Pir Mehr Ali Shah

ARID AGRICULTURE UNIVERSITY RAWALPINDI

Self Assessment Report

DEPARTMENT OF PLANT PATHOLOGY

October, 2012 - October, 2014

Ph.D

Prepared by:

1.	Prof. Dr Tariq Mukhtar	**Coordinator**
2.	M. Usman Raja	**Member**
3.	Dr. Gulshan Irshad	**Member**

Contents **Page**

List of Figures

List of Tables

Introduction

The Department of plant pathology initiated Ph.D. Program in 1999. However, it has been offering two supporting/ minor courses since the establishment of the Barani Agricultural College in 1979 later; the college was upgraded to University of Arid Agriculture in 1994 and M.Sc. (Hons) and Ph.D.degree program in Plant Pathology commenced in 1994 and 2000 respectively. Since then, its growth and progress both in terms of faculty, students and up gradation have been remarkable. It has produced well-known Plant Pathologists, who are serving the country in different manners.

The aim of this program was to prepare the highly skilled and professionally sound plant pathologists who can understand the pathological problems, forecast the upcoming plant disease epidemics and be able to take decisions for managing the disease by combating these pathogens so that it may not cause the economic losses to the farmer. Its curriculum highlights the emerging issues of new and economically important plant diseases in the area. The disease management has been given substantial importance in the curriculum. The department is committed inquality teaching to augment the professional skill of the students in plant protection so that they can keep with the pace of requirements of rapidly increasing population. Keeping in view its commitment the department updates its curriculum regularly to meet the future challenges. Recently emerging tools of molecular approaches have also been incorporated in the curriculum and the department provides a variety of study programs such as Mycology, Bacteriology, Virology, Nematology, Epidemiology and Disease management to enhance students' professional training and career opportunities .More over department also arrange frequent tours of the farmers' fields for in situ disease diagnosis. The faculty is actively engaged in a number of research projects; some of which are internationally collaborated and funded.

This Self Assessment Report (SAR) presents the progress of Department at post graduate level, for the academic years 2012-14. Surveys were conducted at the end of each semester i.e. fall semester (2012 - 2013), spring (2013), fall semester (2013 - 2014) and spring (2014). This Self Assessment Report (SAR) is based on eight criteria. Program mission and objectives are outlined in the first criterion.Criterion2 provides information about the curriculum development. Criterion3 catalogues the laboratories and other relevant information. The fourth criterion consists of the information about students' support and advising. Information about process control, faculty characteristics and institutional facilities and support is depicted in the last four criteria.

Criterion 1: Program Mission, Objectives and Outcomes

To meet the above mentioned criterion of the self assessment, some standards must be satisfied. This section describes how the standards of the Criterion 1 are met.

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

Mission Statement

Plant diseases caused by various microorganisms, sush as viruses, bacteria, fungi, protozoa, and nematodes reduce cultivation and growth of food plants qualitatively and quantitatively. About 14 % of crop produces is lost due to plant diseases every year globally. Controlling plant disease necessitates the use of millions of kilograms of pesticides for treating seeds, fumigating soil, spraying plants or the popst harvest treatments of fruits. Such control measures not only add to the cost of food production but also causeenvironmental pollution, disturbs the biodiversity and microbes resistance against thepesticides.The challenges for plant pathology are to reduce food losses while improving food quality, and at the same time, safeguarding our environment. As the world population continues to increase and arable land and most other natural resources continue to decrease, and as our environment continue to decrease, congested and stressed, the need for controlling plant disases effectively and safely will become one of the most basic necessities for feeding the hungry millions increasingly populated country. Therefore, the mission of this programme of Plant Pathology is to deliver quality education, conduct superior research and extend knowledge for the amelioration of agriculture, environment, to ensure self-sufficiency in quality food by reducingquantitative as well as qualitative losses in crop yields due to diseases. The emphasis is given at early disease diagnosis, forecasting and finding environmental friendly means for controlling plant diseases

to develop a sustainable and substantially profitable production system so as tomake the future of Pakistan radiant.

Strategic objectives of the programme of Plant Pathology are:

1. To facilitae the teachers by providing the discipline on modern and innovative lines for teaching and research for the postgraduate students.
2. To stress advance knowledge pertaining to various fields of Plant pathology viz. virology, bacteriology, mycology, nematology, disease diagnosis, pathogen detection and characterization, disease epidemiology and management.
3. To guide the students how to plan and prepare the research proposal and execute iton diseases of economic and national importance in the area.
4. To strengthen the discipline with incorporation and integration of advanced knowledge and approaches of related subjects such as Molecular Plant Pathology.
5. To predict new and emerging problems in the field through *in situ* and *in vitro* Plant disease diagnosis understanding.
6. To encourage culture of research in teaching faculty and students.

Main elements of strategic plan to achieve mission and objectives

- Development of a sound and dynamic teaching system based on the experience and vision gathered from world reviews, literature, innovations, proceedings, symposia etc for the award of degrees.
- Designing and constantly updating the curricula involving core subjects, elective subjects, specialized areas, internship programs and study tours.
- Preparation research projects, its execution and research reports.

- Setting up of well equipped specialized research laboratories depending on the available resources.
- Publication of scientific papers, books, manuals and bulletins etc.
- Planning and implementation of research projects funded by the universities and other agencies.
- Development of linkages with national and international research organizations top romote research.

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

S. #	Objective	How Measured	When Measured	Improvement Identified	Improvement made
1	Strengthening of Plant Pathology discipline at AAUR	On the basis of recognition, importance & impact of plant diseases in the area	It is a continuous & dynamic process	Teaching methods need to be improved	Teaching methods have been revised and developed on modern lines
2	To impart advance& applied education to thepost-graduate students	Back ground information and status of knowledge of students through entry tests and students feed back	At the time of admission or semester	Some basic courses need to be included in the curriculum	Revision of curriculum as per requirement
3	Guidance to students in research/ internship	Assessing interest of students, students feed back	Before start of research/ internship	Students to make presentations and reports	Presentations, seminars, communication skills development
4	Integration of related fields	Through entry tests, interviews research interests	Subject/ courses attachment before start	Related subjects to be recommended for studies	Enhancement of knowledge and vision
5	Anticipation of new teaching/ researchable areas	Through surveys, monitoring of diseases and identity of priority problems	Continuous activity	New courses to be included in curriculum, research on new problems	Approval of new curriculum integrated approaches
6	Inculcation of interest and spirit in academics and research in Plant Pathology	No. of research publications, research projects submitted & completed; evaluation by students and	During the whole academic year	Use of advanced techniques in disease monitoring and evaluation; interaction between	Research papers published in reputed journals; approval of projects;

		efficiency in disease diagnosis		farmers and scientists; maintenance of pathogen cultures	application of new immunological & DNA-based techniques

Table1. Program Objectives and their Assessment

Standard1-2: The program must have documented outcomes for graduating students. It must be documented that the outcomes support the program objectives and that graduating students are capable of performing these outcomes.

Expected Outcomes of the Programme

All the students in Plant Pathology should possess the ability of:

1. Development of communication skills through class presentations, oral discussions, writing review articles etc.
2. Preparation of research projects based upon identification of problems and use of newanalytical techniques; such as immunological, molecular, DNA-based techniques and nano-technology.
3. Identification of priority problems and their solution.
4. Enhancement of knowledge and broadening the vision.
5. Approval of new curriculum integrated approaches.
6. Research papers published in reputed journals; strengthening of plant pathology; a number of surveys based on the questionnaires were conducted to assess the program outcomes/graduates of the Department.

Table 2 shows that outcomes of the programme are aligned with each objective

Table 2: Programme outcomes and their relationship with objectives

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

+ = satisfactory, ++ = moderately satisfactory, +++ = highly satisfactory

Programme Outcome Measurement

Evaluation of the performance of the most concerned with regard to achievement of the determined objectives; information was gathered from the target groups through proforma provided by the Quality Enhancement Cell of Pir Mehr Ali Shah, Arid Agriculture University, and Rawalpindi. The proformas were filled in by the respective class students, faculty members, department alumni, and the graduates (previously passed out from the university) working in different organizations, research institutes, and agriculture departments in different positions at national level.

Program Assessment Results

Teachers' Evaluation

The overall compiled results showed that the performance of teachers was satisfactory. It is obvious from the graph that Teacher 2 is on the top scoring 97% followed by teacher1, 4,and 3 respectively (Fig. 1). Where as in spring semesters, the overall performance of all the teachers was graded as very good and rated more than 90 %. Teacher 2, however, was on top with 98 and 97% scoring followed by teacher4, 3 and 1 (Fig. 2). This was during the Assessment which was conducted twice during each academic year 2012 – 14 at the end of each semester: Fall.Semesters 2012- 2013 and 2013- 2014 and spring semesters 2013 and 2014. Four teachers, Dr.Ashfaq, Dr. Tariq, Dr.M. Inam-ul-Hq and Dr.Abid Riaz as 1-4 were evaluated by the students in accordance with Proforma-10. The cumulative result of fall semesters 2012-13& 2013-14 is presented graphically in Fig. 1 and of spring 2013& 2014 in Fig. 2

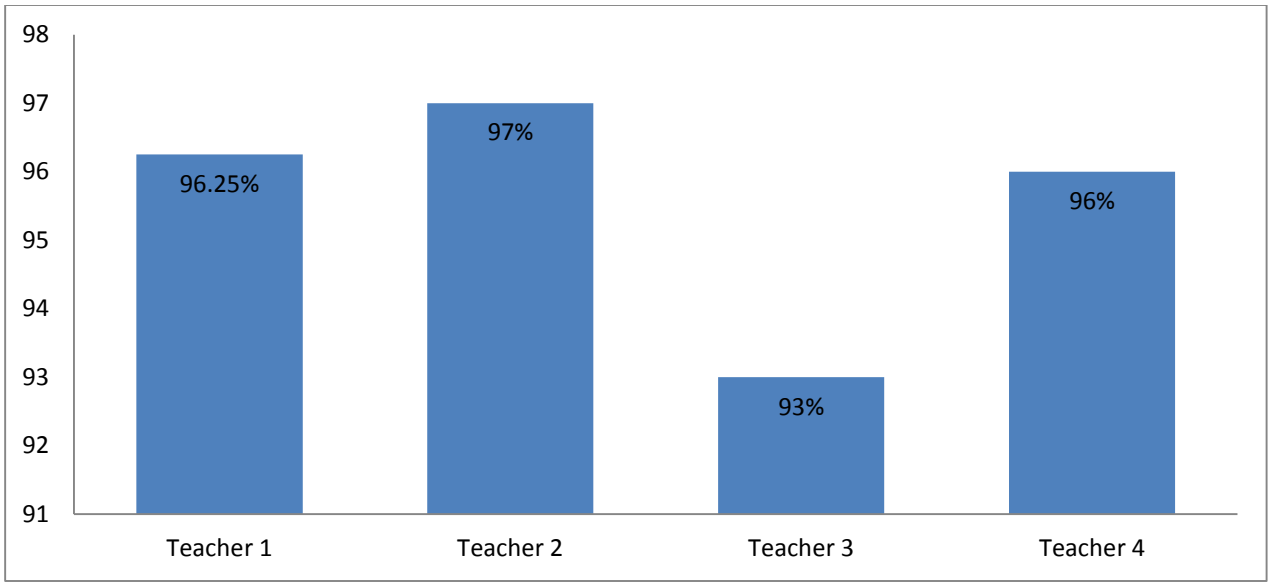


Fig.1 Teacher Evaluation for Ph.D Courses (Fall 2012-13 & 2013-14)

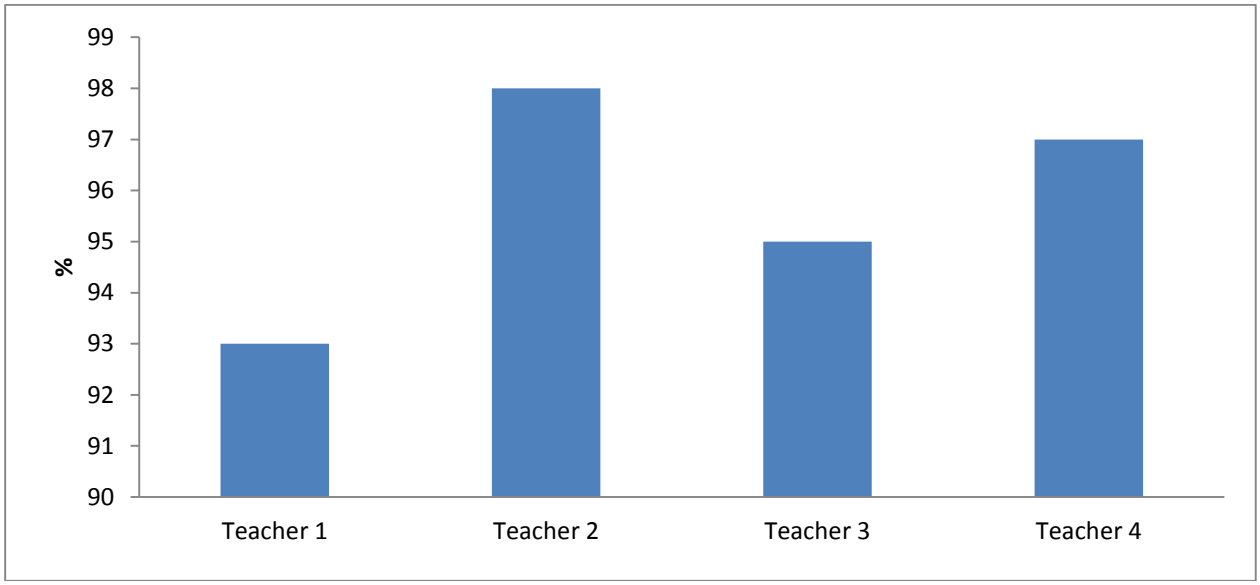


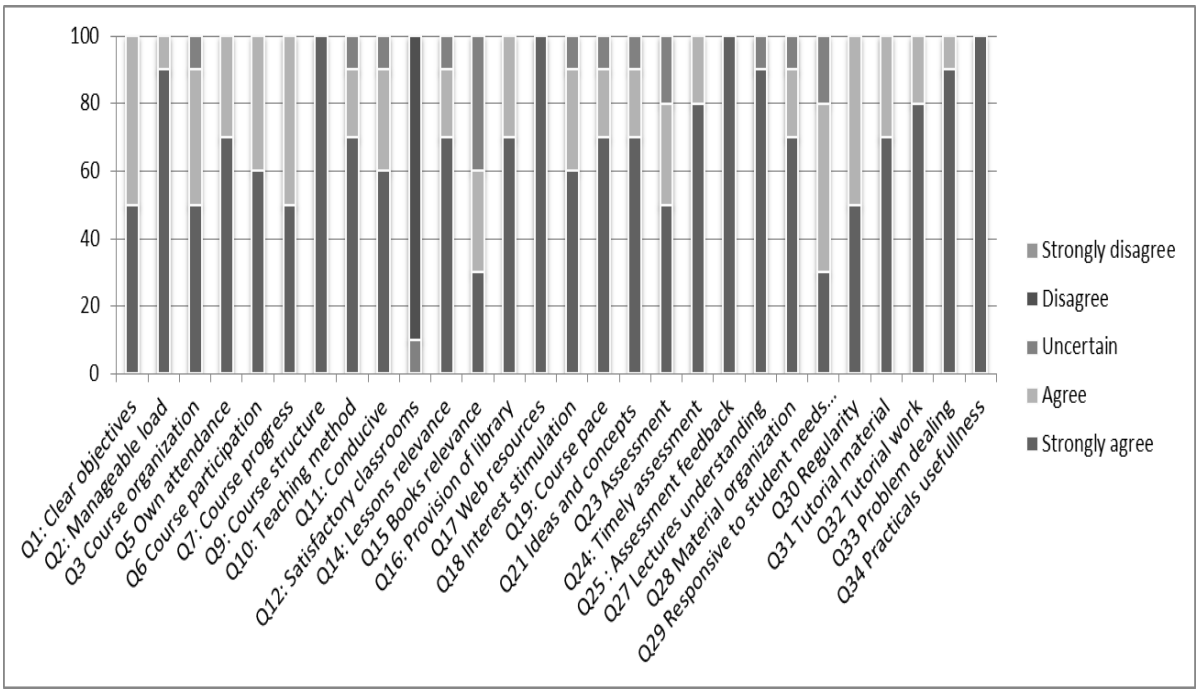
Fig.2 Teacher Evaluation for Ph.D Courses (spring, 2013& 14)

Detail of individual performance of each teacher is obvious from the graphes & Pie-charts given ahead.

