UNIVERSITY OF HORTICULTURAL SCIENCES
BAGALKOT, KARNATAKA

SELF STUDY REPORT FOR THE
M. Sc. HORTICULTURE IN POST HARVEST TECHNOLOGY, COH, BAGALKOT
2014-15 to 2018-19

SUBMITTED TO
Indian Council of Agricultural Research,
Krishi Bhavan, New Delhi.

SUBMITTED BY
University of Horticultural Sciences,
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Karnataka

PREFACE

The growth of Indian agriculture sector has had its moments of glory. The green revolution has been major success story of free India to achieve surplus today, nonetheless frequently plagued by famines and chronic food shortage. From food grain production around 55 million tons at the time of independence, now boast the production of 284.83 million tons of food grains (2017-18). Indian agriculture has witnessed wide variations in growth performance after independence in India. The record horticulture production (306.8 million tonnes estimated) during 2017-18 will mark the sixth straight year of horticulture production outstripping that of food grains. Further, the percentage share of horticulture in agriculture GDP is 33 per cent which is quite impressive. The horticulture sector plays vital role in nutritional security, economic sustainability and employment generation. It was realized only in mid-80s about the importance of horticulture and thus the Government of India recognized Horticulture as a prominent sector. Horticulture appears to be a viable means of diversification for making agriculture more profitable through efficient land use, optimum utilization of natural resources while creating skilled employment for the rural masses. Horticulture has invariably enhanced the economic status of farming community besides, without disturbing invaluable natural resources. In general the growth of horticulture sector has created ripples which consequently resulted in a wide spectrum of processing industries. In this context, quality seed and planting material supply, surge for hi-tech horticulture, better prospects for contract farming as well as cooperative farming, participatory approach in production and marketing have attained magnanimous stature. The higher growth rate in horticulture sector suggests a structural change in Indian agriculture where farmers are increasingly growing perishable commercial crops due to a growing market and a quicker cash flow as these crops require less time from sowing to marketing. Thus, there is a growing awareness about the advantages of the horticultural crop production and this is bound to go up with the improvement in socio-economic status of the people.

In the recent past R & D programmes in horticulture received an impressive support from the government. As a result, the research infrastructure has increased many-fold with the setting up of a number of new institutes, national research centres for several crops, important both from domestic as well as export point of view. The

establishment of educational institutions in the field of horticulture play a pivotal role in developing human infrastructure, which would cater to the needs of the emerging horticulture industry.

To develop the quality human infrastructure in the field of horticulture in general and to cater to the needs of the farmers of Northern Karnataka in particular, the College of Horticulture was established at Bagalkot on 07.07.2008 under the University of Agricultural Sciences, Dharwad. With the establishment of the University of Horticultural Sciences at Bagalkot the college of Horticulture came under the administrative control of the said university from 2009-10. The college offers undergraduate, postgraduate and Ph.D. courses. The college has the admission capacity of about 120 students annually for undergraduate, about 55 students for Master' degree programme and 25 students for Ph.D. programme. The students of this college have excelled not only in studies but also in extra-curricular activities and National level competitive examinations. The college has been making efforts to improve the quality of education offered in this direction. Since the college is due for accreditation, the present self study report provides all the necessary information about the college activities performed during last five years (01-01-2014 to 31-12-2018).

The University Level Task Force and Steering Committee have also been gratefully acknowledged for their help, guidance and suggestions given in preparing the report.

The college level Steering Committee and Task Force have done a great job in compiling information and bringing out this report to be submitted to Accreditation Board of ICAR. My heartfelt thanks to all for providing valuable suggestions to improve the quality of presentation.

Dean
(H.B.Patil)

College of Horticulture, Bagalkot
March, 2019.

