Revised

PIR MEHR ALI SHAH
ARID AGRICULTURE UNIVERSITY
RAWALPINDI

SELF ASSESSMENT REPORT 2022-24
Department of Entomology
M. Sc. (Hons)

Program Team:

Dr. Munir Ahmad (Convener)

Dr. Farid Asif Shaheen (Member)

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INTRODUCTION

Since its inception, the M. Sc. (Hons) degree program in the Department of Entomology has been exceptional. This program has focused on the crucial facets of the farming community that are related to insect pest issues, including their detection and control as well as the preservation and use of beneficial insects. Over two-thirds of all animals on Earth are insects. Over 1.3 million bug species are known to exist in the universe. There are various ways in which insects are related to humans, animals, and crop plants. Entomology encompasses biology, physiology, ecology, biosystematics, and all facets of insects' life. Although a number of variables contribute to the deterioration in the quantity and quality of food produced, insect pests are mostly responsible for the losses in fields and stored grains. PMAS-Arid Agriculture University Rawalpindi's entomology department is committed to researching the variables influencing crop yield and working to develop pest control strategies and initiatives. The Department's primary focus areas are as follows:

- Identification and classification of insects, particularly those found in Pakistan's dry regions.
- Improving the Department's Insect Museum and bolstering its insect identification services.
- Determining the current state of various insect pests in diverse crop systems.
- Recognizing helpful insects (natural enemies and pollinators) and using them for pollination services and other pest management initiatives.
- Create bug control plans and evaluate several eco-friendly methods in the field and in storage facilities while maintaining the quality of the products being stored.

The Entomology Department launched the M. Sc. (Hons) degree program in 1997. The Higher Education Commission (HEC) and other financing organizations currently provide financial aid to a number of students. These academics are conducting study on a range of topics related to pest problems and how to handle them. Although insects naturally cause losses or harm to both plants and animals, the Department of Entomology primarily studies key crops and the insect pests that affect them, such as pests of homes, buildings,

stored grains, and things with aesthetic value. Additionally, studies include study on medical entomology and disease vectors, such as houseflies and mosquitoes. In light of the program's primary goals, curriculum review has also been a top priority in order to preserve the caliber of the final result, which is the passing of M. Sc. (Hons) students.

All of the required tasks for the M. Sc. (Hons) program were completed on time throughout the reporting period (2022–24). Numerous activities, such as apiculture, biological control, managing stored grain insects, biodiversity, pesticide resistance, pest management, and exhibiting insect variety, have been covered in seminars and workshops that involve researchers. This initiative has continued to include a few other activities, such as field surveys to get insight into the issues facing the agricultural workforce in relation to insect pest management, stored grain entomology, household and urban pests, etc. While some researchers have been studying the biodiversity of mosquitoes, ants, and aphids in the Pothwar region, others have been focusing on pollinators, particularly bumblebees.

Projects supported by several organizations, including the Higher Education Commission (HEC), Pakistan Science Foundation (PSF), ALP-NARC, Islamabad, and PMAS-Arid Agriculture University Rawalpindi, have produced funding. The department's funded programs made the resources needed for study and experimentation more accessible. The University's Quality Enhancement Cell (QEC) has been playing a crucial role in maintaining the caliber of research and instruction during the troubling time. Teaching, research, and a number of departmental activities have all improved as a result of QEC's comments and suggestions. Additionally, QEC performed well in order to meet the program's goals.

The M. Sc. (Hons) program's Self-Assessment Report (SAR) is divided into eight sections: faculty characteristics, process control, curriculum development, lab and computer facilities, student support and advising, program mission and objectives, and institutional facilities and university support.

CRITERION 1: PROGRAMME MISSION, OBJECTIVES AND OUTCOMES

The largest group of life is the subject of entomology, which also examines the advantages and disadvantages of insects for humans. Insects were present on Earth billions of years ago and make up roughly 53% of biodiversity. Because they harm buildings, cattle, crops grown in fields and greenhouses, and our living conditions, insect pests result in financial losses. Nonetheless, helpful insects are also a subset of insect species that aid in agricultural pollination, natural ecosystem preservation, and biocontrol. Agronomy, horticulture, plant pathology, biotechnology, and plant breeding are just a few of the fields in which entomology continues to play a significant role.

The newest and most innovative methods for pest monitoring, identification, host-plant resistance, pesticide resistance, stored product entomology, beneficial insects, and their economic importance are studied by M. Sc. (Hons) students. Innovative laboratory techniques and contemporary teaching methodologies help to address the current insect pest issues. Students' tasks also include looking for solutions to the difficulties that society has with insect pests in order to develop and implement strategies for their sustainable control.

Standard 1-1: The program must have documented measurable objectives that support institution mission statements

Maintaining excellent standards for entomology professionals with up-to-date technical knowledge is the primary goal of the M. Sc. (Hons) program. Another key goal of the program is to address issues like managing insect pests while maximizing the production of beneficial insects and utilizing their potential for the good of humanity. As a result, these activities enhance food, pollinators, beneficial goods (including honey, silk, lac, and some plant and entomopathogens-based biopesticides), and human aesthetics. The general standard of human life on Earth is raised by these advantageous elements and goods.

Documented measurable objectives:

To prepare highly qualified indigenous experts for future demands at the national and international levels, an M. Sc. (Hons) degree in entomology is given. Research topics that are especially related to entomological problems in the agricultural sector at the national level of

dry agriculture are typically chosen for study in order to form private-public partnerships that benefit the GDP and national economy.

Objectives of M. Sc. (Hons) Entomology program

1. To educate the students conventional and proven techniques of integrated pest management program with least environmental hazards and healthy society.
2. To train/equip the Entomology scholars to deliver a good level of responsibilities at their workplace.
3. To develop highly skilled personnel well-equipped with essential knowledge and techniques in Entomology and ensure its applicability in field to get high benefits.
4. To promote verified techniques of entomology/pest management in order to reduce cost of production with reduced use of pesticides.
5. To prepare the scholars to make efforts both in research and development for safer environment and enhanced productivity.

Main elements of strategic plan to achieve the mission and objectives

1. Designing and updating the curricula involving core subjects related to today Entomology issues and their practical solutions.
2. To establish liaison with the farmers, researchers and extension workers for better comprehension of issues and their solutions.
3. Planning and execution of a well-built teaching system based on the updated knowledge, expertise and vision gathered from world reviews, literature, research results, proceedings, symposia etc. for the award of M. Sc. (Hons) degree.
4. Establishing and strengthening well-equipped specialized research laboratories to conduct research of applied as well as basic approach with problem oriented approach.
5. Generating review papers, popular articles and scientific papers for reputed journals, and manuals etc.
6. Execution of research projects funded by donors/sponsors including Higher Education Commission, Pakistan Science Foundation, PARB,USAID and FAO etc.
7. Developlinkages with national and international research organizations and private sector to solve entomological issues.

PROGRAM OBJECTIVES ASSSESSMENT

The Department monitoring system is focused on the following lines:

- Student-teacher interaction, students views for program/faculty.
- Critical analysis and policy formulation for development of infrastructure.
- Periodic review of the target achievements at department level.

Table 1: Program Objectives Assessment

S. #	Objective	How Measured	When Measured	Improvement Identified	Improvement made
1.	To prepare the scholar to make efforts both in research and development for safer environment and enhanced productivity.	Reviewed by concerned departmental or faculty level committees, and councils (academic council) etc	In the periodic meetings of the concerned bodies	Allied topics/courses are suggested in the light of university/ HEC guidelines/recommendations.	New development in related fields are incorporated for awareness and exposure regarding the environment/ productivity
2.	To prepare highly skilled manpower equipped with necessary knowledge and techniques in Entomology and ensure its applicability in field to get high benefits.	Various verbal and written examinations and their presentations at various occasions. Additionally, their delivery while working at various positions	It is a regular process as per requisite	Updating knowledge & techniques and enhancement of applicability	Courses updated and practical part especially exercised both in lab and in field
3.	To educate the students popular and proven techniques of IPM with minimal environmental hazards and healthy society.	Assessing the previous understanding of students through exams/tests and student response	During the already established regular and periodic exam system by the university	Incorporation of new techniques in entomology course work and accordingly some new subjects are required to be incorporated in the syllabus	Improvement of existing courses as per requisite Communication system is made better by developing the class lectures and using audio visual aids
4.	To train/equip the Entomology scholars to deliver a good level of responsibilities at their workplace	Through examinations/seminars and the feedback from the alumni additionally from the reports of the organizations where they work.	Regular feature	Latest subjects should be incorporated in syllabus, to study the new challenges	Endorsement of new syllabus to incorporate modern techniques and regular feedback from individual/employer organization
5.	To promote proven techniques of pest management through lectures, seminars and forums helpful in reducing use of chemical pesticides.	Evaluating the students research/internship project topics/thesis/reports etc , by the concerned committees/evaluators, synopsis and thesis defense seminars etc.	Existing evaluation procedure, prior to initiate the projects and at the completion of the research thesis	Strong scrutiny system for topics and synopsis evaluation Students to deliver seminars and prepare reports	Seminars, presentation sessions and class discussions, were organized for communication proficiency improvement

Standard 1-2 The Program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and the graduating students are capable of performing these outcomes

Expected Outcomes of the Program:

1. Professional advancement is facilitated by the advanced theoretical and practical knowledge that M. Sc. (Hons) students possess.
2. M. Sc. (Hons) students have capability to conduct advanced level research on the problems relating to applied and economic Entomology.
3. M. Sc. (Hons) students are capable to establish their own enterprises and business using their skills such as pest management service, silkworm/honey production, sterile maggot production, mass scale production of predators/parasites etc.
4. M. Sc. (Hons) students are able to understand the entomological issues related to pests, their identification, management and environmental problems and potential to resolve these issues at field level.
5. M. Sc. (Hons) students have a substantial skill to identify the pests and bio-control agents and its application in devising IPM techniques for sustainable pest solutions.
6. M. Sc. (Hons) students have ample capacity to analyze the pest problem and to recommend an adequate and effective pest management package suitable for the situation keeping in view cost effectiveness and environmental safety.
7. M. Sc. (Hons) students having potential to contribute in solving national issues related to Entomology in through research and development activities in public/private sectors.

Relationship between programme outcomes and objectives are given in Table 2.

Table 2: Program outcomes and their relationship with the program objectives

		Outcomes						
Objectives		**1**	**2**	**3**	**4**	**5**	**6**	**7**
	1	+++	+++	+++	+++	++	++	+++
	2	+++	++	++	+++	+++	+++	++
	3	++	+++	+++	+++	++	+++	+++
	4	+++	+++	+++	+++	+++	+++	+++
	5	+++	+++	++	++	+++	+++	+++

+ Moderately satisfactory
++ Satisfactory
+++ Highly satisfactory

Programme Outcome Measurement

In order to gather information about the performance of the most concerned achievement of the specified objectives, prescribed performa were filled out by the relevant class students, concerned faculty members, department alumni, and graduates working in various organizations, research institutes, etc. The Quality Enhancement Cell (QEC), PMAS-Arid Agriculture University, Rawalpindi, provided the necessary performa that were used to gather data from the chosen groups. Six instructors from the Department of Entomology were enrolled in the M. Sc. (Hons) Program during the reporting period; they are designated 1-6.

Prof. Dr. Muhammad Naeem (1), Dr. Munir Ahmad (2), Dr. Muhammad Asif Aziz (3), Dr. Muhammad Tariq (4), Dr. Asim Gulzar (5), and Dr. Farid Asif Shaheen (6) were the teachers. Teacher #1 received a score of 4.5, followed by Teacher #2 (4.9), Teacher #3 (4.7), Teacher #4 (4.5), Teacher #5 (4.6), and Teacher #6 (4.9), according to the results. These values are displayed in the graph below. (Figure 1).

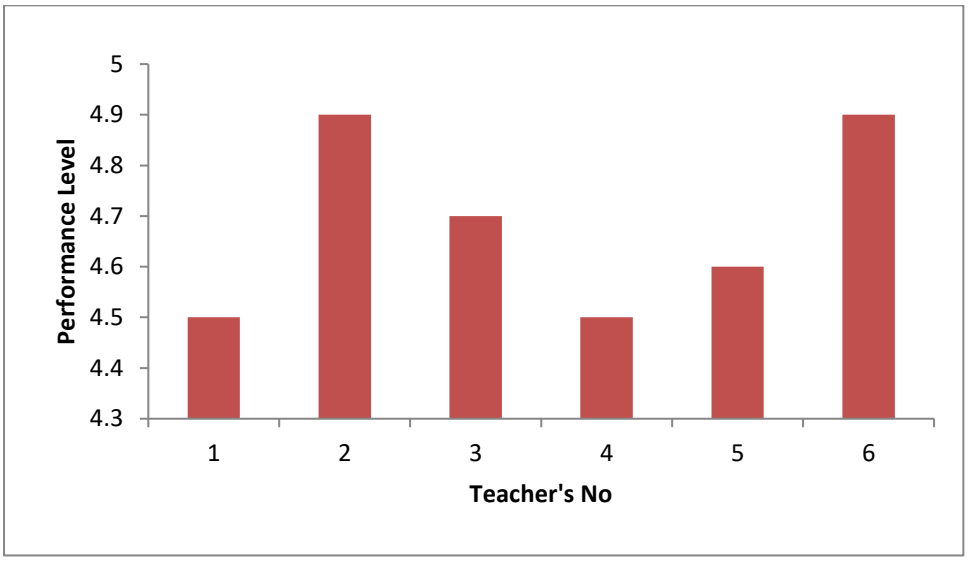

Figure 1: Performance level of different teachers

PROGRAM ASSESSMENT RESULTS

FALL-2022

Teacher's Evaluation (Performa 10)

In the context of teachers' performance and evaluation, students evaluated each other and provided feedback on the assigned tasks. Through the completion of Performa 10, this assessment was completed for various courses that were allocated to certain professors.

Students' Course Evaluation (Performa 1)

The concerned students also evaluated department-level courses offered by teachers. Based on data collected from Performa 1, the teacher's course was assessed.

Teacher's Evaluation (Prof. Dr. Muhammad Naeem) on ENT-701, Fall-2022

For this course, 94% to 100% students were strongly agreed for all questions excepting questions 8, 9, 11, 13 and 16. For these questions they agreed as 6% (Figure 2).

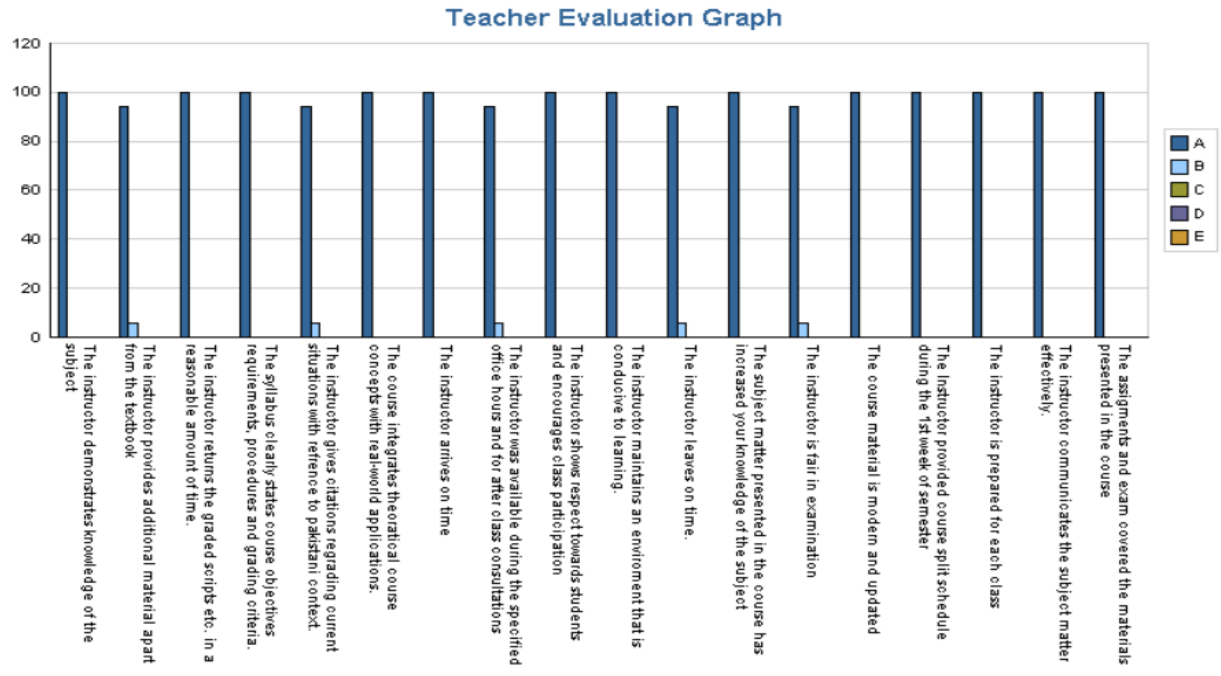

Figure 2: Graph showing teacher's evaluation on ENT-701 during Fall-2022

Students' Course Evaluation (Prof. Dr. Muhammad Naeem) on ENT-701, Fall-2022

There were 100% satisfactory classrooms, appropriate comments, and consistent instructor attendance throughout the course. There was 100% availability of appropriate

instruction and study resources. It was firmly agreed that the course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely. (Figure 3).

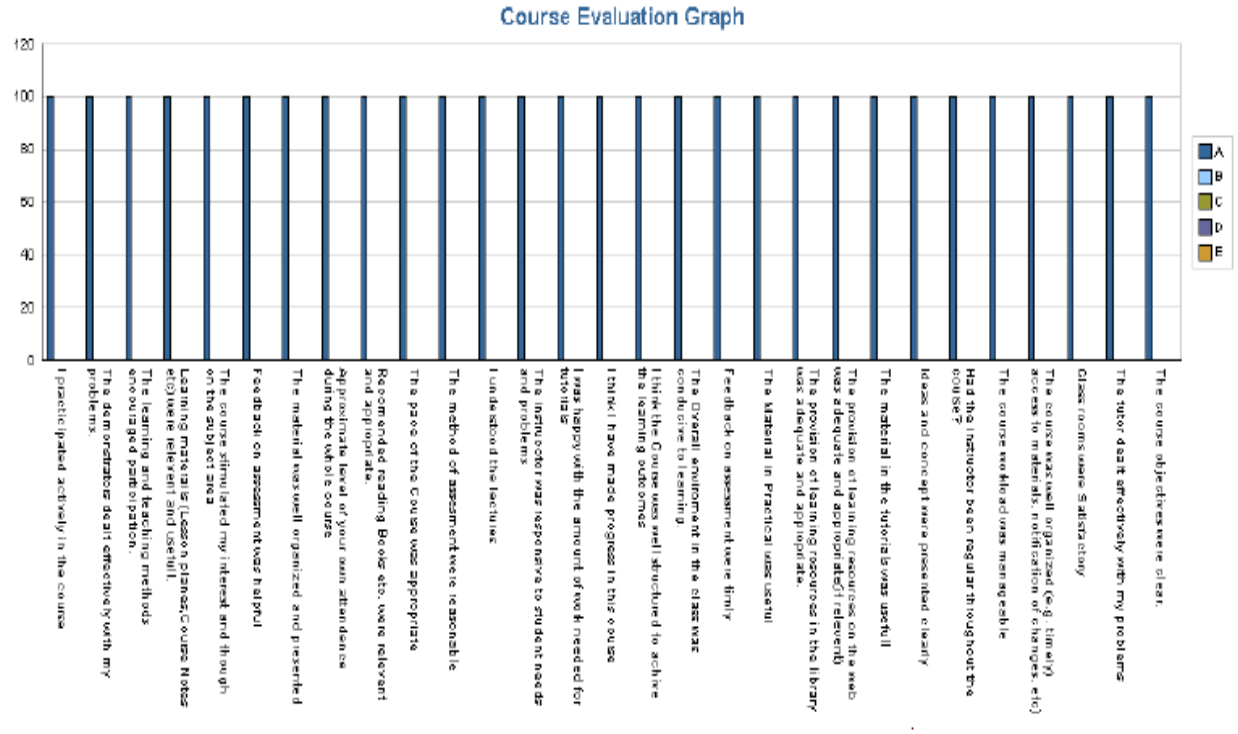

Figure 3: Students' course evaluation for ENT-701 during Fall-2022

Teacher's Evaluation (Dr. Muhammad Tariq) on ENT-711, Fall-2022

For this course, every criterion—including attendance, participation, understanding, lecture preparation, exam grading, and so forth—was 100% met (Figure 4).

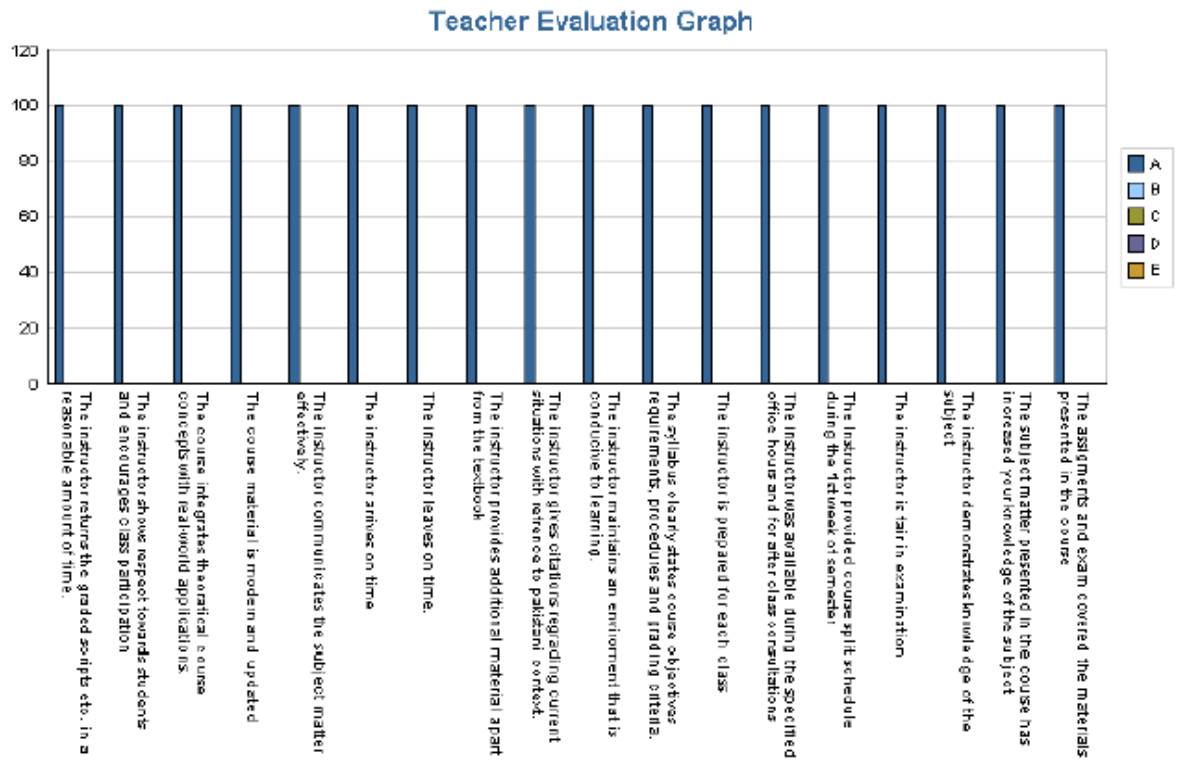

Figure 4: Graph showing teacher's evaluation on ENT-711 during Fall-2022

Students' Course Evaluation (Dr. Muhammad Tariq) on ENT-711, Fall-2022

100% of the students were there, the classrooms were satisfactory, the feedback was appropriate, and the instructor was present at all times. There was 100% availability of appropriate instruction and study resources. It was firmly agreed that the course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely (Figure 5).

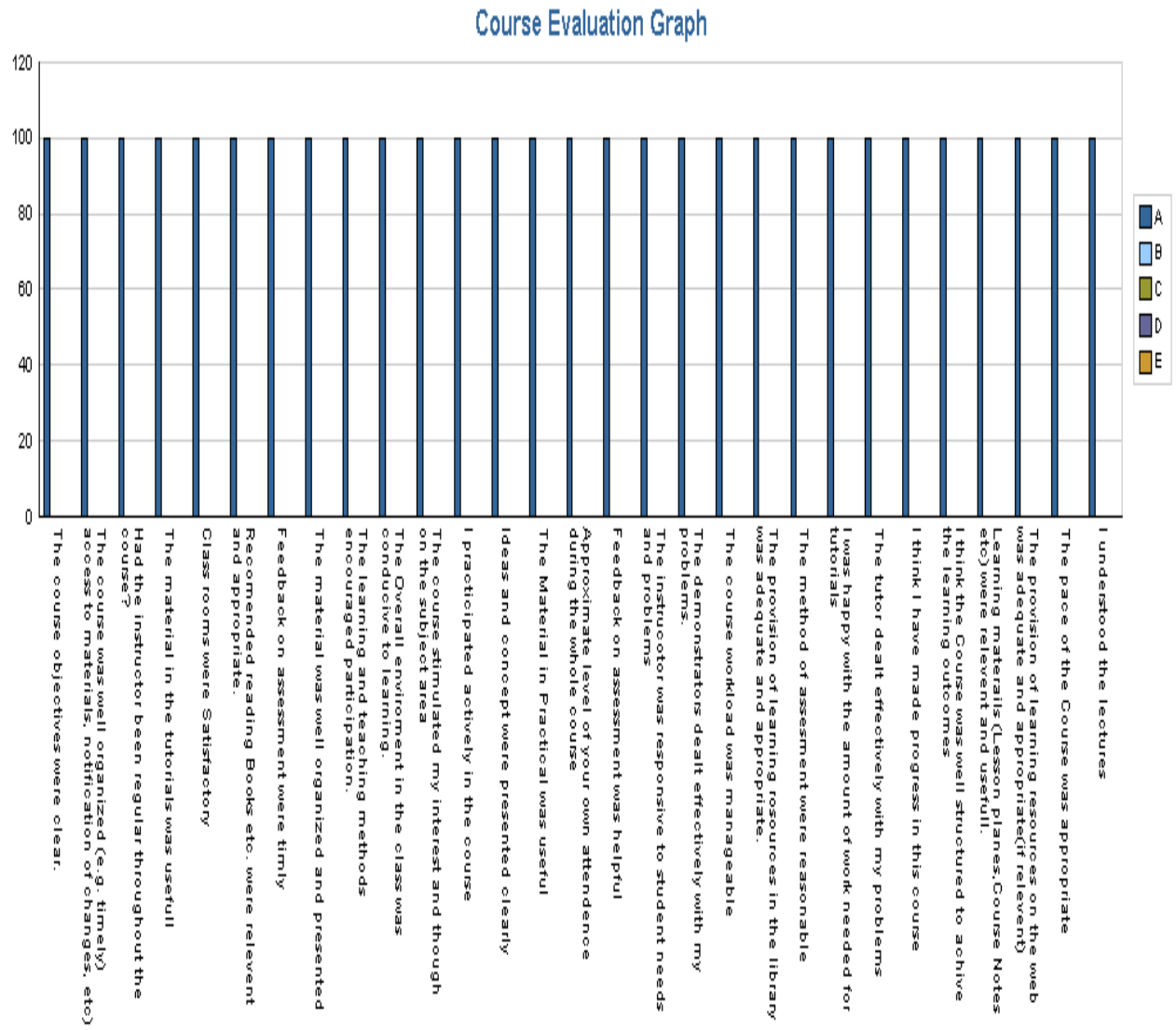

Figure 5:Graph showing students course evaluation on ENT-711 during Fall-2022

Teacher's Evaluation (Dr. Asim Gulzar) on ENT-718, Fall-2022

Every observable metric, including the instructor's active role, his participation in class, his demonstration of knowledge, fairness in the exam, preparation for class, the provision of extra materials, the timely return of the graded scripts, respect for the students, and encouragement of class participation, was 100%. The instructor followed the curriculum precisely, adhering to the objectives, requirements, processes, and grading standards as 100%. The instructor was available for consultations throughout the designated office hours as well as after class (Figure 6).

