DEPARTMENT OF ZOOLOGY

LAHORE COLLEGE FOR WOMEN UNIVERSITY, LAHORE

SELF-ASSESSMENT REPORT

PhD Program

Submitted to

Quality Enhancement Cell,

Lahore College for Women University, Lahore

Dated: _____

Program Team Members:

1. Dr. Sumera Sajjad
2. Dr. Shafaq Fatima
3. Dr. Mateen Arshad

Head of the Department: Prof. Dr. Farkhanda Manzoor

T A B L E O F C O N T E N T S

INTRODUCTION

Zoology is the branch of Natural Science that deals with the animal Biology and is concerned with every level of biological organization i.e. from gene to the ecosystem and with the structure, evolution, physiology, behavior, entomology, genetics, development and distribution of animals in all taxonomic groups. Zoology Department at Lahore College for Women was established in 1956. Dr. Nazir Ahmad was the first Head of the Department of Zoology. Lahore College for Women was elevated to the status of a Women University in September 2002. Zoology Department at Lahore College for Women University includes eight concentration areas: (1) General Zoology, (2) Cell and Molecular Biology, (3) Entomology and Vector Biology, (5) Pathophysiology and Parasitology, (6) Endocrinology and Physiology, (7) Microbiology, (8) Biodiversity and conservation.

The syllabi are dually upgraded and modernized to make them abreast with the International standards. Currently department enrolls students for 4 years Bachelor's degree (BS Zoology), 2 years Master degree (MS Zoology) and Ph.D. program.

Mission of the Department

The overarching aim of the graduate and postgraduate degree programs in Zoology is to train and prepare scholars who are capable of productive careers in animal biology in teaching and research at national and international level, develop human resource in recently emerging technological and inter disciplinary fields such as Genetic Engineering, Bioinformatics, Endocrinology, Microbiology, Entomology and Vector Biology, Pathophysiology and Parasitology, Biodiversity, Wildlife and Conservations etc. Our aims and objectives are:

- To impart knowledge about the advances in major disciplines of Zoology.
- To teach different methods of exploration, investigation, organization of data and its utilization in practical life.
- To equip students with the knowledge and skills for better planning and management of animal resources, environment, health, medicine, agriculture and livestock in the country.
- To prepare and train students for advanced studies and specialization in recently emerging technological and interdisciplinary fields such as Genetic Engineering, Bioinformatics, Endocrinology, Microbiology, Entomology and Vector Biology,

Pathophysiology and Parasitology, Biodiversity, Wildlife and Conservations etc.. after completing the degree the students will be able to apply knowledge to the respective fields more effectively.

- To develop the scientific attitude and demonstrate professional skills in teaching, research and managerial positions in wide range of professions in national and international organizations.

The core values of the Department are:

- Quality
- Honesty and character building
- Value addition
- Hard work
- Care
- Esteem
- Assurance
- Accountability
- Impartiality
- Transparency
- Conviction
- Team spirit

Teaching Methodology:

In all courses included are an excellent mix-match of various methods including lectures, practicals, seminars, assignments, workshops, tutorials and group discussions using audio-visual aids. The teaching culminates in developing the ability in students to collect, organize and interpret the information through various sources like the library and internet. This creates originality among students enabling them to work with gravity of purpose with sharp learning skills.

CRITERION 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

Quality Policy of Department of Zoology:

Mission of the program is to produce skillful researchers to meet with the dire need of the public and private organizations. The ultimate goal of the program aims to produce intellectual and productive resource for Pakistan.

Standard 1.1: The program must have documented measurable objectives that support Faculty/College and Institution mission statements.

Name of programs	Duration	No. of Modules	Total Credit Hours
Ph.D. (after 18 years of education)	2 semesters+ Research	(Course work+ Comprehensive Exams+ Rsearch	18

1.1: PROGRAM OBJECTIVES

1.1.1 Ph.D. (After 18 years of education):

In the first year of the program, the students complete course work of 18 credit hours in two semesters. Students securing minimum 3.00 GPA in the course work appear for comprehensive written test and in the third year the students submit their synopsis. They are also required to clear GAT before submission of the synopsis. After the approval of the synopsis from the concerned Bodies Ph.D. scholars proceed for their research work (Annexure 1 a, b & c). For thesis submission it is compulsory for the students to publish their Ph.D. research work in and HEC recognized Journal with impact factor. As per HEC policy thesis is evaluated from two external foreign examiners and two from any local University. Evaluation reports are submitted and approved in Board of Advanced Studies. After successful defence of the thesis and approval from the Syndicate, the scholar is awarded Degree of Ph.D.

Objectives are:

1. To evolve the ability to formulate an innovate research plan and carry out original independent research in depth concerning novel ideas about animal biology.. Mastery of specific and advanced technical research skills (established or novel) that is necessary for testing the hypothesis.

2. To inculcate the potentials to successfully complete a hard core research assignment.

3. To build skills to fetch the research grants with the help of effective proposal write up.

4. To develop abilities for collaborations with the relevant public and private sector organizations and other research institutes.

5. To embody the scholars as a productive citizens in terms of intellectual resource of the nation.

1.1.2. Strategies are based on:

i) Designing the programs as per requirements of the students.

ii) Develop curriculum according to the need of the program.

iii) Regular revision of curriculum according to keep them abreast with the national and international developments.

iv) Providing all resources including class room facilities, multimedia, computers and properly equipped laboratories.

v) Updating the knowledge of the teachers through workshops and training programs.

vi) Encouraging the establishment of linkages at national and international level.

vii) Establish liaison with the potential employers and provide economical consultancy services

viii) Develop moral basis of the students to impart concepts of teams, honesty and discipline through ethical attitudes.