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6.4.1. BRIEF HISTORY OF THE DEGREE PROGRAMME

Evolution of the P.G. programme:

Establishment of a Post-Graduation degree programme covering Plant Biotechnology, Genetics, Plant Breeding, Seed Science and Biochemistry disciplines, in the name of 'Biotechnology and Crop Improvement' was started at the College of Horticulture, Bagalkot of University of Horticultural Sciences, Bagalkot during the academic year 2013-14. The primary aim of the degree programme was training the students and meeting the trained man power requirement in the sector for horticulture biotechnology and crop improvement and applications of cutting edge molecular biology and biotechnology tools in horticulture. Immediate next year, in 2014-15 the doctoral programme in the discipline of 'Biotechnology and Crop Improvement;' was started during the year 2014-15, at College of Horticulture, Bagalkot with an initial intake of three students.

Change of Nomenclature

Realizing the drawbacks of the non-acceptance of the nomenclature as M.Sc. (Horticulture) in Biotechnology and Crop Improvement by either the State Agriculture Universities or ICAR New Delhi for considering the eligibility of the degree program for recruitment to Assistant Professors or ARS scientists either in GPB or plant biotechnology, the nomenclature had to be changed. Finally, by the recommendations of 5th Deans committee and ICAR guidelines to initiate the PG programs in the recognized disciplines of ICAR, the Biotechnology and Crop Improvement program in M.Sc. was separated in to 2 PG programs M.S.c in Genetics and Plant breeding and M.S.c in Plant Biotechnology (PBT) from the academic year 2017-18. Presently the M.Sc. programs are running in the name of above 2 disciplines. At present, the following degree programs have been offered at Department of Biotechnology and crop improvement:

Objectives

1. Teach, train and graduate qualified skilled scientists in the disciplines of Biotechnology and crop improvement related subjects.
2. Develop, implement and evaluate the curriculum of biotechnology programme with a strong commitment to be aligned and comply with the national and international standards
3. Conduct applied research in basic and translational biotechnology and fosters interactions and collaboration between faculty, researchers and industry.

4. Promote a supportive learning environment for life through implementing continuous learning programmes.
5. Apply the general principles and standards of technology transfer and ensure adequate training of our personnel in modern biotechnology.

Accomplishments:

1. P.G. student's research outcomes which are helpful for the farming community and further research:

Sl. No	Name of Student	Title of thesis	Outcome
1	Chaitra A. Poleshi	Functional markers based allelic diversity for root traits incarrot (*Daucuscarota* subsp. *sativus*).	Identification temperate carrot genotypes adaptable to tropical conditions
2	Naveen N	Studies on development stages of microsporogenesis to induce male sterility using male gamaetocides in okra (*Abelmoschus esculentus* L.)	Enhancement of seed yield in Okra
3	Shahaji Bhausaheb Pukale	Genetic and Molecular Studies in Pomegranate (*Punica granatum* L.)	Identification of mutant pomegranate resistant to bacterial blight
4	Karthik A. M.	Morphological and molecular diversity analysis of okra genotypes (*Abelmoschus esculentus* L. Moench)	Identification of okra heterotic groups for hybrid production
5	Abhilasha K	Evaluation of Advanced Lines of Okra (*Abelmoschus esculentus* L.) for Productivity & Quality Traits.	Identification of parents for Okra hybrid production
6	Sushilkumar K.	Morphological and molecular characterization of cucumber genotypes (*Cucumis sativus* L.) for productivity and quality traits.	Identification of cucumber heterotic groups for hybrid production
7	Chaitra C. Kulkarni	Linkage disequilibrium mapping using microsatellites for root traits in diverse populations of Carrot (Daucus carota L.)	Identification of markers linked to root quality traits in Carrot
8	Mahadev Kivati	DNA Fingerprinting and estimation of homozygosity in Bitter gourd. (Mamordica Charantia L.) OPV'S.	Optimization of homozygosity for enhancing hybrid yield
9	Ms. B. R. Chaitra	Morphological and Molecular characterization of ecotypes in local Banana	Nutritional profiles of banana cultivars and identification of marker haplotypes for banana
10	Mr. Nandan M.	Identification of Candidate Resistance gene in Pomegranate	Identification of candidate resistance genes against