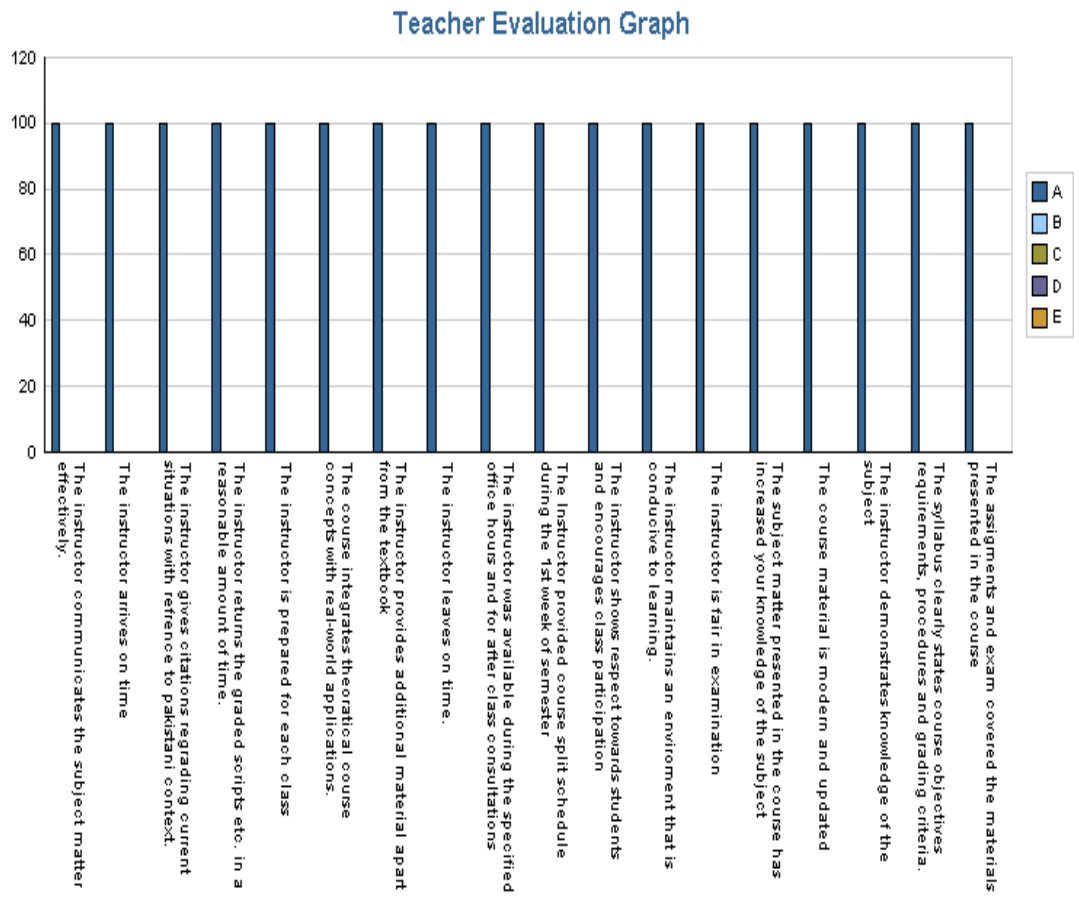

Figure 6: Graph showing teacher's evaluation on ENT-718 during Fall-2022

Students Course Evaluation (Dr. Asim Gulzar) on ENT-718, Fall-2022

Approximate level of student attendance, satisfactory class rooms, proper feedback and instructor regularity throughout the course was 100%. Availability of proper training and materials for study were 100% strongly agreed that I think the course was well structured to achieve the learning outcomes. Overall environment in the class was conducive to learning, course objectives were clear and stimulated my interest and though on the subject area. Course was well organized, workload was manageable, and instructor was responsive to student needs and problems. Learning and teaching methods encouraged participation and material in the tutorials was 100% useful. Pace of the course, learning resources on the web, in the library was adequate and the tutor dealt effectively with my problems as 100% (Figure 7).

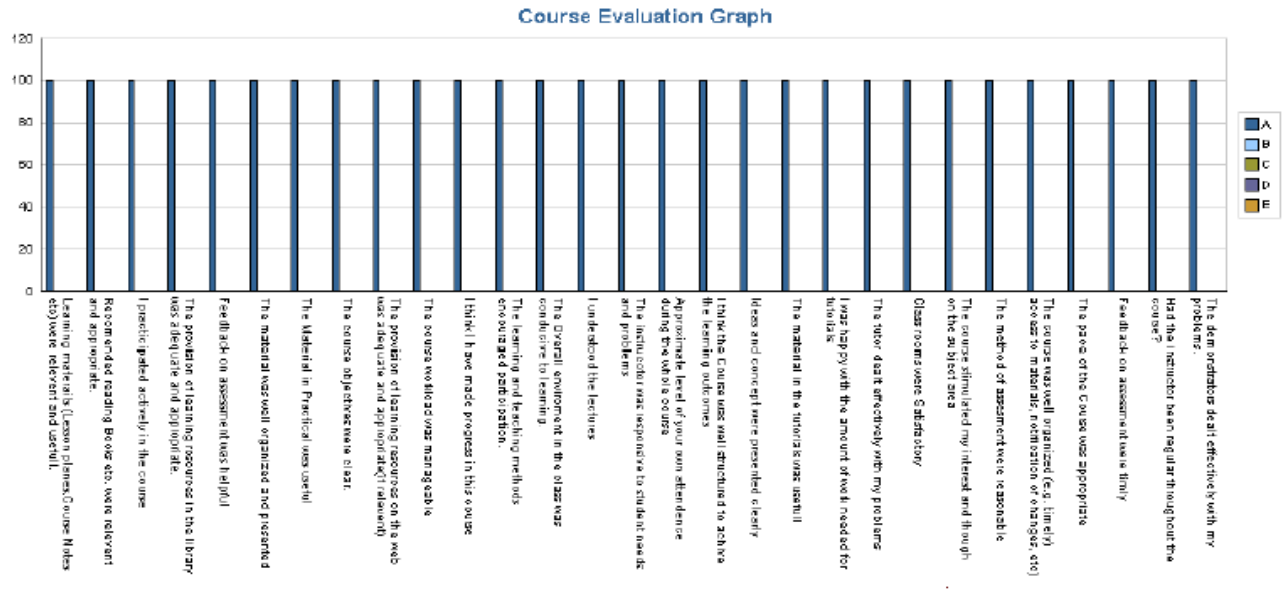

Figure 7: Graph showing student course evaluation on ENT-718 during Fall-2022

Teacher's Evaluation (Dr. Farid Asif Shaheen) on ENT-724, Fall-2022

For this course, every criterion including attendance, participation, understanding, lecture preparation, exam grading, etc. was 100% (Figure 8).

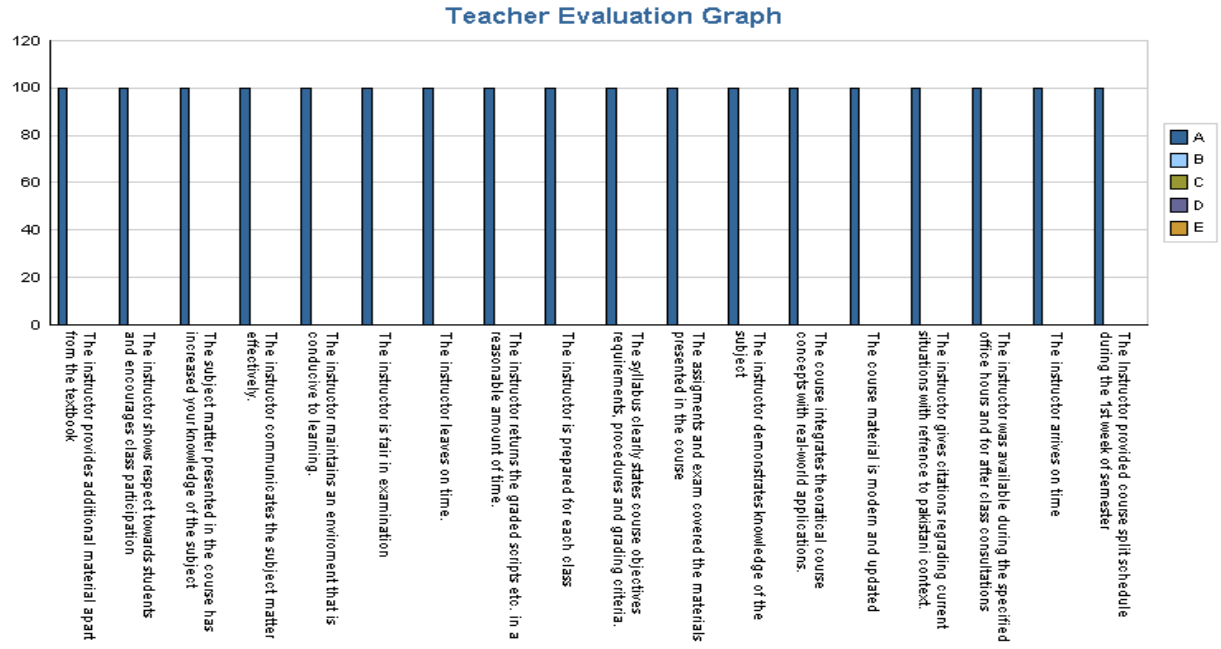

Figure 8: Graph showing teacher's evaluation on ENT-724 during Fall-2022

Students' Course Evaluation (Dr. Farid Asif Shaheen) on ENT-724, Fall-2022

Throughout the course, there was about 100% student attendance, excellent classroom conditions, appropriate feedback, and consistent instructor presence. There was 100% availability of appropriate instruction and study resources. It was agreed that the course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient and the teacher addressed the issues of students completely and in the best way (Figure 9).

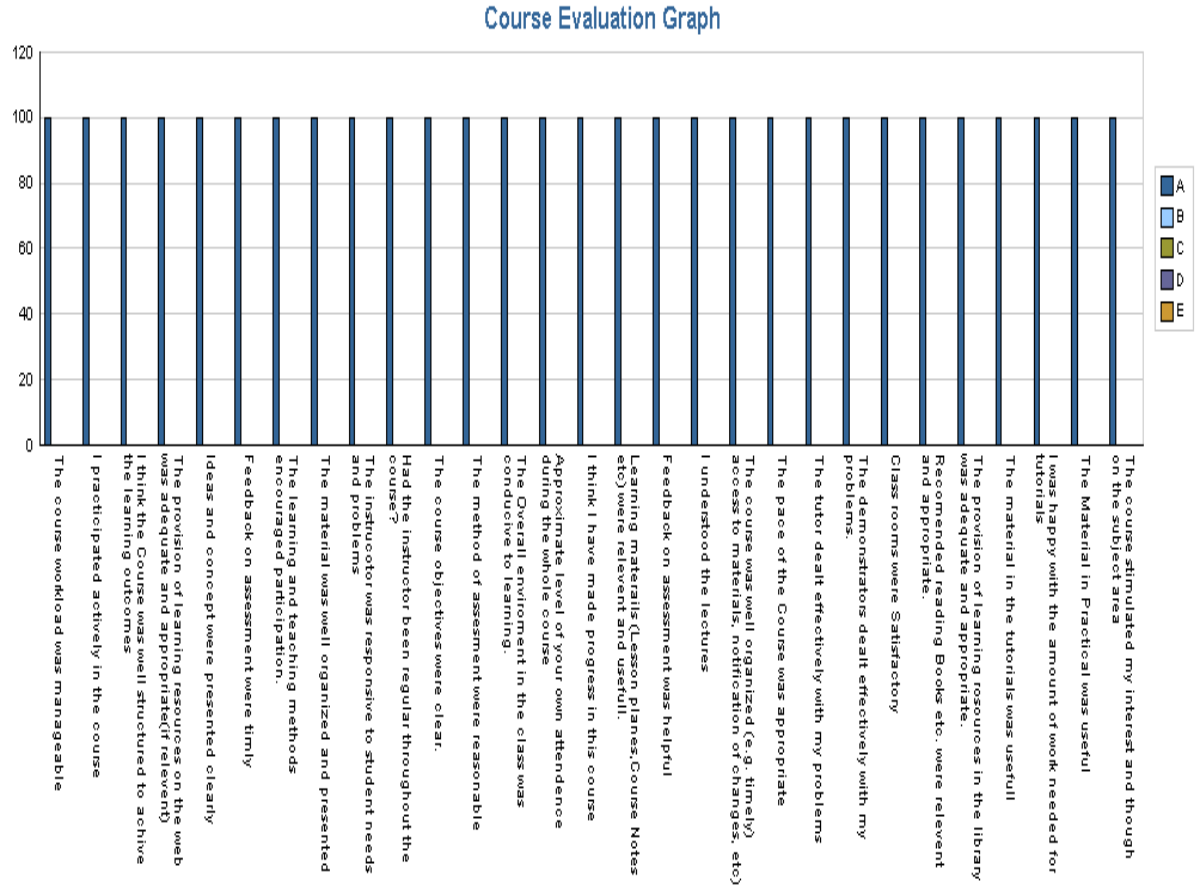

Figure 9: Graph showing student course evaluation on ENT-724 during Fall-2022

SPRING-2023

Teacher's Evaluation (Prof. Dr. Muhammad Naeem) on ENT-703, Spring-2023

For this course, 100% students were strongly agreed for all questions (Figure 10)

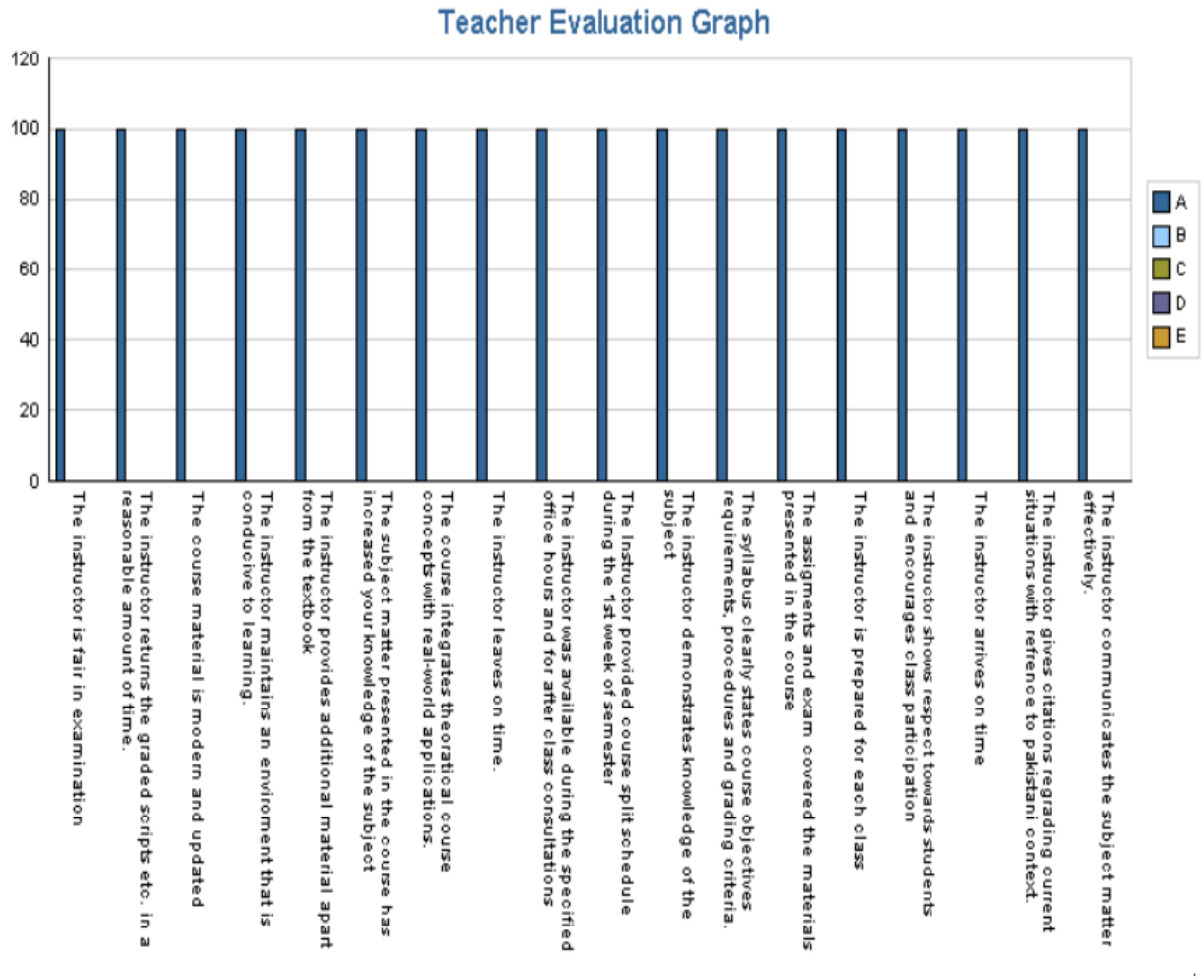

Figure 10: Graph showing teacher's evaluation on ENT-703 during Spring-2023

Students Course Evaluation (Prof. Dr. Muhammad Naeem) on ENT-703, Spring-2023

100% of students received appropriate feedback, and the instructor was present at all times during the course. There was 100% availability of appropriate instruction and study resources. It was agreed that the course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured.

Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely. (Figure 11).

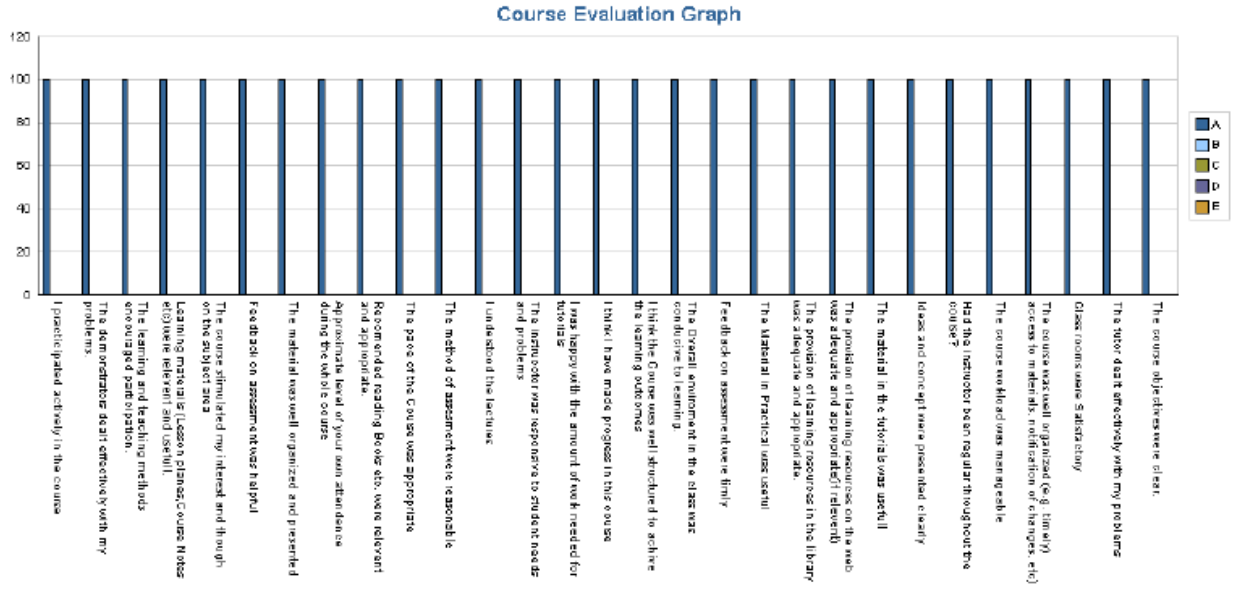

Figure 11: Student's course evaluation for course No. ENT-703 during Spring-2023

Teacher's Evaluation (Dr. Munir Ahmad) on ENT-714, Spring-2023

All the parameters regarding course, attendance, participation, lecture preparation, participation, understanding and examination grading were 100% for this course (Figure 12).

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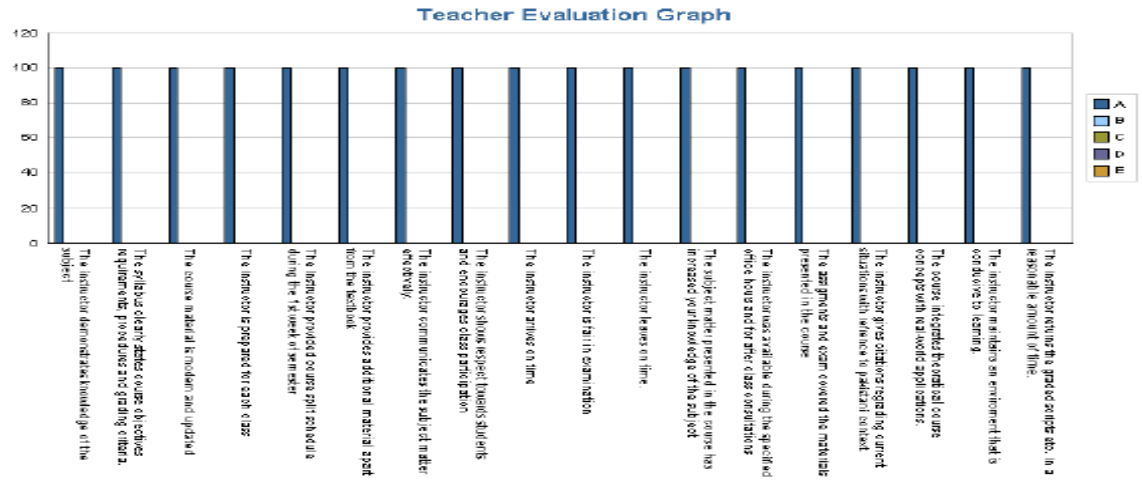

Figure 12: Graph showing teacher's evaluation on ENT-714 during Spring-2023

Students Course Evaluation (Dr. Munir Ahmad) on ENT-714, Spring-2023

Appropriate comments, a roughly adequate attendance rate, comfortable classrooms, and consistent instructor attendance throughout the course were all 100%. There was 100% availability of appropriate instruction and study resources. It was firmly agreed that the course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely. (Figure13).

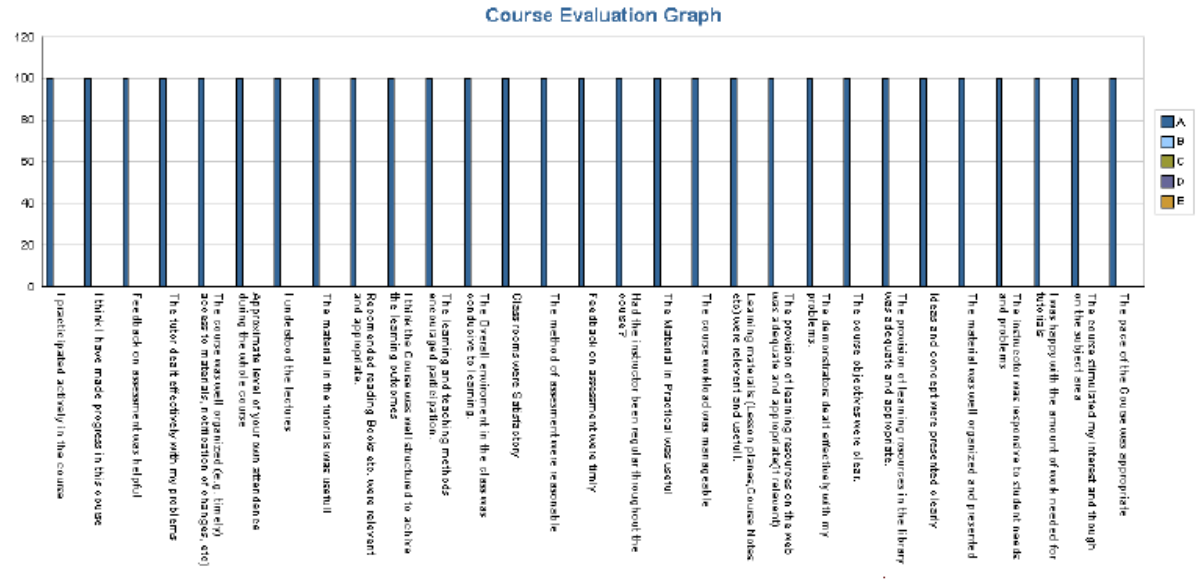

Figure13: Graph showing student course evaluation on ENT-714 during Spring-2023

Teacher's Evaluation (Dr. Asim Gulzar) on ENT-709, Spring-2023

With the exception of questions 8, 9, 11, 13, and 16, 94% to 100% of students strongly agreed with every question in this course.6% of them agreed with these questions. (Figure 14).

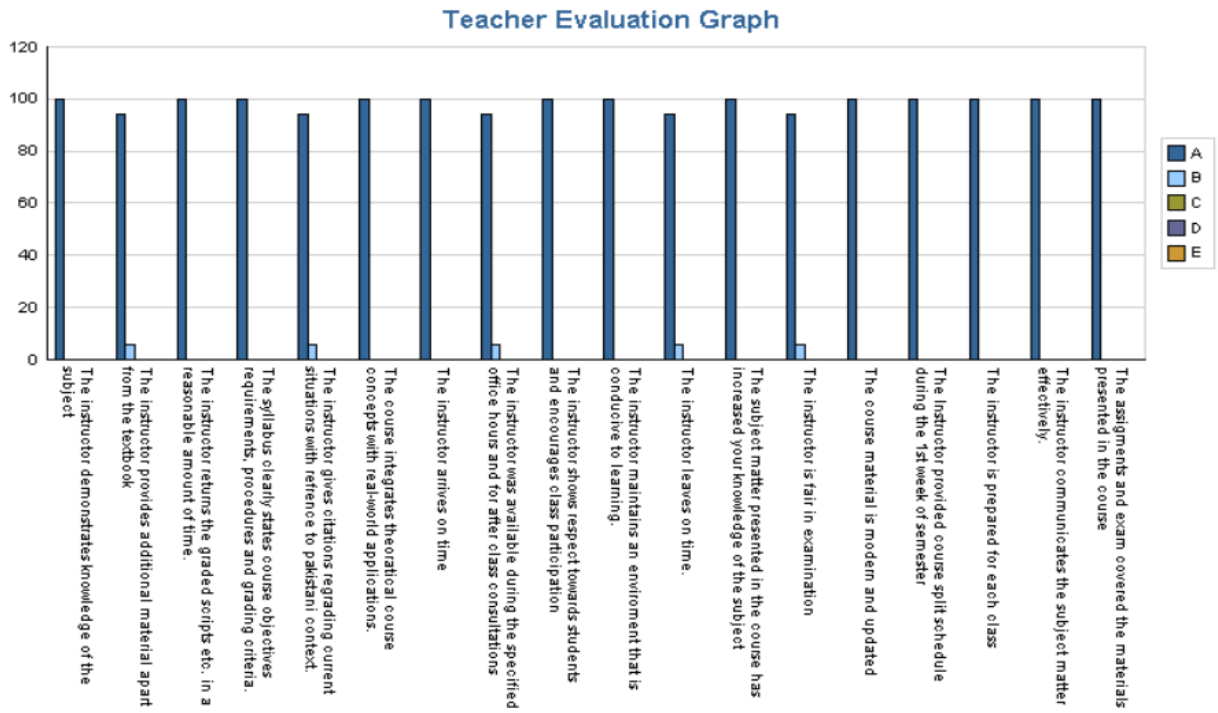

Figure14: Graph showing teacher's evaluation on ENT-709 during Spring-2023

Students' Course Evaluation (Dr. Asim Gulzar) on ENT-709, Spring-2023

Class rooms were satisfactory, feedback was appropriate, student attendance was roughly at 100%, and the instructor was there every day of the course. There was 100% availability of appropriate instruction and study resources. The course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely. (Figure 15).

