

Pir Mehr Ali Shah

Arid Agriculture University Rawalpindi



Self-Assessment Report

6th Cycle (Fall 2016 to Spring 2018)

Ph.D. Wildlife Management

Department of Wildlife Management

Faculty of Forestry, Range management and Wildlife

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INTRODUCTION

The Department of Wildlife Management was established in 2007 at Pir Mehr Ali Shah Arid Agriculture University Rawalpindi with a mandate to carry out teaching and research on various aspects of wildlife, suggesting measures for conservation of wildlife populations and their habitat, especially focusing on threatened species, management of protected areas and wetlands, and management of human-wildlife conflict. The department is offering postgraduate degrees of M.Sc., M. Phil. and Ph.D. in wildlife management. The students' enrollment during the reporting period was 08 scholars in Ph. D programme.

An extensive scheme of study (consisting of more than 30 courses) has been developed for post graduate degree programme in the field of wildlife management including all major aspects such as wildlife study techniques, wildlife population, management, diseases and captive breeding, management of protected area, wetlands and terrestrial habitats, wildlife policy, laws, conservation strategies and conventions, wildlife damage management, threatened species management, illegal trade, etc. The courses are supported by latest text books and research publications.

Presently, the research studies conducted by the students and faculty focus on population density and size, wildlife habitat analysis, evaluation and preference, food habits and diet composition, breeding habits and breeding biology, distribution of wildlife species in their habitat, baseline data on protected areas and threatened species, wetland ecology, population size and trends of water birds, threats to wildlife species, estimation of home ranges of large mammals etc. In future, the department would address major issues on wildlife population, habitat and threats, developing strategies for their conservation and environmental education/awareness among the public.

The research facilities have been established both in the field as well as in the laboratory. Necessary field equipment required for conducting wildlife research studies have been procured under HEC funded development and research projects as well as university funded research projects. This includes; live traps, nets, binoculars, spotting scopes, digital cameras, camera traps, GPS, camping gear, radio-telemetry, glassware, refrigerators, ovens, deep freezers, chemicals, etc.

The faculty members implemented five research projects during reporting period which included; i) "Baseline studies on wildlife diversity in selected protected areas of Pakistan-Phase-II" funded by HEC for a period of three years (2014-17), amounting to Rs. 3,916,555.00, ii) "Spatial distribution of habitats influences anuran diversity and space use in the landscape: implications for conservation beyond species level" funded by International Foundation for Science, Sweden (2013-2017) amounting to US\$12,000/-, iii) Are anurans impacted by urbanization? Anuran monitoring and conservation in a human-dominated landscape, funded by HEC amounting Rs. 8.6 million Rs., iv) Reptilian assemblage in agricultural landscape of

District Chakwal, Punjab funded by National Geographic Society amounting 12,000 USD and iv) Ecologically based rodents management in croplands of Pothwar Plateau, Pakistan” amounting to Rs. 7.596 million.

More than 270 books related to wildlife ecology, management and conservation are available in the departmental library, in addition to several books in university library for ready reference to the students. In addition, students are encouraged to get electronic copies of latest research papers related with their area of research by contacting relevant authors, institutions, publishers, etc.

This Self-Assessment Report (SAR) is based on eight criteria. The first criterion outlines the program mission and objectives. Criterion 2 provides information about the curriculum development. Criterion 3 enlists the laboratories and other relevant information. The fourth criterion is pertinent to the information about students' support and advising. The last four criteria provide information about process control, faculty characteristics and institutional facilities and support.

CRITERION 1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES**Standard 1.1. The program must have measurable objectives to support Mission**

Mission Statement: To provide in-depth knowledge on wildlife biology / ecology / conservation and generate knowledge through courses and thesis research.

Objectives:

1. To create a corps of wildlife biologists for management of wildlife of the country.
2. To impart training for conducting research studies on wildlife species and their habitat for promoting conservation.
3. To impart knowledge about global issues related to biodiversity/wildlife conservation

Main elements of strategic plan to achieve mission and objectives:

- Development of sound teaching system based on experience and vision gathered from literature, reviews, symposia, workshops, etc. for the award of degrees.
- Designing of curricula including core subjects, elective subjects, specialized areas, internship programs and study tours.
- Setting up of well-equipped laboratories for students as per available resources.
- Conducting research studies through writing of synopses and theses.
- Development of scientific writing and presentation skills assignments and research reports.
- Publication of scientific papers, popular articles, books, etc.
- Arranging study tours to provide knowledge to students about wildlife management.

The assessment of the program objectives through different criteria is presented in Table 1.

Table 1. Program Objectives Assessment for Ph.D.

S. #	Objective	How Measured	When Measured	Improvement Identified	Improvement made
1	To create a corps of wildlife biologists for management of wildlife of the country.	Test their knowledge about Wildlife management techniques through tests / comprehensive exams	During the semesters and at the time of written & oral comprehensive exams	Courses to be updated by inducting new knowledge/ techniques & induct new courses when required	Revision of curriculum and induction of new courses.
2	To impart training for data collection and analysis about wildlife species and their habitat for promoting its conservation.	Assessing the interest of students, quality of their thesis research studies	During synopsis writing for starting of research and thesis writing on completion of research	Students to make presentations and submit reports	Presentations, seminars started for communication skill development

3	To impart knowledge about global issues related to biodiversity / wildlife conservation	Assess their knowledge about these aspects through tests / comprehensive exams / presentations	During the semesters and at the time of written & oral comprehensive exams	Courses to be regularly updated by inducing new knowledge on global issues and trends	Revision of relevant course contents and induction of new courses.
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Standard 1.2 The program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and that graduating students are capable of performing these outcomes

Students of Ph.D.in Wildlife Management should possess the ability of:

- Identification of problems in wildlife management/conservation and suggest appropriate solutions
- Preparation of problem based research proposals and use of scientific study techniques.
- Communication skills through presentations, oral discussions, scientific and review articles, etc.
- Scientific writing skills and publication of research papers and popular articles in scientific journals.

Table 2. Relationship of Program Objectives with Program Outcomes

Program Objectives	Program Outcomes			
	Wildlife management Skills	Developing Research Proposals	Communication skills	Scientific writing/publishing
Education	+++	++	++	++
Research	++	+++	+++	++
Global issues	++	+	+	

+ = Moderately satisfactory ++ = Satisfactory +++ = Highly satisfactory

Teacher's evaluation

Four teachers of the department teach classes to Ph.D. students namely:

1. Dr. Maqsood Anwar Professor
2. Dr. Tariq Mahmood Assistant Professor
3. Dr. Muhammad Rais Assistant Professor
4. Dr. Bushra Allah Rakha Lecturer

Note: All teachers' designation represents their designation for the period of evaluation.

The teachers were evaluated by the students at the end of course completion through the proforma-10. Details of performance of each teacher are given in Figs. 1-4.

WL-702 (Wildlife Population Ecology)

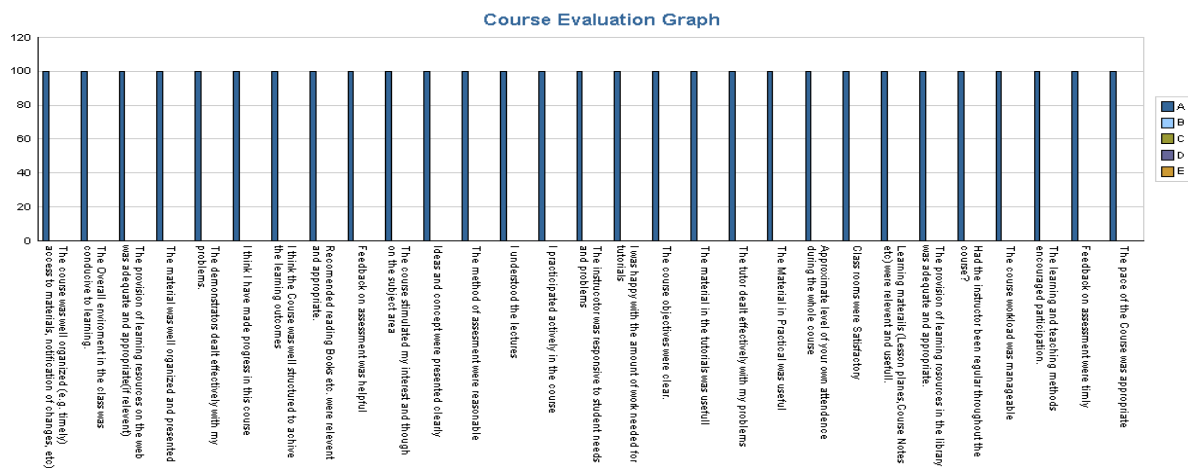


Figure 1 Teacher Evaluation for WL-702 during Fall-2016

Discussion: All students were satisfied regarding timely return of graded scripts timely, instructor's ability, punctuality, fairness and impartiality, clarity on course objectives and contents, provision of course spilt and learning resources. They were satisfied and provided positive feedback that the course increased their knowledge, integrated theory and practical knowledge. The students were also satisfied that the course was updated and relevant to national needs.

WL-709 (Society, Values and Economics of Wildlife)

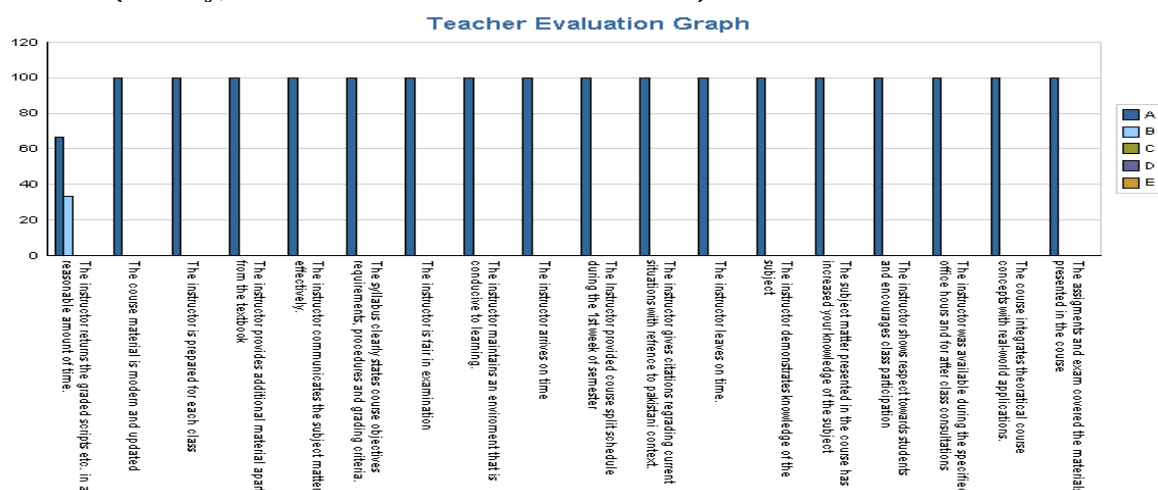


Figure 2. Teacher Evaluation for WL-709 during Spring-2017

Discussion: Majority of the students are satisfied and provided positive feedback that the course increased their knowledge, integrated theory and practical knowledge. The students

were also satisfied that the course was updated and relevant to national needs. All students were satisfied regarding timely return of graded scripts timely, instructor's ability, punctuality, fairness and impartiality, clarity on course objectives and contents, provision of course spilt and learning resources.

WL-717 (Endangered species and their Management)

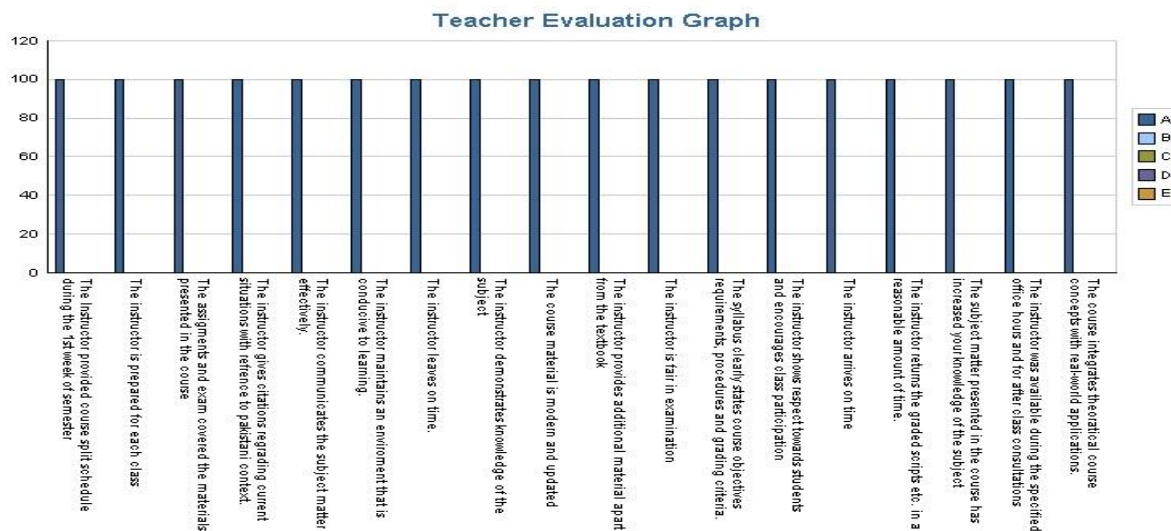


Figure 3. Teacher Evaluation for WL-717 during Fall-2017

Discussion: All students were satisfied regarding timely return of graded scripts timely, instructor's ability, punctuality, fairness and impartiality, clarity on course objectives and contents, provision of course spilt and learning resources. They were satisfied and provided positive feedback that the course increased their knowledge, integrated theory and practical knowledge. The students were also satisfied that the course was updated and relevant to national needs.