Sl. No	Name of Student	Title of thesis	Outcome
		(PunicaGranatum) against bacterial blight caused by Xanthomonas axonopodis PV. Punica	bacterial blight in pomegranate
11	Mr. Mahadev Rudagi	Morphological and Molecular Characterization and Nutritional Composition analysis of local ecotypes of Cucumber (Cucumber Sativus L.)	Identification of local varieties of cucumber with enhanced nutritive value
12	Ms. Satyavathi J.	Characterization of Tuberose (*Polianthes tuberosalinn*) genotype based on Phenotypic and Molecular Characters.	Identification of high flower yielding genotypes
13	Ms. Shahenaz Begum	Nutritional and Morphological Profiling of rainbow Carrots (*Daucus Carota* L.) and their molecular Phylogenic assessment.	Evaluation of nutritive values (carotenoids) of carrots

2. P.G. student's research topics linked with staff research projects

1. Molecular characterization of carrot (*Daucuscarota* L.) and identification of candidate genes for nutritional quality, root morphology and adoptability traits for tropical region .
2. Breeding for fruit quality and agronomic traits of cucumber (*Cucumissativus* L)
3. Evaluation of the Okra (*Abelmoschusesculentus* L) genotypes for drought tolerance
5. Identification of suitable onion (*Allium cepa*) varieties to Bijapur and Bagalkot districts
6. Characterization and identification of superior varieties of French bean, ring beans, gladiolus, brinjal and tomato.
7. Genetic purity testing of onion by GOT and molecular markers

External funded projects

- Centre for horticulture biotechnology, funded by RKVY, GoK
- Conservation, creation of genetic variability, and *in vitro* mass multiplication of regionally important banana varieties (Part of IT,BT and S&T, funded CBR project)
- Establishment of a field gene bank and characterization of accessions for bacterial blight, wilt and genetic diversity in pomegranate (Part of IT,BT and S&T, funded CBR project)
- Department of Biotechnology, Govt. of India, Externally Funded project: Molecular characterization of carrot (*Daucuscarota* L.) and identification of candidate genes for

nutritional quality, root morphology and adoptability traits for tropical region (PI: Dr. Sarvamangala S. Cholin)\

- PPV & FR (Govt of India)-Development of DUS guidelines for examination of distinctness, uniformity and stability in drumstick (PI: Dr. R. C. Jagadeesh)
- SERB, Deartment of Science and Technology, Govt. of India: Identification of bacterial blight resistance genes in pomegranate based on dual mixed transcriptomics of *Xanthomonas axonopodispv. Punicae* and pomegranate (Dr. Raghavendra G.)

6.4.2. FACULTY STRENGTH:

Sl. No.	Sanctioned Faculty	Faculty in place	Vacant position	Faculty recommended by the ICAR	Deviations from ICAR recommendations
1.	Professor	1			
2.	Associate Professor	0			
3.	Assistant Professor	4			
Faculty from UHS Directorate of Research and other Department					
4.	Assistant Professor of Seed Science and Technology	2			
5.	Assistant Professor of Crop Physiology	3			
6.	Assistant Professor of GPB, HRES, Tidagundi (80 Km from Main station)	1			
7.	Assistant Professor of GPB, COH, Arabhavi, (120 Km from Main station)	4			

Services of assistant professors of Plant biotechnology are also been taken being taken to carry out the PG courses and guidance to the PG students.

6.4.3. TECHNICAL AND SUPPORTING STAFF:

The Department has 2 technical (non-teaching) staff.

Supporting staff position of the department

Sl. No.	Sanctioned Faculty	Faculty in place	Vacant position	Faculty recommended by the ICAR/UGC/VCI/ other regulatory bodies	Deviations from ICAR recommendations
1	Laboratory Assistant	2			
2	Field Assistant	2			

6.4.4. CLASSROOMS AND LABORATORIES:

Class rooms

Sl. No.	Class room No.	Area (ft.)	Seating capacity	Other facilities (LED, projector, computer, etc.)
1	Class room No. 1	39 X 19	60	LED: 1, Projector: 1, Computer: 1
2	Class room No. 2	39 X 19	60	LED: 1, Projector: 1, Computer: 1
3	Class room No. 3		30	Black board, benches and dissection instruments