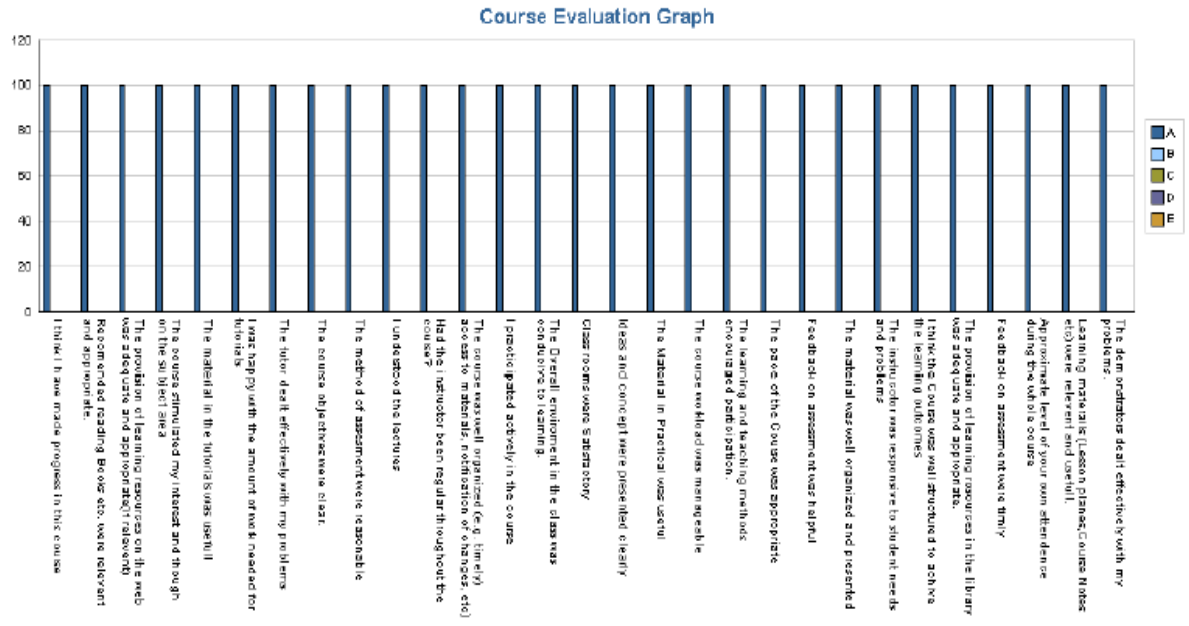

Figure15: Graph showing student course evaluation on ENT-709 during Spring-2023

FALL-2023

Teacher's Evaluation (Dr Munir Ahmad/Dr. M. Asif Aziz) on ENT-701, Fall-2023

Course attendance, participation, lecture preparation, participation, understanding and examination grading were 100% for this course (Figure 16).

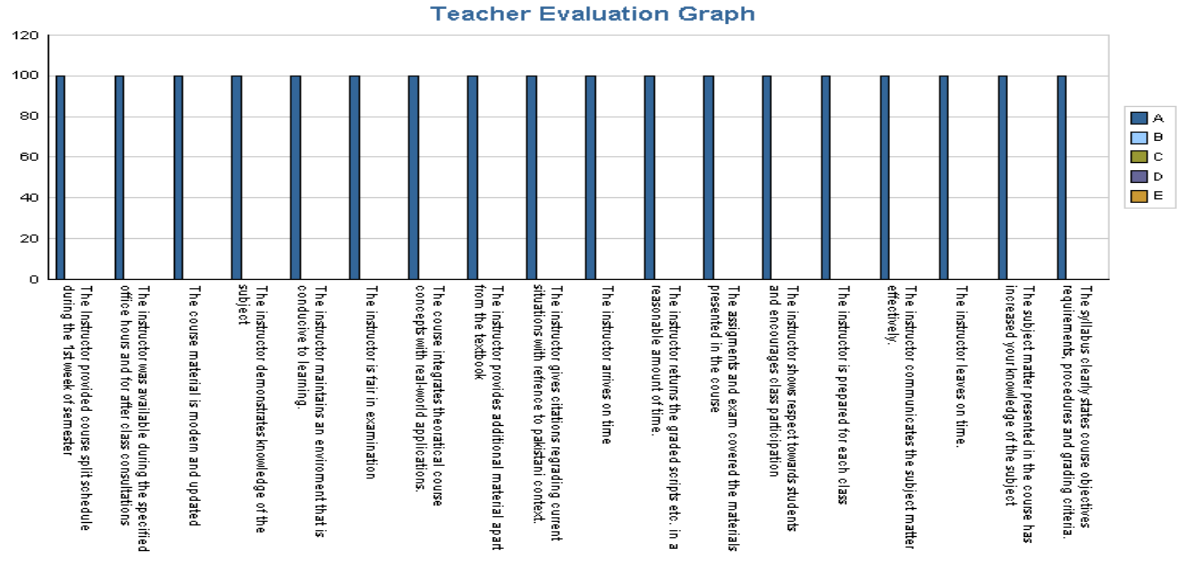

Figure 16: Graph showing teacher's evaluation on ENT-701 during Fall-2023

Students Course Evaluation (Dr Munir Ahmad/Dr. M. Asif Aziz) on ENT-701 Session Fall 2023

Class rooms were satisfactory, feedback was appropriate, student attendance was roughly at 100%, and the instructor was there every day of the course. There was 100% availability of appropriate instruction and study resources. The course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely (Figure 17).

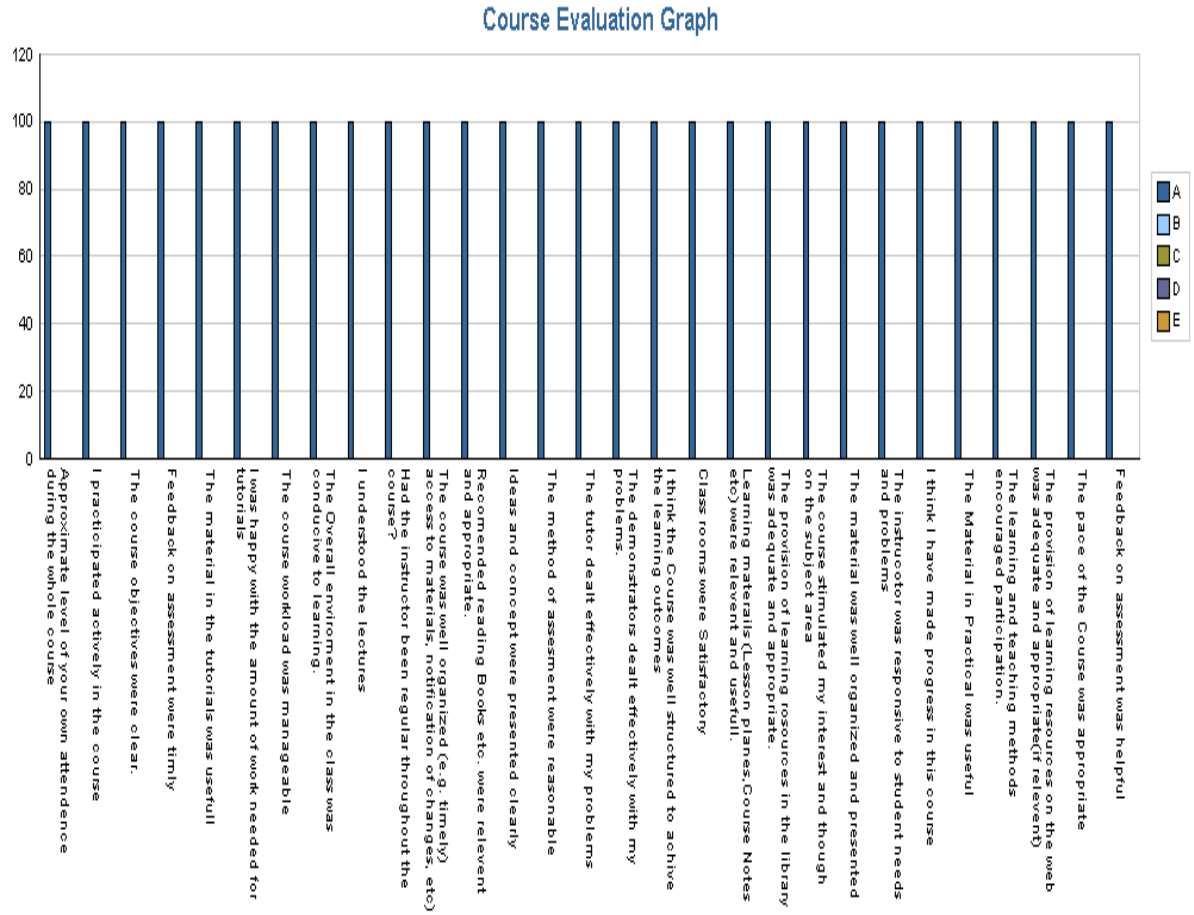

Figure17: Graph showing student course evaluation on ENT-701 during Fall-2023

Teacher's Evaluation (Dr. M. Tariq) on ENT-711 Session Fall 2023

With the exception of questions 8, 9, 11, 13, and 16, 94% to 100% of students strongly agreed with every question in this course. 6% of them agreed with these questions (Figure 18).

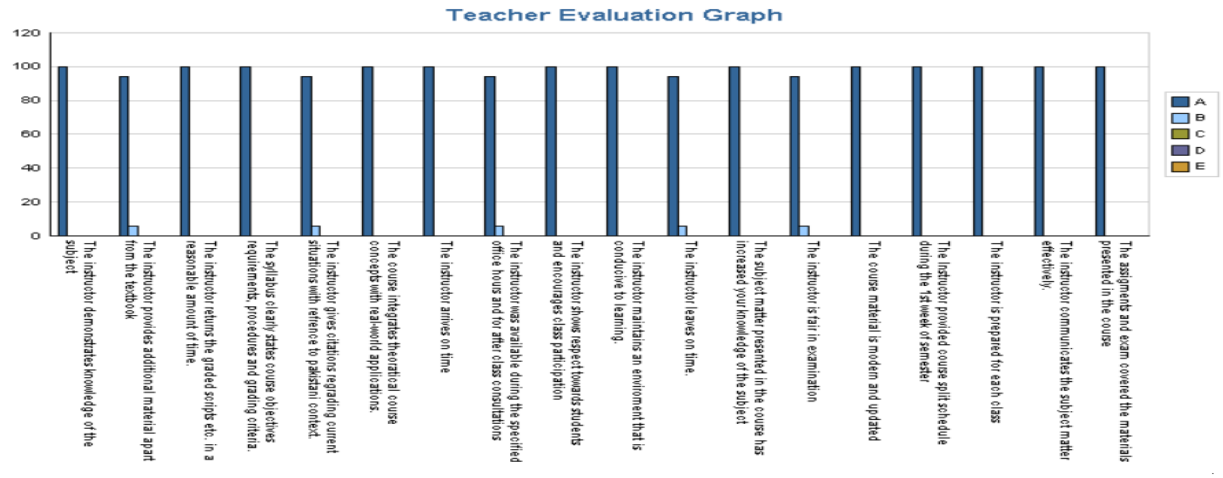

Figure18. Teacher's (Dr. M. Tariq) Evaluation on ENT-711 Session Fall 2023

Students Course Evaluation (Dr. M. Tariq) on ENT-711 Session Fall 2023

For every question, between 85% and 96% of students strongly agreed, as seen in Figure 19, just 4% of respondents agreed that question 3 was unclear. Between 4% and 15% of students agreed on every question.

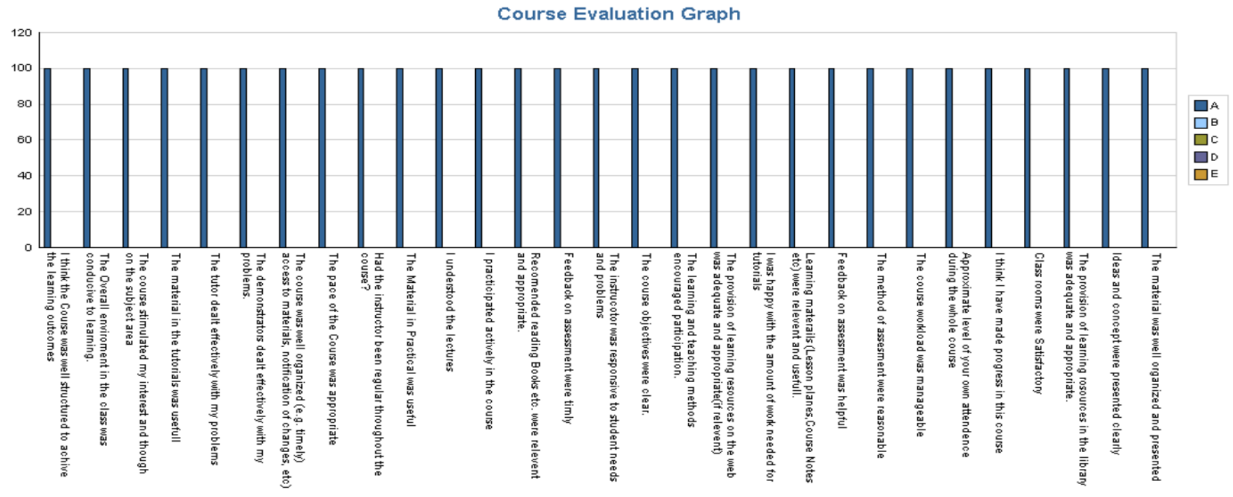

Figure 19. Students' Course Evaluation (Dr. M. Tariq) on ENT-711 Session Fall 2023

Teacher's Evaluation (Dr. Asim Gulzar) on ENT-718, Fall-2023

Figure 20 showed that 100% students were strongly agreed for all questions prescribed for this course regarding teacher's evaluation.

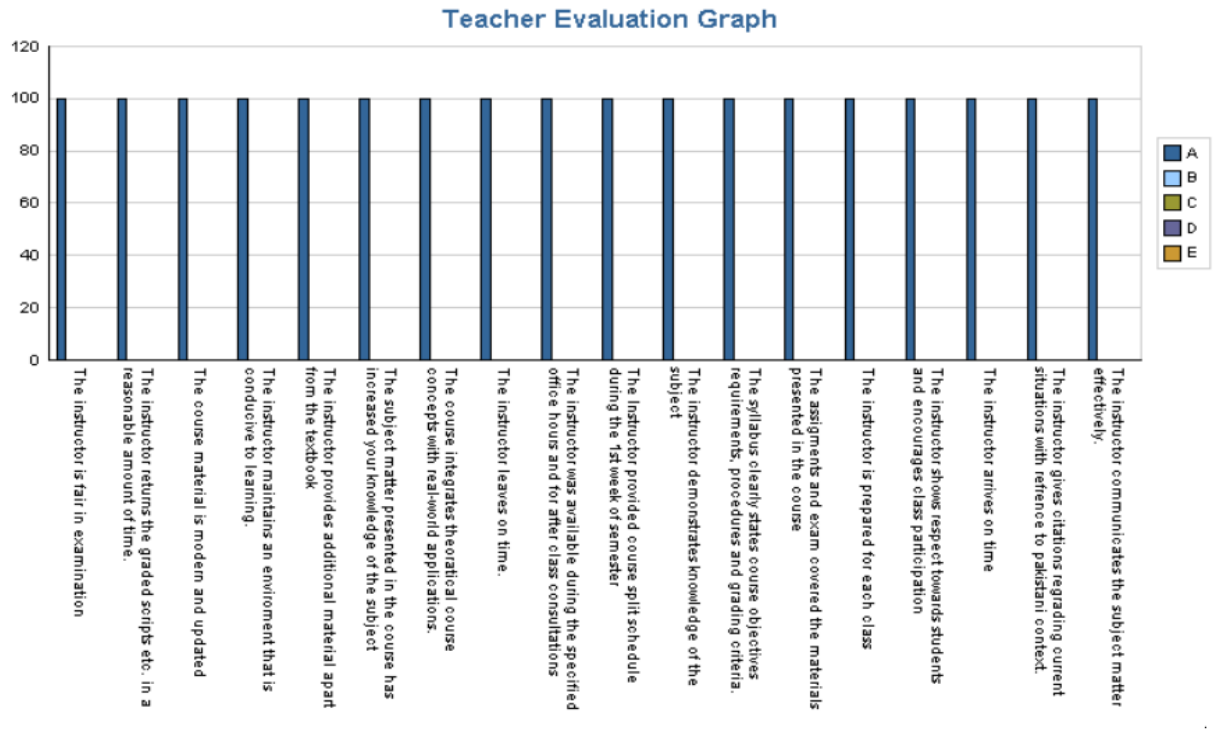

Figure 20: Graph showing teacher's evaluation on ENT-718 during Fall-2023

Students Course Evaluation (Dr. Asim Gulzar) on ENT-718, Fall-2023

Throughout the course, there was an approximate 100% attendance rate, appropriate feedback, and teacher regularity. There was 100% availability of appropriate instruction and study resources. Course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely. (Figure 21).

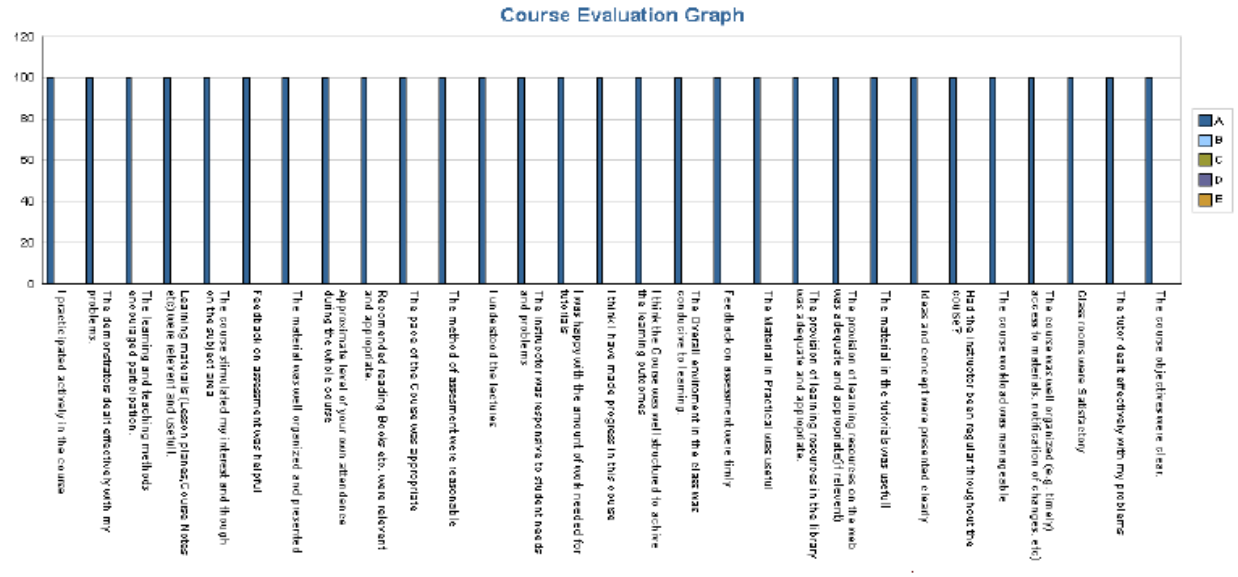

Figure 21: Student course evaluation for ENT-718 during Fall-2023

Evaluation of Teacher (Dr. Farid Asif Shaheen) on ENT-724, Fall-2023

For this course, all of the parameters including participation, lecture preparation, participation, comprehension, and exam grading were 100%. (Figure 22).

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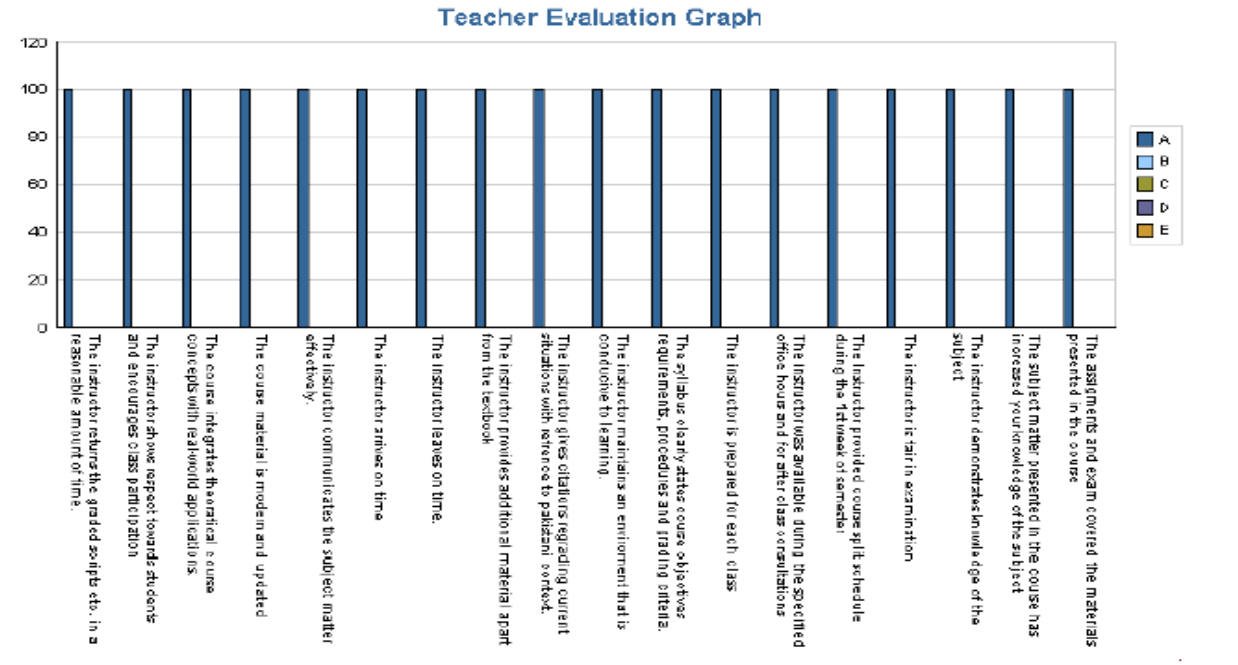


Figure 22: Graph showing teacher's evaluation on ENT-724 during Fall-2023

Students Course Evaluation (Dr. Farid Asif Shaheen) on ENT-724, Fall-2023

Satisfactory class rooms, level of student attendance, proper feedback and instructor regularity throughout the course were 100%. Availability of proper training and materials for study were 100% strongly agreed that I think the course was well structured to achieve the learning outcomes. Overall environment in the class was conducive to learning, course objectives were clear and stimulated my interest and though on the subject area. Course was well organized, workload was manageable, and instructor was responsive to student needs and problems. Learning and teaching methods encouraged participation and material in the tutorials was 100% useful. Pace of the course, learning resources on the web, in the library was adequate and the tutor dealt effectively with my problems as 100% (Figure 23).

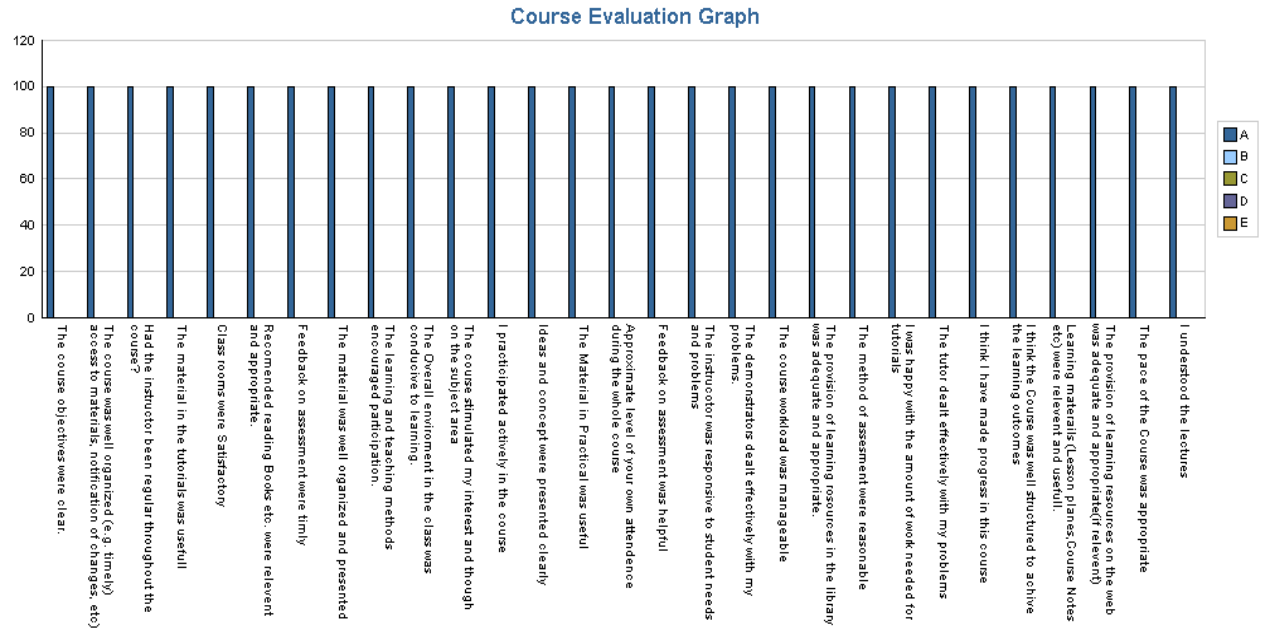


Figure 23:Graph showing students course evaluation on ENT-724 during Fall-2023

SPRING 2024

Evaluation of Teacher (Dr. Asim Gulzar) on ENT-716, Spring-2024

For this course, all parameters pertaining to attendance, participation, understanding, lecture preparation, and exam grade were 100% (Figure 24).

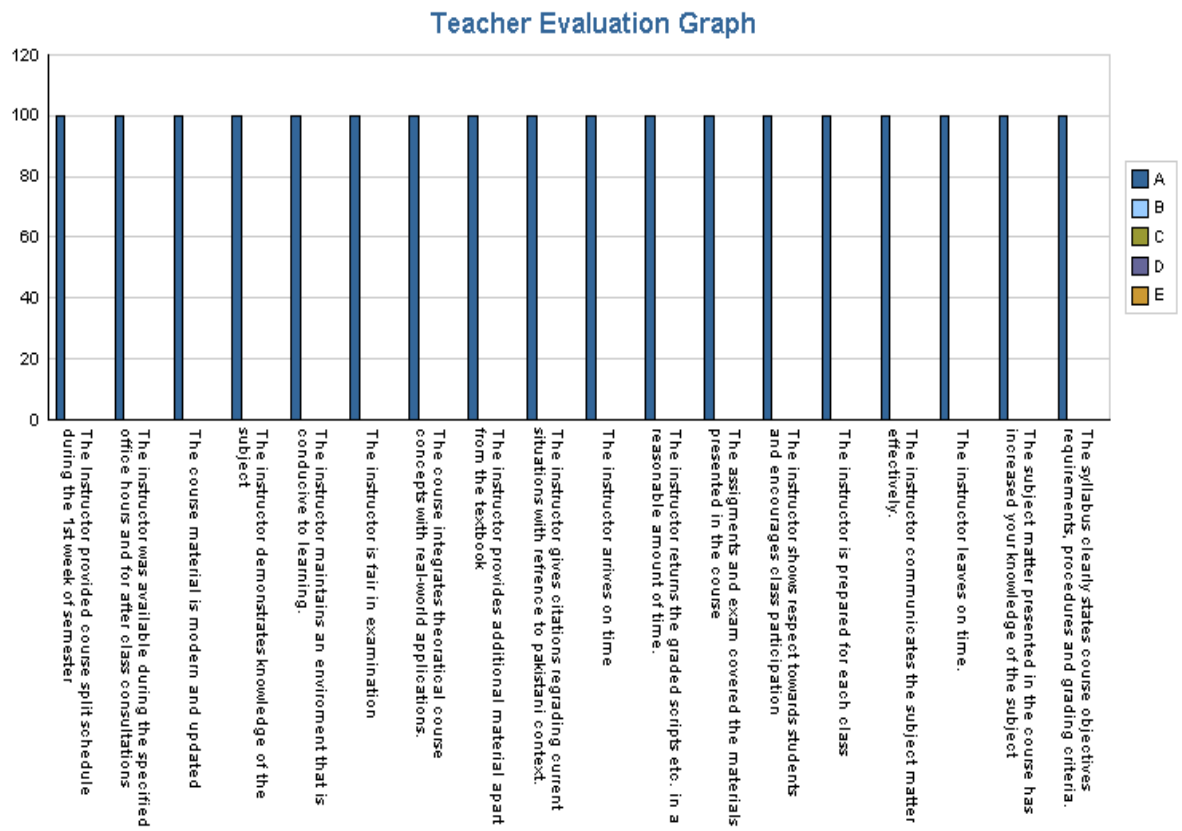


Figure 24: Graph showing teacher's evaluation on ENT-716 during Spring-2024

Students Course Evaluation (Dr. Asim Gulzar) on ENT-716, Spring-2024

There were 100% satisfactory classrooms, appropriate comments, and consistent instructor attendance throughout the course. There was 100% availability of appropriate instruction and study resources. It was firmly agreed that course was designed to meet the learning objectives. The classroom atmosphere was generally supportive of learning, the course goals were understandable, and the material piqued my curiosity. The lecturer was receptive to the needs and issues of the students, the workload was reasonable, and the course was well-structured. Participation was encouraged by the teaching and learning strategies, and the instructional content was completely beneficial. The course proceeded at a reasonable pace, the online and library resources were sufficient, and the tutor addressed my issues completely. (Figure 25).