Graphes & Pie chart Showing Evaluation of Teachers in Detail

Teacher 1 (PP 708)

According to the diagram overall performance of the teacher was good.



General Comments of the Students about this Teacher

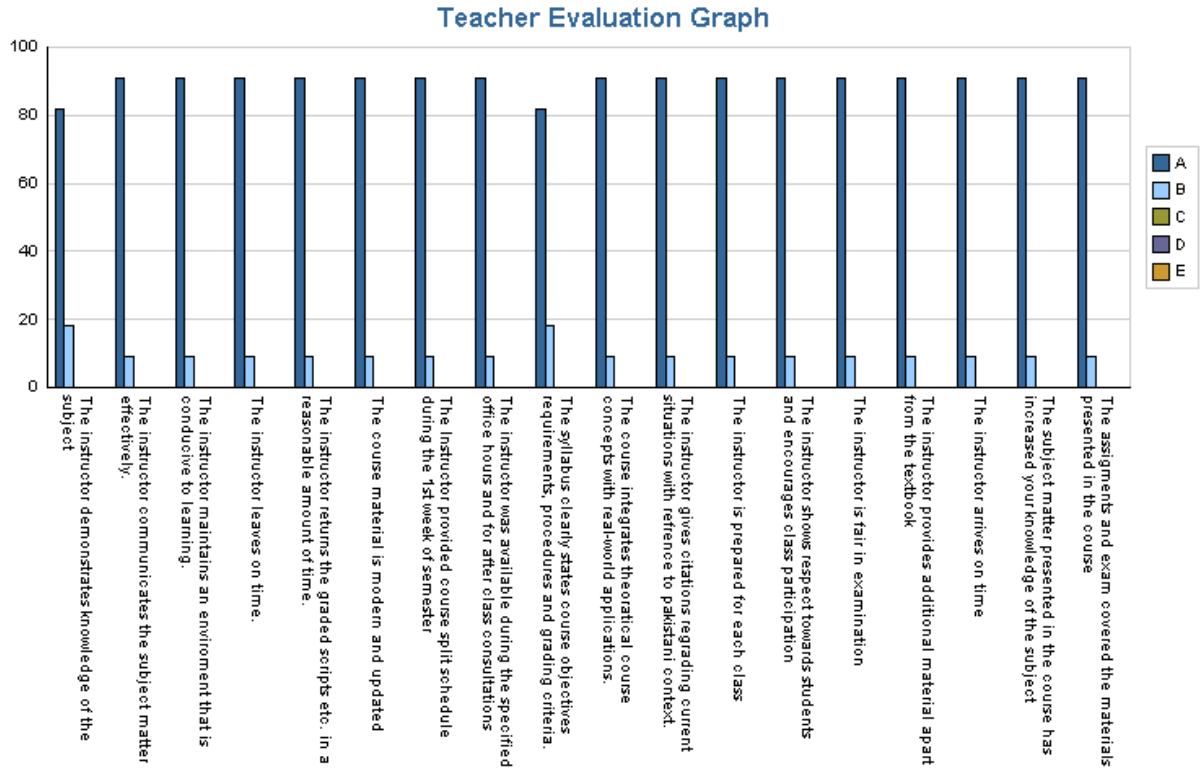
<u>Teachers Evaluation (Proforma 10)</u>

Strengths:

- Teacher always reaches on time .
- Teacher delivered the lectures with fully preparations.

Teacher: 1(PP- 718)

Results showed that all the students were found agreed and teacher's performance remained very good in the course regarding all parameters.



General Comments of the Students about this Teacher

<u>Teachers Evaluation (Proforma 10)</u>

Weaknesses:

- Teacher should teaches electronically for better understanding

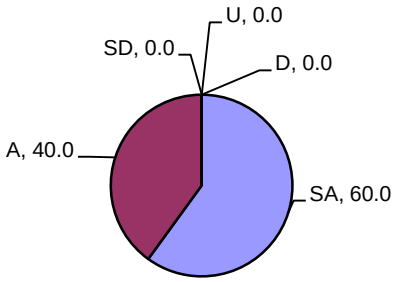
Strengths:

- Teacher was cooperative

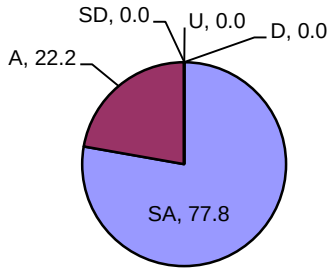
Teacher 2 (PP-74)

Every student agreed that course objectives were clear, course load was manageable and the course was well organized, yet students have to be present all the time. Similarly, the ideas and concepts were presented in an ideal environment and the method of assessment was impartial.

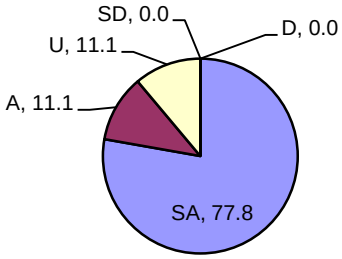
1 The instructor demonstrates knowledge of the subject



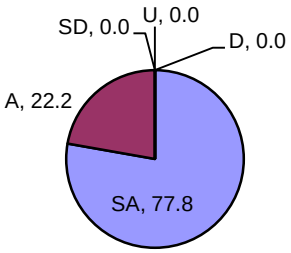
2 The instructor demonstrates knowledge of the subject



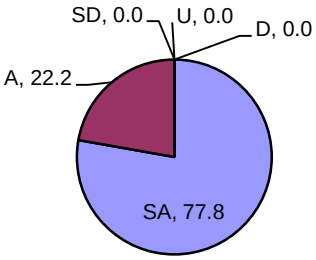
3 The instructor has completed the whole course



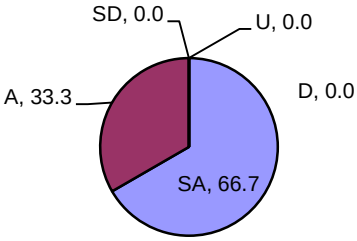
4 The instructor provides additional material apart from the textbook



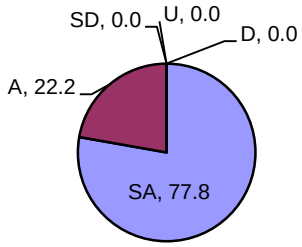
6 The instructor communicates the subject matter effectively



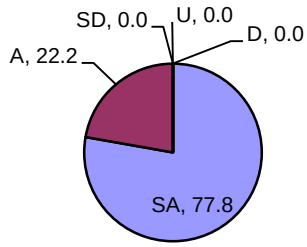
5 The instructor gives citations regarding current situations with reference to Pakistani context



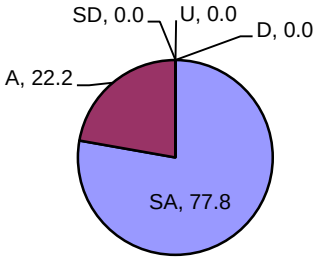
8 The instructor maintains an environment that is conducive to learning



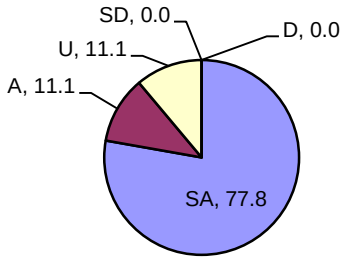
7 The instructor shows respect towards students and encourages class participation



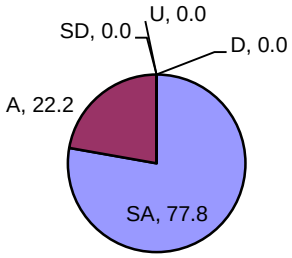
10 The instructor leaves on time



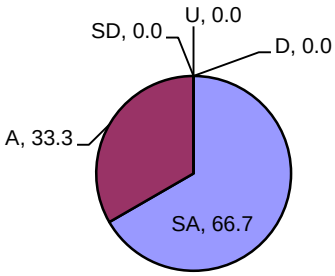
9 The instructor arrives on time

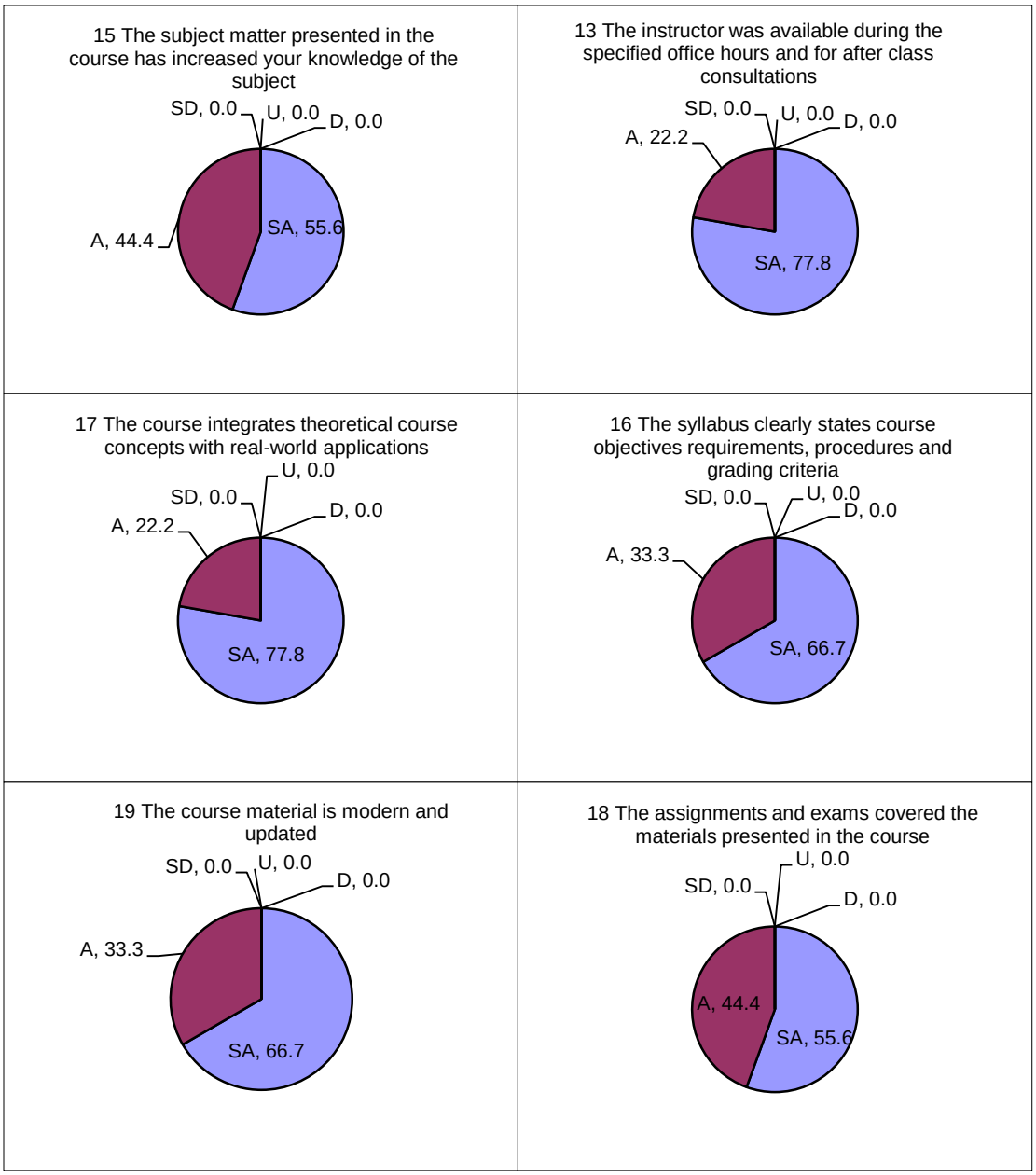


12 The instructor returns the graded scripts etc. in a reasonable amount of time



11 The instructor is fair in examination





General Comments about the Teacher

Teachers Evaluation (Proforma 10)

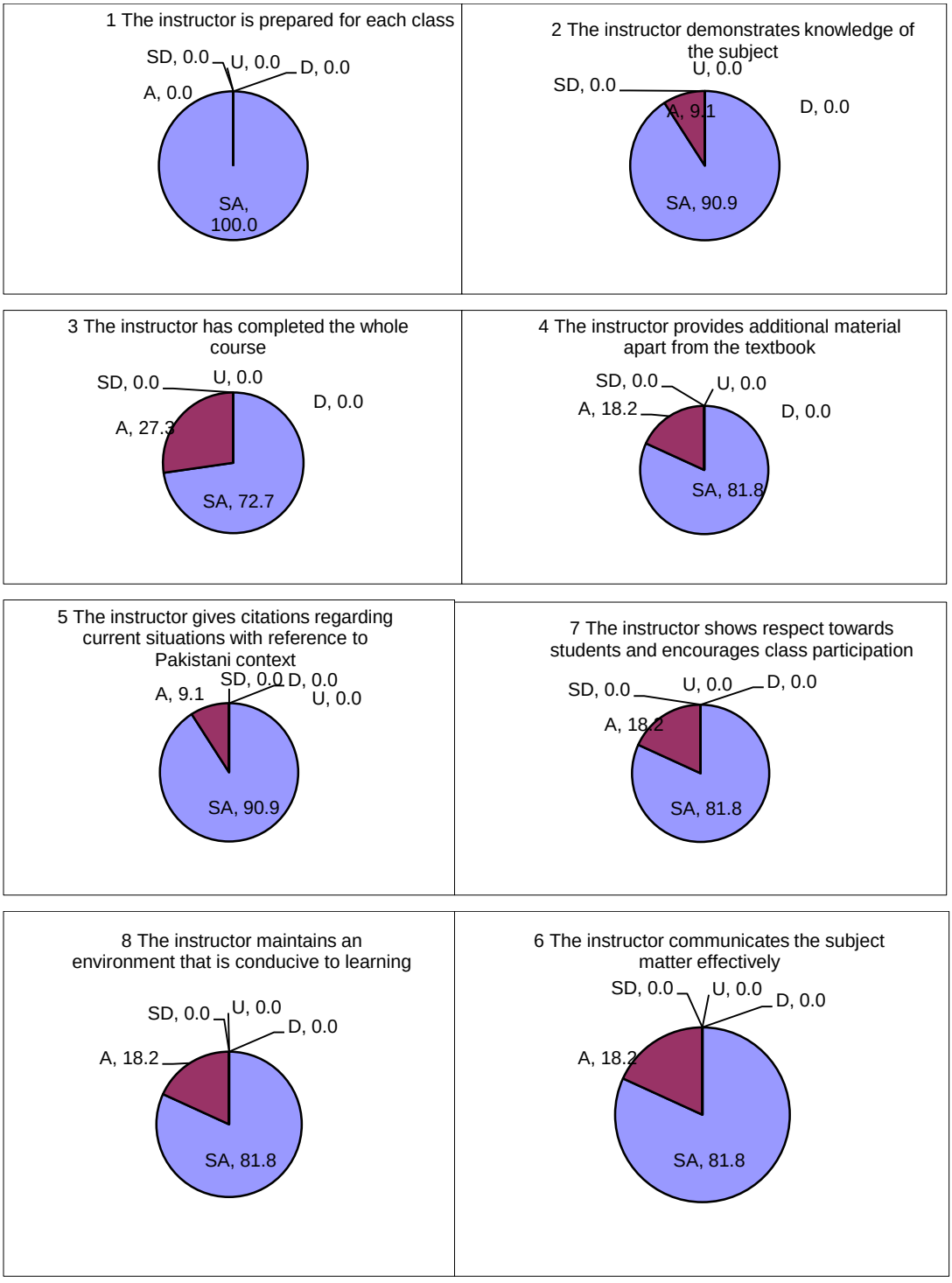
Strengths:

- Teacher was friendly.

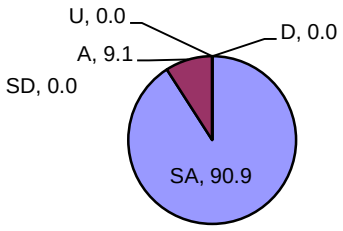
Teacher: 3 (PP- 708)

According to the assessment, 90% of the students agreed that course objectives were clear whereas the rest remained uncertain. Same was the case with course load. 20% students

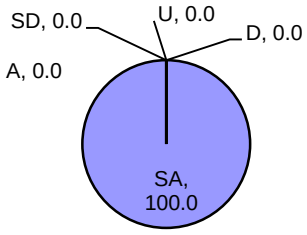
showed their uncertainty about the pace of this course. Similarly, 50% of the students were uncertain about the understanding of lectures.