1.1.3. ASSESSMENT OF Educational Objectives of each Program:

Table 2: Ph.D. Programs Objectives Assessment

OBJECTIVES (1)	HOW MEASURED (2)	WHEN MEASURED (FREQUENCY) (3)	IMPROVEMENT IDENTIFIED (4)	IMPROVEMENT MADE (CORRECTIVE AND PREVENTIVE ACTION) (5)
As given in para 1.1	1. Regular assessment of student knowledge and ability to exhibit the skills by the teacher	Regular	1) Regularity of attendees required 2) Work based teaching 3) Course/curriculum revision to enhance outcomes and to make it more work based 4) Enhancing communication skills 5) Guidance to the students	1) Attendance rules applied more strictly 2) Teachers training and development 3) Course/curriculum revised 4) Students encouraged to enhance their writing skills 5) Students encouraged to attend the National and International workshops/ seminars/ conferences
	i) Class tests	1 pre mid term		
	ii) Class exercises relating to problem	1 pre mid term, 1 post mid term		
	iii) Presentation of relevant topic	Once in a semester		
	iv) Quizzes	As per course requirement		
	2. Written examination	Twice during each semester		
	3. Practical assignment in each modules	Once in a semester		
	4. Discussions	As per requirement		

	5. Research project	Once during program		
OBJECTIVES **(1)**	**HOW MEASURED** **(2)**	**WHEN MEASURED (FREQUENCY)** **(3)**	**IMPROVEMENT IDENTIFIED** **(4)**	**IMPROVEMENT MADE (CORRECTIVE AND PREVENTIVE ACTION)** **(5)**
	6. Teaching/learning process survey (Teacher's evaluation by the students)	Once in a semester	Shortcoming as per survey identified	Teachers are intimated the survey report who make effort to improve which is monitored in next survey
	7. Faculty survey form	Once in a semester	1) More time to be spent on the following during teaching: i) Teacher student interaction ii) Personal development topic like ethic, moral & code of conduct iii) Improvement in quality of administrative support	All the improvements identified have been implemented
	8. Suggestions received from students	As and when received	1) Administrative and personal problems of students 2) Laboratory	Complaints are administered immediately
	9.			

	Students/Quality Assurance Advisor liaison		facilities	
OBJECTIVES (1)	**HOW MEASURED (2)**	**WHEN MEASURED (FREQUENCY) (3)**	**IMPROVEMENT IDENTIFIED (4)**	**IMPROVEMENT MADE (CORRECTIVE AND PREVENTIVE ACTION) (5)**
	New introductions 1. Employer surveys:	Once a year	Results awaited	-
	2. Alumni surveys:	Once a year	Results awaited	-
	3. Survey of graduating students:	Once a year	Results awaited	-
	4. Latest Research students Progress Review	As per requirement	Regular assistance from the concerned quarters	Support and the cooperation from the organizations as per requirement of the project
	5. Survey of Department offering Ph.D.	Every six month	-	-
	6. Faculty Resume	Once a year	1. Qualification 2. Training	1) Sent for higher studies 2) Internal and external training arranged

Standard 1.2: The programs must have documented outcomes for graduating students. It must be demonstrated that that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.

1.2.1. Ph.D. Program Outcomes:

1. Application of the required research experience on a wider scale to solve everyday problems by complying the ethical issues concerned.

2. Acquire the abilities for alliances with the relevant public and private sector research organizations.

3. Achieve art of using scientific research for the improvement of the community and society for career development.

Table 5:Ph.D. Programs Outcomes:

Program Objectives	**Program Outcomes**		
	1	**2**	**3**
1	**X**	**X**	
2	**X**	**X**	**X**
3	**X**	**X**	**X**
4	**X**	**X**	
5	**X**		**X**

Standard 1.3: The results of program's assessment and the extent to which they are used to improve the program must be documented.

1.3.1. a. Actions taken on the basis of assessment:

1) Syllabus revision
2) Teachers training
3) Labs development
4) Faculty Development

1.3.1. b. Strengths of the Department:

i) Team work

ii) Infrastructure

iii) Work environment

iv) Highly equipped Science laboratory, Library, Computing and Internet facilities

1.3.1. c. Weaknesses of the Department:

i) Building facilities

ii) Departmental Library

iii) Trained Laboratory Personnel

iv) Strengthening of existing laboratory facilities

Standard 1.4: The department must assess its overall performance periodically using quantifiable measures.

1.4.1: Performance Measures:

Department assesses the overall performance using quantifiable measures e.g. statistical method.

i) Student's enrollment

ii) Student passed out

iii) Attrition rate

iv) Student teacher ratio

v) Number of publications

vi) Number of projects

vii) Books in library

viii) Linkages and collaborations with other institutes and organizations

ix) Workshops and seminars

x) Purchase of equipment

xi) Other performance indicators

Standard 1.4: The department must assess its overall performance periodically using quantifiable measures.