Laboratories

Sl. No.	Name of the laboratory	Area (ft.)	Working capacity
1	Lab No. 1 (Genetics and cytogenetics)	39 X 19	25
2	Lab No. 2 (Biochemistry)	44 X 19	25
3	Lab No. 3 (Molecular Biology)	20 X 15	10
4	Lab No 4 (Seed technology)	45*19	25

Major equipments

Sl. No.	Equipment Name	No. of Equipment	Year of Procurement
	U.G., P.G., and Ph.D. Labs.		
1	Water Bath with Shaker	01	2014-15
2	Water Bath with 12 holes	01	2014-15
3	Double Distillation unit	01	2014-15
4	Autoclave	02	2014-15
5	Orbital Shaker	01	2014-15
6	Variable Micropipettes	01 Set (04 no.)	2014-15
7	Germinator	01	2014-15
8	Protoelectric Calorimeter Digital	01	2014-15
9	Digital Calorimeter	02	2014-15
10	L.G. Refrigerator	01	2014-15
11	Centrifuge	01	2014-15
12	Electronic Weighing Balance	01	2014-15
13	Hot Plate Cum Magnetic Stirrer	02	2014-15
14	Photometer	01	2014-15
15	Homogeniser	01	2014-15
16	Vertical Laminar Airflow	01	2014-15
17	Horizontal Laminar Airflow	01	2014-15
18	Vertical Autoclave	01	2015-16
19	Binocular Microscope	06	2015-16
20	Electronic Top Loading Balance	01	2015-16
21	Monocular Microscope	01	2015-16
22	Digital conductivity	01	2015-16
23	Samsung AR 18JC Split AC with V-Guard Stabilizer	01	2015-16
24	Weighing Balance Cap. 35 kg	01	2015-16
25	Hot Plate 8’ Round Shape	02	2015-16
26	Weighing Balance (Cap. 1mg – 100mg)	01	2015-16
27	Research Plus Micropipettes	01 Set (04 no)	2016-17
28	Digital PH Meter	01	2016-17

Sl. No.	Equipment Name	No. of Equipment	Year of Procurement
29	Centrifuge MiniSpin&Rotar	01	2016-17
30	Horizontal Electrophoresis Package	01	2016-17
31	MicroProcessor based Visible Spectrophotometer	01	2016-17
32	Thermo scientific Micro Centrifuge	01	2016-17
33	Blue Star Make Hi Wall Split Air Conditioner with V- Guard Stabilizer	01	2016-17
34	Master Cycler Nexes Gradient (PCR Machine)	01	2016-17
35	Biospectrometer	01	2016-17
36	Water Purifier (Milipore)	01	2016-17
37	De -freezer	01	2016-17
38	DSLR Canon Camera	01	2016-17
39	Microwave Oven	01	2015-16
40	Spinot – Magnetic Stirrer hot Plate 18 x 18 cm	01	2015-16
41	Spinix Vortex Shaker	01	2015-16
42	Electronic Balance (Accuracy 1mg)	01	2015-16
43	Upright Freezer	01	2015-16
44	Horizontal Gel Electrophoresis	01	2015-16
45	Research Plus Micro Pipettes	01 set (03 No)	2015-16
46	Research Plus Micro Pipettes (8 Channel)	01	2015-16
47	Vernier Caliper (Size 0-150mm)	01	2015-16
48	Master Cycler Nexus gradient	01	2016-17
49	PCR – Cooler 0.2ml Starter set	01	2016-17
50	Sequencing Gel Electrophoresis with high volt power pack	01	2016-17
51	ThermoScientific , TH Sorvall ST. 8R Small Benchtop Refrigerated Centrifuge	01	2016-17
52	Gel Documentation System	01	2016-17
53	Prestige Mixer Grinder	01	2018-19
54	Digital Caliper	01	2018-19
55	Refractometer	01	2018-19

