PIR MEHR ALI SHAH
ARID AGRICULTURE UNIVERSITY
RAWALPINDI

SELF ASSESSMENT REPORT 2009-10
Department of Entomology
M.Sc. (Hons.) Entomology

Program Team

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ANNEXURES

Introduction

At some 1.3 million described species, insects account for more than two-thirds of all known organisms, date back some 400 million years, and have many kinds of interactions with humans and other forms of life on earth. Like several of the other fields that are categorized within zoology, Entomology is a taxon-based category; any form of scientific study in which there is a focus on insect related inquiries is, by definition, entomology. Entomology therefore includes a cross-section of topics as diverse as molecular genetics, behavior, biochemistry, systematics, physiology, developmental biology, ecology, morphology, paleontology, agriculture, nutrition, forensic science and more. It was 1986 when Department of Entomology started working with the establishment of Agriculture College, Rawalpindi. It was started with the B.Sc. (Hons) agriculture program and with the up gradation of College to the University in 1994, M.Sc (Hons) degree program was initiated in 1997 and Ph.D. program was introduced in the next coming year, 1998.

In a country like Pakistan, where their exist a diverse system of agriculture, the subject of Entomology serves as an important management source of information to all the farming community from field crops insect pest management to household and forest pest management. It also serves as a soure of highly trained manpower development to meet the need of the growing economic needs. Keeping in view its mission and objectives, the department of Entomology periodically reviews its curriculum to meet the challenges and to keep up with the pace of development. The department is always committed to enhance students' professional training and career opportunities. It arranges field visits and holds national and international seminars on current issues relating to the protection and quality of post-harvest etc. The faculty is actively engaged in a number of research projects some of which are funded by Higher Education Commission. Likewise, Pakistan Science Foundation also supported technically for some research initiatives.

The basic aim of the deparmnet is to provide quality education and conduct result oriented research in the field of agriculture. It is committed to promote merit and improve quality of education, teaching and research. The department is always willing to cooperate with the Quality Enhancement Cell of the University as well as to incorporate their recommendations for improving standard of teaching, quality of learning and achievement of its objectives. This report encompasses the departmental activites both in the field of education and research in collaboration with QEC to achieve the stipulated results as per plan of the university and the Higher Education Commission, Islamabad..

The present report on self assessment is comprises of eight sub-sections (criterion). The first section outlines the programme mission and objectives. Section 2 provides information about the curriculum development. Section 3 enlists the laboratories and other relevant information followed by student support and guidance. The last four sections provide information about student support, process control, faculty characteristics and institutional facilities and support provided by the university.

Criterion-1: Programme Mission, Objectives and Outcomes

Entomology, study of insects, an arthropod class that comprises about 900,000 known species, representing about three fourths of all the classified animal species. Insects are studied because of their importance as pollinators for fruit crops; as carriers of bacterial, viral, and fungal diseases; as parasites of humans or livestock; as destroyers of economically important plants/crops; or as predators of other destructive insects. The role of insects in ecosystems and their control by insecticides or by biological and cultural methods methods are studied in ecology.

We come in contact with different insects in our every day life. These very small living creatures are very good competitiors of human race on this planet. It covers all the fields like harmfull insect pests, beneficial insects including biocontrol agents, pollinators, scavangers, honey bee, silkworm and other useful insects. Management of major insect pests of field crop, stored grains, fruit trees, vegetables and ornamentals etc using IPM techniques and safe and judicious use of pesticiedes is also a key component of entomology. In case of medical discipline, entomology is playing a key role in healing of wounds by application of sterile maggots which are otherwise difficult to heal specially in diabetic patients. Likewise environmental pollution, biodiversity and insect resistance against the pesticides are the burning issues of today which warrant continuous processes of education and research. Advanced education to the students at PhD level, in this specialized field, involves the use of modern/advanced teaching methods and innovative analytical techniques for insect pest problem solving attitudes and techniques establishment. Application of applied knowledge regarding pest management not only reduces enormous losses due to insect pests, lessen pollution hazards and develop a sustainable and substantially profitable production system for the farmers.

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

During the reporting period the MSc pogram has been producing a cader of highly skiled manpower well equipped with the theoratical and practical knowledge and techniques concerning both the basic and field (applied) issues of entomology. This post-graduate (MSc Hons) cader of technical manpower serves in all the government and pivate sectors like research, education, planning & execution and extension sb-sectors. The technical field areas of entomology are; identification and management of major insect pests of agricultural crop, vegetables and fruits; stored commodities pests, pesticide use and allied issues, and the beneficial insects like natural enemies of insect pests, pollinators and those prodicing products like honey, silk and lac etc.

Documented measurable objectives

The department of Entomology offers MSc (Hons) Entomology degree to cater highly skilled local manpower for future needs at national and international level. The students of this programe complete their course work alonq with their resrach project and the thesis. Research areas are mostly related to isues of regional, national and to some extent international level.

Objectives of Entmology program are given as under.

1. To yield highly skilled manpower equiped with both the theoretical as well as applied knowledge relating to the Entomological studies.
2. To make awared and educate them about most recent and effective techniques of IPM (Integrated Pest Management) in various crop ystem.
3. To produce a cader of students having potential to work effectively in a research, edcation, and extension setps to genrate high level outputs.
4. To enable the students to become an efficient, job-oriented and dedicated professional to ferform for the betterment of community and the country.
5. To couch the students in order to make them delivering individuals in social and economic aspects of agriclture and the society in a hormonized way to produce a better index of cost and benefits of farming community and also in the context of sustainability of healthy and safe environment.

Main elements of strategic plan to achieve the mission and objectives

- Planning and implementation of an effecient teaching system based on practical knowledge and expertise gathered from different sources for overall education and training of the students.
- Periodic review and improvement of the curricula involving core subjects related to present pest problems and their solutions.
- Establishing and strengthening well-equipped research laboratories to conduct good level research.
- Execution of research projects funded by the universities and other donor agencies.
- Provocation of linkages with national and international research organizations to solve indigenous problems relating to research.

PROGRAM OBJECTIVES ASSSESSMENT

The department monitoring system is focused on the 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 yield highly skilled manpower equiped with both the theoretical as well as applied knowledge relating to the Entomological studies.	Getting views of MSc students based on different activites being carried out at department level regarding teaching, research and management at department level. .	Will be measured on regular basis	Establishing an insect pest advisory service at the department	For insect pest identification identified specimen are preserved for technical suppot Techniques regarding research and field practices developed and dissemination to the students and the growers also
2	To make awared and educate them about most recent and effective techniques of IPM (Integrated Pest Management) in various crop ystem.	Assessing the previous understanding of students through exams,/tests and through interaction with student	In the already established system of 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
3	To produce a cader of students having potential to work effectively in a research, edcation, and extension setps to genrate high level outputs.	Students' evaluation through research/internship project topics, and thesis/reports by the concerned individuals and committees.	Existing evaluation procedure, prior to initiate the activity like seminar and projects etc and at the completion of the activity or resrach thesis	Strong scrutiny system for topics and synopsis evaluation Students to deliver seminars and prepare reports etc	Seminars, presentation sessions and class discussions, were organized for communication proficiency improvement
4	To enable the students to become an efficient, job-oriented and dedicated professional to ferform for the betterment of community and the country.	Will be evaluated by concerned departmental or faculty level committees, and councils (academic council)	Periodic evaluation will be done in the meetings of the concerned bodies	Different titles/courses are suggested as per HEC/University guidelines/recomm -endations.	New development in realted fields are incorporated for awareness and exposure regarding the field
5	To couch the students in order to make them	Through evaluation in different examinations at	It would be a regular feature	Latest subjects should be	Endorsement of new syllabus to incorporate

	delivering individuals in social and economic aspects of agriclture and the society in a hormonized way to produce a better index of cost and benefits of farming community and also in the context of sustainability of healthy and safe environment.	Departmental levels. This also includes the comprehensive and the final viva voce of th student for the award of the degree.		incorporated in syllabus, to study the new challenges. Semianrs and workshops on related issues may be organized and participated fully.	modern techniques and their formal and informal motivation and training to achieve the said objective.

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

Expected Outcomes of the Programme:

1. The gradating students (MSc Hons.) should have a thorough understanding of knowledge and issues related to insect pests, their biosytematics, their management and related problems of environment and have capacity to devise solutions.
2. The pasing student 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 underwstanding to devise effective pest management methodology which is cost effective and environmetnal friendly.
4. The grduates (MSc Hons) 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 experties to add to the national economy.
7. They must have potential to contribute in sustainable development through their input in research and development activities in entomological activites.

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

Table 2: 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

Programme Outcome Measurement

In order to complete this activity, information was gathered from the target groups through prescribed proforma provided by the Quality Enhancement Cell of Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi. The prescribed prorformas were filled in by the respective class students, respective faculty memebrs, department alumni, and the graduates (previously passed out from the university) working in different organizations, research institutes, and agriculture departments in different capacities/positions at national level.

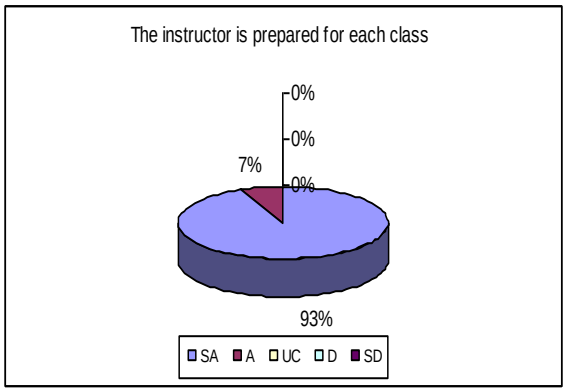
PROGRAM ASSESSMENT RESULTS

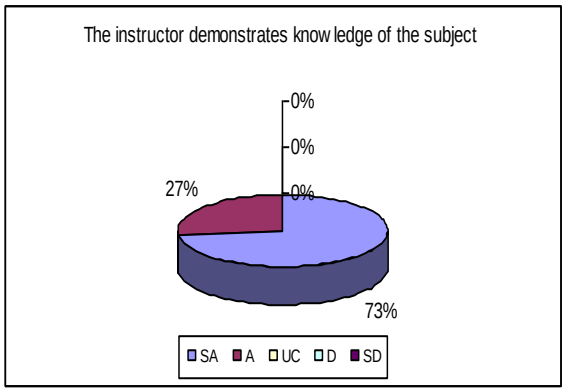
Teachers' Evaluation

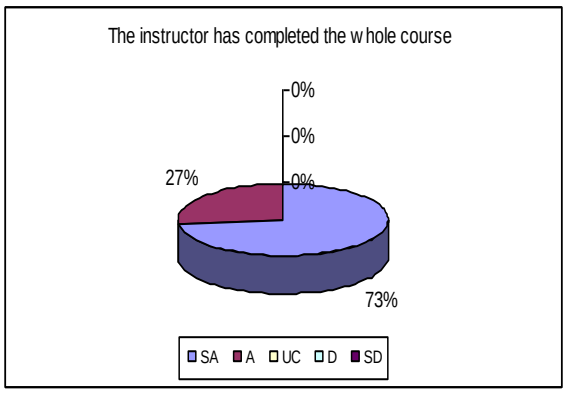
Regarding the teachers' performance and their assessment, evaluation was done by the respective students and their comments were gathered on prescribed performa. This evaluation was done for different courses assigned to individual teachers through filling in Proforma 10 (Annexure-IV). Prof. Dr. Muhammad Aslam taught MSc (Hons) course and scored 4.6.

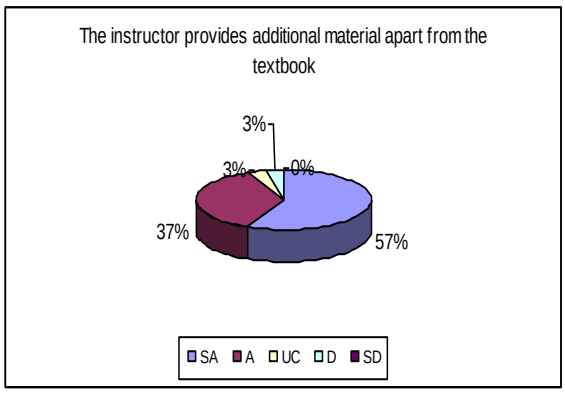
Pie Charts Showing Teacher Evaluation

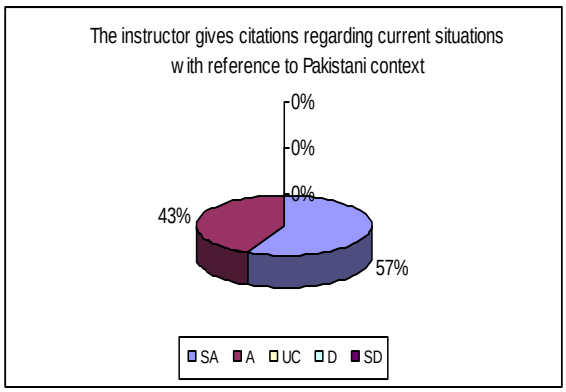
The individual graphs reflected excellent performance of the teacher in all respects. However, 3.0 % students complained that the instructor does not provide study material other than course. Another 3 % is uncertain about this indicator. 3 % of the students disagree with showing respect towards students and does not encourage the class participation.

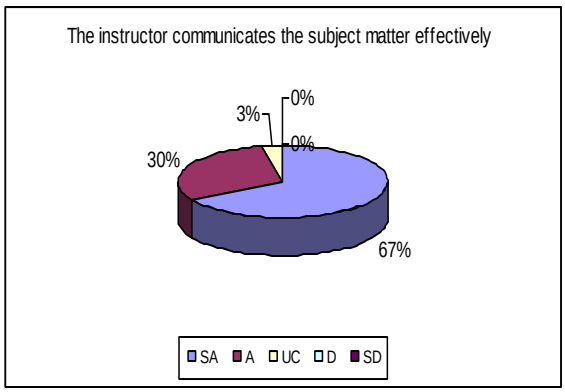


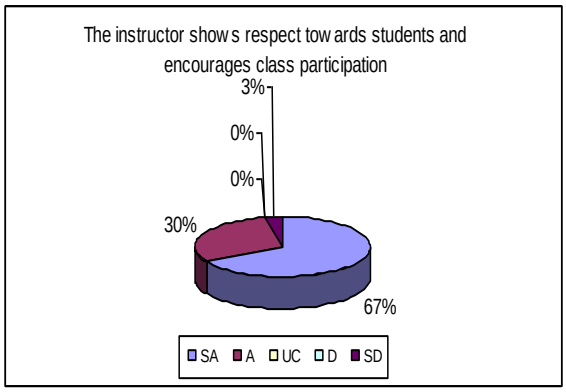


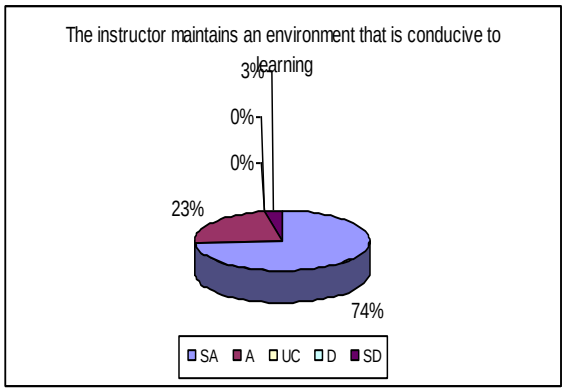


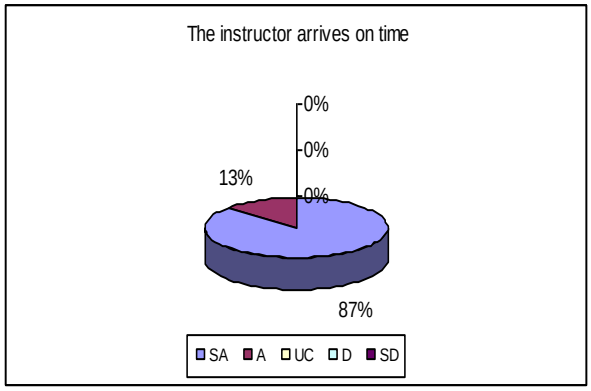


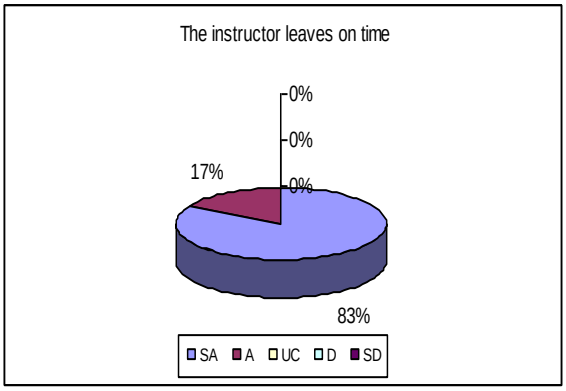


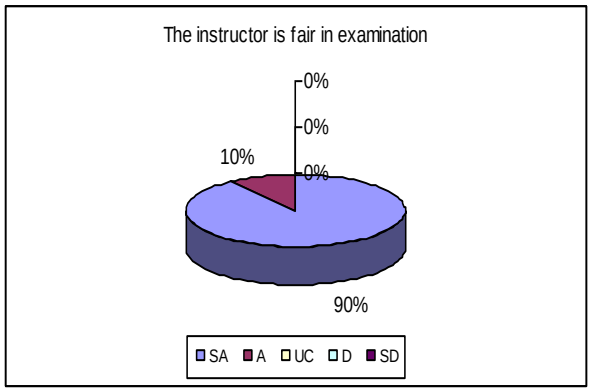


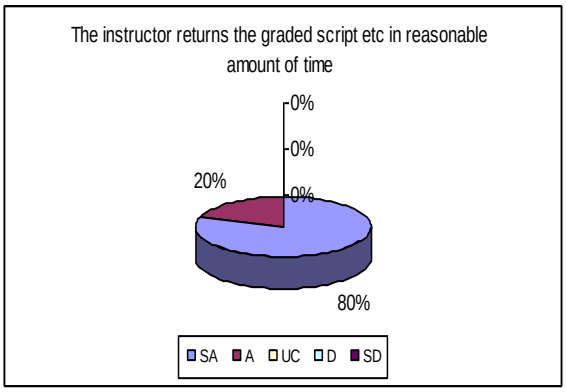

The instructor shows respect towards students and encourages class participation
3%
0%
0%
30%
67%
SA A UC D SD