1.4.1 Performance Measures:

Ta**ble 3: No. of Students Enrolled**

Program	Session	No. of Students
PhD	2013- Onwards	Nil
	2014- - Onwards	02
	2015- - Onwards	02
	2016 - Onwards	13
	2017 - Onwards	08
	2018 - Onwards	04

ii) Table 4: Student-Faculty Ratio

Year	No. of Students	No. of Faculty Members	Student-Faculty ratio
2014-2015			
2013-2014			
2012- 2013			

iii) Table 5: No. of Students Passed Out

Program	Passing out Year	No. of Students
PhD Program	2017	04
	2016	01
	2015	01
	2014	NIL
	2013	NIL
	2012	NIL

IV) Table 6: Percentage of Honor Students & Attrition Rate

Year	**%age of Honor Students** **Criteria:** CGPA 3.75 and above	**Attrition Rate** (Admitted –pass out) *100 Admitted
2018		**NIL**
2017	**01**	**NIL**
2016		**NIL**
2015		**NIL**
2014		**NIL**
2013		**NIL**

v) Table 7: Faculty Training, Seminars and workshops (Appendix A)

Year	2013	2014	2015	2016	2017	2018
Total No. of workshops and seminars organized	0	01	01	05	01	6

Table 8: Number of Publications (Appendix B)

Year	2013	2014	2015	2016	2017	2018
Total No of publications	17	18	16	17	21	17

Table 9: Number and detail of projects

Sr. No.	Title of the project	Name of faculty member	Amount (Million)	Funding agency	Duration	From-To
	Genetic and molecular Characterization of Corneal Dystrophies	Dr. Shagufta Naz	2.99 Million	HEC	3 years	2014 on wards

	Prevalent in Pakistan					
	Production of all-female population in silver carp (Hypophthalmichthys molitrix) by 17α-methyltestosterone immersion and dietary treatment to improve its annual production and harvesting period	Dr. Shafaq Fatima	02	HEC	5 years	2015-2019
	Natural/synthetic pesticides induced hepatic toxicity and variation in iron metabolism regulatory genes in *Rattus novagicus*	Dr. Afshan Syed Abbas	0.5 million	HEC	1 Year	2015-2016
	Study of the innate immune system and expression profiles of immune-responsive genes in major carps, Labeo rohita, *Catla catla* and *Cirrhinus mrigala* challenged with microbial infections	Dr. Zakia Kanwal	7.49	HEC	3 Years	Sep 2016-Sep 2019
	Enhancement of the activity of two synergistic *Bacillus thurgiensis* proteins against cotton bollworms *Earias vitella*, *Earias insuliana* and *Spodoptera litura*	Dr. Fakhar un Nisa	5963566	HEC	3 Years	Sep 2016-Sep 2019
	Grant for upgradation and strengthening of library for Zoology Department, LCWU by HEC	Prof. Dr. Farkhanda Manzoor	2.26 million	HEC		2017
	Antimicrobial properties of nanoparticles (NPs) against beta lactamases producing bacteria and their cytotoxic	Dr Farzana Rashid	12.307	HEC	36 months	2018 to 2021

	potential in prokaryotic and eukaryotic mammalian systems					
	Characterization of industrial effluents using whole effluent toxicity testing (wet) and evaluation of cyto-genotoxicity biomarkers in the fish due to industrial effluents exposure	Dr. Ghazala Jabeen	4.73	HEC	3 years	2018-2021
	Genetic and Immunological analysis of Cockroach Allergen–Induced Asthma in Pakistani population	Dr. Najiya Al-Arifa	480000	HEC	One year	2018-Ongoing
	Therapeutic effects of honey bee venom on different Diseases and antimetastatic effect on carcinoma cell proliferation.	Dr. Saffora Riaz	0.5 million	HEC	One year	2018-Ongoing

vi) <u>Books in Library</u>

Year	Purchased	Stock
2013		986
2014		986
2015		50
2016		50
2017		50
2018	179	229

Research Areas

The Faculty is involved in research in the following areas:

- Molecular Biology
- Microbiology
- Genetics

- Biochemistry
- Endocrinology and Physiology
- Parasitology and Pathophysiology
- Fisheries & Aquaculture
- Entomology

Collaborations

IUCN, WWF, Lahore Zoo and Safari Park, Forest Department, Pakistan

Departmental Achievements (others)

- Since 2004 after the start of PhD. Program in the Zoology Department, 6 PhD scholars have completed their degrees.
- About 48 scholars are enrolled in PhD program under different specializations with different supervisors.
- Department has various projects at different stages of completion through various funding agencies.
- Around 131 research papers have been published in national and international impact factor journals.
- Various new programs have been started in the department.

Honors and Awards

Best teacher award has been honored to One of the faculty member by HEC.

CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION

Provide the following information about the program's curriculum:

A. **Ph.D. Program**.

B. Definition of credit hour: Contact hrs per week

C. Degree plan: attach a flow-chart showing the prerequisites, core, and elective courses.

Prerequisites:

i) MS degree with 3.00 CGPA,

ii) Entry Test by the Department at the time of Admission with securing at least 50% marks

iii) Interview in the departmen

Courses:

Total 18 Credit hrs courses in 1st and 2nd Semester.

Table 4.3 . Curriculum course requirements

Year-I

SEMESTER – I

Course No	Course Title	Credit Hours
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Research Reading-I	(3)
	Total Credit Hours	**9**

SEMESTER – II

Course No	Course Title	Credit Hours
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Research Reading-II	(3)
	Total Credit Hours	**9**

Total Credit Hours: 09+09= **18 CR**

The course will be selected by the student from "Annexure –A" on the availability of faculty member expertise and number of students.

* Candidate will be eligible for comprehensive exam after securing 3.00 CGPA in 2 Semesters.

Comprehensive exam will be considered cleared with securing 50% marks on aggregate. Afterwards, the scholar is supposed to submit synopsis for approval from BOS and ASRB.

