Pir Mehr Ali Shah
ARID AGRICULTURE UNIVERSITY RAWALPINDI

DEPARTMENT OF BIOLOGY

(M. Sc. Programme)

Self Assessment Report

7th Cycle (2018-2020)

Program Team

Dr. Mazhar Qayyum (Coordinator)

Dr. Muhammad Sajid Nadeem (Member)

Dr. Muhammad Irfan (Member)

DEPARTMENT OF BIOLOGY

1. INTRODUCTION

The Department of Zoolgy/Biology established in 1997. The M. Sc. degree program in Biology was started in 1997. The M.Sc. Biology degree program aims to produce specialized personal in animal as well as plant sciences. The degree is offered on merit as well as through self finance program. A total of 70 students get admission annually. The students are recruited on the basis of marks of their previous degree. The students enroll in M. Sc. Biology are trained by faculty of Zoology, Biochemistry and Botany at the same time. The students are encouraged to get involved in the research activities. The laboratories are designed for conducting modern research in its diverse fields. Furthermore, students are involved in coordinated research projects in the state-of-the-art laboratory facilities of National Agriculture Research Center, Museum of Natural History, National Institute of Health, Islamabad.

SECTION-1

CRITERION-1: PROGRAM MISSION, OBJECTIVES AND OUTCOMES

The course of study aspires to develop qualified Biologists, specialized in one or more sub-discipline reflecting the student's particular interest.

Mission Statement

The program encourages learning at all stages of biological organization (molecular, cellular, organismic, population, community, and ecosystem).

STANDARDS:

Standard 1-1: Documented measurable objectives

Objectives:

1. It aims at conventional and modern Biology such as Animal and Plant Diseases, Animal and Plant Physiology and Systematics, Aquaculture and Fisheries, Ethno-biology and Wildlife and Ecology
2. Acquisition of teaching skills involving oral and written accounts of complex scientific ideas

Outcomes:

1) Passing the course, students have a good command of the subject.
2) Graduates are getting jobs in various national teaching institutes.

Main elements to achieve objectives

1. Maintain major teaching foci and strive for excellence in the areas of cell and molecular, organismal, ecological, evolutionary, and behavioral biology.
2. Teaching at the interface of empirical and theoretical biology.
3. Maintain a rigorous, broad-based major in biological sciences that provides a compelling learning experience.

TABLE-1: OBJECTIVES ASSSESSMENT

S. #	Objective	How Measured	When Measured	Improvement Identified	Improvement made
1	A focus on a thorough knowledge of a specific topic dealing with one or more of the following areas: Animal and Plant Diseases, Animal and Plant Physiology and Systematics, Aquaculture and Fisheries, Ethno-biology and Wildlife and Ecology	Interview, semester examination; students Feedback from assessment proformas	While entry into the program, end of semester and course work	Curriculum update and faculty training	Specific optional courses are offered to increases knowledge of a specific sub-discipline of Biology. The courses are given to senior faculty.
2	Acquisition of teaching skills involving oral and written explanations of complex scientific ideas	Seminars/Presentations, quizzes, papers, assignments	During course work; Mid and Final exams; presentations and field works	Only subject instructor took seminars	All the faculty members are bound to participate in seminars

TABLE-2: STANDARD 1-2: OBJECTIVES VS OUTCOMES

	Objectives		
Outcomes	**Sr. No.**	**1**	**2**
	1	***	**
	2	***	***

*** Relevant**

**** Relevant and satisfactory**

***** Highly relevant and satisfactory**

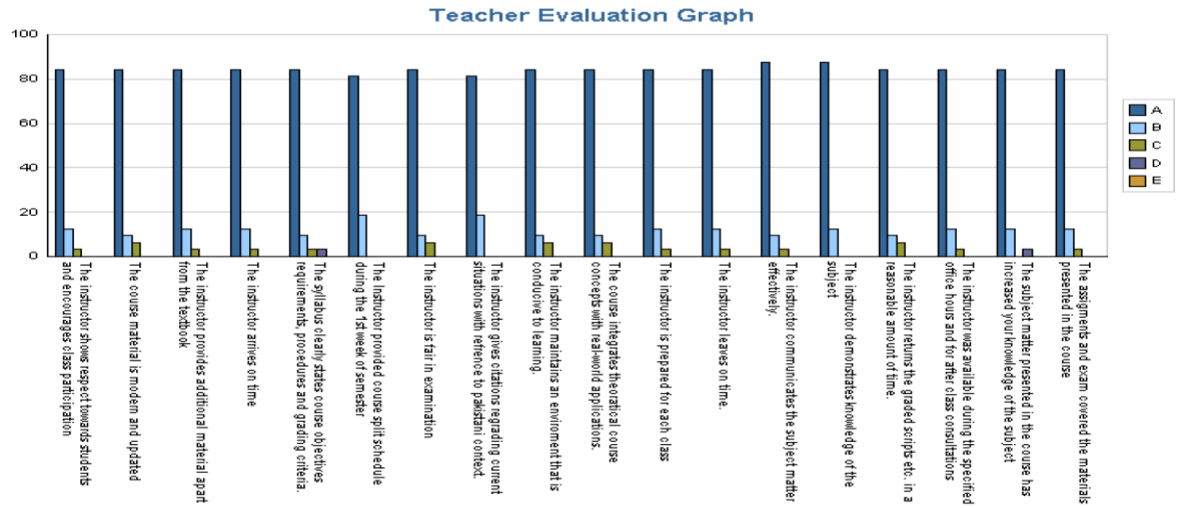
Teacher Evaluation

Following teachers of the department were evaluated. The teachers were evaluated by the students at the end of course completion through the proforma-10 (Annex-II). Detail of performance of each teacher is given in Figs.

Teacher Name: Mazhar Qayyum

Course Name: Fundamentals of Microbiology and Immunology

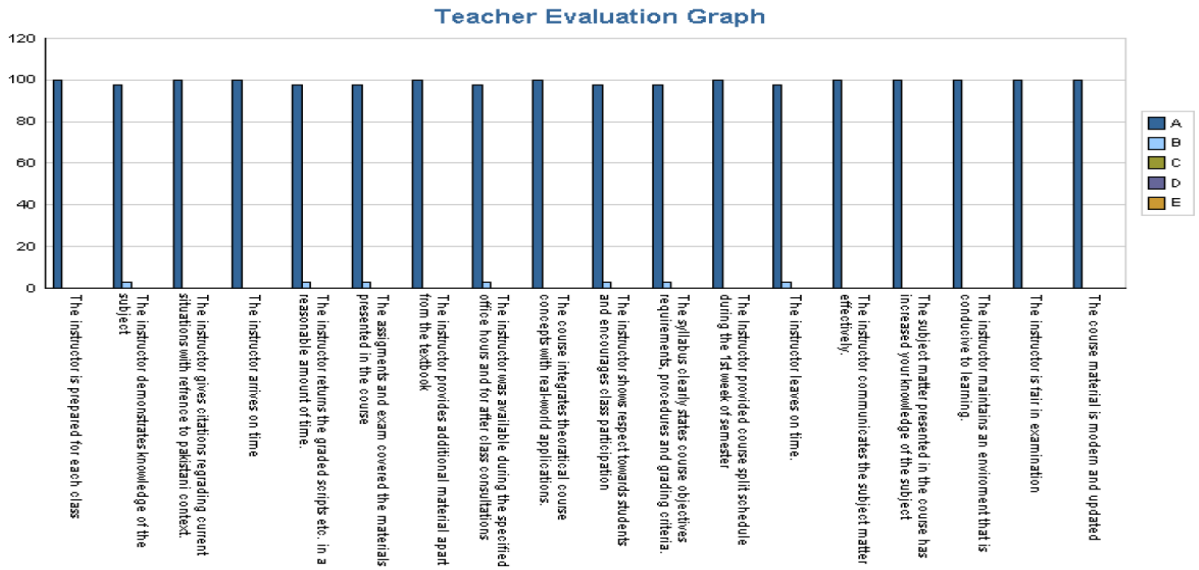
Section: A **M/E:** M **Semester#:** 2



Teacher Name: Mazhar Qayyum

Course Name: Fundamentals of Microbiology and Immunology

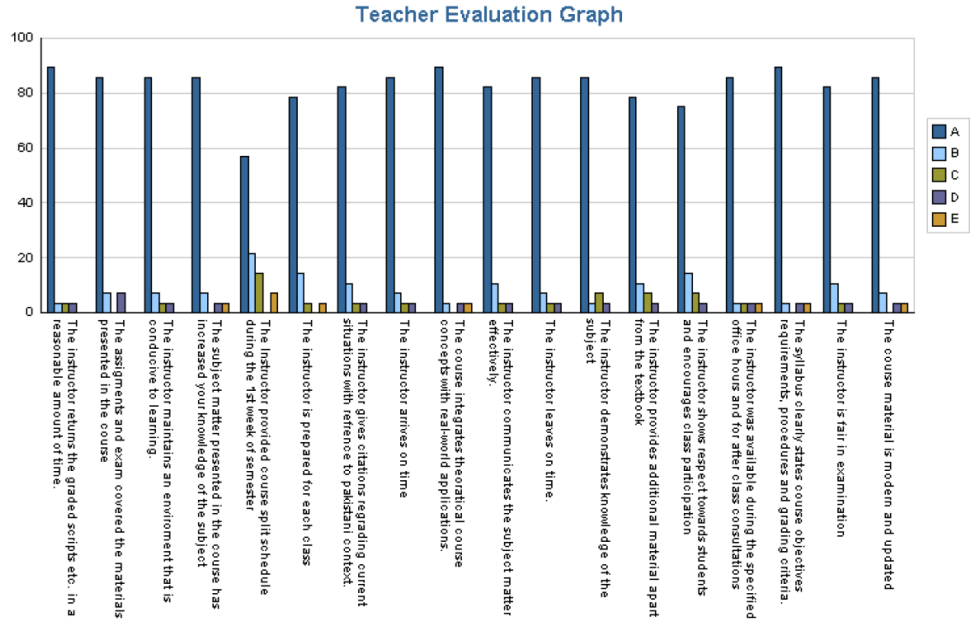
Section: B **M/E:** E **Semester#:** 2



Teacher Name: Muhammad Irfan

Course Name: Physiological Systems of Animals

Section: B M/E: E Semester#: 4



Teacher Name: Muhammad Irfan

Course Name: Physiological Systems of Animals

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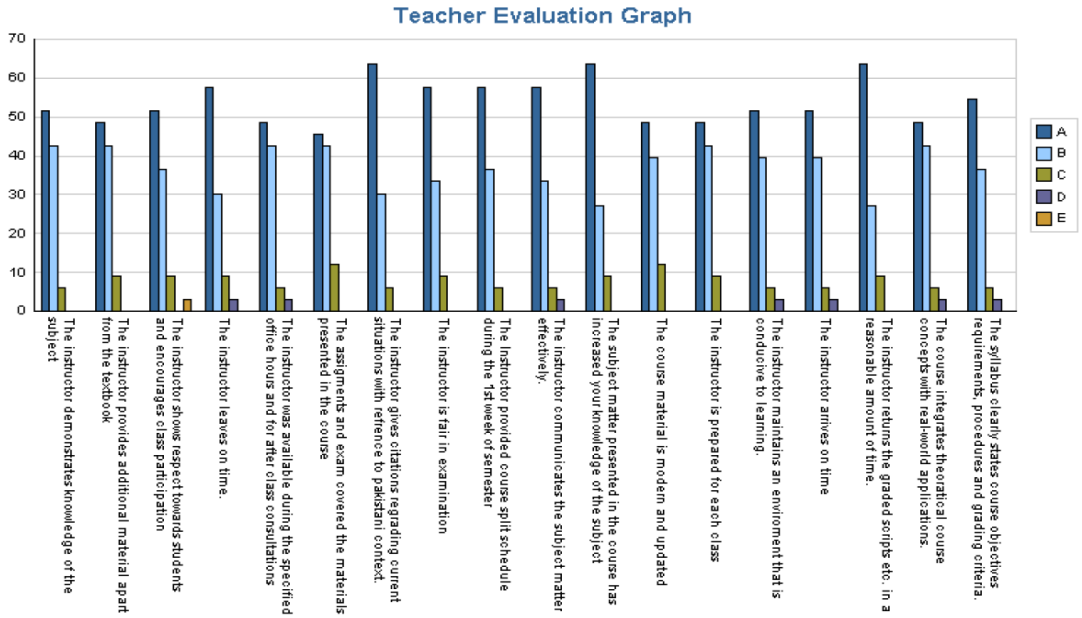
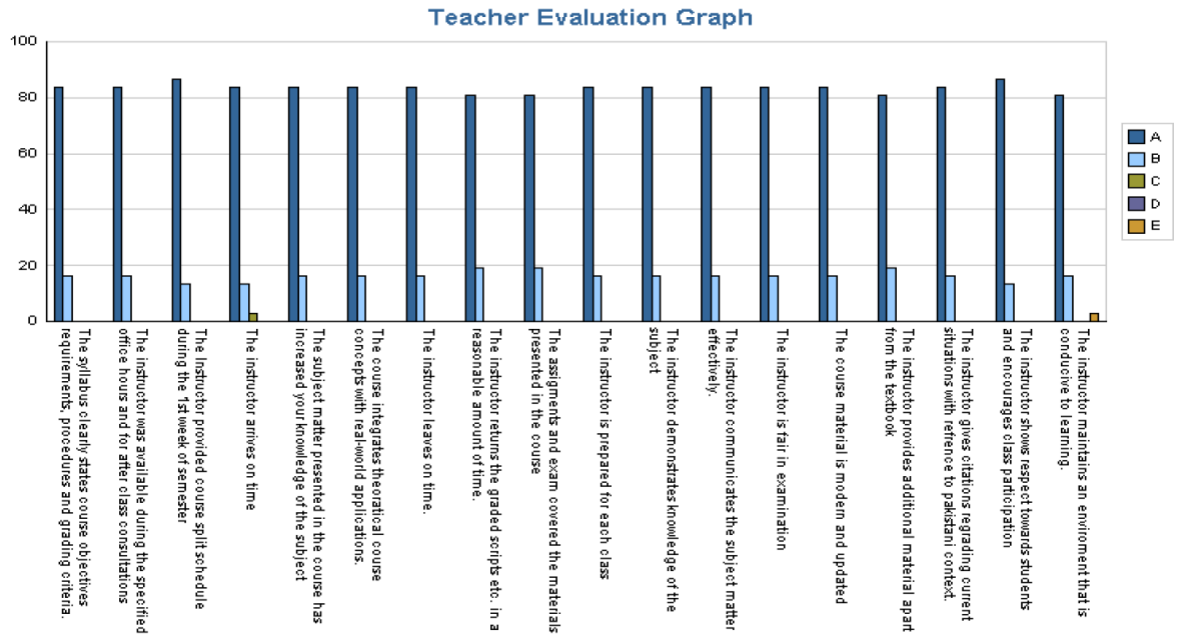