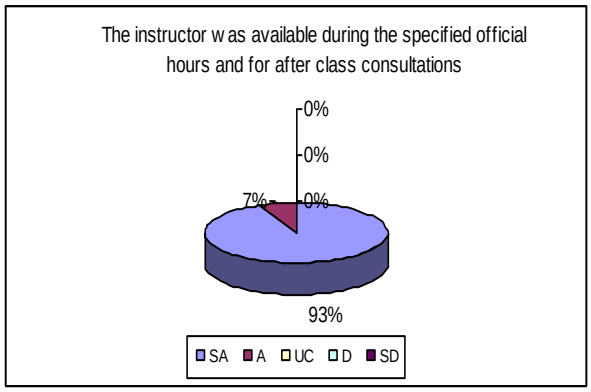

The instructor maintains an environment that is conducive to learning
3%
0%
0%
23%
74%
SA A UC D SD

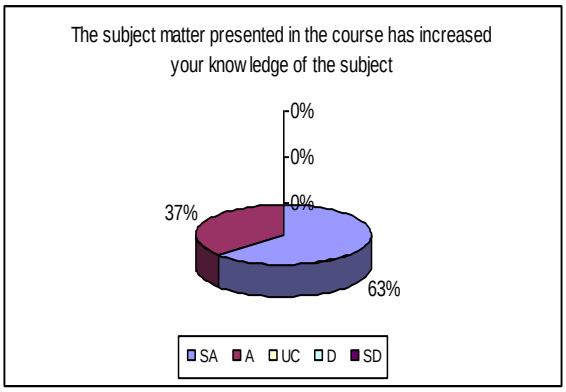

The instructor arrives on time
0%
0%
13%
0%
87%
SA A UC D SD

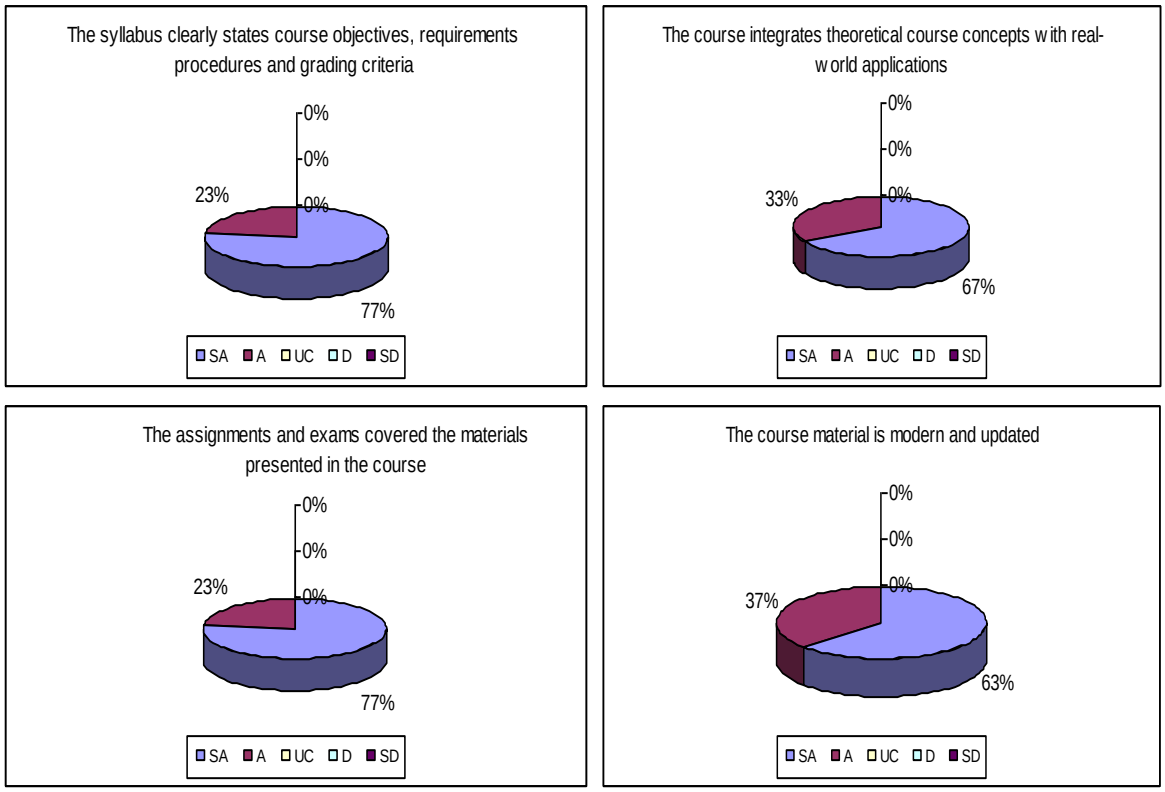

The instructor leaves on time
0%
0%
17%
0%
83%
SA A UC D SD


The instructor is fair in examination
0%
0%
10%
0%
90%
SA A UC D SD


The instructor returns the graded script etc in reasonable amount of time
0%
0%
20%
0%
80%
SA A UC D SD


The instructor was available during the specified official hours and for after class consultations
0%
0%
7%
0%
93%
SA A UC D SD


The subject matter presented in the course has increased your knowledge of the subject
0%
0%
37%
0%
63%
SA A UC D SD

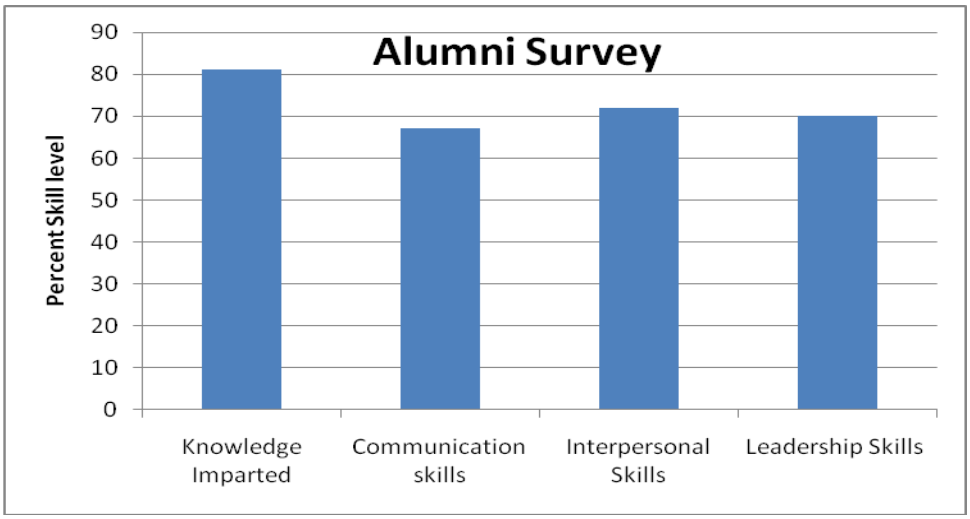


SA: Strongly Agree **A: Agree** **UC: Un-certain** **D: Disagree** **SD: Strongly Disagree**

This three credit hour coure "Insect Pest Management System" (ENT-708) was taught during the reported period. A total of 28 students got registered the course; among these 32% scored A grade, 50 % scored B grade and 18% scored C grade. (Proforma-2). The course was found very much appropriate and in line with the curriculum and intended objectives. A gap which was felt wad the lack of field visits ans practical demonstrations of the IPM technologies in fields.

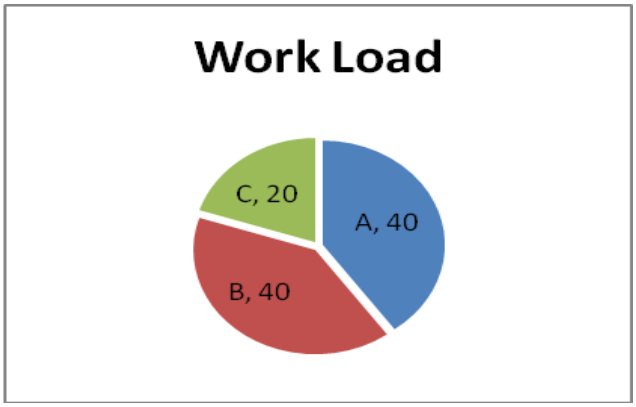
Alumni Survey Results

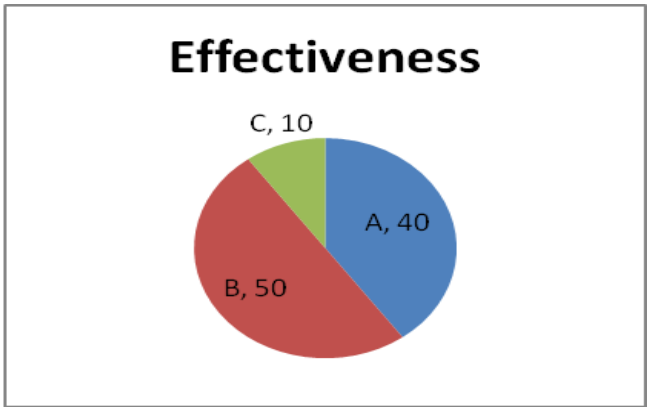
Department of Entomology conducted a survey of 13 alumni using Proforma – 7. The proforma was provided to the students to get the required information and ffeedback. The results generated from the information are given in Fig. given below.Majority of the alumni have rated the knowledge imparted by the department at grade A (Excellent) and with respect to the communication skills it falls in low B grade. Interpersonal skills have been given grade B by a majority of the alumni whereas they have rated the management/leadership skills at grade B. The alumni have suggested arranging more field vists for the students. The infrastructure of the department has is considered verygood, and reputation of the department at national level in a very good.



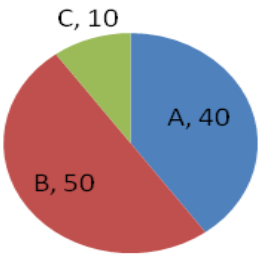
Survey of the Graduating Students

The survey regarding post-graduate students (MSc Hons.) was conducted by gathering information from 10 students (Proforma # 3) The programme assessment is depicted in the for of pie charts. It is evident from the graphical data that majority of the students reported about their satisfaction with the programme followed by the students who expressed their views as very satisfied. However, very few students were dissatisfied incase of analytical skill and objective achievement. A segment of the respondents also expressed heir views as uncertain incase of advanced curriculum, planning abilities, work load, effectiveness, administrative role, independent thinking, capable faculty and co-curriular activites. Detailed graphical presentation of the data is given below in the form of pie graphs.