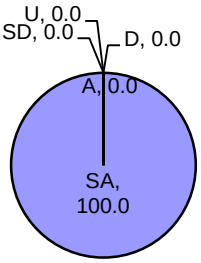
9 The instructor arrives on time



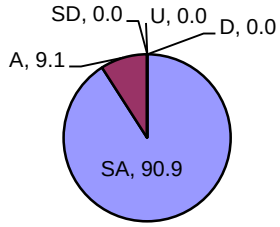
10 The instructor leaves on time



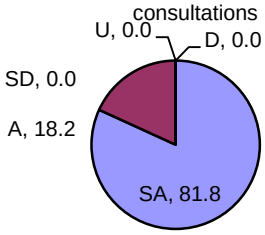
11 The instructor is fair in examination



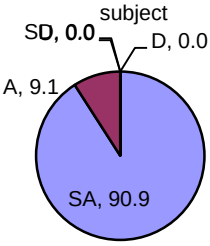
12 The instructor returns the graded scripts etc. in a reasonable amount of time



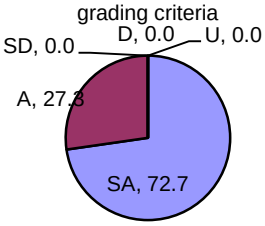
13 The instructor was available during the specified office hours and for after class consultations



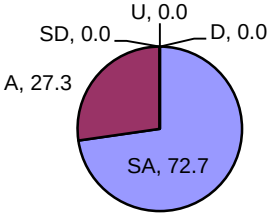
15 The subject matter presented in the course has increased your knowledge of the subject

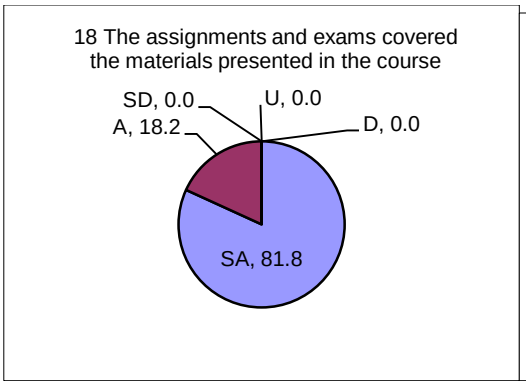


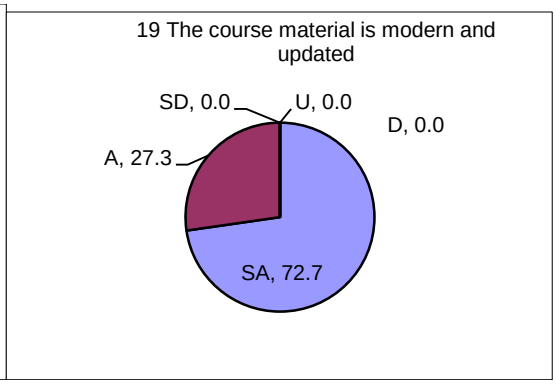
16 The syllabus clearly states course objectives requirements, procedures and grading criteria



17 The course integrates theoretical course concepts with real-world applications







General Comments of the Students about this Teacher

Teachers Evaluation (Proforma 10)

Weaknesses:

- Teacher should encourage class participation.

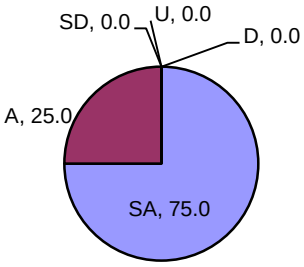
Strengths:

- Teacher completed the course within time.Teacher was punctual.

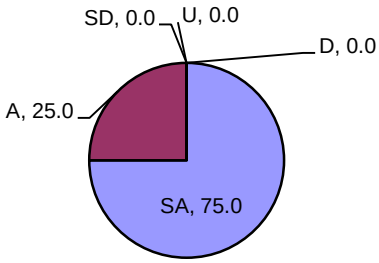
Teacher: 4 (PP-717)

The teacher's performance was excellent by the collected the data. Almost all students were agreed that the teacher demonstrates knowledge of the subject; Teacher completed the whole course, the teacher used to communicate the subject matter effectively etc.

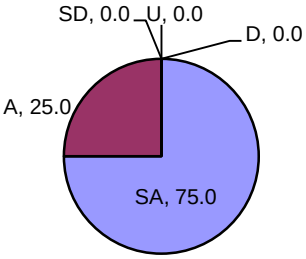
1 The instructor is prepared for each class



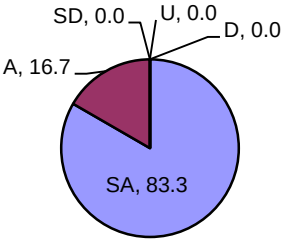
2 The instructor demonstrates knowledge of the subject



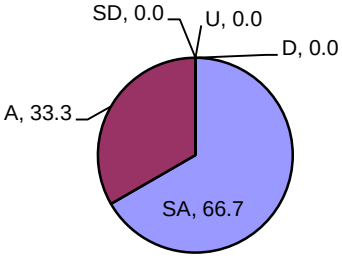
3 The instructor has completed the whole course



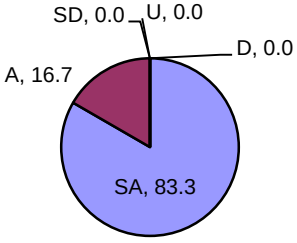
4 The instructor provides additional material apart from the textbook



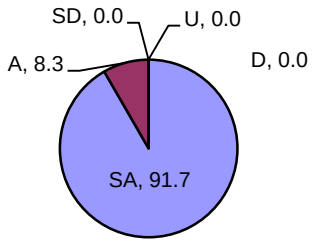
6 The instructor communicates the subject matter effectively



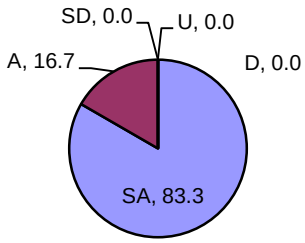
5 The instructor gives citations regarding current situations with reference to Pakistani context



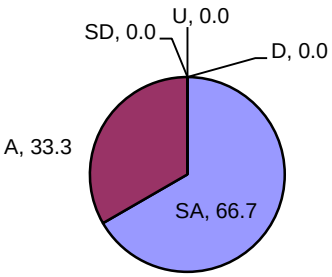
8 The instructor maintains an environment that is conducive to learning



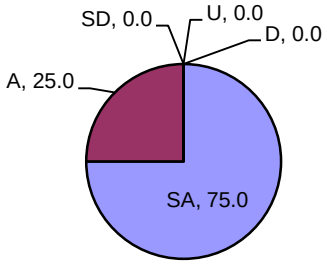
7 The instructor shows respect towards students and encourages class participation



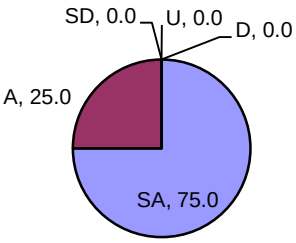
10 The instructor leaves on time



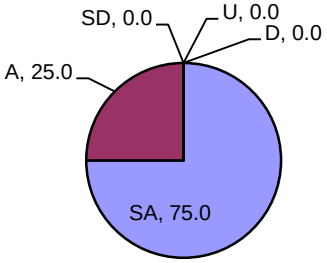
9 The instructor arrives on time



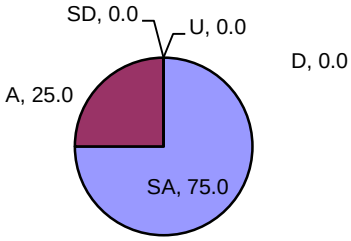
12 The instructor returns the graded scripts etc. in a reasonable amount of time



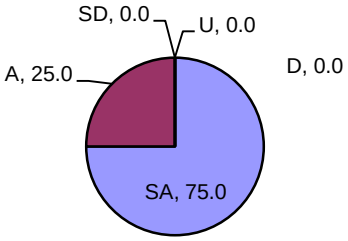
11 The instructor is fair in examination



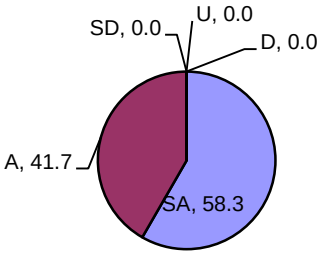
15 The subject matter presented in the course has increased your knowledge of the subject



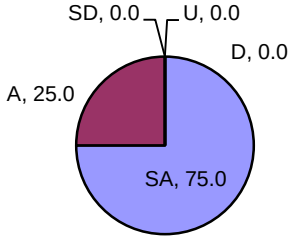
13 The instructor was available during the specified office hours and for after class consultations



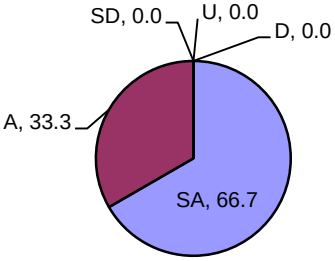
17 The course integrates theoretical course concepts with real-world applications



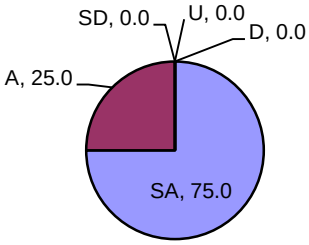
16 The syllabus clearly states course objectives requirements, procedures and grading criteria



19 The course material is modern and updated



18 The assignments and exams covered the materials presented in the course



General Comments of the Students about this Teacher

Teachers Evaluation (Proforma 10)

Strengths:

- Teacher completed the course within time.
- Teacher was guiding.
- Teacher presented ideas and concepts clearly.

PP 718	PP 714	PP 708	PP-718	PP-714
PP708	PP-720	PP-720	PP-720	PP-718
PP717				

Student Course Evaluation

The courses of the respective teachers were also evaluated as per Proforma1 twice during each academic year 2012-13 and 2013-14 at the end of each semester: Fall. semesters(October, 2012- February, 2013) and (October, 2013- February, 2014), Spring semesters (March, 2013- August, 2014) and (March, 2013- August, 2014), The results are shown in Fig-2 a. and 2 b. six courses were taugh altogether during the two semesters. In Fall semester PP-708, PP-717, and PP-714 in spring semester PP-718, PP-708 and PP-720 were taught by four teachers (Dr.M Ashfaq, Dr. M. Inam-ul-Haq, Dr. Abid Riaz and Dr. Tariq Mukhtar) numbered 1-4. It is clear from the figure 3 that during fall semester the course taught by the teacher 4, is on the top securing 4.75 points and the course of Teacher 2 is on second number, securing 4.63 points. The course taught by teacher 3 was ranked at the bottom securing 3.87 points. Similarly, in the spring semester the course taught by the teacher is again on the top securing 4.42 points and the course taught by teacher 3 was ranked at the bottom securing 3.97 points (Fig.4). The overall performance of all the courses was however can be ranked as of high-quality. The scores of other courses of respective teachers can be seen from the graph.

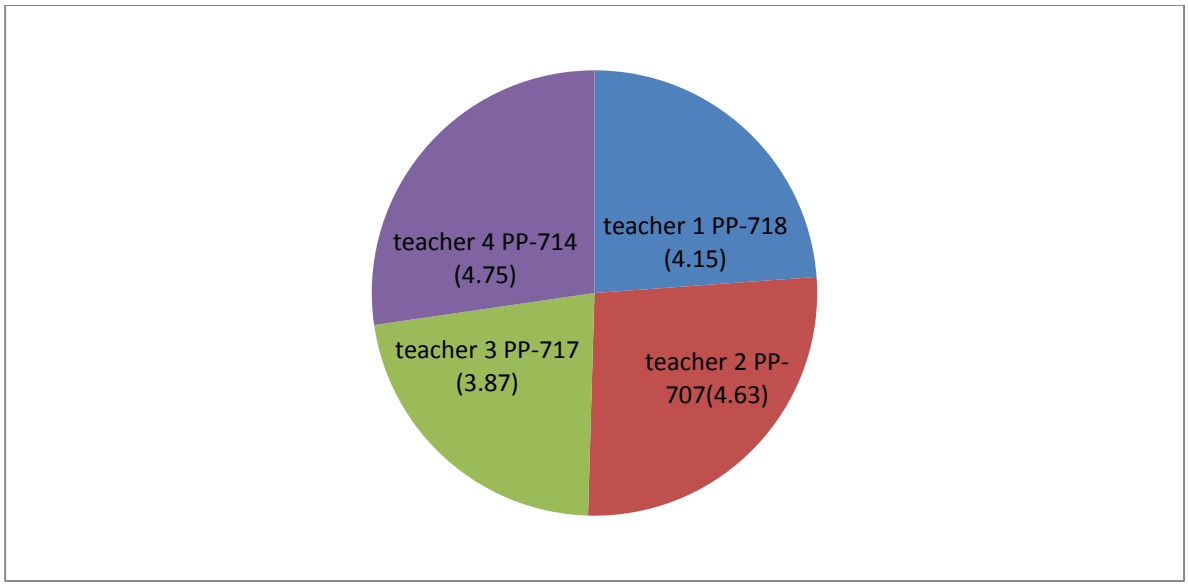


Figure: 3Performance level for each course offered in Plant Pathology in Fall Semesters during 2012-13 & 2013-14

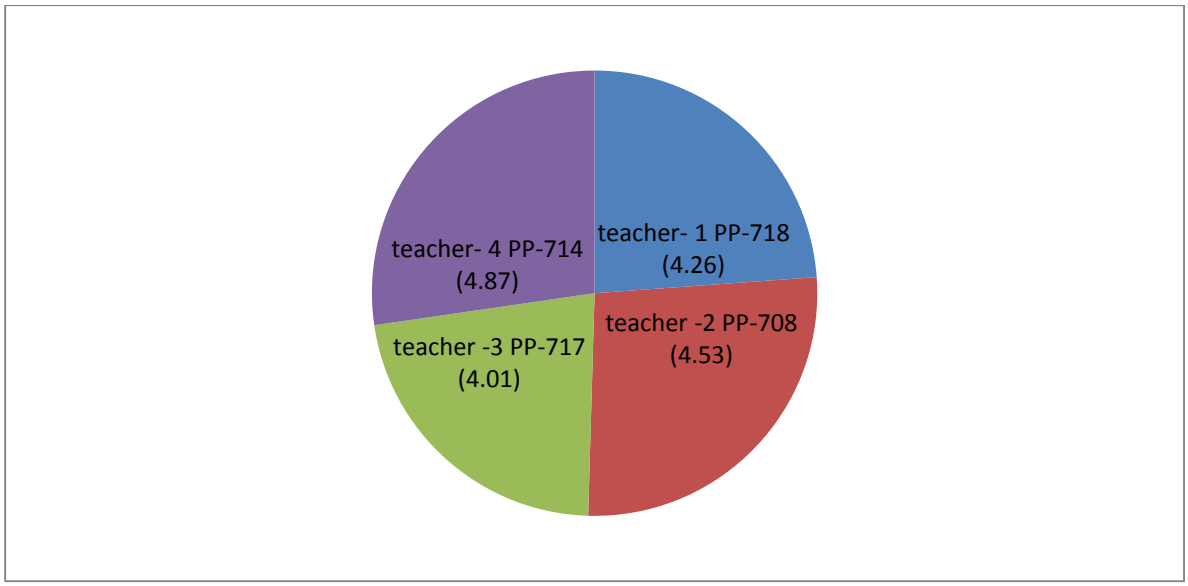
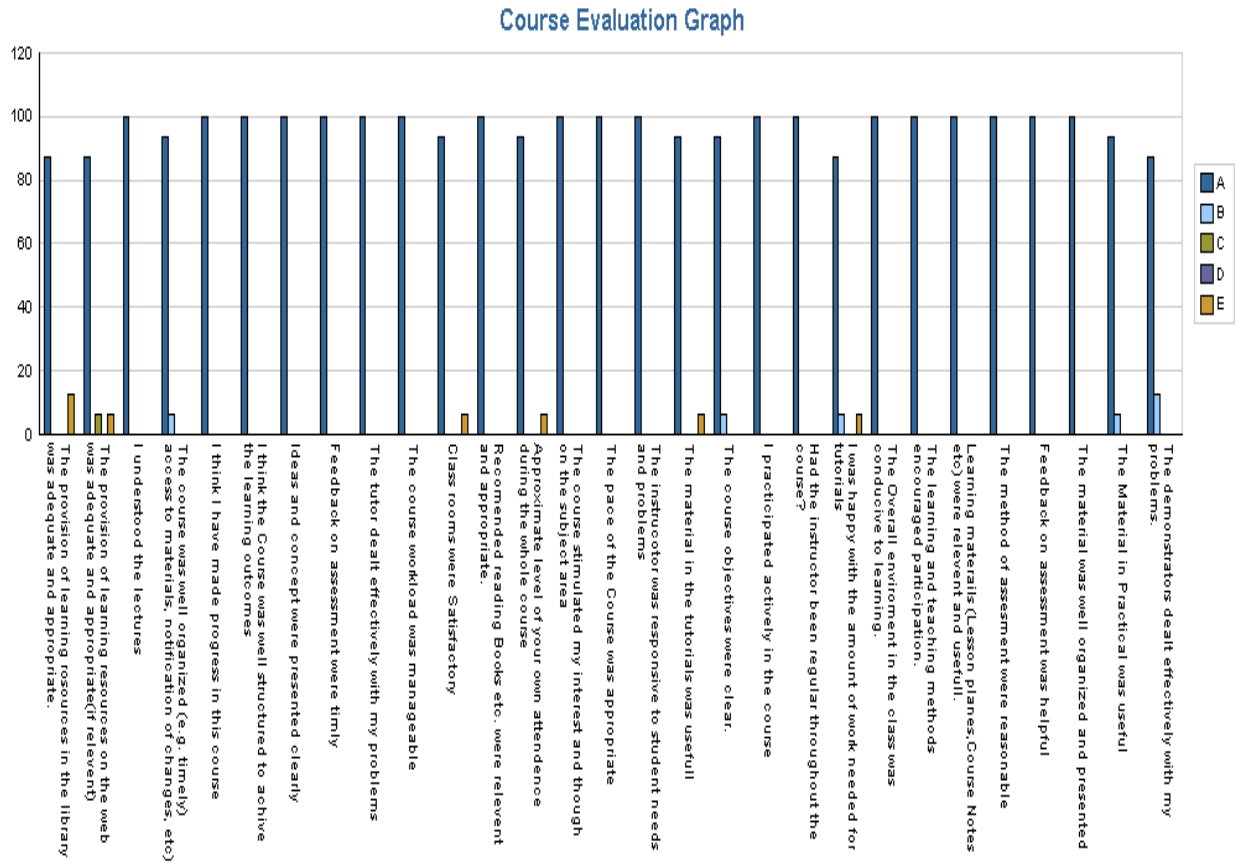


Figure: 4 the performance level for each Plant Pathology courses offered in Spring Semesters 2013 & 2014

PP-718: Teacher 1

Many students were strongly agreed with the statement that course objectives were clear and course work was manageable. Participation of the students was adequate.