Farm facilities

Sl. No.	Name of the Department	Farm area	Irrigated /Non-irrigated	Crops grown
1	Farm facility (Open land)	0.2 ha.	Irrigated	Vegetables, Fruits, pomegranate orchard, Banana orchard flowers, spices, ornamentalsetc
Civil facility	Transgenic containment and bio safety facility (1)	2 Gunta	Irrigated	Pomegranate, Okra,
	Breeding cage (3)	2 Gunta	Irrigated	Okra, Tomato, Brinjal
	Polyhouse facility	2.5 Gunta	Irrigated	Pomegranate, Okra, Tomato, Gladiolus

Civil structure developed for research at COH Bagalkot

P.G research facility availability: Research facilities like inputs (Seeds, fertilizers, irrigation and pesticides) and workforce required for conducting PG research are facilitated from the Department field research block, COH Bagalkot.

Workshops if any ; Nil

The department is facilitated with the equipment's which are sufficient to carry out the PG and PhD students research. The field related equipment's, the land requirement for conducting the breeding related research work and germplasm mantainanace is also sufficient.

The faculty members are well qualified to guide, mentor and handle the courses of PG and Ph.D students. To fulfill the course curriculum of supporting courses

6.4.5. CONDUCT OF PRACTICAL AND HANDS-ON-TRAINING

Sl. No.	Course Title & No	Method of hands-on-training
1	Principles of Genetics (GPB501)- 2+1	Laboratory exercises on Mendelian problems, gene interaction, linkages, probability and Chi- square; Demonstration of genetic principles using; Chromosome mapping using three point test cross; Tetrad analysis; Induction and detection of mutations through genetic tests
	Principles of Cytogenetics (GPB502)	Various chemicals to be used for fixation, dehydration, embedding, staining, cleaning etc. - Microscopy: various types of microscopes, - Preparing specimen for observation – Fixative preparation and fixing specimen for light microscopy studies. Studies on the course of mitosis in onion and other crops - Studies on the course of mitosis in important crops - Studies on the course of meiosis in oilseeds and forage crops - Using micrometers and studying the pollen grain size in various crops -Various methods of staining and preparation of temporary and permanent slides - Pollen germination *in vivo* and *in vitro;* Solution preparation and application at seed, seedling level - Identification of polyploids in different crops - Induction and identification of haploids; Anther culture and Ovule culture – Morphological observations on synthesized autopolyploids - Observations on C-mitosis, learning on the dynamics of spindle fibre assembly – Morphological observations on alloployploids - Morphological observations on aneuploids - Cytogenetic analysis of interspecific and intergeneric crosses - Maintenance of Cytogenetic stocks and their importance in crop breeding - Various ploidy levels due to somaclonal variation ; Polyploidy in ornamental crops. - Fluorescent *in situ* hybridization (FISH)- Genome *in situ* hybridization GISH.