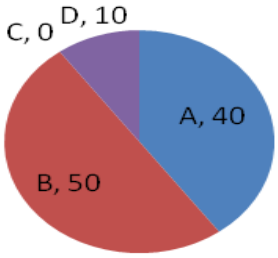




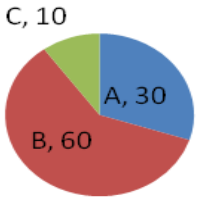
Administrative role



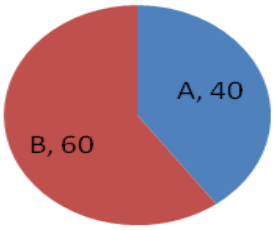
Analytical skill



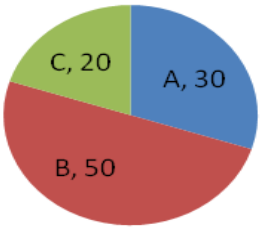
Independent thinking



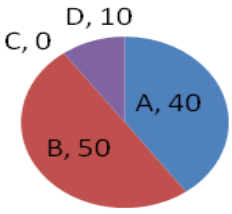
Communication skill



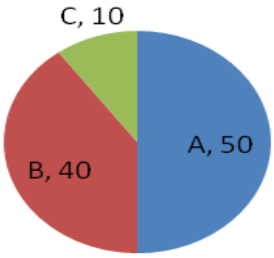
Planning abilities



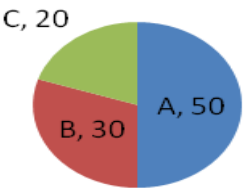
Objective achievement

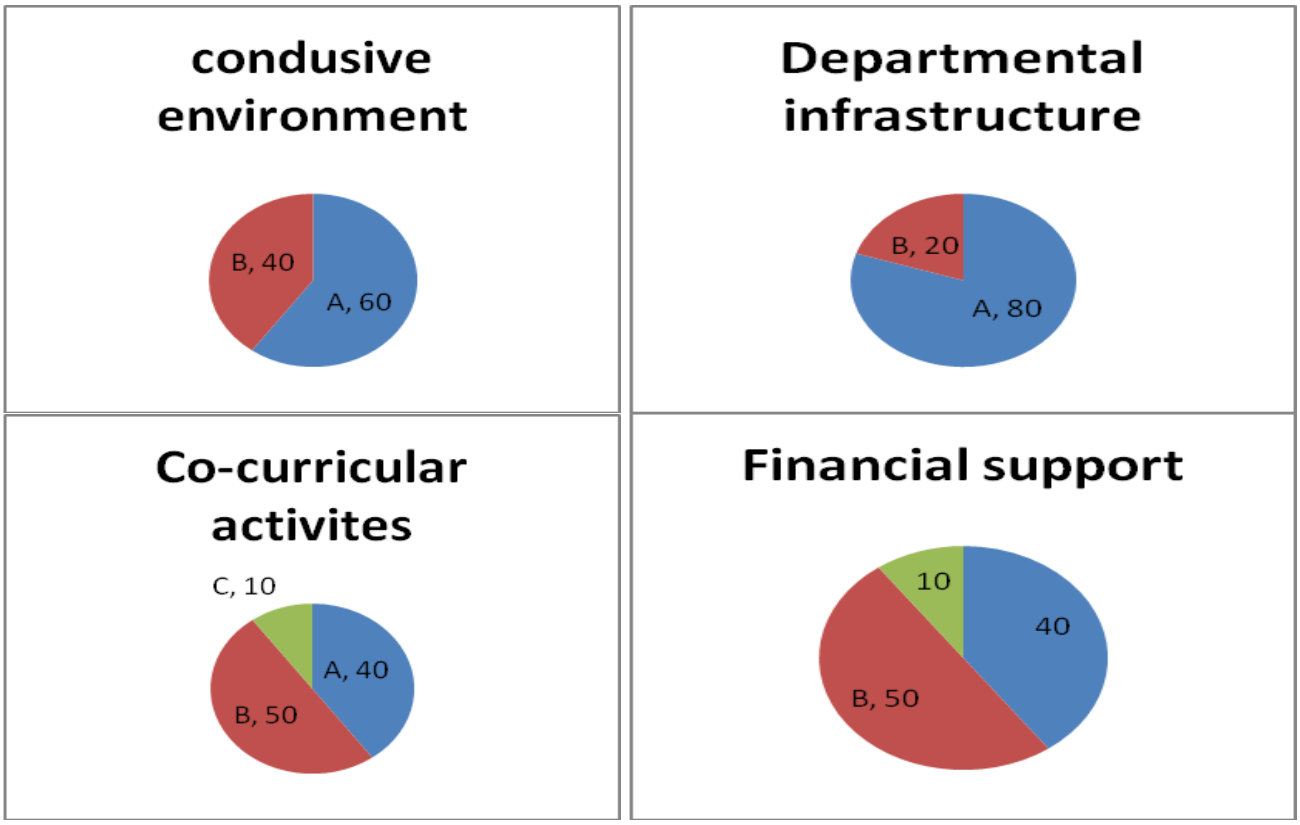


Capable faculty



Advanced Curriculum





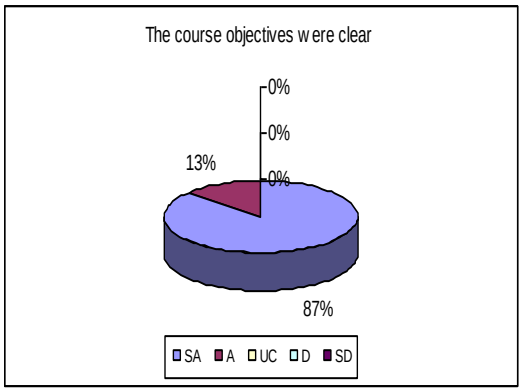
Students Course Evaluation

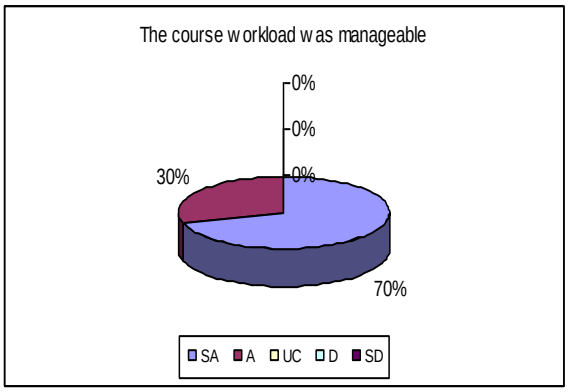
Courses taught the teachers at department level were also evaluated by the concerned students. The course of the teacher was evaluated on the basis of information gathered from Proforma 1 (Annexure-III) for Prof. Dr. Muhammad Aslam. The performance level for each course is depicted in figure as shown below. Evaluation of courses alongwith their scores as done by the students are given as under.

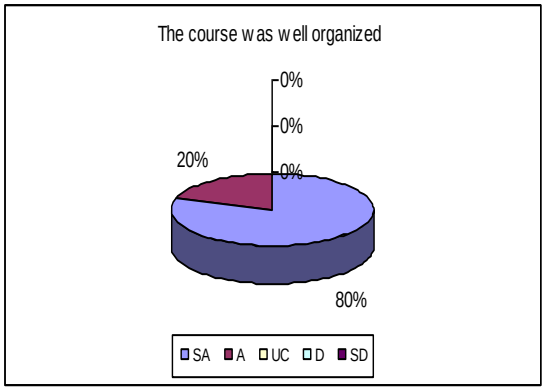
Pie Charts Showing Student Course Evaluation

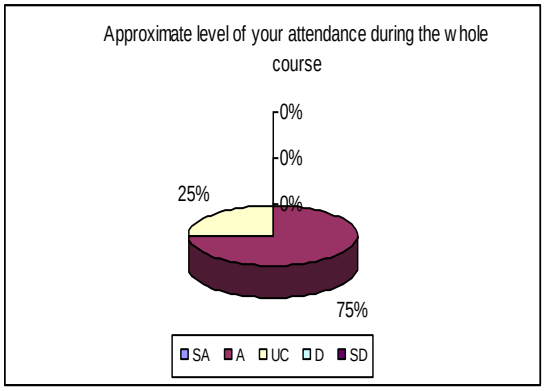
Course ENT-708

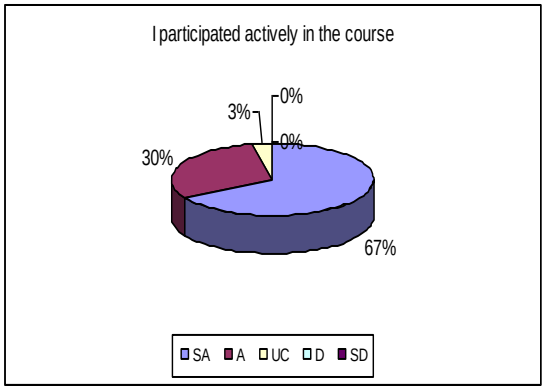
All of the students were found strongly agreed or agreed with the statement that course objectives were clear, course work was manageable and the course was well organized. 25 percent of the students were not certain about their appropriate attendance level. 3 % of the students were disagreeing that ideas and concepts in the course are presented clearly and they understand what is presented there in class.

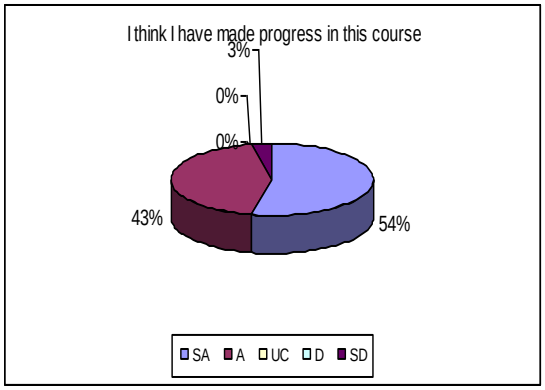

The course objectives were clear
0%
0%
0%
13%
87%
SA A UC D SD

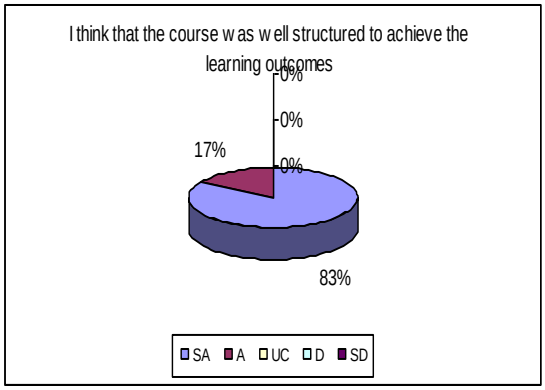

The course workload was manageable
0%
0%
0%
30%
70%
SA A UC D SD

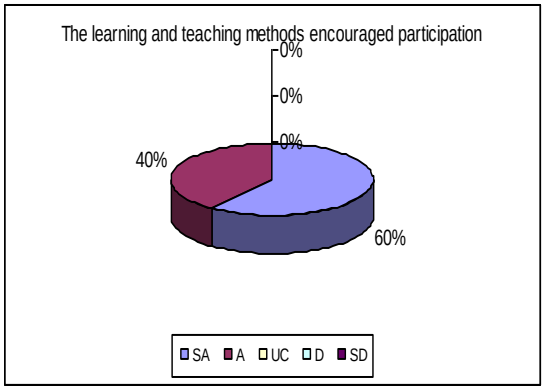

The course was well organized
0%
0%
0%
20%
80%
SA A UC D SD

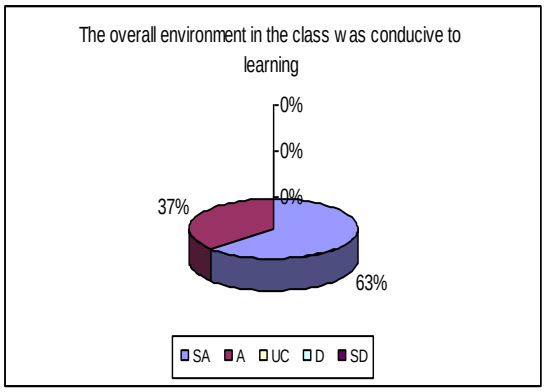

Approximate level of your attendance during the whole course
0%
0%
0%
25%
75%
SA A UC D SD

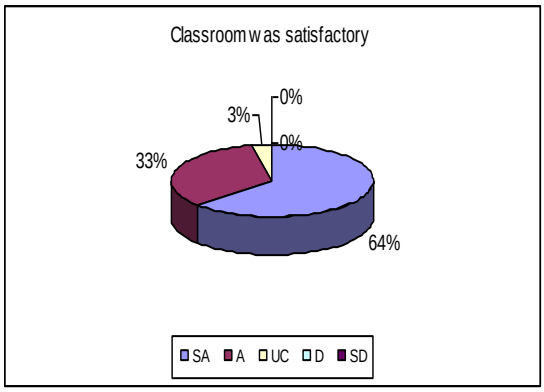

I participated actively in the course
0%
0%
3%
30%
67%
SA A UC D SD

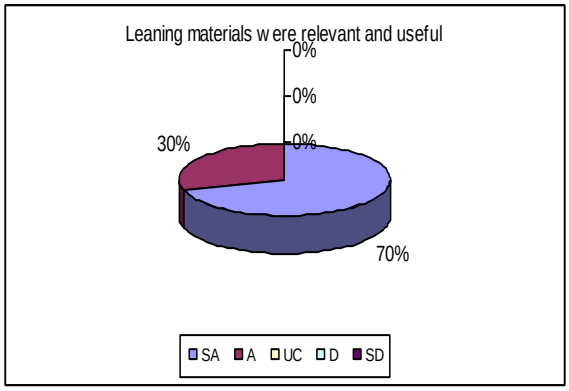

I think I have made progress in this course
3%
0%
0%
43%
54%
SA A UC D SD

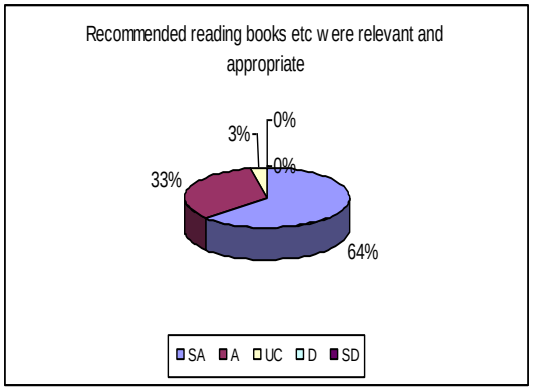

I think that the course was well structured to achieve the learning outcomes
0%
0%
0%
17%
83%
SA A UC D SD

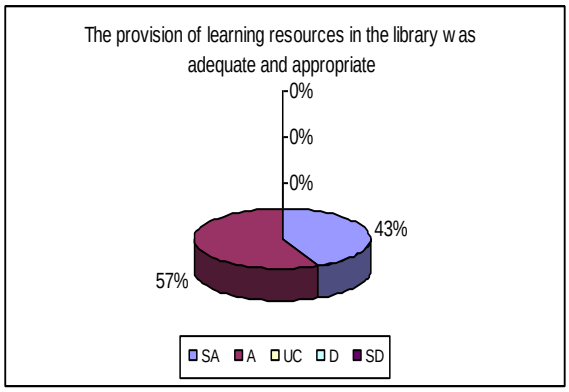

The learning and teaching methods encouraged participation
0%
0%
0%
40%
60%
SA A UC D SD

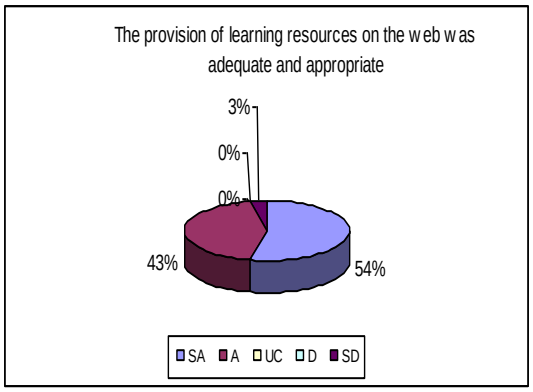

The overall environment in the class was conducive to learning
0%
0%
0%
37%
63%
SA A UC D SD

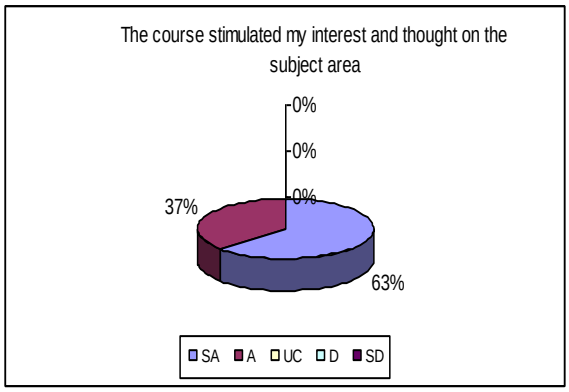

Classroom was satisfactory
0%
3%
0%
33%
64%
SA A UC D SD

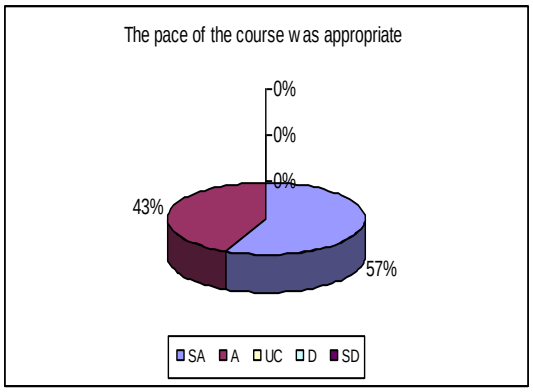

Leaning materials were relevant and useful
0%
0%
0%
30%
70%
SA A UC D SD

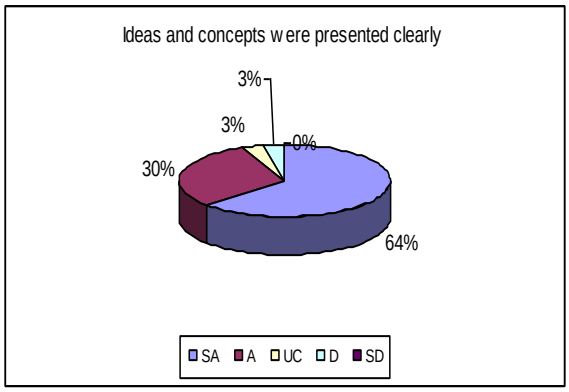

Recommended reading books etc were relevant and appropriate
0%
3%
0%
33%
64%
SA A UC D SD

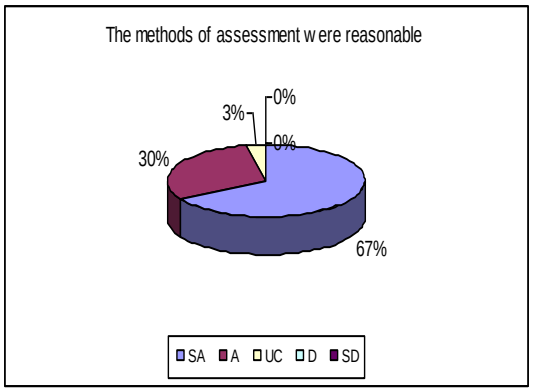

The provision of learning resources in the library was adequate and appropriate
0%
0%
0%
43%
57%
SA A UC D SD

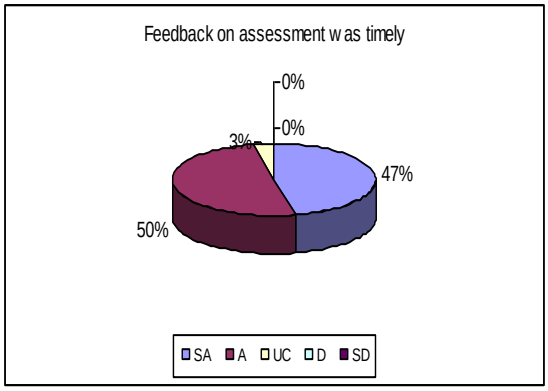

The provision of learning resources on the web was adequate and appropriate
3%
0%
0%
43%
54%
SA A UC D SD