WL-732 (Wildlife Data Analysis)

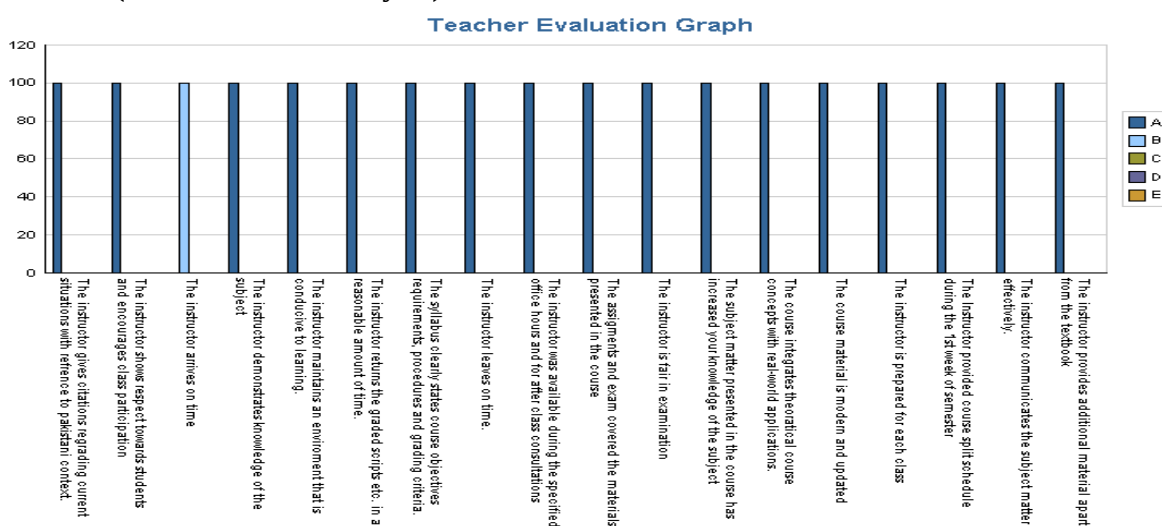


Figure 8. Teacher Evaluation for WL-732 during Spring-2017

Discussion: Majority of the students were satisfied and provided positive feedback that the course increased their knowledge, integrated theory and practical knowledge. The students were also satisfied that the course was updated and relevant to national needs. Majority students were satisfied regarding timely return of graded scripts timely, instructor's ability, fairness and impartiality, clarity on course objectives and contents, provision of course spilt and learning resources.

Course Evaluation

The courses offered during the report period (Fall 2014 to Spring 2016) are given below.

Table 3 Courses offered and evaluated for Ph.D. from Fall 2014 to Spring 2016

#	Code	Course Title	Semester	Teacher
1	WL-702	Wildlife Population Ecology	Fall 2016	Dr. Tariq Mahmood
2	WL-709	Society, Values and Economics of Wildlife	Spring 2017	Dr. Tariq Mahmood
3	WL-717	Endangered species and their management	Fall 2016, fall 2017	Dr. Maqsood Anwar
4	WL-732	Wildlife Data Analysis	Spring 2017	Dr. Muhammad Rais

These offered courses were evaluated by the Ph.D. students at the end of course completion through proforma-1. Details of evaluation of each course are given below in **Figs. 5-8**.

WL-702 (Wildlife Population Ecology)

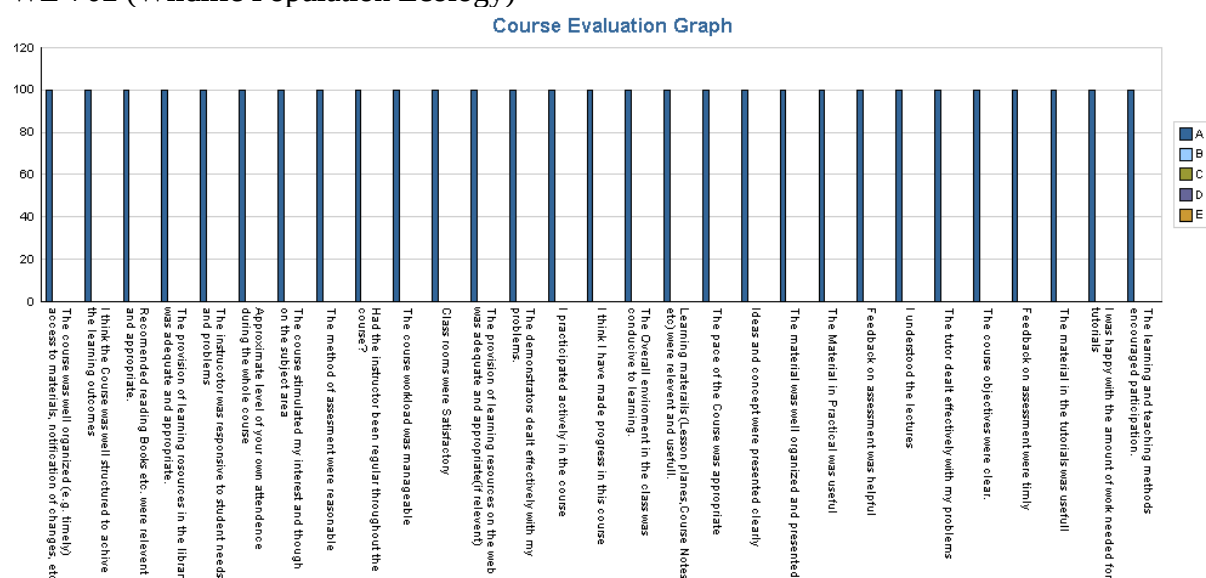


Figure 5. Course Evaluation of WL-702 during Fall -2016.

Discussion: All the students showed satisfaction on their approximate level of attendance and learning progress. They agreed on punctuality of the tutor. The students were agreed that the tutor was approachable and provided timely feedback on assessment. They were satisfied with

the learning resources. The students commented that the course was informative, interesting and well organized.

WL-709 (Society, Values and Economics of Wildlife)

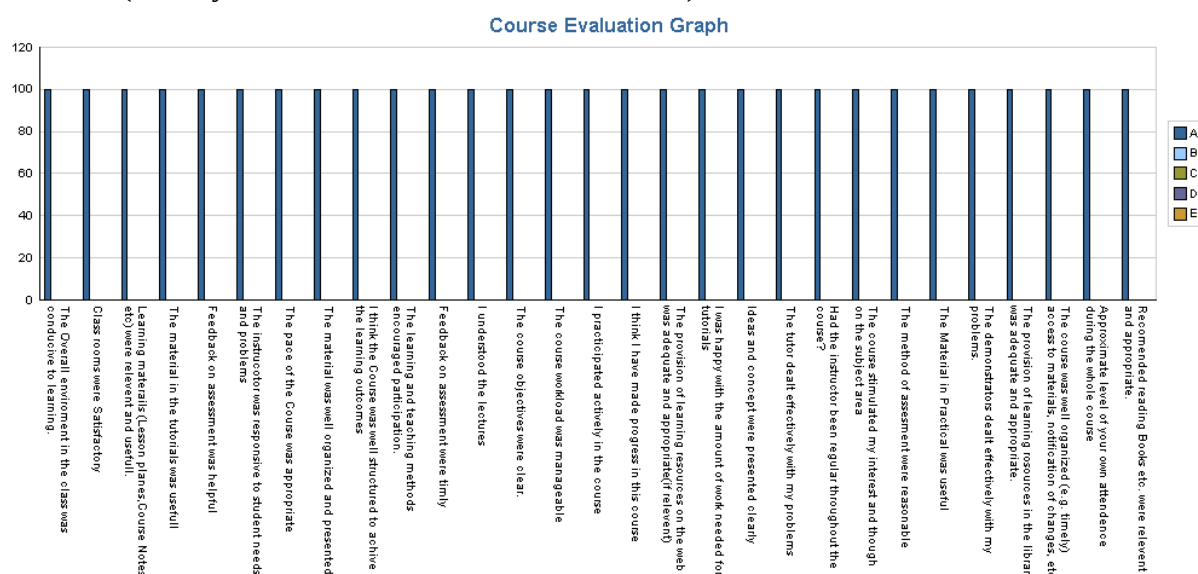


Figure 6 Course Evaluation of WL-709 during spring -2017

Discussion: All the students commented that the course was informative, interesting and well organized. They agreed on punctuality of the tutor. The students were agreed that the tutor was approachable and provided timely feedback on assessment. They were satisfied with the learning resources. All the students showed satisfaction on their approximate level of attendance and learning progress.

WL-717 (Endangered Species and their Management)

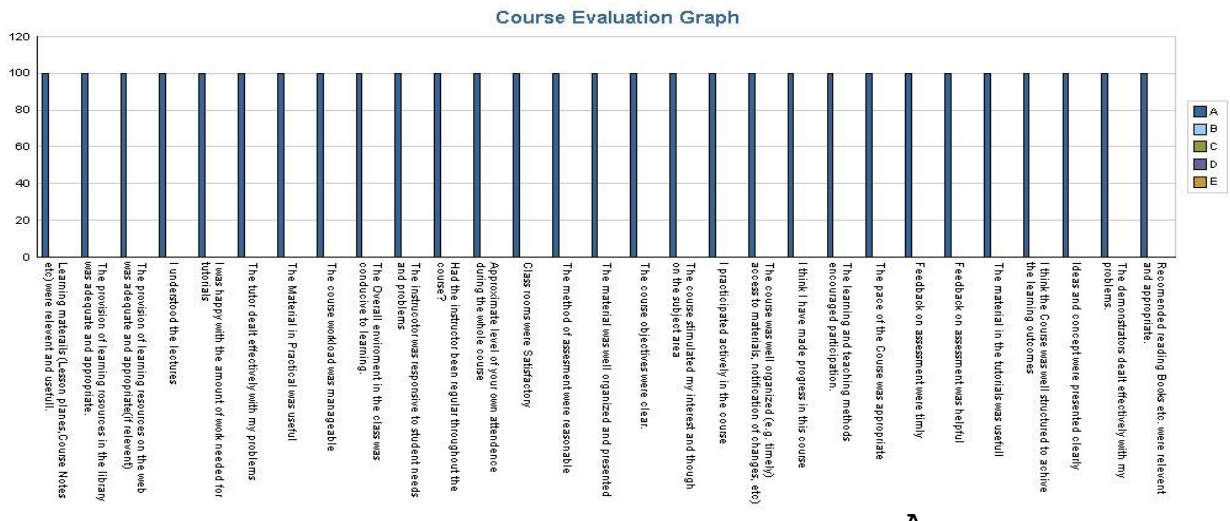


Figure 7. Course Evaluation of WL-717 during Fall -2017

Discussion: All students showed satisfaction on their approximate level of attendance and learning progress. They agreed on punctuality of the tutor. The students were agreed that the tutor was approachable and provided timely feedback on assessment. They were satisfied with the learning resources. The students commented that the course was informative, interesting and well organized.

WL-732 (Wildlife Data Analysis)