Almost 65 % reported that they have made progress in this course. About 25 % disagreed regarding the provision of learning in the library was adequate.



Weaknesses:

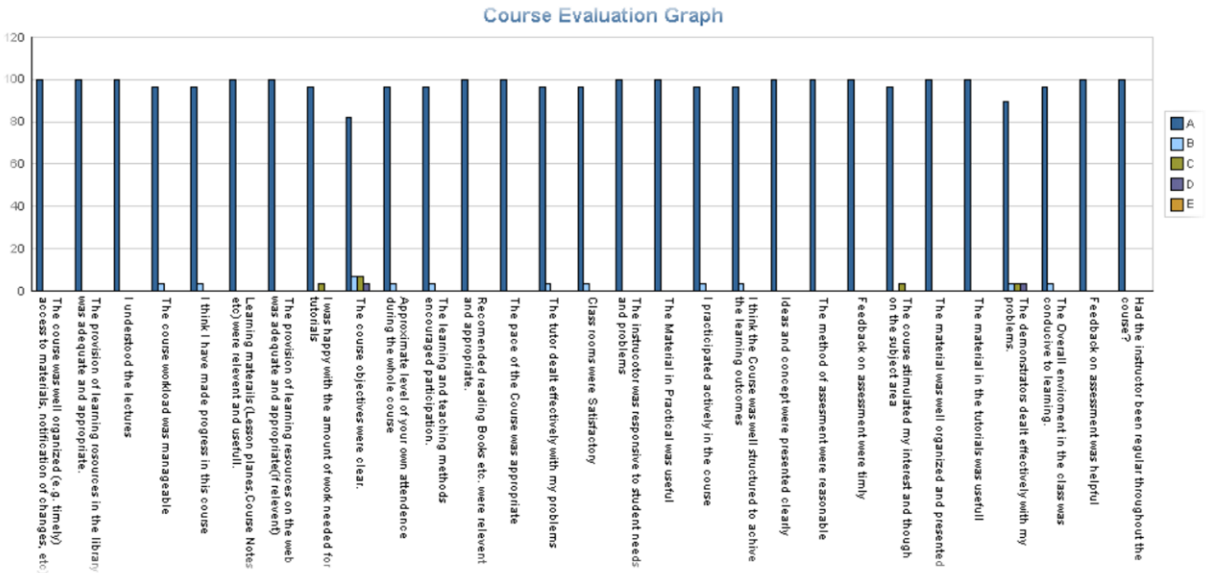
- Teacher should take the lecture by himself.
- Course can be improved by performing the practical.

Strengths:

- Course was informative.

Teacher 1 PP-708

Many students were strongly agreed with the statement that course objectives were clear and course work was manageable. Participation of the students was adequate. Almost 65 % reported that they have made progress in this course. About 25 % disagreed regarding the provision of learning in the library was adequate.



Weaknesses:

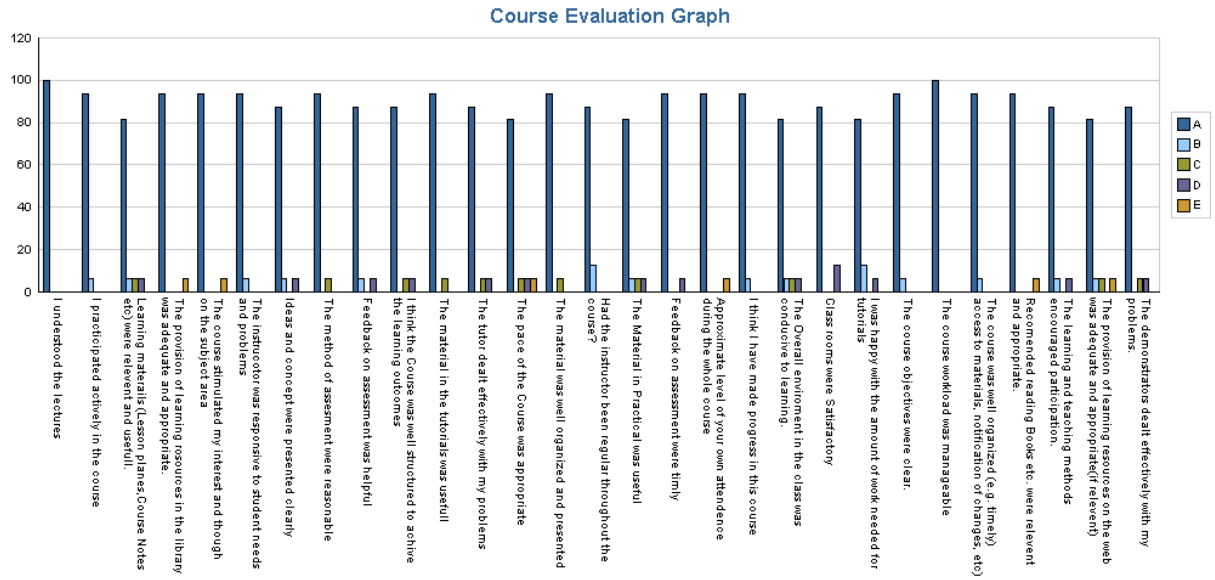
- Teacher should take the lecture by himself.
- Course can be improved by performing the practical.

Strengths:

- Course was informative.

Teacher 2 PP- 708

Many students were strongly agreed with the statement that course objectives were clear and course work was manageable. Participation of the students was adequate. Almost70- 85 % reported that they have made progress in this course. About 20 % disagreed regarding the provision of learning in the library was adequate.



Weaknesses:

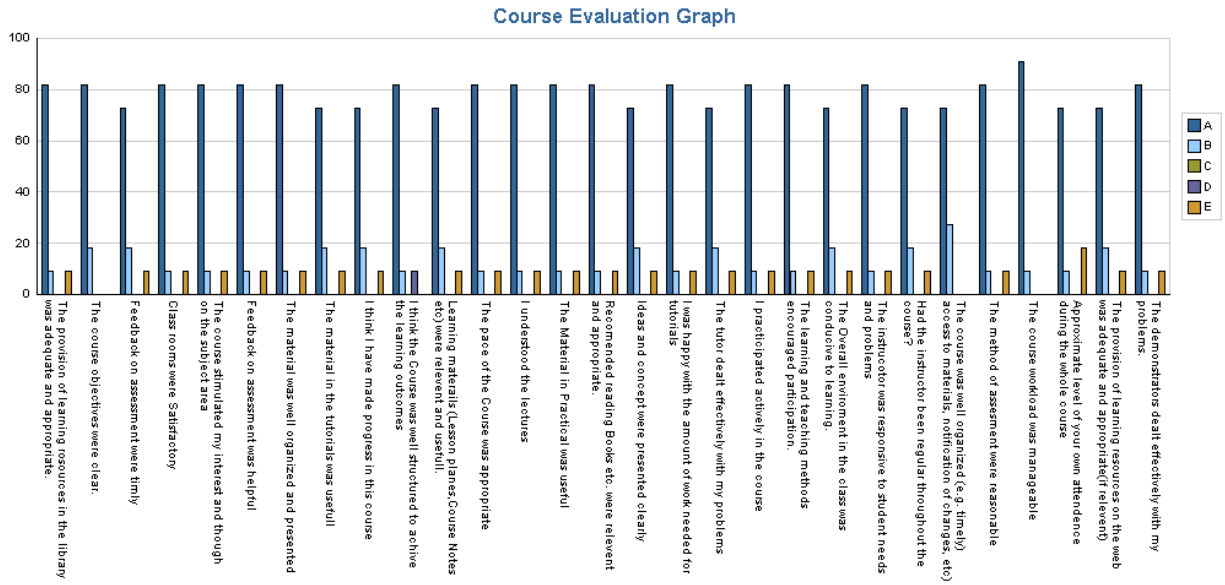
- Teacher should take the lecture by himself.
- Course can be improved by performing the practical.

Strengths:

- Course was informative.

Teacher 3 PP- 717

It is obvious from the graph that overall performance of the teacher was very good. Almost all respondents agreed that instructor was prepared for each class, demonstrates knowledge of the subject in a very good way and returns the graded scripts etc. in a reasonable time.



Weaknesses:

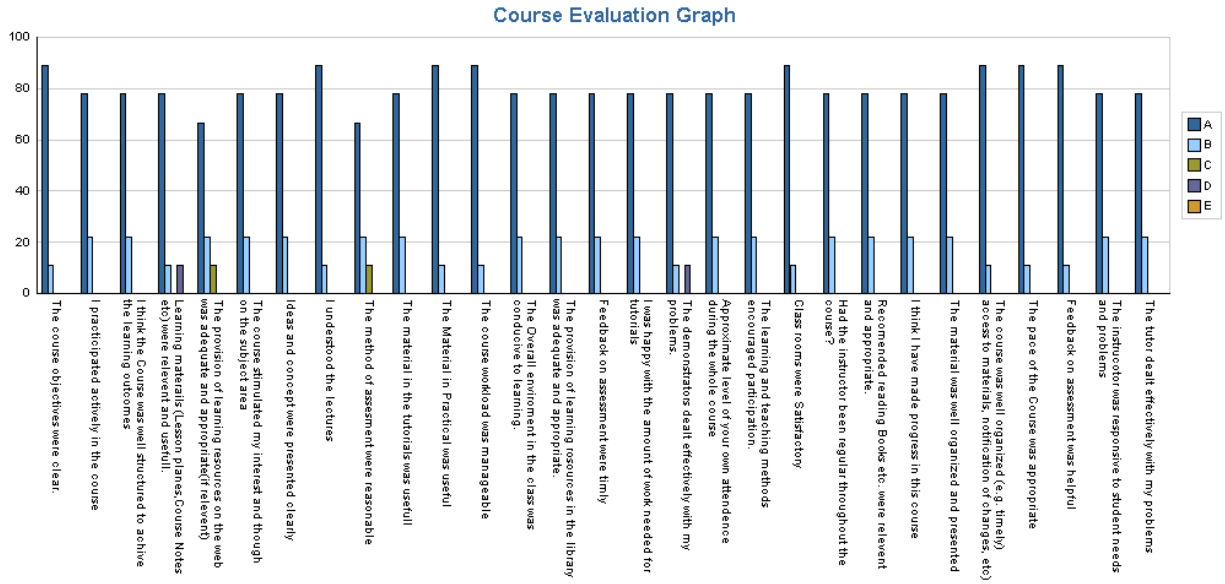
- Teacher should take the lecture by himself.
- Course can be improved by performing the practical.

Strengths:

Course was informative

Teacher 4 PP- 714

It can be envisaged from the graph that the overall performance of the instructor was good.Most of the indicators are categorized as strongly agreed and agreed by all the students.



Weaknesses:

- Teacher should encourage class participation.

Strengths:

- Teacher completed the course within time.
- Course was informative.

Alumni Survey Results

After M.Sc Hons Degree most of the students joined research institutes, public or private sector organization. Proforma 7 was sent to the heads organizations for their feedback about our graduates in their organizations. The overall results of program assessment by the Alumni are presented in Fig-5.

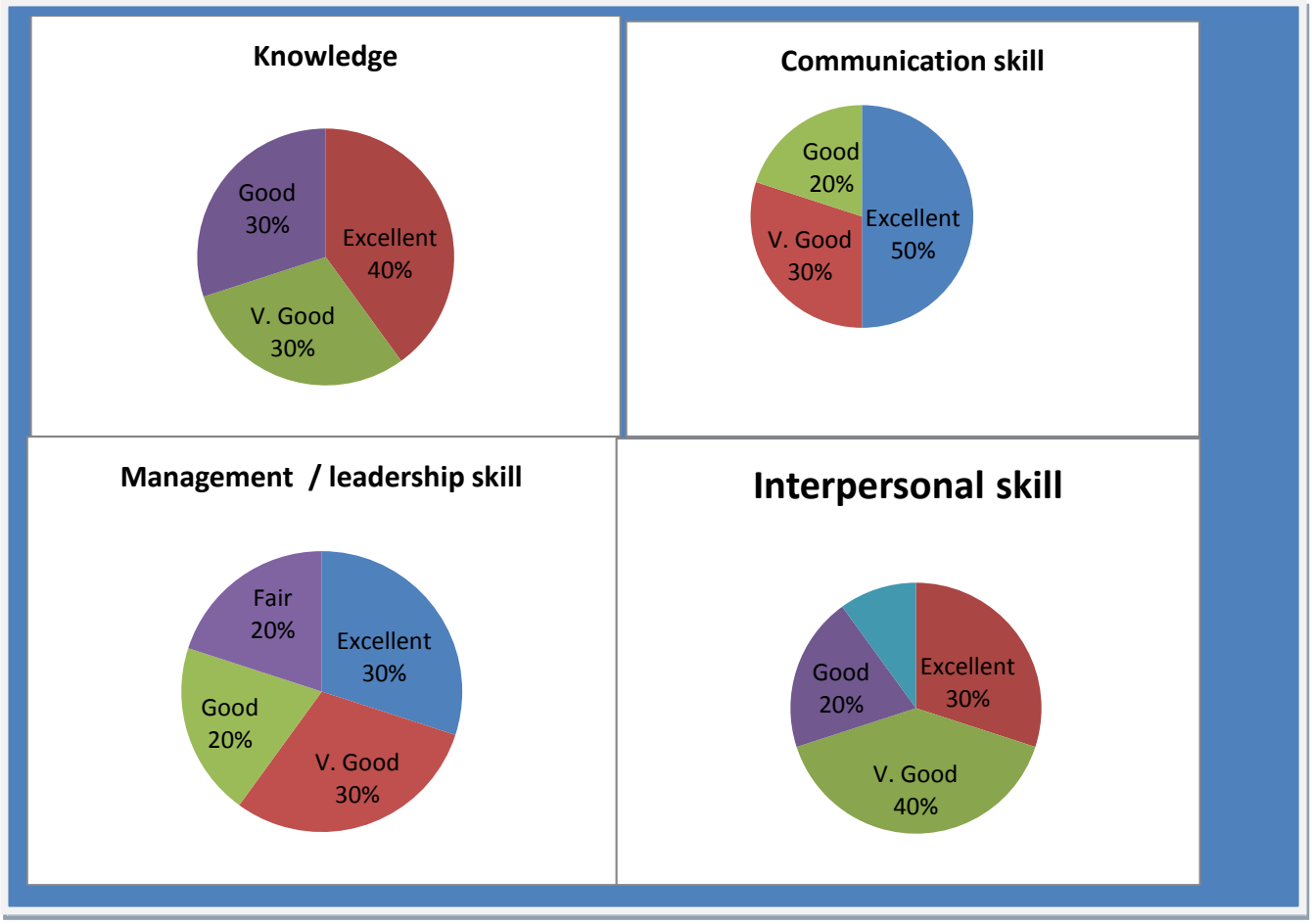


Fig.5 Results of the Alumni Survey Proforma

S.D = Strongly Disagree S.A = strongly agreed
A = Agreed D = Disagree U.C = Uncertain

Pie chart shows 35.56 % heads of the organizations strongly agreed whereas 30.89 % were agreed that the knowledge of the students was up todate. While about 26% were uncertain about the knowledge of the students. The chart regarding communications skills showed that 49.5 % of our students were excellent where as 30 % possessed good communication skill. Excellent interpersonal skill was shown by 31% students and 40.40 % were graded as very good. However, 10 % of our students were graded poor as for as interpersonal skill is concerned. It is evident from the pie chart that 600% of our students possess excellent and very good management/ leadership skills.