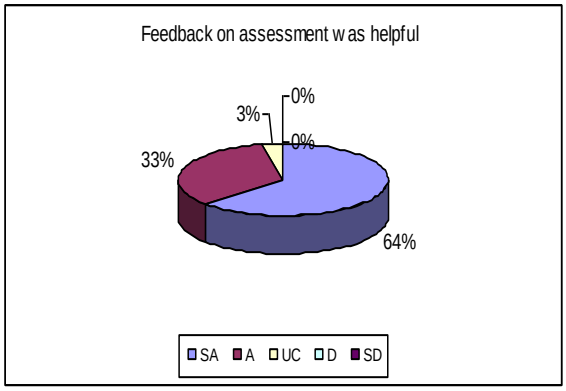

The course stimulated my interest and thought on the subject area
0%
0%
0%
37%
63%
SA A UC D SD

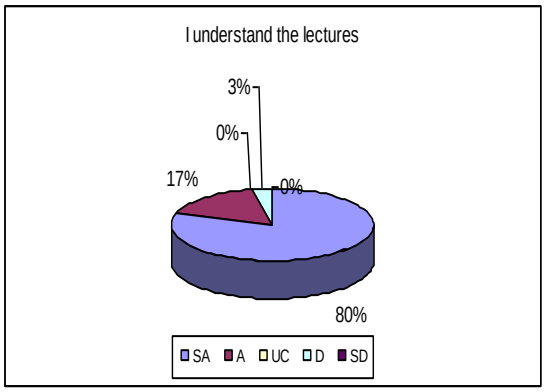

The pace of the course was appropriate
0%
0%
0%
43%
57%
SA A UC D SD

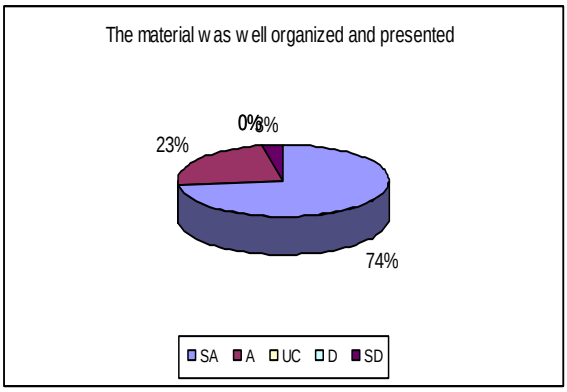

Ideas and concepts were presented clearly
3%
3%
0%
30%
64%
SA A UC D SD

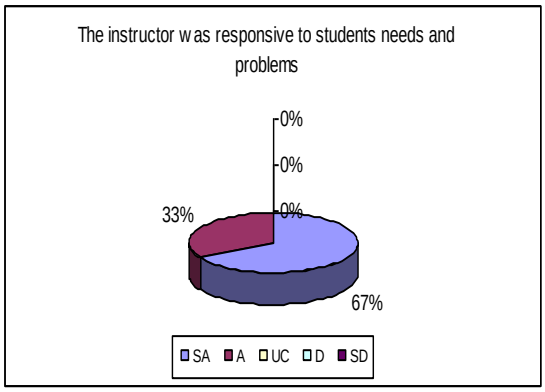

The methods of assessment were reasonable
3%
0%
0%
30%
67%
SA A UC D SD

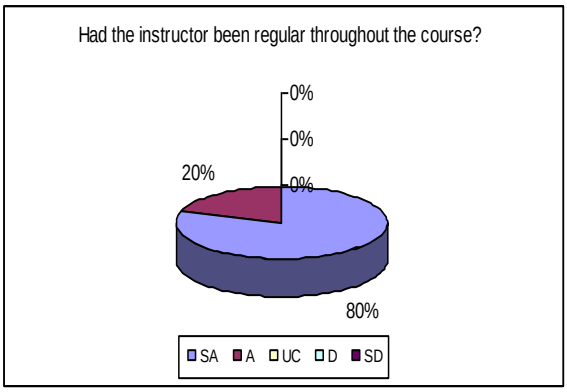

Feedback on assessment was timely
0%
0%
3%
47%
50%
SA A UC D SD

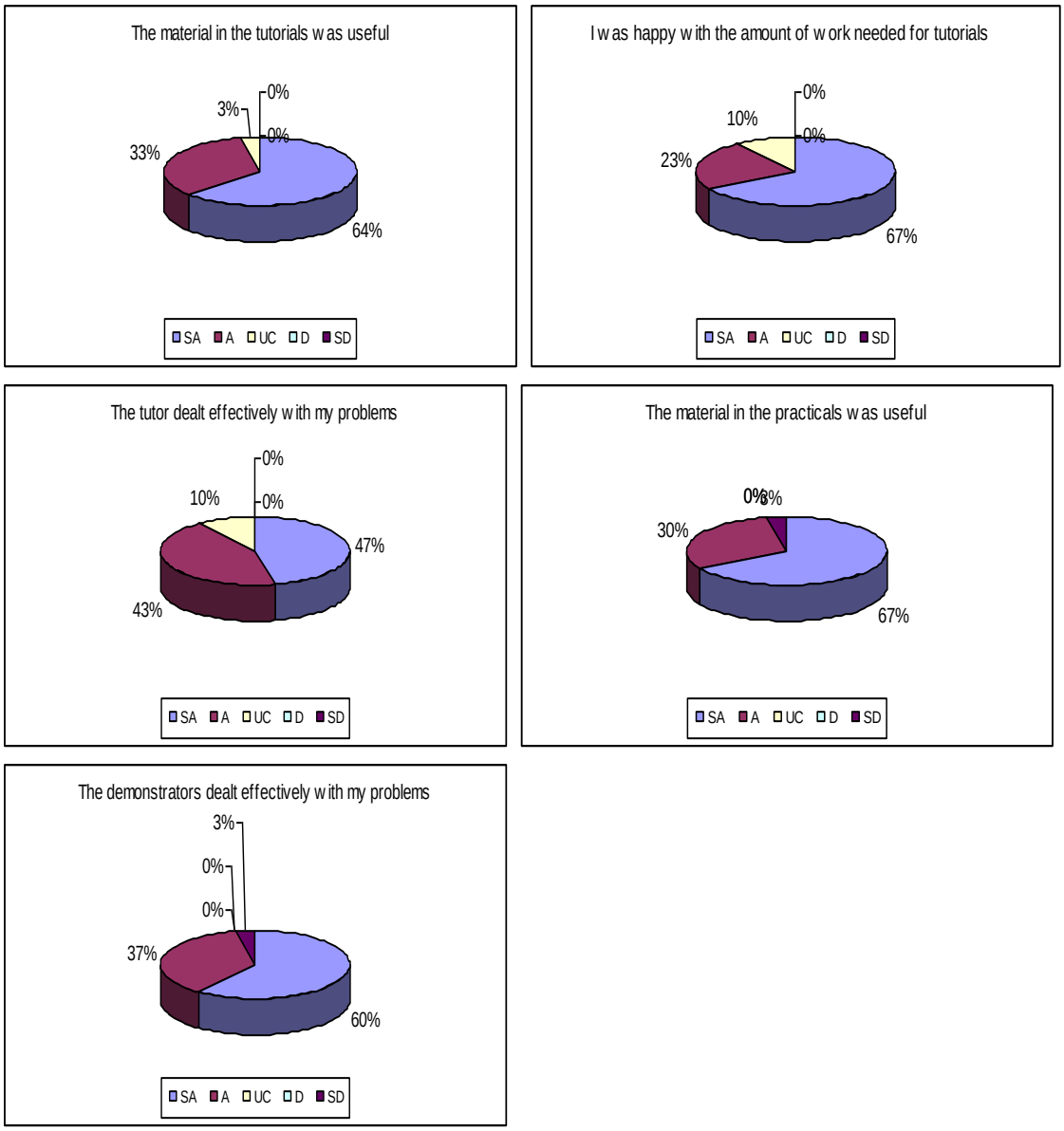

Feedback on assessment was helpful
3%
0%
0%
33%
64%
SA A UC D SD


I understand the lectures
3%
0%
17%
0%
80%
SA A UC D SD


The material was well organized and presented
0%
3%
23%
74%
SA A UC D SD


The instructor was responsive to students needs and problems
0%
0%
0%
33%
67%
SA A UC D SD


Had the instructor been regular throughout the course?
0%
0%
0%
20%
80%
SA A UC D SD



SA: Strongly Agree A: Agree UC: Un-certain D: Disagree SD: Strongly Disagree

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

Strength of the Department

Entomology department has a regular activity regarding inhouse accountability or review of the previous semester to discuss achievements, performance, attitude and regularity of the students. The main strength of the department is the urge and desire to promote the entomological knowledge and research to solve the field problems relating to crop pests, systematics, pesticide resistance, food

security and economic entomology. At present three of the senior faculty members are foreign qualified Ph.Ds; one local PhD whereas three junior faculty members are doing Ph.D. abroad. It is hoped that on their return the department will be capable to achieve the targets of success in research and teaching methodologies. So far as equipment and laboratories are concerned; through HEC funded project entitled" Strengthening of Entomology Department" procurement of required equipment and upgradtionof laboratories is being done which would be a big support in upgradation of both educational and research activities at the department.

Weakness Identified In the Program

The department is facing acute shortage of:

- Lack of Electron microscope, Microtome, Growth chambers and equipment related to molecular techniques etc.
- With the increase in students' registration a severe dearth of space (class rooms) is being felt.

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

Present Performance Measures for Research Activities

Table 3 Research Performance of the Faculty

Faculty	Journal Publications (National & International)	Conference Publications (Proceedings Abstract)	Projects
Dr. Muhammad Aslam	1	-	1
Dr. Muhammad Naeem	-	-	1
Dr. Ata-ul-Mohsin	-	-	-
Dr. Munir Ahmed	4	-	-
Dr. Muhammad Farooq Nasir	1	-	-

Community Services by the Department

- Participated in "Kisan Mela" organized by PMAS-Arid Agriculturer Univeristy Rawalpindi at Koont Farm near Chakwal.
- Pest identification service for the visiting farmers and recommendation of pest management methodology

Faculty Satisfaction Regarding the Administrative Services

- A good level of management and performance has been maintained at departmental level and the faculty member reported a good level of satisfaction.

Major Future Improvement Plans

Keeping under consideration the previous evaluation / monitoring activity, the department is focusing specifically on:

- Up-gradation of the laboratories and classrooms are a dire need to deliver an excellent level of teaching.
- Better teaching/learning environment and standards are needed to be maintained for better output .
- Preparation and submission of research projects are needed.
- To plan and execute problem oriented research on local and serious crop pests prevalent in the arid ecology.
- There is a need to improve the capacity of the faculty memebrs to get more exposure about the changing senario of the international research and activities concerning Entomology

Table: 4 Quantitative Assessment of the Department

Sr.#	Particular	No.	Remarks
i	MSc. produced	18	In employment
ii	Students: Faculty ratio	37:1	Fulfils HEC criteria
iii	Technical: Non Technical ratio	8:3	Fulfils HEC criteria
iv	Average grade point	Around 3	Fulfils HEC criteria

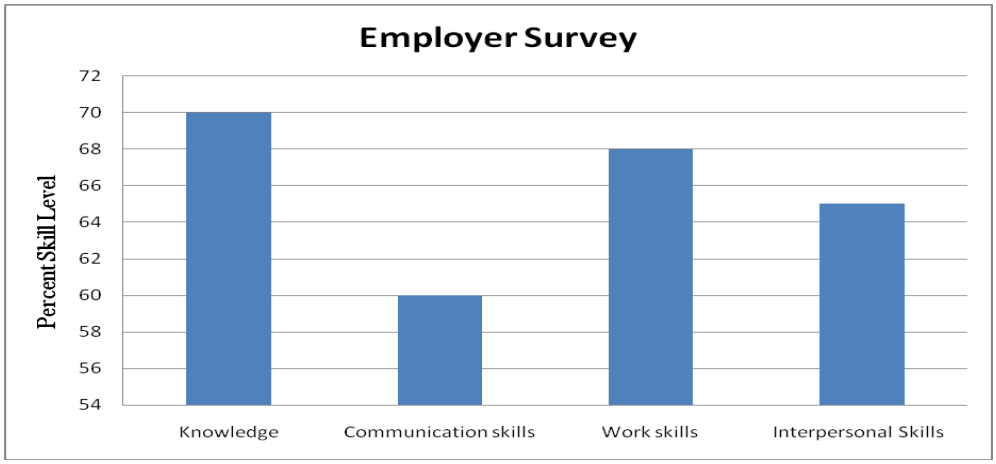
The assessment exhibited high efficiency of system and adequate impact of outcomes.

The pre-requisites for the admission in MSc (Hons) Agri Ento degree program are given as below:

Degree	**Pre-requisites**
M.Sc. (Hons) Agric. Entomology	B.Sc. (Hons) Agric. with Entomology as major subject, entry test

Employer Survey:

Using Proforma 8, Employer survey for the determination of student skills was conducted from the different organization. Survey shows that our post-graduate students fall above average in all areas except communication skills. The weakness of communication skills will be tried to improve for our current and future students.



Majority of the employers were satisfied with potential of our students in handling entomological problems independently. Performance of our students was appreciated by the employers. Some employers suggested that students should be given opportunity to take up courses on communication skills before they are awarded degrees. Besides some office management courses have also been suggested to be included in the curricula.

CRITERION 2: CURRICULUM DESIGN AND ORGANISATION

DEGREE PLAN

MSc (Hons) Agriculture (Entomology)

A candidate having CGPA = 2.75 or its equvilant marks in MSc (Hons) Agriculture with 50% marks in a field of study relating to the subject can get admission. Minimum grade point average for obtaining Master's Degree is 2.50. At present department have two Ph.D. faculty members. Whereas, four teachers are continuing their Ph.Ds. The department is strictly following HEC instructions and guidelines in relation to admission, examination and performance evaluation of MSc students.

- **Curriculum course requirements for MSc Entomology degree is summarized below.**

The requirement to be completed by each student for the award of degree is 45 credits (35 credits of course work and 10 credits of research thesis 9not to be counted towards CGPA). Each student doing MSc (Hons) Agriculture (Entomology) with thesis will have a supervisory committee to advise him in program of studies and research. A student shall be entitled to submit thesis for examination after he/she has passes all the final examinations in the approved courses and comprehensive examination provided he/she has also fulfilled the residential requirements.

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

The assessment of curriculum is done in the table given below and the courses are cross tabulated in accordance with the program outcomes.

Table 5 Courses Taught during the semester Versus Outcome

Course/ Groups of courses	Out comes						
	1	2	3	4	5	6	7
Ent-708, Ent-709, Ent-715, Ent-716, Ent-719,	+ + +	+ + + +	+ +	+ + + +	+ + + +	+ + +	+ + +
Ent-710, Ent-711, Ent-712, Ent-713, Ent-714	+ + + +	+ + + +	+ + + +	+	+ + +	+	+ + + +

+ = Relevant

++ = Relevant & satisfactory

+ + + = Very relevant & Very satisfactory

+ ++ + = Highly relevant & Highly satisfactory

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

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

Table 6: Programme Courses corresponding to theoretical background, problem analysis and solution design.

Elements	Courses
Theoretical backgrounds	Ent-710, Ent-712
Problem analysis	Ent-714, Ent–701,
Solution design	Ent-704, Ent-705, Ent–706, Ent-708, Ent-709, Ent-716, Ent-719, Ent-720

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 four 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
- Location and Area: Faculty of Crop and Food Sciences, A-Block, 2nd Floor, Main Campus
- Objectives: Laboratories are used for:
- Research work for the PhD scholars
- Used for execution of the research/development projects funded by HEC, PSF, PARC, and other national and international agencies/institutions.

Future Need

- More spacious and well equipped laboratories to fulfill the contemporary level of research/education are necessitated for better output.

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

Laboratory manuals are not available. Presently the department library has all the relevant books. Though laboratories are not specious but serving the purpose at limited level. The equipments are being procured and replaced as per availability of funds. Equipments regarding molecular approaches are lacking e.g. centrifuge (slow and ultr), PAGE-Electrophoresis apparatus, PCR, Spectrophotometer, relevant software and chemicals.

Standard-3.2: There must be support personal for instruction and maintaining the Laboratories.

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

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

- To upgrade the prevailing education facilities, separate class rooms are needed as presently classes (lectures) are taken in laboratories.
- 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.
  - **Shortcoming in computing infrastructure:** Computers with internet facilities should be available to all faculty members and postgraduate students.
  - **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 2^{nd} floor; there is no emergency exit for the labs.

CRITERION 4: STUDENT SUPPORT AND ADVISING

In order to resolve issues of post-graduate students regarding provision of guidance and information in various social and educational matters, Directorate of Students Affairs provides an effective support. University organizes various cultural activities and study tours/visits to broaden the students knowledge and experience to be utilized in their professional carrer.