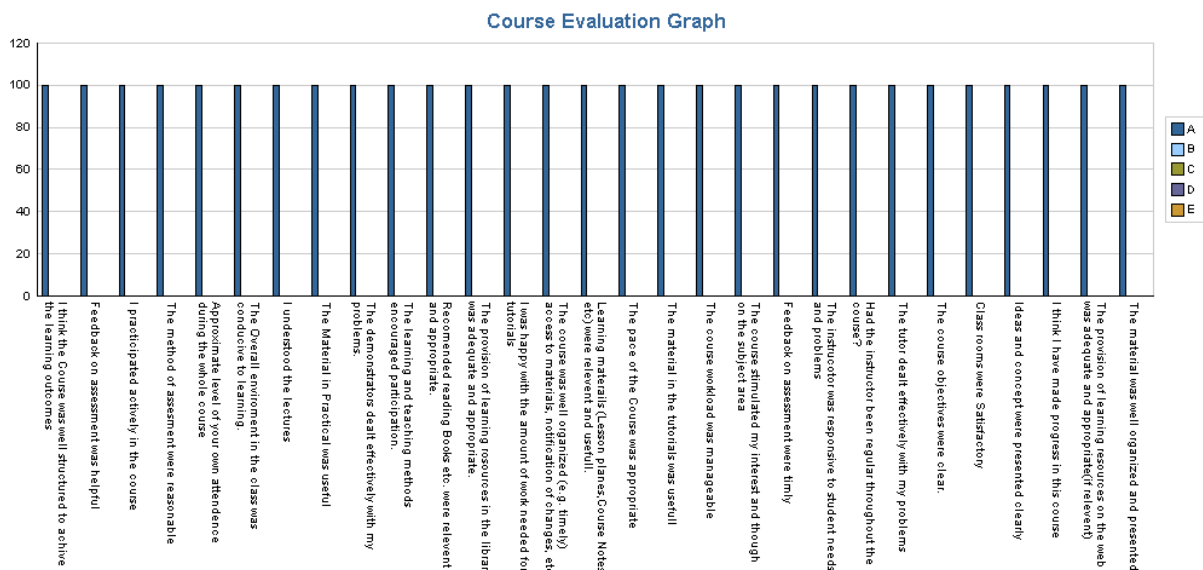


Figure8. Course Evaluation of WL-732 during Spring-2017

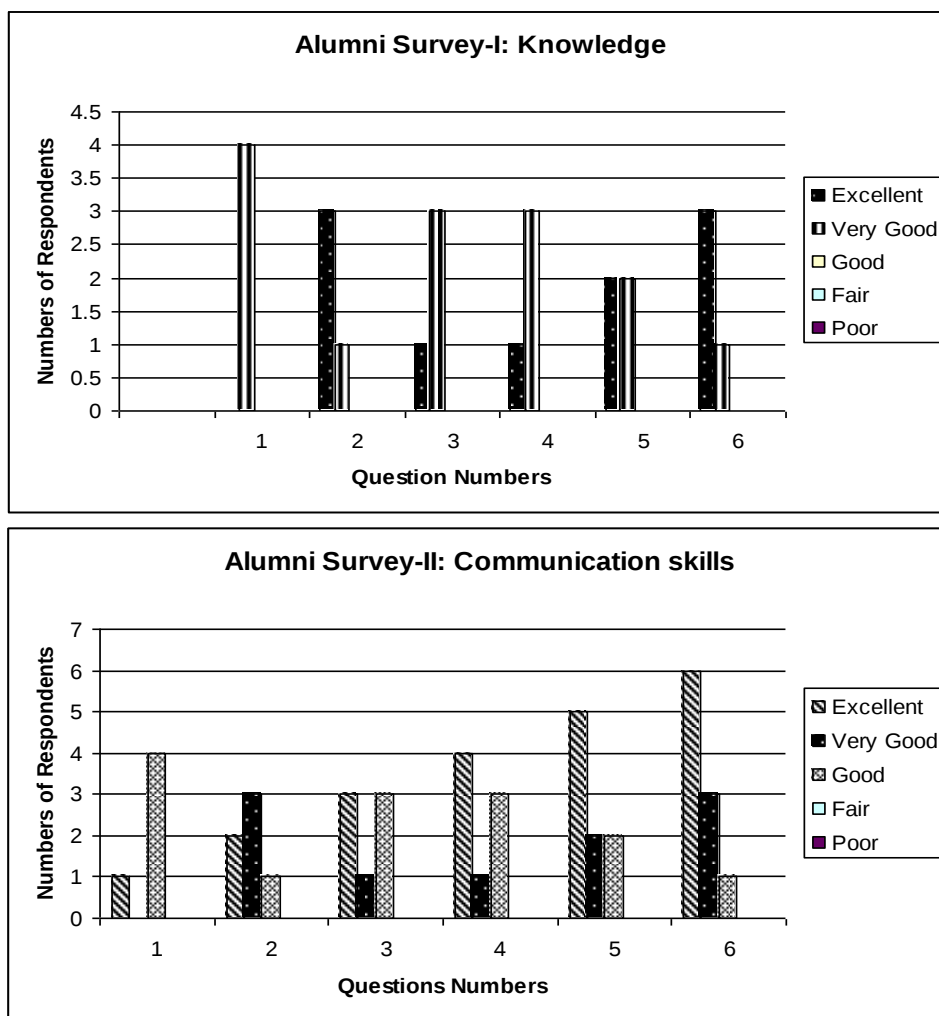
Discussion: All the students showed satisfaction on their approximate level of attendance and learning progress. They agreed on punctuality of the tutor. The students were agreed that the tutor was approachable and provided timely feedback on assessment. They were satisfied with the learning resources. The students commented that the course was informative, interesting and well organized.

FACULTY COURSE REVIEW REPORT

At the time of completion of each semester, each faculty member for each course offered during the semester filled and completed **performa 2** (online on CMS) to compile the Faculty Course Review report. The results and details of the said review report are shown annexure I.

ALUMNI SURVEY RESULTS

Results of Alumni survey were compiled using Proforma-7 and are shown below as Figure 9 (I-V); N=04.



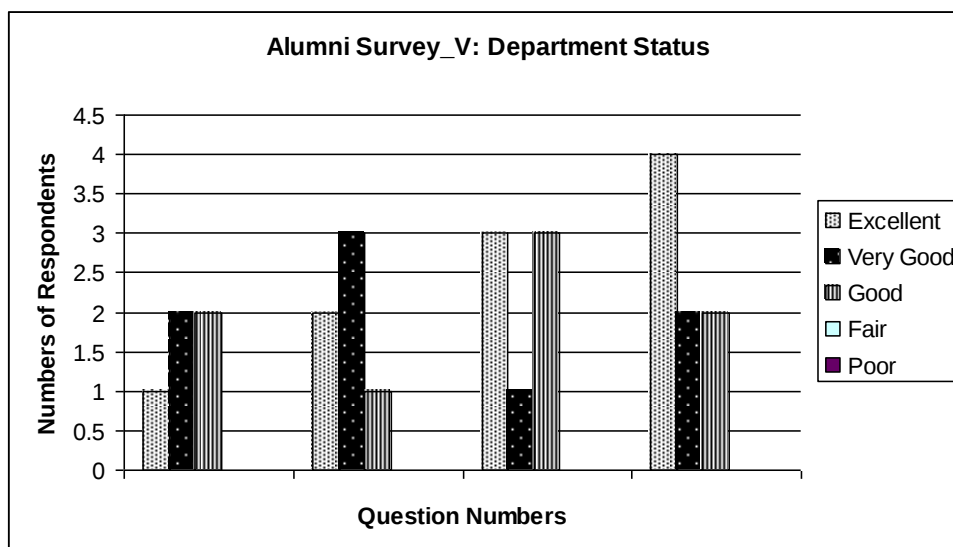
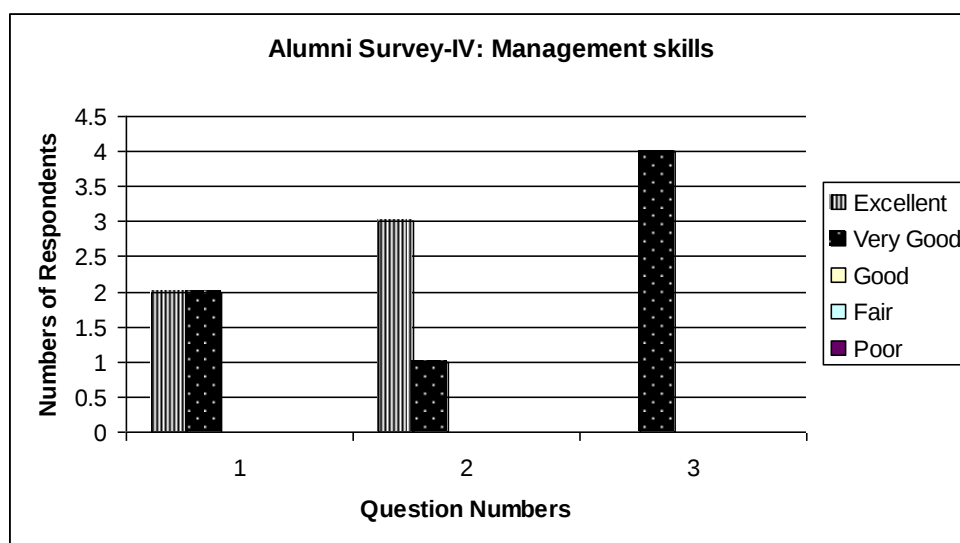
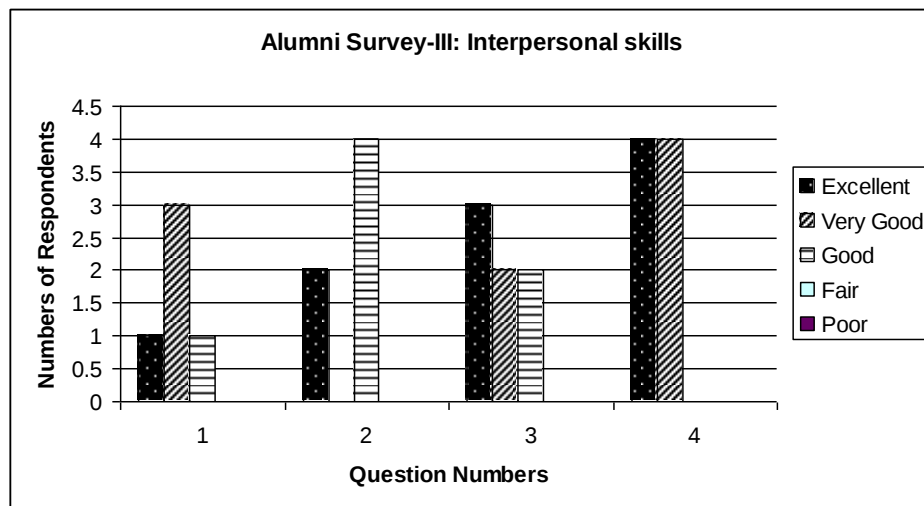


Figure 9 (I-V). Results of Alumni Survey in context of knowledge, communication skills, interpersonal skills, management skills of the faculty members and the department's status.

SURVEY OF GRADUATING STUDENTS

Results of the survey of the Ph.D. graduating students of the department during the reporting period are shown below as Figure 10, data were collected using **Performa 3**. N=09

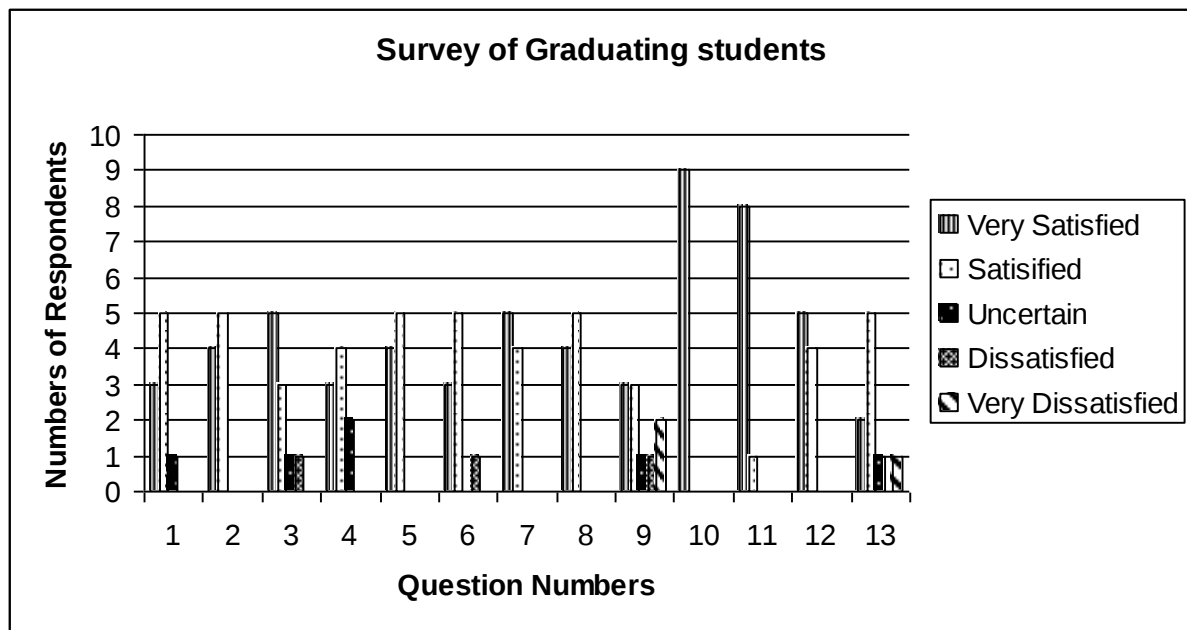


Figure 10. Results of the survey of the graduating students of the department during the reported period.

RESEARCH STUDENTS PROGRESS REVIEW

Survey of Ph.D. research students for progress review was conducted through **Performa 4**. Results are given in Fig. 9-10.

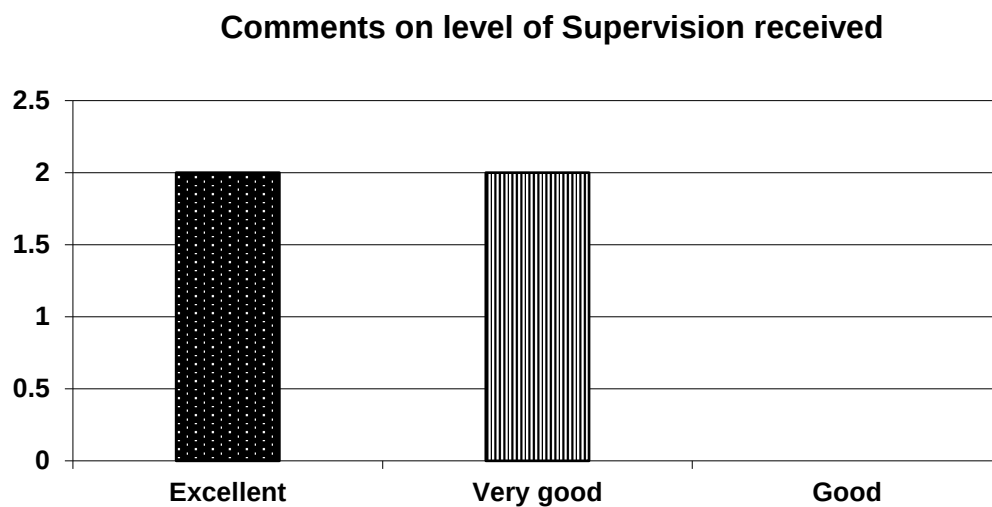


Figure 11 Comments on the level of supervision received by Ph.D. students in the Department.

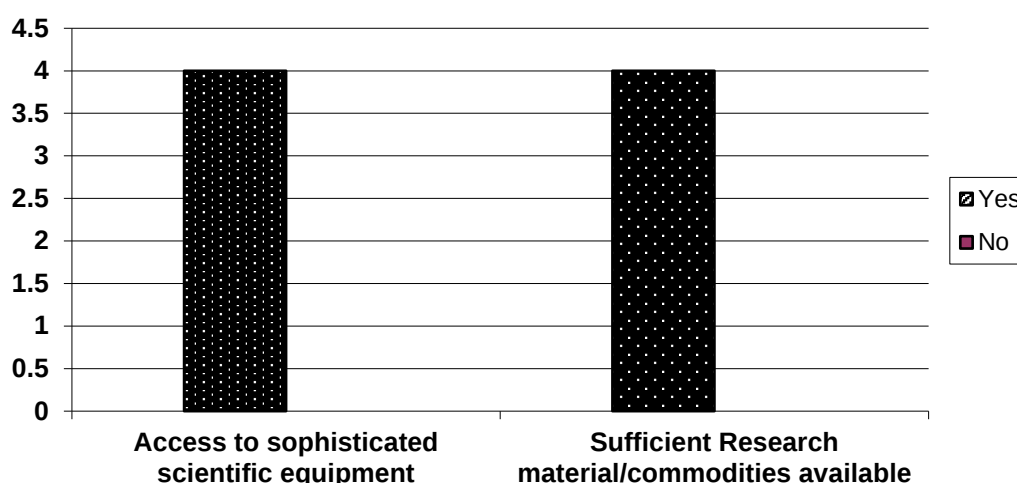


Figure10 Response of Ph.D. students on miscellaneous issues regarding the Department.