Skills and Capabilities Reflected in Performance as Plant Pathologists

Students are trained in a way that they develop ability to apply knowledge of plant pathology as professionals. They can exploit their confidence level and communication skills effectively in writing, discussion, use of modern tools, techniques and skills for their profession to formulate and design the experiments/ project and to work effectively in a team, to manage disease problems and exploittheir abilities to recognize future needs.

Survey of Graduating Students

According to the results of Performa 3 which was survey of graduating are given in Fig- 5. The graduating students in last semester were surveyed before the award of degree. More than 46 % students showed their satisfaction regarding all the parameters on average, whereas 24 % of the students surveyed were highly satisfied regarding all information asked. The results of graduating students are summarized and given in Fig. 6.

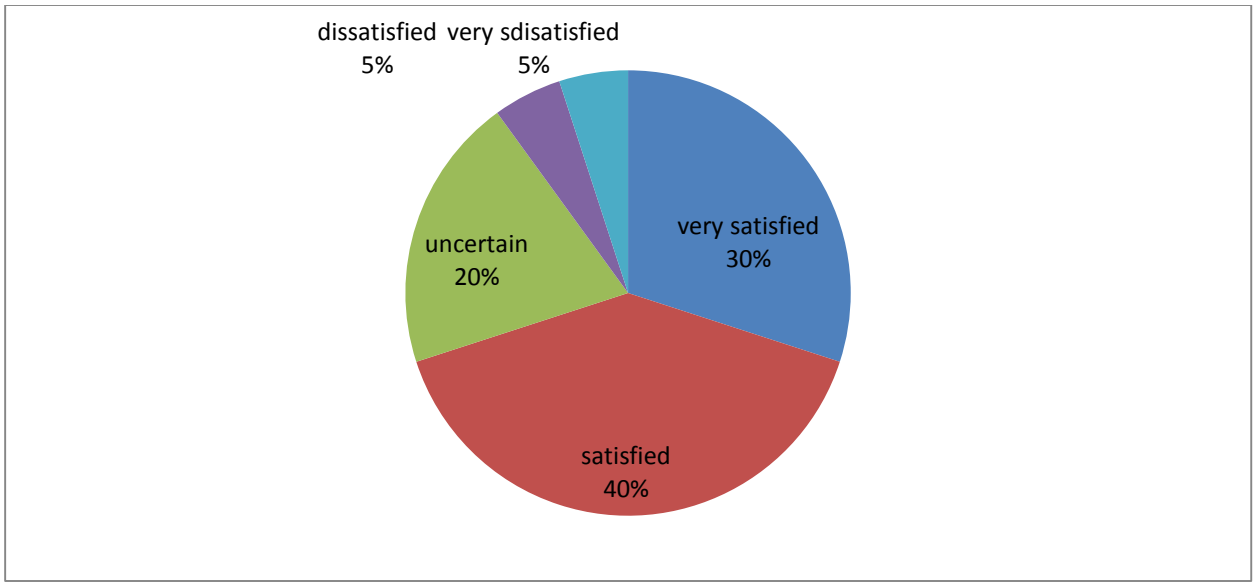


Fig. 6 Survey of Graduating Students Best Aspects of the Pogramme

1. Highly qualified faculty
2. Induction of national professors through the higher education commission
3. Helping attitude of the chairperson for all students in research and extra curricular activities
4. Timely advice
5. Phytodoctor forum

Weeknesses:

1. Laboratories are not well equipped and research facilities such as ELISA, PCR etc are not available
2. Lecture rooms are not enough to take classes and some times teachers have to take classes in the laboratory where research students are working (UV/ autoclave is on)

Affectivity of Internship Experience

The internship experience was found effective in enhancing, ability to work in team, independent thinking, appreciation of ethical values, professional development, time management skills, judgment and discipline Fig- 7.

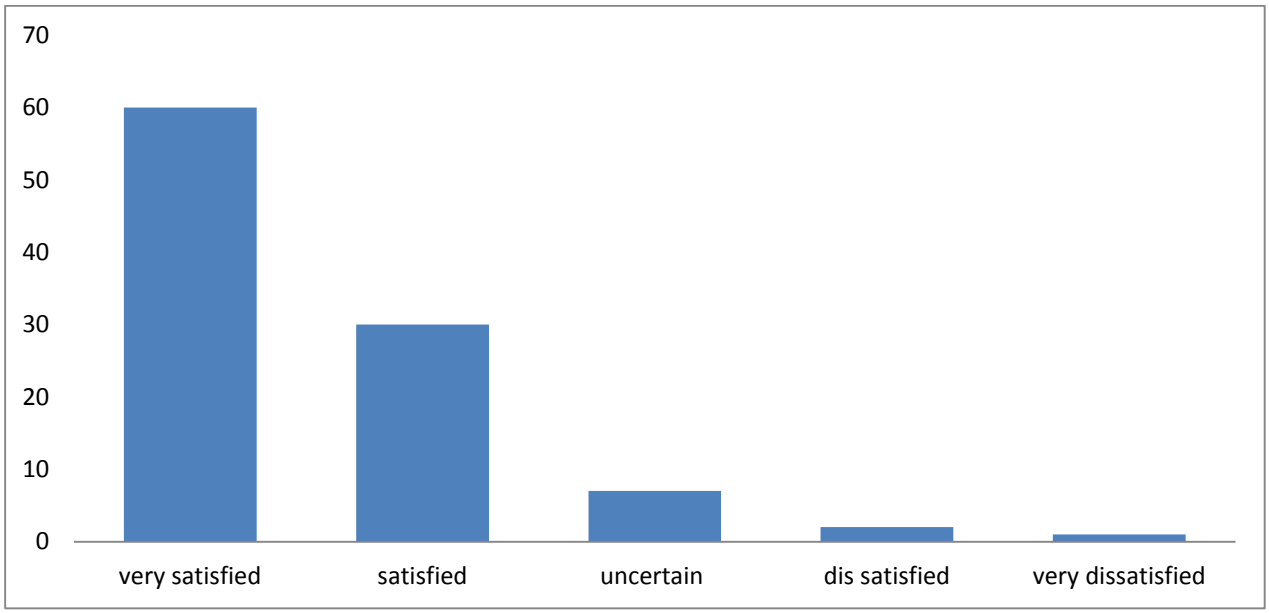


Fig. 7: Affectivity of Internship Experience

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

The main strength of the department is the availability of all expertise viz. Mycology, Bacteriology, Nematology, Virology, Epidemiology and Disease management, with full acquaintance of their respective subjects, having vast knowledge of local agriculture production systems and disease problems. Two of our faculty members did post doctorate from the world reknowned universities and equipped themselves with latest techniques in their respective fields of specialization. Most of the faculty members have local degrees and are experts in their fields. Their work has been published in national and international Journals (Annexure 11). They have also implemented national research projects and are highly conscious about the upcoming problems in the field of plant pathology. They are trying to highlight these problems through the surveye of the farmers fields so that the undergraduate students can pick up these problems in

their post graduate research. One National Professors namely Dr. S.M. Mughal and one subject specialist Dr. Kishwar Sultana from Higher Education Commission (HEC) specialized in their subjects were also contributing their best in the department (Table 5).

Weaknesses Identified in the Program

Advanced research is still handicapped due to lack of important equipment as ELISA Reader, plate washer, homogenizers, PCR equipment and ultracentrifuge also mentioned in the Latest literature and reviews are hardly available. There is a need for short term foreign training to young faculty members. Green-house and animal-house facilities are also lacking. Lecture rooms, common rooms, post-graduate laboratories, library and survey / field diagnostic aids are also lacking. The students' work indicates that there is some opportunity for improving communication skills and the focusing on the practical aspects.

This is the first assessment report; the department is looking forward to see the implementation of the measures.

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

Performance of the faculty members pertaining to research activities indicates that there are 252 research papers and 62 other publications and 12 projects in the credit of faculty members of the plant pathology department (Table-3).

Table 3 Present Performance Measures for Research Activities

Faculty	*Publications*	*Projects*
Dr. Abdul Rauf	10	3
Dr Inam ul Haq	03	3
Dr. Tariq Mukhtar	24	1
Dr. Abid Riaz	12	1
Mr. Usman Raja	04	0
Ms. Gulshan Irshad	08	0
Dr. Muhammad Ashfaq	12	1
Dr. Farah Naz	09	1
Total	**82**	**10**

Major Future Improvement Plans

- To impart quality education in Plant Pathology through audio visual aids and modern tools along with provision of latest literature, journals, books, reviews and access to internet.
- To extend facilities for plant disease diagnosis, herbarium, museum, culture bank and develop extension material.
- To prepare hand-outs, brochures and pamphlets for the farmers and advisory services
- To equip the post-graduate laboratories (Mycology, Nematology, Bacteriology and Virology) with the modern and sophisticated equipments stated above.
- Human Resource development in Plant Pathology to meet future challenges for sustainable agriculture leading to self sufficiency in food
- To emphasize problem oriented research on specific diseases prevalent in the arid ecology.
- Overall enhancement of knowledge and skills of faculty members in relation to the latest global advancements in this discipline through exchange programs, short training and collaborative research projects within and outside Pakistan.

Community Services Provided by the Department

The department is providing following community services:

- Advisory services to the farmers as and when desired.
- Advisory services to protected farming in tunnels.
- Advisory services on disease diagnosis and management to provincial agriculture department (local).
- Guidance and supervision of students of various departments.
- Supervision of students on internship in various organizations in the Punjab.

Evaluation of the Administrative Services Offered by the Department

- The department maintains a ratio of 4:1 for the academic (technical) and administrative non-technical staff which fulfils the standard set by the HEC (Table 6).
- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required. Generally two meetings of academic council are held per month. Board of studies of the department meets quarterly.

- Quick office disposal; no complaint pertaining to delay has ever received from authorities.
- Proper record of individual students, their theses etc. are maintained.

Students are reasonably happy about the administrative services provided by the department as shown from the graduating student's survey.

Table 4 Quantitative Assessment of the Department at undergraduate level (Last two years)

Sr. #	Particular	No.	Remarks
I	Undergraduates (B.Sc. Hons.) produced	34	95% of them joined M.Sc, 5% did not continue their education.
Ii	Students: Faculty ratio	12:1	
Iii	Technical : Non Technical ratio	4:1	
iV	Average grade point	3	Fulfils HEC criteria

The evaluation process indicated high efficiency of system and satisfactory impact of outcomes. Almost all the graduate and post graduates got jobs in various organizations (provincial department, universities, research organizations, banks and private firms).

Employer Survey

A survey was conducted to get the employer's point of view about the working of our former students in their organizations (Proforma 8). Feed back about 30 employees was obtained from organizations viz. National Agriculture Research Centre Islamabad (NARC), Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Federal Seed Certification Department, Islamabad, Bahaud Din Zakria University Multan and Department of Agricultural Extension Punjab. Their views are reflected in the graphically below. The major emphasis was to know the employers comments on the quality of education regarding: knowledge, communication skill, work skill and interpersonal skill these students have. Survey reflects that our graduates fall above average in all areas and their skill levels revealed more than 80% (Fig-8). This indicates that these graduates are adaptable in show their best potential in any given environment. Some employers gave general comments about some weaknesses in the practical workability. The employers in this survey however, appreciated the practical skills shown by some of our students.

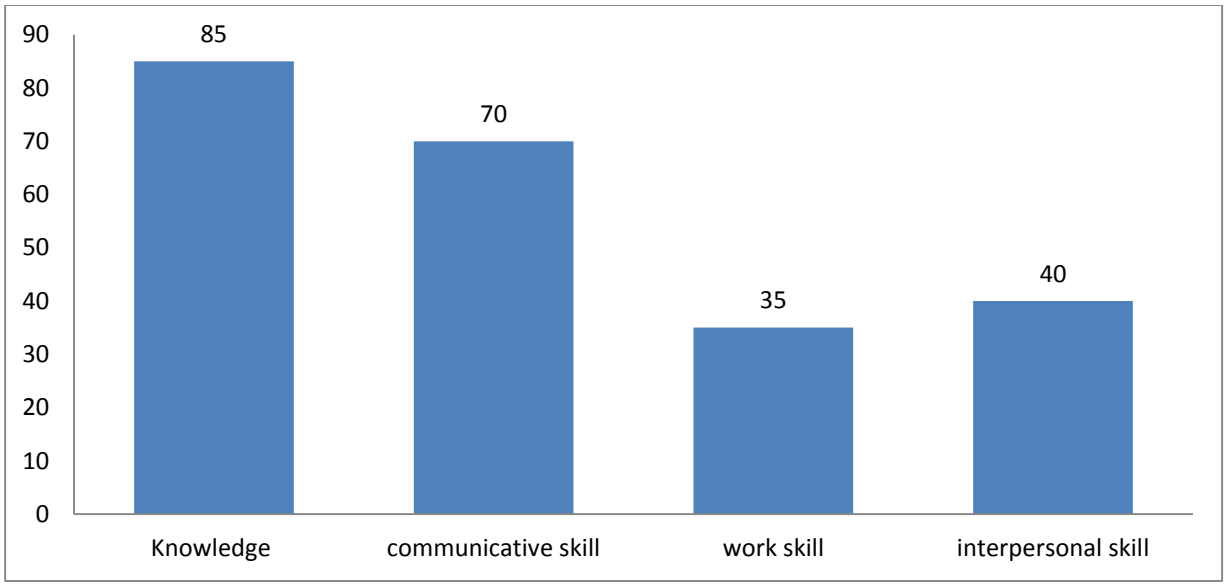


Fig. 8 Employer survey for the determination of students skill level PROFORMA 2

The Proforma pertains to the report of course review by the faculty members. These proformae were collected from each of the teachers who took undergraduate course in the assessment year. In the following pages soft copies sent by the teachers are reproduced as such.

Faculty Course Review Report

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

Department:	Plant Pathology		Faculty:	FC & FS	
Course Code:	PP- 717	Title:	Genetics of plant pathogens		
Session:	2012-203	Semester:	Autumn ■	Spring ☐	Summer ☐
Credit Value:	3(2-2)	Level:		Prerequisites:	
Name of Course Instructor:	Dr.Abid Riaz	No. of Students:18 Contact Hours:03	Lectures	Other (Please State)	
			Seminars		
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)		Midterm 12 marks (only theory) Final Theory 24 Practical 20 Assignment 04			

	Total: 60

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

Undergraduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	F	No Grade	Withdrawal	Total
No. of Students	18	17.3%	66.4%	17.7%	-		-		-	18

Overview/Evaluation (Course Co-coordinator's Comments)
Feedback: first summarize, and then comment on feedback received from:
(These boxes will expand as you type in your answer.)

4)Student (Course Evaluation) Questionnaires (Proforma-1) Informative course contains basicthings
2)External Examiners or Moderators (if any) --nil

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

4) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines Should be essential before taking pathology as major. Yes complies with HEC.

5) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives) 6)Effective method and should be continued

7) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports: Not received.

Faculty Course Review Report

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

Department:	Plant Pathology		Faculty:	FC & FS	
Course Code:	PP- 708	Title:	Advances in plant pathology		
Session:	2012-2013	Semester:	Autumn ■	Spring ☐	Summer ☐
Credit Value:	3(2-2)	Level:		Prerequisites:	
Name of Course Instructor:	Dr.Inam ul haq	No. of Students:40 Contact Hours:03	Lectures	Other (Please State)	
			Seminars		
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)		Midterm 12 marks (only theory) Final Theory 24 Practical 20 Assignment 04 Total: 60			

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

Undergraduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	F	No Grade	Withdrawal	Total
No. of Students	12	36.3%	52%	12%	-		-		-	12

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

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

1) Student (Course Evaluation) Questionnaires(Proforma-1)
   Informative course contains basicthings

2) External Examiners or Moderators (if any)

--Nil

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

--nil

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

Should be essential before taking pathology as major. Yes complies with HEC.

