)
12	Basic Sciences, Humanities and Social Sciences	3	30 x 60 (one) 30 x 40 (two)
13	Green house/ poly house / glass house	As Per Requirement	

13. *Equipment Facilities: Central Teaching and Research Laboratories
(Centralized Instrumentation Laboratories)

Sl. No.	Name of Equipment	Number
1.	Laminar air flow chamber	1
2.	Shaker and Incubator	1
3.	Autoclave	1
4.	pH meter	1
5.	Mirco and macro balances	1 each
6.	Agarose Gel electrophoresis unit (Horizontal)	1
7.	PAGE- electrophoresis unit (Vertical)	1
8.	Gel Documentation Unit	1
9.	ELISA reader	1
10.	Microscopes (simple, compound and stereo)	1
11.	BOD incubator	1
12.	Cold room	1
13.	Liquid Nitrogen Plant	1
14.	Liquid Nitrogen Flask	2
15.	Ice maker	1
16.	High Speed Centrifuge	1
17.	High speed cooling centrifuge	1
18.	Double Distillation unit with RO	(As per requirement)
19.	Computers	4
20.	Table top Centrifuge	1
21.	Micropipettes (0.2-5ml)	1
22.	Hot air oven	2
23.	PCR unit	2
24.	Water bath	1
25.	Pestle & Mortar	10
26.	Micro oven	2
27.	Dissection microscope	5
28.	Compound microscope	5
29.	Megaphones	1
30.	Amplifier	1
31.	Sony handy cam	1
32.	Nikon camera	1
Any other equipment as per requirement		

14. Equipment in the Department Laboratories (additional specialized equipment may be required depending on the mandate of the institute).

Sl. No.	Name of the Equipment	Number of units x Divisions	Total Number	Departments using
1.	Tractor	1x1	1	SHPS
2.	Tiller	1x1	1	SHPS
3.	Secateurs	10x1	10	SHPS
4.	Looping Shear	2X1	2	SHPS
5.	Brush Cutter	1X1	1	SHPS
6.	Sprayer	2X1	2	SHPS
7.	Battery operated knapsack sprayer	2X1	2	SHPS
8.	Aspee sprayers	5X1	5	SHPS
9.	Mulberry cutting preparation machine	1X1	1	SHPS
10.	Mulberry stem crushing machine	1X1	1	SHPS
11.	Screw auger	1X1	1	SHPS
12.	Tube auger	1X1	1	SHPS
13.	Other farm implements for cultivation	As per requirement		
14.	Laminar flow	1X2	2	SSHPS+SCP
15.	Autoclave	1X2	2	SSHPS+SCP
16.	Spectrophotometer	1X2	2	SSHPS+SCP
17.	Flame photometer	1X2	2	SSHPS+SCP
18.	Insect collection box	10X2	20	SSHPS+SCP
19.	Dissection microscopes	5X2	10	SSHPS+SCP
20.	Compound microscopes	5X3	15	SHPS+SCP+ SI
21.	Acid treatment bath	2x1	2	SCP+SI
22.	Chawki rearing stands	10X2	20	SCP+SI
23.	Plastic trays	50X2	100	SCP+SI
24.	Feeding stands	5X2	10	SCP+SI
25.	Leaf chopping board	2X2	4	SCP+SI
26.	Knives	2X2	4	SCP+SI
27.	Leaf chamber	2X2	4	SCP+SI
28.	Ant wells	50X2	100	SCP+SI
29.	Room heater	8X2	16	SCP+SI
30.	Atomizer	2X2	4	SCP+SI
31.	Humidifier	4X2	8	SCP+SI
32.	Leaf collecting basket	8X2	16	SCP+SI
33.	Electrical balance	2X2	4	SCP+SI
34.	Power sprayer	2X2	4	SCP+SI
35.	Mask	2X2	4	SCP+SI
36.	Rotary mountages	150X2	300	SCP+SI
37.	Cocoon harvester	10X2	20	SCP+SI
38.	Cocoon cutting machine	2x2	4	SCP+SI
39.	Plastic mountages	150X2	300	SCP+SI
40.	Deflossing machine	1X2	2	SCP+SI
41.	Plastic incubation frames	20X2	20	SCP+SI