Sl. No.	Course Title & No	Method of hands-on-training
	Principles of Plant Breeding (GPB503)-2+1	Floral biology in self and cross pollinated species, Selfing and crossing techniques in different crop plants. Evaluation of breeding material; Analysis of variance (ANOVA); Estimation of heritability and genetic advance. Maintenance of experimental records. Selection methods in segregating populations; Field Visits and practical exposure for study of segregating generations in Horticulture crops.
	Principles of Quantitative Genetics (GPB – 504)-2+1	Problems on multiple factors inheritance - Partitioning of variance - Estimation of heritability and genetic advance - Covariance analysis - Metroglyph analysis - D^2 analysis - Grouping of clusters and interpretation - Cluster analysis, interpretation - Correlation analysis - Path analysis - Parent-progeny regression analysis - Diallel analysis: Griffing's methods I and II – Diallel analysis: Hayman's graphical approach - Diallel analysis: interpretation of results - NCD and their interpretations - Line x tester analysis and interpretation of results. Working out efficiency of selection methods in different populations and interpretation, Biparental mating, Triallel analysis, Quadriallel analysis and Triple Test Cross (TTC) –analysis and result interpretation, Advanced biometrical models for combining ability analysis, Models in stability analysis Additive Main Effect and Multiplicative Interaction (AMMI) model – Principal Component Analysis model - Additive and multiplicative model – Shifted multiplicative model - Analysis and selection of genotypes
	Mutagenesis and Mutation Breeding (GPB – 505)-1+1	Learning on Radioactivity – Production of source and isotopes at BRIT, Trombay - Learning about gamma chamber; Radiation hazards - Monitoring – safety regulations and safe transportation of radioisotopes - Visit to radio isotope laboratory ; learning on safe disposal of radioisotopes - Hazards due to chemical. Mutagens - Treating the plant propagules at different doses of physical and chemical mutagens - Learning combined mutagenic treatments; Raising the crop for observation - Mutagenic effectiveness and efficiency; Calculating the same from earlierliterature-StudyofM1generation– Parameterstobeobserved;StudyofM2generation Parameters to be observed; Mutation breeding in cereals and pulses – Achievements made and an analysis - Mutation breeding in oilseeds and cotton – Achievements and opportunities- Mutation breeding in forage crops and vegetatively propagated crops; Procedure for detection of mutations for polygenic traits in M2 and M3generations.
2	Heterosis Breeding (GPB – 506)-1+1	Male sterile line characterization using morphological descriptors; Restorer line identification. and diversification of male sterile sources - Male sterile line creation in oilseeds, pulses, cotton and cereals; problems in creation of CGMS system; Ways of overcoming them ,use of gametocides in inducing male-sterility.- Apomixis: practical applications and difficulties in breeding; Estimation from the various models for heterosis parameters -Hybrid seed production in field crops – an account on the released hybrids. Hybrid breeding

Sl. No.	Course Title & No	Method of hands-on-training
		at National and International level; Opportunities ahead.
3	Molecular Breeding (GPB511)	Methods of development of mapping populations and their utility in gene / QTL mapping; different types of markers- Hybridization and PCR based markers and their genotyping following different approaches; Construction linkage maps and QTL mapping-different approaches and relevant algorithms; Marker assisted backcross - Foreground and background selection, zygosity assays, MAS in segregating populations; High precision phenotyping and genotyping methods and their integration in genome mapping and QTL mapping; Next gene sequencing and its utility in markers discovery including SNPs and genotyping.Standardization of protocols especially for the important fruit crops such as Banana, Pomegranate, drumstick etc. development of Tissue culture plants in banana, drumstick, pomegranate etc.

Note: Clearly mention about how the hands-on-training is being imparted to the students as per course curricula for different courses.

6.4.6. SUPERVISION OF STUDENTS IN PG/PHD PROGRAMMES

Every student shall have an Advisory Committee with a Major Advisor and at least three members among whom two members shall be from outside the major field of specialization.Advisory Committee for Ph.D. student shall consist of atleast four members of whom three are from outside the major field of specialization.The research problem will be selected as per the need of the farmers, existing problems including basic, strategic and applied research. Programme of Research proposed by the Advisory Committee and approved by the Dean (Post Graduate Studies)will be carried out by the student under the supervision of Advisory Committee. Totally 14 M.Sc. (7 female and 07 male) students are passed out from theDepartment of Biotechnology and Crop Improvement M.S.c and 3 doctoral students (College of Horticulture, Bagalkot from 2013 to 2018. The research topic carried out by students is in major and minor horticulture crops such as onion, carrot, okra, pomegranate, gladiolus, cucumber, melons etc on various breeding asepectes like germplasm characterization, nutritional profiling molecular phylogenetic assessment, marker assisted recurrent selection, use of ‘omics’ platform for genetic diversity assessment, QTL mapping, association mapping etc.