Teacher Name: Amjad Rashid Kayani

Course Name: Evolutionary Biology

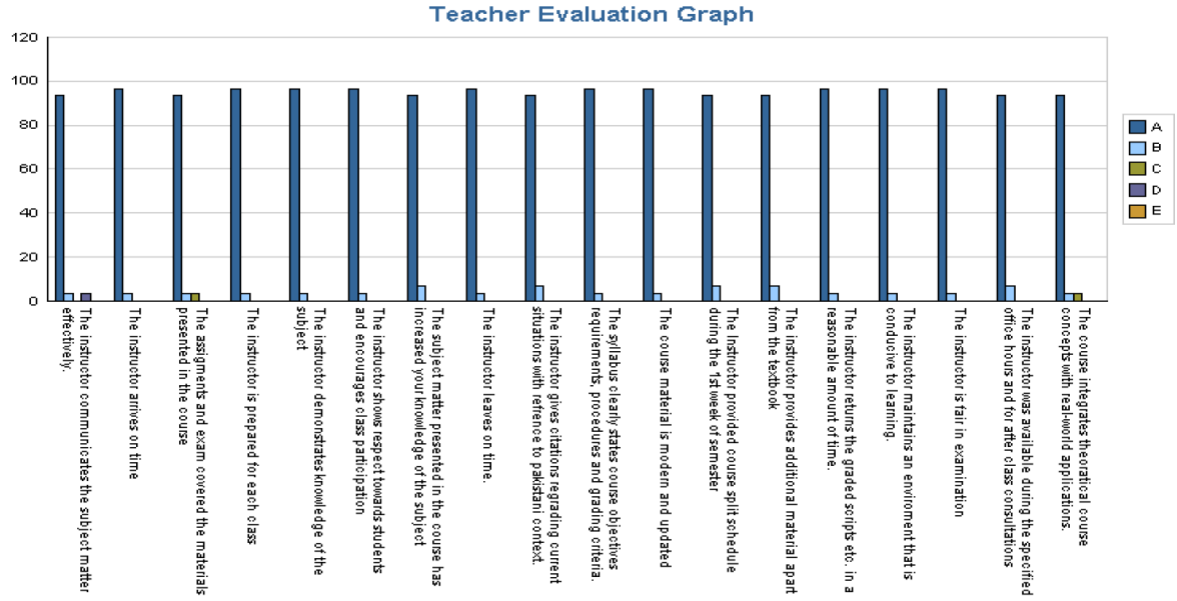
Section: A **M/E:** M **Semester#:** 4



Teacher Name: Amjad Rashid Kayani

Course Name: Evolutionary Biology

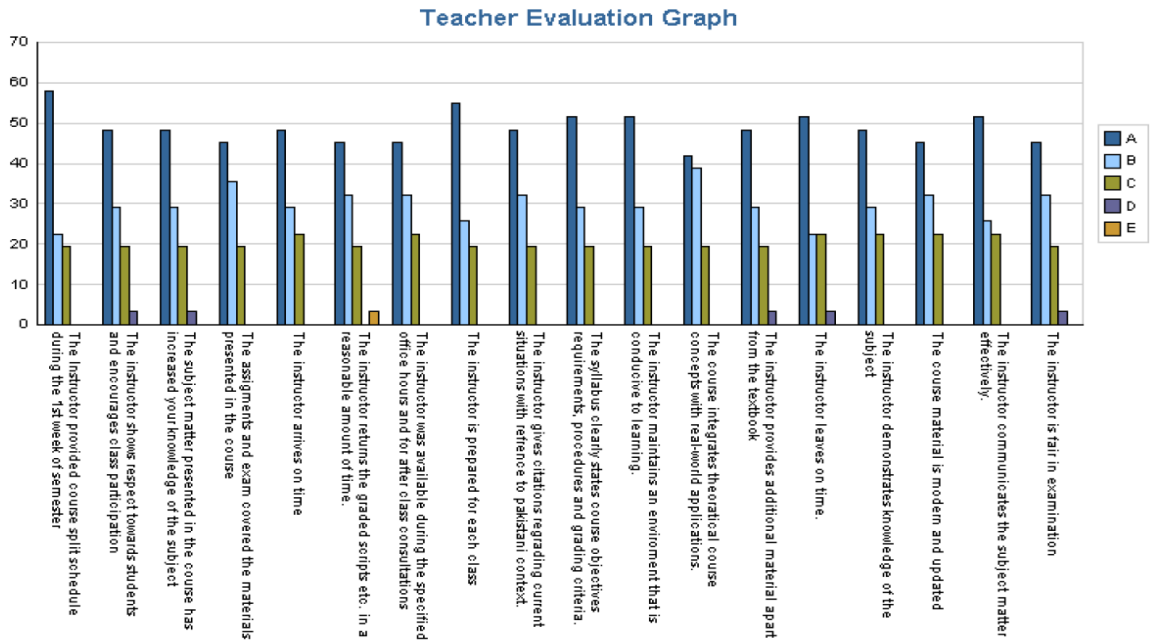
Section: B **M/E:** E **Semester#:** 4



Teacher Name: Muhammad Mushtaq

Course Name: Biosystematics

Section: A M/E: M Semester#: 3



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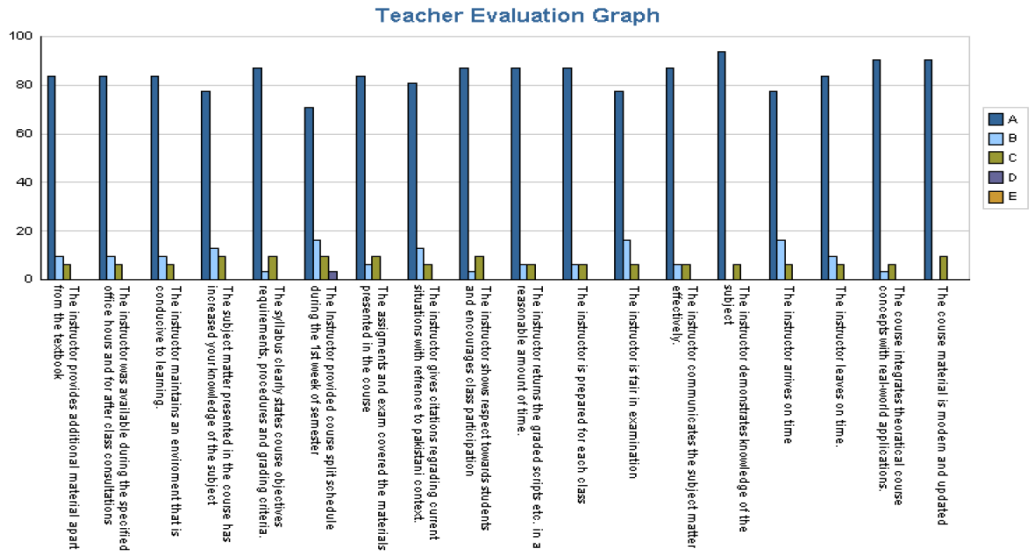
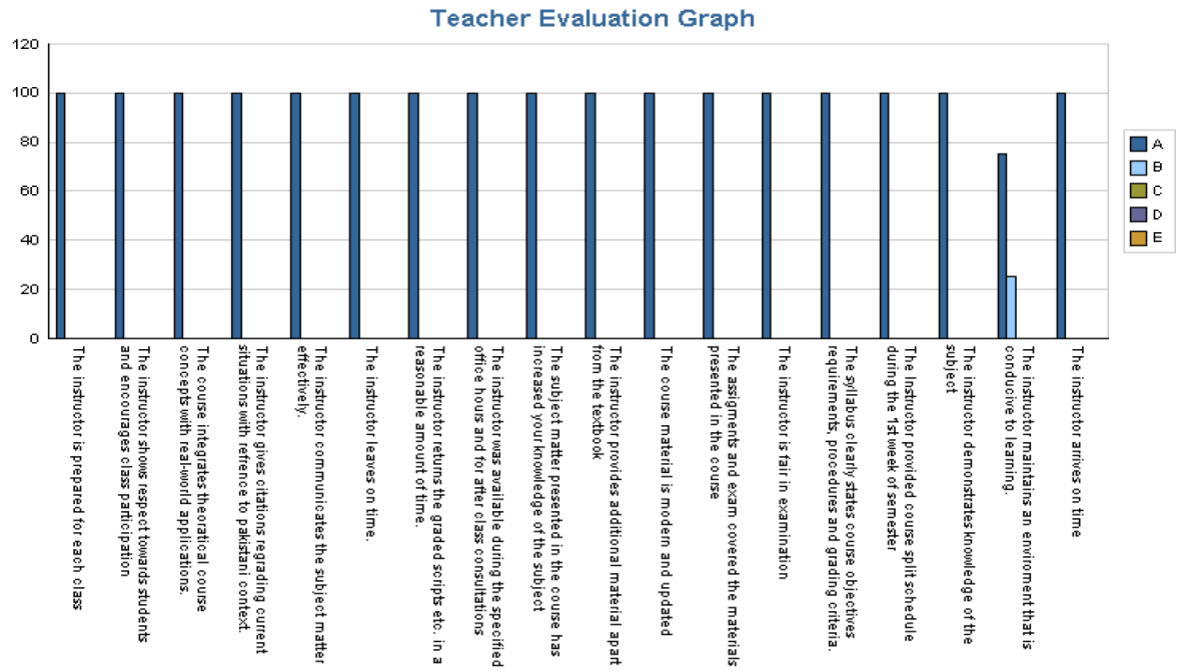


Teacher Name: Muhammad Sajid Nadeem

Course Name: Biodiversity

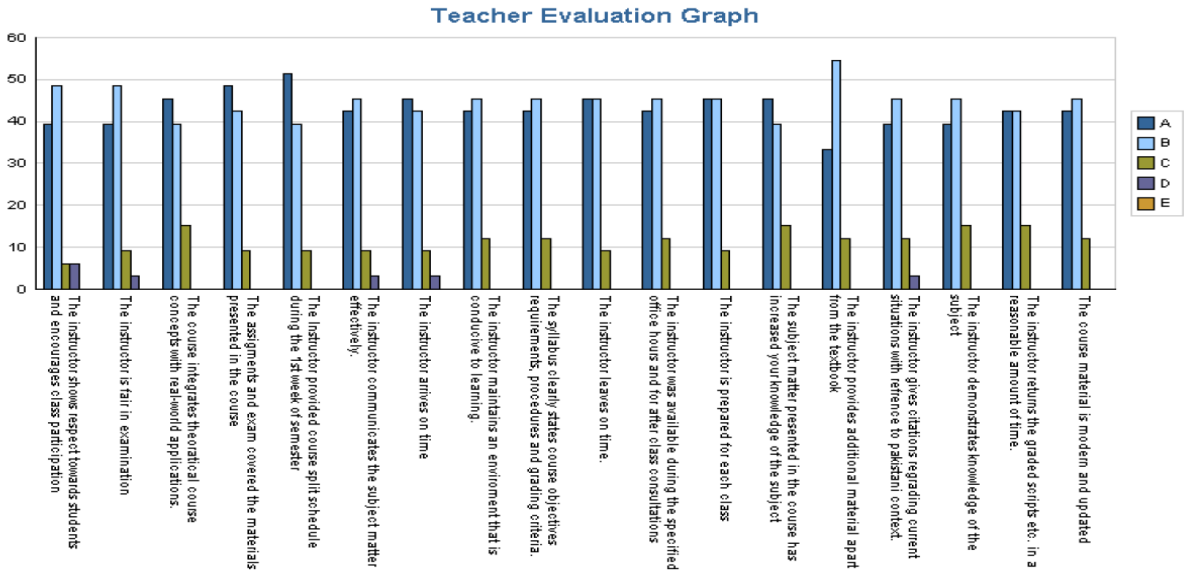
Section: A M/E: M Semester#: 2



Teacher Name: Farhana Riaz Chaudhry

Course Name: Research Planning and Report Writing

Section: A M/E: M Semester#: 3



Teacher Name: Farhana Riaz Chaudhry

Course Name: Research Planning and Report Writing

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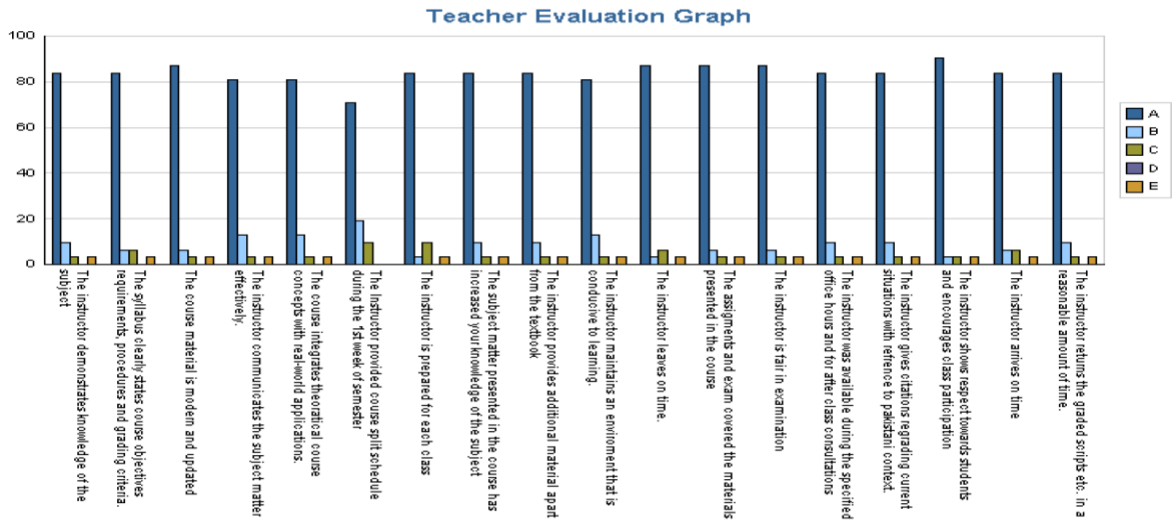
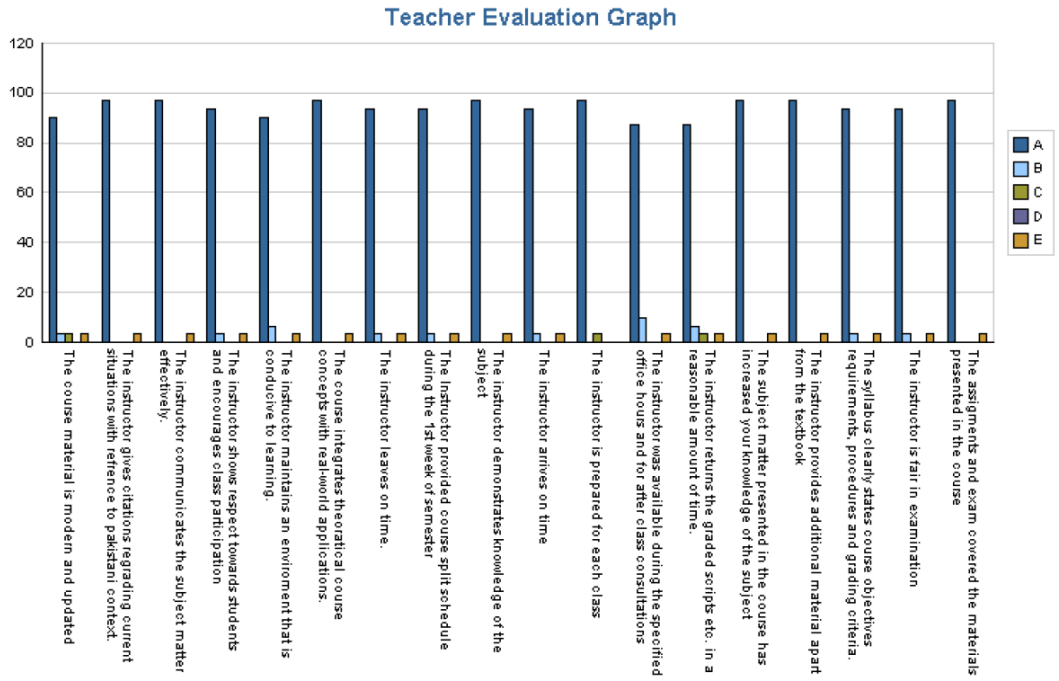


Teacher Name: Muhammad Zubair Anjum

Course Name: Fish Biology

Section: A M/E: M Semester#: 4



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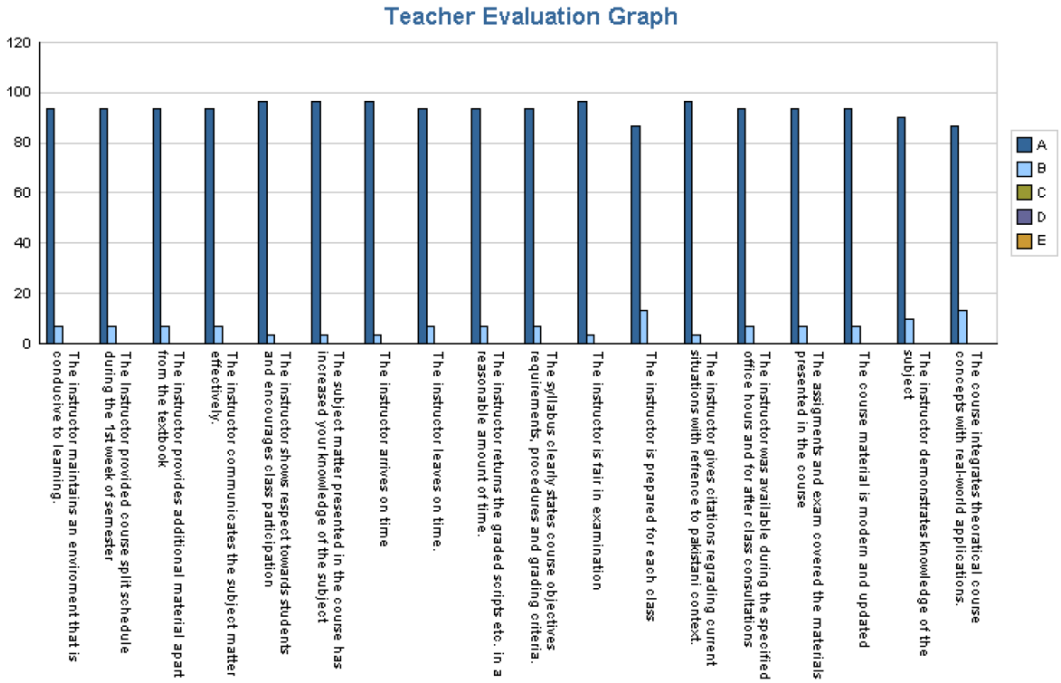
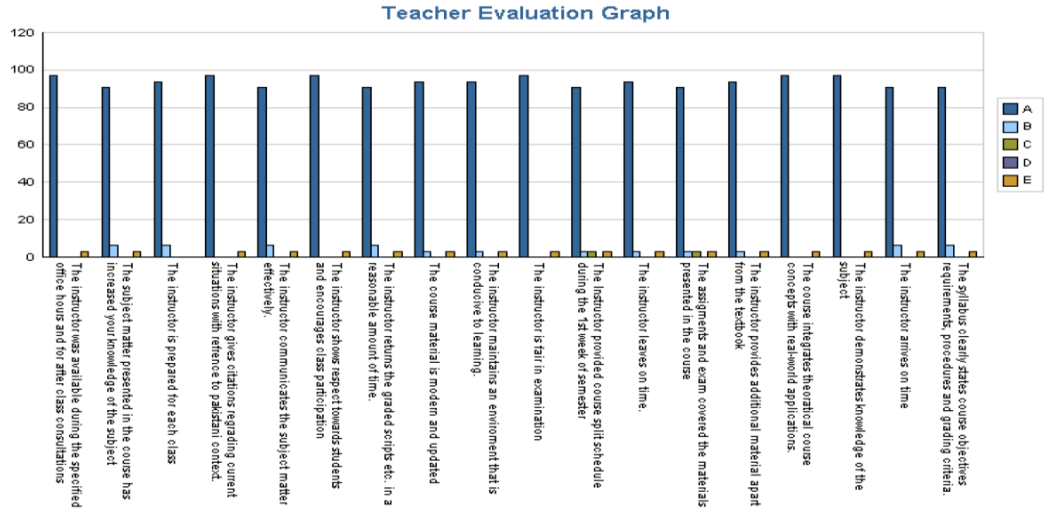


Teacher Name: Shamim Akhtar

Course Name: Animal Reproductive Biology

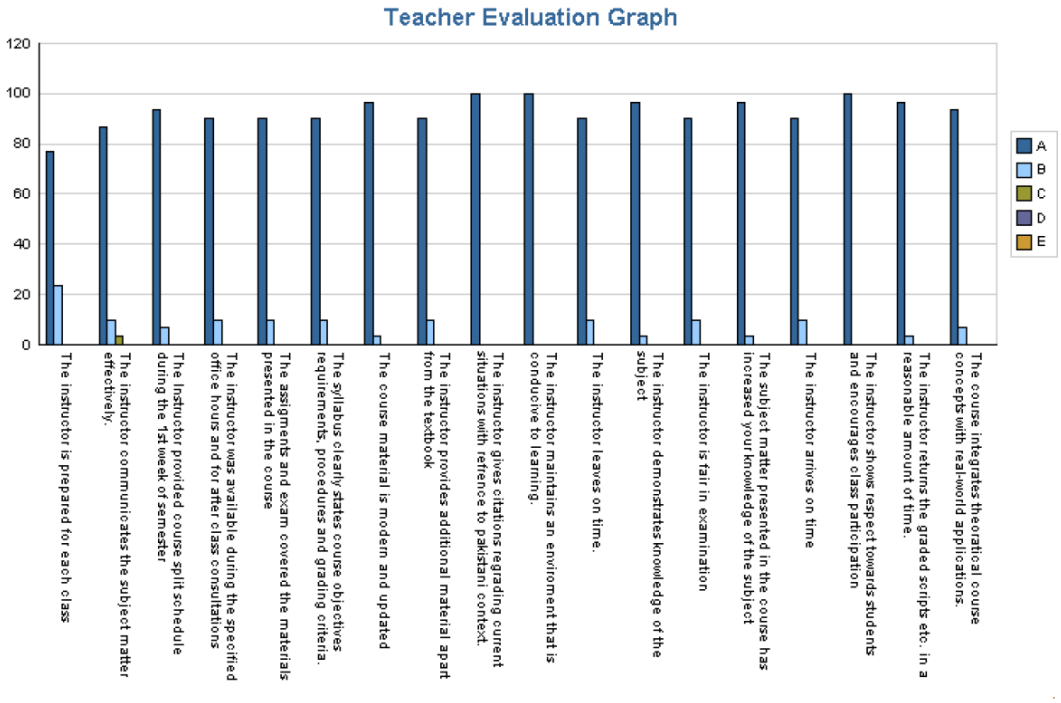
Section: A M/E: M Semester#: 4



Teacher Name: Shamim Akhtar

Course Name: Animal Reproductive Biology

Section: B M/E: E Semester#: 4



Course Evaluation

Courses offered during report period are given in Table. These were evaluated by students at the end of course completion through proforma-1 (Annex-I). Detail of evaluation of each course is given in graphs.