Standard 1-3. The results of program's assessment and the extent to which they are used to improve the program must be documented

Regular assessment process will be continued and the results will be incorporated accordingly. Following are the strengths and weaknesses of program identified.

Strengths of the Program

1. The department is having qualified teachers with full acquaintance of their respective subjects, knowledge of research and management techniques for study of wildlife.
2. One Associate professor obtained Ph.D. degree from Quid-i-Azam University, Islamabad, one assistant professor obtained PhD from Karachi University and one lecturer has completed her Ph.D. in Wildlife Management. Two faculty members are HEC approved supervisors who can supervise Ph.D. students.
3. All faculty members are involved in research directly or indirectly as supervisor and committee members of post-graduate students.
4. The Associate professor obtained his post-doc from Malaysia and the assistant professor obtained a training from USA and Post-doc from Australia.
5. All faculty members have got research projects funded from various funding sources.
6. Three laboratories have been established with basic necessary equipment and field gears required to carry out field studies on wildlife species.
7. The department has got necessary field and laboratory equipment and class room aids to strengthen academic and research activities of the department.
8. Department has signed MoUs with seven public and private sector organizations to facilitate its research projects and students' theses research.

Weaknesses of the Program

1. There is scarcity of space as there is only one class room due to which department is facing difficulty in adjusting simultaneous classes.
2. The department needs a store room. Currently several items such as display racks, cupboards, traps etc are stored in the labs which hinders research and teaching activities.

3. Wildlife is an applied, field-based subject which needs extensive touring for imparting hands-on training and knowledge to the students and therefore, a suitable field vehicle is needed.
4. Coordination with federal and provincial wildlife departments and other relevant organizations has been developed which needs to be further strengthened for field tours and research studies.

Standard 1-4. The department must assess its overall performance periodically using quantifiable measures.

The evaluation process indicated high efficiency of system and satisfactory impact of outcomes (Table 4).

Table 4. Performance measures for research activities

Faculty	Publications in Journals	Research & Development Projects
Dr. Maqsood Anwar	06	1
Dr. Tariq Mahmood	17	-
Dr. Muhammad Rais	09	2
Dr. Bushra A.Rakha	09	1

Future Plans

The Department of Wildlife Management has planned a number of research studies in future addressing the issues of wildlife conservation and protected areas management including wetlands and collecting data on biology/ecology of wildlife species particularly the threatened species. Some of the studies/activities include:

1. Population density/size, habitat utilization/preference, breeding habits/biology of wildlife species, especially rare and threatened species
2. Food habits, diet composition and food preference of wildlife species, particularly focusing on ungulates, carnivore and threatened bird species.
3. Distribution range/pattern of wildlife species especially focusing on Pothwar area.
4. Baseline data on protected areas including wildlife diversity, threatened or rare species studies, social issues and major threats to the PAs.
5. Baseline data on wetlands including both resident and migratory waterfowl and threats to the ecosystem.
6. Wildlife damage assessment / management particularly of rodent pests, porcupine and wild boar.
7. To impart quality education in wildlife management/conservation through study tours, audio visual aids along with provision of latest literature, journals, books and internet.
8. To impart training to employees of wildlife/forest departments, other relevant organizations and NGOs in wildlife research and management.
9. To develop strong collaboration and linkages with wildlife related government departments and NGOs for wildlife conservation and research.
10. To equip the department with the advanced equipments both for laboratories and field surveys/studies of wildlife species.
11. To enhance knowledge and skills of faculty members about latest advancements in wildlife/biodiversity research and conservation through exchange programs, short trainings and collaborative research projects within and outside Pakistan.

Faculty satisfaction regarding the administrative services

- The department maintains a ratio of 4:1 for the academic (including technical) and administrative/support (non-technical) staff which fulfils the standard set by HEC
- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required.
- Office matters/files are disposed regularly and so far no complaint has been received from higher administrative authorities.
- Proper records/file of each employee and students are maintained.

Quantitative assessment of the department for the last two years is given in the Table 5.

Table 5. Quantitative assessment of the department (Fall 2014 to Spring 2016)

Sr. #	Particular	No.	Remarks
1	Ph.D. degree awarded	07	7 students got their Ph.D. Degree during this evaluation period from Fall 2014 to Spring 2016
2	Post-Doc fellowship	Nil	-
3	Students: Faculty ratio	-	Fulfils HEC criteria
4	Technical: Non-technical Ratio	-	Fulfils HEC criteria

EMPLOYER SURVEY

The employer survey was not possible to be conducted (**Performa 8**).

CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION**A. Intent**

All courses for Ph.D. were initially developed by faculty members and finalized after sharing with relevant government departments, NGOs, universities and individual experts. During the course of time, a few courses have been revised and some new courses added based on the need felt by the department. Curriculum and course contents are finally approved by the University Academic Council.

B. Definition of credit hour

One credit hour is one theory lecture or two hours laboratory practical per week. A credit hour carries 20 marks.

C. Degree plan - pre-requisites**Ph.D. Wildlife Management**

M.Sc.(Hons.)/M.S./M. Phil. in first division or 3.00/4.00 CGPA or an equivalent examination from a recognized institution in the field of study related to the subject, NTS-GAT(Subject) test with 60% marks and interview.

The selection criterion for each course is as follows;

- The course is relevant to the degree program

- It meets the national and international requirements for the degree
- Adequate facilities are available in the department to offer the courses
- The course contents meet the program objectives as highlighted and provided by the Higher Education Commission of Pakistan.

Each course in the program is to be completed for credits specifying the following:

- Course title (WL)
- Course objectives and outcome (Given in course breakdown into lectures separately)
- Catalogue description (yes)
- Text book and reference (Given in course contents)
- Syllabus breakdown in lectures (yes supplied to QEC separately)
- **Computer usage:** Internet facility is used by faculty members to update their knowledge regarding each course, research studies and recent references. Students also use this facility to solve their problems, assignments and presentations.
- **Laboratory facilities** are provided to the students for their practical exercise, given in the curricula. Post-graduate students also use laboratories for their theses research where equipment, material and chemicals are provided.

D. Degree requirements

Ph. D. Wildlife Management

The duration of course of Ph.D. degree in full residence shall not less than six semesters for whole time students and eight semesters for part time students. The maximum limit shall be 10 semesters. A student admitted in the course shall be required to be in residence during first two semesters of the course. A minimum 18 credits of course work is compulsory for Ph.D. degree out of which 9 credits are of core/compulsory courses and 9 credits from minor courses. After completing the course work, a written and oral comprehensive examination is taken. Student is required to defend his/her synopsis in a seminar and submit thesis to be approved by the University and examined by two foreign internationally recognized scientists from the universities of technologically advanced countries.

Ph.D. Courses

Note: According to HEC criteria, only 18 credit hours courses (including 9 credit hours of minor courses) are needed to fulfill Ph.D. degree requirement. The courses assigned to the students are generally selected on the basis of students past academic record and the Ph.D. research topic needs. Therefore, there are not any specific courses for Ph.D. students but are assigned on the case to case basis from the available post-graduate level courses.

Table 6. Course Requirements for Ph.D. in Wildlife Management

Sr. No.	Course No.	Course Title	Credit hours
1	WL-702	Ecology of Wildlife Populations	3 (3-0)
2	WL-709	Society, values and Economics of Wildlife	3 (3-0)
3	WL-717	Endangered Species and their Management	3 (3-0)
4	WL-720	Seminar-II	1 (1-0)
5	WL-732	Wildlife Data Analysis	3(3-0)

Standard 2-1. The curriculum must be consistent and support the program's documented objectives.

The curriculum of Department is consistent with the program objectives (Table 7).

Table 7. Courses with relation to their outcomes

Course	Objectives		
	HRD	Priority of Research	Integrated approaches
Wildlife management/conservation	++ +	++	+ +++
Wildlife study/management techniques	+ + +	++ ++	+ + + +
Wildlife ecology	+ +	+ + +	+ + +
Wildlife biology	+ +	++	+ +
In-situ conservation	++	++	++
Ex-situ conservation	+	+	+
Policy/law/social issues	+	+	+ +

+ = Relevant, ++ = Relevant & satisfactory, + + + =Very relevant & satisfactory,

+ + + + = highly relevant & highly satisfactory

Assessment of the Department of Wildlife Management Curriculum

The assessment of curriculum is given in Table 16above and the courses are cross tabulated according to the program outcomes.

1. The curriculum fits very well and satisfies the core requirements for the program, as specified by the respective accreditation body.
2. The curriculum satisfied the general arts and professional and other discipline required for the program according to demands and requirements set by the Higher Education Commission.

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

The Table below represents the required information regarding standard 2.2.

Table 8. Courses representing theoretical background, problem analysis and solution design.

Elements	Courses	Title of Courses
Theoretical Background	WL-702	Wildlife Population Ecology
	WL-709	Society, Values & Economics of Wildlife
	WL-717	Endangered species and their Management
Problem Analysis	WL-719	Special Problem
	WL-720	Seminar-I and II
Solution Designs	WL-732	Wildlife Data Analysis
	WL-726	Essentials of Wildlife Conservation-National Perspectives
	WL-729	Biology and Conservation of Amphibians and Reptiles

Standard 2-3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.

The curriculum fully satisfies the core requirements for the Ph.D. degree program (please refer to Table 8)

Standard 2-4: The curriculum must satisfy the major requirements for the program as specified by HEC, the respective accreditation body / councils.

The curriculum is in consistency as specified by the HEC and it satisfies the major requirements for the Ph.D. Program.

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 student are encouraged to conduct social activity programs in the department, to organize welcome and farewell parties for the juniors and seniors, which also promotes their interaction among themselves. Similarly, the students are also encouraged to conduct and host short term (one day) seminars, exhibitions related to their degree program and so on.

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

During curriculum development, aspects of information technology were considered and relevant aspects were integrated into the program. One course of statistics (3 credit hours) based on computer practical was included in the curriculum, in addition to one 3 credit hour course on data analysis offered in the department, to fulfill the requirements of the students.

WL-732 Wildlife Data Analysis (Table 8), during which the students are taught to learn and apply different softwares such as SPSS, Arc GIS, Quantum GIS, DISTANCE software, and some others to analyze their research data. Similarly, there is a course WL-720-I and II (Seminar-I and II) during which the students learn how to search on the web about some topic, how to download the literature, and how to compile and present their project

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

- Two seminars each of one credit hour are compulsory for students.
- Special problem (one credit hour) is offered to the students which require writing a comprehensive report on a topic and presenting it in the class.
- Assignments are given to all students in each course on specific titles relevant to the course which are presented orally and given as written assignments by the students which improve their oral and written communication skills.

CRITERION 3.

LABORATORIES AND COMPUTER FACILITIES

- Laboratory Title: Herpetology Laboratory -1
Mammalian Laboratory-2
Molecular Ecology Laboratory 3
- Location and Area: Faculty of Forestry, Range Management and Wildlife, Ground and 1st Floor of Spur-D, Main Academic Block.
- Objectives: Laboratories are used by students and faculty for research studies including; autopsy of animals, micro-histological studies and food/diet composition analysis studies.

Research work for the graduate and post-graduate students

- Adequacy for instructions: Laboratories meet the requirements in terms of equipment, chemicals, furniture and general facilities, however, not spacious enough for demonstration purposes and analysis studies.
- Major apparatus: Major equipment available in the Labs. include; microscopes, deep freezers, refrigerators, pH meters, electric balances, electric oven, slides, glass ware, centrifuge machine, spectrophotometer, tissue homogenizers, equipment for histological studies of the animal tissues,etc. purchased from HEC funded research& development projects.
- Field Equipment: Binoculars, GPS, Cameras, Cages, live traps, spotting scopes, spring balances, field tents etc.
- Safety Regulations: Safety measures such as fire extinguishers, first aid kit are not available in the Labs. However, the University maintains a Medical Dispensary for minor incidents.

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

Laboratory manuals of each subject are not available in the departmental library. However, books and manuals owned by individual faculty are used by the students. A number of books and manuals have been prepared in the department.

Standard 3.2. There must be adequate support personnel for instruction and maintenance of laboratory

Laboratories are maintained by two laboratory attendants and one laboratory assistant who assist the students in research studies, practical, cleaning and washing, etc. Students are instructed for Lab. work by respective faculty members.

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

The University has limited computer facility for students. Computer facility is available at the department level to most of faculty members independently. However, it is not adequate to meet the objectives of the programme and needs improvement.

CRITERION 4. STUDENT SUPPORT AND GUIDANCE

Directorate of Students Affairs of the University organizes support programs, cultural activities for students and guides them in case of any problem. The university staff provides information regarding admission, scholarships, career opportunities, etc. The university arranges orientation programme for new students and guided tours to various departments. However, currently Parent/Teacher association in the university does not exist.

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

- Courses are taught as per strategy and guidance provided by HEC.
- Subject courses are offered as per scheme of study of the department after approval of Academic Council of the university. Courses are offered by faculty trained in the relevant subject and as per their availability.
- Elective courses and minor courses are offered as per policy of HEC and University.

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

- Courses are structured and decided among the faculty members in the departmental board of study meeting.
- Courses to be offered are decided before the commencement of each semester and the faculty members interact frequently among themselves and with students.
- Students are encouraged to ask question, give comments and take part in the discussions in the class.
- Emphasis is given on effective interaction between the students and between students and teachers.

Standard 4.3. Guidance on how to complete the program must be available to all students and access to qualified advising must be available to make course decisions and career choice.

- Students are informed about program requirements through office of chairperson of the department and through personal communication of teachers with them.
- The counseling of students is continuous process and students are free to contact relevant teachers whenever they face any professional problem.

- Students are also facilitated for interaction with faculties/scientists in other universities and research organizations whenever they need and there is open option for the students to get membership of professional societies.