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

- 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.
- Tthe post-graduate courses (number and type) are taught as per the HEC criterion/standard.
- 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.

The post-graduate courses are designed / tailored to address the teaching needs in an effective way. In this regard teaching staff and students are consulted periodically to get the feedback for further improvement. Along with theoretical aspects of the courses, practical work is also done in field/laboratories while students are also oriented to tackle their professional needs through different assignments and submission of reports. They are coupled with various institutions/organization to get updated knowledge and insight addressing their future needs.

In this regard

- Considering the feedback from students and teachers, courses are structured and updated in the board of study meeting and other periodic meetings.

  This was carried out as a routine to maintain an effective interaction between students and faculty and inter and intra classes of the students.

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.

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

- 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.
- Students are informed about the program requirement through the office of the head of the department.
- 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.

- 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.
- Citerion regarding admission in MSc degree course are described in definite term by the university and admission system is based upon the recommendations of supervisory committee.
- A regular process of revision of the admission criterion is well in place on yearly basis.

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

- 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.
- Recommendations regarding admission process for different departments are forwarded to the Registrar office for their formal registration as university student.
- 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:

- 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.
- Selection of candidates is approved by the Syndicate for issuing orders to join within a specified period.
- Induction of new candidates depends upon the number of approved vacancies.
- At present, no procedure exists for retaining highly qualified faculty members, however, the revised pay scales of structure is quite attractive.
- HEC also supports appointment of highly qualified members as foreign faculty Professor, National Professors and deputes them in various departments of the University.

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 meting its objectives

- To convay/impart the most recent advances and techniques in entomology, course curriculum are regularly revised / updated time to time.
- With the initiation of new areas/fields, new courses are set and included in the curriculum.
- 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.
- For effective communication, all sorts of audio visual aids are utilized in educational process.

- All the courses and knowledge imparted meet the objectives and outcome. The progress is regularly reviewed in the staff meetings.

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.

- Date of commencement of examination is announced by the Controller of Examinations. After about ten to twenty days of the examinations, the controller office notifies the results of the students. The evaluation procedure involves quizzes, mid and final examinations, practicals, assignments and reports, oral and technical presentations. Candidates who secure 80% or above marks are awarded grade A; grade Gold medals are awarded to the scholars who secure highest marks in various fields. Successful students are awarded by the degrees in the annual convocation held regularly on annual basis.

CRITERION 6: FACULTY

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, one Associate Professor, and two Assistant Professors and one lecturer working in the MSc (Hons) programme.

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

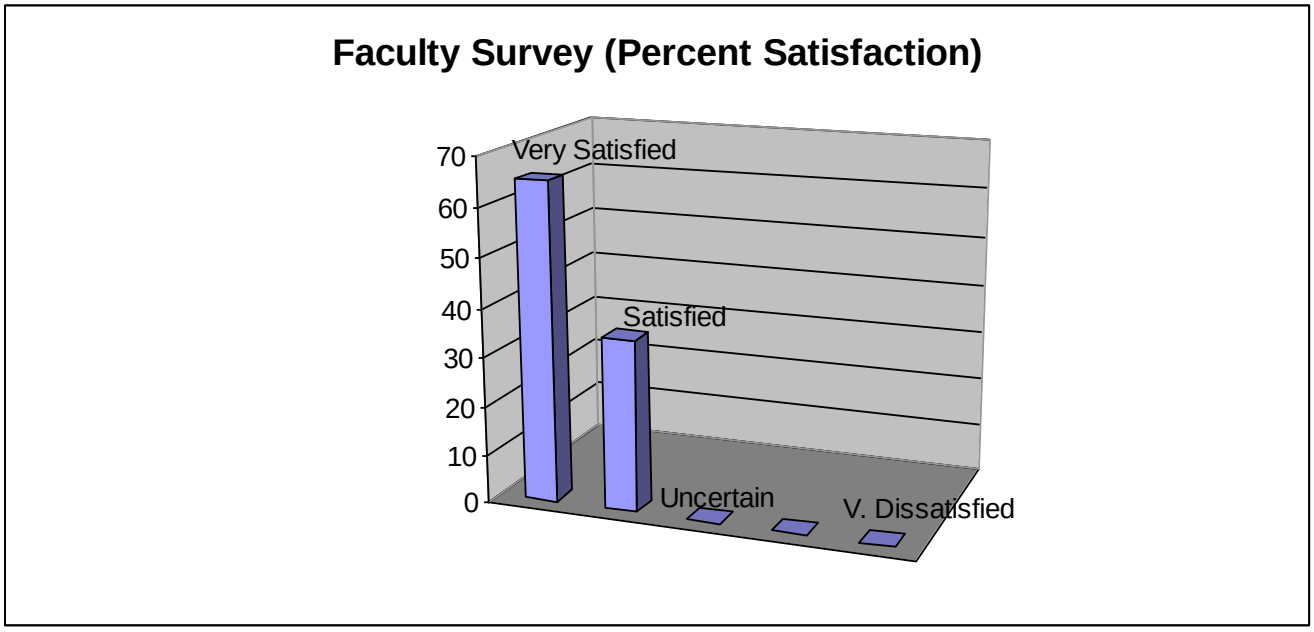
- All of the faculty members are provided with different academic, research and training facilities as per availability in the university system.
- Supervisors of MSc research are offered incentives for implementing different laboratory and filed experiments to promote high standard research activities.

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

Faculty members are contented by the initiatives undertaken by the management in this regard. Formal and informal coaching by the senior faculty members, different entertainment events, field visits and excursions etc play a vital role in motivating the young faculty members.

Faculty Survey:

Data regarding faculty survey is presented below (Proforma 5, Annexure V). The results indicated that 65% of the faculty memebrs are very satisfied while 35% are satisfied. The HEC funded project for strengthening of department will help a lot inboosting the departmental activites focusing the main objectives.



Presently, only 1 Professor, one Associate Professor, two Assistant professors and one lecturer are working for MSc (Hons) program. All of the faculty members are experienced and have good expertise in their subjects/areas. All of the faculty members are striving with their full potential to boost the department's performance and acheve the stipulated objectives.

Performa 9

Faculty Resume

Name	Dr. Muhammad Aslam
Personal	**N I D C #** 37405-2706966-5 **Permanent Address:** SN-312- A, Madina Town, Dhoke Kala Khan, Shamsabad, Murree Road Rawalpindi **Phone # (Residence)/ email:** (051) 9062288, (051) 4423693, 0301-5502356/ aslam502001@yahoo.com **Present Official Address:** Professor (BS-21) / Chairman Department of Entomology, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi (Pakistan).
Experience	▪ Chairman Department of Entomology UAAR w.e.f 02-05-2007 ▪ Professor of Entomology, Department of Entomology UAAR w. e. f. 04-12-2004 ▪ Associate Professor, Dept. of Entomology UAAR, from 28-10-1999 to 04-12-2004 ▪ Assistant Professor, Dept. of Entomology UAAR, w.e.f. 27-08-1988 to 28-10-99 ▪ Lecturer, Dept. of Entomology, UAAR from March 27, 1982 to July 31,1984, ▪ Farm Manager, Pak. Tobacco Board, from October 11, 1974 to March 26, 1982 ▪ Tobacco Dev. Asstt., Pak. Tobacco Board, from April 18, 1973 to October 10, 1974
Honor and Awards	▪ **Topped** the University of Agriculture Faisalabad in 1972 and was decorated with a **GOLD MEDAL** ▪ Completed Ph.D in Entomology from UGA, USA in a record period of less than 3 years and got a Gold Medallion. ▪ Decorated with **PEF 8TH NATIONAL EDUCATION AWARD 2002** on account of quality publication of research papers on science. ▪ Decorated with **XIIITH STAR AWARD 2002** by South Asia Publications based upon credentials and research publications par excellence. ▪ Decorated with **QUAID-E-AZAM GOLD MEDAL 2004** on account of best performance of duties and loyalty for the nation. ▪ Throughout merit scholarship holder starting from **5th class**

	onward. Received **Saigol Foundation Scholarship** during B.Sc.(Hons)Agric on account of having first positions in the classes. ▪ Received Merit Certificate from Pakistan. Statistical. Association. in an Essay Reading Contest "Application of Statistics. in Different Fields of Knowledge". ▪ Received **"Honoraria"** from Pakistan. Tobacco Board in 1976 and 1978 on account of excellent performance of research duties. ▪ Nominated by the competent authority for best teacher award for 2001. ▪ Nominated by the competent authority for Presidential Award Izaz-e-Fazeelat for Academic Distinction for 2002and 2003. ▪ Nominated by the competent authority for 16th Khwarzmi International Award 2003.
Membership	▪ Member of **Entomological Society of America** since 1986. ▪ Selected by Govt. of Pak. for higher education on competitive basis during 1985 and deputed to UGA, Athens (USA) officially as **FAO FELLOW # 30, (UTF/PAK 1073) for Ph.D**. (Entomology). Grant for Fellowship was awarded by Govt. of Pakistan., PARC Islamabad in collaboration with **FAO** of the **UN** and the **USDA, International Organization Washington D.C.** ▪ Member **AGRICS** since 1996. ▪ Founder and lifetime member of **Agricultural Foundation of Pakistan since 1996.** ▪ Member LEAD Pakistan (ID#1877) ▪ Member **Pakistan Botanical Society since 19-03-1996.** ▪ Member of research team to carry out research activities under a **UNESCO** sponsored project for Rural Education and Development during 1999. ▪ Life Time Member of Pakistan Education Forum Islamabad, since 31-12-2000. (R.No.261)
Service Activity	▪ Editor- in- Chief (Pakistan) of American–Eurasian Journal of Scientific Research, IDOSI Publications anada w.e.f. 03-04-2006 for the session (2006-2009). ▪ Editor- in- Chief (Pakistan) of American–Eurasian Journal of Agricultural and Environmental Sciences, IDOSI Publications Canada w.e.f. 10-04-2006. ▪ Editor, World Journal of Agricultural Sciences, IDOSI Publications Canada w.e.f. 4-2-2006. ▪ Associate Editor, Pakistan Journal of Arid Agriculture w.e.f. 27-03-2003. ▪ Remained Editor of Naveed-e-Baran for one year. ▪ Member Univ. Publication Committee for one year (1997) ▪ Subject Expert to review articles in Sarhad Journal of Agriculture of NWFP agricultural University Peshawar. W.e.f. 2002. ▪ Subject Expert/Scientist to evaluate research papers of Pakistan

	Journal of Agriculture, Agricultural Engineering and Veterinary Sciences of Sindh Agriculture University Tandojam, Sindh, Pakistan Journal of Science and Technology, Federal Seed Certification and Registration Department, Islamabad. ▪ Referee Journal of Research (Science) of Bahauddin Zakariya University Multan **Dr. Aslam as External Examiner / Thesis Examiner of Ph.D. / M. Sc of the following Universities:** ▪ Referee Ph.D. Synopses of Bahauddin Zakariya University Multan. ▪ External Examiner of Postgraduate students in University of Agriculture, Faisalabad. ▪ External Examiner and paper setter of Entomology courses of Gomal University, University College of Agriculture. AJ&K Univ. Muzaffarabad and University of Balochistan, Quetta. ▪ Thesis Examiner of Ph. D. in Bangladesh Agricultural University Mymensingh, Bangladesh. **Dr. Aslam as Advisor, Foreign Students** ▪ Advisor Foreign Students w.e.f. 14-06-2003 at UAAR to take care of the foreign student affairs. **Dr. Aslam as member of Inter University Course Curriculum Committee (IUCCC)** ▪ Notified by Inter University Faculty Board (IUFB) as member IUCCC on Entomology vide University of the Punjab, Lahore letter No. D/284/R of 06-04-2004. **Bangladesh Agricultural University Mymensingh** Bioecology and management of stemfly, Ophiomyia phaseoli (Tryon) (Diptera: Agromyzidae) on blackgram. 23-08-2006 **University of Pune India** Bioefficacy and Residue Study of Lufenuron on Tribolium castaneum (Herbst) (Coleoptera Tenebrionidae). 08-07-2007 **GC University Lahore** "Biodiversity of Entozoic Flagellates of the *Heterotermes indicola* and *Coptotermes heimi* and the effect of Wood, Wood Extracts and Anti Protozoan Drugs on Flagellates". 12-01-2008
Brief Statement of Research Interest	Though worked on a variety of study areas in Entomology but more focused on Integrated Pest Management, Stored Grain Pest Management, Biological control of insect pests and Toxicological studies on effectiveness of pesticidides and resistance.

Publications	**RESEARCH PAPERS (PUBLISHED)** 1. **Aslam, M**; M-ul-Haq and M. Zarif Qazi, 1980. Effect of Dipel, Lannate and Thiodan on *Agrotis ipsilon*

	(Hfn.) and *Heliothis armigera* (Hb.) attacking Virginia Tobacco. Pak Tobacco (J) IV (2): 25-29. 2. **Aslam, M**; M-ul-Haq and M. Zarif Qazi 1982. Extent of damage to Virginia Tobacco by *Agrotis ipsilon* (Hfn.) and *Heliothis armigera* (Hb.) in Punjab. Pak Tobacco (J) VI (1): 27-28. 3. **Aslam, M**. 1996.The Infectivity of *Beauveria bassiana* to *Galleria mellonella* Journal .Science & Tech.nology, 20: 47-49. (ISSN 0250-5339) 4. **Aslam, M**. 1997. Diversity of Arthropod populations in Conventional Tillage, No. Tillage and Old Field Systems. Journal .Science & Tech.nology 21: 15-17. (ISSN 0250-5339) 5. **Aslam, M**., R.B. Chalfant and G.A. Herzog. 1998. The influence of insecticide regimens applied to various cotton strains on the pouluation of *Spodoptera exigua* (Hubner) (Lepidoptera: Noctuidue) under field conditions. Sarhad J. Agric., 14(5): 457–461. (ISSN 1016-4383) 6. **Aslam, M**. 1998. Response of *Periplaneta americana* (Linnaeus) (Dictyoptera:Blattidae) to different food materials under natural Environments. Sarhad J.Agric., 14(6): 635–639. (ISSN 1016-4383) 7. **Aslam, M**., 1998. Study of the Pathogenic Relationship of *Neoaplectana carpocapsae* and *Achromobacter nematophilus* infecting the larvae of *Galleria mellonella.* Pak. J. Agri., Agril., Engg., Veterinary . Science. 14(1): 49-51(ISSN 1015-3055). 8. **Aslam, M.**, R. B. Chalfant., G.A. Herzog 1998. Population of harmful and beneficial arthropods on selected cotton strains under different levels of pest management. Sarhad J Agric.14 (5):463-469. (ISSN 1016-4383). 9. **Aslam, M**., R.B. Chalfant and G.A. Herzog. 1998. Evaluation of resistance of Cotton Strains to *Heliothis virescens* (F) (Lepidoptera: Noctuidae) under laboratory conditions. Sarhad J. Agric.14 (5):471-474. (ISSN 1016-4383). 10. Nasir, A. B., H. Javed, **M. Aslam** and A.A. Khan. 1998. Influence of Abiotic Factors on the Population of Mustard Aphid, *Lipaphis erysimi* Kalt. Sarhad J. Agric.15 (5): 453 – 455. (ISSN 1016-4383). 11. **Aslam, M**., R.B. Chalfant and G.A. Herzog. 1998.