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

6)Effective method and should be continued

7) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports:
Not received.

Faculty Course Review Report

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

Department:	Plant Pathology		Faculty:	FC & FS	
Course Code:	PP- 714	Title:	Introduction to nematology		
Session:	2012-2013	Semester:	Autumn ☐	Spring ■	Summer ☐
Credit Value:	3(2-2)	Level:		Prerequisites:	
Name of Course Instructor:	Dr.Tariq Mukhtar	No. of Students:10 Contact Hours:03	Lectures	Other (Please State)	
			Seminars		
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)		Midterm 12 marks (only theory) Final Theory 24 Practical 20 Assignment 04 Total: 60			

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

Undergraduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	F	No Grade	Withdrawal	Total
No. of Students	10	30	50	20	-		-		-	10

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

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

a. Student (Course Evaluation) Questionnaires(Proforma-1) Informative course contains basicthings
b. External Examiners or Moderators (if any) --Nil

Faculty Course Review Report

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

Department:	Plant Pathology		Faculty:	FC & FS	
Course Code:	PP- 718	Title:	Introduction to nematology		
Session:	2012-2013	Semester:	Autumn ☐	Spring ■	Summer ☐
Credit Value:	3(2-2)	Level:		Prerequisites:	
Name of Course Instructor:	Dr.Ashfaq	No. of Students:4 Contact Hours:03	Lectures	Other (Please State)	
			Seminars		
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)		Midterm 12 marks (only theory) Final Theory 24 Practical 20 Assignment 04 Total: 60			

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

Undergraduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	F	No Grade	Withdrawal	Total
No. of Students	04	25	50	25	-		-		-	04

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

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

a. Student (Course Evaluation) Questionnaires(Proforma-1) Informative course contains basicthings
b. External Examiners or Moderators (if any) --Nil

Faculty Course Review Report

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

Department:	Plant Pathology		Faculty:	FC & FS	
Course Code:	PP- 7o8	Title:	Introduction to nematology		
Session:	2012-2013	Semester:	Autumn ☐	Spring ■	Summer ☐
Credit Value:	3(2-2)	Level:		Prerequisites:	
Name of Course Instructor:	Dr.Ashfaq	No. of Students:4 Contact Hours:03	Lectures	Other (Please State)	
			Seminars		
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)		Midterm 12 marks (only theory) Final Theory 24 Practical 20 Assignment 04 Total: 60			

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

Undergraduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	F	No Grade	Withdrawal	Total
No. of Students	04	-	100	-	-		-		-	04

Overview/Evaluation (Course Co-coordinator's Comments)
Feedback: first summarize, and then comment on feedback received from:
(These boxes will expand as you type in your answer.)

a. Student (Course Evaluation) Questionnaires(Proforma-1) Informative course contains basicthings
b. External Examiners or Moderators (if any) --Nil

Research student progress review

Thesis program both at master and Ph.D level offered biannually and usually initiation date start in month of September and March. Research is carried out usually in 3rd semester after the approval of synopsis. The feedback from research showed that students are mostly satisfied with facilities and supervision however few pointed out that more emphasis must be given on molecular side. Synopsis writ up and defence, comprehensive exam both oral and written is following university statutes and dates religiously. Mostly Ph. D students are on HEC scholarships or their research is funded through different research grants. Ph. D students given chance to demonstrate in bachelor classes which helpful for their grooming as future academicians or researchers. Almost every research student finishing his degree within stipulated time and adequate time and guidance given for manuscript writ up. Similarly, supervisor and their respective supervisory committee members also satisfied with their progress in research and is continuously monitored through lab meetings. Student feedback showed that students are both involved with laboratory and field research. Students are confident that after finishing their masters and Ph. D from department they can work independently and also contribute something positive to discipline of plant pathology.

Survey of department offering Ph.D Programms

Ph.D Program was started in Department of Plant pathology in year 2000 and successfully running since then. Latest issues of subject journals such as Pakistan journal of Botany, Pakistan journal of Phytopathology, Pakistan Journal of Nematology are available in laboratories. All labs have own university WiFi and all the students have laptops as well few desktops are also available in labs/offices. Department has 7 HEC approved supervisor who had ample experience in teaching and research. Eighteen students completed their Ph.Ds from department and currently twenty eight are enrolled. Out of 28, 9 are indigenous scholars while 8 are research associates. Since its inception department has completed research projects worth of 9.2 million rupees while projects of 57.132 Million Rupees are ongoing. Student ratio between applicants and acceptance for Ph.D. program is 90%. Only those candidates are accepted for Ph.D program who had completed 18 years of education with one year research. Ph.D program is based on both taught and research and maximum 5 years given to complete Ph.D. Students

are supposed to clear 5 courses along two seminars. There is entry test for Ph. D enrolment and students also appear for synopsis and thesis defence along Oral and written comprehensive. It is compulsory to publish paper from Ph. D research work. Three internationally renowned examiners evaluate Ph. D thesis and their name approved by department board of studies and later by director advance study and controller examination.

Strengths found in the programme

The department is having the faculty of all specialties regarding main components of plant pathology viz., Fungal plant pathology, Plant Bacteriology, Plant Nematology, Plant Virology, Plant Disease Epidemiology and Disease management, with full acquaintance of their respective subjects, having vast knowledge of local agriculture production systems and disease problems. Most of the faculty members did their post doctorate in recent past from the world renowned universities and equipped themselves with latest techniques in their respective fields of specialization. Most of the faculty members have local degrees and are experts in local field problems. Their work has been published in national and international Journals (Annexure 11). They have also implemented national research projects and are highly conscious about the upcoming problems in the field of plant pathology. They are trying to highlight these problems through the surveys of the farmers fields so that the undergraduate students can pick up these problems in their post graduate research. Induction (Interim placement by Higher Education Commission (HEC), Pakistan) of Assitant professor Dr. Mian Abdur Rehman Arif (Ph.D. from Germany) has further enhanced the performance of the department. Each of the major disciplines has an independent laboratory. Internet access to the faculty and the students has played important role in broadening their vision.

Weaknesses Identified in the Program

Although department is making progress in teaching, research and community services but advanced research is still handicapped due to lack of important equipment as PCR equipment, ELISA Reader, plate washer, homogenizers, and ultracentrifuge. Latest useful literature (full-text papers) and reviews are rarely available. There is a need for short term foreign training to young faculty members.. The students' work indicates that there is some room for improving communication skills and the focusing on the practical aspects. Green-house and animal-house facilities are also lacking. Lecture rooms, common rooms, post-graduate laboratories, library and survey / field diagnostic aids are also lacking.

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

Major Future Improvement Plans

- To equip the post-graduate laboratories (Mycology, Nematology, Bacteriology and Virology) with the modern and more sophisticated equipments.
- Human Resource development in Plant Pathology to meet future challenges for sustainable agriculture leading to self sufficiency in food.
- To impart quality education in Plant Pathology through audio visual aids and modern tools along with provision of latest literature, journals, books and reviews
- To extend facilities for plant disease diagnosis, herbarium, museum, culture bank and develop extension material.
- To prepare hand-outs, brochures and pamphlets for the farmers and advisory services
- Overall enhancement of knowledge and skills of faculty members in relation to the latest global advancements in this discipline through exchange programs, short training and collaborative research projects within and outside Pakistan.
- To emphasize problem oriented research on specific diseases prevalent in the arid areas of the country.

Community Services Provided by the Department

The department is providing following community services:

- Advisory services to the farmers as and when desired.
- Advisory services to protected farming in tunnels.
- Supervision of students on internship in various organizations in the Punjab.
- Advisory services on disease diagnosis and management to provincial agriculture department (local).
- Guidance and supervision of students of various departments.

Evaluation of the Administrative Services Offered by the Department

- The department maintains a ratio of 4:1 for the academic (technical) and administrative non-technical staff which fulfils the standard set by the HEC (Table 5).

- Administrative meetings (departmental, university, academic council, and syndicate) are attended as and when required. Generally two meetings of academic council are held per month. Board of studies of the department meets quarterly.
- Quick office disposal; no complaint pertaining to delay has ever received from authorities.
- Proper record of individual students, their theses etc. are maintained.

Students are happy about the administrative services provided by the department as shown from the graduating student's survey.

Table 5 Quantitative Assessment of the Department at undergraduate level (Last two years, 2012-2014)

Sr. #	Particular	No.	Remarks
I	Undergraduates (B.Sc. Hons.) produced	50	85% of them joined M.Sc, 5% did not continue their education.10% got jobs soon after the degree.
Ii	Students: Faculty ratio	10:1	
Iii	Technical : Non Technical ratio	4:1	
Iv	Average grade point	3	Fulfils HEC criteria

The evaluation process indicated high efficiency of system and satisfactory impact of outcomes. Almost all the graduates and post graduates got jobs in various organizations (provincial department, universities, research organizations, banks and private firms).

Criterion 2: CURRICULUM DESIGN AND ORGANIZATION

Degree Title: Ph.D

All the courses for degree program were developed by a committee constituted by the Higher Education Commission, Pakistan. The committee consisted of experts and learned professors, subject specialists from other universities and research organizations from Pakistan. When and if needed, curriculum for the Department of Plant Pathology is revised/updated through different bodies. At department level, Board of Studies, which comprised of senior faculty members, is responsible for updating the curriculum. This body is authorised to formulate syllabus and course content. The chairperson of the Department is the convener of this body. The courses are then sent to the Board of Faculty for approval. The Dean of the Faculty, who is also the Convener, conducts meeting. As per university rules courses after the approval from the Faculty Board, are placed before the University Academic Council for their approval.

Definition of credit hour

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

Degree plan

Ph.D degree program consists of minimum 3 academic years of 6 semester's duration**.**

Pre-requisites: minimum academic requirements

A candidates seeking admission to the courses for the degree of Doctor of philosophy in full and partial residence must:

a. Have passed the MSc (hons) degree or an equivalent examination in 1st division or 3.00/4.00 CGPA from a recognized institution in a field of study related to Subject, he desire to take up.
b. Meet all the requirements mentioned in these regulations.
c. The application of the candidates must be accompanised with a comprehensive Research proposal that he tntends to undertake.
d. Must have passed GAT (Subject) with 60%.

Examination and Weightage

a) Theory

In theory paper, students' evaluation is done by mid-term examination, assignments/ quizzes and final examination. Both the mid-term and final examinations are compulsory. A student who misses the mid-term examination is not allowed a make-up examination and is awarded zero marks in that examination. In case a student does not appear in the final examination of a course, he/she will be deemed to have failed in that course. In theory, weightage to each component of examination is as prescribed here under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

b) Practical

For practical examination (if applicable) 100% weightage is given to practical in final examination

Eligibility for Examination

A student is eligible to sit for the examination provided that he/she has attended not less than 75 % of the classes in theory and practical, separately. The minimum pass marks for each course are 40% for undergraduate.

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

Following table depicts that the curriculum of the plant pathology department is consistent with the program objectives.

Table 6 Courses versus Outcomes

Courses	Outcomes					
	1	**2**	**3**	**4**	**5**	**6**
PP-504, PP-506, PP-508, PP-510, PP-601, PP-603	+++	++	++	+++	+++	++
PP-502, PP-507, PP-509	++	+++	+++	++	++	+++
PP-605, PP-609	+++	+	++	+	++	+++
PP-401, PP-402, PP-501, PP-503, PP-505,	+	+++	+	++	+++	++

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

Assessment of the Plant Pathology Curriculum

The assessment of curriculum (the courses) has been done and every course is cross tabulated according to the program outcomes.

- The curriculum has been adopted from HEC, Pakistan with little modifications duly recommended by academic bodies of the university and fits very well and satisfies the core requirements for the program, as specified by the respective accreditation body.
- The curriculum satisfied the general arts and professional and other disciplines required for the program according to demands and requirements set by the Higher Education Commission of Pakistan.

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

The table-7 indicates courses that play vital role in building theoretical background, problem analysis and solution design.

Table 7: Detail of courses representing theoretical background, problem analysis and solution design.

Elements	Courses	Title of the Courses
Theoretical background	PP-401	Introduction to Plant Pathogens
	PP-402	Introduction to Plant Pathology
	PP-501	Introductory Mycology
	PP-503	Introductory Plant Nematology
	PP-505	Introduction to Prokaryotes
	PP-507	Introduction to Plant Viruses
	PP-502	Introduction to Molecular Plant Pathology
	PP-601	Principles and Methods of Plant Disease Management
Problem analysis	PP-504	Diseases of Field Crops
	PP-506	Diseases of Horticultural crops
	PP-603	Range and Forest Pathology
	PP-605	Seed and Post Harvest Pathology
Soluti on desig	PP-508	Clinical Plant Pathology
	PP-509	Beneficial Microorganisms
	PP-510	Plant Resistance to Diseases

	PP-609	Project Planning and Scientific Writing
	PP-602	Internship Including Report writing and Presentation

Standard 2-6: Information technology component of the curriculum must be integrated throughout the program

After the recommendation of National curriculum committee and subsequent approval of university academic bodies all aspects of information technology were considered and after a critical analysis, relevant aspects were integrated into the program as:

- Three computer and I.T. courses (6 credit hours) and two courses of statistics (6 credit hours) based on computer practical usage were included in the curriculum to fulfill the I.T. requirements for the students of B.Sc (Hons) Agric. degree.
- Internet facilities have been made available to the students at the campus and in hostels round the clock.

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

- A course of 2 credit hours developing communication skills has been integrated in the curriculum of B.Sc. (Hons) Agriculture level.
- Assignments are essential part of the course and are given to B.Sc. (Hons) Agric. students on specific titles which are presented orally and are submitted as written report, to increase their oral and written communication skills.

• Criterion 3: Laboratories and Computing Facilities

For undergraduate classes there is only one laboratory in the department. The facilities and shortcomings of this laboratory are listed as under.

a. **Laboratory Title**: General Laboratory

- **Location and Area**: Faculty of Agriculture and Food Sciences, B-Block, 2nd Floor, Main Campus
- **Objectives:** Used for practical exercise and demonstrations to under-graduate students in their major courses.
- **Facilities:** Almost all the facilities are shared with post graduate laboratories.
- **Shortcoming:** Laboratory (including postgraduate laboratories) is not spacious and provided with inadequate facilities for general classes. Being on the top floor a lot of expensive material goes in vain because of contamination and high temperature as no cooling units are installed in laboratories. The standard requirements in view of equipment, chemicals and other resources are also not enough. Major apparatus *viz*. microscopes, autoclave, incubator, deep freezer, refrigerators, laminar flow cabinet, pH meter, electric balance, slide and overhead projectors, shaker, pipettes are available but when become out of order, there is no in time /quick maintenance system.
- **Safety Regulations**: The department is located on the 2nd floor; there are no emergency exits for the labs. No fire extinguishers have been installed in any laboratory. No first aid kits / facilities for minor hazards and accidents/injuries are provided in the laboratories/department.

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

Laboratory manuals for each subject (Mycology, Nematology, Virology, Bacteriology, disease diagnosis and diseases management) are now available.

In nutshell there are no proper safety arrangements and no security plan is available in case of emergency. The laboratories are not spacious and inadequate. Equipments regarding molecular

approaches are lacking e.g. Stereoscope, centrifuge, PAG-Electrophoresis apparatus, H.P.L.C.& relevant software, chemicals and biochemicals P.C.R and Spectrophotometer etc.

Standard-3.2: There must be s
upport personal for instruction and maintaining the laboratories.

Currently department is having three laboratory attendants and one laboratory assistant. They do not have the relevant knowledge. Repairing of equipments involves a lot of money. Therefore, there is a dire need of appointing a skilled technician and if one is there at the campus, he should be given training for handling specialized equipments intermittently.

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

- **Computing facilities support*:*** Available to some faculty members.
- **Shortcoming in computing infrastructure:** Computers with internet facilities should be available to all faculty members.

• Criterion 4: Student Support and Advising

Our University organizes support programs for students and provide information regarding admission, scholarship schemes etc. Department in its own capacity arranges orientation and guided tours of the department. Director Students Affairs is also there and arranges various cultural activities and solves the students' problems. However, currently there is no Parent/Teacher association.