Number of PG (M.Sc) students taken admission in the Biotechnology and crop improvement and Genetics and plant breeding

Year	Male	Female	Total
2014-15 (BCI)	3	3	6
2015-16 (BCI)	3	1	3
2016-17 (BCI)	3	3	5
2017-18 (GPB)	3	0	Yet to complete
Total	**12**	**7**	**14**

Year	Name of the Department	No. of PG recognized teachers	Intake of students	Student to teacher ratio
2014-15	Biotechnology and Crop improvement & Genetics and Plant Breeding	4	6	2:3
2015-16		4	4	1:1
2016-17		4	6	2:3
2017-18		4	3	2:1.5

6.4.7 FEEDBACK OF STAKEHOLDERS (STUDENTS, PARENTS, INDUSTRIES, EMPLOYERS, FARMERS ETC.)

Feed back by the students:

Sl. No.	Name	Year of completion	Important remarks
1.	Ms. ChaitraKulkarni	2017-19	The Department has very good faculty, laboratories, teaching and research environment
2.	Mr. Santhosh H.	2018-20	Well equipped laboratory facilities. Teachers are skillful. It was privilege to be in PHT.
3.	Ms. Chaitra Poleshi	2014-19	The Department has qualified teachers and unique method of teaching and gave exposure not only in the core subject but also in other horticulture and allied science. Learnt more aspects through hands on learning.
4.	Pushpa Hulagannavar	2016-18	Courses related to teaching were good, we have well equipped laboratories, I have good advisory committee members and HOD aresupportive and who help time to time to conduct my research.
5	Ranjitha B R	2017-19	We have a good lab facility for conducting advance research, teaching is good and I request to take us to some of the breeding stations of other universities for exposure during the course work.
6	Me. Shivadatta	2018-20	Facilities in the Department are unique. The faculty is versatile. The Department stands committed.
7.	Shivaleela	2018-20	I am happy to be a part of this department, the teaching is best and teachers are very co-operative.

6.4.8. STUDENT INTAKE AND ATTRITION

Year	Sanctioned seats	Actual intake	Attrition	% Attrition
2014-15	6	6	0	0
2015-16	6	4	1	25%
2016-17	6	6	0	0
2017-18	3	3	0	0
2018-19	6	6	0	0
Total	27	**25**	**1**	**25%**

Students who got job in government sector left the studies ; in all two PhD students and one MSc student left studies due to this reason

6.4.9. ICT APPLICATION

In the college the students were paid the fees and registered through Academic Management System (AMS). All PG correspondences like Plan of Work, Programme of Research and Submission of all PG forms by the students were through AMS. All approvals by the Head of the Department, Chairman and members of the Advisory Committee, Dean (PGS) and Registrar approval through on line by using AMS in order to make paperless transactions. Teaching will be done by using PPT and smart boards.

The Koha (library management) open wear software is implemented to automate the library activities. The charging and discharging of documents is automated and e-mail reminder facility has been introduced.

CeRA and other online e-resources:

CeRA is the ICAR Consortium of e-resources in Agriculture. This covers more than 3000 scholarly journals pertaining to the Agriculture and allied sciences which are available in full text.

e-books:

Library is having access to Springer e-books for the copy right years 2014-16, which covers nearly 1900 books in virtual format with fulltext availability and at a time 25 users can open an e-book. In addition library has access to >200 Indian e-books.

Krishikosh:

Krishikosh is a database of theses submitted to the Agriculture universities and ICAR institutions are freely accessible by students. The UHS Library is member for Krishikosh and all the theses submitted to the UHS are being uploaded regularly.

Internet

The library is provided with separate internet link line with speed of 100mbps. There is a separate digital library section made in the library which is equipped with 25 computers

with facility of internet connected to all computers. Web OPAC of the main campus library is available in the net. EZ-proxy remote access server is installed in the library through which one can access e-resources, CeRA, and Agristatin distant places also.

Wi-fi facility:

Wi-fi is available in the library premises, department and the hostel 24 x 7. One can have net facility in the main campus through IP based network. Through which students and faculty members can browse CeRA and e-resources of the library in hostels and Departments related to the recent advances, previous literature and update themselves in the area of breeding, geentics, biotechnology, crop improvement etc.

6.4.12.

CERTIFICATE

I the Dean, College of Horticulture, Bagalkot hereby certify that the information contained in the Section 6.4.1 to 6.4.9 are furnished as per the records available in the college and degree awarding university.

Date: March, 2019