	Screening of Cotton Strains for Resistance to *Anthonomus grandis grandis* (Boheman) (Coleoptera: Curculionidae). Pak. J. Biol. Sci. 1(4): 285 – 286. (ISSN 1028-8880). 12. **Aslam, M.**, R.B. Chalfant and G.A. Herzog.1998. Naturally occuring Arthropods on Cotton Strains Grown under Different Levels of Pest Management. Pak. J. Arid. Agric. 1(1): 61-67. (ISSN 1027-877X). 13. **Aslam, M**., G.A. Herzog and R.B. Chalfant. 1998. Oviposition and Feeding Preferences of *Anthonomus grandis grandis* (Boheman) (Coleoptera:Curculionidae on various cotton strains. Sarhad J. Agric. 15(2): 135-138. (ISSN 1016-4383). 14. **Aslam, M**., G.A. Herzog and R.B. Chalfant. 1998. The Influence of Pest Management levels on the Yield of Different Cotton Strains. Pak. J. Biol. Sci. 1(4):248-251 (ISSN 1028-8880). 15. **Aslam, M**. and N. Suleman. 1999. Biology of *Pieris brassicae* (Linnaeus) Lepidoptera: Pieridae) nder Laboratory Conditions. Pak. J. Biol. Sci. 2(1): 199– 200 (ISSN 1028-8880). 16. **Aslam, M**, R.B Chalfant and G.A. Herzog. 1999. Resistance of High Gossypol Cotton Strains to *Heliothis* spp. (Lepidoptera:Noctuidae under field conditions.Scientific Khyber(J) 12(1):65-72. (ISSN 1017-3471). 17. **Aslam, M**., 1999. Identification of some parasites of the Introduced Pine Sawfly, *Diprion similis* (Hartig) (Hymenoptera: Diprionidae) by examination of the mature larval remains Sarhad J. Agric. 15(1):45-46. (ISSN 1016-4383). 18. **Aslam, M**., 1999. Evaluation of Lincoln Index Capture- Recapture Method with known population of House Crickets, *Acheta domesticus* Linnaeus) (Orthoptera: Gryllidae). Sarhad. J. Agric. 15(3):213-215. (ISSN 1016-4383). 19. **Aslam, M**, .G.A. Herzog and R.B. Chalfant. 1999. Evaluation of Resistance of Cotton Strains to *Heliothis* spp.(Lepidoptera: Noctuidae) under Different Pest Management Levels. Pak. J. Arid Agric. 2(1):93-98. (ISSN 1027-877X). 20. **Aslam, M**, .R.B.Chalfant and G.A. Herzog. 2000. Evaluation of Resistance of Cotton Strains to *Anthonomus grandis grandis* (Boheman) (Coleoptera:" Curculionidae) under different

	Levels, of Pest Management. Pak. J. Biol. Sci. 3(5):854-855. (ISSN 1028-8880). 21. Aslam, M. N. Suleman; Asia Riaz;Abdul Rehman and Qamar Zia. 2000. Insect Pests found on *Helianthus annuus* Linnaeus (Compositae) in the Potohar Region of Pakistan. Pak. J. Biol. Sci. 3(6):963-964. (ISSN 1028-8880). 22. Suleman, N., **M. Aslam** and A. Riaz**.** 2000. Evaluation of Resistance in some Wheat Cultivars to *Sitophilus oryzae* Linnaeus. (Coleoptera: Curculionidae) Under Laboratory Conditions. Pak. J. Biol. Sci 3(6):1029-1032. (ISSN 1028-8880). 23. Riaz, A., **M. Aslam** and N. Suleman.2000.Evaluation of Resistance in Different Chickpea Strains to ***Callosobruchus chinensis*** Linnaeus (Coleoptera:Bruchidae) under Laboratory Conditions. Pak. J. Biol. Sci 3(6):1033-1036. (ISSN 1028-8880). 24. **Aslam, M**, G.A. Herzog and R.B. Chalfant. 2000. Different cotton strains screened for resistance to *Heliothis* spp. (Lepidoptera: Noctuidae) in the field. Pak. J. Biol. Sci. 3(8):1290-1291. (ISSN 1028-8880). 25. **Aslam, M**. N., M Aslam, and F.A. Shaheen. 2000. Preference of *Pieris brassicae* (Linnaeus) (Lepidoptera: Pieridae) on Different *Brassica* Genotypes under Field Conditions. Pak. J. Biol. Sci. 3(8):1339-1340 (ISSN 1028-8880). 26. **Aslam, M**. F**.A.** Shaheen and A**.** Rehman.2000. Screening of sunflower (*Helianthus annuus* Linnaeus) Genotypes against the attack of *Odontotermes obesus* (Rambur) (Isoptera:Termitidae) Pak. J. Biol. Sci. 3 (12):2238-2240. (ISSN 1028-8880). 27. Aslam, M.and H. Rehman. 2000. Screening of Some Sunflower (H*elianthus annuus* Linnaeus Compositae) Genotypes against Insect Pests. Pak. J. Biol. Sci. 3 (12):2241-2243. (**ISSN 1028-8880).** 28. **Aslam, M**. and N. A. Awan, 2000. Melittophily and Aphidophagy Found on Sunflower (*Helianthus annuus* Linnaeus) (Compositae) Genotypes Pak. J. Biol. Sci. 3 (12):2251-2252. 29. Jamil S. and M. Aslam, 2000. Screening of Different Wheat Cultivars (Flour) Against the Attack of *Tribolium Castaneum* Herbst

(Coleoptera:Tenebrionidae) Under Laboratory Conditions. Pak. J. Biol. Sci. 3 (12):2256-2259. (ISSN 1028-8880)

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50. **Aslam, M.,** F. A. Shaheen, M. A. Abbas and A. Saba. 2006. Management of *Callosobruchus chinensis* Linnaeus through use of Resistance in Stored Chickpea Varieties. **World Journal of Agricultural Sciences (International, published by International Digital Organization for Scientific Information Canada, available on net)**, 2(1):82-84 (ISSN 1817-3047).

51. M. Hameed, H.I. Javed, **M. Aslam,** and S. R Qureshi. 2006. Relative resistance of different Maize genotypes against major insect pests. Pak.J.Arid Agric. 9(1):11-15 (ISSN 1027-877X).

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53. S. R Qureshi, H. I. Javed, **M. Aslam,** and. M. Hameed.2006. Infestation of Stem Borer,(*Chilo partellus,*) on different Maize germplasmunder rainfed conditions.. Pak. J. Arid Agric.9(1):29-33 ISSN 1027 877

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NOTE: (All these papers have been published in the journals of international repute)

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Research Grants and Contracts	▪ UGC/UAAR funded Research Project. "Screening of Sunflower Cultivars against Insect Pests in the Potohar Region of Pakistan to Reduce Environmental Pollution Problems" Duration: 36 months Cost: 0.5 million. ▪ PSF/R&D/P-UAAR/AGR/70. Integrated Management of Stored Chickpea Beetle, *Callosobruchus chinensis* Linnaeus. Duration: 36 months Cost: 0.6 million. ▪ Project Director HEC Project Strengthening of Dept of Entomology (34.783 m) 2007-2009 **All completed**
Other Research or Creative Accomplishments	---
Selected Professional Presentations	---

CRITERION 7: INSTITUTIONAL FACILITIES

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

The faculty has access to e-library which is very helpful for the high quality education and producing research of international standard. They also have access to the internet. However the department lacks facilities as mentioned below:

- A number of faculty members do not have access to the PCs as department have only three Computers provided by the university.
- No registered softwares of computer programmes are available to be installed at departmental level.
- Registered versions of Microsoft Windows, Office XP, Adobe reader, writer are required.
- A printer with in built scanner and fax facility is urgently needed by the department.

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 University Central Library has very limited number of books, journals and periodicals. It's a small library in term of space and facilities with no catalogue systems. It does not meet the standards of a University Library. Department itself is developing its own library. It needs funds allocation to establish a well equipped library at departmental level.

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

Currently the class rooms are not enough and the space is not only limited but some basic facilities are lacking. Multimedia are not available for the lecture halls. Practical lab space is also not meeting the needs which affects the quality of teaching. Although at present offices for the faculty are sufficient, yet on the return of the remaining faculty, we will face severe problem regarding shortages of offices for the staff.

CRITERION 8: INSTITUTIONAL SUPPORT

Administration of the PMAS-Arid Agriculture University Rawalpindi has been striving to strengthen all the departments and up-gradation of departments and establishing new Faculties and Institutes. The university is also trying to attract highly qualified faculty members. Currently, the university has launched tenure track system which would be helpful in pooling up better human recourses as faculty 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 the present situation, the department of Entomology is having inadequate financial resource to meet the present needs for a better education system. Individual research grants for students and faculty are mainly supporting the departmental research activities. Keeping in view the awful need for increasing the financial resources to establish a library, laboratories and computer facilities, The HEC has approved a project for strengthening the department. This project will prove beneficial in improving the quality of education and research.

Standard 8-2: There must be an adequate number of high quality Ph.D. students.

Ph.D. admission is usually offered in each semester.

RESEARCH STUDENTS REVIEW

For this purpose the Proforma 4 was used to conduct survey to review the progress of Ph.D scholars. General inferences are drawn hereunder.

- A big Majority of the scholars were found satisfied with the level of supervision maintained at department.
- Post-graduates of the department had access to the available sophisticated equipments through a well managgemed/operative system.
- The post-graduates have access to scientific literature through central laboratory.

- A small number of the respondents have requested for the provision of computers or their research work.
- A few respondents were of the view 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 and biosystematics of the insect pests. .

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

To the maximum extent, administration provides adequate financial resources, yet there is need to increase budget to carry out research at Masters Level.

Summary and Conclusion

Highly skilled human resource development and field-oriented research with basic concept establishment in the field of Entomology have been the aims and objectives of Department of Entomology, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi. Present development of the department under HEC funded project “Strengthening of the Department of Entomology” has served as a landmark to improve not only the infrastructure, research facilities and provision of advance equipments but also helped in training for faculty development. The newly developed facilities impacted a lot and both the education and research level of the student has been enhanced.

Along with other facilities four laboratories have also been developed with better equipments for carrying out high tech experiments. A number of facilities of advanced microscopy, growth chamber, testing devices to check infestation of stored product insect pests, high performance liquid chromatography with adequate supply of respective chemicals and the new and plentry of glassware facility to be used in experimentation with high level of precision.

At the university research Farm Dnear Chakwal, practical work and field-oriented research is being carried out for students and farmers to provide learning opportunities in bee farming and applied entomology. A nuber of experiments are being carried out from establishment of year-round rearing of fertile and healthy queens to low cost management of their predators/pests like mites, ants, hornets etc. This facility will help a lot to the students to conduct their research experiments and training of the growers. This activity will also yield ample quantity of honey.

Annexure -1

Proforma - 1

Student Course Evaluation Questionnaire

(To be filled by each Student at the time of Course Completion)

Department _____ Course No _____

Course Title _____ Teacher Name_____

Year of Study _____ Semester / Term_____

Please give us your views so that Course quality can be improved. You are encouraged to be frank and constructive in your comments

CORE QUESTIONS

Course Content and Organization	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. The course objectives were clear	☐	☐	☐	☐	☐
2. The Course workload was manageable	☐	☐	☐	☐	☐
3. The Course was well organized (e.g. timely access to materials, notification of changes, etc.)	☐	☐	☐	☐	☐
4. Comments					

Student Contribution					
5. Approximate level of your own attendance during the whole Course	☐<20%	☐21-40%	☐41-60%	☐61-80%	☐>81%
	Strongly Agree	Agree	uncertain	Disagree	Strongly Disagree
6. I participated actively in the Course	☐	☐	☐	☐	☐
7. I think I have made progress in this Course	☐	☐	☐	☐	☐
8. Comments					

Learning Environment and Teaching Methods	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
9. I think the Course was well structured to achieve the learning outcomes (there was a good balance of lectures, tutorials, practical etc.)	☐	☐	☐	☐	☐
10. The learning and teaching methods encouraged participation.	☐	☐	☐	☐	☐
11. The overall environment in the class was conducive to learning.	☐	☐	☐	☐	☐
12. Classrooms were satisfactory	☐	☐	☐	☐	☐
13. Comments					

Learning Resources	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
14. Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful.	☐	☐	☐	☐	☐
15. Recommended reading Books etc. were relevant and appropriate	☐	☐	☐	☐	☐
16. The provision of learning resources in the library was adequate and appropriate	☐	☐	☐	☐	☐
17. The provision of learning resources on the Web was adequate and appropriate (if relevant)	☐	☐	☐	☐	☐
18 Comments					

Quality of Delivery	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
19. The Course stimulated my interest and thought on the subject area	☐	☐	☐	☐	☐
20. The pace of the Course was appropriate	☐	☐	☐	☐	☐
21. Ideas and concepts were presented clearly	☐	☐	☐	☐	☐
22.Comments					

Assessment	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
23. The method of assessment were reasonable	☐	☐	☐	☐	☐
24. Feedback on assessment was timely	☐	☐	☐	☐	☐
25. Feedback on assessment was helpful	☐	☐	☐	☐	☐
26. Comments					

Additional Core Questions

Instructor / Teaching Assistant Evaluation	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
27. I understood the lectures	☐	☐	☐	☐	☐
28. The material was well organized and presented	☐	☐	☐	☐	☐
29. The instructor was responsive to student needs and problems	☐	☐	☐	☐	☐
30. Had the instructor been regular throughout the course?	☐	☐	☐	☐	☐

Tutorial	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
30. The material in the tutorials was useful	☐	☐	☐	☐	☐
31. I was happy with the amount of work needed for tutorials	☐	☐	☐	☐	☐
32. The tutor dealt effectively with my problems	☐	☐	☐	☐	☐

Practical	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
33. The material in the practicals was useful	☐	☐	☐	☐	☐
34. The demonstrators dealt effectively with my problems.	☐	☐	☐	☐	☐

Overall Evaluation

35.The best features of the Course were:

36.The Course could have been improved by:

Equal Opportunities Monitoring (Optional)

37. The University does not tolerate discrimination on any irrelevant distinction (e.g. race, age, gender) and is committed to work with diversity in a wholly positive way. Please indicate below anything in relation to this Course which may run counter to this objective:

Demographic Information: (Optional)

38. Full/part time study: Full Time ☐ Part Time ☐

39.Do you consider yourself to be disabled: Yes ☐ No ☐

40. Domicile:

41.Gender: Male ☐ Female ☐

42. Age Group: less than 22 ☐ 22-29 ☐ over 29 ☐

43. Campus: Distance Learning/ Collaborative ☐

THANK YOU

Annexure -2

Proforma: 2

FACULTY COURSE REVIEW REPORT

(To be filled by each teacher at the time of course completion)

For completion by the course instructor and transmission to head of department of his/her nominee (Deputy Quality Officer) together with copies of the course syllabus outline.

Department	ENTOMOLOGY		Faculty	FC&FS	
Course code	ENT-708		Title	Insect Pest Management System	
Session		Semester	Autumn	Spring	Summer
Credit Value	3(2-2)	6			
Name of Course instructor	Dr. M. Aslam	No. of Students contact hours	Lectures = 36	Others (Please state)	
			Seminars		
Assessment Methods Give precise details (No. and length of assignments, exams and weightings etc.)	Assignment given to each student individually and evaluated. Assignment 10% Mid Exam 30%; Final Exam.60%				

Distribution of grade marks and other outcomes: (Adopt the grading system as required)

Undergraduate	Originally Regd.	Percent Grade A	Percent Grade B	Percent Grade C	D	E	F	No. of Grades	Withdrawal	Total
No. of Students	--	--	--	--	--	--	--	--	--	--
Post-Graduate	Originally Regd.	Percent Grade A	Percent Grade B	Percent Grade C	D	E	F	No. of Grades	Withdrawal	Total
No. of Students	28	32.20	50.0	17.8	--	--	--			

Overview Evaluation (Course Coordinator's Comments)

Feedback: First summarize then comment on Feedback received from:

Students (course Evaluation)Questionnaires In place
External Examiner/Moderator (if any) ----------

Students/Staff consultative committee or Equivalent (if any)

Curriculum comment on the continuing on the appropriativeness of the course curriculum in relation to the intended learning outcome (course objectives) and its compliance with the HEC approved /Revised National Curriculum guidelines.

The course was found very much appropriate and in line with the curriculum and intended objectives.

Assessment comment on the continuing effectiveness of methods of assessment in relation to the intended learning outcomes (course objectives)

That is already fine

Enhancement comments on the implementation of changes proposed in earlier faculty review report)

Positive citisism and modified as suggested

(7) Outline any changes in the future delivery or structure of the course that this semester turns experience may prompt

A gap which was felt wad the lack of field visits ans practical demonstrations of the IPM technologies in fields.

Name : Dr. M. Aslam_____ Date: _____
Course Instructor
Name __Dr. M. Aslam_____ Date _____
Head of Department

Annexure -3

Proforma 3

Survey of Graduating Students

(To be filled out by graduating students in last semester/year before the award of degree)

The survey seeks graduating students' input on the quality of education they received in their program and the level of preparation they had at university. The purpose of this survey is to assess the quality of the academic programs. We seek your help in completing this survey.