42.	Mountagedeflossing machine	5X2	10	SCP+SI
43.	Digital hygrometers	4X2	8	SCP+SI
44.	Cellules	500X2	1000	SCP+SI
45.	Small rearing cages with trays	25X2	50	SCP+SI
46.	Cocoon deflossing machine	1X2	2	SCP+SI
47.	Cocoon drying machine	1X1	1	ST&VA
48.	Cocoon cooking machine	1X1	1	ST&VA
49.	Cocoon reeling machine(either multiend reeling machine or Semi-automatic with denier detecting system)	1X1	1	ST&VA
50.	Silkre-reeling machine	1X1	1	ST&VA
51.	Vacuum permeation device	1X1	1	ST&VA
52.	Cocoon assorting machine	1X1	1	ST&VA
53.	By-product treating machine	1X1	1	ST&VA
54.	Silk skein twisting machine	2X1	2	ST&VA
55.	Silk book making machine	2X1	2	ST&VA
56.	Seri plane winding machine	1X1	1	ST&VA
57.	Illumination equipment for inspection	1X1	1	ST&VA
58.	Denier scale	4X1	4	ST&VA
59.	Rewinding test machine (10 bobbins)	1X1	1	ST&VA
60.	Boiler	1X1	1	ST&VA
61.	Mechanical tools	1X1	1	ST&VA
62.	Water testing kit	1X1	1	ST&VA
63.	Spinning wheel	1X1	1	ST&VA
64.	Weaving unit (Hand loom and power loom)	1 EACH	2	ST&VA
65.	Serigraph	1X1	1	ST&VA
66.	Cohesion tester	1X1	1	ST&VA
67.	Tenacity and elongation testing machine	1X1	1	ST&VA

NB: SHPS-Silkworm Host Plant Sciences; SCP- Silkworm Cocoon Production; SI- Silkworm Improvement; ST&VA Silk technology and Value addition

Annexure-II

Courses for B.Sc. (Sericulture) in UAS(B)

Department of Silkworm Host Plant Sciences**:**

Sl. No.	Course No.	Course Title	Credits Hours
1	AGR.101	Introductory Agriculture, Principles of Agronomy and Soil Management	2+1
2	AGR.102	Water Management including Micro irrigation	1+1
3	AGR.105	Cultivation of Host Plants of Silkworms	0+1
4	AGR.207	Mulberry Production and Management	0+1
5	AGR.301	Agricultural Meteorology, Rainfed Agriculture and Watershed Management	1+1
6	AGR.303	Farming Systems, Organic Farming and Sustainable Agriculture	2+1
7	AGR 304	Experimental Techniques in Sericultural Research	1+1
8	PBT.201	Plant Biotechnology	1+1
9	SAC.101	Fundamentals of Soil Science	2+1
10	SAC 302	Soil Fertility and Nutrient Management	1+1
11	CPH 101	Crop Physiology	2+1
12	AEG202	Farm Power, Sericultural Machinery and Renewable Energy (with Importance to Mechanization)	1+1
13	FES 101	Introduction to Forestry	1+1
14	FES201	Environmental Science and Agro-Ecology	1+0
15	HRT102	Fundamentals of Plant Propagation and Nursery Management	1+1
16	HRT 203	Dry land Horticulture	1+1
17	AET102	Fundamentals of Agricultural Entomology	1+1
18	AET204	Introduction to Apiculture	1+1
19	AET302	Pests of Host Plants of Silkworms and their Management	1+1
20	PAT201	Introductory Plant Pathology and Nematology	1+1
21	PAT 306	Diseases of Host Plants of Silkworms	1+1
22	GPB101	Principles of Genetics	2+1
23	HGB101	Botany and Cytology of Host Plants of Silkworms	2+1
24	HGB201	Genetics and Breeding of Host Plants of Silkworms	2+1
25	BCM 101	Plant Biochemistry	1+1
26	SST 301	Principles of Seed Science and Technology	2+1
27	SWR101	History, Development and Organization of Sericulture Industry	1+0
28	AMB.101	Agricultural Microbiology	1+1
29	**Module -1#**	**Mulberry Production**	**0+15****
	MLP401	Mulberry Nursery Management	0+5
	MLP402	Mulberry Production Technology	0+5
	MLP403	Utilization of sericulture waste	0+5
30	**Module –II#**	**Natural Resources Management**	**0+25****

	NRM401	Soil Health Clinic	0+5
	NRM402	Problematic Soils and their Management	0+5
	NRM403	Integrated Farming Systems	0+5
	NRM404	Water Management (Watershed, Micro irrigation, Problematic water)	0+5
	NRM405	Farm Mechanization	0+5
Rural work Experience Programme			
31	RSE 401	Placement in Mulberry Crop Production	0+4
Total			**33+30=63**