E. For each course in the program that can be counted for credit provide 1-2 pages specifying the following:

Course title: MOLECULAR ENTOMOLOGY

Course objectives: To provide the modern molecular concepts of Insect Genome System and its applications in Bio-diversity studies.

Course outcomes: Students will be able to learn the in depth knowledge about insect genome and its application in practical life.

Catalog description: Introduction; insect genomes; nucleus, chromosomes, DNA and RNA; Gene structure and function; gene transcription and translation; concept of introns 123 and exons; central dogma of molecular biology; polymerase chain reaction (PCR), gene cloning and sequencing; restriction analysis, gene libraries; DNA for insect species identifications and insect population diversity; DNA for phylogenetic analysis and construction of phylogenies; RAPD, RFLP and PCR-RFLP; linkage and chromosomal mapping, genes regulatory processes, mutagenesis; molecular basis of insect functions (insect behavior, insecticidal resistance), gene knock-ins and knock-outs by RNA interference, DNA and protein sequence alignments and use of bioinformatics tools.

Text book (s) and references:

1. Gilbert, L. 2005. Comprehensive Molecular Insect Science.1-7 Vol.

2. Glick, B.R. and Pasternek, J. J. 1998. Molecular Biotechnology: Principles and Applications of Recombinant DNA.ASM Press.Washington D.C.

3. Hall, B.G. 2007. Phylogenetic Trees Made Easy: A How to Manual. 3rd Ed. Sinauer Associates.

Computer usage: Computer lab is present in department with internet facility. Students have also access to HEC digital library.
Laboratory: As per specilaization

Standard 2.1: The curriculum must be consistent and supports the program's documented objectives.

Table- 4.4: Courses versus Program Outcomes

Courses or Group of Courses	Program Outcomes		
	1	**2**	**3**
1	√	√	
2.	√	√	
3.	√	√	√

Standard 2.2: Theoretical background, problems analysis and solution design must be stressed within the program's core material.

Ph.D. Program:

The modules of the program adequately address:

1. Problem solving
2. Solution design
3. Application of the theoretical knowledge
   - The product of the task results in the application of theoretical knowledge in the applied fields of natural sciences.
   - All the modules provide adequate practical application of the knowledge

   in different specializations with the exploitation of advanced techniques.

Table 13: **Elements of Courses**

Elements	**Courses**	**No of Courses**
Theoretical background	Courses taught under different specializations provide theoretical background needed for further research	2-4
Problem solving	NA	
Solution design	Two courses of research reading (3 + 3) help to design their proposal and other solutions of the problem	2

Standard 2.3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.

The curriculum satisfy both the core requirements of credit hours and criteria of admission lay down by Lahore College for Women University and HEC and are in par with the international standards.

Standard 2.4: The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body.

The curriculum satisfies the major requirements of the program. No formal accreditation with any professional body is yet established. The program and curriculum has the approval of BOS Zoology and advanced board of studies under the major outlines of HEC.

Standard 2.5: The curriculum must satisfy general education, arts, and professional and other discipline requirements for the program, as specified by the respective accreditation body/council.

The curriculum satisfies general education disciplines requirements. No formal accreditation with any professional body but it fulfills all necessary/basic requirements of the accreditation body. The programs and curriculum has the approval of Board of Studies of Zoology and Lahore College for Women University.

Standard 2.6: Information technology component of the curriculum must be integrated throughout the program.

Requirement for the information technology component is fulfilled by various presentations made by each student in almost every semester and the data analysis for the final project.

Standard 2.7: Oral and written communication skills of the student must be developed and applied in the program.

Oral and written communication skills of the student are developed by the structurally designed courses for English, Seminars, question, answer, debates and by the class participation of the students in previous completed programs i.e., MS and BS.

CRITERION 3: LABORATORIES AND COMPUTING FACILITIES

Standard 3.1: Laboratory manuals/documentation/instructions for experiments must be available and ready accessible to faculty and students.

Instructions to the students are available with the course tutors and are made accessible to the students. Every laboratory has formulated safety guidelines with major equipment and electric gadgets which are clearly displayed in each laboratory.

LABORATORY DETAILS

CRITERION 3: LABORATORIES AND COMPUTING FACILITIES

1. Micro and Molecular Biology Laboratory

Lab Title	**Micro and Molecular Biology**
Location	Department of Zoology, LCWU
Objectives	1. Application of recombinant micro organisms in health 2. Use of microbes as a tool for the assessment of environment associated risks. 3. Researching recent advances in health, agricultural and environmental biotechnology and nanomaterials. 4. Deal with potential microbes related to genetic engineering.
Adequacy for Instruction	
Courses Taught	1. Microbiology 2. Advanced Cell and Molecular Biology 3. Microbial Biotechnology 4. Molecular Biology
Available Software	**Not yet available**
Major Apparatus	1. Petridishes 2. Beakers 3. Micropipettes 4. Screw capped bottles 5. Flasks
Major Equipment	1. Autoclave 2. Refrigerator 3. Incubator 4. Colony counter 5. Microwave oven 6. Gel illuminator
Requirement for Strengthening	1. pH meter 2. UV spectrophotometer 3. Camera fitted microscope 4. Centrifuge 5. Incubators 6. Ultra centrifuge 7. -80 ^{o}C freezer 8. Blotting apparatuses 9. Electroporator 10. Scintillation apparatus 11. PCR 12. ELISA 13. Incubated Shaker 14. Gel Documentation System 15. HPLC

	16. Gel Apparatus (horizontal and vertical) 17. Safety cabinet Type II 18.Water bath shakers

Safety Procedures (**Micro and Molecular Biology Laboratory)**

Safety Regulations	**In case of fire** 1. Fire extinguisher 2. Alarm Sounds **In case of Injury and electric Shock** 1. First Aid Kit **General Instructions** 1. Cleanliness of lab using disinfectants 2. Lab containment 3. Safety measure (Lab coat, masks etc.)