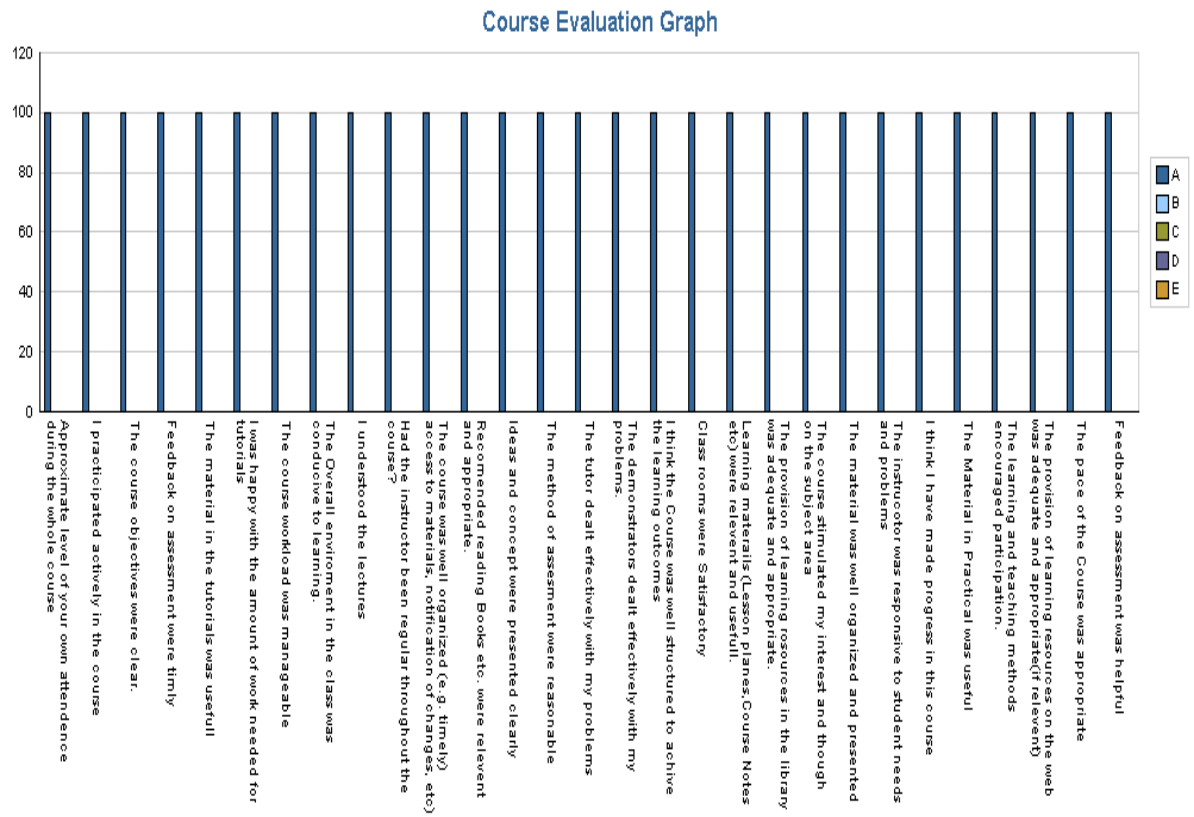


Figure 25: Graph showing student course evaluation on ENT-716 during Spring-2024

Teacher's Evaluation (Dr. M. Asif Aziz) on ENT-717, Spring-2024

Parameters regarding course, attendance, participation, lecture preparation, participation, understanding and examination grading were 100% for this course (Figure 26).

Students Course Evaluation (Dr. M. Asif Aziz) on ENT-717, Spring-2024

Satisfactory class rooms, proper feedback and instructor regularity throughout the course was 100%. Availability of proper training and materials for study were 100% strongly agreed that I think the course was well structured to achieve the learning outcomes. Overall environment in the class was conducive to learning, course objectives were clear and stimulated my interest and though on the subject area. Course was well organized, workload was manageable, and instructor was responsive to student needs and problems. Learning and teaching methods encouraged participation and material in the tutorials was 100% useful. Pace of the course, learning resources on the web, in the library was adequate and the tutor dealt effectively with my problems as 100% (Figure 27).

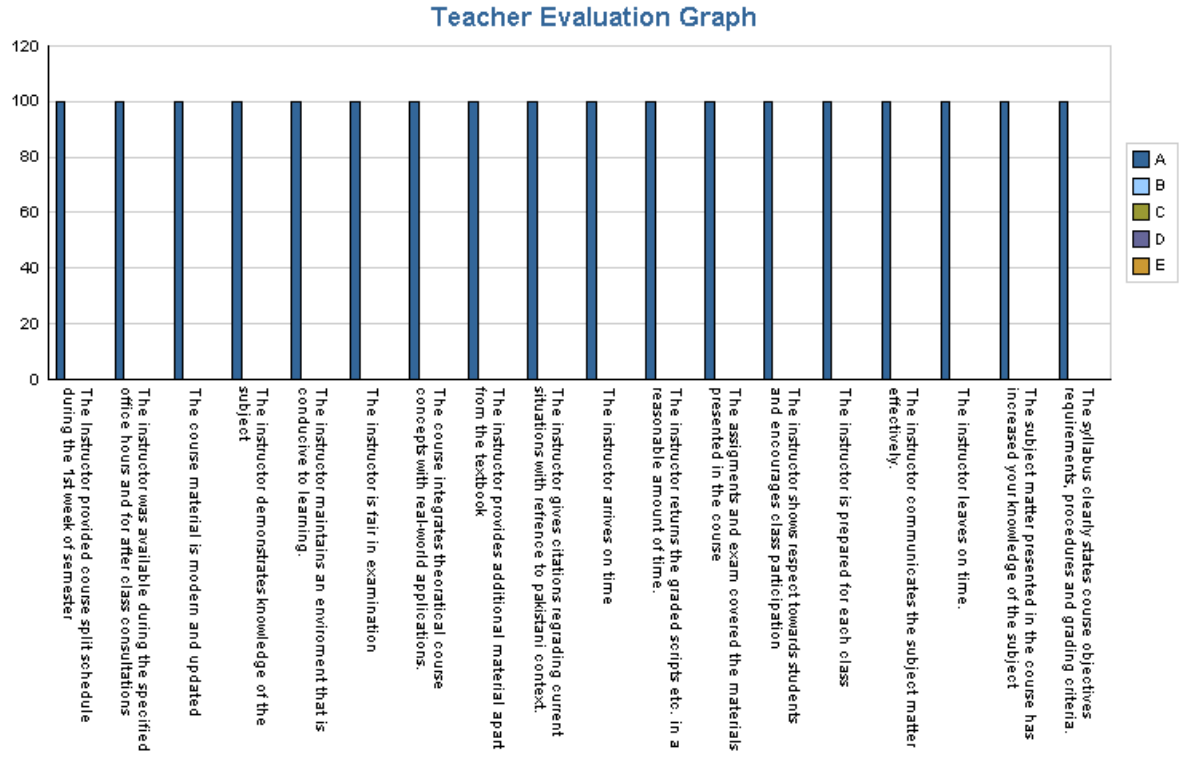


Figure26: Graph showing teacher's evaluation on ENT-717 during Spring-2024

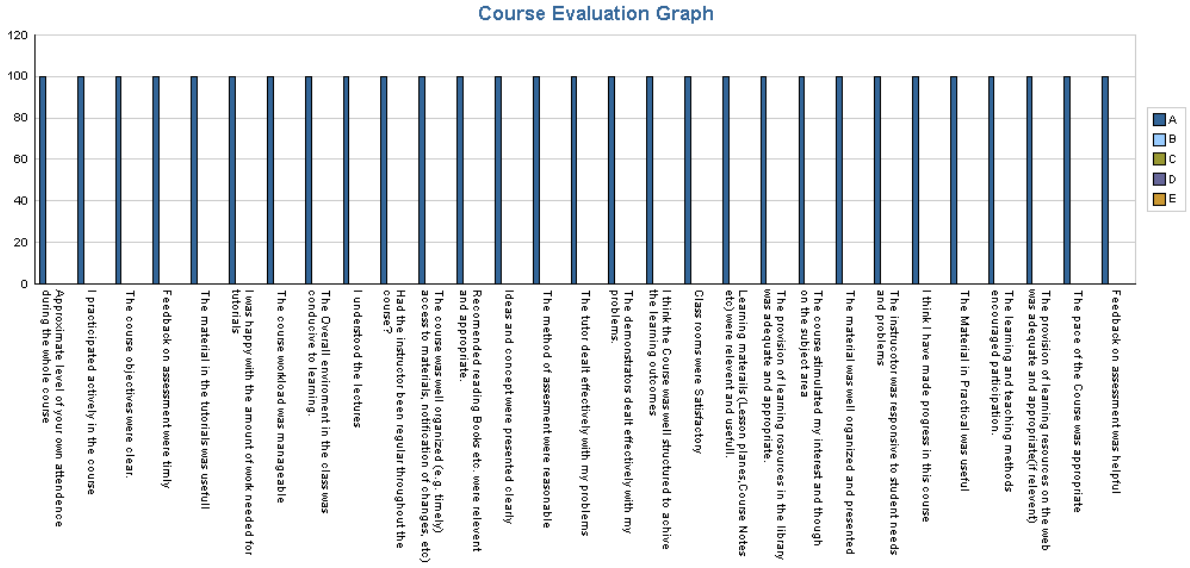


Figure 27: Graph showing student course evaluation on ENT-717 during Spring-2024

Teacher's Evaluation (Dr. Munir Ahmad) on ENT-729, Spring-2024

With the exception of questions 8, 9, 11, 13, and 16, 94% to 100% of students strongly agreed with every question in this course. 6% of them agreed with these questions. (Figure 28).

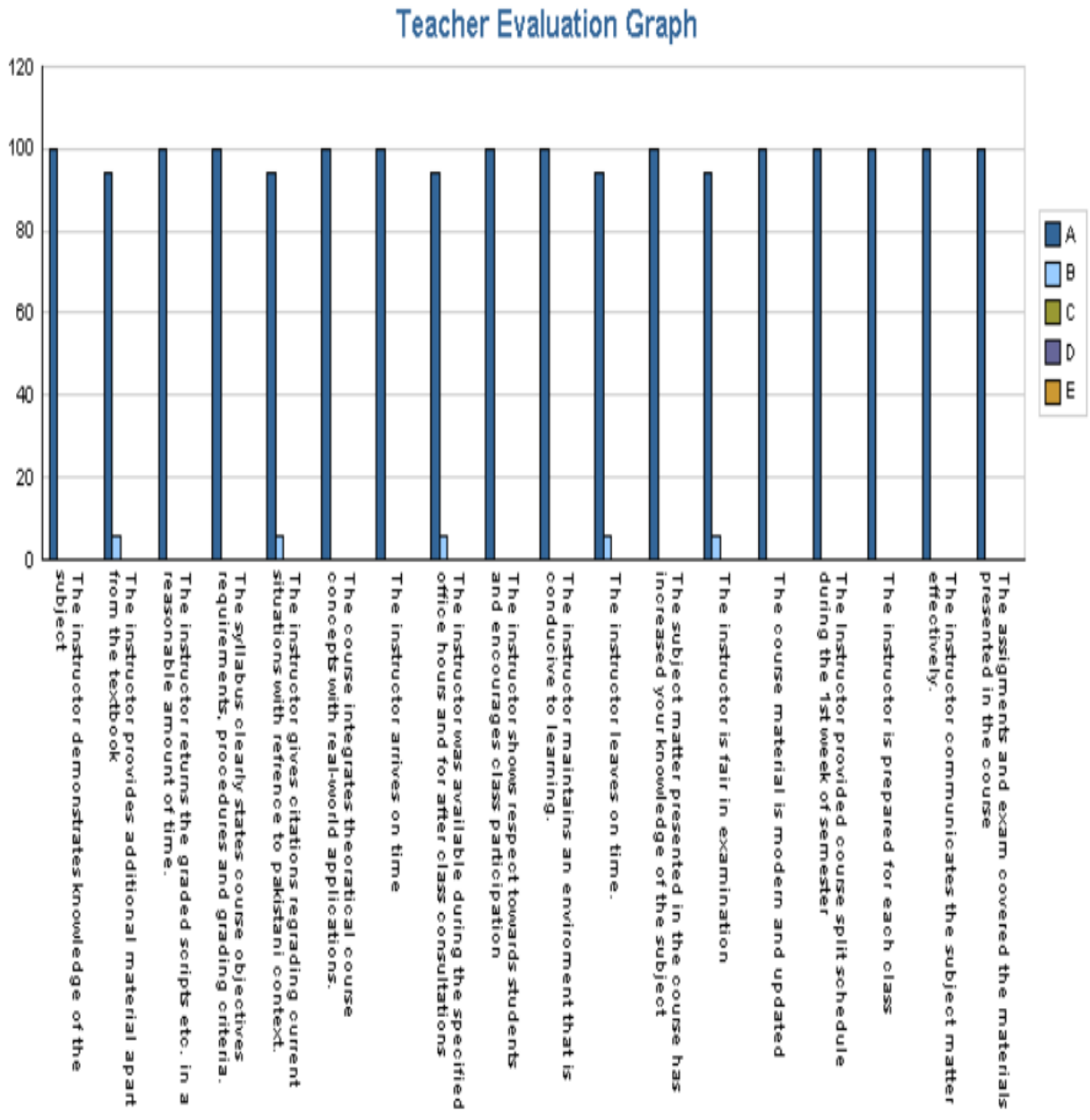


Figure 28: Graph showing teacher's evaluation on ENT-729 during Spring-2024

Students Course Evaluation (Dr. Munir Ahmad) on ENT-729, Spring 2024

With the exception of 1% and 18, 77% to 100% of students strongly agreed with every question in this course. With the exception of questions 1, 16, and 18, 4–9% of students agreed on every question. For questions 1, 2, 4, and 28, 4% were unsure (Figure 29).

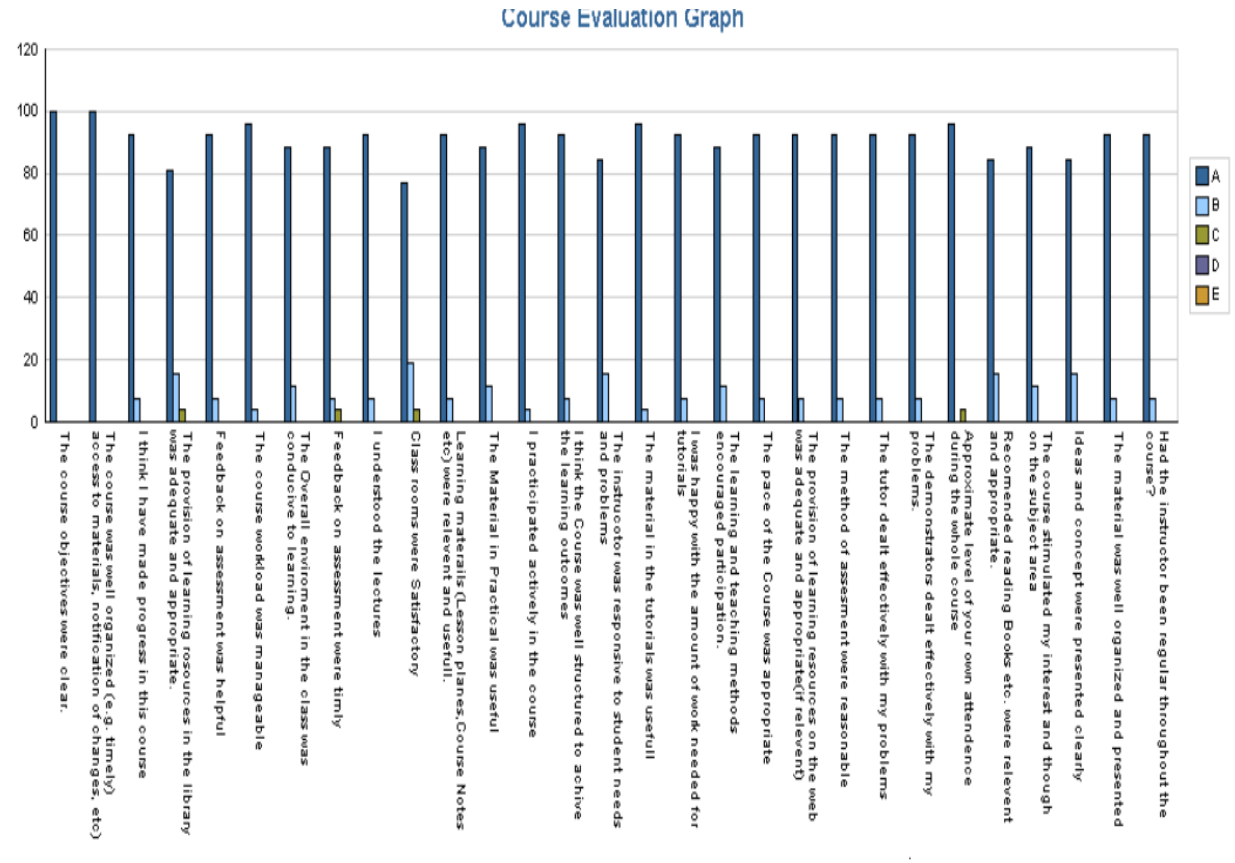


Figure 29: Students' Course Evaluation on ENT-729 in Spring-2024

FACULTY COURSE REVIEW REPORT

Fall Semester 2022

Four courses were taught during the reported period in this semester (Performa-2). Eighteen students signed up for these classes. Fifty percent, thirty-five percent, and fifteen percent received A, B, and C grades for the ENT 701 course. 73%, 27%, and 0% of students received A, B, and C grades for ENT 724, respectively. 60%, 30%, and 10% of

students received A, B, and C grades for ENT 711, respectively. 78%, 22%, and 0% of students received A, B, and C grades for ENT 718, respectively. It was determined that the courses were very acceptable and aligned with the curriculum and intended goals. **(Table 3)**

Spring Semester 2023

Three courses were taught during the reported period (Performa-2). A total of 18 students got registered in these courses. For ENT 703 course, 65%, 20% and 15% obtained A, B and C grades, respectively. For ENT 714 course, 58%, 32% and 10% obtained A, B and C grades, respectively. For ENT 709 course, 70% and 30% obtained A and B grades, respectively. The courses were found very much appropriated and in line with the curriculum and intended objectives. **(Table 4)**

Fall Semester 2023

In this semester, four courses were taught during the reported period (Performa-2). A total of 15 students got registered in these courses. For ENT 701 course, 45%, 26% and 25% obtained A, B and C grades, respectively and 4% got D grade. For ENT 711 course, 60%, 25% and 15% obtained A, B and C grades, respectively. For ENT 718 course, 75%, 20% and 5% obtained A, B and C grades, respectively and for ENT 724 course, 60%, 30% and 10% obtained A, B and C grades, respectively. **(Table 5)**

Spring Semester 2024

Three courses were taught during the reported period (Performa-2). A total of 15 students got registered in these courses. For ENT 716 course, 58%, 22% and 20% obtained A, B and C grades, respectively. For ENT 717 course, 70%, 30% and 0% obtained A, B and C grades, respectively. For ENT 729 course, 65% and 25% obtained A and B grades, respectively. The courses were found very much appropriated and in line with the curriculum and intended objectives. **(Table 6)**

Course Review Report

Table 3: Course assessment evaluation based on Performa 2

Fall Semester 2022													
Course code	Title	Credit value	Assessment Methods/ Exam	No. of students	Comments on Curriculum	Any change in course for future	Semester	Grade (%)					Course Instructor
								A	B	C	D	F	
ENT-701	Research methods in entomology	4(2-4)	Mid and Final exam	18	Good	N/A	Fall-2022	50	35	15			Prof. Dr. M. Naeem/Dr. M. Asif Aziz
ENT-711	Medical & veterinary entomology	3(2-2)	Mid and Final exam	18	Good	N/A	Fall-2022	60	30	10			Dr. M. Tariq
ENT-718	Advances in Insect Behavior	3(2-2)	Mid and Final exam	18	Good	N/A	Fall-2022	78	22				Dr. Asim Gulzar
ENT-724	Insect Pathology	3(2-2)	Mid and Final exam	50	Good	N/A	Fall-2022	73	27				Dr. Farid Asif Shaheen

Table 4: Course assessment evaluation based on Performa 2

Spring Semester 2023													
Course code	Title	Credit value	Assessment Methods/ Exam	No. of students	Comments on Curriculum	Any change in course for future	Semester	Grade (%)					Course Instructor
								A	B	C	D	F	
ENT-703	Environmental Entomology	2(2-0)	Mid and Final exam	18	Good	N/A	Spring 2023	65	20	15			Prof. Dr. Muhammad Naeem
ENT-709	Insecticides resistance & management	3(2-2)	Mid and Final exam	18	Good	N/A	Spring 2023	70	30				Dr. Asim Gulzar
ENT-714	Insecticides Toxicology	3(2-2)	Mid and Final exam	18	Good	N/A	Spring 2023	58	32	10			Dr. Munir Ahmad

Table 5: Course assessment evaluation based on Performa 2

Fall Semester 2023													
Course code	Title	Credit value	Assessment Methods/ Exam	No. of students	Comments on Curriculum	Any change in course for future	Semester	Grade (%)					Course Instructor
								A	B	C	D	F	
ENT-701	Research methods in entomology	4(2-4)	Mid and Final exam	15	Good	N/A	Fall-2023	45	26	25	4		Dr. Munir Ahmad / Dr. Muhammad Asif Aziz
ENT-711	Medical and Veterinary Entomology	3(2-2)	Mid and Final exam	15	Good	N/A	Fall-2023	60	25	15			Dr. M. Tariq
ENT-718	Advances in Insect Behavior	3(2-2)	Mid and Final exam	15	Good	N/A	Fall-2023	75	20	05			Dr. Asim Gulzar
ENT-724	Insect Pathology	3(2-2)	Mid and Final exam	15	Good	N/A	Fall-2023	60	30	10			Dr. Farid Asif Shaheen

Table 6: Course assessment evaluation based on Performa 2

Spring Semester 2024													
Course code	Title	Credit value	Assessment Methods/ Exam	No. of students	Comments on Curriculum	Any change in course for future	Semester	Grade (%)					Course Instructor
								A	B	C	D	F	
ENT-716	Insecticides and Public Health	3(2-2)	Mid and Final exam	15	Good	N/A	Spring 2024	58	22	20			Dr. Asim Gulzar
ENT-717	Advances in Biological Control of Insect Pests	3(2-2)	Mid and Final exam	15	Good	N/A	Spring 2024	55	30	15			Dr. M. Asif Aziz
ENT-729	Insect Rearing Techniques	3(2-2)	Mid and Final exam	15	Good	N/A	Spring 2024	65	26	09			Dr. Munir Ahmad

Standard 1-2 The Program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and the graduating students are capable of performing these outcomes.

1. By the time they graduate, MSc (Hons) students should be well-versed in the biosystematics of insect pests, their management, and associated environmental difficulties. They should also be able to come up with solutions.
2. The passing students must have a high level expertise in biocontrol pest management techniques and utilizing these techniques in an effective IPM system.
3. The student should have a good level understanding for situation analysis related to a pest and understanding to devise effective pest management methodology which is cost effective and environmental friendly.
4. M. Sc. (Hons) to have a high level of potential to conduct research experiments on the prevailing pest issues in the field of agriculture.
5. They must have a good level of advanced theoretical and practical knowledge of the subject helping them to prepare research projects for future needs.
6. They should be capable to devise and design field related enterprises and business using their expertise to add to the national economy.
7. They must have the capacity to support sustainable development by participating in entomological research and development projects.

Relationship between programme outcomes and objectives are given in Table 7.

Table 7: Programme outcomes and their relationship with the Programme objectives

		Outcomes						
Objectives		**1**	**2**	**3**	**4**	**5**	**6**	**7**
	1	++	++	++	+++	++	++	+++
	2	+++	++	++	+++	+++	+++	++
	3	++	+++	+++	+++	++	++	++
	4	++	+++	++	+++	+++	++	++
	5	+++	+++	+++	+++	+++	++	+++

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

Standard 1-3: Weakness Identified in the Program

Department is facing acute shortage of

- Absence of growth chambers, electron microscopes, and other molecular method equipment, together with specific chemicals, etc.
- Energy load shedding is another significant barrier to doing research and teaching under the necessary regulated conditions, even with the university administration's assistance and consideration.

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

Community Services by the Department

- To exhibit bumblebee colonies, honeybee rearing (apiculture), *Trichogramma* rearing, insects as significant pests and beneficial, and entomological industries like lac-culture and sericulture, among others, the entomology department regularly participates in a number of festivals (such as Food/Spring) held at the university.
- Provision of services of household pest control including dengue vector mosquitoes, cockroaches, flies, mealy bugs etc.
- Pest identification service for the visiting farmers and recommendation of pest management methodology.
- Termite proofing services for the general public and university employees in both urban and rural areas.

Faculty Satisfaction Regarding the Administrative Services

- The Entomology Department consistently participates in all scheduled and periodic meetings, including departmental, university, academic council, and syndicate meetings.
- Entomology Department maintains a ratio of 8:4 for the academic (technical) and administrative (non-technical) staff, as per standards of Higher Education Commission of Pakistan.
- A good level of regularity has been maintained in quick office disposal; so far no complaint has been lodged from any quarter in this regard.
- All sorts of records/inventories pertaining to personnel, students, results or thesis etc. have been maintained properly.
- The department now routinely has review meetings at the end of each semester..

Major Future Improvement Plans

Entomology department is specifically focusing on the following improvements after considering the previous evaluation/monitoring activities:

- Delivering high-quality instruction in the field of entomology by utilizing all available methods and resources.
- Establishing and maintaining high level of teaching-learning environmental standards for better productivity of professionals by Department.
- Visiting University Research Farm (Koont) as a regular activity to help the young entomologist for better understanding in research and field activities.
- Conducting farmers' field visits incorporating entomological problems particularly of arid-zone agriculture.
- Developing and delivering the extension material concerning pest management and other novel tactics.

- Organizing seminars/workshops on Entomological industries especially sericulture, apiculture, bombiculture and rearing of bio-control agents for agricultural/research officers of arid zone.
- Planning and executing problem based research on indigenous and major crop pests prevalent in arid ecology.
- Preparation and dissemination of extension literature like brochures and pamphlets for the farmers and advisory services.
- Capacity building of faculty members in relation to the latest global advancements in this discipline through exchange programs, short term trainings and collaborative research projects with federal and provincial government bodies.
- Establishing post-graduate labs in a range of fields, including pollinator conservation, plant disease vectors, host-plant resistance, and sericulture. Development of Entomology Human Resources to Address Future Challenges for Sustainable Agriculture and Food Self-Sufficiency.

CRITERION2: CURRICULUM DESIGN AND ORGANISATION

Degree	**Pre-requisites**
M.Sc. (Hons) Agric. in Entomology	B.Sc. (Hons) Agric. in Entomology, University Test at 50%, Interview

Definition of Credit Hour

A student must complete a definite number of credit hours. One credit hour is one theory lecture or two hours laboratory (practical)/week. One credit hour carries 20 marks. Duration of a semester is 18 weeks.