Department of silkworm Cocoon production			
32	AMB201	Applied Microbiology	1+1
33	ASC201	Livestock and Fish Production Management	2+1
34	SEP201	Silkworm Embryology	0+1
35	SEP301	Silkworm Seed Technology – I	1+1
36	SEP302	Silkworm Seed Technology – II	1+1
37	SWR301	Non-mulberry Sericulture	1+1
38	SWR302	Mulberry Silkworm Rearing – I	1+1
39	SWR303	Mulberry Silkworm Rearing – II	2+1
40	SWP201	Diseases of Silkworms – I	1+1
41	SWP202	Pests of Silkworms	1+1
42	SWP301	Diseases of Silkworms – II	1+1
43	**Module –II#**	**Silkworm Egg Production and Rearing**	**0+20****
	SER 401	Silkworm Egg production Technology	0+5
	SER 402	Silkworm Rearing	0+5
	SER 403	Seri Clinic	0+5
	SER 404	Bio-crafts from pierced cocoons	0+5
Rural Work Experience Programme			
44	RSE 402	Placement in cocoon crop production	0+4
45	RSE 403	Placement in Grainage	0+4
Total			**12+19=31**

Department of Silk Worm Improvement			
46	SGB201	Cytology and Genetics of Silkworms	2+0
47	SGB 301	Silkworm Breeding – I	1+1
48	SGB302	Silkworm Breeding – II	1+1
49	SWR201	Morphology and Systematics of Silkworms	1+1
50	SWR202	Silkworm Anatomy and Physiology	1+1
		Seri Biotechnology*	
		Seri Biochemistry*	
		Seri Physiology*	
			6+4=10

*Syllabus needs to be developed

Department of Silk reeling, post reeling Technology and value addition			
51	SRT201	Silk Technology – I	1+1
52	SRT301	Silk Technology – II	1+1
53	SRT302	Planning and Management of Silk Reeling Industry	1+0
54	SPT201	Physics and Chemistry of Fibers	1+0
55	SPT202	Raw Silk and Spun Silk Technology	1+1
56	SPT301	Silk Throwing, Dyeing and Weaving	0+2
57	SPT302	Apparels and By-products in Sericulture Industry	0+2
58	AEC101	Principles of Agricultural and Resource Economics	1+1
59	AEC303	Seri-Business Management (includes Exim Policy)	1+1
		Silk weaving and wet processing*	
60	**Module –III#**	**Silk Reeling and Raw Silk Technology**	**0+15****
	SRT 401	Raw silk production Technology	0+5
	SRT 402	Silk Throwing and Dyeing	0+5
	SRT 403	Silk Weaving	0+5
	RSE 404	Placement in Filature	0+3
			7+12=19

*Syllabus needs to be developed

Social Sciences			
61	AEX101	Fundamentals of Rural Sociology, Educational Psychology and Constitution of India	0+2
62	AEX201	Fundamentals of Extension Education and Rural Development	1+1
63	AEX301	Communication and Extension Methodologies for Transfer of Technology	2+1
64	**Module –V#**	**Social Sciences**	**0+20**
	SSC 401	Project formulation and financial Management for Agri-Business	0+5
	SSC 402	Farm Planning, policies and Programmes for agriculture development	0+5
	SSC 403	Multimedia production	0+5
	SSC 404	Agricultural Journalism	0+5