2. Parasitology Laboratory

Lab Title	**Parasitology Lab**
Location	Department of Zoology, LCWU
Objectives	1. Parasitological investigation by serology and histology 2. Providing basic practical skills of laboratory techniques in Parasitology. 3. Introduce techniques, which are used to detect the cysyts, eggs and larvae of parasites in the faecal material.
Adequacy for Instruction	
Courses Taught	Parasitology I Parasitology II Protozoology Helminthology and Host Parasite Relationship Epidemiology of Parasitic Disease Wildlife Parasitology
Available Software	**Not yet available**
Major Apparatus	1. Petridishes 2. Slides 3. Cover slips 4. Beakers
Major Equipment	
Requirement for Strengthening	1. PCR 2. ELISA

Safety Procedures (**Parasitology Laboratory)**

Safety Regulations	**In case of fire** 1. Fire extinguisher 2. Alarm Sounds **In case of Injury and electric Shock** 1. First Aid Kit **General Instructions** 1. Use of biohazards consumables

3. Entomology Laboratory

Lab Title	**Entomology Lab**
Location	Department of Zoology, LCWU
Objectives	1. Familiarized with modern equipment's used in entomological research. 2. Providing skills for the implementation of Integrated Pest Management. 3. Skilling with practical advances in vector management with growth regulators.
Adequacy for Instruction	
Courses Taught	1. Advance Instrumental techniques 2. Entomology 3. Molecular Entomology 4. Research Methods in Entomology 5. Biological Toxicology
Available Software	**Not yet available**
Major Apparatus	1. Petridishes 2. Flasks 3. Cover slips 4. Micropipettes 5. Soxhlet extractor
Major Equipment	1. Microscope 2. Incubator 3. Weighing balance
Requirement for Strengthening	1. Insect growth and rearing chambers 2. Humidifier 3. Hygrometer 4. Micro applicator 5. Air conditioner 6. Heater

Safety Procedures (**Entomology Laboratory)**

Safety Regulations	**In case of fire** 1. Fire extinguisher 2. Alarm Sounds **In case of Injury and electric Shock** 1. First Aid Kit

	General Instructions 1. Use of biohazards consumables

4. Human Molecular Genetics Laboratory

Lab Title	**Human Molecular Genetics**
Location	Department of Zoology, LCWU
Objectives	1. Establishment of repository of DNA samples and pedigrees of genetic diseases for research purpose. 2. Use of Pedigrees as a tool for genetic counseling of affected diseases. 3. Researching recent advances in health, medical biotechnology.
Adequacy for Instruction	
Courses Taught	1. Molecular Genetics 2. Applied Genetics 3. Medical Biotechnology 4. Molecular Biology 5. Human Genetics
Available Software	Cyrillic
Major Apparatus	1. PCR plates 2. Beakers 3. Falcon tubes 4. Micropipettes 5. Screw capped bottles 6. Flasks 7. Measuring cylinder 8.Eppendrofs 9.Blue,Yellow and white tips 10.Glass pipettes
Major Equipment	1. Weighing balance 2. Gel Electrophoresis
Requirement for Strengthening	1. Incubators 2. -20^{o}C Refrigerator 3. Incubated Shaker 4. Deep Freezer 5. Laminar Air flow Cabinet 6. pH meter 7.Hot plate and magnetic stirrer

Safety Procedures (**Human Molecular Genetics Laboratory)**

Safety Regulations	**In case of fire** 1. Fire extinguisher

	2. Alarm Sounds **In case of Injury and electric Shock** 1. First Aid Kit **General Instructions** 1. Cleanliness of lab using disinfectants 2. Lab containment 3. Safety measure (Lab coat, masks etc.)

5. Physiology, Endocrinology and Biochemistry Laboratory

Lab Title	**Physiology, Endocrinology and Biochemistry**
Location	Basement of Zoology Department
Objectives	1. To teach advanced techniques related to biochemical and physiological analysis. 2. To teach skills to use the advanced equipment in a coherent way. 3. To conduct research in the related areas.
Adequacy for Instruction	1. Overhead projector 2. Laboratory manuals
Courses Taught	1. Advance Instrumental Techniques 2. Immunology 3. Molecular Physiology 4. General Endocrinology 5. Biological Toxicology 6. General Endocrinology 7. Molecular Physiology
Available Software	1. SPSS 2. Minitab
Major Apparatus	1. Measuring cylinder 2. Culture tubes 3. Haemocytometers 4. Petri dishes

	5. Beakers 6. Jars 7. Staining apparatus 8. Dissecting dishes/boards 9. Reagents bottles/jars 10. Micropipettes 11.Glass pipette 12. Weighing balance 13. Conical and round bottom flask 14 Separating funnels
Major Equipment	1. Autoclaves 2. Binocular Microscopes 3. Conductivity Meter 4. Digital Balances of varying capacities 5. Distillation Apparatus 6. Heating mantle 7. Horizontal Gel Apparatus 8. Hot plates with magnetic stirrer 9. Incubator 10. Microcentrifuge Machine 11. pH Meter 12. Refrigerators. 13. Stereoscopic Camera fitted Microscope 14. Student Microscopes (Binocular) 15. Student Microscopes (Monocular) 16. Table top centrifuge machine.