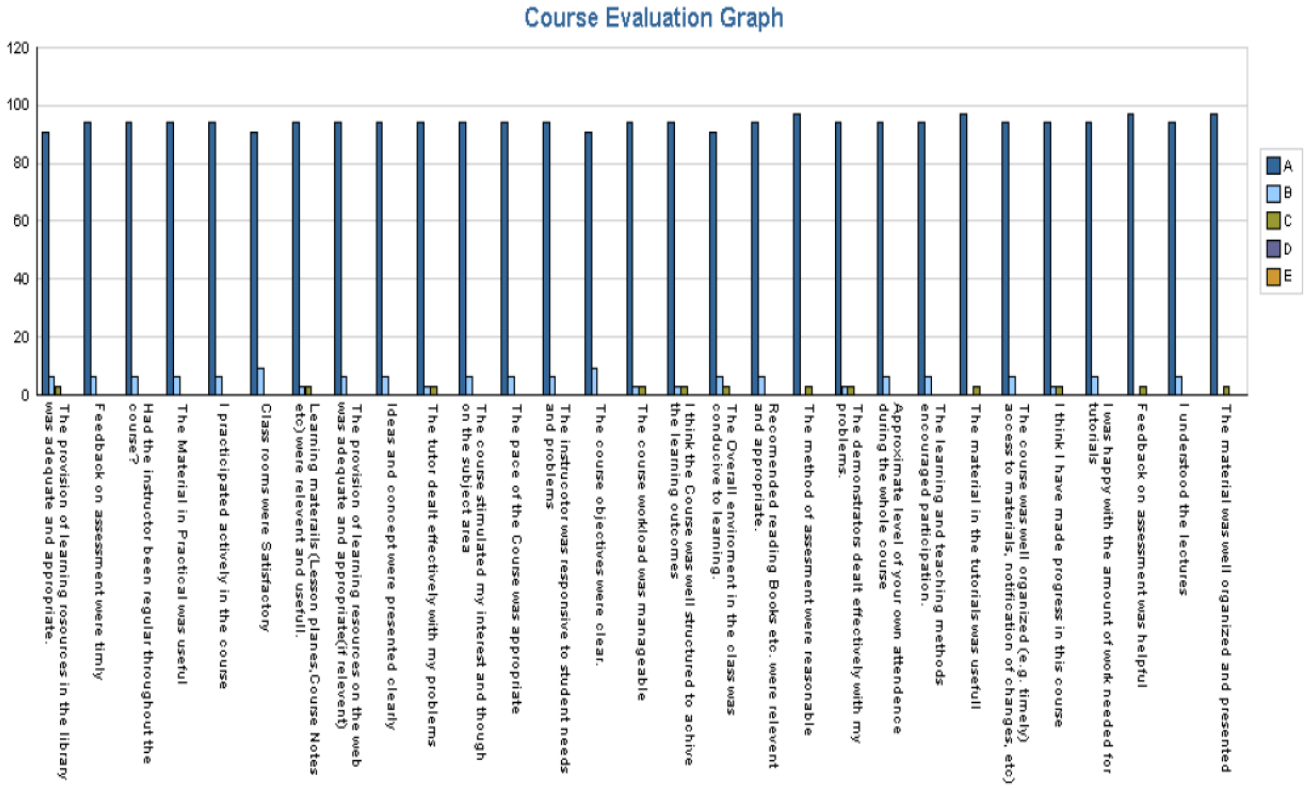
Course No.	Course Title	Credit Hours	Instructor Name
BIOL-709	Fundamental of Microbiology and Immunology	3(2-2)	Dr. Mazhar Qayyum
BIOL-705	Evolutionary Biology	2(2-0)	Dr. Amjad Kayani
BIOL-725	Animal Reproductive Biology	3(2-2)	Dr. Shamim Akhter
BIOL-706	Biosystematics	4(3-2)	Dr. M. Mushtaq.
BIOL-711	Research Planning and Report Writing	3(1-4)	Dr. M. Irfan
BIOL-707	Biodiversity	4(3-2)	Dr. M. Sajid Nadeem
BIOL-721	Fish Biology	3(2-2)	Dr. M. Zubair Anjum
BIOL-702	Physiological System of Animals	3(2-2)	Dr. M. Irfan

Teacher Name: Mazhar Qayyum

Course Name: Fundamentals of Microbiology and Immunology

Section: A M/E: M Semester# 1

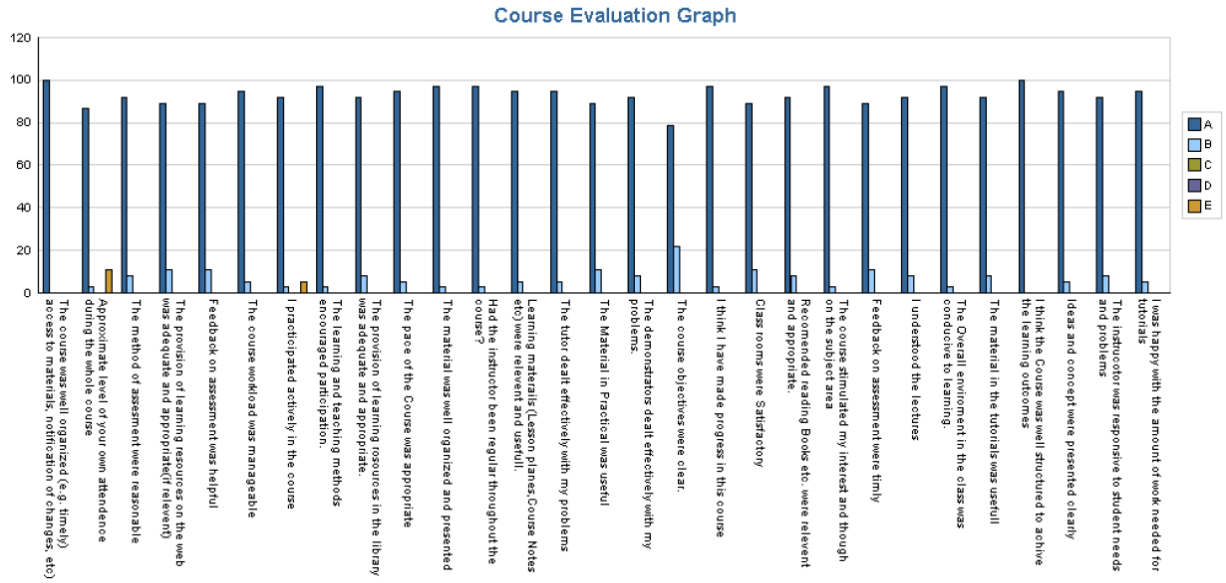
Class: M.Sc (Biology)



Course Name: Fundamentals of Microbiology and Immunology

Section: B M/E: E Semester# 1

Class: M.Sc (Biology)

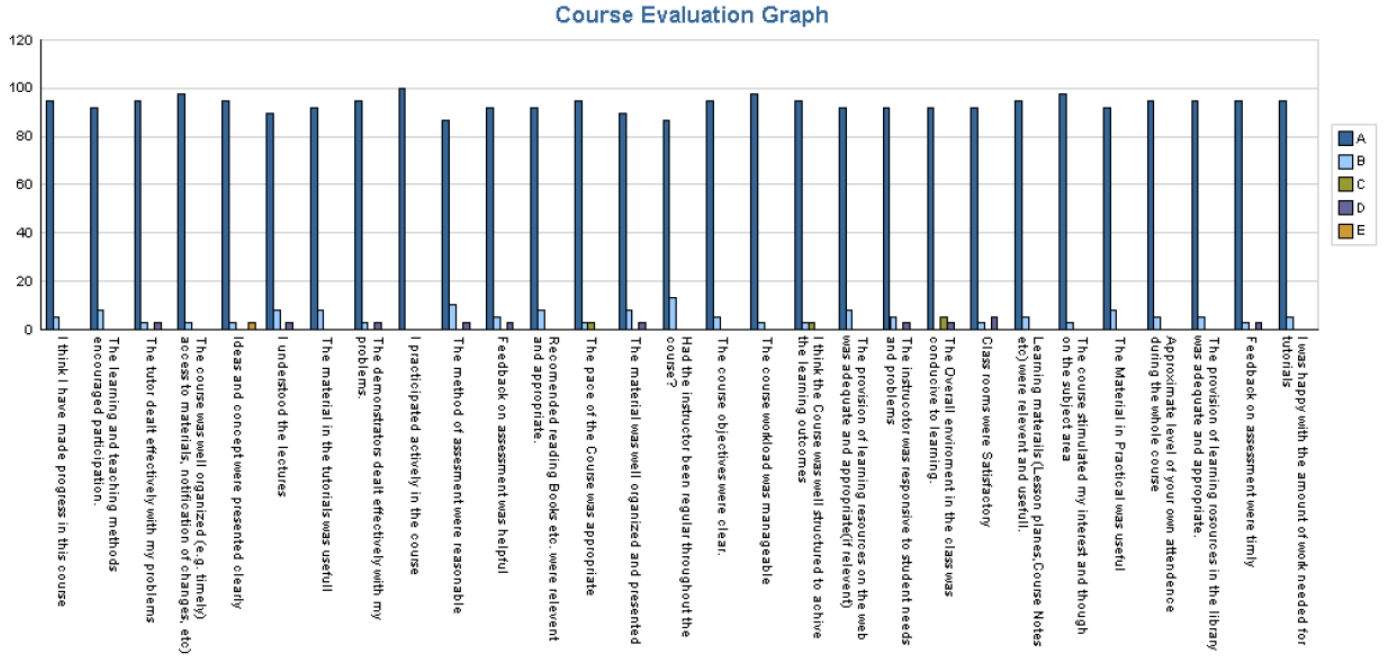


Teacher Name: Amjad Rashid Kayani

Course Name: Evolutionary Biology

Section: A M/E: M Semester# 2

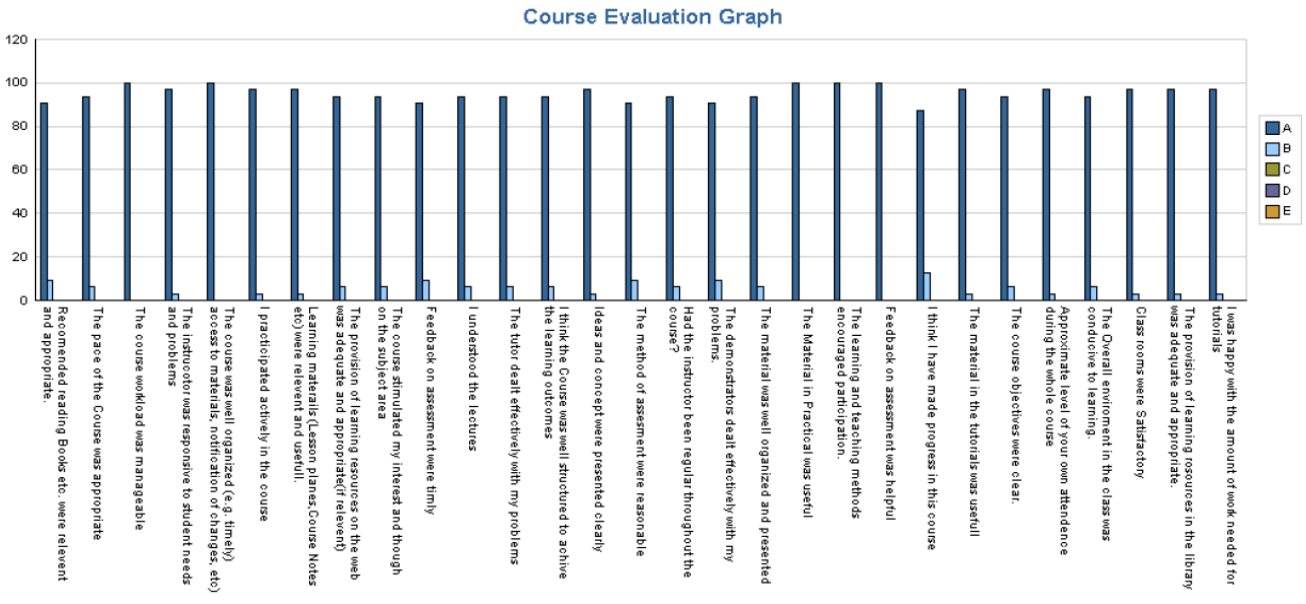
Class: M.Sc (Biology)



Course Name: Evolutionary Biology

Section: B M/E: E Semester# 4

Class: M.Sc (Biology)

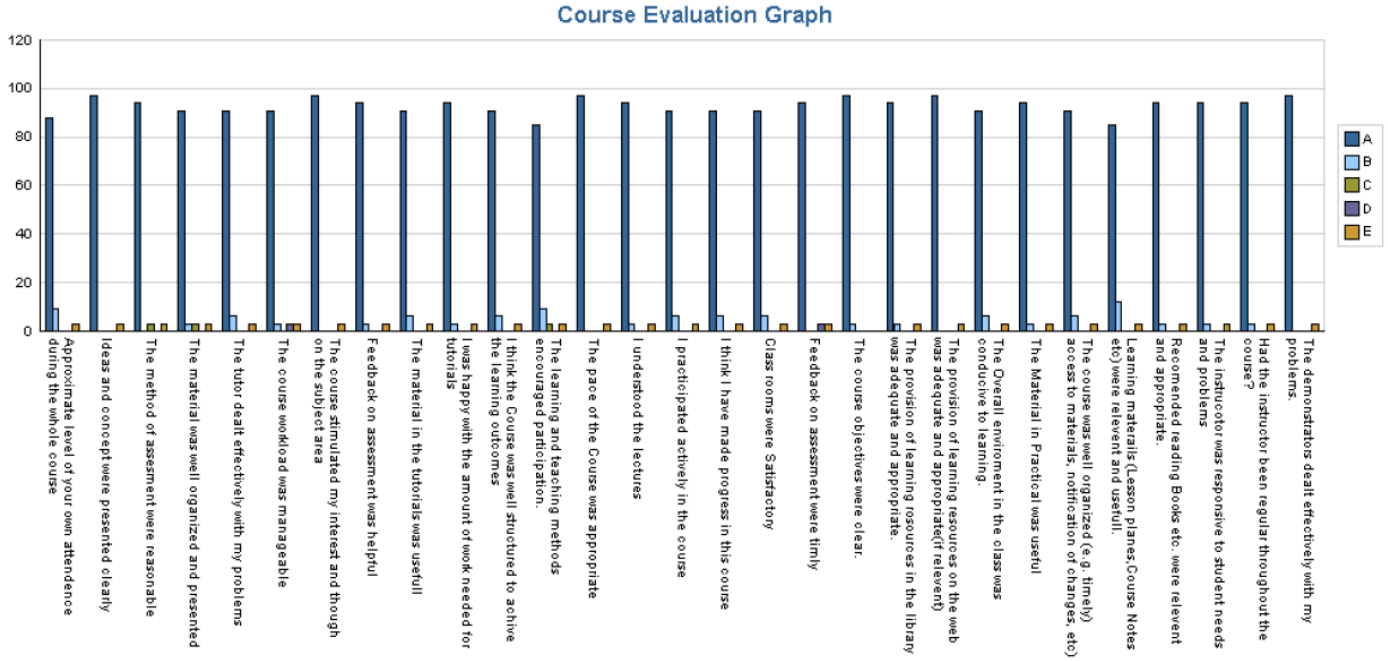


Teacher Name: Shamim Akhtar

Course Name: Animal Reproductive Biology

Section: A M/E: M Semester# 4

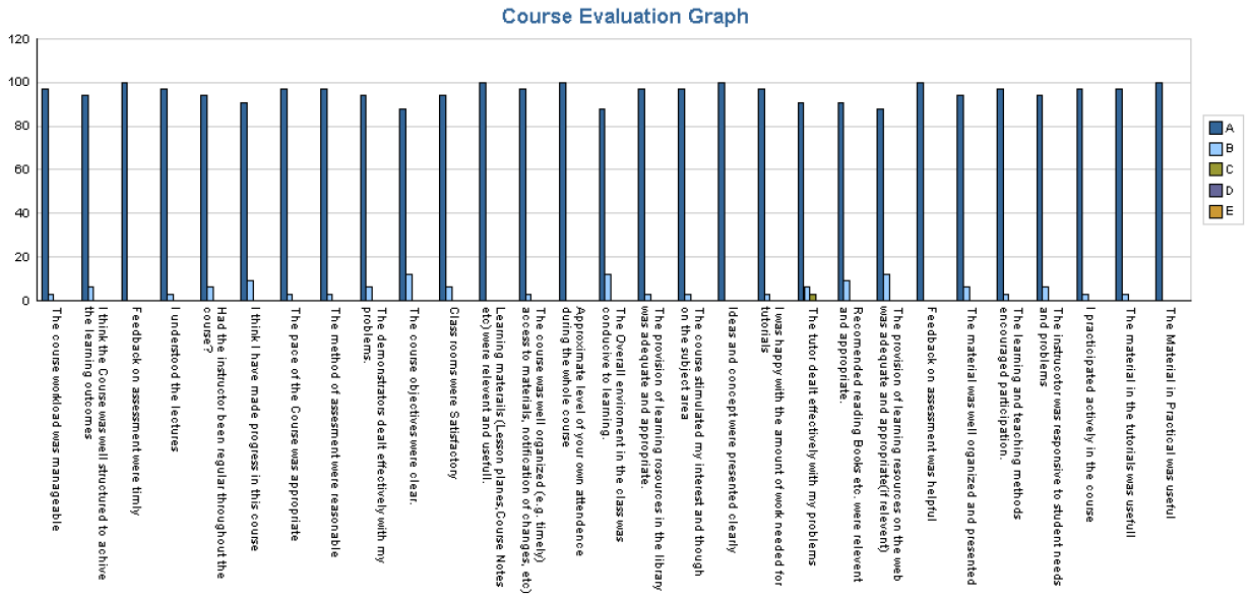
Class: M.Sc (Biology)