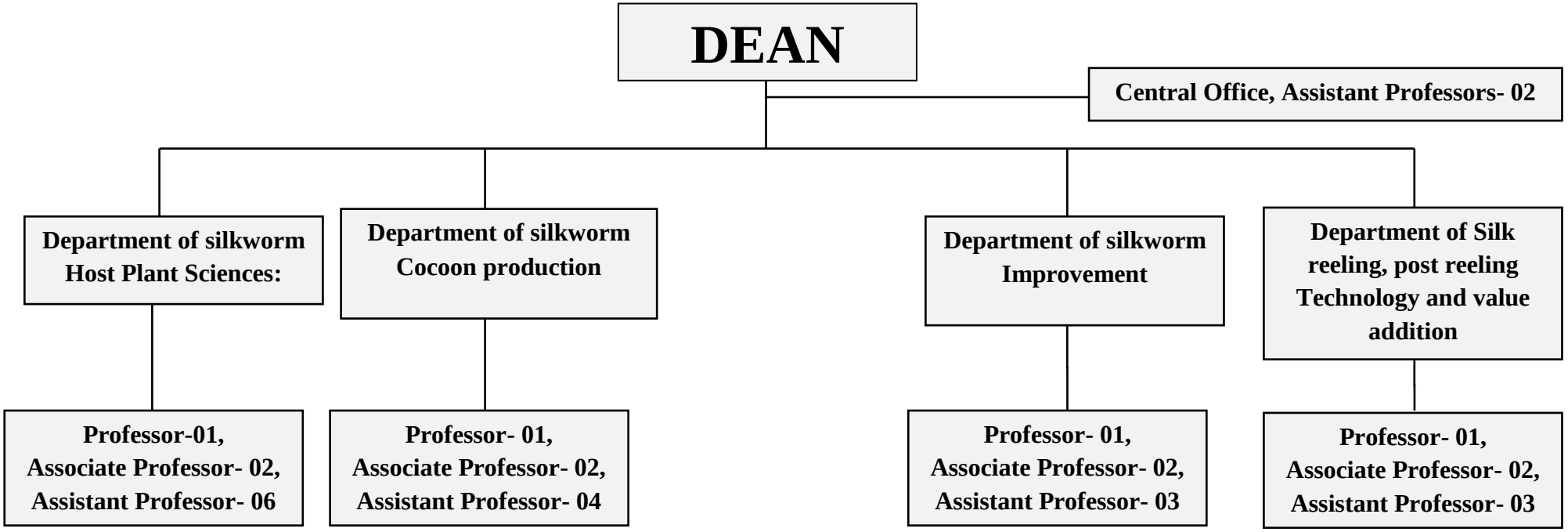
Rural Work Experience Programme			
65	RSE 405	Practical Extension Work in Villages	0+5
Basic Sciences and Humanities			
66	CSC 101	Introduction to Computers and Application	1+1
67	ENG 101	Comprehension and Communicative English	1+1
68	AST 301	Agricultural Statistics	1+1
69	PED 101	Physical Education, Health Education and Recreation	0+1*
70	NSS 101	National Service Scheme	0+1*
71		Educational Tour	0+1*
		Total	**6+12=18**
		Grand Total=141+*(3)+# (20)= 164	

* Non-Credit ;

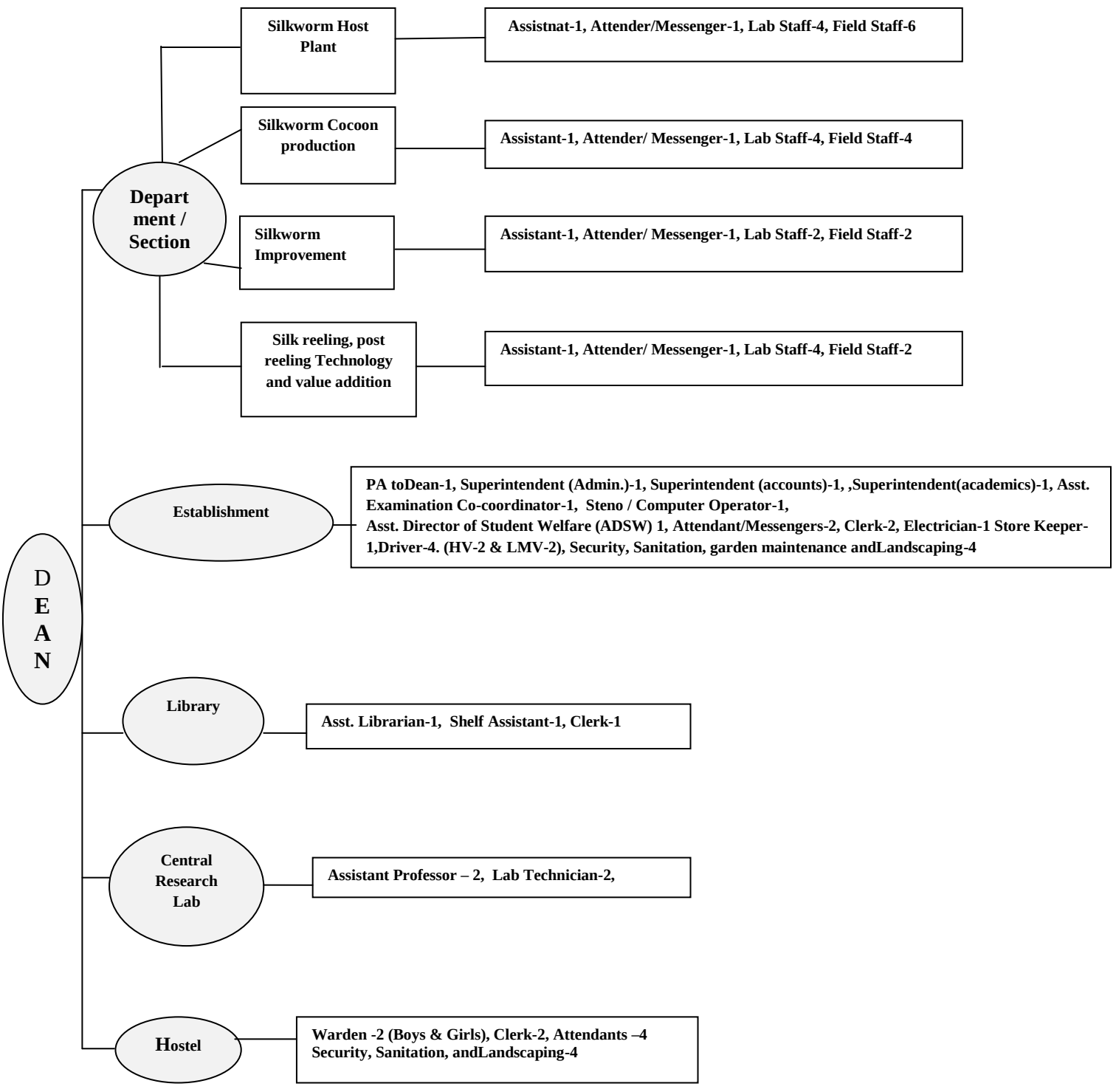
Student has to register for 20 credits with major load (0+15) in one module and (0+5) elective from another module in the seventh semester.