CRITERION5. PROCESS CONTROL

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

- The process of admission is well established and followed as per rules and criterion set by University for students of Ph.D.
- Admission criteria for Ph.D. program: Eighteen years of education in relevant field/subjects and GAT subject test in the field of wildlife.
- All these entries are based on the recommendations of admission committees.
- Admission criteria is revised when required before the announcement of admissions.

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.

- Registration of students is done once every year at the time of admission. When a student is admitted for each degree, he/she is evaluated through the result of each course for each semester. If the students fulfill the criteria of the University (a specific CGPA after each semester) they are promoted to the next semester.
- Students are evaluated through Mid, Final and Practical exams and through written assignments and oral presentations.
- In general, the students are registered on competition bases keeping in view the academic and research standards.

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 with its objectives.

- The University follows the recruitment policy and rules recommended by HEC.
- Posts are advertised in national newspapers and university website, and applicants are short-listed on the basis of experience, qualification, publications and other qualities / activities as fixed by the University
- The candidates are interviewed by the University Selection Board and principal and alternate candidates are selected.
- Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period.

- Induction of new candidates depends upon the number of approved vacancies.
- Recently, Tenure Track System (TTS) has been introduced by the University which is a good incentive for retaining highly qualified faculty members.
- HEC also supports appointment of highly qualified members as foreign faculty professor, national professors and deputed them in various departments.

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.

- Periodical update of curriculum is made depending upon the requirements, innovations and new knowledge generated.
- New courses are developed and included in the curriculum when needed.
- Books on various aspects of wildlife are available in the department and in University library where documentation, photocopying and internet facilities are also available. .
- Students also take notes during the classes and photocopies of slides/transparencies are also provided in addition to printed material.
- All efforts are made to impart the course material and knowledge to meet the objectives of the curriculum.

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 the examination system of the University, the following are clearly mentioned;

- The evaluation procedure consists of quizzes, mid and final examinations, practical, assignments, reports and oral presentations.
- The controller of examinations announces the dates of examinations. After each semester, the controller office notifies results of the exams.
- The minimum passing marks for each course is 50 % for Ph.D. in theory and practical, separately.
- In theory, weight age of each component of examination is as under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

- Grade points are as follows

Marks	Grade	Grade point	Remarks
80-100 %	A	4	Excellent
65-79 %	B	3	Good
50-64 %	C	2	Satisfactory
40-49 %	D	1	Pass
Below 40 %	F	0	Fail

- Gold medals are awarded to the students who secure highest cumulative marks in each department. Degrees are awarded to the students in the convocation which is held every year.

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.

Currently, there are **three** full-time faculty members bearing PhD degree and one subject specialist who also possesses doctorate degree. The fields of specialization of faculty members include; wildlife management/conservation, wildlife study/management techniques, wildlife ecology, wildlife biology, in-situ conservation, ex-situ conservation and policy/law/social issues (Table 9).

Table 9. Faculty distribution by program area in wildlife management

S. No.	Area of specialization	Relevant Courses	No. of faculty members	No. of faculty members with Ph.D.
1	Wildlife management/ conservation	7	3	3
2	Wildlife study/management techniques	4	3	3
3	Wildlife ecology	3	3	3
4	Wildlife biology	7	3	3
5	In-situ conservation	4	3	3
6	Ex-situ conservation	5	2	3
7	Policy/law/social issues	3	2	3

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.

- In each semester courses are offered according to the specialization of the faculty members and their work load.
- Division of students for Research supervision is made on the basis of faculty expertise/research interest.

Existing faculty development programs at department and university level

- Faculty members attended conferences/workshops/seminars outside and within university, availing Travel grant facility form HEC Islamabad.
- Laboratory, library and internet facilities are available for scholarly work and academic improvement.
- Support for attending conferences lead to enhancement of research initiatives.
- All faculty members have got financial support for research projects from HEC and university-funded Research projects specifically designed for junior faculty members.

Standard 6-3. All faculty members should be motivated and have job satisfaction to excel in their profession

The young faculty is mobilized by timely back up and appreciation by the senior faculty members. Avenues for research funding are provided to them through university research programme. There are programs and processes in place to attract good faculty members e.g. teaching and research awards annually, reasonable teaching load and class size, social activities and better salary package.

Results of the faculty survey

Results of faculty survey (**Performa 5**) are summarized in Fig.11. The results in general showed satisfaction of the teachers over most of the parameters questioned. However, cooperation among colleagues needs to be improved.

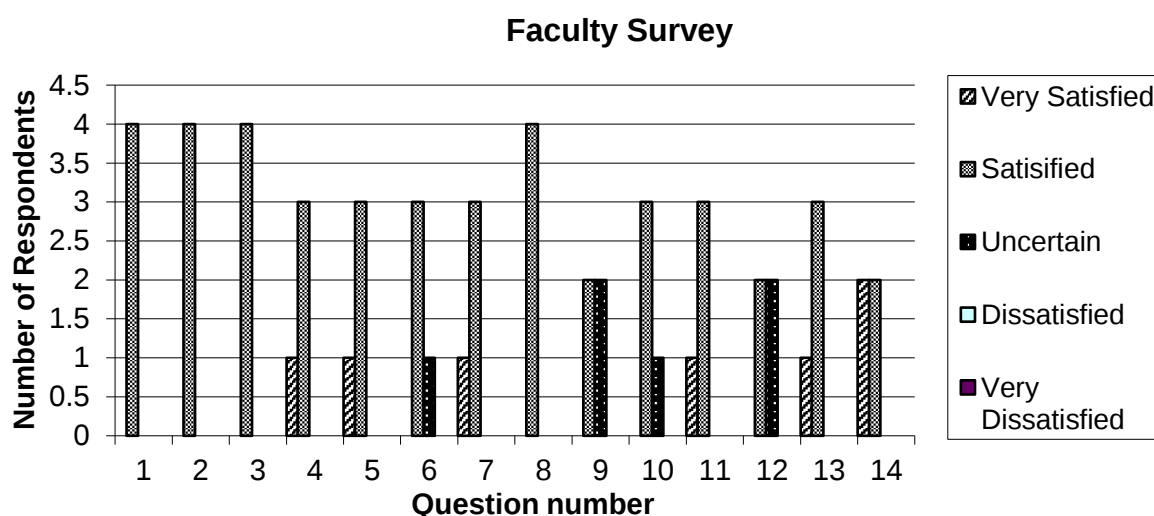


Figure11. Results of Faculty Survey

Best Program Features:

- Cooperation from colleagues
- Conducive environment at the department
- Teaching and research together
- Funds for research projects

Programs that could improve your motivation:

- There are needed more computer and internet facilities for students in the department
- There are always opportunities for improving teaching skills and knowledge
- More field oriented knowledge

CRITERION7. INSTITUTIONAL FACILITIES

Standard 7.1. The institution must have the infrastructure to support new trends in learning such as e-learning. Supportive Infrastructure and Facilities in learning:

- a. Three well-equipped labs. And one class room with teaching aids (multimedia, over head projector) and number of books are available in the department.

- b. However, more sitting place for faculty members and Ph.D. students with computer and internet facility is desired to make working environment conducive for higher learning.

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.

- Central library has been recently up-graded with provision of computer and internet facility to the post-graduate students.
- The department is regularly suggesting to the central library for provision of new books related to wildlife sciences.
- The department under its HEC funded project has purchased more than 270 books in the area of wildlife studies.
- Only a small number of scientific journals are available in the central library; even Pakistani Journals are not available. Provision of major journals related to wildlife is highly desired for research and scientific/technical writing.

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

There is only one classroom with the department which possesses proper teaching facilities such as multimedia projector and overhead projector. Classroom is inadequate for all classes. Sometimes classes are taken in the laboratories. Similarly, space for faculty offices is not sufficient. This makes Lab. space insufficient for practical and research use by the students.

CRITERION 8. INSTITUTIONAL SUPPORT

The university administration is making all possible efforts for strengthening the existing departments by attracting highly qualified faculty and by getting financial support through R&D Project. One such project of Rs. 36.141 million was awarded by HEC for Strengthening of the Department of Wildlife Management, and it was successfully completed.

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.

There is no proper maintenance/documentation and attractive investment of GPF deducted from salary of the employees. Similarly, no benefit/welfare from BF deduction is available to the faculty except a meager benefit for faculty children's education at university level. Similarly, little attention is being paid for faculty residential facilities at university campus and majority of faculty members remain on waiting list for a long period. Transport facility is not frequently and easily available for field works/touring. Financial support is too low to meet expenses of the department and only Rs. 50,000/- were allocated for the year 2012-13 and 2013-14 for office and Lab. expenses including student research. However, the department can get chemicals, glassware, stationery and other office use items from central stores of university by submitting special request.

Technical Staff: Civil Works and internet networking departments are very slow in response. Financial and accounting departments are also slow in their delivery.

Office equipment: Sufficient office equipment is available to meet the current teaching and research activities of the department.

Standard 8-2. There must be an adequate number of high quality graduate students, research assistants and Ph.D. students.

The admission of Ph.D. is held twice a year i.e. in each semester. A strict merit policy is applied for admission and GRE is required for Ph.D. Detail of students enrolled during last two years is given in Table 9.

Table 9. Enrollment in Ph.D. degree program in 2014-15 and 2015-16

Year	Number of Ph.D. students
2014-15	4
2015-16	4
Total	8

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

An amount of about Rs. 50,000/- per annum is considered sufficient to meet the needs of the department which is too low to maintain and run the departmental activities.

SUMMARY AND CONCLUSIONS

The Department of Wildlife Management at PMAS-Arid Agriculture University, Rawalpindi was established in 2007 with a mandate to carry out teaching and research in wildlife for its conservation in the country, particularly in Pothwar region. There are three full time and one subject specialist faculty members out of them four having doctoral degrees and two are HEC approved supervisors. The courses have been prepared keeping in view the latest developments in Wildlife Management and conservation. The department is offering M.Sc., M. Phil. and Ph.D. in Wildlife Management. During the report period 25 students in M. Phil. were enrolled. The department has published 49 research papers during the period under report.

Basic equipment for field surveys of wildlife and its habitats has been procured through various funding sources which include binoculars, spotting scopes, global positioning system (GPS), camera, telemetry equipment, camping gear, etc. Three laboratories have been established with basic necessary equipment for micro-histological, taxonomy, food habit studies and food/diet composition. More than 200 latest books on the subject of wildlife/biodiversity have also been purchased and placed in the main library and in the department for ready reference to the students.

Two faculty members obtained six research projects from the university funding programme while one faculty obtained post-doc from Australia. The senior faculty has earned three research projects from HEC. The departmental teaching and research capacity has been

enhance through PSDP/HEC funded project titled “Strengthening of Department of Wildlife Management” amounting to Rs. 36.141 m. Research studies currently being conducted focus on wildlife population density and size, wildlife habitat analysis, food habits and diet composition, breeding habits and breeding biology, distribution patterns, data on protected areas and threatened species, wetland ecology, population trends of water birds, threats to wildlife species, wildlife damage assessment and management, etc.

Proper steps are taken to guide the students for programme requirements, communication, meetings, study tours, students-teacher interaction, etc. They are well informed of relevant scientific societies, job opportunities and other such activities. University and HEC rules and guidelines are followed for process control covering admission, registration, recruiting policy, courses and delivery of material, academic requirements, performance and grading.

Curriculum design, development and organization is based upon approved criteria. Pre-requisites are fully observed, examinations are conducted as per schedule, academic schemes are prepared and courses for each semester are developed. Their efficacy was found to range between satisfactory to highly satisfactory. Self assessment report has shown programme outcomes as satisfactory. Teachers’ evaluation and course evaluation by the students’ revealed highly satisfactory standards. Faculty survey results were variable but with overall satisfactory rating. Graduating students also showed their satisfaction over the knowledge being provided and research studies conducted about wildlife management in the department.

Performance of the department could be improved considering the following points.

1. There is a need for refresher courses for teachers pertaining to teaching methodology, education psychology, research and developments and evaluation of students.
2. Professional and behavioral training of support staff will improve their abilities for enhancing the quality of research and teaching.
3. Advance laboratory equipment are needed to carry out molecular/DNA analysis in food habits and species verification.
4. Department budget may be increased to fulfill its requirements for purchase of chemicals, glassware and other items required for conducting of research.
5. The department is in dire need of office rooms for two faculty members, one store room, one library room, one class room and one laboratory room.
6. Regular provision of transport facility for field visits is highly desired.