DEGREE PLAN

M.Sc. (Hons) Agric. in Entomology

A candidate can be admitted if they have a CGPA of 2.75 or its equivalent in MSc (Hons) Agriculture and 50% in a relevant field of study. A minimum grade point average of 2.50 is required to earn a master's degree. All of the department's faculty members currently hold Ph.D.s. Regarding MSc student enrollment, examination, and performance review, the department closely adheres to HEC directives and rules.

- **Curriculum Course Requirements**

Each student must complete 45 credits in order to receive their degree, which consists of 10 credits for their research thesis (which does not count toward their CGPA) and 35 credits for their coursework. A supervisory committee will be assigned to each student pursuing an MSc (Hons) Agriculture (Entomology) with thesis to provide guidance on his course of study and research. Once a student has passed all final exams in recognized courses and the comprehensive exam, as long as they have also met the residential criteria, they will be able to submit their thesis for review.

Table 8 Curriculum Course Requirements

S. No.	Course No.	Title	Credit Hours
1.	ENT-701	Research Methods in Entomology	3(2-1)
2.	ENT-702	Origin and Phylogeny of Insects	3(3-0)
3.	ENT-703	Environmental Entomology	2(2-0)
4.	ENT-704	Advanced Insect Morphology	3(2-1)
5.	ENT-705	Advanced Insect Ecology	3(2-1)

6.	ENT-706	Numerical Taxonomy	3(2-1)
7.	ENT-707	Advanced Insect Physiology and Embryology	3(2-1)
8.	ENT-708	Molecular Entomology	3(2-1)
9.	ENT-709	Insecticide Resistance and Management	3(2-1)
10.	ENT-710	Insects in Relation to Plant Diseases	3(2-1)
11.	ENT-711	Medical and Veterinary Entomology	3(2-1)
12.	ENT-712	Acarology	3(2-1)
13.	ENT-713	Classification of Immature Insects	3(2-1)
14.	ENT-714	Insecticide Toxicology	3(2-1)
15.	ENT-715	Insect Nutrition	3(2-1)
16	ENT-716	Insecticides and Public Health	3(2-1)
17.	ENT-717	Advances in Biological Control of Insect Pests	3(2-1)
18.	ENT-718	Advances in Insect Behaviour	3(2-1)
19.	ENT-719	Special Problem	1(1-0)
20.	ENT-720	Seminar	1(1-0)
21.	ENT-721	Pesticides Application Equipments	3(1-2)
22.	ENT-722	Advances in Pest Management Research	3(2-1)
23.	ENT-723	Insect Cytogenetics and Cytotaxonomy	3(2-1)
24.	ENT-724	Insect Pathology	3(2-1)
25.	ENT-725	Insect Biochemistry	3(2-1)
26.	ENT-726	Chemical Ecology of insects	3(3-0)
27.	ENT-727	Forensic Entomology	3(2-1)
28.	ENT-728	Insect Neurobiology	3(2-1)
29	ENT-729	Insect Rearing Techniques	3(2-1)
30	Thesis	MSc (Hons.) thesis	

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

The table below shows the results of the curriculum assessment, and the courses are cross-tabulated based on the program outcomes..

Table 9 Courses Taught during the semester Versus Outcome

Course/ Groups of courses	**Out comes**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Ent-701, Ent-724, Ent-711, Ent-716, Ent-717, Ent-718	+ + + +	+ + + +	+ + ++	+ + + +	+ + + +	+ + +	+ + ++
Ent-703, Ent-729, Ent-709, Ent-714	+ + +	+ + + +	+ + + +	+++	+ + +	+ +	+ + +

+ = Relevant
++ = Relevant & satisfactory
+ + + = Very relevant & Very satisfactory
+ ++ + = Highly relevant & highly satisfactory

- The curriculum fits in perfectly and meets the program's essential standards as stated by the relevant accrediting authority.
- In accordance with the Higher Education Commission's demands and specifications, the curriculum met the general arts, professional, and other disciplinary requirements for the program..

Standard 2-2: Theoretical backgrounds, problem analysis and solution design must be stressed within the program's core material.

Table 10: Programme Courses corresponding to theoretical background, problem analysis and solution design.

Elements	Courses
Theoretical backgrounds	Ent-701, Ent-724, Ent-716
Problem analysis	Ent-718, Ent-703
Solution design	Ent-716, Ent-717, Ent-714

Standard 2-3: Information Technology Component of the Curriculum Must Be Integrated Throughout the Program

During the preparation of curriculum, all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program. The curriculum is designed according to the requirements of the NAEAC and is duly approved by the Academic Council of PMAS-AAUR.

Standard 2-4: Oral and written communication skills of the student must be developed and applied in the program

During different courses, students are assigned various group tasks and presentations to develop and enhance their oral and written communication skills. Moreover, their leadership qualities and motivation skills are also improved during course work by indulging them into several learning activities.

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:

Professional ethics focus on rules, regulation used in the field. Mathematical and statistical background is also built using certain data analysis software. To improve the English language, lectures are delivered in English medium and to improve the skills presentations are conducted in all the courses.

Standard 2-6: Information Technology Component of the Curriculum Must Be Integrated Throughout The Program:

While the curriculum was prepared, all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program.

Standard 2-7: Oral and written communication skills of the student must be developed and applied in the program.

Students of MSc (Hons) Agriculture (Entomology) are assigned presentations and group works during different courses which are presented in the class to develop and enhance their written and oral communication and motivation skills.

CRITERION 3: LABORATORIES AND COMPUTER FACILITIES

There are six laboratories in the department. The facilities and shortcomings of these laboratories are listed as under.

- Laboratory Title:
  - Biosystematics laboratory
  - Biocontrol laboratory
  - Insect Toxicology Laboratory
  - Stored grain insect laboratory
  - Apiculture laboratory
  - Non Apis Bee Laboratory
  - Mosquito Research Laboratory
- Location and Area: Faculty of Crop and Food Sciences, A-Block, 2nd Floor, Main Campus, Rawalpindi
- Objectives: Laboratories are used for:

- Research work for the post graduate students
- Used for execution of the research/development projects funded by HEC, PSF, PARC, and other national and international agencies/institutions.

Future Need

- To meet the modern level of research and education, larger, better-equipped labs are required for improved results.

Standard 3-1: Laboratory manuals/documentation/instructions for experiments must be available and easily accessible to faculty and students

There are no laboratory manuals available. All of the pertinent literature is currently available at the department library. Although they serve a limited purpose, laboratories are not specious. Depending on financial resources, the equipment is being purchased and changed. There is a paucity of equipment related to molecular methods, such as slow and ultra centrifuges, PAGE-Electrophoresis apparatus, PCR, spectrophotometers, and the necessary software and reagents.

Standard 3-2: There must be support personal for instruction and maintaining the Laboratories.

Only one laboratory assistant is responsible for maintaining the equipment, glassware, chemicals, materials, etc. in the labs. Three lab attendants help the students with cleaning, washing, and practical.

Standard 3-3: The University computing infrastructure and facilities must be adequate to support program's objectives.

- Since lessons (lectures) are now held in laboratories, separate classrooms are required to enhance the current educational facilities.
- Space limitation is a major constraint as department could not initiated some of the major subjects like sericulture, host plant resistance and insect vectors' research activities.
    - **Computing facilities support*:*** Available to a limited number of faculty members and Post-graduate scholars.

- **Safety Arrangements:** There is no proper safety arrangement and no security plan is in place in case of emergency. The department is located on the 2nd floor; there is no emergency exit for the labs.
- **Shortcoming in computing infrastructure:** Computers with internet facilities should be available to all faculty members and postgraduate students.

CRITERION 4: STUDENT SUPPORT AND ADVISING

The Directorate of Students Affairs offers efficient assistance in resolving post-graduate students' concerns about the availability of advice and information in a range of social and educational subjects. To help students expand their knowledge and experience for use in their professional careers, the university arranges a variety of cultural events and study excursions and visits.

Standard 4-1: Courses must be offered with sufficient frequency and number for students to complete the program in a timely manner

- The post-graduate courses (number and type) are taught as per the HEC criterion/standard.
- In line with the HEC guidelines and Academic Council's recommendations regarding schemes of study, all the courses are offered accordingly to MSc level as per mentioned of the authorities but depend upon the availability of teachers and facilities.
- To meet the human resource needs in public and private sector at national level, the MSc (Hons) level courses are tailored accordingly.

Standard 4-2: Courses in the major area of study must be structured to ensure effective interaction between students, faculty and teaching assistants.

Effective teaching needs are addressed by the post-graduate courses' design and customization. In this sense, students and teaching staff are consulted on a regular basis to gather input for future development. In addition to the theoretical components of the courses, students are prepared to handle their professional needs through various

assignments and report submissions, and practical work is also conducted in the field and in laboratories. To obtain up-to-date information and insight addressing their future demands, they are partnered with a variety of institutions and organizations.

In this regard

- At the board of study meeting and other regular meetings, courses are revised and structured based on input from instructors and students. This was done on a regular basis to keep students and professors in good communication as well as across and within classes.

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 choices.

The post-graduate students are guided properly in relation to their on-going educational programs at university and also focusing their future needs.

- Students are informed about the program requirement through the office of the head of the department.
- The subject department has developed full harmony among the faculty members and students especially the MSc students. Management has made all sorts of efforts to update their knowledge and information source.
- All of the records pertaining to studies of the students are regularly updated through teacher – student interaction.

CRITERION 5: PROCESS CONTROL

Process control encompasses students' admission, students' registration, faculty recruitment activities which are dealt by various statutory bodies and the university administration.

Standard 5-1: The process by which students are admitted to the program must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.

- A regular process of revision of the admission criterion is well in place on yearly basis.
- An established and recognized admission system works at university/department level. This is followed as per the rules and regulations set by the university. Admission for MSc degree is properly advertised in the newspapers having national level circulation.
- Criterion regarding admission in MSc degree course is described in definite term by the university and admission system is based upon the recommendations of supervisory committee.

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

- Recommendations regarding admission process for different departments are forwarded to the Registrar office for their formal registration as university student.
- For the masters degree course registration of students is done once but evaluation is done a number of times through different examination stages. Successful completion of one semester ensures the promotion to the next semester.
- Admission merit based upon marks percentages of previous and entry test exams etc.

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

HEC guidelines are followed by the University in recruitment process. Induction of all positions at Faculty level is done as per rule:

- Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period.
- HEC also supports appointment of highly qualified members as foreign faculty Professor, National Professors and deputes them in various departments of the University.
- Different faculty positions are advertised in different newspapers of national circulation; 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 fixed by the University.
- The candidates are interviewed by the University Selection Board and Principal and alternate candidates are selected.
- 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.

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

- With the initiation of new areas/fields, new courses are set and included in the curriculum.
- To convey/impart the most recent advances and techniques in entomology, course curriculum are regularly revised / updated time to time.
- It is preferred by the students to buy cheaper books of Asian Editions. These editions are also available in university library where computers, electronic journals and internet facility are made available to all faculty members and scholars.
- All the courses and knowledge imparted meet the objectives and outcome. The progress is regularly reviewed in the staff meetings.

- For effective communication, all sorts of audio visual aids are utilized in educational process.

Standard 5-5: **The process that ensures that scholars 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.**

- The Controller of Examinations announces the start date of the exam. The controller office tells the students of their exam results after roughly ten to twenty days. Quizzes, midterm and final exams, practical, assignments, reports, and oral and technical presentations are all part of the evaluation process. Candidates receive grade A if they receive 80% or higher. Scholars who achieve the highest grades in a variety of subjects are given gold medals. Degrees are given to successful students at the yearly convocation, which is held on a regular basis.

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.

Presently there is one Professor, six Associate Professors, and one Assistant Professor working in the MSc (Hons.) programme.

Table 4.6

Program area of specialization	**Courses in the area**	**Number of faculty members**	**Number of faculty with PhD degree**
Insect Taxonomy and Biosystematics	Numerical Taxonomy, Classification of Immature Insects	02	02
Insect Toxicology	Insecticide Toxicology, Environmental Entomology	02	02
Stored Product Entomology	Stored Grains Pests and Their Management	01	01
Apiculture	Apiculture	01	01
Insecticides Resistance	Insecticide Resistance and Management	01	01
Molecular Entomology	Insect Biochemistry	01	01
Total	08	08	08

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. Effective Programs for Faculty Development

- All of the faculty members are provided with different academic, research and training facilities as per availability in the university system.
- Supervisors of MSc research are offered incentives for implementing different laboratory and filed experiments to promote high standard research activities.

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

The management has taken steps in this direction, and faculty members are happy with them. Young faculty members are greatly aided by the formal and informal coaching provided by experienced faculty members, as well as by other forms of entertainment, field trips, and excursions.

CRITERION 7: INSTITUTIONAL FACILITIES

Standard-7-1: The institution must have the infrastructure to support new trends in learning such as e-learning:

The Department of Entomology's faculty members have access to the internet and electronic library. This is highly helpful for performing research at the worldwide level and providing high-quality education. However, there are still certain facilities listed below that are deficient in this regard.

- High speed internet is not available in the department everywhere therefore routers are needed in some laboratories and offices.
- Registered versions of various software and computer programs are not available to faculty members as well as scholars.

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

The Central Library of University has limited number of books, journals and periodicals. According to the need of hour, this is a small library with no catalogue systems. To fill this gap, department is developing its own library to meet the needs of students and funds allocation is strongly desired to establish a comprehensive library.

Standard 7-3: Class-rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibilities

The department has a small number of classrooms, but they also lack some essential amenities. For seminars, presentations, and lectures, there is just one multimedia set accessible. The lack of a functional lab environment has an impact on the caliber of instruction. Additionally, there are not enough faculty offices, so four teachers share two rooms. The quality of instruction and the process of disseminating knowledge are also being impacted by this circumstance.

CRITERION 8: INSTITUTIONAL SUPPORT

To achieve this condition, the management of the university has been working to improve all departments, create new faculties and institutes, and enhance existing departments. Additionally, the university is making an effort to draw in highly skilled professors. At the moment, the institution has implemented a tenure track system that will help to pool better human resources, such as academic members.

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

In terms of funding, the department does not have enough money to meet the current demands for an improved educational system. Departmental research activities are primarily supported by individual research grants for staff and students. Given the dire need for more funding to build a library, labs, and computer facilities, the department's strengthening project, which was supported by HEC, greatly assisted in meeting the needs to some degree.

Standard 8-2: There must be adequate number of high quality students

The admission is offered in each semester.

Research students' review

Performa 4 was used to conduct survey to review the progress of students. General inferences are drawn hereunder.

- The scholars have access to scientific literature through central/departmental laboratory.
- Some scholars argued that equipments relating molecular and biochemical techniques should be made available in the department to carry out biochemical analysis of cereals, toxicological study of insecticides, bumble bee and apiculture research and biosystematics study of insects.
- Majority of the scholars were found satisfied with the level of supervision maintained at department.

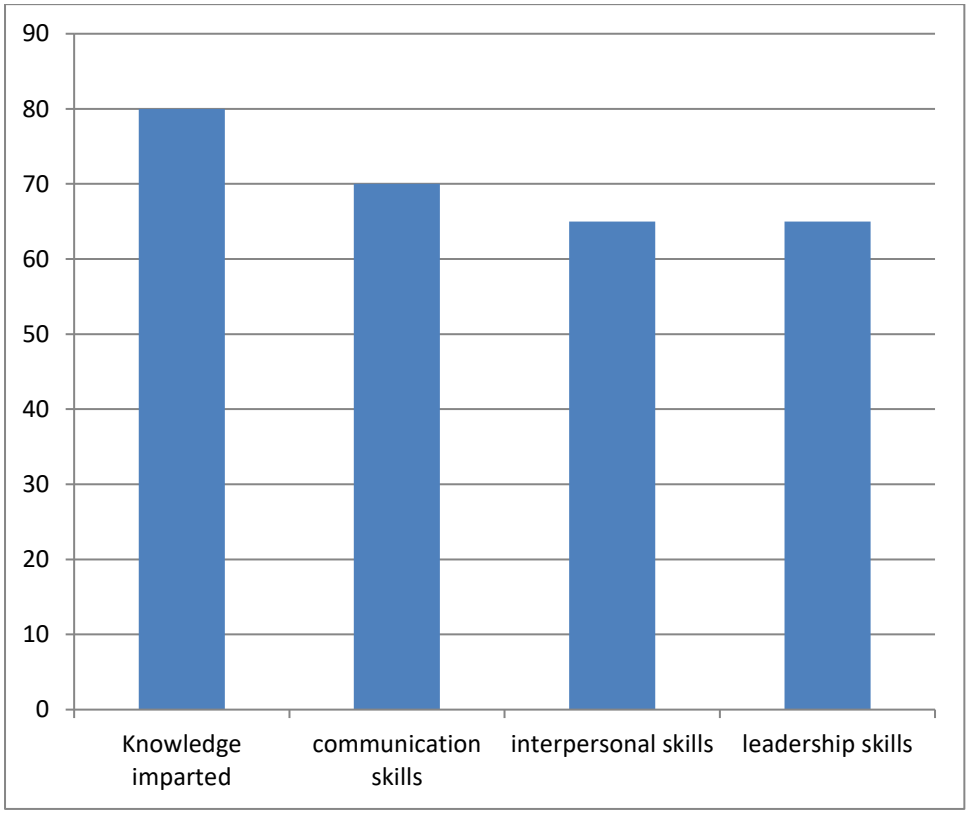
- The scholars had access to the available sophisticated equipments through a well managed system.
- Majority of the scholars have computers or their research work.

Standard 8-3: Financial resources must be provided to acquire and maintain Library holdings, laboratories and computing facilities.

Although administration provides adequate financial resources, yet there is need to increase budget to carry out advance level research.

Alumni Survey Results

Proforma-7 was used by the Department of Entomology to survey 20 alumni. The pupils were given the proforma in order to obtain the necessary data and input. The figure below shows the results that were produced from the data. The majority of alumni have evaluated management/leadership skills at a B, while interpersonal skills have been given a B. The alumni have suggested arranging more field visits for the students to understand what is actually being done in the field/by the farmer. The department's reputation at the national level is excellent, and its infrastructure is regarded as excellent. The majority of graduates have given the department's instruction an A (Excellent) rating for knowledge, and a B for communication abilities.

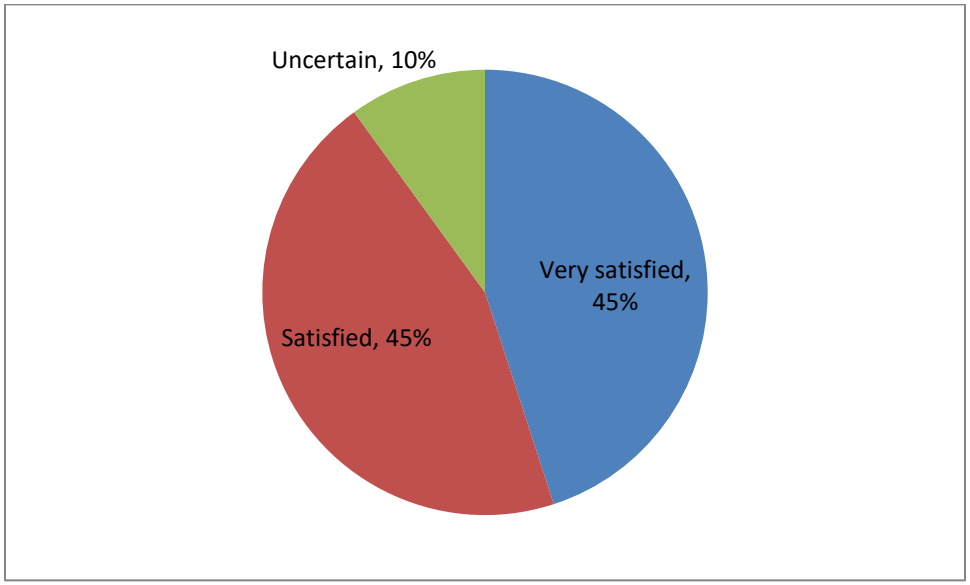


Survey of Research Students Progress Review Form

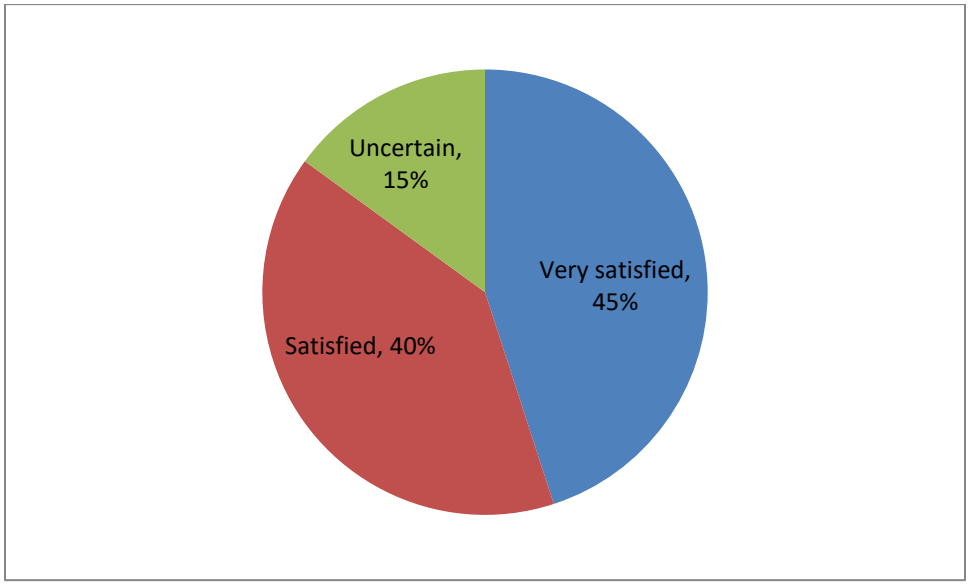
Twenty students were asked to complete this survey. Pie charts are used to illustrate the program assessment. The graphical data makes it clear that the majority of students indicated happiness with the program, with the students who said they were extremely satisfied coming in second. In contrast, only few students expressed

dissatisfaction with objective achievement and analytical skill. Additionally, some respondents stated that they were unsure about advanced curricula, planning skills, workload, efficacy, administrative responsibilities, autonomous thought, competent professors, and extracurricular activities. Below are pie graphs that provide a detailed visual representation of the data.