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

- Courses are taught as per criteria of HEC.
- At undergraduate level subjects/courses are offered as per scheme of study provided by the HEC and approved by Academic Council.
- Elective courses are offered as per policy of HEC and the University.

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

Both theoretical and field/practical aspects are focused to prepare the students for field challenges. Theoretical problems are explained and assignments are also given to the students whereas, practical are carried out in the labs and filed. Field visits and study tours to various research organizations are also organized to keep them updated on the latest developments in the area and to stimulate them for discussion through teacher/student interaction.

- Courses are structured and decided in the board of studies meeting.
- At commencement of each semester, faculty members interact frequently among themselves and with students. Students are welcome to ask questions in class and even after the class.
- Emphasis is always given for an effective interaction between each section of B.Sc. (Hons) classes.

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

Several steps have been taken to provide guidance to students by different ways such as:

- Students are informed about the program requirement through the chairman office.
- Through the personal communication of the teachers with the students.
- Intermittent meetings are organized by the head of the department for counseling of the students. In addition, students can also contact with the relevant teachers whenever they face any problem.
- In case of some problem, Director Student Affairs appointed by the university helps the students. Tutorial System in all departments has also been introduced. Two periods on Thursday are reserved for extracurricular activities. Due to great significance, students must be motivated to participate in such activities. However, there is no such counseling cell in the department.
- Student can interact with the teachers/scientist in universities or research organization whenever they need and there is an open option for the students to get the membership in the professional societies like Pakistan Phytopathological Society, Mycology and Plant Pathology Society, Pakistan Society of Nematologists, Pakistan Botanical Society and other relevant professional societies.

• Criterion 5: Process Control

It includes students' admission, registration and 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.

- The process of admission is well established and is followed under the relevant rules and criteria set by HEC. For this purpose an advertisement is published in the National News Papers by the Registrar Office.
- Admission criteria for B.Sc. (Hons) Agri. are F.Sc. pre medical or pre engineering with minimum of second division.
- Admission criteria are revised every year before the announcement of admission.

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.

- The student name, after completion of the admission process, is forwarded to the Registrar Office for proper registration in the specific program and the registration number is issued to the student.
- After the 4^{th} semester students are allotted different majors (e.g. Plant Pathology, Entomology etc.) by the Dean Faculty of Crop and Food Sciences.
- Students are evaluated through Mid, Final and Practical exams and through assignments.
- Registration is done for one time for each degree but evaluation is done through the result of each semester. Only those students, who fulfill the criteria of the University, are promoted to the next semester.
- In general, the students are registered on competition bases keeping in view their academic standings.

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.

Recruitment policy followed by the University is the same as recommended by the HEC. Induction of all posts is done as per rule.

- Vacant and newly created positions are advertised in the national newspapers, applications are received by the Registrar office, scrutinized by the scrutiny committee, and call letters are issued to the short-listed candidates on the basis of experience, qualification, publications and other qualities/activities as determined 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 structure is quite attractive.
- HEC also supports appointment of highly qualified members as foreign faculty Professors, National Professors and deputes them in concerned 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 provide high quality teaching, department periodically revises the curriculum in views of field requirements, innovations and new technology.
- With the emergence of new fields, new courses are introduced and included in the curriculum.
- Students usually buy cheap Asian editions of technology books. These are also available in the University library, where documentation, copying and internet facilities are available.

- Notes are also prepared by the teachers and given to the students.
- Most of the lectures are supplemented by overheads, slides and pictures. Department has also one multimedia which remains in use by the faculty for delivery of lectures/ demonstrations.
- All efforts are made that 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 graduates have completed the requirements of the program must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.

The controller of examinations announces the date regarding commencement of examination. After each semester, the controller office notifies results of the students. The evaluation procedure consists of quizzes, mid and final examinations, practicals, assignments, reports, oral and technical presentations. The minimum pass marks for each course is 40% for undergraduate in theory and practical, separately.

- In theory, weightage to each component of examination is as prescribed here under:

Mid Examination	30%
Assignments	10%
Final Examination	60%

- Grade points are as follows

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

- Gold, Silver and bronze medals are awarded to the students who secure highest marks on overall degree basis i.e., our students has to compete with students of other majors. Degrees are awarded to the students on the convocation that is held every year.

• Criterion 6: Faculty

Standard 6-1: There must be enough full time faculties 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.

At present there are two professors, two associate professors; four assistant professors (one on ex-Pakistan leave) and one lecturer are working in the programme. Except two all are having Ph.D. degree. Both (one assistant professor and one lecturer) are pursuing for Ph.D. Most of the Faculty having Ph.D. has done post doctorate studies in recent past. Their field of specialization is mycology, plant virology, phyto nematology and plant bacteriology (Table 8).

Table 8 Faculty Distribution by Program Areas in Plant Pathology

Program area of specialization	Courses in the area at undergraduate level and average number of sections per year	Number of faculty members in each area	Number of faculty with Ph.D. degree
General Plant Pathology	20	-	-
Mycology	02	04	03
Plant Virology	01	01	01
Phyto nematology	01	01	01
Plant Bacteriology	01	02	01
Others	03	-	-
Total	28	08	6

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

- Professional training and availability of adequate research and academic facilities are provided to the faculty members according to the available resources.

- In recent past, 04 faculty members did post doctoral fellowship sponsored by the HEC where as one member is doing his Ph.D. in UK.
- Incentives in the form of allowances to theses supervisors have been given to promote high standard research.
- Existing facilities include mainly internet access, which is available through local area network. In addition library facility with latest books is also available.
- A university-funded program of research projects is providing financial support to the young faculty members.
- Support for attending conferences can lead to enhancement of research initiatives at the university as presently no financial support for attending inland seminars/ conferences is available.

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

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

Results of faculty survey employing Proforma 5 were summarized and are depicted in Fig.9 and table 8. Their satisfaction level upon the querries pertaining in proforma 5 revealed that all the teachers were found satisfied over most of the parameters. However, they had concern that the laboratory conditions should be improved, level of monitoring, and cooperation with colleagues and of teachers also need to be addressed.

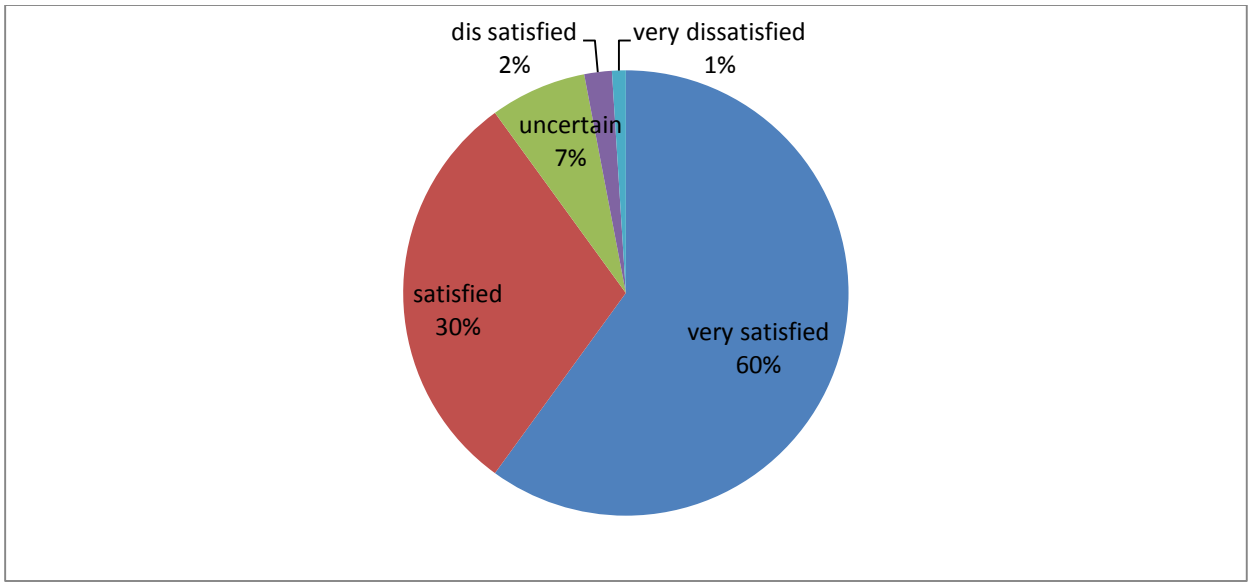


Fig 9 Faculty Survey as per parameters mentioned in proforma 5, conducted in April, 2012

Table 08 Results of Faculty Survey

S #	Parameter	Dr. Abdul Rauf	Dr. Tariq Mukhtar	Dr.M.Inam-ul-Haq	Dr. Abid Riaz	Dr. M. Ashfaq	Dr. Farah Naz	Ms. Gulshan Irshad
1	Your mix of research, teaching and community service	B	A	A	B	A	B	B
2	The intellectual stimulation of your work	B	A	A	A	A	A	A
3	Type of teaching/research you currently do.	B	B	B	A	A	A	B
4	Your interaction with students	B	B	B	A	A	A	A
5	Cooperation you received from colleagues	A	A	B	B	B	B	A
6	The mentoring available to you	B	A	B	B	B	B	B
7	Administrative support from the department	B	B	B	A	B	A	A
8	Providing clarity about the faculty promotion process	B	A	B	B	B	B	A
9	Your prospects for advancement and progress through ranks	B	B	A	C	B	B	B
10	Salary and compensation packages	A	B	B	A	B	A	A
11	Job security and stability at the department	A	B	A	A	B	A	A
1	Amount of time you have for	B	B	A	A	B	C	C

2	yourself and family							
13	The overall climate at the department	B	A	B	B	B	A	A
14	Whether the department is utilizing your experience and knowledge	B	A	B	A	A	A	A
15	what are the best programs/ factor currently available in your department that enhance your motivation and job satisfaction.	cooperation of the colleagues and the staff	Applied knowledge	Descipline at the campus	knowledge friendly environment	Working environment	Friendly environment	Working, and friendly environment
16	Suggest programs/factors that could improves your motivation and job satisfaction	High profile research & teaching collaboration at international level	--	--	In time advancement through ranks	--	Budget for the practical of major and general classes should be increased	Provide extra lab facilities for better performance.

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

• Criterion 7: Institutional Facilities

Among the institutional facilities, the institution must have the amenities to support new trends in learning such as library, e-learning including digital publications, journals etc.

- The library must possess an up-to-date technical collection relevant to the program and must be adequately staffed with professional personnels. Insufficient library's technical collection of books with increasing number of the students the recommended books and research journals of the programs are not enough for the students.
- These aspects need to be strengthened in number and space.
- Well equipped class rooms and offices must be adequate to enable faculty to carry out their responsibilities**.**

Standard wise description of this criterion is given a under

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

Department is benefitting fully from HEC National Digital Library's e-resources of superior quality peer-reviewed, full text, academic and research material in the shape of e-journals as well as e-books. Our faculty has the access to Springer Link, Project MUSE, Cambridge Uni. Press, Science Online, Wiley, Interscience, IEEE, JSTOR, Ebrary, McGraw Hill Professional, ISI Web of Science, Science Direct and Emerald.

This is very helpful for the high quality education and producing research of international standard. They also have access to the internet. However the department has the following shortcomings/problems:

- Majority of the faculty members do not have access to the PCs. Ones who have some they have their own computer and are not provided by the university.
- The internet services provided by the university are very poor. The speed of internet is slow and often internet does not work. The intercom is connected with the internet and the services are often breached.
- Breach of power intermittently, due to which research and academic work both are suffered.
- Latest and modern molecular equipments or apparatus are lacking.

- Untrained supporting staff.
- Faculties lack practical knowledge of modern and molecular techniques.
- Minor electronic faults are not properly and timely removed.

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.

Recent Extension in its space, increasing no. of books and other facilities, University Central Library has more worth than before. It has limited number of books, international journals and periodicals. It's a medium-sized library in term of space and facilities with no catalogue systems. However, department itself owns few books in its library.

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 also some facilities are lacking. Multimedia is now available but due to unavailability of the lecture room, it has no fix place and is kept moving from one place to another thus some times become problematic Practical lab. space is also lacking. This affects the quality of teaching. The faculty offices are another serious problem of the department. Some faculty members are sharing small rooms and the other are having their desks in the laboratories.

• Criterion 8: Institutional Support

The university administration has been struggling hard to strengthen all the departments, upgrade them and establish new faculties and Institutes. The university is also trying to attract highly qualified faculty.

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.

- At present department is having a very meager financial resource from university main budget to maintain the present needs of the department. Individual research grants for students and faculty are mainly supporting the departmental research activities. Senior faculty members have research projects supporting the needs of the department partially. There is a dire need for increasing the financial resources allocated to the department to establish a departmental library, laboratories and computer facilities. Suggestions and factors that can contribute to the motivation of the faculty are given as follows:
- Research grants for young faculty members may be allocated.
- Foreign trainings should be arranged for the faculty members.
- Department's share from university budget should be increased.

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

The intake of B.Sc. (Hons) students is once in a year. A strict merit policy is applied during admission. Option to take the major subjects in third year (5^{th} Semester) is provided to the students. Preference of the subject of choice is taken from every student. Generally around 20 students opt for Plant Pathology major as per decision take by the Dean office based on merit cum choice.

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

Total budget of the department in 2007-08 was just Rs 32,000/- Rs., which was amplified upto 4,20,000/- Rs. in 2009-10. Which has improved the financial condition of the department and the department can now purchase the equipments and chemicals for laboratories which are used for conducting the practical. Some books are also purchased for the department library.

Conclusion:

Unfortunately, some aspects of institutional support are very weak such as;

- Unavailability of class rooms, classes are taken in the labs.
- Faculty offices are inadequate and therefore, two teachers (in some cases) have one office room.
- Space limitation is the major constraint in the development and strengthening of discipline.
- The department at present avails all the human resources assigned with the addition of one interim placement. Moreover, the up gradation of existing teaching cadre also provided and added advantage in retaining the present faculty.
- Insufficient technical staff and office equipment are among major constraints.

SUMMARY AND CONCLUSIONS

There were 18 scholars who completed Ph. D from Plant Pathology department and there are around 25 students who are currently enrolled which is huge success as department offered Ph. D degree in year 1999. Though, major focus area is Pothowar but students are also encouraged to work on upcoming pathological challenges. Ph. D students selected according to criteria set by HEC and University. Students are supposed to went through taught courses, seminars, special problems on latest development in discipline. Students are also engaged in lab and teaching activities to groom them future independent scientists and academicians. Student research is either supported through projects won by faculty or scholarship won by them and there are hardly few students whose research not externally funded.

Department allocates courses and students after discussion in department board of studies keeping in mind students interest and background in research. Department also remain in touch with University directorate of advance study and research, director quality control and also with respective dean office for the title, synopsis, defence. As most of students have basic knowledge of plant pathology subject therefore advance courses in molecular research offered which also attract students of other disciplines. All the courses are orchestrated according to HEC curriculum. The results of these measures are excellent as students gave more than 90% marks to different teachers which are huge achievement as these are Ph.D. students. Not only teachers are highly rated by students but they also think environment is conducive for research as well. Students are not only satisfied with style of teaching but with content of course as they gave excellent marks to contents and find them updated. However, students pointed out that labs and other activities must be conducted and monitored by teacher himself.

The basic purpose of Ph.D. is to prime young mind to take independent decisions is achieved as the organizations where they are currently working are completely satisfied with their performances. Post graduates students are also satisfied with their practical and theoretical knowledge in the department. However, students are pointing out that facilities about latest molecular techniques must be improved there should be more PCR, ELISA tests must be performed to underpin the molecular nature problem. Ph.D. supervisors are HEC approved with papers in good impact factor and encouraged students to publish paper in good journals during degree.

There are certain pitfalls as department doesn't has glass house to perform practical *in vivo* in control conditions which sometime not only effect result but also time as wasted. There must be more emphasis on the incorporation new innovative research.

Conclusions:

Performance of the department may be further improved through following steps.

1. For the departmental library allocation of sufficient funds will be helpful in subscription of reputed journals and purchase of recent books that will ultimately boost quality of learning, teaching and research.
2. Existing number of class rooms are not sufficient. Available rooms need improvement to provide Conducive environment for student's learning.
3. Laboratories not need new equipments but the old one should be repaired.so that the graduate and postgraduate students may carry out their research without any difficulty. Recently the department has been granted a project strengthening of the program. It is hoped that the department will be able to provide more facilities to the graduate and post graduate students.
4. There is also a need to improve level of cooperation among the faculty members as well as students for better results.
5. Faculty members have pointed out that salaries and compensation may be improved for more satisfactory job performance.
6. There is also a need to improve mix of research and teaching proportion to produce professionally sound graduates.
7. At present there is no arrangement for professional and behavioral training of the supporting staff. Such sort of training will improve their utility in carrying out research and teaching quality.
8. Survey has also pointed out a shortage of personal computers and slow speed of internet. Improvement in this area will also boost the level of research and teaching.
9. For the departmental library allocation of sufficient funds will be helpful in subscription of reputed journals and purchase of recent books that will ultimately boost quality of learning, teaching and research.