Thanks

Program Team Members

1. **Dr. Tariq Mahmood (Coordinator)**
2. **Dr. Dr. Muhammad Rais (Member)**
3. **Dr. Bushra Allah Rakha (Member)**

PMAS-Arid Agriculture University Rawalpindi

Faculty Course Review Report

Department: Department of Wildlife Management
 Course Code: WL-702 Title: Wildlife Population Ecology
 Session: 2016 Semester:
 Credit Value: 3(3-0) Lectures 45
 No. of Students: 10 Seminars: 0
 Contact Hours: 3(3-0)
 Assessment Method: Mid Exam: 18 Marks Assignment: 06 Marks Final Exam: 36 Marks

Distribution of Grade/Marks and other Outcomes

Undergraduate	Originally Registered	% Grade A	% Grade B	% Grade C	% Grade D	% Grade E	% Grade F	No Grade	Withdrawal	Total
No. of Students	0	0	0	0	0	0	0	0	0	0
Undergraduate	Originally Registered	% Grade A	% Grade B	% Grade C	% Grade D	% Grade E	% Grade F	No Grade	Withdrawal	Total
No. of Students	10	10	30	40	20	0	0	0	0	10

Overview/Evaluation (Course Co-Coordinator Comments)

PMAS-Arid Agriculture University Rawalpindi

Feedback:

Faculty Course Review Report

1: Student (Course Evaluation) **Questionnaires**

Yes

2: External Examiners or Moderators (if any)

3: Student/Staff Consultative Committee (SSCC) or equivalent (if any) N/A

4: Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved/Revised National Curriculum Guidelines
appropriate

5: Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
effective

6: Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Report
N/A

7: Outline any changes in the future delivery or structure of the course that this semester/terms experience may prompt
to be updated with passage of time in future

PMAS-Arid Agriculture University Rawalpindi

Faculty Course Review Report

Department: Department of Wildlife Management

Course Code: WL-702 Title: Wildlife Population Ecology

Session: 2017 Semester: 40

Credit Value: 3(3-0) Lectures: 40

No. of Students: 14 Seminars: 0

Contact Hours: 3 per week

Assessment Method: Mid-term Exam: 18 Assignment: 06 Final Exams: 36

Distribution of Grade/Marks and other Outcomes

Undergraduate	Originally Registered	% Grade A	% Grade B	% Grade C	% Grade D	% Grade E	% Grade F	No Grade	Withdrawal	Total
No. of Students	0	0	0	0	0	0	0	0	0	0
Undergraduate	Originally Registered	% Grade A	% Grade B	% Grade C	% Grade D	% Grade E	% Grade F	No Grade	Withdrawal	Total
No. of Students	14	2	7	1	2	0	2	0	0	14

Overview/Evaluation (Course Co-coordinator Comments)

PMAS-Arid Agriculture University Rawalpindi

Feedback:

Faculty Course Review Report

1: Student (Course Evaluation) Questionnaires

Yes

2: External Examiners or Moderators (if any)

3: Student/Staff Consultative Committee (SSCC) or equivalent (if any) N/A

4: Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved/Revised National Curriculum Guidelines

appropriate and in accordance to HEC criteria

5: Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)

effective

6: Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Report

ok

7: Outline any changes in the future delivery or structure of the course that this semester/terms experience may prompt

to be updated in future with passage of time

Proforma 2

Faculty Course Review Report (To be filled by each teacher at the time of Course Completion)



For completion by the course instructor and transmission to Head of Department of his/her nominee (Dept. Quality Officer) together with copies of the Course Syllabus outline

Department: Wildlife Management	Faculty: Forestry, Range Management & Wildlife			
Course Code: WL-717	Title: Endangered species and their management			
Session: Fall 2017	Semester:	Autumn	Spring	Summer
Credit Value: 3(3-0)	Level:	Post-Graduate	Prerequisites:	16 years Education
Name of Course Instructor:	No. of Students 3	Lectures 48 hrs.	Other (Please State)	
Prof. Dr. Maqsood Anwar	Contact Hours	Seminars	N/A	
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)	Exams Weight-age (Mid, Assignment, Final): Mid-Term: 30% Assignments: 10% (Presentations) Final-Term: 60%			

Distribution of Grade/Marks and other Outcomes: (adopt the grading system as required)

Under-graduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	F	No Grade	Withdrawal	Total
No. of Students	N/A	N/A	N/A	N/A				N/A	N/A
Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	F	No Grade	Withdrawal	Total
No. of Students	3	67	33	0	0	0	0	Nil	3

Overview/Evaluation (Course Co-coordinator's Comments)

Feedback: first summarize, then comment on feedback received from: (These boxes will expand as you type in your answer.)

1) Student (Course Evaluation) Questionnaires

Student course evaluation: 86.7% strongly agreed, 8.45% agreed, 3.62% uncertain.

Questionnaire survey results show that majority of the students are satisfied with course contents, organization and teaching methods, etc.

2) External Examiners or Moderators (if any)

N/A

3) Student /staff Consultative Committee (SSCC) or equivalent, (if any)

N/A

4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines

Curriculum has been developed as per HEC approved guidelines

5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)

Assessment Methods are satisfactory

6) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports

No changes were proposed.

7) Outline any changes in the future delivery or structure of the Course that this semester/term's experience may prompt

No change required yet

Name: __Dr. Maqsood Anwar____ Date: _____ (Course Instructor)

Name: __Prof. Dr. Maqsood Anwar ____ Date: _____ (Head of Department)

PMAS-Arid Agriculture University Rawalpindi

Faculty Course Review Report

Department: Department of Wildlife Management
 Course Code: WL-732 Title: Wildlife Data Analysis
 Session: 2017 Semester: Spring
 Credit Value: 3(1-4) Lectures: 54
 No. of Students: 1 Seminars: 0
 Contact Hours: 1
 Assessment Method: Mid-term:12; Assignment:04; Final:24; Practical:20

Distribution of Grade/Marks and other Outcomes

Undergraduate	Originally Registered	% Grade A	% Grade B	% Grade C	% Grade D	% Grade E	% Grade F	No Grade	Withdrawal	Total
No. of Students	0	0	0	0	0	0	0	0	0	0
Undergraduate	Originally Registered	% Grade A	% Grade B	% Grade C	% Grade D	% Grade E	% Grade F	No Grade	Withdrawal	Total
No. of Students	1	0	1	0	0	0	0	0	0	1

Overview/Evaluation (Course Co-coordinator Comments)

PMAS-Arid Agriculture University Rawalpindi

Feedback:

Faculty Course Review Report

1: Student (Course Evaluation) Questionnaires

Yes

2: External Examiners or Moderators (if any)

3: Student/Staff Consultative Committee (SSCC) or equivalent (if any) Yes

4: Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved/Revised National Curriculum Guidelines

The course was taught according to the objectives of the course set when the contents were prepared.

5: Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)

The assessment methods particularly feedback from the students have proved to be very useful.

6: Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Report

Incorporation of new topics, inclusion of field and laboratory learning topics.

7: Outline any changes in the future delivery or structure of the course that this semester/terms experience may prompt

The course will be updated in the future.

ANNEX-II**Proforma 9****FACULTY RESUME**

Name: PROF. DR. MAQSOOD ANWAR
 Present Address: In charge faculty of Forestry, Range Management and Wildlife,
 Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi
 46300,
 Telephone 0334-5434784
 E-mail maqsoodanwar@uaar.edu.pk

EXPERIENCE

DATE	TITLE	INSTITUTION
December 2013 to October 2017	Chairman, Department of Wildlife Management	PMAS – Arid Agriculture University Rawalpindi
June 2015 to October 2017	Dean Faculty of Forestry, Range management and Wildlife	PMAS – Arid Agriculture University Rawalpindi
October 2017 to March 2019	Subject Expert Wildlife	PMAS – Arid Agriculture University Rawalpindi

GRADUATE STUDENTS SUPERVISED#	Year	Degree	Name
1	2018 completed	Ph.D	Sara Shabbir
2	Thesis submitted		Ume Habiba
3	Thesis submitted		Naureen Mustafa
4	Thesis writing		Jibran Haider
5	Thesis writing		Rukhsana Khatoon
		M. Phil.	
6	2017		Manahil Wahab
7	2017		Ishfaq Karim
8	2017		Abdul Basit
9	2017		Hamid Ur Rehman
10	2018		Amir Shahzad
11	2018		Zeeshan Khalid
12	2018		Memoona Aziz
13	2018		Amjad Hussain
14	2018		Syeda Hareem
15	2018		Shabbir Ahmed
16	2018		Gohar Ali Gohar

MEMBER OF SUPERVISORY COMMITTEE

UNIVERSITY AND PUBLIC SERVICE ACTIVITIES

#	Status	Committee
1	Member	Synopsis Scrutiny Committee - Department of Forestry and Range Management
2	Member	Synopsis Scrutiny Committee - Department of Botany
3	Member	Board of Study, Department of Zoology
4	Member	Advisory Board, Department of Forestry, Range and Wildlife Management, College of Agriculture & Environmental Sciences, The Islamia University Bahawalpur.
5	Convener	University Discipline Committee (up to October 2017)
6	Convener	University Cafeteria Committee (up to October 2017)
7	Member	University Syndicate (up to October 2017)

RESEARCH INTEREST

Plan, design and execute research on wildlife species, particularly threatened species of mammals/birds including studies on ecological and biological aspects of those species; studies on baseline data on inventory/wildlife diversity in protected areas and major threats to wildlife in these areas.

PUBLICATIONS

Articles published in refereed journals

1. Sabeeqa Usman Malik, M. Irfan Ashraf, M. Ibrar Ahmad and **Maqsood Anwar**. 2017. Identifying causes of conflict among forest stakeholders: Suitable coping strategies. Accepted in Journal of Agricultural Research. 07-06-2017.
2. Muhammad Saad, **Maqsood Anwar**, Muhammad Waseem, Muhammad Salim and Z. Ali. 2015. Distribution range and population status of Indian Grey wolf (*canis lupus pallipes*) and Asiatic Jackal (*canis aureus*) in Lehri Nature Park, district Jhelum, Pakistan. The Journal of Animal & Plant Sciences, 25(3 Supp. 2): 433-440.
3. Sara Shabbir, **Maqsood Anwar**, Tariq Mahmood and Mirza Azhar Beg. 2018. Population Status of Western Horned Tragopon (*Tragoppon melanocephalus*) in Machiara National Park, Azad Jammu & Kashmir, Pakistan. The Journal of Animal and Plant Sciences. 28(5): 1542-1546.
4. Rukhsana Khatoon, Iftikhar Hussain, **Maqsood Anwar** and Muhammad Ali Nawaz. 2017. Diet selection of snow leopard (*Panthera uncia*) in Chitral, Pakistan. Turkish Journal of Zoology. 41: 914-923.
5. Jibran Haider, Muhammad Zafar Khan, **Maqsood Anwer**, Shaukat Ali and Hussain Ali. 2018. Population status and migration trends of Marco Polo argali (*Ovis ammon polii*) in Pakistan. Mammalia. Accepted 7 December, 2017.
6. Bilal Kabeer, **Maqsood Anwar**, Muhammad Rais, Muhammad Jawad Jilani, Muhammad Arslan Asadi, Sadia Abid, Sadaf Bilal, Farukh Saleem, Babar Hilal Ahmed, Agha Waqar Yunis, Saleem Zahid, Muzamil Anjum, Pavla Hejzmanova, Muhammad Kamal Sheikh, Abid Mehmood. 2018. Study of feed preference of endangered Hog Deer under captive conditions in Pakistan. International Journal of Conservation Science. 9(2):337-344.

Research reports submitted to sponsors

1. Third progress report for the HEC funded project “Baseline studies on wildlife diversity in Selected protected areas of Pakistan – Phase II”. Department of Wildlife Management, PMAS-Arid Agriculture University, Rawalpindi. 2017.
2. Final Technical report for the HEC funded project “Baseline studies on wildlife diversity in Selected protected areas of Pakistan – Phase II”. Department of Wildlife Management, PMAS-Arid Agriculture University, Rawalpindi. 2018.

RESEARCH GRANTS

Date	Title	Agency/ Organization	Amount
Completed In 2018	Baseline Studies on Wildlife Diversity in Selected Protected Areas of Pakistan Phase-II	HEC Pakistan	3,916,555/-

SELECTED PROFESSIONAL PRESENTATIONS

#	Title	Institution
1	Global Warming and Wildlife: Pakistan’s Perspective’’	1 st International Conference on Climate Change and Biodiversity Cholistan Institute of Desert Studies, Islamia University Bahawalpur.
2	Protected Areas: An effective tool for Biodiversity Conversation’	1 st International Conference on Emerging Trends in Zoology’’ Department of Zoology, University of Sargodha, Sargodha.

Name	Dr. Tariq Mahmood
Personal	Associate Professor, Department of Wildlife Management 0321-5105689; tariqjanjua75@uaar.edu.pk
Experience	Year Title Institution Since 2007 Assistant Professor PMAS-AAUR
Honor and Awards	--
Memberships	IUCN Pangolin Specialist Group Society for Conservation Biology: Asia-Section Zoology Society of Pakistan
Graduate Students	Year Degree Name

	PhD Produced: ➤ December 2017 Ph.D. Saima Yousaf ➤ July 19 2018 PhD Shaista Andleeb ➤ September, 2018 PhD Faraz Akrim M.Phil. Produced ➤ October 2016 MPhil Fakhra Fazal ➤ October 2016 MPhil Imad Ud Din Zangi ➤ October 2016 M.Phil.. Muhammad Awais ➤ December 2016 M.Phil. Konish Kanwal ➤ October 2017 MPhil Abdul Hamid ➤ October 2017 MPhil Abid Hussain ➤ October 2017 M.Phil. Muhammad Waseem ➤ March 2018 M.Phil. Ijaz Ahmed
Service Activity	➤ Teaching to M.Phil., M.Sc. and Ph.D. classes ➤ Member Departmental Admission committee ➤ Member Departmental Self-Assessment Team ➤ Secretary Departmental Board of studies ➤ Supervising PhD / M.Phil. Research Students
Brief statement of research interest	I am working on various Ecological aspects of mammals, especially the carnivores, in the Potohar Plateau, Margalla Hills National Park Islamabad, Azad Jammu & Kashmir, and Gilgit Baltistan.
Publications	1. Nausheen Irshad, Imran Yousaf, Tariq Mahmood and Muhammad Saeed Awan. 2018. Occurrence of Common Leopard (<i>Panthera pardus</i>) in Abbaspur Area, District Poonch, Azad Jammu and Kashmir. Pakistan J. Zool., 50(4): 1-4. 50(4): DOI: http://dx.doi.org/10.17582/journal.pjz/2018.50.4.sc13 (IF: 0.547) 2. Shahnaz Bibi, Muhammad Sajid Nadeem*, Muhammad Bilal Anwar, Syed Israr Shah, Amjad Rashid Kayani, Muhammad Mushtaq, Mirza Azhar Beg and Tariq Mahmood. 2018. First record of Mus cookii (Cook's mouse) from Pothwar, Pakistan: a probable case of range extension? Mammalia. https://doi.org/10.1515/mammalia-2017-0130 . (IF: 0.714) 3. Faraz AKRIM, Tariq MAHMOOD, Muhammad Sajid NADEEM*, Shaista ANDLEEB and Siddiqa QASIM. 2018. Spatial distribution and dietary niche breadth of the leopard Panthera pardus (Carnivora: Felidae) in North-Eastern Himalayan region of Pakistan. Turkish Journal of Zoology. 42: 585-595. (IF: 0.558) 4. Faraz Akrim, Tariq Mahmood, Tamara Max, Muhammad Sajid Nadeem, Siddiqa Qasim and Shaista Andleeb. 2018. Assessment of Bias in morphological identification of carnivore scats confirmed with