Course Name: Animal Reproductive Biology

Section: B M/E: E Semester# 4

Class: M.Sc (Biology)

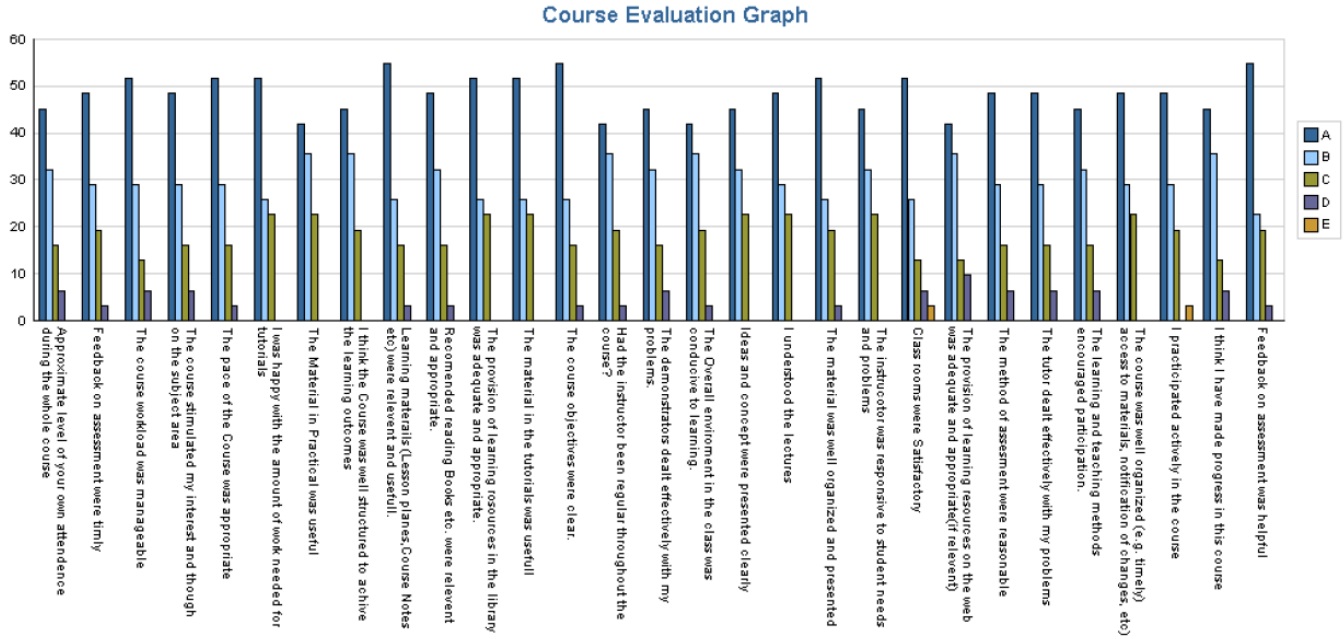


Teacher Name: Muhammad Mushtaq

Course Name: Biosystematics

Section: A M/E: M Semester# 3

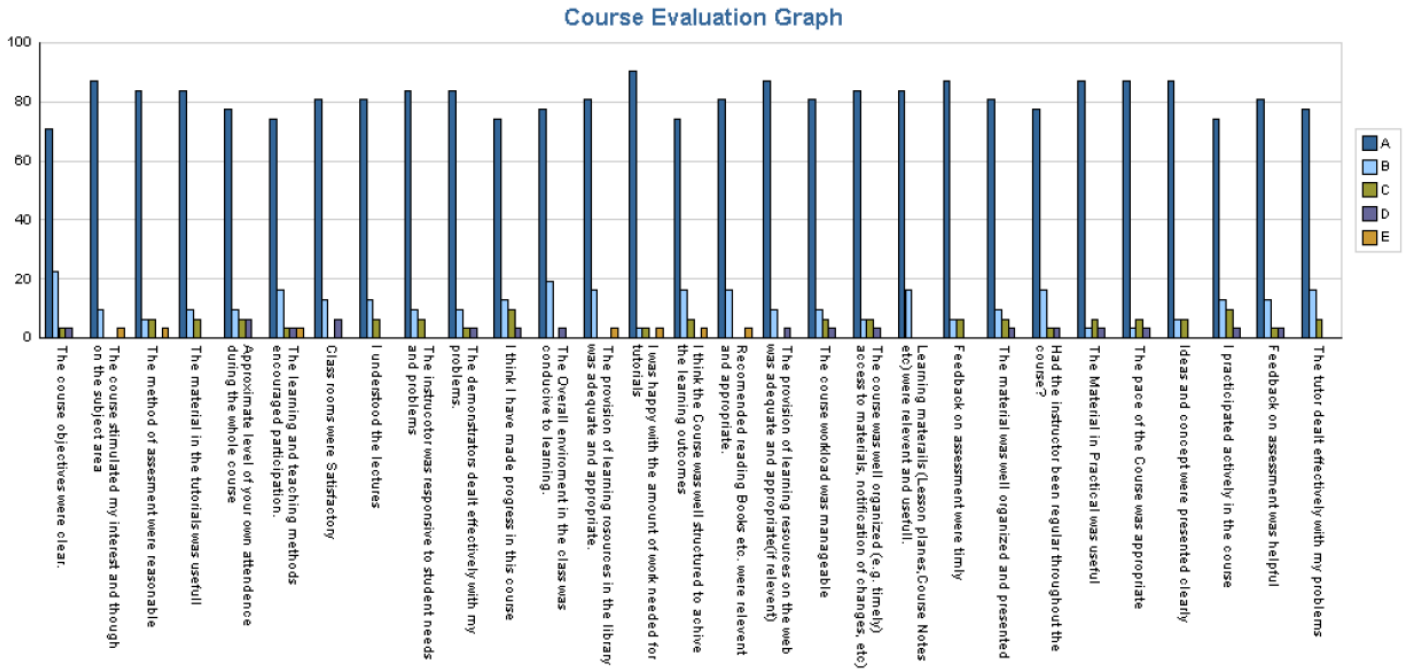
Class: M.Sc (Biology)



Course Name: Biosystematics

Section: B M/E: E Semester# 3

Class: M.Sc (Biology)

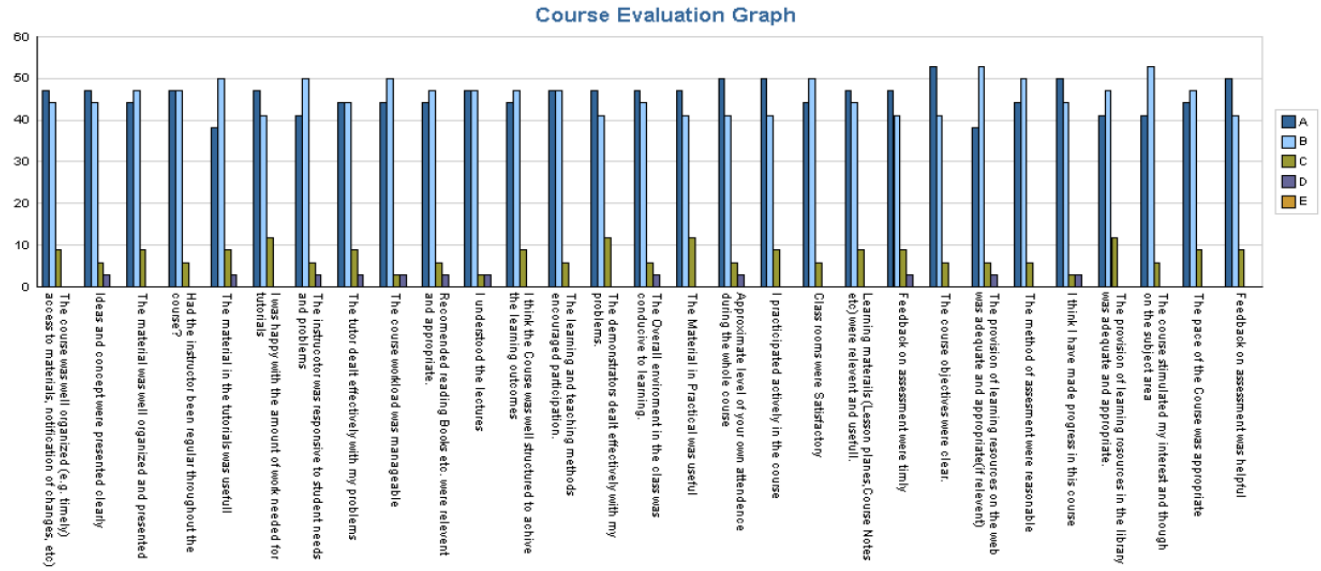


Teacher Name: Farhana Riaz Chaudhry

Course Name: Research Planning and Report Writing

Section: A M/E: M Semester# 3

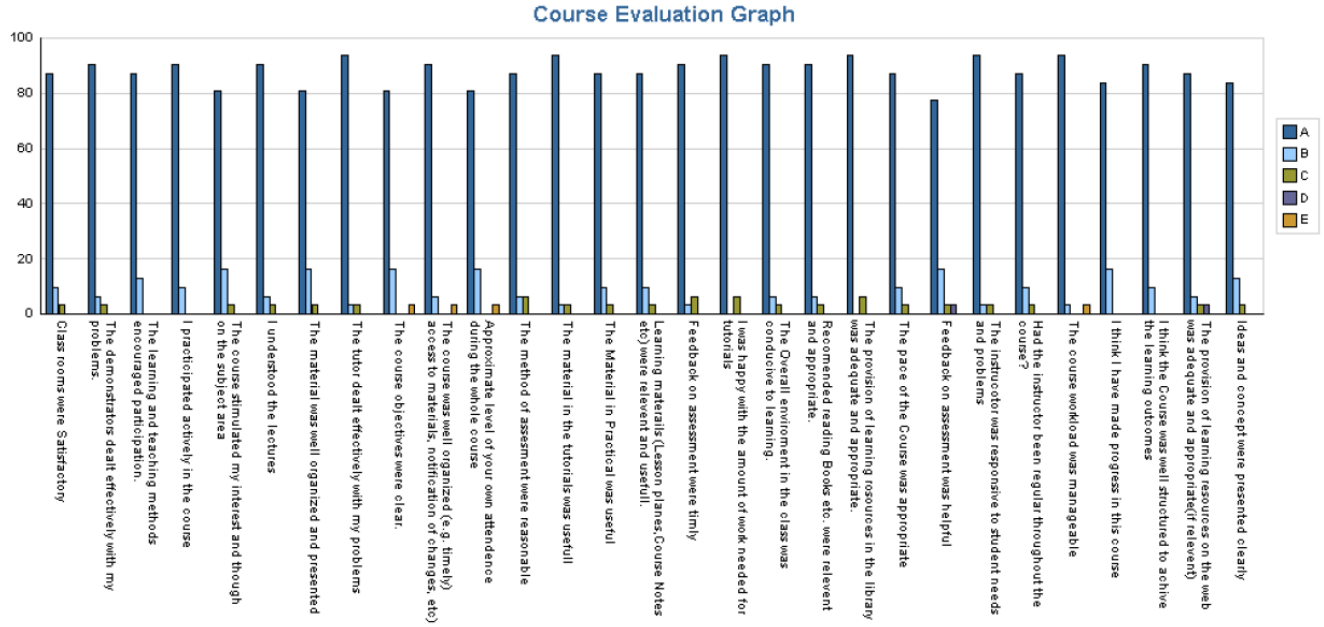
Class: M.Sc (Biology)



Course Name: Research Planning and Report Writing

Section: B M/E: E Semester# 3

Class: M.Sc (Biology)

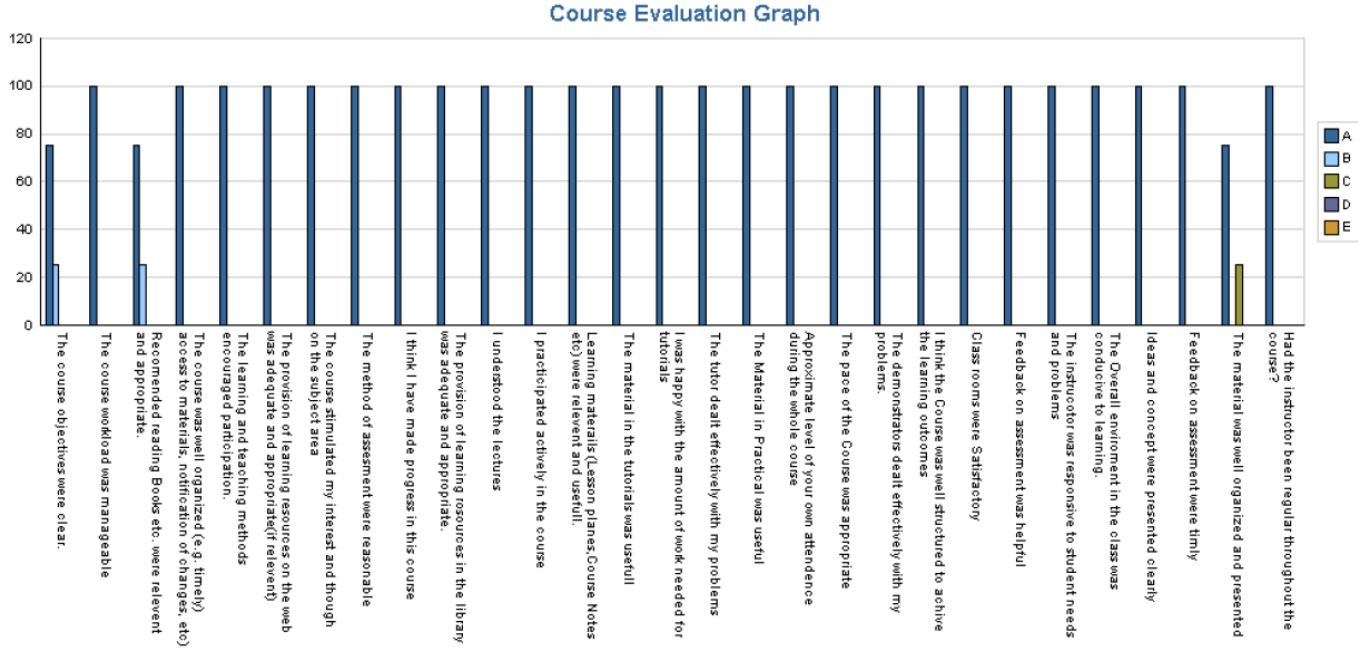


Teacher Name: Muhammad Sajid Nadeem

Course Name: Biodiversity

Section: A M/E: M Semester# 2

Class: M.Sc (Biology)