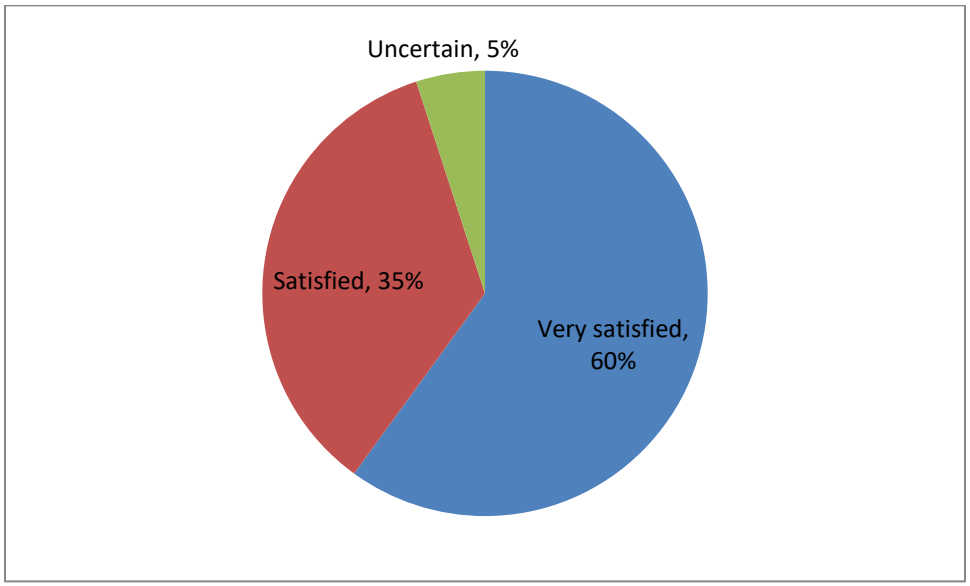
Workload



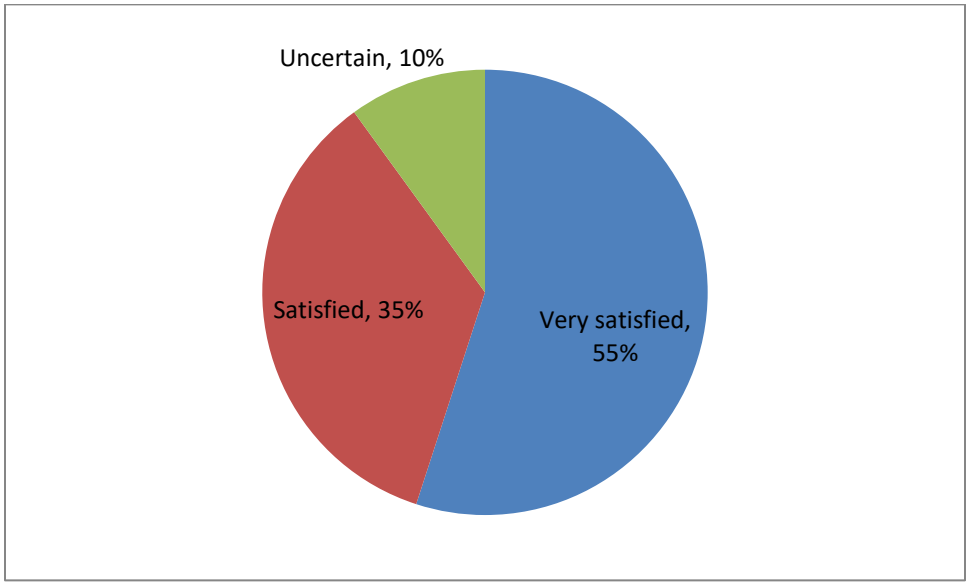
Effectiveness



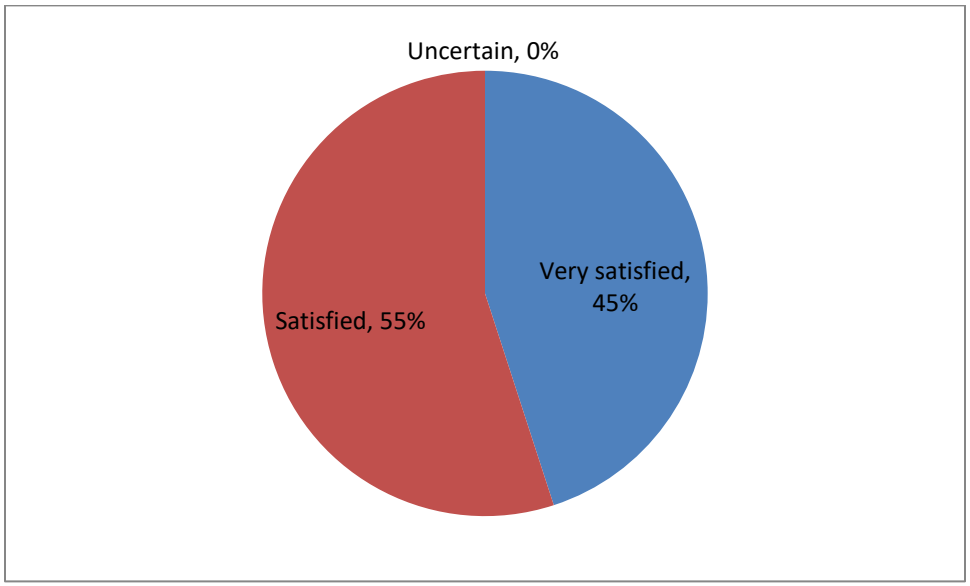
Administrative Role



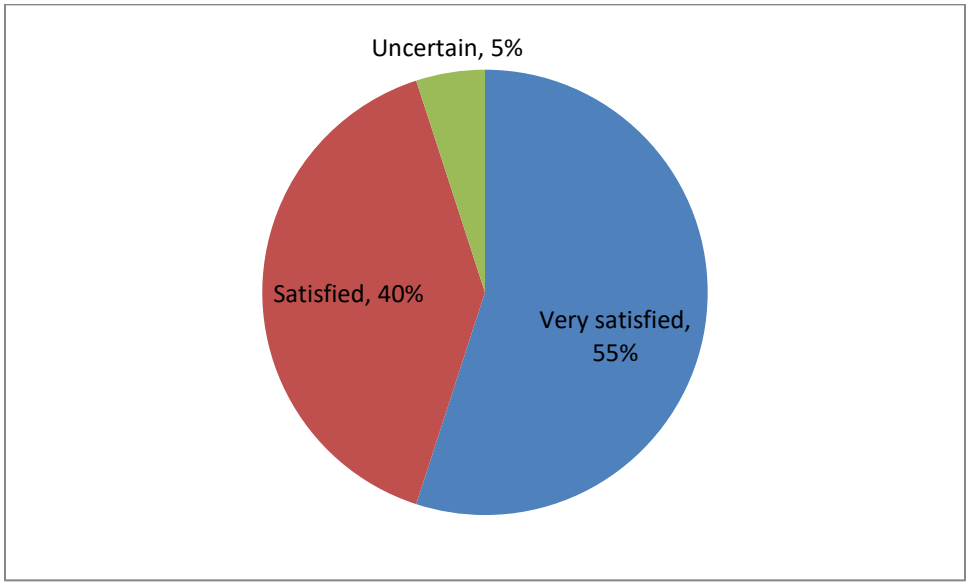
Analytical Skill



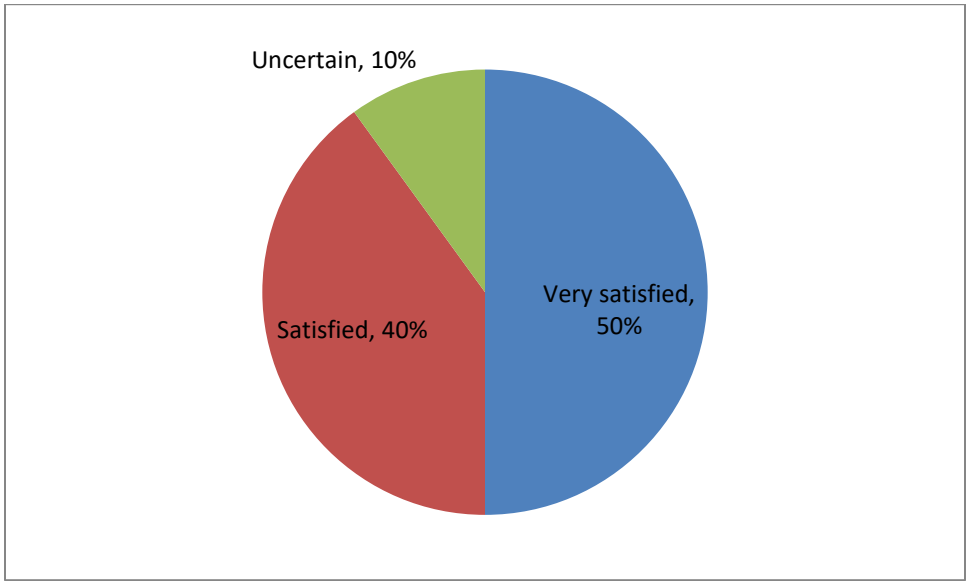
Independent thinking



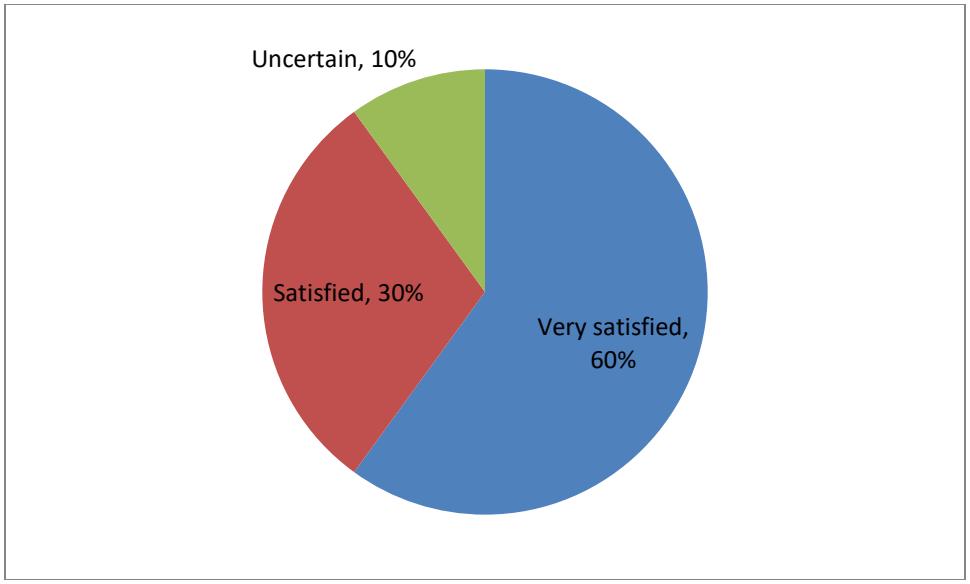
Communication skills



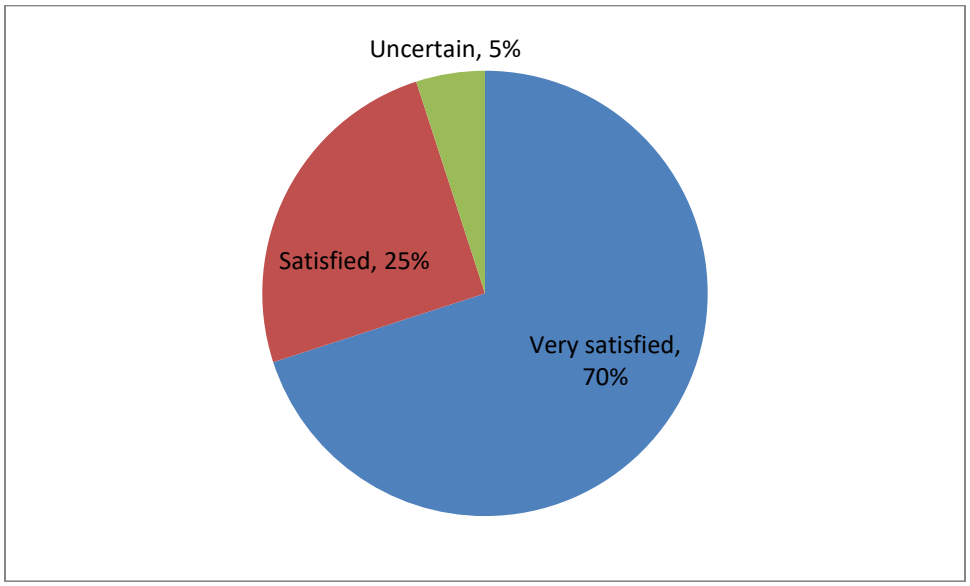
Planning abilities



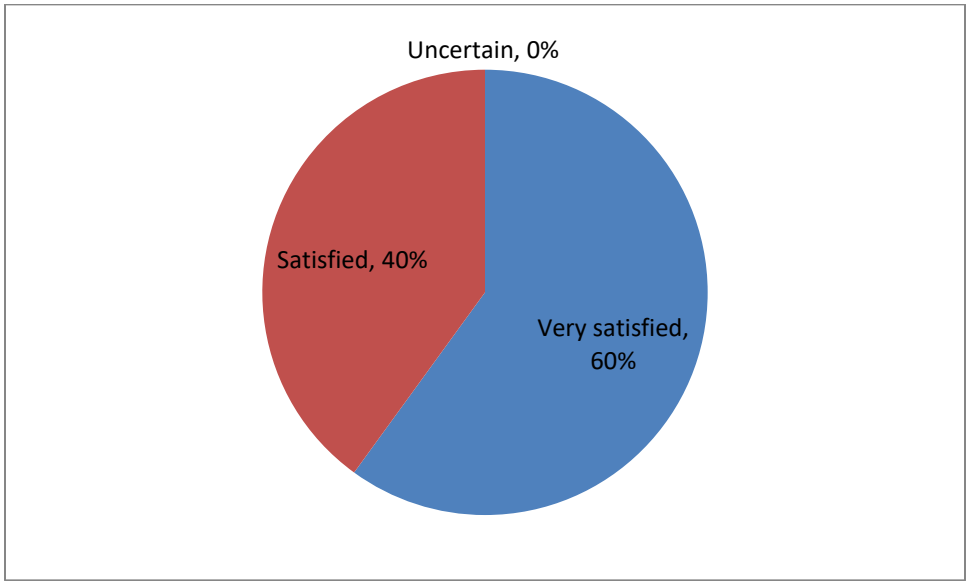
Objective achievement



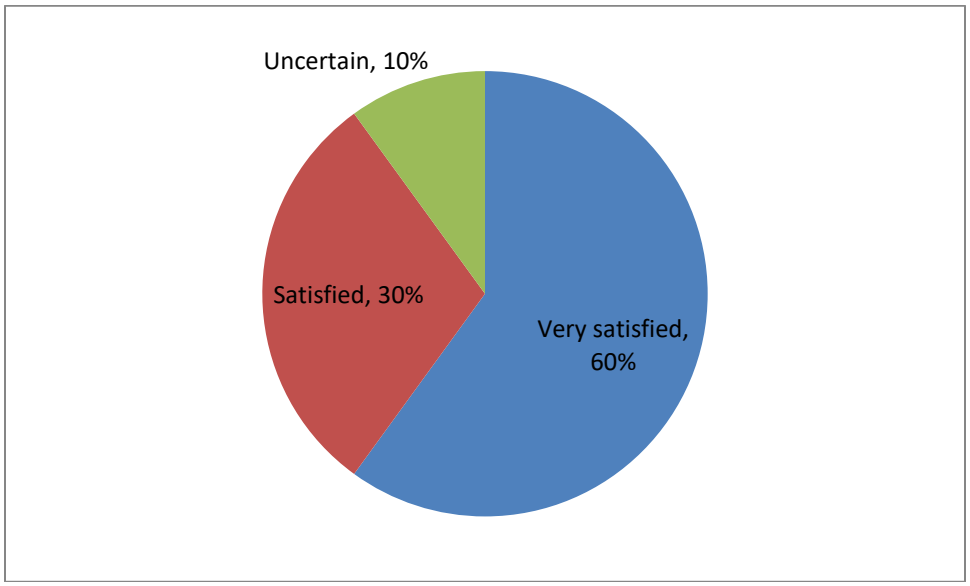
Capable Faculty



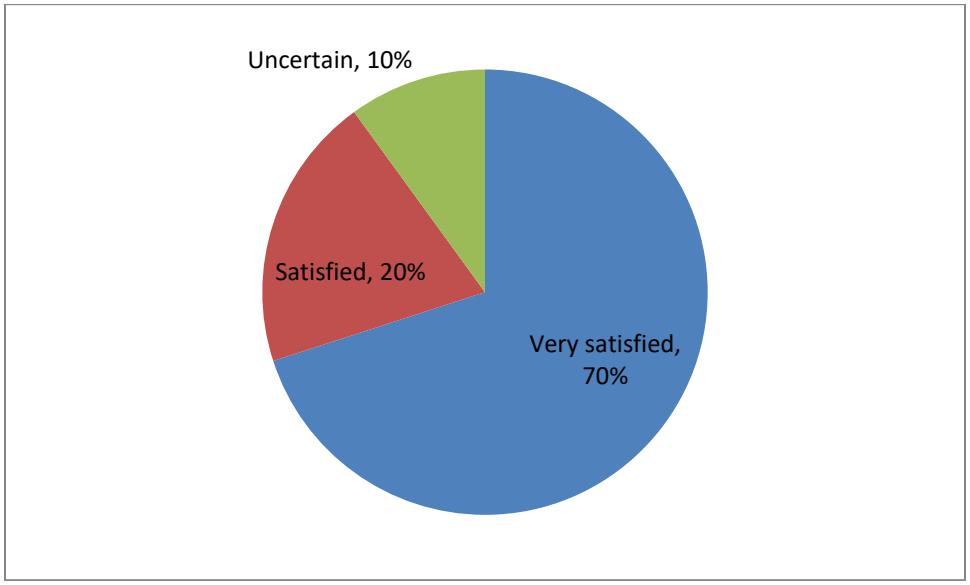
Advanced Curriculum



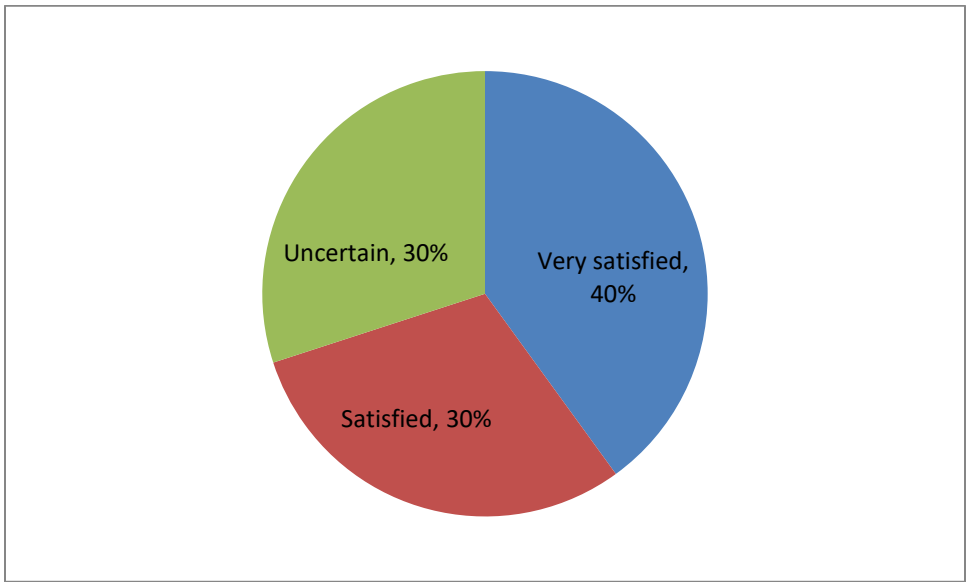
Condusive Environment



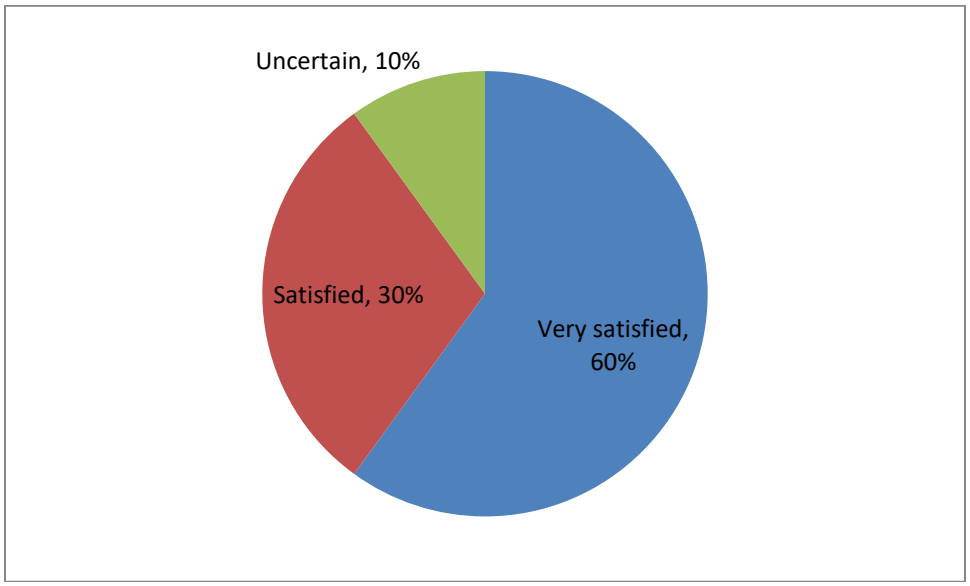
Departmental Infrastructure



Co-Curricular Activities

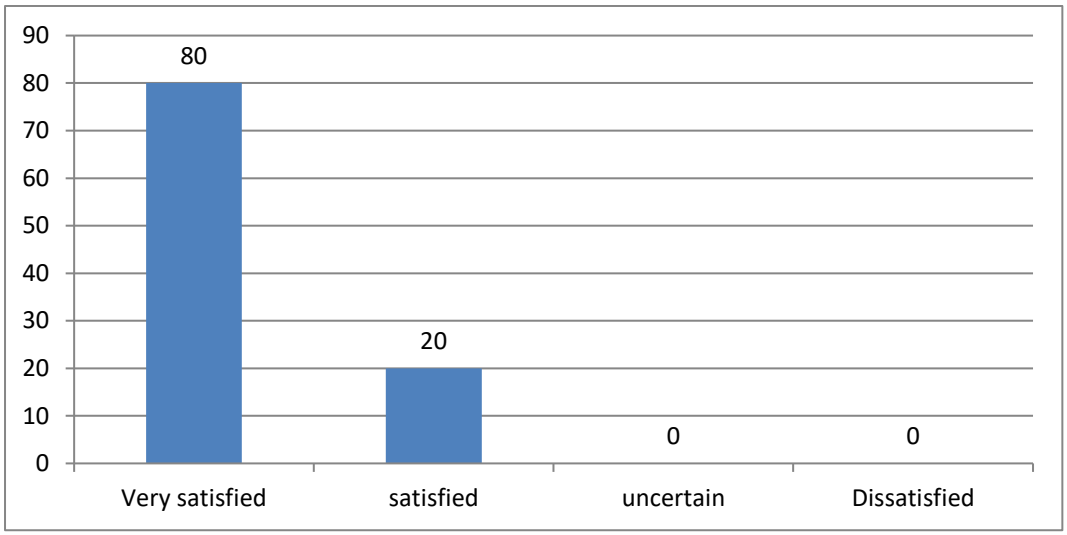


Financial Support



Employer Survey

A survey was conducted to get the employer's point of view about the working of our former students in their organizations. Feedback about 25 employees was obtained from organizations viz. National Agriculture Research Centre Islamabad (NARC), Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Federal Seed Certification Department, Islamabad, Department of Agricultural Extension Punjab and Plant Protection Department, Punjab. Their views are reflected graphically below.



SUMMARY AND CONCLUSION

Eight faculty members currently teach in the Entomology Department for the M. Sc. (Hons) degree, and each of them is a supervisor approved by HEC. Numerous entomological investigations, including bio-systematic, biological control, host plant resistance, pesticide resistance, and studies of Apis and Non-Apis bees, are covered in the M. Sc. (Hons) curriculum. Through a financed initiative called "Strengthening of Entomology Department," the Higher Education Commission of Pakistan has significantly contributed to the improvement of the department's faculty, labs, infrastructure, and other facilities. The department currently has five operational laboratories that are devoted to various facets of entomological research. Advanced

microscopy, growth chambers, testing equipment for stored goods insect pests, high performance liquid chromatography (HPLC), and diapause breaking of helpful insects are among the well-equipped facilities in these labs.

Although the entomology department offers a favorable environment for M. Sc. programs, numerous sections of the report highlight the need for contemporary tools and technology for postgraduate research. Additionally, the department has built a suitable setting for the dissemination of educational materials, communication skills, capacity building, and the training of young scholars. The department assists Ph.D. researchers in achieving academic success and teachers in enhancing their research, teaching, and dissemination of practical knowledge to the general public. All Ph.D. students currently have laptops thanks to the Prime Minister Scheme, HEC, and independent sources. Scholars are becoming more productive due to the availability of laptops, which are highly useful for finding scientific information, honing technical writing abilities, and saving valuable time. Teachers and HEC have also improved the course material in response to time demands. Better time and resource management is needed, according to information gathered from graduating students and alumni. Additionally, in order to compete for career possibilities and satisfy the demands of the professional world, communication technologies and interpersonal skills were also required.
The Apis and Non-Apis Bee Laboratory was established, which is also expanding the field of applied entomology by introducing bombiculture to improve agricultural pollination and increase crop yields. The Koont Farm honey bee research station helps bee caretakers meet their demands and deal with their issues. The new issues of entomological studies for improved food and living quality are urban pests, dengue vector pests, and other aspects of stored grain pest control. Tri-trophic relationships are new ideas for pest control tactics that seek to expand the possibilities of biological control initiatives. Studies in these areas are also being carried out at the department level. It is imperative that faculty members' capacity be increased through post-doctoral studies and short-term overseas trainings in order to broaden their perspectives on problem-oriented research and teaching.

CV's OF All FACULTY MEMBERS

(DEPARTMENT OF ENTOMOLOGY)

RESUME OF PROF. DR. MUHAMMAD NAEEM

Name	Prof. Dr. Muhammad Naeem
Personal	Professor, Department of Entomology, Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi E-mail: naeem18ap@yahoo.co.uk muhammad.naeem@uaar.edu.pk Phones: Office: +92-519062206 Cell: 03335751475
Experience	26 Years ➢ ***Chairman (2020 to 2023)*** Department of Entomology, PMAS-Arid Agriculture, University, Rawalpindi ➢ ***Chairman (2010 to 2016)*** Department of Entomology, PMAS-Arid Agriculture, University, Rawalpindi ➢ ***Professor (28-06-2010 to date)*** Serving in Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, Pakistan ➢ ***Associate Professor (2006-2010)*** Served in Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, Pakistan. ➢ ***Assistant Professor (2001-2005):*** Served as Assistant Professor, Department of Entomology, University of Arid Agriculture, Rawalpindi. ➢ ***Lecturer (1998-2001):*** Served as Lecturer, Department of Entomology, University of Arid Agriculture, Rawalpindi.
Honor and Awards	**HEC BEST UNIVERSITY TEACHER AWARDS FOR THE YEAR 2010** **HEC APPROVED SUPERVISOR**
Membership	
Graduate Students supervised Undergraduate Students	M.Sc (Hon.) : completed (4), In progress (0) Ph.D. completed (4), In progress (0)

<table>
<tr><td>Service Activity</td><td>

MEMBERSHIP OF VARIOUS COMMITTEES OF THE UNIVERSITY:

<table>
<tr><th>S. No.</th><th>Name of the Committee</th><th>Served as</th></tr>
<tr><td>1.</td><td>Comprehensive (Written & Oral) Examination Committee, Dept. Zoology, Dept. Wild life</td><td>Member</td></tr>
<tr><td>2.</td><td>Applications Scrutiny Committee for admission to B.Sc.(Hons.) Agri.</td><td>Member</td></tr>
<tr><td>3.</td><td>Scrutiny of Synopsis and Thesis, Department of Zoology</td><td>Member</td></tr>
</table>

HEAD EXAMINER / PAPER SETTER / EXTERNAL EXAMINER

<table>
<tr><th colspan="2">In Serving the following Universities / Colleges / Institutes as Head Examiner & Paper Setter / External Examiner</th></tr>
<tr><td>1.</td><td>External Examiner for Ph.D , University of Sargodha, University of BZU, University of Poonch, University of Gujrat</td></tr>
<tr><td>2.</td><td>External Examiner for M. Sc. (Zoology), Govt. College University, Lahore

Paper Setter for B. Sc. (Hons.) (Entomology, Zoology) Govt.College University, Lahore</td></tr>
<tr><td>3.</td><td>External Examiner for M. Sc. (Entomology), AgricultureCollege Rawalakot, AJ&K University, Muzzafarabad.

Head Examiner for B.Sc. (Hons.) (Entomology) Agriculture College Rawalakot, AJ&K University, Muzzafarabad.</td></tr>
<tr><td>4.</td><td>External Examiner for M.Sc. (Entomology), University of Agriculture, Faisalabad,</td></tr>
<tr><td>5.</td><td>Paper Setter for B.Sc.(Hons.) (Entomology), Baluchistan Univesity, Quetta</td></tr>
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</td></tr>
<tr><td>Brief Statement of Research Interest</td><td>Insect Biosystematics and Ecology</td></tr>
<tr><td>Publications</td><td>1. N. Nargis, M. Naeem, L. Vilhelmsen, I. Bodlah and M.S. Nadeem .2020. Newly recorded species and spatio-temporal distribution of rarely collected tribe Adeshini (Braconidae: Braconinae) from Pakistan: Braconinae) from Pakistan. J. Anim. Plant Sci.30 (5): 1319-133.
2. Qureshi MS, Ata ul Mohsin, M. Naeem, KN Shah 2020. Parasitism and sex ration of Diadegma insulare (Cresson)(Hymenoptera:Ichneumonidae)</td></tr>
</table>

	against Plutella xylostella (Linnaeus) (Lepidoptera: Plutellidae) on cruciferous cuciferous cultivars under different temparatures. Egyptian Journal of Biological Pest Control. 30: 122 (1-6). IF (0.206) 3. Jamal M,MA Aziz, M Naeem, Z Iqbal, A Khalid, F Siddique, KA Khan, HA Ghramh 2020. Detection of flumethrin acaridae residues from honey and beewax using high performance liquid chromatography (HPLC) technique. Journal of King Saud University-Science. 32; 2229-2235. IF (3.819) 4. Noushaba N, M.Naeem, I.Bodla, A.Mehmood 2018. First Record of genus Neoclarkinella Rema and Narendran,1996 (Braconidae:Microgastrinae) from Pakistan. International Journal of Biosciences. 12: 284-290. 5. K Mehmood, M.Naeem, M Ahmad SJ Butt 2018. Diversity of Sunflower Insect Pollinators and their foraging behavior under field conditions. Uludag Bee Journal (Turkey). 18: 14-27. 6. Hamza A, **M. Naeem,** Z. Ahmad, Ata ul Mohsin and T.Mahmood 2020. Diversity of terrestrial Heteropterans (Hemiptera) from various localities of Rawalpindi and Islamabad. Pakistan Entomologist. 42: 11-15. 7. Quratulain, Ata-ul-Mohsin, **M Naeem,** G Shabir, M K Rafique and R Mahmood 2020. Screening of onion (Allium cepa L.) Accessions for susceptibility to *Thrips tabaci* L. (Thysanoptera: Thripidae) under insecticide free field conditions. Pakistan Journal of Zoology. 52 1691-1699. (IF, 0.79) 8. Nargis N, **M. Naeem**, L. Vilhemsen, I Bodlah and MS Nadeem 2020. Newly recorded species and spatio-temporal distribution of rarely collected tribe Adeshini (Braconidae:Braconinae) from Pakistan The Journal of Animal and Plant Sciences. 30: 1319-1330. (IF, 0.481). 9. Blouch A,Ata ul Mohsin, **M. Naeem** and R. Mahmood 2020. Comparative efficacy *of Bacillus thuringiensis* commercial formulation against leaf worm, *Spodotera litura* Fabricius under Laboratory conditions. Pakistan Journal of Zoology. 52 609-616. (IF, 0.79) 10. Bushra S.,M.Tariq,M. Naeem and M. Ali 2019. Behavioral responses of *Coccinella septempunctata* and *Diaeretiella rapae* under the influence of semiochemicals and plant extract in four arm olfactometer. Pakistan Journal of Zoology. 51: 1403-1411. (IF, 0.79) 11. T Akhtar, MA Aziz**, M Naeem**, MS Ahmed, I Bodlah 2018. Diversity and Relative Abundance of Pollinator Fauna of Canola (*Brassica napus* L. Var Chakwal Sarsoon) with Managed Apis mellifera L. in Pothwar Region, Gujar Khan, Pakistan. Pakistan Journal of Zoology. 50: 567-573. 12. A Iftikhar, MA Aziz, **M. Naeem,** M Ahmad and T Mukhtar 2018. Effect of temperature on Demography and predation rate of *Menochilus sexmaculatus* (Coleoptera:Coccinellidae) reared on *Phenacoccus solenopsis* (Hemiptera:Pseudococcidae) Pakistan Journal of Zoology. 50: 1885-1893.
Research Grants and Contracts	**1.** Impact of management pollination by *Apis mellifera* L. on the yield of different crops. **PARB** (Rs. 10.934 million) Ent. Dept. (Rs. 4.00 million) (approved), as collaborating Scientist