	molecular scatology in north-eastern Himalayan region of Pakistan. Peer J. DOI 10.7717/peerj.5262 (IF: 2.2) 5. Tariq Mahmood, Konish Kanwal and Iftikhar-Uz-Zaman. 2018. Records of Indian pangolin [Mammalia: Pholidota: Manidae: <i>Manis crassicaudata</i>] from Mansehra District, Pakistan. Journal of Threatened Taxa. 10(2): 11254- 11261. 6. Shaista Andleeb, Tariq Mahmood, Azeem Khalid, Faraz Akrim, and Hira Fatima. 2018. Hexavalent chromium induces testicular dysfunction in small Indian mongoose (<i>Herpestes javanicus</i>) inhabiting tanneries area of Kasur District, Pakistan. <i>Ecotoxicology and Environmental Safety</i>. 148 (C): 1001-1009. (IF: 3.974) 7. Nadeem Munawar, Iftikhar Hussain and Tariq Mahmood. 2018. Occurrence of rodents' species in agricultural lands during cropping and non-cropping seasons of Pothwar Plateau, Pakistan. Pakistan J Zool. 50(5): 1663-1669, (IF: 0.547) 8. Tariq Mahmood, Shafqat Rasool, Faraz Akrim, Shaista Andleeb, Muhammad Sajid Nadeem, and Fiaz Nadeem. 2018. Diversity and nest characteristics of owl species inhabiting Margalla Hills National Park Islamabad, Pakistan. Pakistan J. Zool. 50(4): DOI: http://dx.doi.org/10.17582/journal.pjz/2018.50.4.sc16 (IF: 0.547) 9. Saima Yousaf and Tariq Mahmood. 2018. Feeding Ecology of Four Freshwater Turtle Species in Pothwar Plateau and its Potential implication in Turtle Farming in Pakistan. Int. J. Agric. Biol. 20: 723-729. (IF: 0.869) 10. Tariq Mahmood, Syed Wasif Ahmed Shah, Muhammad Rais, Hira Fatima, Faraz Akrim and *Muhammad Sajid Nadeem. 2018. Nesting use of tree species by avifauna inhabiting Pabbi Range forest, Kharian, Punjab, Pakistan. Pakistan J. Zool., 50(1): 329-338. (IF: 0.547) 11. Tariq Mahmood, Fakhra Fazal, Faraz Akrim, Hira Fatima and Muhammad Sajid Nadeem. 2018. Comparative morphology and anatomy of two sympatric mongoose species (<i>Herpestes javanicus</i> and <i>H. Edwardsii</i>) from Potohar Plateau. Pakistan J. Zool., 50(1): 385-387 (IF: 0.547) 12. Riaz Hussain, Tariq Mahmood, Faraz Akrim, Hira Fatima and Muhammad Sajid Nadeem. 2017. Human activity mediates reciprocal distribution and niche separation of two sympatric mongoose species in Pothwar Plateau, Pakistan. <i>Turkish Journal of Zoology</i>. 41: 1045-1058.: DOI: 10.3906/zoo-1606-34. (IF: 0.558) 13. Faraz Akrim, Tariq Mahmood, Riaz Hussain, Siddiqa Qasim and Imad Ul Din Zangi. 2017. Distribution pattern, population estimation and threats to the Indian Pangolin <i>Manis crassicaudata</i> (Mammalia: Pholidota: Manidae) in and around Pir Lasura National Park, Azad Jammu & Kashmir, Pakistan. Journal of Threatened taxa, 9(3): 9920-9927.
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	14. Faraz Akrim, Hira Fatima, Saida Amna Nazir, Tariq Mahmood, Riaz Hussain and Muhammad Sajid Nadeem. 2017. Seasonal hormones, female reproductive tract changes and some field observations on breeding activities of small Indian Mongoose (<i>Herpestes javanicus</i>) from its native range of Potohar Plateau, Pakistan. Turkish Journal of Zoology; 41: 664-673. (IF: 0.558) 15. Muhammad Awais, Tariq Mahmood, Iftikhar-uz-Zamman and Muhammad Waseem. 2017. First camera trap photos of leopard in the Galiat Forests of Abbottabad, Pakistan. CAT news 65. 16. Tariq Mahmood and Ayesha Adil. 2017. Diet composition of small Indian mongoose (<i>Herpestes javanicus</i>) varies seasonally in its native range. Animal Biology, 67: 69-80. (IF:1.069)
Research Grants	Date/Year Title Agency Progress 2016: Ecologically based rodents' management in crop lands of Pothwar Plateau". HEC Islamabad Funded Progress: On-Going (3rd and last year: it will be completed till December 2019)
Other research or creative accomplishment	Supervising 5 Ph.D. Scholars at the same time for their Ph.D. Degrees.
Selected professional presentations	➤ Spatial distribution and dietary niche breadth of common leopard (<i>Panthera pardus</i>) in north-eastern Himalayan region of Pakistan. Conservation Asia 2018. Held at American University of Central Asia (AUCA), from 6 to 10 August 2018.Bishkek, Republic of Kyrgyzstan, ➤ Chromium induced histo-architectural alterations in female small Indian mongoose (<i>Herpestes javanicus</i>) inhabiting tannery areas of the Kasur District, Pakistan. ISEEP 2017 VIII International Symposium on Ecology and Environmental Problems", October 04 to 07, 2017, at Canakkale Onsekiz Mart University, Canakkale, Turkey. ➤ Human activity mediates reciprocal niche distribution and separation of two sympatric mongoose species in Pothwar Plateau. IUFRO Regional Congress for Asia and Oceania 2016, 24th to 27 October 2016, held at China National Convention Center (CNCC), Beijing, China.

Name	Dr. Muhammad Rais
Personal	Assistant Professor, Department of Wildlife Management 0310-5349776 sahil@uaar.edu.pk
Experience	Year Title Institution 2015 Assistant Professor PMAS AAUR 2007 Lecturer PMAS AAUR
Honor and Awards	1. Gold medal awarded by the University of Karachi at annual convocation 2005 for standing first in M.Sc Zoology (Wildlife and Fisheries). 2. Gold medal awarded by the Zoological Society of Pakistan at 25th Pakistan Congress of Zoology for standing first in M.Sc Zoology (Wildlife and Fisheries).
Memberships	1. Amphibian Specialist Group, IUCN 2. Executive Member (2018-2020), Zoological Society of Pakistan 3. Life fellow of The Scientific and Cultural Society of Pakistan, Karachi, Pakistan. 4. Member of South Asian Reptile Network (SARN), Zoo Outreach Organization, Tamil Nadu, India. 5. Member of Amphibian Network for South Asian (ANSA), Zoo Outreach Organization, Tamil Nadu, India. 6. Member of International Conservation Society, China. 7. Member of Activists Network, Natural Resources Defense Council, New York, USA. 8. Member of Partners in Amphibian and Reptile Conservation, USA. 9. Member of Amphibian Ark, USA.
Graduate Students	Year Degree Name ➤ 2017 MPhil Waseem Ahmed ➤ 2017 MPhil Muhammad Imtiaz Ahmed ➤ 2017 MPhil Sidra Ikram ➤ 2017 MPhil Huma Akbar ➤ 2016 MPhil Misbah Razzaq ➤ 2016 MPhil Sadia Munir ➤ 2016 MPhil Saleha Abbassi ➤ 2016 MPhil Abdullah Ibrahim
Service Activity	Member SAR Team
Brief statement of research interest	I am working on various aspects of herpetology in the Potohar Area, Punjab, Pakistan. I have completed three foreign trainings (USA, Australia, and India) in herpetology. I am a member of IUCN

	amphibian specialist group. I initiated research to document genetic diversity and radio-telemetric studies on endemic and threatened amphibians and reptiles of the area. I am currently executing research projects on genetic diversity, space use, habitat association, and monitoring of anuran populations.
Publications	1. Kabeer, B., Anwar, M., Rais, M., Jilani, M.J., Asadi, M.A., Abid, S., Bilal, S., Saleem, F., Ahmed, B.H., Yunus, A. W., Zahid, S., Anjum, M., Hejcamnova, P., Sheikh, M.K. and Mehmood, A. 2018. Study of feed preference of endangered Hog Deer under captive conditions in Pakistan. International Journal of Conservation Science. 9 (2): 337-344. 2. Jilani, M.J., Rais, M., Asadi, M.A., and Mahmood, T. 2018. Comparison of morphometric and gravimetric measurements of Common Skittering Frog (<i>Euphlyctis cyanophlyctis</i>) from paddy fields and urban wetlands Journal of King Saud University – Science. 30(3): 404-411. 3. Qasim., S., Rais, M., Akram, F. and Mahmood, T. 2018. A study on diet and relationship of Indus Valley Spiny-tailed Lizard (<i>Saara hardwickii</i>) with vegetation. The Journal of Animal & Plant Sciences. 28 (3): 702-707. (Impact factor=0.407) 4. Mahmood, T., Shah, S. W. A. S., Rais, M., Fatima, H., Akrim, F. and Nadeem, M.S. 2018. Nesting Use of Tree Species by Avifauna Inhabiting Pabbi Range Forest, Kharian, Punjab, Pakistan. Pakistan Journal of Zoology. 50 (1): 329-338. (Impact factor=0.547) 5. Asadi M.A., M. Rais, S. Munir, M. Saeed, M.J. Jilani, A. Akram, T. Mahmood and M. Anwar. 2017. Spatio-temporal variations in Red-wattled Lapwing (<i>Vanellus indicus</i>) abundance with notes on major habitat types in North Punjab, Pakistan. J. Appl. Agric. Biotechnol., 2(2): 54-62. 6. Bibi, R., Rais, M., Saeed, M., Akram, A., Mahmood, T. and Anwar, M. 2016. Impacts of ammonium nitrate on survival of tadpoles of the common skittering frog (<i>Euphlyctis cyanophlyctis</i>). Basic and Applied Herpetology. 30: 39-46. 7. Mahmood, T., Qadosi, I. Q., Fatima, H., Akrim, F. Rais, M. 2016. Metal concentrations in common skittering frog (<i>Euphlyctis cyanophlyctis</i>) inhabiting Korang River, Islamabad, Pakistan. Basic and Applied Herpetology. 30: 25-28

	8. Anwar M., S. Ali, M. Rais and T. Mahmood. 2016. Breeding ecology of red jungle fowl (<i>Gallus gallus</i>) in Deva Vatala National Park, Azad Jammu & Kashmir, Pakistan. J. Appl. Agric. Biotechnol., 1(1): 59-65 9. Balouch, S., Rais, M. Hussain, I. and Ayesha Akram. 2016. Squamate diversity in different croplands of District Chakwal, Punjab. Journal of King Saud University – Science. 28: 255-260. (Citations=02)
Research Grants	Date Title Agency Progress 1. 2018 Reptilian assemblage in agricultural landscape of District Chakwal, Punjab National Geographic Society Completed 2. 2015 Are anurans impacted by urbanization? Anuran monitoring and conservation in a human-dominated landscape. HEC In progress (last year)
Other research or creative accomplishment	Training provided as a resource person Wildlife Data Analysis. Wildlife Survey/ Census and Habitat Evaluation Techniques. Wildlife Research Centre, Gatwala, 01-01-2018 to 14-01-2018, Faisalabad. Wildlife Data Analysis. Wildlife Survey/ Census and Habitat Evaluation Techniques. Wildlife Research Centre, Gatwala, 02-10-2017 to 15-10-2017, Faisalabad.
Selected professional presentations	Invited Lectures 1. Threatened herpetofauna of Pakistan. Seminar on Threatened Wildlife Species, 27 December, 2017, Held at PMNH organized by Ministry of Planning and Rural Development, Government of Pakistan.
	Oral presentations
	International
	1. Rais, M. and Akram, A., Saeed, M., Munir, S., Abbassi, S., Mahmood, T., Anwar, M. 2017. Anuran assemblage and identification of sites for population monitoring in sub-tropical scrub and pine forest, Rawalpindi and Islamabad Capital Territory, Pakistan. Joint meeting of Ichthyologists and Herpetologists. 12-16 July, 2017, Austin, Texas, USA.

	National
	1. Significance of amphibians and a review of recent global efforts in amphibian conservation. 1st International Conference on Emerging Trends in Zoology. 8-9 December, 2017. University of Sargodha, Sargodha. 42 pp. 2. Morphometric, habitat and breeding of south-east Asian Toad in Rawalpindi-Islamabad, Pakistan. 37th Congress of Zoology organized by Zoological Society of Pakistan, Government College University, Faisalabad. Feb. 28- Mar.2, 2017. 338pp.
	Poster presentations
	International
	1. Rais, M. and Akram, A. 2017. Taxonomic review, revised checklist and photographic identification guide of frogs (Family Dicroglossidae) of sub-tropical scrub and pine forest, Rawalpindi and Islamabad Capital Territory, Pakistan. Joint meeting of Ichthyologists and Herpetologists. 12-16 July, 2017, Austin, Texas, USA.
	National
	1. Diversity and monitoring of amphibian populations in three forest types of Pakistan. 5th Conference on Biology and Computer Sciences, 14 December, 2017. Capital University of Science and Technology, Islamabad.