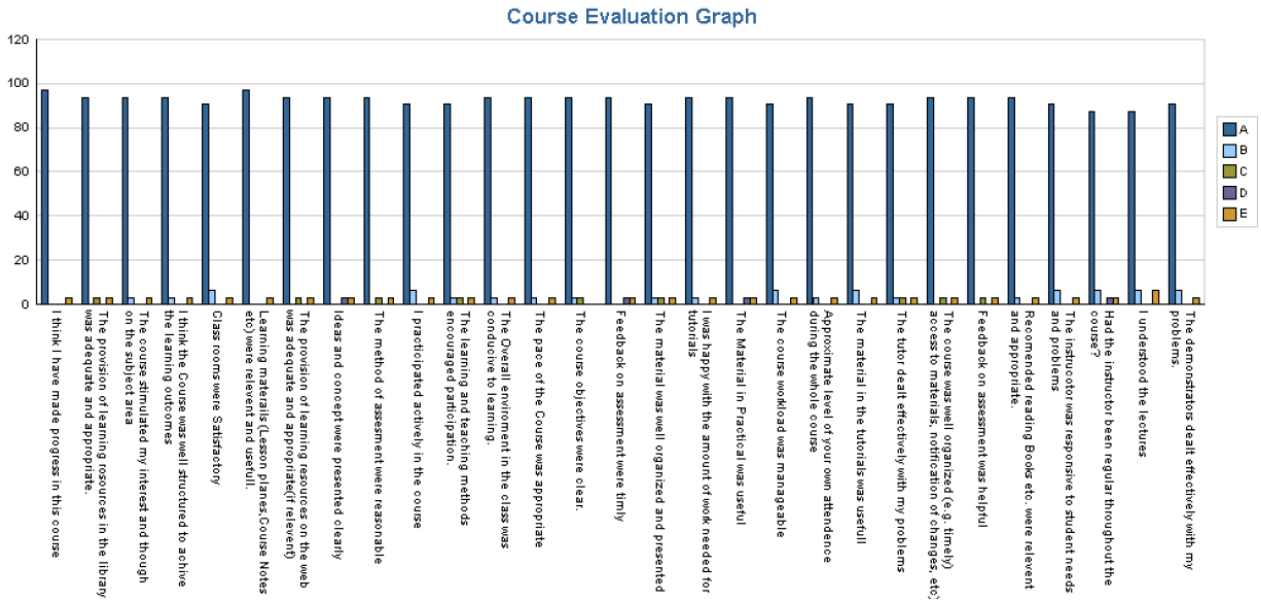


Teacher Name: Muhammad Zubair Anjum

Course Name: Fish Biology

Section: A M/E: M Semester# 4

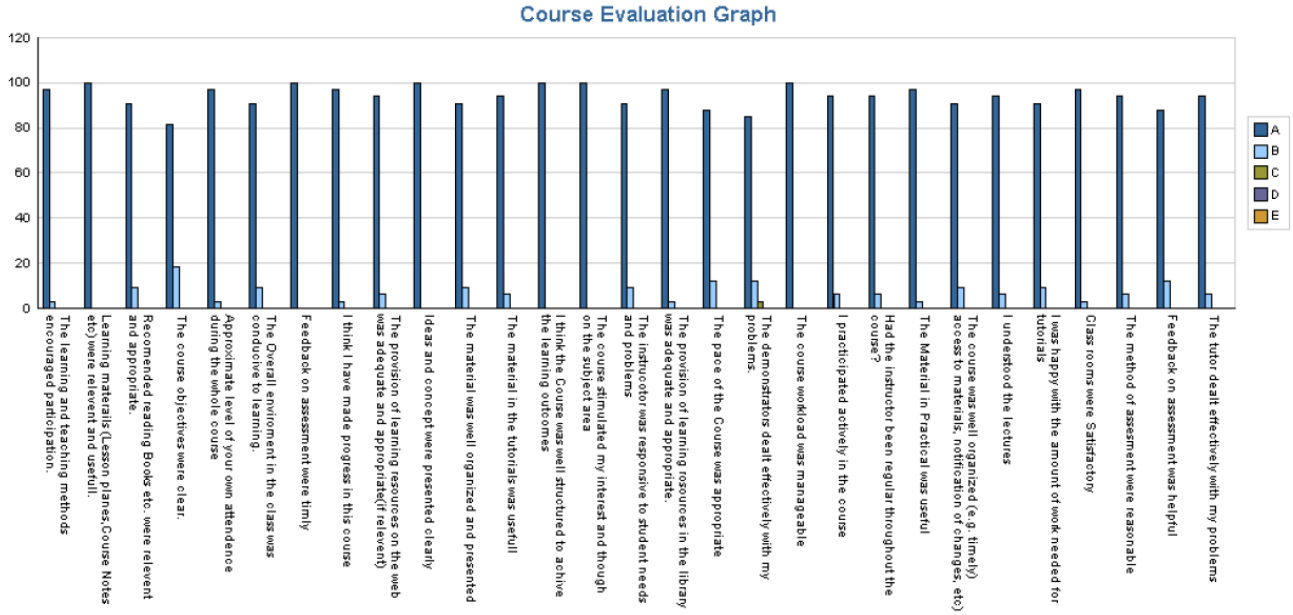
Class: M.Sc (Biology)



Course Name: Fish Biology

Section: B M/E: E Semester# 4

Class: M.Sc (Biology)

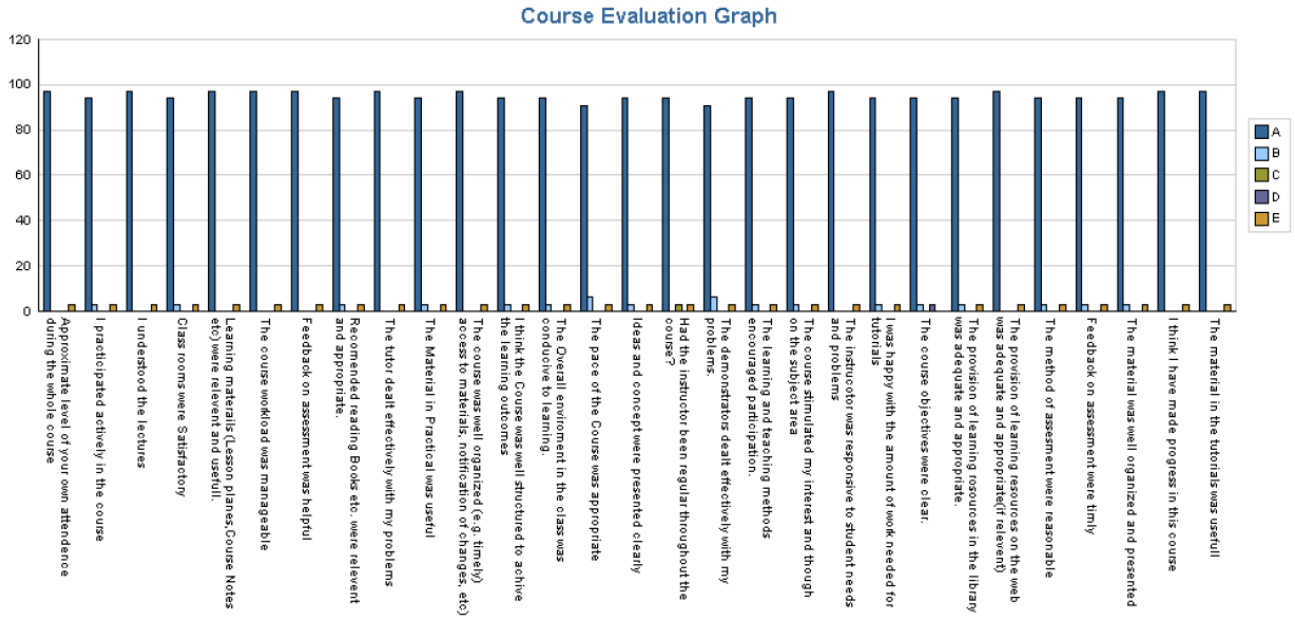


Teacher Name: Muhammad Irfan

Course Name: Physiological Systems of Animals

Section: A M/E: M Semester# 4

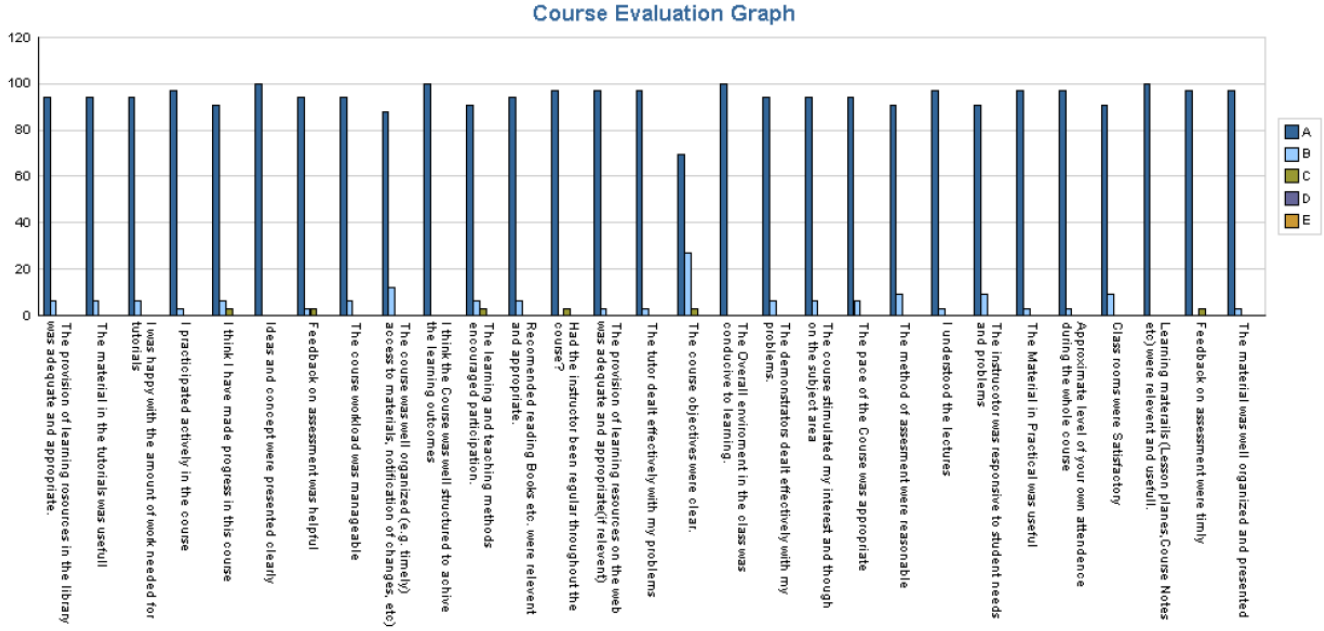
Class: M.Sc (Biology)



Course Name: Physiological Systems of Animals

Section: B M/E: E Semester# 4

Class: M.Sc (Biology)



Faculty Course Review Survey

The questionnaire for the evaluation has been filled and analyzed. The internal evaluation was done through with mid and final term examinations for all courses offered by the department.

Faculty Course Review Survey

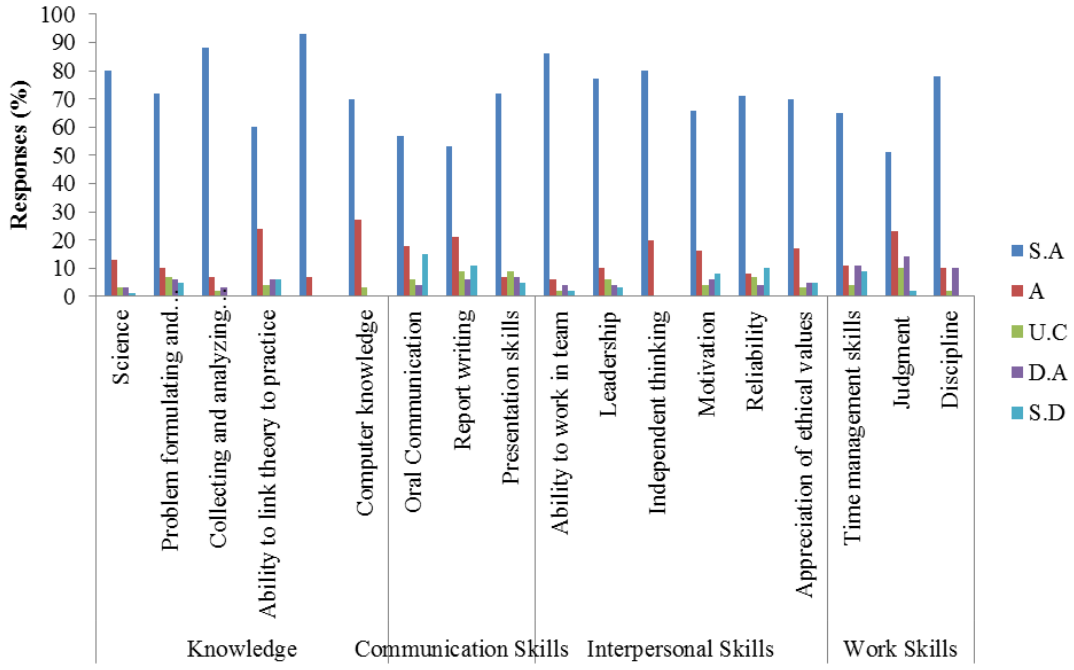
Code	Title	Credit value	Assesment method	No. of Students	Comments on curriculum	Any Change for future in course	Semester	Grades						Teacher
								A	B	C	D	E	F	
BIOL-702	Physiological System of Animals	3(2-2)	Mid/Final Exam	66	Appropriate	Not suggested	Spring	22	34	44	-	-	-	Dr. M. Irfan
BIOL-705	Evolutionary Biology	2(1-2)	Mid/Final Exam	66	Appropriate	Not suggested	Spring	67	29	4	0	0	0	Dr. Amjad Rashid Kayani
BIOL-709	Fundamental of Microbiology and Immunology	3(2-2)	Mid/Final Exam	62	Appropriate	Not suggested	Fall	62	26	12	0	0	0	Dr. Mazhar Qayyum
BIOL-711	Research Planning and Report Writing	3(1-4)	Mid/Final Exam	62	Appropriate	Not suggested	Fall	26	63	7	0	4	0	Dr. M. Irfan.
BIOL-725	Animal Reproductive Biology	3(2-2)	Mid/Final Exam	62	Appropriate	Not suggested	Fall	53	42	5	0	0	0	Dr. Shamim Akhtar
BIOL-721	Fish Biology	3(2-2)	Mid/Final Exam	66	Appropriate	Not suggested	Spring	21	66	9	2	2	0	Dr. M. Zubair Anjum
BIOL-711	Research Planning and Report Writing	3(1-4)	Mid/Final Exam	62	Appropriate	Not suggested	Fall	33	56	8	0	3	0	Dr. M. Irfan
BIOL-706	Biosystematics	4(3-2)	Mid/Final Exam	66	Appropriate	Not suggested	Spring	25	67	8	0	0	0	Dr. M. Mushtaq
BIOL-707	Biodiversity	4(3-2)	Mid/Final Exam	62	Appropriate	Not suggested	Fall	22	67	8	3	0	0	Dr. M. Sajid Nadeem

Research progress (2018-2020)

Name of Faculty Member	Journal Publications	Conference publication	Projects
Dr. Mazhar Qayyum	8	2	0
Dr. Shamim Akhtar	36	4	1
Dr. Muhammad Sajid Nadeem	12	2	1
Dr. Amjad Rashid Kiyani	4	-	0
Dr. M. Mushtaq	8	-	0
Dr. Abida Arshad	4	1	1
Dr. M. Zubair Anjum	4	5	1
Dr. Ruqia Mehmood Baig	7	1	2
Dr. Muhammad Irfan	14	1	1

ALUMNI SURVEY RESULTS

Feedback of students M. Sc. graduated was acquired through Proforma-7. Majority of the Alumni have rated the knowledge imparted by the department and career opportunities as excellent. Communication skills, interpersonal skills and management/ leadership skills have also been rated high, a mix of excellent & very good. Results of the survey are presented below.



Key: SA=Strongly Agree, A=Agree, UC=Uncertain, D=Disagree, SD=Strongly Disagree

Alumni Survey Results

General comments:

A course on museum biology is needed. Include latest study techniques. Improve taxonomy aspects. Department is doing excellent research work.

Career opportunities:

Job opportunity after getting this degree is there if study with dedication. Has a wide spectrum of employment in public and private colleges and scientific organizations.

SURVEY OF GRADUATING STUDENTS

Survey of graduating students was conducted through Performa 3. Students showed their satisfaction program effectiveness for enhancing team work, support for learning, meeting objectives of program and environment conducive for learning. Other aspects of the program have also been rated. They were dissatisfied only with infrastructure of department.

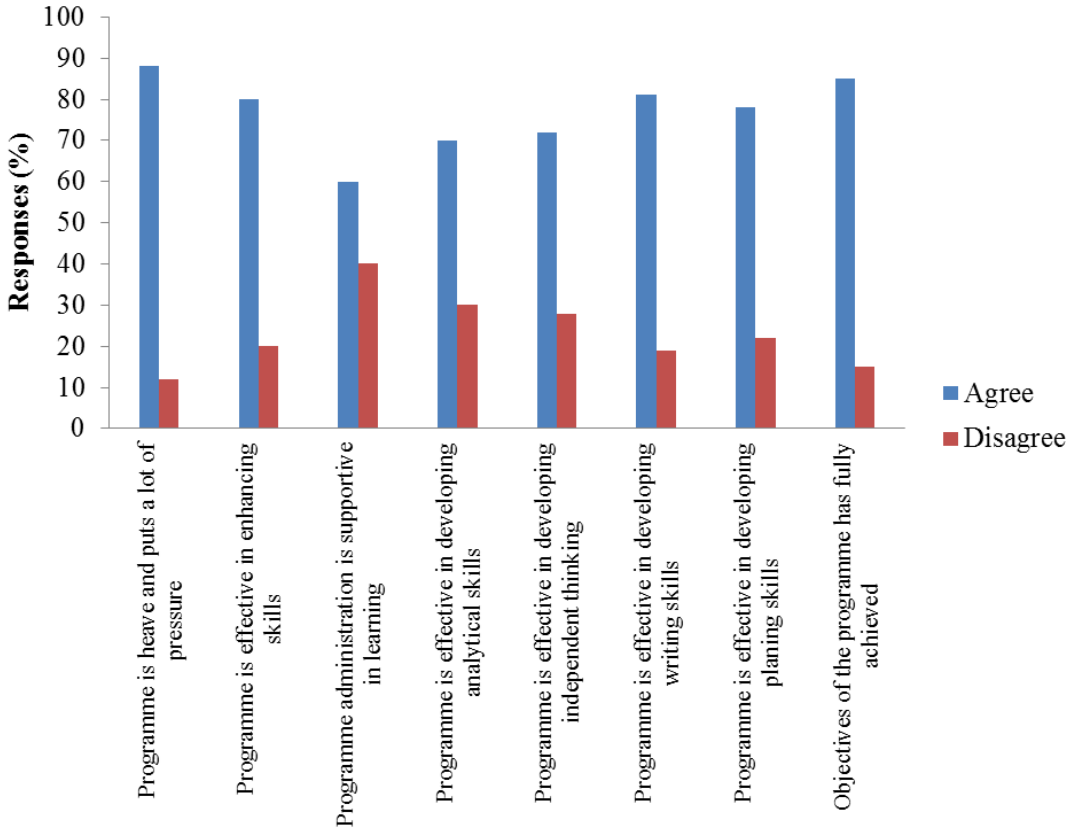


Fig.36 . Graduating student's survey results

Best aspects of the Program:

- Development of better working as a team
- Program is conducive and improved learning skills
- Confidence building, field work, research and writing abilities
- Enhanced writing, professional skills of

Aspects of Program in need of improvement:

- More study tours to natural areas
- Trained laboratory and field staff and own transport facility
- More research equipment/facilities in laboratories

RESEARCH STUDENTS PROGRESS REVIEW

As thesis research is not offered to M. Sc. students therefore, survey was not carried out for M.Sc. programme.

Results of Faculty Survey

The data generated as a result of faculty survey, most of the faculty themselves reported as very satisfied mentoring and administrative support, job security, support from the department, their progress through ranks. The least time availability to faculty to interact with their family is due to extra load on present teachers as some times of the faculty members proceed on training, workshops etc so the poor strength of remaining faculty in the campus has to bear out the load of course work and other assignments.