** Courses modification may be included as per the requirement of different climatic zones in states after the receipt of the feed back from the respective Universities.,

College of Sericulture: Faculty



College of Sericulture: Supporting Staff



Proceedings of the Meeting held to Prepare a Report on the Minimum Standards of Higher Agricultural Education (MISHAE) in Sericulture under the Chairmanship of Vice Chancellor, UAS, Bangalore,on 21/04/14 at UAS, GKVK, Bangalore-65.

Members Present:-

1. Dr. K. Narayana Gowda, Hon'ble Vice- Chancellor, UAS, Bangalore in Chair
2. Dr. Kusumakar Sharma, ADG (EQR), ICAR,New Delhi- Member
3. Dr. K. Jagadeeshwara, Dean (Seri.), College of Sericulture, Chintamani- Member
4. Dr. S.V. Krishnamoorthy, Professor and Head, Dept. of Sericulture, TNAU, Coimbatore- Member.

Invitees

5. Dr. T. K. Narayanaswamy, University Head and Professor, Dept. of Sericulture, AC,UAS (B)
6. Dr. Chickalingaiah, Professor and Head, Dept. of Sericulture, AC, UAS (B)
7. Dr. K.P. Chinnaswamy, Professor of Sericulture, Dept. of Sericulture, AC, UAS (B)
8. Dr. R. N. Bhaskar, Professor of Sericulture, Dept. of Sericulture, AC, UAS (B)
9. Dr. H. Chandrashekar, Coordinator, PPMC, VC's office, UAS, Bangalore
10. Dr. S. Chandrashekhar, Associate Professor, College of Sericulture, Chintamani &
11. Dr. Chandrashekar, Co-ordinator, PPMC, GKVK, Bangalore.

Member Absent

1. Dr.R.Govindan , Former Dean, College of Agriculture, UAS (B)

At the outset, Dr. K. Jagadeeshwara, Dean (Seri.), College of Sericulture, Chintamani welcomed all the members of the committee and invitees to the meeting and requested Vice Chancellor to chair the meeting and conduct the deliberations.

The Vice Chancellor, Dr. K. Narayana Gowda in his opening remarks informed the members that the committee had earlier met once and had a detailed discussion regarding preparing the report on the Minimum Standards of Higher Agricultural Education (MISHAE) in Sericulture. Dr. R. Govindan, Former Dean, College of Sericulture, members of the committee and other invitees had provided useful inputs. Further he informed that the report on Biotechnology made available by ICAR, has served as good reference material in preparing a draft report for sericulture education. The draft report prepared by the University may be discussed in detail to enable the committee to fine tune the report. He requested Dr. Kusumakar Sharma, ADG (EQR) ICAR, New Delhi to offer his remarks.