	17. Water bath
Requirement for Strengthening	1. Automated ELIZA 2. Double Distillation Apparatus 3. De-ionizer 4. Heamatology Apparatus 5. Oven 6. Power Lab System 7. Semi-Automated Chemistry Analyzers

Safety Procedure (Physiology, Endocrinology and Biochemistry Laboratory)

Safety Regulations	**In Case of Fire** • Inform the concern authority immediately about the fire to evacuate the building and to notify the Fire Department. • Use stairways, not elevators. • As you leave, close the doors and windows behind you. • If there is smoke and heat, stay low, Crawl to nearest exit if need be. • If you are trapped: Cover your nose and mouth with wet cloth Do NOT jump Do NOT open break windows • If you must through flames -hold your breath move quickly, covering your head and hair. Keep your head down, close your eyes as much as possible. • Leave the area by the nearest stairway that is clear of smoke. • Do not re-enter the building until notified to do so by the Fire Department. **In case of Electric Shock** While waiting for medical help, follow these steps: • Look first. Don't touch. The person may still be in contact with the electric source. • Turn off the source of electricity, if possible. • Check for signs of circulation (breathing, coughing or movement).

	• If absent, begin cardiopulmonary resuscitation (CPR) immediately. Prevent shock. • Lay the person down and position the head slightly lower than trunk with the legs elevated. • After coming into contacts with electricity, the person should see a doctor to check for internal injuries, even if he or she has no obvious signs or symptoms. • Never, ever modify, attach or otherwise change any high voltage equipment. **In case of injury/burns/poisoning Inhalation of poisonous gases, vapors and aerosols:** • Ensure your own safety by wearing respiratory protection (gas mask), then carry out the rescue by removing the injured person outside into fresh air. • If the injured person stops breathing, immediately apply mouth-to-mouth resuscitation; in case of cardiac arrest,apply cardiopulmonary resuscitation (CPR). • If the injured person is conscious, he or should sit upright; an unconscious victim should be arranged in the recovery position until medical assistance arrives. • Treat any ingestion of unknown chemicals as poisoning. **General Bleeding:** • Wear gloves when touching or rinsing the wound. • Cover the wound with the sterile dressing and apply a protective bandage. Disinfect only if no further medical treatment is necessary. • Have the patient sit or, preferably, lie down. Raise the injured limb applies pressure with your finger and apply pressure bandage with a thick, absorbent dressing. • Never use a tourniquet. If application of a pressure bandage is not possible, exert pressure directly on the wound. **BURNS:** • Remove the affected clothing of the injured person immediately in case of skin burns. • Rinse the burn immediately with the plenty of water (for at least 10 minutes). • Do not attempt to neutralize. • Cover injured areas with a sterile dressing to prevent infection. • Use an eye-wash bottle to rinse the affected eye thoroughly with plenty of water. • Do not apply any cream, powder, oil or any other preparation to the burn or scald.

	General Laboratory Instructions: Conduct yourself in a responsible manner at all times in the laboratory. 1. Ask your teacher before proceeding with the activity. 2. Never work alone in the laboratory. 3. Do not touch any equipment, chemicals or other materials in the laboratory area until you are instructed to do so. 4. Do not eat food, drink beverages, or chew gum in the laboratory. 5. Do not use laboratory glassware as container for food or beverages.

6. Fisheries & Aquaculture

Lab Title	**Fisheries & Aquaculture**
Location	Basement of Zoology Department
Objectives	4. To teach advanced techniques related to fisheries and aquaculture. 5. To teach skills to use the advanced equipment in a coherent way. 6. To conduct research in the related areas.
Adequacy for Instruction	1. Laboratory manuals
Courses Taught	1. Principles of Fish Biology 2. Fish Physiology and Breeding 4. Limnology 5. Endocrinology of Fish 6. Fresh Water Biology 7. Aquatic Toxicology 8. Fish Nutrition and Health 9. Aquaculture Biotechnology
Available Software	1. SPSS 2. Minitab
Major Apparatus	1. Flasks

	2. Petridishes 3. Beakers 4. Autoclave bottles 5. Hot plate
Major Equipment	1. Fiberglass tanks with aeration system 2. Aquaria with aeration system 3. Meter to check Water quality parameters 4. DO Meter 5. Student Microscopes (Binocular) 6. Weighing balance 7. Refrigerator 8. Fridge (4 degree, -20 degree) 9. Incubator
Requirement for Strengthening	1. Microtome 2. Automatic staining machine 3. Freeze dryer 4. Proximate analysis equipment 5. Power Lab System

Safety Procedure (Fisheries & Aquaculture Laboratory)

Safety Regulations	**In Case of Fire** • Inform the concern authority immediately about the fire to evacuate the building and to notify the Fire Department. • Use stairways, not elevators. • As you leave, close the doors and windows behind you. • If there is smoke and heat, stay low, Crawl to nearest exit if need be. • If you are trapped: Cover your nose and mouth with wet cloth Do NOT jump Do NOT open break windows