FACULTY SURVEY

	Dr. Abida Arshad	Dr.M. Mushtaq	Dr. Amjad Rashid	Dr. Shamim Akhtar	Dr. Zubair Anjum	Dr. Ruqia M. Baig	Dr. M. Irfan	Dr. Mazhar Qayyum	Dr. M. Sajid Nadeem
Your mix of research, teaching and community service	V. satisfied	V. satisfied	V. satisfied	V. satisfied	Satisfied	V. satisfied	V. satisfied	Satisfied	Satisfied
The intellectual stimulation of your work	Satisfied	V. satisfied	V. satisfied	V. satisfied	Satisfied	V. satisfied	Satisfied	V. satisfied	V. satisfied
Type of teaching / research you currently do	Satisfied	V. satisfied	V. satisfied	V. satisfied	Satisfied	V. satisfied	Satisfied	V. satisfied	V. satisfied
Your interaction with students.	Satisfied	V. satisfied	V. satisfied	Satisfied	Satisfied	Satisfied	Satisfied	V. satisfied	Satisfied
Cooperation you receive from colleagues	V. satisfied	Satisfied	V. satisfied	Satisfied	V. satisfied	Satisfied	Satisfied	Satisfied	Satisfied
The mentoring available to you.	Satisfied	Satisfied	V. satisfied	Satisfied	V. satisfied	Satisfied	Satisfied	Satisfied	Satisfied
Administrative support from the department	Satisfied	Satisfied	V. satisfied	V. satisfied	Satisfied	V. satisfied	Satisfied	Satisfied	Satisfied
Providing clarity about the faculty promotion process	Satisfied	Satisfied	V. satisfied	Satisfied	Satisfied	Satisfied	V. satisfied	Satisfied	V. satisfied
Your prospects for advancement and progress	V. satisfied	Satisfied	V. Statisfied	Satisfied	Satisfied	Satisfied	V. satisfied	Satisfied	Satisfied

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

Equipment such as ELISA reader, PCR machine, Ultra-centrifuge, Gamma Counter etc and multimedia are not available in the Department, therefore difficulties are being faced in advance research. Latest literature and reviews are hardly available. There is need for short teacher training to faculty members. Moreover, museum and animal house are lacking. Practical aspects of the courses are weak.

Major Future Improvement Plans

Practical classes are being taken to enhance practical skills. To develop labs equip fully with modern equipments for the advance research work and extend facilities of museum and animal house.

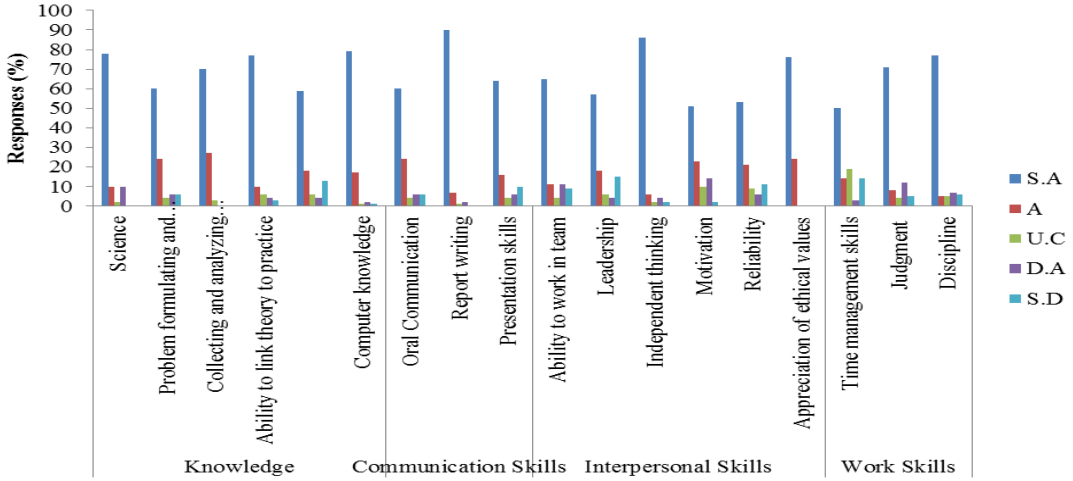
STANDARD 1-4: The department must assess its overall performance periodically using quantifiable measures.

Table-3: Quantitative assessment of the department

S. No.	Particulars	No.	Remarks
1	M. Sc degree awarded	~140	Every year 70 students get enrolled most of them acquire degree and join different institutes for higher degree while other got employment in various fields.
4	Students: Faculty (ratio)	17:1	
5	Technical: non technical (ratio)	4:1	
6	Average grade point	4	

EMPLOYER SURVEY

According to employers, the students have excellent knowledge of science, employers agreed that candidates have excellent power of problem formulation and solving skills, and have great ability of oral communication and are reliable and ethically sound. Employers showed a severe concern about computer skills of the candidates.



Key: SA=Strongly Agree, A=Agree, UC=Uncertain, D=Disagree, SD=Strongly Disagree

SECTION 2

CRITERION-2: CURRICULUM DESIGN AND ORGANIZATION

Curriculum design and update is initiated by the faculty members of the Department after the approval of Board of Studies which is comprised of senior faculty members and subject specialist who is taken from other faculties or from other Universities or research Institutions. It is headed by the Chairman of the Department. The approved curriculum is then sent to Board of Faculty, headed by the Dean Faculty of Sciences. This Board consist senior faculty members from all the Departments of the faculty and subject specialists. Finally the curriculum is presented before the Academic Council which is comprised of the Professor, Associate Professor, Faculty Representatives and very senior subject specialists.

Degree Title:

M. Sc. Biology

Definition of Credit Hour:

One credit hour is one theory lecture or two hours laboratory (practical / week). One credit hour carries 20 marks. A semester is of 18 weeks.

Degree Plan:

M.Sc: Consists of 4 semesters/2 years. 64credit hours course work.

Pre-requisites

Academic Requirements:

A person holding B.Sc. with Zoology or equivalent degree from any recognized institute with at least second division or 2.5/4CGPA is eligible to get admission. Merit is determined by B. Sc. Marks

Degree Requirements:

Degrees are awarded after completing the required 64 credit hours (courses). Minimum Grade Point Average for obtaining the degree is 2.50/4.00 CGPA.

Examination

In course work, student's evaluation is done by mid-term examination, assignments/quizzes and final examination. A student, who misses the mid-term examination, is not allowed a make-up examination and is awarded zero marks in that examination. In case a student does not appear in the final examination of a course, he shall be deemed to have failed in that course. In theory, weightage to each component of examination is as prescribed here under: The qualification marks for each examination is 40%. .

Mid Examination	30%
Assignments	10%
Final Examination	60%

For practical examination (if applicable) 100% is given to practical as scored final examination. A student is eligible to sit for the examination provided that he/she has attended not less than 75% of the classes in theory and practical, separately.

Courses:

M. Sc Biology		
Course No.	**Course Title**	***Credit Hours***
Major Courses		
BIOL-701	Cellular Biology	3(2-2)
BIOL-704	Environmental Biology	3(2-2)
BIOL-706	Biosystematics	4(3-2)
BIOL-708	Economic Biology	4(3-2)
BIOL-709	Fundamental of Microbiology and Immunology	3(2-2)
BIOL-711	Research Planning and Report Writing	3(1-4)
BIOL-712	Principles of Biotechnology	3(2-2)
BIOL-720	Seminar-I	1(1-0)
BIOL-725	Animal Reproductive Biology	3(2-2)
BIOL-728	Concept of Genetics	3(2-2)
BIOL-702	Physiological Systems of Animal	3(2-2)
BIOL-703	Plant Physiology	3(2-2)
BIOL-704	Environmental Biology	3(2-2)
BIOL-705	Evolutionary Biology	2(2-0)
BIOL-707	Biodiversity	4(3-2)
BIOL-709	Fundamentals of Microbiology and Immunology	3(2-2)
BIOL-710	Mycology and Plant Pathology	3(2-2)
BIOL-712	Principles of Biotechnology	3(2-2)
BIOL-722	Host/Parasite Interactions in Animals	3(2-2)
BIOL-723	Immunology	3(2-2)
BIOL-726	Pathophysiology	3(2-2)
BIOL-729	General Pharmacology	3(2-2)

STANDARD 2-1: The curriculum must be consistent and supports the program's documented objectives

	Objectives	
Courses	**1**	**2**
BIOL-702	***	**
BIOL-706	***	**
BIOL-709	**	**
BIOL-711	***	**
BIOL-712	**	***
BIOL-725	**	***
BIOL-705	***	**
BIOL-709	**	***
BIOL-721		

Highly Satisfactory	***
Satisfactory	**
Not satisfactory	*

STANDARD 2-2: ELEMENTS *VS* COURSES

Elements	Biology Courses
Theoretical background	BIOL – 701, BIOL – 702, BIOL – 703, BIOL – 704, BIOL – 705, BIOL – 706, BIOL – 707, BIOL – 708, BIOL – 709, BIOL – 710, , BIOL – 712, BIOL – 713, BIOL – 714, BIOL – 715, BIOL – 716, BIOL – 717, BIOL – 718, , BIOL – 720, BIOL – 721, BIOL – 722,BIOL – 723, BIOL – 724, BIOL – 725, BIOL – 726,BIOL – 727,BIOL – 728, BIOL – 729,
Problem analysis	BIOL -711, BIOL – 720, BIOL – 719
Solution Design	BIOL -711

STANDARD 2-3:

The curriculum is designed and offered according to the requirements of HEC. There are compulsory basic and advance courses along with an applied course of statistics. Students have to take a minimum 64 credit hours courses

STANDARD 2-4:

Higher Education Commission (HEC) course work of 64 credit hours

Program	Credit hours/semester	Total Credit hours	Theory	Practical
M. Sc.	16	64	40	24

STANDARD 2-5:

Courses being offered are highly informative and fulfilling the requirements but most of the courses are of basic nature and only one or two are applied.

STANDARD 2-6:

There is deficiency of information technology related courses but some activities and courses in program are useful to give basic training of computer use.

S. No.	Course No.	How applied and integrated through out the program
1	BIOL-711	Research planning and report writing require the basic knowledge of computer sciences. It urges the students to learn basic use of computer
2	BIOL-720	Seminar preparation requires the basic knowledge of computer sciences. It urges the students to learn basic use of computer
Note: Programs include some minor courses of statistics (STAT-700, STAT-701, STAT-702), which enhances the skills to use statistical software.		

STANDARD 2-7:

Two seminars of one credit hour each are compulsory at the M.Sc. level. Moreover, students have to defend their research report. Assignments are given to M.Sc. students on specific titles (part of the course) which are presented orally and given as written report (assignments) by the students which have increased their oral and written communication skills.

S. No.	Course No.	How applied and integrated through out the program
1	BIOL-720	A seminars of one credit hour each are compulsory at the M.Sc. level during course work
2	Courses presentations/assignments	During course work a presentation/assignment is obligatory for each course
3	Synopsis formation	Before commencing research in open forum
4	Poster presentation	After report writing in open forum

SECTION-3

CRITERION-3: LABORATORIES AND COMPUTING FACILITIES

Laboratory Title:

1. Microbiology and Parasitology laboratory
2. Reproductive Physiology/Endocrinology laboratory
3. Wildlife & Biodiversity laboratory
4. Animal Physiology laboratory
5. Fisheries laboratory

Location and Area:

Faculty of Sciences, D-Block, 2nd Floor, New Academic Block and area of each laboratory is 450 square feet

Objectives:

Laboratories are used for:

1. Practical exercise and demonstrations to graduate students in their introductory and major courses
2. Research work for the Post-graduate students
3. Used for implementing the funded projects by the University, HEC, PSF, PARC and other agencies.
4. Laboratories are well specious and adequate.

Major apparatus/equipment:

Microscopes, autoclave, incubator, deep freezer, refrigerators, laminar flow cabinet, pH meter, elective balance, slide and overhead projectors, shaker, hitter, pipettes are present but

some are out dated and out of order. Centrifuge (slow and ultra), PAG-Electrophorsis apparition, PCR Spectrophotometer. Moreover, department requires an animal house and a museum

Safely Regulations:

Safety measures are not available against fire (Extinguishers), minor hazards and accidents, injuries (First Aid Kit). However, the University maintains a Medical Dispensary for such incidents.

STANDARD-3.1: LABORATORY MANUALS:

- Laboratory manuals of each subject (Microbiology and Parasitology, Reproductive Physiology, Wildlife & Biodiversity, Animal Physiology) are not available. The department has no library at all. However, individual teachers have their books.

STANDARD-3.2: SUPPORT/LABORATORY PERSONAL FOR MAINTENANCE OF LABORATORY

Laboratories are maintained by only one laboratory assistant (equipment, glassware, chemicals, material etc). A laboratory attendant assists the students in practicals, cleaning and washing.

STANDARD-3.3:COMPUTING INFRASTRUCTURE AND FACILITIES

- ***Computer facilities:*** Available to all faculty members and the post graduate students
- ***Safety arrangements*****:** The labs have no exhaust fan. No first aid kits/facilities provided in the laboratories/department.

SECTION-4

CRITERION 4: STUDENT SUPPORT AND ADVISING

The university organizes support programs and provide information regarding admission, scholarship schemes etc. Department in its own capacity arrange orientation and guided tours of department.

STANDARD-4.1: FREQUENCY OF COURSES

- Courses are taught as per criteria laid down by HEC.
- Courses are offered according to the scheme of study approved by Academic Council and courses are offered as per the availability and expertise of the teachers.
- Elective courses are offered according to the policy of the university.
- For postgraduate programs, a variety of courses are offered according to demand of the profession.

STANDARD-4.2: STRUCTURE OF THE COURSES

Theoretical as well as practical aspects are focused in designing the courses. Theoretical problems are explained and assignments are also given to the students. Practical are carried out in the labs as well as in the field. Field visits to related research organizations are also organized for the awareness of the students about the latest developments in the area and to stimulate them for discussion and teacher/student interaction.

- Board of Studies approved the course contents
- Faculty members interact frequently to the students to solve their problems. Students are always welcome to ask questions in class rooms and teachers are also available even after the classes.

STANDARD-4.3: GUIDANCE TO THE STUDENTS

Following steps have been taken for the guidance of the students:

1. Information about the program requirements are provided to the students through the office of the head of the department.
2. Through the personal communication of the teachers with the students
3. Students can also contact with relevant teachers whenever they face any professional problem.
4. Students can interact with the teachers/scientists in the universities or research organization according to their requirement and there is open option for the students to get the membership in the professional societies like Pakistan Zoological Society and other relevant professional societies.

SECTION-5

CRITERION-5: PROCESS CONTROL

It includes student admission, student's registration, faulty requirement activities which are dealt by various statutory bodies and the university administration.

STANDARD-5.1: PROGRAM ADMISSION CRITERIA

- The admission advertisement is given in the National Papers by the Registrar office. The criteria and rules of the admission are followed set by the University.
- Admission criteria may be revised every year before the announcement of admissions

STANDARD-5.2: PROCESS OF REGISTRATION

- The student's name, after completion of the admission process, is forwarded to the Registrar Office for proper registration in the specific program and the registration numbers are issued to the students.
- Students are evaluated through Mid, Final and Practical exams and through assignments
- Registration is done for one time for each degree but evaluation is done through the result of each semester. If the students fulfill the criteria of the university they are promoted to the next semester.
- In general, the students are registered on competition bases keeping in view the academic and research standards.

STANDARD-5.3: RECRUITING PROCESS FOR FACULTY

Recruitment policy developed by the university is according to HEC rules.

Induction of all posts is done as per rule:

- Vacant and newly created positions are advertised in the National newspapers, applications are received by the Registrar office, call letters are issued to the short –listed candidates on the basis of experience, qualification, publications and other qualities/activities as per rules of the university

- The candidates are interviewed by the University Selection Board, principal and alternate candidates are selected.
- Selection of candidates is further approved by the Syndicate and then candidates are invited to join the university within a specified period.
- Induction of new candidates depends upon the number of approved vacancies.
- At present, no procedure exists for retaining highly qualified faculty members. However, the revised pay scales of structure is quite attractive
- HEC also supports appointments of highly qualified members as foreign faculty Professors, National Professors and deputes them in various departments of the university.

STANDARD-5.4: TEACHING AND DELIVERY OF COURSE MATERIAL

- The department revises the curriculum time to time depending upon the requirements, innovations and new technology to enhance the high quality teaching.
- With the emergence of new fields, new courses are designed and included in the scheme of study
- Students usually purchase low price editions books. Very few related books are also available in the university library, where documentation, copying and internet facilities are available.
- Some teachers also provides notes to the students
- Most of the lectures are supplemented by overhead, slides and pictures
- All efforts are made that courses and knowledge imparted meet the objectives and outcome. The progress is regularly reviewed in the staff meetings.

STANDARD-5.5: COMPLETION OF PROGRAM REQUIREMENTS

The controller of examinations announces the date of commencement of examination. After ~20-30 days of the examinations, the controller office notifies the results of the students. The evaluation procedure consists of mid and final examinations,

practical formulas, assignments and reports, oral and technical presentations. Candidates who secure 80% or more marks are awarded grade A. Gold medals are awarded to the students who secure highest marks. Degrees are awarded to the students on the annual convocation that is held every year.