Dr. Kusumakar Sharma, ADG (EQR) ICAR thanked Vice Chancellor for organizing the meeting of the committee at UAS, Bangalore and stated that ICAR has undertaken the task of preparing a document prescribing Minimum Standards of Higher Agricultural Education for various disciplines which will serve as a bench mark for any Public / Private institutions interested to start college in a particular discipline. Report will also serve as bench mark while accrediting the colleges. Further he also informed that since UAS, Bangalore is one of the a few State Agricultural Universities in country which has started Graduate, Master's and Doctoral degree programs in sericulture and has gained sufficient expertise in the field, the task of preparing minimum educational standards in sericulture has given to UAS, Bangalore under the Chairmanship of Vice Chancellor. He desired that it would be more appropriate to restrict the exercise to arrive at the minimum requirement to start a college in sericulture discipline rather than recommending or assessing potential to have new colleges as it requires a bigger exercise and not the mandate of the committee.

Dr. K. Jagadeeshwara, Dean (Seri.) College of Sericulture, Chintamani, presented the draft report prepared by UAS, Bangalore which comprised of, present status of silk industry and sericulture education in the country. The report comprised of divisions identified to impart higher education in sericulture, viz., Division of Silkworm Host Plant Sciences, Division of Cocoon Crop Production, Division of Crop Improvement, Division of Silk technology by products and Division of Social Sciences. The requirements to be met like, 1. Eligibility criteria for admission to degree programme, 2. Medium of Instruction, 3. Land requirement, 4. Manpower and faculty requirement for the college, 5. Faculty expertise, 6. Division/Sections and related laboratories, 7. Floor space requirement, 8. Equipment requirement/central teaching and research laboratories and 9. Courses for B.Sc Sericulture as per the divisions were also presented.

Dr. Kusumakar Sharma, ADG (EQR) ICAR, New Delhi made following observations on the presentation and asked the concerned to address these issues while preparing the final report.

The title of the report may be modified as "ICAR Norms for Starting Constituent / Private College in State Agricultural Universities" Sericulture. While appreciating the potential of sericulture sector in employment generation, livelihood improvement and earning foreign exchange, he opined that the report should invariably mention the location specificity of this enterprise as sericulture is being practised only in a few states.

Recommendations of IV Deans Committee Report may be taken as bench mark while estimating man power, infrastructure and other minimum requirements to start a new college.

The draft report may be also be sent to Sher-E-Kashmir Agricultural University, Jammu, Assam Agriculture University, Jorhat, Tamil Nadu Agriculture University, Coimbatore, for getting their feedback, before finalizing the report and submit to ICAR.

The Vice Chancellor Dr .K. Narayana Gowda in his remarks indicated that it would be more appropriate to incorporate the experience of UAS, Bangalore especially regarding status of Sericulture graduates during the last ten years, how many of them are employed and the sectors in which they have been absorbed and their position (underemployed) vis-à-vis agricultural graduates. Realistic projections may be provided in regard to the employment opportunities for the sericulture graduates and scope to pursue higher education.

Vice Chancellor was also of the view that minimum land required to start new college may be prescribed as 40 hectares (100 acres) instead of 30 hectares which would be ideal in long run keeping in view the future expansions.

The report may also broadly indicate are region specific courses to be incorporated by different states (may be as annexures) since there is a scope to include 30 percent of the courses which are region specific.

He also reiterated that while developing the guidelines for infrastructure facilities, faculty strength, and non-teaching staff strength, recommendations of the IV Dean's Committee should be kept in view. The course curriculum should be location specific and

Vision document for 2030 and 2050 should be taken into consideration while suggesting new courses. He expressed the necessity to include the courses on International Trade and Farm Mechanization in Sericulture in the changing scenarios.

Further, Vice Chancellor suggested to send the draft report to CSR &TI, Mysore and KSSR & DI, Bangalore to seek their opinion. Finally he thanked the committee for efforts made for development of MISHAE in terms of infrastructure- Sericulture.

Dr. T. K. Narayanaswamy, University Head, Department of Sericulture extended vote of thanks.

The suggestions of the meeting held on 21.04.2014 were attended and the recent draft copy has been prepared here under.