	• If you must through flames -hold your breath move quickly, covering your head and hair. Keep your head down, close your eyes as much as possible. • Leave the area by the nearest stairway that is clear of smoke. • Do not re-enter the building until notified to do so by the Fire Department. **In case of Electric Shock** While waiting for medical help, follow these steps: • Look first. Don't touch. The person may still be in contact with the electric source. • Turn off the source of electricity, if possible. • Check for signs of circulation (breathing, coughing or movement). • If absent, begin cardiopulmonary resuscitation (CPR) immediately. Prevent shock. • Lay the person down and position the head slightly lower than trunk with the legs elevated. • After coming into contacts with electricity, the person should see a doctor to check for internal injuries, even if he or she has no obvious signs or symptoms. • Never, ever modify, attach or otherwise change any high voltage equipment. **In case of injury/burns/poisoning Inhalation of poisonous gases, vapors and aerosols:** • Ensure your own safety by wearing respiratory protection (gas mask), then carry out the rescue by removing the injured person outside into fresh air. • If the injured person stops breathing, immediately apply mouth-to-mouth resuscitation; in case of cardiac arrest,apply cardiopulmonary resuscitation (CPR). • If the injured person is conscious, he or should sit upright; an unconscious victim should be arranged in the recovery position until medical assistance arrives. • Treat any ingestion of unknown chemicals as poisoning. **General Bleeding:** • Wear gloves when touching or rinsing the wound. • Cover the wound with the sterile dressing and apply a protective bandage. Disinfect only if no further medical

	treatment is necessary. • Have the patient sit or, preferably, lie down. Raise the injured limb applies pressure with your finger and apply pressure bandage with a thick, absorbent dressing. • Never use a tourniquet. If application of a pressure bandage is not possible, exert pressure directly on the wound. **BURNS:** • Remove the affected clothing of the injured person immediately in case of skin burns. • Rinse the burn immediately with the plenty of water (for at least 10 minutes). • Do not attempt to neutralize. • Cover injured areas with a sterile dressing to prevent infection. • Use an eye-wash bottle to rinse the affected eye thoroughly with plenty of water. • Do not apply any cream, powder, oil or any other preparation to the burn or scald. **General Laboratory Instructions:** Conduct yourself in a responsible manner at all times in the laboratory. 7. Ask your teacher before proceeding with the activity. 8. Never work alone in the laboratory. 9. Do not touch any equipment, chemicals or other materials in the laboratory area until you are instructed to do so. 10. Do not eat food, drink beverages, or chew gum in the laboratory. 11. Do not use laboratory glassware as container for food or beverages.

7. PhD Laboratory

Lab Title	**PH.D. Lab**
Location	Department of Zoology, LCWU
Objectives	1. Advanced techniques for PhD students.
Adequacy for Instruction	
Courses Taught	
Available Software	**Not yet available**
Major Apparatus	
Major Equipment	1. Camera Fitted Microscope 2. Weighing balance

	3. Semi-automated chemistry analyzer 4. Haematology analyzer (non functional) 5. Refrigerated centrifuge 6. centrifuge 7. Spectrophotometer 8. PCR 9. Ph meter 10. Electrophoresis apparatus 11. Real time PCR 12. Water bath
Requirement for Strengthening	RNA Extraction

Safety Procedures (**Ph.D. Laboratory)**

Safety Regulations	**In case of fire** 1. Fire extinguisher 2. Alarm Sounds **In case of Injury and electric Shock** 1. First Aid Kit **General Instructions** 1. Use of biohazards consumables

Standard 3.2: There must be adequate support personnel for instruction and maintaining the laboratories:

Support of trained laboratory personnel is deficient and the tutors themselves are responsible for instructions and tutorial related to the practicals. They supervise each experiment and provide practical guidance to each student.

Standard 3.3: The university computing infrastructure and facilities must be adequate to support program's objectives:

The computing infrastructure of the Zoology Department is adequate (see criterion). There is 1 computer lab and it consists of 36 computers for the use of the students. The number of computers is constantly under review. Most of the students have got laptops under Prime Minister / Chief Minister laptop scheme.

CRITERION 4: STUDENT SUPPORT AND ADVISING

Standard 4.1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner:

- The strategy for programs (courses) offering is controlled. The PhD courses are offered twice a year.

Standard 4.2: Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants:

- The effective student/faculty interaction in programs taught by more than one faculty members is streamlined by coordination of these faculty members and the commonality is maintained through any curriculum which is adapted for the particular module..
- The programs are structured to ensure effective interaction between students, faculty and the Head of the Department. The students requiring extra help are provided services through tutorials, questions and answers. Questions are encouraged by the faculty from the students. Seminars are arranged where the students are free to discuss the topics relating to the program. Debates are initiated. The students are free to interact with the class incharge and Head of the Department in case of any shortcoming.

Standard 4.3: Guidance on how to complete the program must be available to all students and access to academic advising must be available to make course decisions and career choices:

- The students are provided guidance regarding the completion of the programs and having access to qualified faculty as well as student counseling. The students are encouraged to bring forward their suggestions and complaints through a complaint box which is maintained in the institute. The students once in semester carry out the teacher's evaluation.
- The counseling of the students are done in the following way:

a) Faculty members are the first available source to the students for guidance
b) Program managers provide further guidance followed-up by guidance from the senior faculty members e.g. Head of Department and the Quality Assurance Advisor. The counseling is regarding the program, its effectiveness, teacher careers available to the students and any other difficulty of personal nature.
The counseling is also availed at the student counseling centre of the University which deals with the various issues.

CRITERION 5: PROCESS CONTROL

Standard 5.1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives:

PhD Zoology Program:

Admission Process:

i) MS degree with 3.00 CGPA,

ii) Entry Test by the Department at the time of Admission with securing at least 50% marks

iii) Interview in the department

Courses:

Total 18 Credit hrs courses in 1st and 2nd Semester.