A: Very satisfied B: Satisfied C: Uncertain D: Dissatisfied E: Very dissatisfied

1. The work in the program is too heavy and induces a lot of pressure

   A B C D E

2. The program is effective in enhancing team-working abilities.

   A B C D E

3. The program administration is effective in supporting learning.

   A B C D E

4. The program is effective in developing analytical and problem solving skills.

   A B C D E

5. The program is effective in developing independent thinking.

   A B C D E

6. The program is effective in developing written communication skills.

   A B C D E

7. The program is effective in developing planning abilities.

   A B C D E

8. The objectives of the program have been fully achieved

   A B C D E

9. Whether the contents of curriculum are advanced and meet program objectives

   A B C D E

10. Faculty was able to meet the program objectives

    A B C D E

11. Environment was conducive for learning

A B C D E

12. Whether the Infrastructure of the department was good.

A B C D E

13. Whether the program was comprised of Co-curricular and extra-curricular activities

A B C D E

14. Whether scholarships/ grants were available to students in case of hardship

A B C D E

Answer question 9 if applicable.

9. The internship experience is effective in enhancing

a.	Ability to work in teams	(A)	(B)	(C)	(D)	(E)
b	Independent thinking	(A)	(B)	(C)	(D)	(E)
c.	Appreciation of ethical Values	(A)	(B)	(C)	(D)	(E)
d.	Professional development	(A)	(B)	(C)	(D)	(E)
e.	Time management skills	(A)	(B)	(C)	(D)	(E)
f	Judgment	(A)	(B)	(C)	(D)	(E)
g.	Discipline	(A)	(B)	(C)	(D)	(E)
h.	The link between theory and practice	(A)	(B)	(C)	(D)	(E)

10. What are the best aspects of your program?

_____
_____
_____
_____
_____
_____

11. What aspects of your program could be improved?

_____
_____
_____
_____
_____
_____

You may use additional sheets for questions 10 & 11 if needed.

Annexure -4

Proforma 4

RESEARCH STUDENT PROGRESS REVIEW FORM

(To be filled out by Master/ M.Phil / Ph.D Research Students on six monthly basis)

To be submitted by the HoD / Dept. Quality Officer to the QEC

For Research Student to Complete:

1. Date of admission to the department
2. Date of initiation of research
3. Date of completion of Course work
4. Number of credit hours completed
5. Date of Synopsis Defense
6. Cumulative Grade Point Average (CGPA) secured
7. Please outline details of progress in your research since your last review (including any research publications):

8. Do you have any comments on the level of supervision received?

9. What do you plan to achieve over the next 6 months?

10. Do you have any comments on generic or subject-specialist training you may have received or would like to receive internally and / or externally?

11. Do you have easy access to sophisticated scientific equipment?

12. Do you have sufficient research material / commodities available?

Student _____ Date: _____

Supervisory Committee Comments

(Please comment on and benchmark the student's progress against your University's internal and external HEC Quality Criteria for Master/PhD/MPhil Studies)

Principal Supervisor: _____ Date: _____

Co-Supervisor: _____ Date: _____

Co-Supervisor: _____ Date: _____

Head of Department Comments:

Signature: _____ Date: _____

Director, Board of Research Studies (or equivalent) Comments:

Signature: _____ Date: _____

Dean/Director, QEC Action: (including monitoring of Follow-up action) Date: _____

Proforma 5

Annexure -5

Faculty Survey

(To be submitted on annual basis by each faculty member)

The Purpose of this survey is to assess faculty members' satisfaction level and the effectiveness of programs in place to help them progress and excel in their profession. We seek your help in completing this survey and the information provided will be kept in confidence. Indicate how satisfied are you with each of the following aspects of you situation at your department?

A: Very satisfied B: Satisfied C: Uncertain D: Dissatisfied E: Very dissatisfied.

1. Your mix of research, teaching and community service.

   A B C D E

2. The intellectual stimulation of your work.

   A B C D E

3. Type of teaching / research you currently do.

   A B C D E

4. Your interaction with students.

   A B C D E

5. Cooperation you receive from colleagues.

   A B C D E

6. The mentoring available to you.

   A B C D E

7. Administrative support from the department.

   A B C D E

8. Providing clarity about the faculty promotion process.

   A B C D E

9. Your prospects for advancement and progress through ranks.

   A B C D E

10. Salary and compensation package.

    A B C D E

11. Job security and stability at the department.

A B C D E

12. Amount of time you have for yourself and family.

A B C D E

13. The overall climate at the department.

A B C D E

14. Whether the department is utilizing your experience and knowledge

A B C D E

15. What are the best programs / factors currently available in your department that enhance your motivation and job satisfaction:

_____
_____
_____
_____
_____
_____
_____
_____

16. Suggest programs / factors that could improve your motivation and job satisfaction?

_____
_____
_____
_____
_____
_____
_____

Information about faculty member

i. Academic rank:

A: Professor B: Associate Professor C: Assistant Professor D: Lecturer
E: Other

ii. Years of service:
A: 1-5 B: 6-10 C: 11-15 D: 16-20 E: >20

Name: _____ Signature: _____ Date: _____

Annexure -6

Proforma 7

Alumni Survey

(To be filled by Alumni - after the completion of each academic year)

The purpose of this survey is to obtain alumni input on the quality of education they received and the level of preparation they had at University. The purpose of this survey is to assess the quality of the academic program. We seek your help in completing this survey.

A: Excellent B: Very good C: Good D: Fair E: Poor

I. Knowledge

1.	Math, Science, Humanities and professional discipline, (if applicable)	(A)	(B)	(C)	(D)	(E)
2.	Problem formulation and solving skills	(A)	(B)	(C)	(D)	(E)
3.	Collecting and analyzing appropriate data	(A)	(B)	(C)	(D)	(E)
4.	Ability to link theory to practice.	(A)	(B)	(C)	(D)	(E)
5.	Ability to design a system component or process	(A)	(B)	(C)	(D)	(E)
6.	IT knowledge	(A)	(B)	(C)	(D)	(E)

II Communications Skills

1.	Oral communication	(A)	(B)	(C)	(D)	(E)
2.	Report writing	(A)	(B)	(C)	(D)	(E)
3.	Presentation skills	(A)	(B)	(C)	(D)	(E)

III Interpersonal Skills:

1.	Ability to work in teams.	(A)	(B)	(C)	(D)	(E)
2.	Ability to work in arduous /Challenging situation					
3.	Independent thinking	(A)	(B)	(C)	(D)	(E)
4.	Appreciation of ethical Values	(A)	(B)	(C)	(D)	(E)

IV Management /leadership Skills:

1.	Resource and Time management skills	(A)	(B)	(C)	(D)	(E)
2.	Judgment	(A)	(B)	(C)	(D)	(E)
3.	Discipline	(A)	(B)	(C)	(D)	(E)

V General Comments

Please make any additional comments or suggestions, which you think would help strengthen our programs. (New courses that you would recommend and courses that you did not gain much from)

_____

_____

_____

_____

_____

_____

VI. Career Opportunities

VII. Department Status:

1. Infrastructure	(A)	(B)	(C)	(D)	(E)
2. Faculty	(A)	(B)	(C)	(D)	(E)
3. Repute at National level	(A)	(B)	(C)	(D)	(E)
4. Repute at international level	(A)	(B)	(C)	(D)	(E)

VIII Alumni Information

1. Name (Optional)_____
2. Name of organization_____
3. Position in organization_____
4. Year of graduation_____

Annexure -7

Proforma 8

Employer Survey

(To be filled in by Employer - after the completion of each academic year)

The purpose of this survey is to obtain employers' input on the quality of education University of **Arid Agriculture, Rawalpindi** is providing and to assess the quality of the academic program. The survey is with regard to University of_____ graduates employed at your organization. We seek your help in completing this survey.

A: Excellent B: Very good C: Good D: Fair E: Poor

I.	**Knowledge.**					
	1. Math, Science, Humanities and professional disciplins, (if applicable)	(A)	(B)	(C)	(D)	(E)
	2. Problem formulation and solving skills	(A)	(B)	(C)	(D)	(E)
	3. Collecting and analyzing appropriate data	(A)	(B)	(C)	(D)	(E)
	4. Ability to link theory to Practice	(A)	(B)	(C)	(D)	(E)
	5. Ability to design a system component or process	(A)	(B)	(C)	(D)	(E)
	6. Computer knowledge.	(A)	(B)	(C)	(D)	(E)
II.	**Communication Skills**					
	1. Oral communication	(A)	(B)	(C)	(D)	(E)
	2. Report writing	(A)	(B)	(C)	(D)	(E)
	3. Presentation skills	(A)	(B)	(C)	(D)	(E)
III.	**Interpersonal Skills**					
	1. Ability to work in teams	(A)	(B)	(C)	(D)	(E)
	2. Leadership	(A)	(B)	(C)	(D)	(E)
	3. Independent thinking	(A)	(B)	(C)	(D)	(E)
	4. Motivation	(A)	(B)	(C)	(D)	(E)
	5. Reliability	(A)	(B)	(C)	(D)	(E)
	6. Appreciation of ethical values	(A)	(B)	(C)	(D)	(E)
IV.	**Work skills**					
	1. Time management skills	(A)	(B)	(C)	(D)	(E)
	2. Judgment	(A)	(B)	(C)	(D)	(E)
	3. Discipline	(A)	(B)	(C)	(D)	(E)

V. General Comments

Please make any additional comments or suggestions, which you think would help strengthen our programs for the preparation of graduates who will enter your field. Did you know as to what to expect from graduates?

_____

_____

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VI. Information About Organization

1. Organization Name_____
2. Type of Business_____
3. Number of Graduates (specify the program) in your Organization:

Annexure -8

Proforma 9

Faculty Resume

Name	
Personal	*May include address(s) and phone number(s) and other personal information that the candidate feels is pertinent.*
Experience	List current appointment first, each entry as follows: *Date, Title, Institution.*
Honor and Awards	List honors or awards for scholarship or professional activity.
Memberships	*List memberships in professional and learned Societies, indicating offices held, committees, or other specific assignments.*
Graduate Students Postdocs Undergraduate Students *Honour Students*	*List supervision of graduate students, postdocs and undergraduate honors theses showing:* **Years Degree Name** Show other information as appropriate and list membership on graduate degree committees.
Service Activity	*List University and public service activities.*

Brief Statement of Research Interest	*May be as brief as a sentence or contain additional details up to one page in length.*

Publications	*List publications in standard bibliographic format with earliest date first.* o Manuscripts accepted for publication should be included under appropriate category as "in press;" o Segment the list under the following standard headings: • Articles published by refereed journals. • Books. • Scholarly and / or creative activity published through a refereed electronic venue. • Contribution to edited volumes. • Papers published in refereed conference proceedings. • Paper or extended abstracts published in conference proceedings. (refereed on the basis of abstract) • Articles published in popular press. • Articles appearing in in-house organs. • Research reports submitted to sponsors. • Articles published in non-refereed journals. • Manuscripts submitted for publication. (include where and when submitted).
Research Grants and Contracts.	*Entries should include:* Date Title Agency / Organization **Total Award Amount** Segment the list under following headings: • Completed • Funded and in progress • In review
Other Research or Creative Accomplishments	*List patents, software, new products developed, etc.*
Selected Professional Presentations	

Proforma 10

Teacher Evaluation Form

(To be filled by the student)

Course Title and Number: _____
Name of Instructor: _____Semester_____
Department: _____Degree_____

Use the scale to answer the following questions below and make comments

A: Strongly Agree B: Agree C: Uncertain D: Disagree E: Strongly Disagree

Instructor:					
1. The Instructor is prepared for each class	A	B	C	D	E
2. The Instructor demonstrates knowledge of the subject	A	B	C	D	E
3. The Instructor has completed the whole course	A	B	C	D	E
4. The Instructor provides additional material apart from the textbook	A	B	C	D	E
5. The Instructor gives citations regarding current situations with reference to Pakistani context.	A	B	C	D	E
6. The Instructor communicates the subject matter effectively	A	B	C	D	E
7. The Instructor shows respect towards students and encourages class participation	A	B	C	D	E
8. The Instructor maintains an environment that is conducive to learning	A	B	C	D	E
9. The Instructor arrives on time	A	B	C	D	E
10. The Instructor leaves on time	A	B	C	D	E
11. The Instructor is fair in examination	A	B	C	D	E
12. The Instructor returns the graded scripts etc. in a reasonable amount of time	A	B	C	D	E
13. The Instructor was available during the specified office hours and for after class consultations	A	B	C	D	E
14. Course:					
15. The Subject matter presented in the course has increased your knowledge of the subject	A	B	C	D	E
16. The syllabus clearly states course objectives requirements, procedures and grading criteria	A	B	C	D	E
17. The course integrates theoretical course concepts with real-world applications	A	B	C	D	E
18. The assignments and exams covered the materials presented in the course	A	B	C	D	E
19. The course material is modern and updated	A	B	C	D	E

Comments:
Instructor:_____

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Course:_____

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Annexure-X

Detailed Course Contents of MSc (Hons) in Entomology

ENT–701 RESEARCH METHODS IN ENTOMOLOGY 4(1-6)

THEORY:

Introduction; techniques and apparatus employed in entomological research: temporary and permanent mounts, microtomy, use of camera lucida. micrometry and scientific photography; bio-assay for insecticide residues; use of Potter's tower, atomic absorption spectrophotometer, gas chromatography, high performance liquid ehromatography, ultraviolet visual spectrophotometer, amino acid analyser, electrophoresis, ultra centrifugation, scanning and transmission, electron microscopy and computer software in entomology; methods of sampling, analysis of data and report writing.

PRACTICAL:

Insect collection apparatus and preservation techniques; rearing and culturing; exercises in microtomy, permanent slides, micrometry and scientific photography; maintenance and measurement of microclimate; use of different equipments in entomological experiments, sampling, tabulation, analysis and interpretation of data.

BOOKS RECOMMENDED:

1. Bancroft, J. D. and A. Stevens, 1990. Theory and practice of histological techniques. Chaschill Livingstone, London.
2. Blaker, A.A. 1977. Handbook for Scientific Photography. W.H. Freeman and Co., San Francisco-3, Erlich, H., 1992. PCR Technology: Principles and Applications for Amplification. W.H.
3. Freeman & Company, New York. Peterson, A. 1976. Kntomological Techniques. Edward Bros. Inc. Ann. Arbor. Michigan. U.S.A
4. Singh, P. & R.F. Moore, 1985. Handbook of Insect Rearing VoU & II, Hlsevier, U.S.A.
5. Smith, 1. 1960. Chromatographic and Electrophoretic Techniques William Heinemann Medical Books Ltd., London. Vol.l (4"1 edition) XII.
6. Tonapai, G. T. 1994. Experimental Entomology - An aid to Laboratory and Field Studies. CBS Publishers and Distributors-Delhi, India.

ENT-702 ENVIRONMENTAL ENTOMOLOGY 2(2-0)

THEORY:

Introduction; diversity and stability of insects in different environments; interactions of various groups olinsects with biological, chemical and physical constituents of their environment; physical and chemical characterization of environmental contaminants, impact of pollutants on insects and non-target organisms at different levels; biological responses to pollutants and biogeochemical cycles; insects as indicators of levels of pollution. Insects as environment cleaners and soil builders.

BOOKS RECOMMENDED:

1. Annual Review of Entomology, 1965 to date Palo Alto, California, Ann. Rev. Inc. U.S.A.
2. Anonymous, 1983, Agrochemical Fate in Food and Environment. Published by I.A.E.A-, Vienna.
3. McEwen, F.L. and G.l. Stephenson, 1979. The Use and Significance of Pesticides in the Environment. John Wiley and Sons Inc.- N.Y.
4. Perry, A.S. 1998. Insecticides in Agriculture and Environment: Retrospects and Prospects. Eljivier, "New York.

ENT 703 ADVANCED INSECT PHYSIOLOGY 3(2-2)

THEORY:

Introduction; advances in physiology of integument, growth, development, diapause, digestion, respiration, circulation, excretion, reproduction, reception and perception; neuromuscular physiology; physiology of locomotion and resistance; hormones, pheromones and light production.

PRACTICAL:

Hormonal control of insect growth, development and breaking of diapause; estimation of digestive enzymes. Oxygen consumption, carbon dioxide production and determination of respiratory quotient. Qualitative and quantitative analysis ofhaemocytes and free ammo acids in haemolymph; determination and estimation of blood proteins, uric acid in excreta and water loss; pheromones as sex attractants; determination of visual, gustatory/olfactory responses and wing beat frequency.