Name:	Dr. Bushra Allah Rakha
Father name:	Haji Allah Rakha
Date of Birth:	21-09-1983
Place of Birth:	Hasilpur distt Bahawalpur
Citizenship:	Pakistani
National ID:	32103-1670611-2
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E-mail:	arbushra@uaar.edu.pk bushrauaar@gmail.com		
Experience			
S. No.	Job Title	Employer	Duration
1	Lecturer	Pir Mehr Ali Shah Arid Agriculture University Rawalpindi	09, May 20007- To date
Honor and Awards	List honors or awards for scholarship or professional activity		
Memberships	List Memberships in professional and learned Societies, indicating offices held, committees, other specific assignments		
	Member Zoological Society of Pakistan Since 2009		
	Member Asian Reproductive Biotechnology Society (ARBS) Since 2012		
	Member of Editorial Board of Journal of Physical Science and Environmental Studies		
	Member Editorial Board of Journal of Austin Gynecology Case Reports		
	Member Editorial Board of Independent Journal of Management and Production		
	Member, Society for the Study of Reproduction		
	Member, Society of Conservation Biology		
Graduate Students Post Docs Undergraduate students/ Honour Students	List supervision of graduate students, post docs and undergraduate honors theses Showing:		
	Year	Degree	Name/Title of Thesis/Report
	2015	M. Sc.	Time budget of captive golden pheasant (<i>Chrysolophus pictus</i>) at avian research station of PMAS AAUR.
	2015	M. Sc.	Time budget of captive common pheasant (<i>Phasianus colchicus</i>) at avian research station of PMAS AAUR.
	2015	M. Sc.	Breeding biology of lakka pigeon at avian research station-1 of PMAS AAUR.
	2015	M. Sc.	Effect of different feed additives on white silky hen at avian research station-1 of PMAS AAUR.
	2015	M. Sc.	Evaluation of commercial feeds on egg shell quality of captive Bantam hen at avian research station-1 of PMAS AAUR.

	2015	M. Sc.	Digestibility of different commercial feeds by Captive Bantam hen at avian Research station of PMAS AAUR
	2016	M. Phil. Student name?	Microbial characteristics of Indian Red Jungle Fowl spermatozoa in captivity.
	2016	M. Phil. Student name?	Population Density And Habitat Association of cape Hare (<i>Lepus Capensis</i>) In Shigar Valley, Central Karakoram National Park
	2016	M. Phil. Student name?	Effect of different formulations of bird feeds on the growth and rearing of ring-necked pheasant (<i>phasianus colchicus</i>) in captivity
Service Activity	List University and Public Service activities		
	Member of Sports Committee of Faculty of Forestry Range Management and Wildlife, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi		
	Member of Media Club of the University of Pir Mehr Ali Shah Arid Agriculture University Rawalpindi		
	Member of Departmental Board for evaluation of Research Proposal for M. Phil. And Ph.D. students		
Brief Statement of Research Interest	Animal Biotechnology especially Assisted Reproductive Technologies for the conservation of Wild animals Reproductive Physiology Wildlife Ecology		
Publications	<u>INTERNATIONAL REFREED JOURNALS:</u>		
	1. S. Qadeer, M. A. Khan, M. S. Ansari, <u>Bushra Allah Rakha</u>, R. Ejaz, A.U. Husna, M. Ashiq, R. Iqbal, N. Ullah and S. Akhter. 2014. Evaluation of Antifreeze Protein III for Cryopreservation of Nili-Ravi (<i>Bubalus bubalis</i>) Buffalo Bull Sperm. Anim. Reprod. Sci., 148: 26-31. 2. R. Ejaz, M. S. Ansari, B.A. Rakha, N. Ullah, A. U. Husna, R. Iqbal and S. Akhter. 2014. Arachidic acid in extender improves post-thaw parameters of cryopreserved Nili-Ravi buffalo bull semen. Reproduction in Domestic Animals. 49: 122-125. 3. Qadeer, S., M. A. Khan, M. S. Ansari, <u>Bushra Allah Rakha</u>, R. Ejaz, R. Iqbal, M. Younis, N. Ullah, Arthur L. DeVries and S Akhter. 2015. Efficiency of Antifreeze Glycoproteins for Cryopreservation of Nili-Ravi (<i>Bubalus bubalis</i>) Buffalo Bull Sperm. Animal Reproduction Science. http://dx.doi.org/10.1016/j.anireprosci.2015.03.015 4. <u>Bushra Allah Rakha</u>, M. S. Ansari, I. Hussain, M. F. Malik, S Akhter and E. Blesbois. 2015. Semen characteristics of the Indian Red Jungle Fowl (<i>Gallus gallus murghi</i>). Eur J Wildl Res. 61:379–386. 5. <u>Bushra Allah Rakha</u>, M. S. Ansari, I. Hussain, M. F. Malik and S Akhter. 2015. Impact of Ejaculate Frequencies on the Quality of Red Jungle Fowl (<i>Gallus gallus murghi</i>) Semen. Avian Biology Research. 8 (2), 2015.		

6. M. S. Ansari , **Bushra Allah Rakha**, M.F. Malik, S. M. H. andrabi, N. Ullah, R. Iqbal., W. V. holt, and S Akhter. 2016. Effect of cysteine addition to the freezing extender on the progressive motility, viability, plasma membrane and DNA integrity of Nili Ravi buffalo (*Bubalus bubalis*) bull spermatozoa. J. Applied Anim. Res., 44: 36-41.
7. Ansari, M. S., **Bushra Allah Rakha**, S Akhter, M. Ashiq. 2016. OPTIXcell® improves the post thaw quality and fertility of buffalo bull sperm. Theriogenology. 85: 528-532.
8. **Bushra Allah Rakha**, M. S. Ansari, I. Hussain, M. Anwar, S Akhter and E. Blesbois. 2016. Comparison of extenders for liquid storage of Indian red Jungle fowl (*Gallus gallus murghi*) spermatozoa. Avian Biology Research 9(3); 207-212.
9. S. Qadeer, M.A. Khan, Q. Shahzad, A. Azam, M.S. Ansari, **Bushra Allah Rakha**, R. Ejaz, A.U. Husna, J.G. Duman, S. Akhter. 2016. Efficiency of beetle (*Dendroides canadensis*) recombinant antifreeze protein for buffalo semen freezability and fertility. Theriogenology, 86: 1662-1669
10. M. S. Ansari, **Bushra Allah Rakha**, S. Akhter. 2016. Effect of Thioglycol on fertility of frozen Nili-Ravi buffalo semen. Buffalo Bulletin 35(2); 277-283.
11. R. Ejaz, M. S. Ansari, **Bushra Allah Rakha**, A. U. Husna, S. Qadeer, R. Iqbal, N. Ullah and S. Akhter. 2016. Cholesterol supplementation in extender improves quality of frozen-thawed Nili-Ravi buffalo bull semen. Buffalo Bulletin 35(2); 259-68.
12. S. Akhter, S. Qadeer, M. A. Khan, M. S. Ansari, B. A. Rakha. 2016. Cryopreservation of Nili-Ravi buffalo bull sperm: The role of antifreeze glycoproteins (AFGPs). Thai Veterinary Journal 46; 91-94.
13. **Bushra Allah Rakha**, Muhammad Sajjad Ansari, S. Akhter, I. Hussain and E. Blesbois. 2016. Cryopreservation of Indian red jungle fowl (*Gallus gallus murghi*) semen. Animal Reproduction Science. 174: 45-55.
14. U. Husna, R. Ejaz, S. Qadeer, A. Azam, **Bushra Allah Rakha**, M. S. Ansari, Q. Shahzad, M. Javed, M. H. Vazquez-Levin and S. Akhter. 2016. A comparative analysis of sperm selection procedures prior to cryopreservation for Nili-Ravi buffalo (*Bubalis bubalis*) semen: Assessment of its impact on post-thaw sperm functional quality. Animal Reproduction Science. 174: 29-36

NATIONAL REFREED JOURNALS:

15. Ansari, M. S., **Bushra Allah Rakha**, S. M. H. Andrabi, N. Ullah, R. Iqbal, W. V. Holt and S. Akhter. 2014. Thioglycol in extender improves the post-thaw quality of buffalo (*Bubalus bubalis*) bull spermatozoa. J. Anim. Plant Sci. 24: 1256-1259.
16. Zia, U., M. S. Ansari, S. Akhter and **Bushra Allah Rakha**. 2014. Breeding biology of red vented bulbul (*pycnonotus cafer*) in the area of rawalpindi/Islamabad. J. Anim. Plant. Sci. 24: 656-659.

17. M. S. Ansari, **Bushra Allah Rakha**, R. Iqbal, S. Akhter. 2014. Effect of glutathione in extender on the Freezability of Sahiwal bull spermatozoa. Pakistan Journal of Zoology. 46: 17-21.
18. S. Akhter, **Bushra Allah Rakha**, R. Iqbal, M. S. Ansari. 2014. Effect of bovine serum albumin on motility, plasmalemma, viability and chromatin integrity of buffalo bull spermatozoa. Pakistan Journal of Zoology. 46: 115-120.
19. Akhter S, M. S. Ansari, **Bushra Allah Rakha**, S. M. H. Andrabi, M. Qayyum and N. Ullah. 2014. Effect of Fructose in Extender on Fertility of Buffalo Semen. Short Communication. Pakistan Journal of Zoology. 46: 279-281.
20. Akhter S, M. S. Ansari, **Bushra Allah Rakha**, T. Aziz, S. M. H. Andrabi, N. Ullah, M. Anwar and M. Qayyum. 2015. Effect of Milk Based Extenders on Motility and Acrosomal Integrity of Buffalo Bull (*Bubalus bubalis*) Spermatozoa at 5°C. Pakistan Journal of Zoology. 47: 1645-1648.
21. Fiza, Y., **Bushra Allah Rakha**, S. Akhter and M. S. Ansari. 2015. Breeding Biology of Scaly-Bellied Woodpecker, *Picus squamatus*, in Margalla Hills National Park, Pakistan. Pakistan Journal of Zoology. 47: 1003-1007.

IN PROCEEDINGS (Abstracts):

INTERNATIONAL CONFERENCES:

1. **Bushra Allah Rakha**, M. S. Ansari, I. Hussain, A. Maqsood, S. Akhter and E. Blesbois. 2016. Evaluation of extenders for short and long-term storage of Indian red jungle fowl (*Gallus gallus murghi*) spermatozoa. The 6th congress on the “Asia Pacific Initiative on Reproduction” 8-10, April 2016. Aspire, Jakarta, Indonesia.
2. S. Akhter, S. Qadeer, M. A. Khan, M. S. Ansari, **Bushra Allah Rakha**. 2016. Cryopreservation of Nili-Ravi buffalo bull sperm: The role of antifreeze glycoproteins (AFGPs). The 15th Chulalongkorn University Veterinary Conference CUVAC 2016: Research in Practice, April 20-22, 2016, Bangkok, Thailand.
3. **Bushra Allah Rakha**. 2015. Evaluation of tris-citric acid, skim milk and sodium citrate extenders for liquid storage of Punjab urial (*Ovis vignei punjabiensis*) spermatozoa. Journal of Tissue Science and Engineering, 6 (2): 14. Proceedings of International Conference and exhibition on Tissue Preservation and Bio-Banking. July 20-22, 2015, Barcelona Spain. <http://dx.doi.org/10.4172/2157-7552.S1.019>
4. S. Akhter, **Bushra Allah Rakha**, M. S. Ansari, N. Kamal, S. Rani, S. Bibi, S. Naz, S. Qadeer, and M. Khalid. 2014. Effect of amino acid supplementation of extender on post-thaw quality of sahiwal bull spermatozoa. The 11th Annual Conference Asian Reproductive Biotechnology Society ARBS 2014. Thailand November 3-8, 2014, Sukosol Hotel, Bangkok.

	<u>NATIONAL CONFERENCES:</u> 5. M. S. Ansari, <u>Bushra Allah Rakha</u>, M. Anwar and S. Akhter. 2016. Effect of Cryopreservation on Indian Red Jungle Fowl (<i>Gallus gallus mgrghi</i>) Spermatozoa. Proceedings of the 36th International Pakistan Congress of Zoology held at University of Sindh, Jamshoro, 16-18, February 2016. 6. Rasool, A., M. Anwar, I. Hussain, M. S. Nadeem and <u>Bushra Allah Rakha</u>. 2015. Prevalence and Habitats of Carnivore Species in Riverine Forest of Dera Ghazi Khan Forest Sub-Division. Proceedings of the 36th International Pakistan Congress of Zoology held at Centre of excellence in marine biology, University of Karachi, 1-4, March 2015. 7. Asadi, M. A., M. Rais, <u>Bushra Allah Rakha</u>, A. Saleem, M. Anwar, I. Hussain, T. Mahmood, M. Saeed and M. J. Jilani. 2015. Breeding and Spatio-Temporal Variations in Abundance and Red-Wattled Lapwing (<i>Vanellus lildicus</i>) in North Punjab, Pakistan. Proceedings of the 36th International Pakistan Congress of Zoology held at Centre of excellence in marine biology, University of Karachi, 1-4, March 2015. 8. Saeed, M., M. Anwar, M. Rais, I. Hussain, <u>Bushra Allah Rakha</u>, T. Mahmood and A. R. Kayani. Baseline Study on Abundance and Habitat of White-Breasted Waterhen (<i>Amaurornis phoenicurus</i>) in Rawalpindi-Islamabad Area, Pakistan. Proceedings of the 36th International Pakistan Congress of Zoology held at Centre of excellence in marine biology, University of Karachi, 1-4, March 2015. 9. Khalil, S., M. Anwar, I. Hussain, T. Mahmood, M. Rais and <u>Bushra Allah Rakha</u>. Identification of Threats to Grey Partridge (<i>Francolinus pondicerianus</i>) in Salt Range, Punjab Pakistan. Proceedings of the 36th International Pakistan Congress of Zoology held at Centre of excellence in marine biology, University of Karachi, 1-4, March 2015.				
Research Grants and Contracts	Date	Title	Agency/Organization	Amount of Award (Million)	Status
	2012-2017	Screening of different avian egg yolks for cryopreservation of buffalo semen: a step to improve fertility in buffaloes with frozen semen (As Co-PI)	Higher Education Commission of Pakistan	4.75	On-going
	2014-2015	Establishment of aviary facility: wild birds	PMAS Arid Agriculture University Rawalpindi	0.147	Completed

	2016-2018	Evaluation of Antifreeze proteins extracted from various Sources for cryopreservation of Buffalo Spermatozoa (As Co-PI)	Higher Education Commission of Pakistan	2.4	On-going
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