Curriculum course requirements

SEMESTER – I

Course No	Course Title	Credit Hours
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Research Reading-I	(3)
	Total Credit Hours	**9**

SEMESTER – II

Course No	Course Title	Credit Hours
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Choose from "Annexure-A" according to specialization	(3+0)
Zoo-7*	Research Reading-II	(3)

	Total Credit Hours	**9**

Total Credit Hours: 09+09= **18 CR**

The course will be selected by the student from "Annexure –A" on the availability of faculty member expertise and number of students.

Standard 5.2: The process by which students are registered in the program and monitoring of students' progress to ensure timely completion of the program must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives:

- Advertisements are made in leading newspapers and on Lahore College for Women University website. The student academic progress is monitored regularly by the written examination system. The process of registration and monitoring are reviewed once in a year three months before the date of admission.
- Students requiring admission in PhD Zoology program who have qualified from private universities are required to give equivalence certificates as per rules of Lahore College for Women University.

Standard 5.3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institution mission statement. These processes must be periodically evaluated to ensure that it is meeting its objectives:

- The standards are clearly indicated in the University calendar which is followed. Qualifications which are required for each subject are kept in mind. The criteria for recruiting are qualification, experience which is judged through analysis of CVs, written test and personal interviews. In case of permanent faculty members, the recruiting is done by a board constituted by Lahore College for Women University whereas; visiting faculty members are recruited by a board constituted by the Institute. The input of the students for maintaining the quality of the teachers is done by evaluating the teachers regularly once in a semester by the students. The results of these studies are sent to the teachers who are asked to improve and in extreme cases, replacements are made.

- An Annual Confidential Report (ACR) is initiated by the Dean annually for each staff member and retention of the staff, their increment and promotion are based on ACRs.
- The faculty members performing well are rewarded by increment and honorariums. Good working conditions provided job satisfaction, pays, providing facilities like Ph.D. programs and scholarships are incentive to faculty member who perform well

.

Standard 5.4: The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives:

- There are process and procedures to ensure that the teaching and delivery of the program material to the students emphasizes active learning. For instance, excercises, tasks, activities, assignments and projects based on practicality of the knowledge are given to the students and research thesis is initiated at the end of the program. Process is monitored and assessed regularly.

Standard 5.5: The process that ensures that graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

- In order to ensure that graduates/outgoing students have completed the requirement of the programs are based on the standards.
- The semester rules have been adopted by the Zoology Department and the course tutors, QEC and the Head of the Department ensure their compliance.
- The operation is reviewed once a year and is documented as Management of academic Programs.

CRITERION 6: FACULTY

Standard 6.1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The

interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline:

- There is adequate full time faculty which provides adequate coverage of the program with continuity and stability. The interest and the qualifications of all faculty members are pre judged and monitored for each course forming a part of the program. The level of competency of the faculty members are evaluated at time of induction and monitored during teaching.

Table 6.1: Faculty Distribution by Program Areas

Program Area of Specialization	**Number of faculty Members in Each Area**	**Number of Faculty with Ph. D Degree**
Entomology	03	14
Pathophysiology & Parasitology	03	
Physiology & Endocrinology	04	
Microbiology, Molecular biology & Genetics	03	
Fisheries & Aquaculture	03	

Standard 6.2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programs for faculty development must be in place:

- All the faculty members remain current in the disciplines and sufficient time is provided for scholarly activities and professional development. The newly inducted faculty is given enough time to familiarize with the working environment of the institute. During this time they are monitored. Faculty is provided with centralized training by the Registrar's office

through NAHE and professional faculty development program of Leaning Innovation division (LID), HEC. They are encouraged to attend international seminars. Some of the faculty members had opportunity to get training and research experiences from foreign universities/institutions (Annexure III).

Standard 6.3: All faculty members should be motivated and have job satisfaction to excel in their profession:

The faculty members are regularly motivated and efforts are made to provide job satisfaction so that they excel in their profession. The satisfaction of the faculty and their input is measured by faculty survey form

CRITERION 7: INSTITUTIONAL FACILITIES

Standard 7.1: The institution must have the infrastructure to support new trends in learning such as e-learning

Academic Building: (Dedicated/Owned)

1. Class rooms	04
2. Research labs	07
3. Computer lab	01
4. Seminar room	01
5. Committee room	0
6. Museum	01
7. HOD Office	01
8. Staff room	01
9. Store rooms	01

- Multimedia are used in the class rooms.
- Internet facility is available throughout the department.
- Access to the HEC digital library.

Standard 7.2: The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnel:

- Almost 2560 up-to-date books are available in the Science library that covers all the areas of programs.
- Institute provides services of digital library.
- Common library is available for books borrowing.

Standard 7.3: Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities:

- Personal offices are not available to the faculty members. They use the research laboratories for taking their lectures and other related activities as no rooms have been allocated for PhD.
- Four class rooms, 7 research laboratories. One seminar room and one computer lab.
- Office of Head of the Department, one staff room

CRITERION8: INSTITUTIONAL SUPPORT

Standard 8.1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teachers and scholars:

- Teachers are recruited on the basis of criterion established by the University and HEC.
- Existing faculty is sent to different courses of teaching organized to update the knowledge.
- Zoology Department has collaboration with industry, NGOs, government departments, universities, research institutes and various other organizations of the country.
- No secretarial support is provided to the teachers to meet the working needs.

Standard 8.2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. students:

Research assistants available to the faculty to conduct research activities dedicated to relevant funded project only.

Standard 8.3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.

- Budget for library (0.1 Million Pak Rupees) was withdrawn after 2015.
- Budget for general laboratory (equipment, glassware, chemicals) is 0.5 Million Pak Rupees.