SECTION-6

CRITERION-6: FACULTY: Standard 6.1: Full Time Faculty

Name	Designation	Qualification	Country Awarding Degree	Date of Birth	E-mail Address
Dr. MazharQayyum	Professor	Ph.D.	Pakistan	7.6.1963	Mazhar_dr@yahoo.com
Dr. ShamimAkhtar	Professor	Ph. D	Pakistan	13.06.1964	sashraf1993@yahoo.com
Dr. Muhammad SajidNadeem	Associate Professor	Ph. D	Pakistan	04.04.1970	sajidnm@hotmail.com
Dr. Amjad Rashid Kiyani	Assistant Professor	Ph. D	UK	28-3-1966	ark120106@yahoo.co.uk
Dr. Muhammad Mushtaq	Assistant Professor	Ph. D	Pakistan	10.12.1970	mushtaq@uaar.edu.pk
Dr. M. ZubairAnjum	Assistant Professor	Ph. D	Austria	9-3-1978	zubair.anjum@uaar.edu.pk
Dr. AbidaArshad	Assistant Professor	Ph. D	China	23-03-1977	abida.arshad6@gmail.com
Dr. RuqiaMehmoodBaig	Lecturer	Ph. D	Pakistan	7-8-1983	dr.ruqia@uaar.edu.pk
Dr. Muhammad Irfan	Assistant Professor	Ph. D. student	Pakistan	16.02.1984	Muhammadirfan11@gmail.com

Table.4.7 Faculty Distribution by Program Areas in Biology

Program area of specialization	Courses in the area and average number sections per year	Number of faculty members in each area	Number of faculty with Ph. D degree
Microbiology/Parasitology	7	2	2
Wildlife	6	2	2
Biodiversity	2	1	1
Reproductive physiology	2	1	1
Endocrinology/Genetics	4	3	2

STANDARD 6.2: EFFECTIVE PROGRAMS FOR FACULTY DEVELOPMENT

1. Professional training and availability of adequate research and academic facilities are not provided according to the faculty members
2. Library facility is insufficient as no latest subject books are available.

STANDARD-6.3: FACULTY MEMBER MOTIVATION

- Time to time provision of enthusiasm to the young faculty by the senior faculty members.

SECTION-7

CRITERION-7: INSTITUTIONAL FACILITIES

INSTITUTIONAL FACILITIES

The institution is working toward acquisition of infrastructure to support new trends in learning such as e-learning

- Electronic library books and journals are available for learning purpose.
- Facilities regarding the infrastructure to support new trends in learning are being provided

However, the library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personal.

- Insufficient library's technical collection of books
- Recommended books, relevant journals of the programs are not available to the students.

Classrooms and offices must be equipped with multimedia and air conditioners and working places of faculty must be adequate to enable them to carry out their responsibilities.

STANDARD-7.1: INFRASTRUCTURE

The faculty is provided with laptops under the Chief Minister Punjab scheme which is very helpful to assess e-resources for the high quality education and producing research of international standard. However, telephone sets/connections are not present.

STANDARD-7.2: LIBRARY FACILITIES

The Central Library being a small library has sufficient space, but less number of books, journals and periodicals with no catalogue frameworks. The department itself does not have a library.

STANDARD-7.3: CLASS ROOM AND FACULTY OFFICES

At present only two class rooms are available for all the degree programs being offered. Rooms are equipped with white boards and lacking multimedia. The learning environment is not conducive being very cold in winter and very hot in summer. No heater and air conditioner is installed in class rooms, labs and offices. Two to three teachers are sharing an office.

SECTION-8

CRITERION-8: INSTITUTIONAL SUPPORT

The university authorities are responsive and trying their best to facilitate academic and research activities of the department. The administration is keen for promoting and establishing research culture by appointing highly qualified faculty.

INTSTITUTIONAL SUPPORT:

The working places for faculty are inadequate as two to four teachers share a small office. Moreover, being on the second floor, offices are not usually comfortable in hot or cold weather.

STANDARD-8-1: SUPPORT AND FINANCIAL RESOURCES

The department does not have enough funds to support a single PhD research student. However, the individual research grants for faculty are mainly supporting the departmental research activities. It is needed to increase the financial resources of the department to support research and academic activities.

STANDARD-8-2: HIGH QUALITY RESEARCH SCHOLARS

Research Assistants	M.Sc. Students
4	140

Faculty to M. Sc. student ratio is 1:15

STANDARD-8-3: FINANCIAL RESOURCES

The total budget of the Department of Biology for the financial year 2018-20 is insufficient for the purchase of equipment, chemicals etc.

SECTION-8

SUMMARY

The Department of Zoology/Biology was established in 1996 and is offering M. Sc. Degree in Biology since 1996. The department offeres anuall merit based admissions with a minimum requirement of second devision B.Sc. degree in Botany and Zoology. Graduates get equipped with key ideas of Biology, and get mindful of the degree and the subject. The students are pushed to learn solution of theoretical as well as practical problems in the science particularly in the Biology. The department and university are keen to maintain the quality of education and research. In this regard, the performance of departmental staff and evaluation of programs run by department is done on semester basis. The survey of course evaluation, teacher evaluation, alumni survey, research/graduating students surveys and faculty survey have been done. The data showed that students are satisfied with the teaching methods, level of knowledge and marking in examination. According to course survey students are highly satisfied by workload and quality of information they are getting during program. Faculty and students are satisfied with working environment and published more than 100 research articles in journals of repute. During 2018-2020, faculty won 11 research projects. Faculty has some concerns over workload. In conclusion program is effective overall and meeting its purpose. However, there are few issues of lacking equipment for practical purposes.

Annex-1

List of courses offered

M. Sc Biology		
Course No.	**Course Title**	***Credit Hours***
Major Courses		
BIOL-701	Cellular Biology	3(2-2)
BIOL-704	Environmental Biology	3(2-2)
BIOL-706	Biosystematics	4(3-2)
BIOL-708	Economic Biology	4(3-2)
BIOL-709	Fundamental of Microbiology and Immunology	3(2-2)
BIOL-711	Research Planning and Report Writing	3(1-4)
BIOL-712	Principles of Biotechnology	3(2-2)
BIOL-720	Seminar-I	1(1-0)
BIOL-725	Animal Reproductive Biology	3(2-2)
BIOL-728	Concept of Genetics	3(2-2)
BIOL-702	Physiological Systems of Animal	3(2-2)
BIOL-703	Plant Physiology	3(2-2)
BIOL-704	Environmental Biology	3(2-2)
BIOL-705	Evolutionary Biology	2(2-0)
BIOL-707	Biodiversity	4(3-2)
BIOL-709	Fundamentals of Microbiology and Immunology	3(2-2)
BIOL-710	Mycology and Plant Pathology	3(2-2)
BIOL-712	Principles of Biotechnology	3(2-2)
BIOL-722	Host/Parasite Interactions in Animals	3(2-2)
BIOL-723	Immunology	3(2-2)
BIOL-726	Pathophysiology	3(2-2)
BIOL-729	General Pharmacology	3(2-2)

Annex-ii

FACULTY RESUMES
1. CURRICULUM VITAE

1. Personal Data

Name: Dr. Shamim Akhtar

Present Address: Professor,

Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi, Pakistan.

Telephone:

E-mail **sashraf1993@gmail.com**

2. Academic Qualification

1.	**Ph.D. (Zoology)**	University of Arid Agriculture, Rawalpindi	**2006**
2	**M.Phil. (Zoology)**	University of Agriculture, Faisalabad.	**1991**
3	**M.Sc. (Zoology)**	University of Agriculture, Faisalabad.	**1987**
4	**B.Sc (Zool, Bot, Chem)**	University of the Punjab, Lahore	**1985**
	Post Doctoral Fellowship :	Commonwealth Post Doctoral Fellowship at "The Royal Veterinary College, University of London, UK. 2009	

3. Area of Specialization: Reproductive Physiology

4. **HEC approved supervisor**

5. **Professional Experience** (Research and Teaching): 15 years

6. Fellowship/Membership of Professional Associations/Societies: 02

7. Research Projects; Completed=06; ongoing=01

8. Participation in Conferences/Workshops: 20

9. Supervision of Post-Graduate Theses: a) Ph.D.:1; b) M.Phil.: 23; M.Sc. 20.

10: International collaborations = Three institutes/universities

11. **Publications**

Publications during reported period (2018-2020)

PUBLICAIONS IN JOURNALS (INTERNATIONAL)

1. R. Ishaq, M. S. Ansari, B. A. Rakha, S. Qadeer, S. Akhter. 2019. Evaluation of Enrofloxacin for Use in Cryopreservation of Zebu Bull (Bosindicus) Semen. BIOPRESERVATION AND BIOBANKING.DOI: 10.1089/bio.2018.0133

2. Ansari, M.S., B. A. Rakha, S. Akhter, E. Blesbois, and J. Santiago-Moreno. 2019. Effect of Cryopreservation on Lipid Peroxidation, Antioxidant Potential, Chromatin Integrity, and Mitochondrial Activity of Indian Red Jungle Fowl (Gallus gallusmurghi) Semen. BIOPRESERVATION AND BIOBANKING. DOI: 10.1089/bio.2018.0111

3. Rakha, B. A., M. S. Ansari, S. Akhter, S. Moreno, E. Blesbois. 2018. Use of dimethylsulfoxide for semen cryopreservation of Indian red jungle fowl (Gallus gallusmurghi). Theriogenology, 122:61-67.

4. Akhter, S., B.A. Rakha, M.S. Ansari, S. Iqbal, M. Khalid. 2018. Evaluation of pigeon egg yolk for post thaw quality, enzyme leakage and fertility of buffalo (Bubalusbubalis) bull spermatozoa. Theriogenology, 119:137-142

5. Rakha, B. A., M. S. Ansari, ShamimAkhter, E. Blesbois. 2018. Cryoprotectant effects of egg yolk on Indian red jungle fowl (Gallus gallusmurghi) sperm. Theriogenology. 119:150-155

6. Awan, M. A., S. Akhter A. U. Husna, M. S. Ansari, B. A. Rakha, A. Azam, S. Qadeer. 2018. Antioxidant activity of Nigella sativa Seeds AqueousExtract and its use for Cryopreservation of Buffalo Spermatozoa. Andrologia. DOI: 10.1111/and.13020

7. Rakha, B. A., M. S. Ansari, ShamimAkhter, E. Blesbois. 2018. Cryoprotective effect of glycerol concentrations on Indian red jungle fowl (Gallus gallusmurghi) spermatozoa. Avian Biology Research. 11: 80-88.

8. Khan, M.Q., M. Z. Anjum, S. Akhter, I. Khattak, M. Adnan & A. Ali. Diet Composition and Seasonal Fluctuations in the Feeding Habit of Snow Barbel (Schizothoraxplagiostomus) in River Indus, Pakistan. Acta Scientiae Veterinariae, 2018. 46: 1550.

9. Shafique, R.H., S. Akhter, S. Abbas, M. Ismail. 2018. Sensitivity to house dust mite allergens and prevalence of allergy causing house dust mite species in Pothwar, Pakistan. ExpApplAcarol ,74:415-426

10. Majeed Z. Ajab Z, Zuberi A, Akther S, Muhammad A. 2018. Meristic variations and skeletal deformities in natural population of mahseer fish, Tor putitora (Hamilton, 1822), Iranian Journal of Fisheries Sciences, 17: 208-216**.**

2. CURRICULUM VITAE

1. Personal Data

Name: Dr. Mazhar Qayyum

Present Address: Professor,

Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi, Pakistan.

Telephone 051-9062267

E-mail mazhar_dr@yahoo.com

2. Academic Qualification

DEGREE	YEAR	SUBJECTS	INSTITUTIONS
Post Doctorate	2003	Parasitology	Louisiana State University, USA
Ph.D	1997	Parasitology	Quaid-I-AzamUniversity,Islamabad, Pakistan
M.Phil	1991	Parasitology	Quaid-I-AzamUniversity,Islamabad, Pakistan
M.Sc	1989	Biology (Animal Sciences)	Quaid-I-AzamUniversity (Animal Sciences), Islamabad, Pakistan

3. Area of Specialization: Parasitology

4. **HEC approved supervisor**

5. **Professional Experience** (Research and Teaching): 19 years

6. Fellowship/Membership of Professional Associations/Societies: 03

7. Research Projects; Completed=04

8. Participation in Conferences/Workshops: 20

9. Supervision of Post-Graduate Theses: a) Ph.D.:10; b)M.Phil.: 23.; M. Sc. 13

10. **Publications**

Papers Published in Peer Reviewed Journals: 8

Publications during reported period (2018-2020)

KIRAN AFSHAN, SARWAT JAHAN AND MAZHAR QAYYUM. 2017. Assessing the Validity of Fasciola hepatica ELISA Test for Immunodiagnosis of Small Ruminant Fasciolosis in Pothwar Region, Pakistan. Pakistan J. Zoology. 49 (2): 1-5.

REHANA BIBI, KIRAN AFSHAN, IMTIAZ AHMAD KHAN, ZUBARIA IQBAL, AMJAD RASHID KAYAN , MUHAMMAD MUSHTAQ, MUHAMMAD IRFAN, MAZHAR QAYYUM AND MOHAMMAD FAROOQUE HASSAN. 2017. Phenotyping and Prevalence of Haemonchuscontortus (Nematoda: Trichostongylidae) in Ruminants from Endemic Areas of Pakistan: Influence of Host Species and Geographical Area on Phenotypic Traits of Worms. Pakistan. Pak. Vet. J. 37(2): 170-174. (IF=1.3).

SADAF IJAZ MALIK, KIRAN AFSHAN AND MAZHAR QAYYUM. 2017.Phenotyping of Amphistomes, and Pathological, Hematological and Bile Biochemical Response to Gigantocotyleexplanatum Infection in Buffaloes. Pakistan J. Zoology. 49 (2): 979-987.

MISBAH RIAZ, QAISER MANSOOR, MALEEHA AKRAM, MUHAMMAD ISMAIL, PARVEEN AKHTAR, SHAKEEL MIRZA, MAZHAR QAYYUM, AFZAAL AHMED NASEEM, FAHEEM TAHIR AND SYED SHAKEEL RAZA RIZVI. 2017. A novel mutation Ser34Phe in GNRHR causes hypogonadotropichypogonadism during pubertal development in boys. Pakistan J. Zoology. 49 (1): 211-217.

AFZAAL AHMAD NASEEM, MALEEHA AKRAM, SARWAT JAHAN, KIRAN AFSHAN, ZUBARIA IQBAL, FAHEEM TAHIR, MAZHAR QAYYUM AND SYED SHAKEEL RAZA RIZVI. 2017. Age and developmental stage dependent changes in plasma concentrations of growth hormone and testosterone and linear growth velocity in boys between the age of 1 and 20 years. Pakistan J. Zoology. 49 (1): 8-12

ULFAT IKHLAK, MUHAMMAD IRFAN, SHAHZAD ALI, ASFA ASHRAF, SHIWEI XIAO, MAZHAR QAYYUM. 2016.Prevalence of Dengue in Students of Arid Agriculture University Rawalpindi. PSM Microbiol., 01(2): 62-65

IFTIKHAR AHMAD, KIRAN AFSHAN, MUHAMMAD RAMZAN, SIKANDER HAYAT, SYED SHAKEEL RAZA RIZVI AND MAZHAR QAYYUM. 2016. Effect of water quality parameters on isopod parasites Alitropistypus (Aegidae) of ectoderms in Chashmalake, Pakistan. Pakistan J. Zoology. 48(3): 769-779.

MAJID MAHMOOD, ABIDA RAZA, MUHAMMAD ASIM, MAZHAR QAYYUM, NASIB ZAMAN, AZRA KHANUM AND MIRZA AZHAR BEG. 2016. Analysis of complete and partial genome sequences of Hepatitis B virus and determination of its genotype and sub-genotypes from Pakistan. Pakistan J. zoology. 48(3): 747-753.

RAFIQUE S., SIDDIQUE,N., MAZHAR QAYYUM, ABBAS, M. A., ALI, A., YASEEN, S AND NAEEM K., 2015. In Ovo vaccination against avian influenza virus subtype H9N2. Pakistan Vet. J., 35 93): 299-302.

SAIRA, M., K. AFSHAN, I. A. KHAN, S. IRUM, I. Z. QURESHI, S. S. R. RIZVI, M. MUKHTAR, M. MUSHTAQ, Z. IQBAL AND MAZHAR QAYYUM, 2015. Serological and Coprological Studies of Bovine Fasciolosis in the Pothwar Region, Pakistan. Pak. Vet. J. 35(2): 178-182. (IF=1.3).

3. CURRICULUM VITAE

1. Personal Data

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2. Academic Qualification

- Ph. D. in Zoology from University of the Punjab, specializing in wildlife. (Year 2005)
  Thesis: Ecology of Houbara Bustard (*Chlamydotis undulata macqueenii*) in Punjab Nag Valley (Balochistan) and Uzbekistan.

- Master of Science in Zoology from University of The Punjab, specializing in wildlife research and fieldwork (year 1994).
  Thesis: Behavioural patterns of Blue Peafowl (*Pavo cristatus*) in Changa Manga Wildlife Sanctuary.

- Bachelor of Science with Botany, Geography and Zoology from Islamia University Bahawalpur. (Year 1990)

3. Area of Specialization: Wildlife / ecology / conservation

4. **HEC approved supervisor**

5. **Professional Experience** (Research and Teaching): 15 years

6. Fellowship/Membership of Professional Associations/Societies: 05

7. Research Projects; Completed=02; ongoing=01

8. Participation in Conferences/Workshops: 23

9. Supervision of Post-Graduate Theses: a) Ph.D.:3; b)M.Phil.: 17.

10. **Publications**

a. Papers Published in Peer Reviewed Journals: 12

Publications during reported period (2018-2020)

1. Anwar, M. B; Nadeem, M. S; Shah, S.I; Kayani, A. R; and Mushtaq, M. 2012. A Note on the diet of Indian Wolf (Canis lupus) in Baltistan, Pakistan. Pak. J. Zool. 44(2):588-591.