RESUME OF DR.MUNIR AHMAD, ASSOCIATE PROFESSOR

Name	**Munir Ahmad**	
Personal Address	Department of Entomology, PMAS Arid Agriculture University Rawalpindi	
Experience	25-07-2023 to date	Chairman, Entomology department
	08.09.2016 to date	Associate Professor,Department of Entomology, Pir Mehr Ali Shah, Arid Agriculture University Rawalpindi
	29.08.2011 -07.09.2016	Assistant Professor, Department of Entomology, Pir Mehr Ali Shah, Arid Agriculture University Rawalpindi (on leave)
	01.04.2010 – 10.08.2014	Worked as a consultant for Insect Pest Management at Hydroponics Project of Farmers Marketing (Pvt) Ltd
	18.09.2008 – 29.08.2011	Lecturer, Department of Entomology, Pir Mehr Ali Shah, Arid Agriculture University Rawalpindi
	May 2008 - 15.09.2008	Scientific Officer, Central Cotton Research Institute, Old Shujabad Road, Multan under Project "Biological control of cotton insect pests of cotton in Pakistan"
Honor and Awards	International Research Support Initiative Program for PhD studies, Higher Education Commission, Government of Pakistan (Jan, 31st – July 04th, 2007). Merit Scholarship under 200 Scholarship Scheme for PhD Studies, Ministry of Science and Technology, (Higher Education Commission) Government of Pakistan (May, 2004–May 16, 2008) MLA-0316267 Merit Scholarship for F. Sc studies by Board of Education, Multan, Pakistan (1991-1993)	
Membership	Member to the Society of the Chemical Industry, Elsevier Member of Pakistan Entomological Society, UAF, Pakistan Member of Life Sciences Research of Pakistan Member of Asian Council of Science Editors, UAE Member Zoological Society of Pakistan	
Graduate Students PhD Postdocs Undergraduate Students Honour Students	23 1 27	
Service Activity	Pest control adviser to community, under- and postgraduate students Pollination advisor for protected and open field crops Silkworm rearing and value addition	

Brief Statement of Research Interest	Insecticide resistance management and pollination ecology, Sericulture

Publications (2022-2024)	**International** 1. Rehana Bibi, **Munir Ahmad**, Junaid Ali Siddiqui, Muhammad Tariq Raseed, Waqar Islam (**2024**) Comparative toxicity of insecticides to the haemocytes of honeybee, *Apis mellifera* (Hymenoptera: Apidae) under laboratory conditions, International Journal of Tropical Insect Science Published online: 20th September, 2024 (IF = 1.1) 2. Ping Zhang, Yuli Wang, Bingdong Deng, **Munir Ahmad**, Myron P. Zalucki, Guizhen Gao andZhaozhi Lu. **2024.***Harmonia axyridis* (Boyer de Fonscolombe) (Hemiptera: Coccoidea) as a potential biological control agent of the invasive soft scale, *Sphaerolecaniumprunastri* (Boyer de Fonscolombe) (Hemiptera: Coccoidea) in native wild apricot forests, Egyptian Journal of Biological Pest Control, 34:28,10.1186/s41938-024-00790-8. (IF = 2.4) 3. Sheikh, U.A.A.; **Munir Ahmad**; Aziz, M.A.; Imran, M.; Rahim, J.; Roulston, T.; Guo, S.; Sun, C. **2024.**Rearing of native bumblebee species *Bombus haemorrhoidalis* for greenhouse pollination in Pakistan. Agriculture 2024, 14, 590. https://doi.org/ 10.3390/agriculture14040590. (IF = 3.6) 4. Erum un-Nisa, **Munir Ahmad**, UmerAyaz Aslam Sheikh, Muhammad Imran, NighatParveen, Junaid Rahim (**2023)** Lethal and sublethal effects of flubendiamide and spirotetramat against the leaf worm, *Spodoptera litura* (Fabricius) under laboratory conditions. PeerJ 11:e15745 http://doi.org/10.7717/peerj.15745. (IF = 3.061) 5. Zhao H, S. Downes, L Bird, MP Zalucki, Y Fan, Z Xie, **Munir Ahmad**, and **Zhaozhi Lu** (April,**2023** online) Long-term changes in pest resistance dynamics in China and Australia in response to the introduction of Bt cotton and patterns of insecticide use, EntomologiaGeneralis, DOI: 10.1127/entomologia/2023/1786. (IF = 6.608) 6. Asif Sajjad, Waseem Akram, Wali Muhammad, **Munir Ahmad**, Ammad Ahmad (**2023**) Pollination in citrus, Chapter 20. In: Sajjad Hussain, Muhammad Fasih Khalid, Muhammad Arif Ali, Niaz Ahmed, Mirza Hasanuzzaman, Shakeel Ahmad (Editors) Citrus Production. CRC Press, Taylor and Francis https://doi.org/10.1201/9781003119852 7. Muhammad, Wali, **Munir Ahmad**, Syed Shahid Hussain **(2022).** Rice Pollination. In: Sarwar, N., Atique-ur-Rehman, Ahmad, S., Hasanuzzaman, M. (eds) Modern Techniques of Rice Crop Production. Springer, Singapore. https://doi.org/10.1007/978-981-16-4955-4_17 8. Rehana Bibi, **Munir Ahmad**, Asim Gulzar, Muhammad Tariq (2022) **Effect of profenofos and citrus oil on***Cryptolaemus montrouzieri***Mulsant and***Chrysoperlacarnea***Stephens, key predators of citrus mealybug,***Planococcus citri* **(Risso), under laboratory conditions,**International Journal of Tropical Insect Science, 42:379-387, https://doi.org/10.1007/s42690-021-00555-y (IF = 0.774)
	1. Spatial and temporal behavior of indigenous bumble bees, *Bombus* spp. of

Research Grants and Contracts	Margalla and Murree Hills funded by PMAS-Arid Agriculture University vide letter No. PMAS-AAUR/DR/630 dated 10-11-2010 for 0.175 million Pak rupees (as PI). 2. Effect of agricultural insecticides on neurological behavior of honeybee (*Apis mellifera*) in Pakistan funded by Higher Education Commission for Rs.0.5 million Pak rupees for one year duration (as Co. PI with Prof. Dr. Naeem). 3. Maintenance of scientific equipment for purchase of HPLC spare parts funded by Higher Education Commission for Rs.0.413 million Pak rupees (as PI). (Received in 2013) 4. Establishing year-round rearing facilities of bumble bees, important pollinator of commercial fruit and vegetable crops vide letter No.20-1697/R&D/10 5289 dated 26.07.2011 funded by Higher Education Commission for Rs.4.52 million for three year duration (December, 2011-14). 5. Identification of European Bumblebee (*Bombus terrestris* L.) pest problems affecting colony development. PMAS-AAUR/ORIC/3092 dated 01/10/2014 with grant of Pak. Rs.195000/. during 2014 (October, 2014-15). 6. Documenting mechanisms of insecticide resistance in brinjal shoot and fruit borer, *Leucinodesorbonalis* (Lepidoptera: Pyralidae) 1.31 million Pak rupees (PSF-NSLP) as Co. PI with Dr. Asim as P.I. received during 2014.
Other Research or Creative Accomplishments	Expert for commercial pollinators rearing especially honeybee and bumblebee Toxicology for important insect pests and their management Introductory for sericulture
Selected Professional Presentations	1. Rehana Bibi, **Munir Ahmad (2023)** Xenobiotics against citrus mealybug, *Planococcuscitri* (Risso) under laboratory conditions, NUST conference on agricultural sciences and technology, Atta Ur Rehman School of Applied Biosciences, NUST, Islamabad, March 14-16, 2023, page 17. 2. Mubeen Iqbal, **Munir Ahmad**, Imran Bodlah, Rehana Bibi, Ata Ul Mohsin **(2023)Laboratory Evaluation of Commonly used Insecticides against Red pumpkin beetle,** *Aulacophorafoveicollis***Lucas on Different Host Plants, 3rd International Conference on Smart Plant Protection, MNS University of Agriculture, Multan, page 39.** 3.Muhammad Tariq, Muhammad Rawal Hameed, Rehana Bibi1, **Munir Ahmad**, ShahzadiMahapara (**2022**) Comparative efficacy of neonicotinoids and conventional insecticides against whitefly *Bemisiatabaci*(Gennadius) on cotton, **7th International Conference on "Climate Smart Agriculture: Innovations and Adaptation" in Rawalakot, Azad Kashmir, June 15-17, 2022, page 389.**

RESUME OF DR. MUHAMMAD TARIQ

Name	**MUHAMMAD TARIQ**
Personal Adress	Village Dia Ram, P/O Tara Singh Tehsil Depalpur, District Okara Cell# 0337471271

Experience	• **Associate Professor**, Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, 14th December 2021 − Present • **Assistant Professor**, Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, 14th October 2011 − Present • **Tutor and Demonstrator** (Teaching experience), Division of Biology, Imperial College London, July, 2007− July 2011. • **Lecturer**, Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, 18th October 2006 − 16th October 2011.
Honor and Awards	**1.** Elected as unopposed **Member Academic Council** (Cader – Assistant Professor) for three years via notification no. PMAS-AAUR/5996; Dated: 6/12/2019 to 14/12/2023 **2.** **Promotion to Assistant professor**, 17th October 2011 **3.** **Supervisor of Internees**, Internship Project, Agriculture Department, Government of Punjab **4.** **Letter of Appreciation** for Dr. Muhammad Tariq from Convener, Anti-Dengue Committee, PMAS-AAUR via dairy no. PMAS-AAUR/10487; Dated: 18/10/2019 **5.** Successfully completed and received a passing grade in "**MalariaX: Defeating Malaria from the Genes to the Globe**" from **Harvard University, USA**. **6.** **Chairman, Student Union**, Silwood Park Campus, Imperial College London, UK. **7.** **Tutor and Demonstrator**, Division of Biology, Imperial College of Science, Technology and Medicine, London, United Kingdom (2007 − 2011). **8.** **HEC PhD Approved Supervisor** **9.** Fauji Foundation scholarship (1996 to 1998), Govt. College Okara. **10.** B.Sc (Hons.) Merit Scholarship (2000-2003), University of Agriculture, Faisalabad. **11.** M.Sc (Hons.) Merit Scholarship (2004-2005), University of Agriculture, Faisalabad. **12.** **Higher Education Commission Overseas Scholarship** (£120,000) for PhD (2007-2011) at Imperial College of Science, Technology and Medicine, London, United Kingdom. **13.** Research supervision of PhD, M.Sc. (Hons.) and B.Sc. (Hons.) students. **14.** **Certificate of Excellence in Molecular Biology** (2010), Imperial College of Science, Technology and Medicine, London, United Kingdom Imperial College London.
Membership	• Royal Entomological Society, UK • British Ecological Society, UK • Society for Applied Microbiology, UK

Graduate Students Postdocs Undergraduate Students Honour Students	6 1 7
Service Activity	**1.** **Technical Expert** and Focal person for District Emergency Response Committee (DERC) and TERC (Tehsil Emergency Response Committee), Rawalpindi for Dengue Control and Preevention, Rawalpindi since October 2011. **2.** **Convener,** Dengue Control Committee, PMAS- Arid Agriculture University Rawalpindi, 7th October 2022 to present (vide Notification No. PMAS-AAUR/5624; dated: 07/10/2022). **3.** **Secretary**, Dengue Control Committee, PMAS- Arid Agriculture University Rawalpindi, 3rd November 2015 to Present (vide Notification No. PMAS-AAUR/3783; dated: 03/11/2015) **4.** Member of Dengue Control Committee- Department of Entomology. **5.** Provided technical assistant regarding anti-dengue measures to various Punjab departments including Commissioner Office, DCO's office, Health Department, Agriculture Department, Directorate of Colleges, TMA's, Social department, Special Branch etc. **6.** Provided technical assistant regarding anti-dengue measures to various departments and directorates and Hall Wardens within the University including Registrar Office, Estate Care Office, Directorate of Works, etc. **7.** Arranged and conducted anti-dengue spray on regular basis in various departments, directorates, hostels and University colonies at University main campus, PMAS-AAUR. **8.** Furnished cleanliness reports of University main campus has been presented many times in TERC, DERC and Cabinet Committee anti-dengue meetings held in Commissioner Office Rawalpindi on every Thursday and Saturday and regular basis during the dengue epidemic times (Since 2012 to present). **9.** Arranged training sessions for faculty members and staff of the University for year, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024.
Brief Statement of Research Interest	Use of different environment friendly techniques for pest and mosquito management

Publications	**1.** Mamoon-ur-Rashid, M., Abdullah, K., Ali, H., Muhammad Tariq, et al. 2024. Response of cotton mealybug, *Phenacoccus Solenopsis* Tinsley (Sternorrhyncha:

	Pseudococcidae) to predators, neem oil, and synthetic insecticide under semi-field and field conditions. International Journal of Tropical Insect Science 44, 1919–1930. https://doi.org/10.1007/s42690-024-01294-6 (I.F. 1.1). **2.** Muhammad Ataullah, Shahzab Riaz, Muhammad Tariq, Asad Aslam, Abdul Qadir, Adeel Asghar, Muhammad Shehzad, Muhammad Faheem Akhtar 2024. In vitro exploration of entomopathogenic nematodes as potential biocontrol agents of brinjal borer Leucinodes orbonalis guenée (Lepidoptera: Crambidae). Plant Protection, 08 (01) 2024. 79-85. **3.** Rehana Bibi, Munir Ahmad, Asim Gulzar, Muhammad Tariq and Munir Ahmed (2023) Consumption of citrus mealybug, *Planococcus citri* by two predators, *Cryptolaemus montrouzieri* Mulsant and *Chrysoperla carnea* (Stephen), under controlled conditions, International Journal of Tropical Insect Science, https://doi.org/10.1007/s42690-022-00921-4 (I.F. 0.774) **4.** Ahmad, Syed Faisal, Asim Gulzar, Naeem Abbas, Muhammad Tariq, Intazar Ali, and Abdulwahab M. Hafez. 2022. Realized heritability, risk assessment, and inheritance pattern in *Earias vittella* (Lepidoptera: Noctuidae) resistant to Dipel (*Bacillus thuringiensis* Kurstaki)" Toxins 14, no. 10: 686. https://doi.org/10.3390/toxins14100686. I.F. 4.086) **5.** Rehana Bibi, Munir Ahmad, Asim Gulzar, Muhammad Tariq and Muneer Ahmed (2022) Consumption of citrus mealybug, *Planococcus citri* by two predators, *Cryptolaemus montrouzieri* Mulsant and *Chrysoperla carnea* (Stephen), under controlled conditions, International Journal of Tropical Insect Science, https://doi.org/10.1007/s42690-022-00921-4 (I.F. 0.774). **6.** Rehana Bibi, Munir Ahmad, Asim Gulzar, Muhammad Tariq (2022) Effect of profenofos and citrus oil on *Cryptolaemus montrouzieri* Mulsant and *Chrysoperla carnea* Stephens, key predators of citrus mealybug, *Planococcus citri* (Risso), under laboratory conditions,International Journal of Tropical Insect Science, 42:379-387, https://doi.org/10.1007/s42690-021-00555-y(I.F. 0.774). **7.** Marium Fatima, Asim Gulzar, Munir Ahmad, Farid Asif Shaheen, Muhammad Tariq, Tariq Mukhtar (2022), Effect of workers density on insect pest incidence and colony development of bumblebees, *Bombus terrestris* (L.)(Hymenoptera: Apidae), Philippine Agricultural Scientist, 105 (1), 85-91. (I.F. 0.16). **8.** Syed Faisal Ahmad, Asim Gulzar, Muhammad Tariq, Bilal Rasool, Dilawar Khan, Shifa Ullah, Muhammad Javaid Asad, 2022. Resistance, cross-resistance and stability of resistance to Bacillus thuringiensis kurstaki in *Earias vittella* (Fabricius) (Lepidoptera: Noctuidae).Biological Control.175: 105058. doi.org/10.1016/j.biocontrol.2022.105058. (I.F. 3.687)

	9. Jabbar, A. M. Tariq, A. Gulzar, T. Mukhtar, T. Zainab, 2022. Lethal and sub lethal effects of plant extracts and green silver nanoparticles against *Culex pipiens*. Pakistan Journal of Zoology. 54: 1259-1267. (I.F. 0.831).
Research Grants and Contracts	Field evaluation and Demonstration of Different pest Management Techniques in Pothwar Region (16 October, 2020 to 4 August 2022)
Other Research or Creative Accomplishments	Molecular basis of insect resistance was explored and behavioural research work was carried out on the efficacy of botanicals against mosquitoes.

RESUME OF DR. ASIM GULZAR, ASSOCIATE PROFESSOR

Name	Dr. Asim Gulzar
PersonalAdress	Street No. 04, Hayatabad Colony, Tehsil ChichaWatni, Distt. Sahiwal
Experience	• Associate Professor,Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, 15-Dec-2022 – Present • Assistant Professor, Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, June 2014 - 14-Dec-2022 • Lecturer,Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi,July2013 - June 2014 • Assistant professor(Adhoc), Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi,October 2011 - July 2013 • Assistant Director Research/Lecturer,PMAS-Arid Agriculture University, Rawalpindi,December 2004 - October 2011
Membership	• Member Royal Entomological Society UK • Member Entomological Society of America
Graduate Students Postdocs Undergraduate Students Honour Students	Graduate Student = 01 Undergraduate Student = 08 .
Brief Statement of Research Interest	Insect toxicology Ecotoxicology Bio control Integrated Pest Management Bioinsecticide Urban Entomology

Publications	1. M Hafeez, S Shah, X Li, Z Zhang, J Huang, L Wang, A Gulzar, E Ali, B Ali (2020) Extensive use of organochlorine pesticides in agriculture: environmental and health concerns: A review. North American Academic Research. 3 (3), 461-474 2. M Shehzad, A Gulzar, JT Staley, M Tariq. (2020). The effects of drought stress and type of fertiliser on generalist and specialist herbivores and their natural enemies. Annals of Applied Biology. https://doi.org/10.1111/aab.12654. Impact Factor; 2.037 3. Asim Gulzar, Tariq Mukhtar and Denis Wright. (2020).Effects of entomopathogenic nematodes Steinernemacarpocapsae and Heterorhabditisbacteriophora on the fitness of a Vip3A resistant sub-population of Heliothis virescens (Noctuidae: Lepidoptera). Bragantia. Impact Factor 1.05 **4.** Muhammad Hafeez, Sisi Liu, Hafiz Kamran Yousaf, Saad Jan, Rui-Long Wang, G. Mandela Fernández-Grandon, **Asim Gulzar**, Bahar Ali, MuzammalRehman, Sajjad Ali, Muhammad Fahad, Mo Wang. (2019). RNA interference-mediated knockdown of a cytochrome P450 gene enhanced the toxicity of α-cypermethrin in xanthotoxin-fed larvae of Spodopteraexigua (Hübner)Pesticide Biochemistry and Physiology, **Impact factor 3.44** **5.** Muhammad Hafeez, Sisi Liu, Saad Jan, Li She, , G. Mandela Fernández-Grandon, **Asim Gulzar**, Bahar Ali, MuzammilRehman, Mo Wang. (2019) Knock-Down of Gossypol-Inducing Cytochrome P450 Genes Reduced Deltamethrin Sensitivity in *Spodopteraexigua* (Hübner).International Journal of Molecular Sciences**. Impact factor 4.13** 6. Muhammad Hafeez, Sisi Liu, Saad Jan, **Asim Gulzar**, G. Mandela Fernández-Grandon,Muhammad Qasim, Khalid Ali Khan, Bahar Ali, SeifuJuneidiKedir, Muhammad Fahad, **7.** Mo Wang. (2019). Enhanced effects of dietary tannic acid with chlorantraniliprole on life tableparameters and nutritional physiology of *Spodopteraexigua* (Hübner). Pesticide Biochemistry and Physiology, 155: 108–118**Impact factor 3.44** **8.** Camilo Ayra-Pardo, Maria E. Ochagavía, Ben Raymond, **Asim Gulzar**, Lianet Rodríguez-Cabrera, Claudia Rodríguez de la Noval, IvisMoránBertot,Ryohei Terauchi, Kentaro Yoshida, Hideo Matsumura, PilarTéllez Rodríguez,Daily Hernández Hernández, Orlando Borrás-Hidalgo and Denis J. Wright (2019). HT-SuperSAGE of the gut tissue of a Vip3Aa-resistant *Heliothisvirescens*(Lepidoptera: Noctuidae) strain provides insights into the basis of resistance. Insect Science, 26, 479–498https://doi.org/10.1111/1744-7917.12535**Impact factor 2.026** **9. Asim Gulzar,** Muhammad Majad Ali, Muhammad Tariq, Imran Bodlah, Kaleem Tariq and AsadAli (2018). Lethal and Sublethal Effects of *Azadirachtinindica*Seed Extract on theDevelopment of Spotted Bollworm *Eariasvittella*(Fab.).Gesunde Pflanzen, https://doi.org/10.1007/s10343-018-0437-9. **I F 0.63**

	10. Ali Asghar1, Tariq Mukhtar, Muhammad Usman Raja and Asim Gulzar. (2020)**.** Interaction between *Meloidogynejavanica* and *Ralstoniasolanacearum* in Chilli. Pakistan J. Zoology. DOI: http://dx.doi.org/10.17582/journal.pjz/2020.52. **Impact factor 0.48** **11.** Rasool, B., M. Adeel, A. Rasul, A. Gulzar, M. Asrar, N. Afzal, R. Munir, Z. Mehmood, T. Sultana, Mansoor-ul-Hassan and F. Jabeen, 2019. Population dynamics, genetic diversity and occurrence of *Wolbachia*in *Amrascadevastans*population from different districts ofPakistan. Pak. Entomol., 41(2):87-94.
Research Grants and Contracts	• Monitoring and characterization of insecticide resistance in spotted bollworm, *Eriasvittella* (Lepidoptera: Noctuidae) against different insecticides funded by HEC, Pakistan • Establishement of National Center for Industrial biotecthnology: Hydropinc Section. **Co PI**
Other Research or Creative Accomplishments	Optimizing the bumble bee rearing protocol
Selected Professional Presentations	• Keynote speaker at Insecticide Resistance and its management Seminar • Paper presentation in International Entomological Congress (IEC) Organized by the Entomological Society of Pakistan, UAF, Faisalabad (April 08-10, 2019).

RESUME OF DR. MUHAMMAD ASIF AZIZ, ASSOCIATE PROFESSOR

Name	**MUHAMMAD ASIF AZIZ**
PersonalAddress	Village Ghazi Minara Tehsil and District Sheikhupura. Cell# 03226862246
Experience	• **Assistant Professor**, Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, from 31st May, 2012 to 2020. • **Lecturer**, Department of Entomology, PMAS-Arid Agriculture University, Rawalpindi, 26thJan, 2008 – 30thMay, 2012.
Honor and Awards	**15. HEC Approved Supervisor** since 2012 **16.** Throughout First Divisions in Academic Career **17. Outstanding Participant Award in** "2014 Seminar on Sericulture Production and Management for Asian countries" South China University of Agriculture, China **18.** Letter of **Appreciation from Honorable Vice Chancellor, PMAS-AAUR,**"in recognition of efforts as member of Business incubation Unit by training NIP interns in the field of Entomology (13-03-2018) **19.** Introduced **ETL based sampling methods** of Varroa mites (pest of honeybees) in Pakistan, for its effective management **20.** Member **Committee for Promotion of Apiculture** in

	Pakistan constituted by Special Assistant to Prime Minister on Climate Change. **21.** Key role in announcement of **Billion Tree Honey initiative** by Prime Minister of Pakistan, (December 21st, 2020) **22. Supervisor of Internees**, Internship Project, Agriculture Department, Government of Punjab **23.** Research supervision of M. Sc. (Hons) , M.Sc. (Hons.) and B.Sc. (Hons.) students. **24. In-charge Honey Bee Research Farm**, University Research Farm, Chakwal Road, PMAS-Arid Agriculture University Rawalpindi from July, 2012 to date **25. Additional Director, Pak Korea Capacity Building Center**, PMAS-Arid Agriculture University Rawalpindi, Since January, 2020.
Membership	• Member Life Sciences Society of Pakistan • Editorial Member Asian Journal of Agriculture and Biology • Member Board of Directors, Asian Research Index
Graduate Students Postdocs Undergraduate Students Honour Students	7 11
Service Activity	1. Member Faculty Board of the Faculty of Crop and Food Sciences, PMAS from 07-01-2019 to date. 2. Member Technical Working Group (TWG) of Institute of Plant and Environmental Protection, NARC, Islamabad since 2018. 3. Secretary Board of Studies, Department of Entomology, PMAS-Arid Agriculture University Rawalpindi since 2012. 4. \ Member Enrollment Committee, for B.Sc. (Hons.) Agri. Entomology students since 2010. 5. Member Selection Committee for Admissions in Department of Entomology for M.Sc. (Hons.) Agri Entomology students 6. Member Pest Management Committee, URF, Koont, PMAS-AAUR.
Brief Statement of Research Interest	Management of *Varroa* mites in Honey Bees, Queen rearing with grafting technique in Honey Bees, Demographic studies of different pests

Publications	**1.** Muhammad Asghar, Talfoor-ul Hassan, Muhammad Arshad, **Muhammad** Asif **Aziz**, Latif, Arshed Makhdoom Sabir. 2020. Effect of plant spacing on incidence of rice planthoppers in transplanted rice. International Journal of Tropical Insect Science. 41(1):575-585. **(Impact factor= 0.82)** **2.** Jamal, M., Aziz, M. A., Naeem, M., Iqbal, Z., Khalid, A., Siddique, F., Khalid Ali Khan, K. A., Ghramh, H. A., 2020. Detection of flumethrin acaricide residues from honey and beeswax using high performance liquid chromatography (HPLC) technique. Journal of King Saud University. 32(3): 2229-2235. https://doi.org/10.1016/j.jksus.2020.02.035. **(Impact Factor=3.74)** **3.** Iftikhar, A., Hafeez, F., Hafeez, M., Farooq, M., Aziz, M.A., Sohaib, M., Naeem, A. and Lu, Y., 2020. Sublethal effects of a juvenile hormone analog, Pyriproxyfen on demographic parameters of non-target predator, *Hippodamia convergens* Guerin-Meneville (Coleoptera: Coccinellidae). Ecotoxicology https://doi.org/10.1007/s10646-020-02159-7 **(Impact Factor=2.535)** **4.** Sajid, Z.N., Aziz, M.A., Bodlah, I., Rana, R.M., Ghramh, H.A. and Khan, K.A., 2020. Efficacy assessment of soft and hard acaricides against *Varroa destructor* mite infesting honey bee (*Apis mellifera*) colonies, through sugar roll method. Saudi Journal of Biological Sciences. 27: 53–59. https://doi.org/10.1016/j.sjbs.2019.04.017**(Impact Factor=4.129)** **5.** Aziz, M.A., Sadaf, H., Iftikhar, A. and Hafeez, F., 2019. Influence of Crapemyrtle aphid, *Tinocalliskahawaluokalani* (Hemiptera: Aphididae) on population characteristics of three aphidophagous ladybird beetles. International Journal of Tropical Insect Science: 1-11. DOI 10.1007/s42690-019-00087-6 **(Impact Factor=0.725)** **6.** Qayyum, A., Aziz, M.A., Iftikhar, A., Hafeez, F. and Atlihan, R., 2018. Demographic parameters of Lipaphiserysimi (Hemiptera: Aphididae) on different cultivars of Brassica 9vegetables. Journal of Economic Entomology .111 (4): 1885-1894. **(Impact Factor=1.715).** **7.** Nasir, M., Saeed, S., Ahmad, M. and Aziz, M.A., 2019. Effect of different diapause conditions on *Bombus terrestris* colony characteristics. Pakistan Journal of Zoology. *51*(4):1273-1280. **(IF= 0.790).** **8.** Nasir, M., Ahmad, M., Saeed, S., Aziz, M.A., Imran, M. and Sheikh, U.A.A., 2019. Effect of different temperatures on colony characteristics of *Bombus terrestris* (Hymenoptera: Apidae). Pakistan Journal of Zoology. *51*(4):1315-1322. **(IF= 0.790).**

	9. Akhtar, T., Aziz, M.A., Naeem, M., Ahmed, M.S. and Bodlah, I.,**2018.** Diversity and relative abundance of pollinator fauna of Canola (*Brassica napus* L Var. Chakwal Sarsson) with managed *Apis mellifera* L. at Pothwar region, Gujar Khan, Pakistan. Pakistan Journal of Zoology. 50(2):567-573. **(IF= 0.790).** 10. Iftikhar, A., Aziz, M.A., Naeem, M., Ahmad, M. and Mukhtar, T., 2018. Effect of temperature on demography and predation rate of *Menochilussexmaculatus* (Coleoptera: Coccinellidae) reared on *Phenacoccussolenopsis* (Hemiptera: Pseudococcidae).Pakistan Journal of Zoology. 50 (5): 1885-1893.**(IF= 0.790)** 11. Maryam, S., Sandhu, A.A., Bodlah, I., Aziz, M.A. and Aihetasham, A., 2019. Contribution to Aphid's Fauna of Gujranwala (Punjab), Pakistan. Punjab University Journal of Zoology.34 (1): 9-16. 12. Ghuffar, S., Irshad, G., Zhai, F., Aziz, A., Asadullah, H.M.A.M., Mehmood, N., Yang, H., Bashir, A., Ahmed, M.Z., Aslam, M.F. and Ahmed, R., 2018. First report of *Fusarium proliferatum* causing fruit rot of grapes (*Vitis vinifera*) in Pakistan. International Journal of Phytopathology. 07 (02): 85-88
Research Grants and Contracts	NRPU 10738 "Molecular characterization of *Apis mellifera* (L.) hygienic behviour against *Varroa* mite in Pakistan (Phase 1)" Funded by HEC, Rs 6.02 million; Duration Three years. (2019).
Other Research or Creative Accomplishments	• Established Molecular Research Lab for Apiculture at PKCBC. • Established Field Research Lab at University Research Farm, Koont, Gujar Khan • Introduced Royal Jelly Production Method at Commercial Scale in the beekeepers.
Selected Professional Presentations	Oral presentation on"Climate resilient adaptations and livelihood improvement interventions for expansion of quality honey production in the country. On September, 26, 2018 at NARC, Islamabad.