BOOKS RECOMMENDED:

1. Agarwal, O.P., 1994. Perspectives in Entomological Research. Scientific Publishers, India.
2. Blum, M.S., 1985. Fundamentals of Insect Physiology. John Wiley and Sons, N.Y.
3. Chapman, R.F. 1982. The Insects; Structure and Function, 3rd ed. American Elsevier Publishing Co., Inc. N.Y.
4. Howse, P., 1. Stevens and 0. Jones, 1998. Insect Pheromones and Their Use in Pest Management. Chapman and Hall, London.
5. Kerkut. G. A. and L. I. Gilbert. 1985. Comprehensive Insect Physiology, Biochemistry and Pharmacology, Vols. 1-12, Pergamon Press, Oxford, New York, Toronto, Sydney, Paris, Frankfurt.

6. Rockstein, M. (Ed.) year. Advances in Insect Physiology Vol. 1-todate. Academic Press, London, N.Y.
7. Tonapi, G.T., 1994. Hxperimental Entomology; An Aid to Laboratory and Field Study. CBS, Publisher; India.

ENT-704 MICROANATOMY AND HISTOLOGY OF INSECTS 2(0-4)

PRACTICAL:

Use of microtome and other apparatus in the study of microanatomy and histology of insects. Fixation and fixatives. Nuclear and cytoplasmic stains. Preparation of temporary and permanent mounts of various body parts and study of histological structure.

BOOKS RECOMMENDED:

1. Gray, P. 1965. The Microtomists Formulary and Guide. The Blakiston Co., Inc. New York.
2. Smith, D.S. 1968. Insect cells, their structure and function. Olive and Boid, Edinburgh.
3. Tonapai, G. T. 1994. Experimental Entomology - An aid to Laboratory and Field Studies. CBS Publishers and Distributors-Delhi, India.

ENT-705 ADVANCED FOREST ENTOMOLOGY 3(2-2)

THEORY:

Ecological and behavioral aspects of forest insects and their management. Population dynamics of forest trees in relation to phytophagous insects. Monitoring pest populations damaging forest trees; defoliating, sap sucking, terminal, shoot, twig and phloem boring insects, wood boring insects and gall makers.

PRACTICAL:

Collection, preservation and identification of insect groups damaging forest plantations. Development of pest management systems for insects attacking forest trees.

BOOKS RECOMMENDED:

1. Coulson, R.N. and J.A. Witter. 1984. Forest Entomology. Ecology and Management. John Wiley and Sons, New York.
2. Barbosa, P. and M.R. Wagner. 1989. Introduction to Forest and Shade Tree Insects. Academic Press, New York.
3. Dent. D. 2000. Insect Pest Management. 2"d Ed. A.B.I. Publishing Co.
4. Thakur, M. L. 2000. Forest Entomology (Ecology and Management). S. A. 1. Publishing Co.

ENT–706 INSECTS OF MAN AND ANIMALS 3(2-2)

THEORY:

Scope of Medical Entomology. Insects and other arthropods of medical and veterinary importance., their biology and control measures. Management strategies for major insects attacking man and domestic animals. Important diseases of man and animals where insects act as vectors.

PRACTICAL:

Collection, identification and control of different arthropod pests in relation to the diseases of man and domestic animals.

BOOKS RECOMMENDED:

1. Metcalf, R.L. and W.H. Luckman. 1982. Introduction to Insect Pest Management. John Wiley and Sons, New York.
2. James, M.T. and R.F. Harwood. 1969. Herm's Medical Entomology. The Mcamillan Company, Collier Macmillan Limited, London.
3. Pedigo,L.P.1996. Entomology and Pest Management. Prentice Hall Inc. N.J.679pp.
4. Wall, R. and D. Shearer. 1997. Veterinary Entomology. Chapman and Hall. London.

ENT–707 CLASSIFICATION OF IMMATURE INSECTS 4(2-4)

THEORY:

Introduction; collection and preservation of immature stages of insects; preparation of immature insects for identification; identification and classification of immature stages of Ephemeroptera, Plecoptera, Odonata, Diptera, Lepidoptera, Trichoptera, Hymenoptera, Neuroptera and Coleoptera up to family level.

PRACTICAL:

Collection, preservation, preparation and identification of immature stages up to family level.

BOOKS RECOMMENDED:

1. Chu, HY., 1983. How to know the Immature Insects. W.M.C. Brown Co., Publishers, Iowa, USA.
2. Peterson, A.R., 1960. Larvae of Insects, Part-1.1. 4th ed. Edwards Brothers Inc., Arbor, Michigan.
3. Peterson, A.. 1962. Larvae of Insects, Part-1,4th ed. Edwards Brothers Inc.; Arbor, Michigan.
4. Stehr, F., 1991. Immature Insects. Vol. I&II. Kendall - Hunt Publishing, U.S.A.

ENT-708 INSECT PEST MANAGEMENT SYSTEMS 3(2-2)

THEORY:

The pest management concept. Ecological considerations for the collection of data for the management of pest populations. The economics of pest management. ,Pest management strategies for insects attacking different crops grown in barani tracts of Pakistan. Transgenic and genetically

modified crops, insects growth regulators, allelopathy, remote sensing and other currents, development in suppressing insect pests.

PRACTICAL:

Estimation of losses done by insects to various crop plants. Demonstration of pest scouting techniques for insects attacking different crops grown in barani areas. Development of pest management systems for key pests of major crops.

BOOKS RECOMMENDED:

1. Dent, D. 1991. Insect Pest Management. Univ. Arizona Press, USA.
2. Dent. D. 1996. Integrated Pest Management. Chapman and Hall, London
3. Metcalf, R.L. and W.H. Luckman. 1982. Introduction to Insect Pest Management. John Wiley and Sons, New York.
4. Teng, P.S. 1987. Crop Loss Assessment and pest Management. APS Press, Minnesota.
5. Frisbie, R. 1989. Integrated Pest Management systems and Cotton Production. John Wiley and Sons, New York.
6. Inayatullah, Ch. 1987. Integrated Pest Management. PARC, Islamabad.
7. Saxena, S.C. 1992. Biology of Insects. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, Bombay, Calcutta.
8. Upadhyay, R. K., K. G. Mukerji, B. P. Chawla and O. P. Dubey, 1998. Integrated Pest and Disease Management. A. P. H. Publishing Corp. New Delhi.

ENT-709 ADVANCES IN HOST PLANT RESISTANCE 3(2-2)

THEORY:

Types and classification of resistance. Physio-chemical basis of plant resistance against insects. Epidemiological types of resistance. The use of plant and insect models in host plant resistance. Germplasm sources and needs. Techniques for screening different plant strains (especially in barani areas) showing resistance to insect pests. The relationship of resistant variety development to biotechnology.

PRACTICAL:

Demonstration of techniques for screening crop plants showing resistance to insect pests. Testing of mechanisms of host plant resistance under laboratory and field conditions.

BOOKS RECOMMENDED:

1. Maxwell, F.G. and P.R. Jennings. 1980. Breeding Plants Resistane to Insects. John Wiley and Sons, New York.
2. Barbosa, P. and D.K. Letourneau. 1988. Novel Aspects of Insect Plant Interactions. John Wiley and Sons, New York.
3. Smith, C.M. 1989. Plant Resistance to Insects. John Wiley and Sons, New York.
4. Pedigo,L.P. 1996 Plant Resistance to Insects. Entomology and PestManagement. Prentice Hall, Inc.N.J.pp 679.

ENT–710 INSECT TOXICOLOGY 3(2-2)

THEORY:

Introduction; general concepts of insect toxicology; theory and principles of bioassay; classification of insecticides on the basis of chemical nature and mode of action; chemistry and comparative toxicology of some'common insecticides from each group; mechanism of action of major groups cf insecticides; phytotoxicity of insecticides; energy production and inhibition by insecticides at various levels; detoxification mechanisms; joint action of insecticides, (synergism and antagonism).

PRACTICAL:

Laboratory equipment used in toxi-cology experi-menu; gross symptom-s produced by representative insecticide groups; relationship between dosages and responses; use of time-mortality determination in comparing the relative toxicity of insecticides; preparation of spectral transmittance and concentration transmittance curves; chemical assay of insecticides.

BOOKS RECOMMENDED:

1. Gupta, H.C.L., 1999. Insecticides: Toxicology and Uses. Agrotech Publishing Academy, Udaipur.
2. Hassal, K.A., 1990. The Biochemistry and Uses of Pesticides: Structure, Metabolism, Mode of Action and Uses in Crop Protection. BLRS/Macmillan, U.K.
3. Ishaaya, I. and D. Deghecle, 1998. Insecticides With Novel Modes of Action: Mechanism and Application. Norosa Publishing House..'New Delhi, Madras, Bombay, Calcutta, London.
4. Kerkut, G.A. and L. I. Gilbert Year Comprehensive Insect Physiology, Biochemistry and Pharmacology. Pergamon Press. Oxford. N.Y., Toronto, Sydney. Paris, Frankfurt.
5. Pedigo, L.P., 1996. Entomology and Pest Management. Macmillan Publishing Co. N. Y., London.
6. Rockstein, M., 1978. Biochemistry of Insects. Academic Press, N.Y., San Francisco, London.
7. SreeRamulu.U.S., 1995. Chemistry of Insecticides and Fungicides Second Edition), Oxford &

IBH Publishing Co. Pvt. New Delhi, Bombay, Calcutta.

8. Wilkinson, C.F., 1976. Insecticides Biochemistry and Physiology- Heyden, London, New York, Rheine.

ENT-711 INSECTS IN RELATION TO PLANT DISEASES 3(2-2)

THEORY:

Introduction; identification, biology and control of insect and mite vectors; mode of transmission of plant pathogens by insects and mites; study of causal organisms, etiology, symptoms and control of important fungal, bacterial and viral diseases of crop plants transmitted by insects and mites.

PRACTICAL:

Identification of insect and mite vectors and pathogens; rearing and handling of insect vectors for plant pathological studies. Study of mode of transmission of plant pathogens by insect and mite vectors.

BOOKS RECOMMENDED:

1. Atkins. M. D., 1978. Insects in Perspective. Macmillan Publishing Company, inc. New York.
2. Boner, D.1., D. M. DeLong and C. A. Triplehom, 1981. An Introduction to the study of insects. 5111 ed. Rainhart and Winston. N.Y.
3. Boucias, D.G. 1998. Principles of Insect Pathology. Chapman Hall, London.
4. Jeppson, L.R., H.H. Keifer and E. W. Baker, 1975, Mites Injurious to Economic Plants. Univ. Calif. Press.

ENT-712 INSECT CYTOGENETICS 3(2-2)

THEORY:

Introduction, cell structure, characteristics and cell division in insects, chromosomes structure, number, diversity and types in insects; chromosomes and parthenogenesis in insects; chromosomes and ecology; modem concept of gene; genedetermined characters; environmental effect on gene expression; sex determination in insects; mutations and variations; genetic engineering; evaluation and speciation in insects.

PRACTICAL:

Study of insect cell, cell division, types and number of chromosomes in important insects like grasshoppers, crickets, cockroaches, flies and dragonflies; study of insect resistance in genetically

engineered crops; study of different types of genetic variations in insects; genetical identification of species and biotypes in insects.

BOOKS RECOMMENDED:

1. Sinha, V. and Sunita Sinha. 1984. Cytogenetics. Plant Breeding & Evolution. VANI Educational Books, New Delhi.
2. Demere M. and B.P. Kaufmann. 1967. Drosophila guide. Washington D.C. Carnegic Institute of Washington.
3. Bahi, P.I. and P.M. Salimath. 1996. Genetics, Cytogenetics and Breeding of Crop Plants. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
4. Ashburner. M., H.L. Carson and J.N. Thompson Jr. 1986. The Genetics and Biology of Prosphila. Academic Press. New York.
5. Rinderer, I.T. 1986. Bee Genetics and Breeding. Academic Press. New York.

ENT-713 INSECT PATHOLOGY 3(2-2)

THEORY:

Introduction; history definition and scope; resistance and immunity in insects; types of insect pathogens; transmission, host range/persistence and virulence of insect pathogens; types of injuries and methods of infection by pathogens in insects; pathogenic diseases and their diagnosis in insects; extra-cellular and intracellular microbiota of healthy insects; control of microbial diseases of useful insects; role of pathogens in IPM of insects.

PRACTICAL:

Isolation, purification, culture and identification of insect pathogens from the diseased insects; diagnosis of different pathogenic diseases in insects; control of microbial diseases of useful insects: control of insect pests with microbial insecticides; determination of extent of parasitism by pathogens in insects.

BOOKS RECOMMENDED:

1. Boucias, D.G. 1998. Principles of Insect Pathology. Chapman Hall, London
2. Burges, H.D. andN.W. Hurrey, 1972, Microbial control of Insect and Mites. Academic Press London.
3. Poinar, G.O. Jr. and G.M. Thomas, 1978. Diagnostic for the Identification of Insect Pathogens, Press. N.Y.
4. Sleinhous, E.A., 1949. Principles ol'-Insect Pathology. McCiraw-Hill Book Co. Inc. New York. 757 pp.

5. Tanada, Y. and H, Kaya, 1992. Insect Pathology. Academic Press, New York.613pp.

ENT-714 INSECT BIOCHEMISTRY 3(2-2)

THEORY:

Introduction; energy metabolism and production in insects; biochemistry of cuticle, muscles, flight, synaptic transmission, light production, biochromes, hormones; insect growth regulators and diapause in insects; metabolism and role of carbohydrates, proteins and lipids in insects; chemical reactions involved in insect resistance to insecticides, chemical control of insect behaviour; biochemical defences in insects.

PRACTICAL:

Chemical identification of insect species and biotypes; pheromone extraction, its identification and control in insects; hormonal control ofinsect growth and development.

BOOKS RECOMMENDED:

1. Candy, D.J. and BA, Kilby, 1978, Insect Biochemistry and Function (2"d cd,) C 1. pman and Hall London. 314 pp.
2. Chapman, R.F., 1998. Insects: Structure and Function. 4111 ed. American Elsvier. Publ. Co. Inc., New York.
3. Gilmour,D., 1961. The Biochemistry of Insects. Academic Press London, .343 pp.
4. Turner, R.B., 1977. Analytical Biochemistry of Insects. Elsevier Scientific Publishing Company New York. 315 pp.
5. Rockstein. M., 1978. Biochemistry of Insects. Academic Press, New York, U.S.A., 649 pp.

ENT-715 COMPARATIVE INSECT EMBRYOLOGY 3(2-2)

THEORY:

Introduction; structure of insect egg, fertilization of egg; early organization and development; segmentation; development of organs and organ systems; study of comparative embryology indifferent groups of insects.

PRACTICAL:

Identification of different types of insect eggs; structure of an insect egg, study of cleavage, Blastodein germ band, embryonic envelopes and blastokins different eggs; study of insect embryo at different durations.

BOOKS RECOMMENDED:

1. Chapman, R.F., 1998. The insects. Structure and 1-unction. 4111 ed. American Elsvier. Pubt.

Co. Inc., New York.
2. Nagabhushanam, R. and R. Sarojini, 1985. Invertebrate Embryology. Oxford and IBH Publishing Co. New Delhi 580 pp.
3. Richards, O.W. and R.G. Davies, 1984. Imms General textbook of Entomology (10 ed.) Vol. l (Structure Physiology and development) Chapman and Hal 1 London.
4. Roeder, K-D., 1963. Insect Physiology 3rd Ed. John Wiley and Sons. Inc. New York.

ENT-716 BIOLOGICAL CONTROL OF INSECT PESTS 3(2-2)

THEORY:

Introduction; history, development and scope of biological control with special reference to Pakistan; ecological basis of biological control; biological characteristics of emomophagous insects; introduction, culture, release and establishment of entomophagous insects; conservation and augmentation of natural enemies; role of micro-organisms in biological control; integration of chemical and biological control.

PRACTICAL:

Collection, laboratory rearing, culturing and identification of parasitoids, predators and micro-organisms of economic importance; study of extent of parasitism / predation of different biocontrol agents.

BOOKS RECOMMENDED:

1. Burges, H.D. and N.W. Hussey, 1971. Microbial control of insects and mites. Academic press, London.
2. De'Bach, 1976. Biological Control of Pests and Weeds, Chapman & Brotcs.
3. Gunasekaran, M. and D, Weber, 1996. Molecular Biology of the Biological Control of Pests and Diseases of Planls. I'-SA Publications. U.S.A.
4. Maramorosch. K,, 1991. Biotechnology for Biological Control of pests and Vectors. CRC Press, U. S. A.
5. Pedigo, L. P., 1996. Lntomology and Pest Management, 2"a ed. Prentic Hall Intl., London.

ENT-719 SPECIAL PROBLEM 1(1-0)

ENT-720 SEMINAR-(I-II) 1(1-0)