2. Anwar, M.B; Jackson, R; Nadeem, M. S; Janecka, J. E; Hussain, S; Beg, M. A; Muhammad, G. and Qayyum, M. 2011. Food Habits of Snow Leopard Panthera unica (Schreber, 1775) in Baltistan, Northern Pakistan. European Journal of Wildlife Research. 57 (5): 1077-1083.
3. Bibi, S; Nadeem, M. S; Anwar, M. B; Shah, S. I; Kayani, A. R; Mushtaq, M; Beg, M. A; and Mahmood, T. 2019. First record of Mus cookii (Cook's Mouse) from Pothwar, Pakistan; A probable case of range extension?. Mammalia, 83(2): 198-202
4. Bibi, S; Nadeem, M. S; Wiewel, A. S; Beg, M. A; Hameed, K; Jabeen, M; and Raja, G. K. 2017. Mitochondrial Genetic Diversity and Phylogeography of Mus musculus castaneus in Northern Punjab, Pakistan. Zoological Science 35 (6): 490-497
5. Irshad, N; Mahmood, T; Hussain, R. and Nadeem, M. S. 2015.Distribution, abundance and diet of Indian Pangolin (Manis crassicaudata) Animal Biology, 65(1):57-71.
6. Nadeem, M. S; Imran, S. M. K; Mahmood, T; Kayani, A. R; and Shah, S. I. 2012. A Comparative Study of the Diets of Barn Owl (Tyto alba) and Spotted Owlet (Athene brama) Inhabiting Ahmadpur East, Southern Punjab, Pakistan. Animal Biology, 62(1): 13-28.
7. Nadeem, M. S; Mahmood, T; and Mahmood-ul-Hassan, M. 2014. Breeding success of Stone Curlew Burhinus oedicnemus in Nag Valley (1999-2001), Kharan, Pakistan. Turk. J. Zool. 38(4): 510-514.
8. Nadeem, M. S; Naz, R; Shah, S. I; Beg, M. A; Kayani, A. R; Mushtaq, M; and Mahmood, T. 2012. Season and locality related changes in the diet of Asiatic jackal (Canis aureus) in Potohar, Pakistan. Turk. J. Zool. 36(6):798-805.
9. Nighat, S; Nadeem, M. S; Shah, S. I; Bhati, R.Z; Akhter, N; Mahmood, T; Aihetasham, A. Asif, M. and Javid, A. 2019. Estimation of Heavy Metals (Cd, Cu, Pb, Zn) from six species of Vesper Bats. J. Anim. Plant Sci. 29 (2):619-624.
10. Zangi, I; Mahmood, T; Akrim, F; and Nadeem, M. S; 2019. Spatial distribution and Population estimates of three vulture species in and around Pir Lasura National Park, north-eastern Himalayan region, Pakistan. J. Raptor Res. 53(2): 164-171.

4. CURRICULUM VITAE

1. Personal Data

Name:	Dr. Amjad Rashid Kayani
Present Address:	Assistant Professor
	Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi, Pakistan.
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2. Academic Qualification

- **Ph.D.** (Zoology) 2006 The University of Reading, UK
- **M.Sc.** (Zoology) 1988 University of Agriculture, Faisalabad
  (Marks obtained 751 out of 920; 83%; **Ist Div.; CGPA 3.93**)
- **B.Sc.** (Zoology, Botany & Geography) 1985 Govt. Postgraduate College Jhelum, The University of Punjab, Lahore
  (Marks obtained 496 out of 800; 62%; **Ist Div.**)

3. Area of Specialization: **A**nimal ecology, behavior and reproductive biology

4. **HEC approved supervisor:** Yes

5. **Professional Experience** (Research and Teaching): 25 years

6. Fellowship/Membership of Professional Associations/Societies: 01

7. Research Projects; Completed=02

8. Participation in Conferences/Workshops: 06

9. Supervision of Post-Graduate Theses: a) Ph.D.:2 (in progress); b) M .Phil.: 08.

Distinctions:

- **University Distinction**: Stood first in the order of merit among all students who qualified for M.Sc. Zoology during calendar year 1988, The University of Agriculture, Faisalabad

- **University Merit Scholarship**, The University of Agriculture Faisalabad, 1986-87 and 1987-88
- **TROSS Scholarship** from Ministry of Science & Technology, Government of Pakistan (2001) for PhD study in UK

10. **Publications**

Papers Published in Peer Reviewed Journals: 2

Publications during reported period (2018-2020)

1. Ahmad, N., Khan, I.A., Iqbal, Z., Naseem, A.A., Kayani, A.R.,Afshan, K. and Qayyum, M. 2019. Seroepidemiology of toxoplasmosis in human population with refernce to its zoonotic potential in Sub-Tropical areas of pakistan. Pak. Vet. J. 39(2): 211-215.
2. Bibi, S., Nadeem, M.S., Anwar, M.B., Shah, S.I., Kayani, A.R.,Mushtraq, M., Beg, M.A. and Mehmood, T. 2018. First record of Muscookii (Cook's mouse) from Pthwar, Pakistan: a probable case of range extension. Mammalia

5. CURRICULUM VITAE

1. Personal Data

Name: Dr. Muhammad Mushtaq

Present Address: Assistant Professor

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2. Academic Qualification

DEGREE	YEAR	SUBJECTS	INSTITUTIONS
Ph.D	2009	Zoology	Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi
M.Sc	1995	Zoology	University of the Punjab

3. Area of Specialization: Pest control

4. Professional Experience (Research and Teaching): 21 years

5. Research Projects; Completed=01

6. Participation in Conferences/Workshops: 2

9. Supervision of Post-Graduate Theses: a) M.Phil.: 12 b) 1

10. **Publications**

Papers Published in Peer Reviewed Journals: 8

Publications during reported period (2018-2020)

1. Bibi, S., M. S. Nadeem, M. B. Anwar, S. I. Shah, A. R. Kayani, M. Mushtaq, M. A. Beg and T. Mahmood. 2019. First Record of Mus cookie (Cook's mouse) from Pothwar, Pakistan: A Probable Case of Range Extension? Mammalia. 83(2): 198-202. (IF = 0.714)
2. Fiaz, M., K. Munawar, M. Mushtaq, M. Ahmad, M. A. Chaudhry, M. Aslam, T. Ahamd and Nasrullah. 2017. Evaluating Varying Calf Milk Replacers on Optimum Growth Performance in Salt Range Lambs. Pakistan J. Zool. 49(5): 1925-1928. (IF: 0.547)
3. Khanam, S. M. Mushtaq, A. R. Kayani, M. S. Nadeem and M. A. Beg. 2017. Small Mammal Community Composition and Abundance in Rural Human Habitations of Pothwar, Pakistan. Trop. Ecol. 58(3): 515-524.
4. Khanam, S. M. Mushtaq, M. S. Nadeem and A. R. Kayani 2017. Population Ecology of the House Mouse (Mus musculus) in Rural Human Habitations of Pothwar, Pakistan. Zool. Ecol. 27(2): 106-113.

5. Sami-ur-Rehman, S. M. F. Nasir, M. Naeem, A.Mehmood and M. Mushtaq. 2017. Fauna of Culex (Culicidae: Diptera) mosquitoes in tehsil Pind Dadan Khan, Jhelum, Punjab, Pakistan. Int. J. Mosq. Res. 4(5): 28-31.
6. Akber, M., M. Mushtaq, M. S. Nadeem, A. R. Kayani and N. Nisa. 2017. Reproductive Patterns of the Norway Rat (Rattus norvegicus) in Urban Rawalpindi, Pakistan. Pakistan. J. Zool. 49(3): 1131--1134. (IF: 0.547)

6. CURRICULUM VITAE

1. Personal Data

Name: Dr. Muhammad Zubair Anjum

Present Address: Assistant Professor,

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2. Academic Qualification

Ph.D. _ Ecology (2009)
Institute of Zoology, Department of Integrative Biology and Biodiversity Research.
Universität für Bodenkultur Wien, Austria.
M.Sc. _ Zoology (2004)
University of Agriculture, Faisalabad, Pakistan.
B.Sc. _ Zoology, Botany & Geography (2002)
University of Punjab, Lahore, Pakistan.

3. Area of Specialization: Fisheries / Ecology

4. HEC approved supervisor

5. Professional Experience (Research and Teaching): 07 years

6. Fellowship/Membership of Professional Associations/Societies: 02

7. Research Projects; Completed=03; ongoing=01

8. Participation in Conferences/Workshops: 14

9. Supervision of Post-Graduate Theses: a) M.Phil: 14.

10. **Publications = 08** **Abstract = 05**

1. Abid Ali, Muhammad Qayash Khan, Muhammad Zubair Anjum, Muhammad Adnan, Abbas khan, Sher Zaman Safi, Hafsa Zahid, Javed Nawab, Muhammad Ishaq Ali Shah and Atif Kamil (2020) Genetic diversity of Schizothorax, Tor, and Mystus spp. in Khyber Pakhtunkhwa, Pakistan: Species of economic importance. Pakistan Journal of Zoology 53(3): 1099-1109.
2. Daniel S. Karp, Rebecca Chaplin-Kramer, Timothy D. Meehan [et al., including Muhammad Zubair Anjum] (2018) Crop pests and predators exhibit inconsistent responses to surrounding landscape composition. PNAS Latest Articles 155 (33): E7863- E7870.

3. Emily A. Martin, Matteo Dainese, Yann Clough [et al., including Muhammad Zubair Anjum] (2019) The interplay of landscape composition and configuration: new pathways to manage functional biodiversity and agroecosystem services across Europe. Ecology Letters 22: 1083-1094.
4. Farman Ali, Muhammad Qayash Khan, Muhammad Zubair Anjum and Irfan Khattak. (2018) Toxic effect of Atrazine herbicide on the hematological indices of Snow Carp (Schizothorax plagiostomus): An indigenous fish species of economic importance. Fresenius Environmental Bulletin 27(5): 3075-3080.
5. Kalim Ullah, Arslan Emmanuel and Muhammad Zubair Anjum (2018) Effect of stocking density on growth performance of Indus Mahseer (Tor macrolepis). International Journal of Fisheries and Aquatic Studies 6 (3): 49-52.
6. Muhammad Qayash Khan, Muhammad Zubair Anjum, Shamim Akhter, Irfan Khattak, Muhammad Adnan and Abid Ali (2018) Diet composition and seasonal fluctuations in the feeding habit of Snow Barbel (Schizothorax plagiostomus) in River Indus, Pakistan. Acta Scientiae Veterinariae 46: 1550.
7. Pasha, R.H., M. Z. Anjum, I. Ullah, M.A. Khan, A. Ali, S. Rehman, S. Batool and A. Emmanuel. (2019). Seasonal variation in the microscopic anatomy of gonads and gonadosmotic index of Clupisoma garua. Pakistan Journal of Agricultural Research, 32(4):670-674.
8. Sana Urooj, Aroosa Qayyum, Muhammad Arfan Hadyait, Shaista Razzaq, Dr. Zubair Anjum (2018) Comparison of Spawning Response of Silver carp (Hypophthalmichthys molitrix) and Grass carp (Ctenopharyngodon idella). International Journal of Research 5 (22): 302-306.

7.CURRICULUM VITAE

1. Personal Data

Name: Dr. Abida Arshad

Present Address: Assistant Professor,

Department of Zoology, Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi, Pakistan.

E-mail abida.arshad6@gmail.com

2. Academic Qualification

DEGREE	YEAR	SUBJECTS	INSTITUTIONS
Ph.D	2012	Neurobiology	Quaid-I-AzamUniversity,Islamabad, Pakistan
M.Sc	2000	Zoology	Quaid-I-AzamUniversity (Animal Sciences), Islamabad, Pakistan

3. Area of Specialization: Neurobiology

4. **HEC approved supervisor**

5. **Professional Experience** (Research and Teaching): 3 years

7. Research Projects; Completed=02

8. Participation in Conferences/Workshops: 2

9. Supervision of Post-Graduate Theses: a)M.Phil.: 5.

10. **Publications**

Papers Published in Peer Reviewed Journals: 4

Publications during reported period (2018-2020)

1. Ahmad Farooq, Usman Waheed, Hasan Abbas Zaheer, Abdul Rauf, Abida Arshad, and Muhammad Arshad. Incidence of Hepatitis B and C Viruses in Thalassaemia Major Patients. Pakistan Journal of Zoology. (2018) 50(3), 1-4.
2. Feroz Khan, Abida Arshad , Ayesha Isani Majeed, Asmat Ullah, Wasim Ahmad. A novel frameshift variant in BHLHA9 underlies mesoaxial synostotic syndactyly associated with postaxial polydactyly. European Journal of Medical Genetics (2019) 62(8), 103688.
3. Muhammad Hassan Raza, Kamni Gul, Abida Arshad, Naveeda Riaz, Usman Waheed, Abdul Rauf, Fahad Aldakheel, Shatha Alduraywish, Maqbool Ur Rehman, Muhammad Abdullah, Muhammad Arshad. Microbiota in cancer

development and treatment. Journal of Cancer Research and Clinical Oncology (2019) 145(1), 49-63.
4. Waheed U, Arshad M, Sultan S, Saeed M, Arshad A, Irfan SM, Zaheer HA. Iron deficiency and iron deficiency anemia in blood donors at a tertiary care hospital in Islamabad, Pakistan. Global Journal of Transfusion Medicine (2018); 3: 17-20.

8.CURRICULUM VITAE

1. Personal Data

Name: Dr. Ruqia Mehmood Baig

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2. Academic Qualification

DEGREE	YEAR	SUBJECTS	INSTITUTIONS
MSc	2004	Zoology	Quaid-I-AzamUniversity,Islamabad, Pakistan
M.Phil	2008	Cell Biology	Quaid-I-AzamUniversity (Animal Sciences), Islamabad, Pakistan
Ph.D	2013	Biosciences	COMSATS Institute of Information Technology, Islamabad

3. Area of Specialization: Genetics

4. **HEC approved supervisor**

5. **Professional Experience** (Research and Teaching): 3 years

7. Research Projects; Completed=02

8. Participation in Conferences/Workshops: 2

9. Supervision of Post-Graduate Theses: a)M.Phil.: 5.

10. **Publications**

Papers Published in Peer Reviewed Journals: 7

Publications during reported period (2018-2020)

1. Hassan MU, Iqbal MF, Riaz A, Zafar MA, Shamim A, Rehman SU, Kayani MFA, Baig RM. Prevalence and Chemotherapy of Warble Fly Infestation in Goat Population of District Khushab, Pakistan. Pakistan Journal of Science. Volume 68 (Issue No. 2) June 2016. 128-132.

2. Banaras F, Abbas F, Awan MA, Riaz A, Khan IA, Ahmad Z, Mengal MA, Banaras S, Hassan M, Zafar MA, Baig RM. Molecular Survey on the Prevalence of Caprine mycoplasma in the Goats of Quetta City of Pakistan. International Journal of Veterinary Science. 2016, 5(3): 158-163.

3. Wazir U, Sanders AJ, Wazir A, Baig RM, Jiang WG, Ster IC, Sharma AK, Mokbel K. Effect of the knockdown of death-associated protein 1 expression on cell adhesion, growth and migration in breast cancer cells. Oncology Reports 33(3):1450-8.2015.

4. Sabir M, Baig RM, Ali K, Mahjabeen I, Saeed M, Kayani MA. Retinoblastoma (RB1) pocket domain mutations and promoter 5 hyper-methylation in head and neck cancer. Cellular Oncology, 37 (3), 203-213. 2014

5. Ali K, Mahjabeen I, Sabir M, Baig RM, Zafeer M, Faheem M, Kayani MA. Germline Variations of Apurinic/Apyrimidinic Endonuclease 1 (APEX1) Detected in Female Breast Cancer Patients. Asian Pac J Cancer Prev, 15(18), 7589-95. 2014

6. Qureshi Z, Mahjabeen I, Baig RM, Kayani MA. Correlation between Selected XRCC2, XRCC3 and RAD51 Gene Polymorphisms and Primary Breast Cancer in Women in Pakistan. Asian Pac J Cancer Prev, 15(23): 10225-9. 2014.

7. Kayani MA, Khan S, Baig RM, Mahjabeen I. Association of RAD 51 135 G/C, 172 G/T and XRCC3 Thr241Met Gene Polymorphisms with Increased Risk of Head and Neck Cancer. Asian Pac J Cancer Prev, 15 (23), 10457-10462. 2014.

10.CURRICULUM VITAE

1. Personal Data

Name: Dr. Muhammad Irfan

Present Address: Assistant Professor

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2. Academic Qualification

DEGREE	YEAR	SUBJECTS	INSTITUTIONS
Ph.D	Cont..	Neurobiology	Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi
M.Phil.	2008	Zoology	Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi
M.Sc	2006	Zoology	Pir Mehr Ali Shah Arid Agriculture University, Murree road, Rawalpindi

3. Area of Specialization: Reproductive Endocrinology and Genetics

4. Professional Experience (Research and Teaching): 9 years

5. Research Projects; Completed=01

6. Participation in Conferences/Workshops: 3

9. Supervision of Post-Graduate Theses: a) M.Phil.: 11.

10. **Publications**

Papers Published in Peer Reviewed Journals: 14

Publications during reported period (2018-2020)

1. **Irfan, M.,** Ismail, S. B., Noor, N. M., & Hussain, N. (2020). Efficacy of Aspirin for Vasculogenic Erectile Dysfunction in Men: A Meta-Analysis of Randomized Control Trials. American journal of men's health, 14(5), 1557988320969082. https://doi.org/10.1177/1557988320969082. (IF: 1.605).
2. **Irfan, M.,** Hussain, N. H. N., Noor, N. M., Mohamed, M., Sidi, H., & Ismail, S. B. (2020). Epidemiology of Male Sexual Dysfunction in Asian and European Regions: A Systematic Review. American Journal of Men's Health. https://doi.org/10.1177/1557988320937200. (IF: 1.605).
3. **Irfan, M**.,Hussain N. H. N., Noor N. M., Mohamed, M., Ismail S. B.Sexual Abstinence and Associated Factors among Young and Middle-Aged Men. (2020)

A Systematic Review. The Journal of Sexual Medicine. 17(3): 412-430. (IF: 3.23)

4. Ismail S. B., Noor N. M., Hussain N. H. N., SulaimanZ.,Shamsudin, M. A., **Irfan, M.** (2019). Angiotensin receptor blockers for erectile dysfunction in hypertensive men: A brief meta-analysis of randomized control trials.American Journal of Men's Health, doi.org/10.1177/1557988319892735. (IF: 1.605).
5. Moeez, S., Khalid, Z., Jalil, F., **Irfan, M**., Ismail M., Ari. M. A., Niazi, R., & Khalid, S. (2019) Effects of SLC22A2 (rs201919874) and SLC47A2 (rs138244461) genetic variants on Metformin Pharmacokinetics in Pakistani T2DM patients. Journal of Pakistan Medical Association. 69 (2): 155-163. (IF: 0.642)
6. Qayyum, A., Najmi, M. H., Mansoor, Q., **Irfan, M**., Naveed, A. K., Hanif, A., Ismail, M. (2018). Frequency of Common VKORC1 Polymorphisms and Their Impact on Warfarin Dose Requirement in Pakistani Population. Clin Appl ThrombHemost, 24(2), 323-329. doi:10.1177/1076029616680478 (IF: 1.85)