RESUME OF DR. FARID ASIF SHAHEEN, ASSOCIATE PROFESSOR

Name	**Dr. Farid Asif Shaheen**
Personal	***Department of Entomology*** ***Pir Mehr Ali Shah Arid Agriculture University*** ***Rawalpindi, Pakistan*** Date of Birth: February 15, 1977 CNIC No. : 37405-0205067-7 Passport No. : JQ 5140671 Marital status: Married Children: 03 Religion: Islam Nationality: Pakistani Domicile: Rawalpindi (Punjab) Permanent Address: House # SN 312-A, Madina Town (Dhok Kala Khan), Shamsabad Rawalpindi (Ph: +92-51-4575314) E-mail address: 95arid34@gmail.com Highest Qualification: Ph. D. & Post-Doctorate (UK)
Experience	• Serving as Associate Professor (BPS-20) as permanent employee in the Department of Entomology, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi *w. e. f.* 30-07-2022 -------To-date. • Served as Assistant Professor (BPS-19) as permanent employee in the Department of Entomology, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi *w. e. f.* 06-07-2012 to 29-07-2022. • Served as Senior Scientific Officer (BS-18) in Pakistan Science Foundation, Ministry of Science & Technology (Govt. of Pakistan), Islamabadfrom16-09-2006 to 06-07-2012. Additionally, served in the PAK-US Natural Sciences Linkages Program (NSLP) including its charge w. e. f. 08-02-2007 to 02-01-2010. • Served as Scientific Officer (BS-17) in Pakistan Science Foundation, Ministry of Science & Technology (Govt. of Pakistan), Islamabad*from*15-01-2005 *to* 15-09-2006. • Worked as Agricultural Officer (BS-17) in Plant Protection, Pest Warning & Quality Control of Pesticides Wing of Punjab Agriculture Department (Govt. of Punjab), Murree*from*08-10-2003 *to* 14-01-2005 • Served as Honorary Lecturer in the Department of Entomology, University of Arid Agriculture, Rawalpindi *from* 01-07-2002 *to* 30-06-2003 (1 Year) • Worked as Research Fellow*from* June 16, 1999 *to* June15, 2002 in the Pakistan Science Foundation funded PSF/RES/P-UAAR/AGR (230) research project entitled "Studies on the Control of Codling Moth in Murree Hills" (3 Years) • Worked at the Tobacco Research Sub-Station, Kunjah, Gujrat during the tobacco crop season (1999-2000) and gained experience in controlling major

	insect pests of virginiatobacco besides their responses to weather factors (10 Months) • Worked on toxicological aspects of major cotton pests both in the field and laboratory such as monitoring of insecticide resistance by using leaf-dip method, topical application of insecticides by using micro applicator or potted tower etc. in the Entomology section of Central Cotton Research Institute (CCRI), Multan during 2001 (4 Weeks)
Honors and Awards	• Working as the "**Editorial Board Member"** of the Journal **"Insectia: Journal of Entomology"** (London, UK) • Working as "**The Editor"** of the **Journal of Tropical Biodiversity and Biotechnology.** • Member of the Commonwealth Scholarship Commission / The British Council (UK) Alumni • The Agrotechnology Innovation Centre, **GadjahMada University, Indonesia** invited me asthe **Subject Expert / Invited Speaker** in the first Summer Program on **"Smart Integrated Farming for Sustainable Agriculture"** held there on July 15-24, 2019. ***(Sponsored by the Indonesian Government).*** • I had the honor to deliver my **guest-lectures** in the Faculty of Biology, **GadahMada University** and Faculty of Agriculture, **Pembangunan National University, Indonesia** on July 23 & 24, 2019 and received the honorary Souvenir and certificate in this milieu. ***(Sponsored by the Indonesian Government).*** • The **Commonwealth Scholarship Commission in UK** awarded the Post-DoctoralFellowship in UK. I was among the only three fellows selected by the Commission throughout Pakistan in 2010. • Decorated with **Bronze Medal** by the Governor of Punjab, Pakistan on account of securing 3rd position in B.Sc. (Hons.) in the University Convocation in 2000. • Gained **1st position** in M.Sc. (Hons) in the Faculty of Crop and Food Sciences of University of Arid Agriculture (UAAR), Rawalpindi in 2001. • Throughout **merit scholarship holder** and 3-times **Vice Chancellor Talent Scholarship** during B.Sc. (Hons) and M.Sc. (Hons). • **Intel Education** awarded **certificate** &**letter of appreciation** for my contribution as judge in the judgment process at the National Science Olympiad, 21-24 January, 2009 in Islamabad. • Awarded with certificate for services as General Secretary in the tutorial group J in the university during 1997-98. • Served as active member of Environmental Friendly Club (EFC) in the University. • Served as President of Entomological Society of Aridian Students (ESAS) in the University and currently registered with University Placement Bureau (Alumni). • Remained member of AGRICS and SACHET, Pakistan. • Represented University in 2 Golden Jubilee Quiz Programs at STN held in

	Lahore during 1996-97 & participated as the guest in the *Youth Show* at Channel 3 of STN, Pakistan in 2001. • Represented University in the meeting of the President of Islamic Republic of Pakistan with students in Aiwan-e-Sadar on 10-7-2001. • Won **1st position** for University of Arid Agriculture, Rawalpindi in the World Water Day Quiz Competition arranged by Pakistan Council of Research and Water Resources, Ministry of Science and Technology, Islamabad in 2000. • Awarded with certificate of services as scouts by the President of Islamic Republic of Pakistan in 5th Divisional Boy Scouts Rally, held at Rawalpindi in August 1987.
Students supervised M. Sc. (Hons) Post Graduate Under-Graduate	Supervisor of Ph.D. students: **(02)** Member of Supervisory Committee of Ph.D. students: **(02)** Supervisor of M.Sc.(Hons.) students **(18)** Member of Supervisory Committee of M.Sc.(Hons.) students **(25)** Supervisor of B.Sc. (Hons.) students **(29)**
Service Activity	Quality Teaching & Research
Brief Statement of Research Interest	Stored Product Entomology
Publications	**1.** Raza M, **Shaheen FA**, Gulzar A, Ahamd MS and Maqsood A. (2024). Pathogenicity aptness of entomopathogenic fungi, *Beauveria bassiana* and *Metarhizium anisopliae* against Saw-toothed Grain Beetle, *Oryzaephilus surinamensis* L. (Coleoptera: Silvanidae). Asian J. Agric. Biol. 2025(1): 2024104. DOI: https://doi.org/10.35495/ajab.2024.104 **(Impact factor: 1.6)** **2.** Fatima, M., A. Gulzar, M. Ahmed, **F. A. Shaheen,** M. Tariq and T. Mukhtar. **2022.** Effect of Workers Density on Insect Pest Incidence and Colony Development of Bumblebees, *Bombus terrestris* (L.) (Hymenoptera: Apidae). The Philippine Agricultural Scientist, 105 (1), 85-91. **(Impact: 0.19)** **3.** Ahmed, M., R. Hayat, M. H. Rehman, **F. A. Shaheen**, M. A. Raza, S. Ahmad. **2022.** Impact of Climate Change on Dry-land Agricultural Systems: A Review of Current Status, Potentials, and Further Work Need. International Journal of Plant Production. https://doi.org/10.1007/s42106-022-00197-1. © Springer Nature Switzerland AG 2022. **(Impact: 2.61)** **4.** Sukirno S., M. Husain, M. Siswantoro, K. G. Rasool, **F. A. Shaheen**, S. Salman, A. S. Aldawood. **2021.** Study on the loss of value of Khodari date fruit infested by almond moth (Lepidoptera: Pyralidae). **Florida Entomologist,** 103(4): 425-430. **(Impact: 1.05)** **5.** Sukirno S., M. Husain, M. Siswantoro, K. G. Rasool, **F. A. Shaheen**, S. Salman, A. S. Aldawood. **2020.** Study on the loss of "Khodari" date fruit values infested by almond moth (Lepidoptera: Pyralidae). Florida Entomologist, 103(4): 425-430.**(Impact: 1.052)** **6.** Iqbal, M., **F. A. Shaheen,** R. Mahmood, K. Rafique,I. Bodlah, F. Naz, M. U. Raja and M. Fiaz. **2019.**Synergistic effect of Entomopathogenic Fungi and

	Bacteria against Pulse Beetle, *Callosobruchuschinensis.* Pakistan J. Zool. 51(5): 1685-1691. (**Impact: 0.790)**DOI: http://dx.doi.org/10.17582/journal.pjz/2019.51.5.1685.1691 **7.** Ahmed, M., S. Ahmad,F. Hassan, G. Qadir, R. Hayat, **F. A. Shaheen** and M. A. Raza. **2019**. Innovative Processes and Technologies for Nutrient Recovery from Wastes: A Comprehensive Review. Sustainability 2019, 11, 4938 (1-20). doi:10.3390/su11184938.(**Impact: 2.592)** **8.** Ali, A., M. Rakha, **F. A. Shaheen** and R. Srinivasan. **2019**. Resistance of Certain Wild Tomato (*Solanum spp.*) Accessions to *Helicoverpaarmigera* (Hübner) (Lepidoptera: Noctuidae) Based on Choice and No-Choice Bioassays. Florida Entomologist, 102 (3): 544-548. **(Impact:1.052)** URL: https://doi.org/10.1653/024.102.0311. **9.** W. S. Alwaneen, M. Husain, K. G. Rasool, M. A. Alwatban, S. Salman, **F. A. Shaheen**, M. A. Alduailij, A. S. Aldawood. **2019**. Prediction of survival ratios of *Cadracautella*(Lepidoptera: Pyralidae) different life stages after treated with ultraviolet radiation in dates. Saudi Journal of Biological Sciences, 26: 1358-1363. **(Impact: 2.820)** doi: https://doi.org/10.1016/j.sjbs.2019.09.034. **10.** Rafique, M. K., R. Mahmood, Z. A. Qadir, I. Bodhla and **F. A. Shaheen**. **2019.** Effects of rearing interlude and grafting technique on honeybee *Apismellifera* L. queen under field conditions. Pakistan J. Zool. 51(6): 1-4. (**Impact: 0.790)**DOI: http://dx.doi.org/10.17582/journal.pjz/2019.51.6.sc1 **11.** Tariq, A., F. Naz, R. Altaf, Z. Jabeen, C. A. Rauf, G. Irshad, and M. U. Raja, **F. A. Shaheen**, M. Aslam, T. Sultana, J.W. Bennett, and N. Zhang. **2018**. First Report of Fruit Rot of Bell Pepper Caused by *Fusariumincarnatum*in Pakistan. Plant Disease,Published Online: 26 Sep 2018. https://apsjournals.apsnet.org/doi/10.1094/PDIS-02-18-0221-PDN**(Impact: 3.173)** **12.** Mehmood, K., M. Husain, M. Aslam, M. S. Ahmedani, A. M. Aulakh and **F. A. Shaheen**. **2018.** Changes in the nutritional composition of maize flour due to *Triboliumcastaneum* infestation and application of carbon dioxide to manage this pest. Environmental Science and Pollution Research. ©Springer-Verlag GmbH Germany, part of Springer Nature, 2018. https://doi.org/10.1007/s11356-018-2063-6. **(Impact: 2.828)** **13.** Iqbal, M., **F. A. Shaheen,** A. R. Bhatti, A. Zia, I. Bodlah, F. Naz and M. Fiaz. **2018.** Effectiveness of *Photorhabdustemperata* and *Xenorhabdusnematophila* against *Callosobruchuschinensis* attacking stored chickpea grains. Pakistan Entomologist, 40(2): 95-103. **14.** Iqbal, M., **F. A. Shaheen,**F. Naz, M. U. Raja, M. Fiaz and M. Nadeem. **2018.**Management of *Callosobruchuschinensis* L. (Coleoptera: Bruchidae) in stored chickpea grains by using entomopathogenic fungi. Pakistan Journal of Agricultural Research, 31(4): 408-418. **15.** Javaid, W., **F. A. Shaheen,** F. Naz and M. U. Raja. **2018.** Entomopathogenicity and modeling aptness of fungi *Beauveriabassiana* and *Metarhiziumanisopliae* against pulse beetle *Callosobruchuschinensis* L. (Bruchidae: Coleoptera). Pakistan Journal of Agricultural Research, 31(3): 202-206. **16.** Umar, M., M. Hussain1, G. Murtaza1, **F. A. Shaheen,** F. Zafar.

2018. Ecological concerns of migratory birds in Pakistan: A Review. Punjab University Journal of Zoology, 33(1): 69-76. http:dx.doi.org/10.17582/pujz/2018.33.1.69.76

17. Bhutta, M. A., **F. A. Shaheen,** M. U. Raja, M. Raza, M. Raza and M. Amjad. **2020.** Pathogenicity of *Photorhabdus luminescens* and *Xenorhabdus Nematophila* against *Rhyzopertha dominica* (Bostrichidae: Coleoptera) in Stored Wheat Grains. Plant Protection, 4 (2): 75-82.

18. Ali, F., M. Tariq, **F. A. Shaheen**, Z. Mashwani, T. Zainab and A. Gulzar. **2019.** Toxicity of different plant extracts and green silver nanoparticles against *Plutellaxylostella*(Lepidoptera: Plutellidae). Plant Protection, 03 (03): 151-159.
DOI : 10.33804/pp.003.03.0163

19. Raja M. U., T. Mukhtar, **F. A. Shaheen**, I. Bodlah, A. Jamal, B. Fatima1, M. Ismail, I. Shah. **2018**.Climate change and its impact on plant health: a Pakistan's prospective. Plant Protection, 02 (02): 51-56

I. CONFERENCE PROCEEDINGS/ABSTRACTS

20. Shaheen, F. A.,M. Husain, F. Naz, M. U. Raja.**2019**.Propensity and immune defense mechanisms of pulse beetle, *Callosobruchuschinensis* L. (Coleoptera: Bruchidae) against infections caused by entomopathogenic fungi." Abstract Book of "1st International Molecular Plant Protection Congress (Molecular Approaches for Better Plant Protection)" held on April 10-13, 2019 at Çukurova University, Adana, **Turkey.**O64, Pages 56-57.***(Travel Grant funded by PSF).***

21. Shaheen, F. A. 2019. Proneness and immune defense mechanism of sawtoothed grain beetle, *Oryzaephilussurinamensis* L. (Coleoptera: Silvanidae) against infections caused by entomopathogenic fungi.*Accepted* for oral presentation in the international conference "ENTOMOLOGY 2019, ESA's 67th Annual Meeting" to be held in St. Louis, Missouri, USA and organized by The Entomological Society of America on November 17-20, 2019. (Presentation #148820) (www.entsoc.org).

22. Shaheen, F. A. and M. Husain. **2018**. Management of pulse beetle, *Callosobruchuschinensis* L. (Coleoptera: Bruchidae) by using synergistic aptness of entomopathogenic fungi and bacteria.Proceedings of "2018 ESA, ESC and ESBC Joint Annual Meeting: Crossing Borders: Entomology in a Changing World" organized by The Entomological Society of America, USA and held on November 11-14, 2018 at Vancouver Convention Centre, Vancouver, British Columbia, CANADA (623). (www.entsoc.org).

23. Tabassum, B.,M. U. Raja, T. Mukhtar and **F. A. Shaheen. 2020.** Screening of chemicals and bio-control agent against pathogens of ornamental plants. Abstract Book of PSHS "International Horticulture Conference (Revolutionizing Horticulture for second future) (IHC 2020)" held on 26-28 February, 2020 at Institute of Agricultural Sciences, University of The Punjab, Lahore. 150p.

24. Shaheen, F. A., M. Husain, K. Mehmood, F. Naz, M. U. Rajaand M. Ahmed. **2018**. Modeling Aptness of Entomopathogenic Fungus, *Metarhizium anisopliae* with Enhanced Diatomaceous Earth (DEBBM) to Control Pulse

	Beetle, *Callosobruchus chinensis*L. *(*Coleoptera: Bruchidae) in Stored Chickpea Grains. Abstract Book of **"3rd International Conference on Biosciences"** held on May 9-11, 2018 at G. C. University, Lahore and organized by Biological Society of Pakistan. 22-23p. **25.** Gull-e-Fareen, A., I. Bodlah, M. T. Rasheed, **F. A. Shaheen** and M. U. Raja. **2018.** Record of aphids, their associated ants and coccinellids on *Punicagranatum* L. (Lythraceae) in Rawalpindi and Islamabad. "National Symposium on Soil Plant Water Interaction for Orchards Management under Changing Climate" held on May 9-11, 2018 at the University of Haripur, KPK. 12p. **Book Chapter:** **26.** Mehmood MZ, Afzal O, Aslam MA, Riaz H, Raza MA, Ahmed S, Qadir G, Ahmad M, **Shaheen FA,** Hassan FU, Shah ZH, **(2020)** Disease Modeling as a Tool to Assess the Impacts of Climate Variability on Plant Diseases and Health In: Ahmed M (ed.), Systems Modeling, **Springer Nature** Singapore Pvt. Ltd., pp. 321-346. https://doi.org/10.1007/978-981-15-4728-7_12 **27.** Ahmed M, Fatima Z, Iqbal P, Kalsoom T, Abbasi KS, **Shaheen FA,** Ahmad S, **(2020)** Potato Modeling In: Ahmed M (ed.), Systems Modeling, , **Springer Nature** Singapore Pvt. Ltd., pp. 377-396. https://doi.org/10.1007/978-981-15-4728-7_14
Research Grants and Contracts	**Research Project (Completed in 2018)** Entomopathogenicity and modelling aptness of fungi, *Beauveria bassiana* and *Metarhiziumanisopliae* against pulse beetle, *Callosobruchus chinensis* L. (Bruchidae: Coleoptera) **Funding Agency PMAS-Arid Agriculture University, Rawalpindi**
Other Research or Creative Accomplishments	The Post-Doctoral fellowship was awarded by the Commonwealth Scholarship Commission and funded by the British Council, UK in 2010-11 to execute research in School of Life Sciences, University of Sussex, England. The work was done with Dr. Neil Crickmore, Senior Lecturer in Molecular Genetics, on projects involving Insecticides Resistance in Crop Pests and Insect Biotechnology.
Selected Professional Presentations	Presentations on anti-dengue measures for general public and solutions to stored grains problems due to insect pests for farmers.

RESUME OF DR. Imran Bodlah, ASSISTANT PROFESSOR

Name	**Imran Bodlah**
Personal Address	Department of Entomology, PMAS Arid Agriculture University Rawalpindi
Experience	27-06-2014 to date Assistant Professor, Department of Entomology, PirMehr Ali Shah, Arid Agriculture University Rawalpindi

	5-07-13 to 27-06-2014 31-07-12 to 5-07-13 30.04.2008 – 31-07-12 February 2011 to date	Lecturer, Department of Entomology, PirMehr Ali Shah, Arid Agriculture University Rawalpindi Assistant Professor, Department of Entomology, PirMehr Ali Shah, Arid Agriculture University Rawalpindi Lecturer, Department of Entomology, PirMehr Ali Shah, Arid Agriculture University Rawalpindi Manager, at Apiculture Research Laboratory at University Research farm Chakwal road under Hec. Funded Project "Strengthening of Department of Entomology
Honor and Awards	Teaching assistantship scholarship from UAAR in Entomology Department for two years.	
Membership	N/A	
Graduate Students PhD Postdocs Undergraduate Students Honour Students	6 1 8	
Service Activity	Teaching classes to B.Sc (Hons) and M.Sc. (Hons) Advisory services for the community and different organization for insects pests and their bio-control agents	
Brief Statement of Research Interest	Biosystematics, species distribution modeling and Ecology of various insects	

Publications (2022-2024)	**1.** Muhammad Adnan Bodlah, Ayesha Younas, AlishbahMohsin, Imran Bodlah, Muhammad Asif, Muhammad Tariq Rasheed, Ammara Gull E Fareen,Aneela Ashiq (2023). The State of Safety and Quality of Honeybee By-Products: A Review. Malaysian Animal Husbandry Journal, 3(2): 49-55. **2.** Muhammad Adnan Bodlah, AlishbahMohsin, Ayesha Younas, Imran Bodlah, Muhammad Asif, Muhammad Tariq Rasheed, Amara Gul e Fareen, Aneela Ashiq (2023). Insect Pests of Rice in Pakistan: A Comprehensive Review of Biology, Damage, And Management. Agriculture Extension in Developing Countries (AEDC), 1(2): 36-42. **3.** Gull E. Fareen A, Mahmood T, Bodlah I, Rashid A, Khalid A, Mahmood S (2022) Modeling potential distribution of newly recorded ant, *Brachyponeranigrita* using Maxent under climate change in Pothwar region, Pakistan. PLoS one 17(1): e0262451. https://doi.org/10.1371/journal.pone.0262451 **4.** Nazir N, Imran M, Bodlah I, Mahmood K, Khan MR, Osman K, Rasool A, Usman M, Din AU. 2022. Distribution, host range and toxicity assessment of

different insecticides on *Bactroceradiversa*Coquillett, 1904 (Diptera: Tephritidae). Braz J Biol.9;84:e263261.

5. Shehzad, M., Bodlah, I., Siddiqui, J. A., Bodlah, M. A., Fareen, A. G. E., & Islam, W. (2023). Recent insights into pesticide resistance mechanisms in Plutellaxylostella and possible management strategies. *Environmental Science and Pollution Research*, *30*(42), 95296-95311.

6. AMIN, M., MAHMOOD, K., BODLAH, I., HASSAN, M. A., QASIM, M., SARWAR, Z. M., & ULLAH, Z. (2023). New data on alien aphid species from Pakistan (Hemiptera: Aphididae). Journal of Insect Biodiversity, 42(2), 35-45.

7. Asrar, R., Masood, M., Bodlah, I., Rasool, G., Suleman, N., &Yousaf, S. (2023). Molecular characterization of mitochondrial COI gene sequences in Micraspisallardi from Pakistan. *Plos one*, *18*(12), e0294034.

8. Iqbal, Z., Azad, R., Nasir, M. F., Bodlah, I., Zaman, M., Hassan, M. A., ... &Nie, R. E. (2024). Review of ladybird tribe EpilachniniMulsant, 1846 (Coleoptera: Coccinellidae) from Pakistan. *Oriental Insects*, 1-47.

9. Hassan, M. A., Shehbaz, M. H., Shehzad, A., Maryam, Z., Khatak, N., &Bodlah, I. (2024). Taxonomic Notes on the Soldier Fly Genus OdontomyiaMeigen, 1803 (Diptera: Stratiomyidae) from Pakistan with a New Country Record. Journal of the Entomological Research Society, *26*(1), 147-156.

10. Bodlah, M. A., Iqbal, J., Ashiq, A., Bodlah, I., Jiang, S., Mudassir, M. A., ... &Fareen, A. G. E. (2023). Insect behavioral restraint and adaptation strategies under heat stress: An inclusive review. Journal of the Saudi Society of Agricultural Sciences.

11. Rasheed, M. T., Bodlah, I., Fareen, A. G. E., Bodlah, M. A. &Qurban, M. 2023. An Updated Checklist of Jumping Plant Lice (Hemiptera: Psylloidea) Of Pakistan.Mun. Ent. Zool. 18 (1).Muhammad Tariq Rasheed, Imran Bodlah, Muhammad Qurban, Muhammad Bilal Khalil, Muhammad Usama Khalil, Junaid Ali Siddiqui, Ammara Gull E Fareenand Muhammad Adnan Bodlah. 2022. New Distributional Record of *Urentiushystricellus* (Richter, 1870) (Hemiptera: Tingidae) from Southernmost Region of Punjab, Pakistan. Proceedings of the Pakistan Academy of Sciences

12. Arooj, R., Kayani, A. R., Rakha, B. A., Bodlah, I., &Rizwan, M. (2023). Species Composition of Mosquitoes in Margalla Hills National Park, Islamabad, Pakistan. Jammu Kashmir Journal of Agriculture, 3(2), 45-57.

13. Rehman, A. U., Bodlah, I., Nasir, M. F., Shehzad, M., Bukhari, S. A. T., Asghar, M. Y. N., ... &Rizwan, M. (2023). Toxicity of Selected Insecticide against Diamondback Moth *Plutellaxylostella* (L.) under Controlled Condition. Jammu Kashmir Journal of Agriculture, 3(2), 89-94.

14. Batool, M., Zia, A., Ahmed, S., Bodlah, I., Panhwar, W. A., Ashfaque, M., ... &Muneer, M. (2024). Preliminary study on impact of altitudinal clines over distribution of Aphidoidea complex in Kaghan Valley, Khyber Pakhtunkhwa, Pakistan. Pakistan Journal of Agricultural Research, *37*(2), 185-189.

15. M. T. Rasheed, I. Bodlah1, M. F. Nasir, T. Mahmood, R. Zada and M. Asif. 2022. Addition to the fauna of psyllid (Hemiptera: Psylloidea) in Pothohar region of Pakistan. The J. Anim. Plant Sci., 32 (1). http://www.thejaps.org.pk/Volume/2022/32-01/32.php.

	16. Tasleem Akhtar, Muhammad Farooq Nasir, Imran Bodlah and Muhammad Adnan Bodlah. 2022. Biological parameters of *Aphidiussmithi*Sharma and SubbaRao (Hymenoptera, Aphidiinae), a parasite of the pea aphid, *Acyrthosiphonpisum*(Homoptera: Aphididae) under laboratory conditions. Pak. J. Zool.1-10. **17.** Muhammad Adnan Bodlah, Imran Bodlah, YasirNiaz, Muhammad Tariq Rasheed, Muhammad Nawaz, Habib Ali, Shahbaz Ali, Ammara Gull e Fareen . 2023. First Record, Incidence and distribution Morphology of *Nausinoegeometralis* (Guenee, 1854) (Lepidoptera:Pyralidae) from Punjab, Pakistan..Journal of Animal and Plant Sciences. 33(2): 2: 490-495. **18.** Imran Bodlah, Ammara Gull E Fareen,*Umer* Ayyaz *Aslam Sheik,* Muhammad Adnan Bodlah, Rehana Bibi,Hesham F. Alharby, Habeeb M. Al-Solami, Naser A. Alkenaniand Abdullah J. Al-Ghamdi. 2024.Habitat modelling of *Bombus haemorrhoidalis* Smith, (Hymenoptera) under future projected climatic conditions in Pakistan. Asian Journal of Agriculture and Biology.https://doi.org/10.35495/ajab.2023.300
Research Grants and Contracts	N/A
Other Research or Creative Accomplishments	Insect species exploration and modeling of species under the influence of climate change
Selected Professional Presentations	Insect Museums for Business Development