10. The survey also revealed that two of the faculty members are sent abroad for professional trainings through HEC, which hasenabled them to carryout research on molecular aspects of plant pathology. HEC is requested to arrange this type of foreign trainings for the rest of the faculty members, so that they can arm themselves with the new and advanced techniques which may be helpful for improving skills, broadening vision and combating the plant diseases.

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					

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

Proforma 2

Faculty Course Review Report

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

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

Department:			Faculty:		
Course Code:		Title:			
Session:		Semester:	Autumn ☐	Spring ☐	Summer ☐
Credit Value:		Level:		Prerequisites:	
Name of Course Instructor:		No. of Students Contact Hours	Lectures	Other (Please State)	
			Seminars		
Assessment Methods: give precise details (no & length of assignments, exams, weightings etc)					

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

Undergraduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	F	No Grade	Withdrawal	Total
No. of Students										
Post-Graduate	Originally Registered	%Grade A	%Grade B	%Grade C	D	E	No Grade		Withdrawal	Total
No. of Students										

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

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

1) Student (Course Evaluation) Questionnaires

2) External Examiners or Moderators (if any)

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

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

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

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

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

Name: _____ Date: _____ *(Course Instructor)* Name: _____ Date: _____ *(Head of Department)*

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.

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

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: _____

Proforma 6

SURVEY OF DEPARTMENT OFFERING Ph.D. PROGRAMS

The following information is required for EACH Department in which a Ph.D. program is offered.

1	**General Information:**	
1.1	Name of Department	
1.2	Name of Faculty	
1.3	Date of initiation of Ph.D. program	
1.4	Total number of academic journals subscribed in area relevant to Ph.D. program.	
1.5	Number of Computers available per Ph.D. student	
1.6	Total Internet Bandwidth available to all the students in the Department.	
2	**Faculty Resources:**	
2.1	Number of faculty members holding Ph.D. degree in the department.	
2.2	Number of HEC approved Ph.D. Advisors in the department.	
3	**Research Output:**	
3.1	Total number of articles published last year in International Academic Journals that are authored by faculty members and students in the department.	
3.2	Total number of articles published last year in Asian Academic Journals that are authored by faculty members and students in the department.	
3.3	Total number of ongoing research projects in the department funded by different organizations	
3.4	Number of post-graduate students in the department holding scholarships/fellowships.	
3.5	Total Research Funds available to the Department from all sources.	
3.6	Number of active international linkages involving exchange of researchers/students/faculty etc. (Attach Details).	

4	**Student Information:**	
4.1	Number of Ph.D. degrees conferred to date to students from the Department during the past three academic years.	
4.2	Number of Ph.D. students currently enrolled in the department.	
4.3	Ratio of number of students accepted to total number of applicants for Ph.D. Program.	
5	**Program Information**	
5.1	Entrance requirements into Ph.D. Program (M.Sc. / M.Phil.) Indicate subjects or M.Sc. / M.Phil.	
5.2	Is your Ph.D. program based on research only? (Y/N)	
5.3	Maximum number of years in which a Ph.D. degree has to be completed after initial date of enrollment in Ph.D. program.	
5.4	Total number of post M.Sc. (16 year equivalent) courses required for Ph.D.	
5.5	Total number of M.Phil. level courses taught on average in a Term / Semester.	
5.6	Total number of Ph.D. level courses taught on average in a Term / Semester.	
5.7	Do your students have to take/write:	
	a. Ph.D. Qualifying examination (Y/N)	
	b. Comprehensive examination (Y/N)	
	c. Research paper in HEC approved Journal	
	d. Any other examination (Y/N)	
5.8	Total number of International examiners to which the Ph.D. dissertation is sent.	
5.9	How is the selection of an examiner from technologically advanced countries carried out?	
5.10	Is there a minimum residency requirement (on campus) for award of Ph.D. degree?	
6	**Additional Information**	
6.1	Any other information that you would like to provide.	

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_____

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 disciplines, (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?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

VI. Information About Organization

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

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:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Course:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Resume of Faculty Members

Faculty Resume-1

Name	**Prof. Dr. Tariq Mukhtar**
Personal	*May include address(s) and phone number(s) and other personal information that the candidate feels is pertinent.* **Present Position & Address**: Professor & Chairman Department of Plant Pathology Faculty of crop & food sciences PMAS Arid Agriculture University Rawalpindi-46300 **Telephone:** Office: 051-9292123 Fax: - e. mail: **drtmukhtar@uaar.edu.pk**

Experience

List current appointment first, each entry as follows:

Date, Title, Institution.

Date		**Title**	**Institution**
From	**To**		
27-06-2014	To-date	Professor/ Chairman	Department of. Plant Pathology Faculty of Crop and Food Sciences PMAS- Arid Agriculture University, Rawalpindi
04-11-2006	26-06-2014	Associate Professor	-Do-
06-10-2006	03-11-2006	Assistant Professor	-Do-
30-05-1991	05-10-2006	Agricultural Officer	Agriculture, Pest Warning & Quality Control of Pesticides (Plant Protection)

Honor and Awards

List honors or awards for scholarship or professional activity.

Research Productivity Award-2014

Memberships

List memberships in professional and learned Societies, indicating offices held committees, or other specific assignments.

a) Zoological Society of Pakistan (ZSP)
b) Pakistan Society of Nematologists (PSN)
c) Pakistan Phytopathological Society (PPS) (**Joint Secretary**)
d) Pakistan Botanical Society (PBS)
e) Myco-Phytopathological Society of Pakistan (MYCOPS)
f) Weed Science Society of Pakistan (WSSP)

g) Pakistan Association for the Advancement of Science (PAAS)

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.

Years	Degree	Name	Contributed as
2013	M.Sc. Hons	Sana Nazir	Supervisor
2013	M.Sc. Hons	Nasira Perveen	Supervisor
2014	M.Sc. Hons	Muneeba Arooj	Supervisor
2014	M.Sc. Hons	Muhammad Saeed	Supervisor
2014	M.Sc. Hons	Waqar-ul-Amin	Supervisor
2010	Ph.D.	Umer Iqbal	Supervisor
2011	Ph.D.	M. Arshad Hussain	Supervisor
2012	Ph.D.	M. Zameer Kayani	Supervisor

Service Activity

List University and public service activities.

- Served as technical advisor (Plant Pathology) of selection boards of
  - Institute of Agricultural Sciences, Punjab University, Lahore
  - The Islamia University, Bahawalpur
  - Sargodha University, Sargodha
  - The University of Poonch, Rawalakot, AJK
- Member Academic Council, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi (PMAS-AAUR).
- Member Faculty Board, Faculty of Crop and Food Sciences, PMAS-AAUR.
- Member Board of Studies, Department of Plant Pathology, PMAS-AAUR.
- Member Self Assessment Team, Department of Plant Pathology, PMAS-AAUR.
- Member Gown Committee, PMAS-AAUR.
- Member Computer Management System (CMS), Department of Plant Pathology, PMAS-AAUR.
- Member Management Team, Hydroponic System, PMAS-AAUR.
- Member Board of Studies, Department of Plant Pathology, Bahauddin University, Multan (05-11-2015 to 04-11-2015).

	• Member Board of Studies, Department of Plant Pathology, The University of Poonch, Rawalakot. • Member Board of Studies, National Agriculture Research Council, Islamabad.
Brief Statement of Research Interest	*May be as brief as a sentence or contain additional details up to one page in length.* My interests are in applied and basic research in Plant Pathology. My basic research efforts are on the identification of plant pathogenic bacteria and nematodes by using conventional, biochemical and molecular approaches. Pathogens of interest include root-knot nematodes, citrus nematode, wheat seed gall nematode, *Ralstonia solanacearum*, *Macrophomina phaseolina*, *Ceratocystis* spp. My applied interests have focused on managing diseases of various crops particularly vegetable crops using Integrated Management Practices. My efforts have focused on the numerous disease management practices including resistance, cultural practices, and chemical and non-chemical methods of disease control. Crops which I have had considerable experience with include numerous vegetables (particularly cucumber, tomato, okra, egg plant, potato, chili and cucurbits), fruit (apple, peach, mango, citrus, plum), and filed crops (wheat, cotton and rice).

Publications

List publications in standard bibliographic format with earliest date first.

- Manuscripts accepted for publication should be included under appropriate category as "in press;"
- 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).

Articles published by refereed journals

1. Batool, M., **T. Mukhtar** and H. Butt. **2014**. First report of *Diplocarpon mespili* on loquat (*Eriobotrya japonica*) in Pakistan. **Österreichische Zeitschrift für Pilzkunde (Austrian Journal of Mycology), 23: 143-147.**

2. **Mukhtar, T**., M. A. Hussain, M. Z. Kayani and M. N. Aslam. **2014.** Evaluation of resistance to root-knot nematode (*Meloidogyne incognita*) in okra cultivars. **Crop Protection, 56: 25-30. [Impact factor = 1.539]**
3. *Iqbal, U. and* ***T. Mukhtar, 2014.*** *Morphological and pathogenic variability among Macrophomina phaseolina isolates associated with mungbean (Vigna radiata L.) Wilczek from Pakistan.* ***The Scientific World Journal, 2014, Article ID 950175, 9 pages,*** **http://dx.doi.org/10.1155/2014/950175. [Impact factor = 1.723]**.
4. Nasir, M., S. M. Mughal, **T. Mukhtar**, M. Z. Awan. **2014**. Powdery mildew of mango: a review of ecology, biology, epidemiology and management. **Crop Protection, 64: 19-26. [Impact factor = 1.539]**.
5. Ashfaq, M., M. A. Khan, **T. Mukhtar** and S. T. Sahi. **2014**. Role of mineral metabolism and some physiological factors in resistance against urdbean leaf crinkle virus in blackgram genotypes. **International Journal of Agriculture and Biology, 16 (1): 189-194. [Impact factor = 0.902]**.
6. Mehboob, N., M. J. Asad, M. Asgher, M..Gulfraz, **T. Mukhtar** and R. T. Mahmood**. 2014.** Exploring thermophilic cellulolytic enzyme production potential of *Aspergillus fumigates* by the solid-state fermentation of wheat straw. **Applied Biochemistry and Biotechnology**, **172 (7): 3646-3655. [Impact Factor = 1.893]**
7. Iqbal, U., **T. Mukhtar** and S. M. Iqbal. **2014.** *In vitro* and *in vivo* evaluation of antifungal activities of some antagonistic plants against charcoal rot causing fungus, *Macrophomina phaseolina*. **Pakistan Journal of Agricultural Sciences**, **51 (3): 689-694. [Impact Factor = 1.24].**
8. Ashfaq, M., S. Iqbal, **T. Mukhtar** and H. Shah. **2014.** Screening for resistance to cucumber mosaic cucumovirus in chilli pepper. **Journal of Animal and Plant Sciences**, **24 (3): 791-795. [Impact Factor = 0.638].**
9. Hussain, M. A., **T. Mukhtar,** M. Z. Kayani. **2014.** Characterization of susceptibility and resistance responses to root-knot nematode (*Meloidogyne incognita*) infection in okra germplasm. **Pakistan Journal of Agricultural Sciences**, **51 (2): 319-324. [Impact Factor = 1.24].**
10. **Mukhtar, T.,** M. Z. Kayani and M. A. Hussain. **2013**. Nematicidal activities of *Cannabis sativa* L. and *Zanthoxylum alatum* Roxb. against *Meloidogyne incognita*. **Industrial Crops and Products. 42: 447-453. [Impact factor = 3.208]**.
11. Kayani, M. Z., **T. Mukhtar,** M. A. Hussain, and M. I. Haque. **2013**. Infestation assessment of root-knot nematodes (*Meloidogyne* spp.) associated with cucumber in the Pothowar region of Pakistan. **Crop Protection**, **47: 49-54. [Impact factor = 1.402]**.
12. **Mukhtar, T.,** M. Z. Kayani and M. A. Hussain. **2013**. Response of selected cucumber cultivars to *Meloidogyne incognita*. **Crop Protection 44: 13-17. [Impact factor = 1.402]**.
13. **Mukhtar, T.,** M. A. Hussain and M. Z. Kayani. **2013.** Biocontrol potential of *Pasteuria penetrans*, *Pochonia chlamydosporia*, *Paecilomyces lilacinus* and *Trichoderma harzianum* against *Meloidogyne incognita* in okra. **Phytopathologia Mediterranea**, **52 (1): 66-76. [Impact factor = 1.398]**.
14. **Mukhtar, T.,** I. Arshad, M. Z. Kayani, M. A. Hussain, S. B. Kayani, A. M. Rahoo and M. Ashfaq. **2013**. Estimation of damage to okra (*Abelmoschus esculentus*) by root-knot

disease incited by Meloidogyne incognita. **Pakistan Journal of Botany, 45 (3): 1023-1027. [Impact factor = 0.907].**

15. Mahmood-ul-Hassan, Z. Akram, S. Ajmal, **T. Mukhtar**, S. Nasim, G. Shabbir and Y. Zafar. **2013**. Highly efficient *in vitro* root induction in peanut by mechanical stress method. **Journal of Animal and Plant Sciences**, **23 (2): 425-429. [Impact factor = 0.585]**.

16. *Zia-Ul-Hussnain S., C. A. Rauf, M. I. Haque, S. Afghan,* ***T. Mukhtar****,* F. Naz, M. K. N. Shah, and A. Shahzad. ***2013****. Comparison of DAC-ELISA and Tissue Blot Immunoassay for the Detection of Acidovorax avenae subsp. avenae, causal agent of Red Stripe of Sugarcane.* ***Journal of Plant Pathology & Microbiology, 4:172 doi: 10.4172/2157-7471.1000172.***

17. Parveen, N., **T. Mukhtar,** M. F. Abbas and C. A. Rauf. **2013**. Management of root knot nematode with marigold (*Tagetes erecta* L.) and antagonistic fungus (*Paecilomyces lilacinus* (Thom) Samson) in tomato crop. **International Journal of Biology and Biotechnology, 10 (1): 61-66.**

18. Kayani, M. Z., **T. Mukhtar** and M. A. Hussain. **2012**. Evaluation of nematicidal effects of *Cannabis sativa* L. and *Zanthoxylum alatum* Roxb. against root-knot nematodes, *Meloidogyne incognita*. **Crop Protection, 39: 52-56. [Impact factor = 1.402]**.

19. Kayani, M. Z., **T. Mukhtar** and M. A. Hussain. **2012**. Association of root-knot nematodes (*Meloidogyne* spp.) with cucumber in the Pothowar region of the Punjab province of Pakistan. **International Journal of Biology and Biotechnology, 9 (1-2): 23-29.**

20. Kayani, M. Z., **T. Mukhtar,** M. A. Hussain, M. I. Haque and R. Perveen. **2012**. Incidence and severity of root-knot nematodes (*Meloidogyne* spp.) in district Rawalpindi. **Pakistan Journal of Phytopathology**. **24 (2): 122-128.**

21. Begum, N., M. I. Haque, **T. Mukhtar**, S. M. Naqvi, J. F. Wang. **2012**. Status of bacterial wilt caused by *Ralstonia solanacearum* in Pakistan. **Pakistan Journal of Phytopathology. 24 (1): 11-20.**

22. Hussain, M. A**., T. Mukhtar,** M. Z. Kayani, M. N. Aslam and M. I. Haque**. 2012.** A survey of okra (*Abelmoschus esculentus*) in the Punjab province of Pakistan for the determination of prevalence, incidence and severity of root-knot disease caused by *Meloidogyne* spp. **Pakistan Journal of Botany, 44 (6): 2071-2075. [Impact factor = 0.907].**

23. Irshad, U., **T. Mukhtar**, M. Ashfaq, M. Z. Kayani, S. B. Kayani, M. Hanif and S. Aslam. **2012**. Pathogenicity of citrus nematode (*Tylenchulus semipenetrans*) on *Citrus jambhiri*. **Journal of Animal and Plant Sciences**, **22 (4): 1014-1018. [Impact factor = 0.585]**.

Books

Papers published in refereed conference proceedings:

67. Ahmad, R., M. A. Khan, T. Mukhtar and N. Javed. 2007. Infestation of citrus orchards by Citrus nematode (Tylenchulus semipenetrans) and screening of some rootstocks for resistance or susceptibility. Proceedings of the International Symposium on Prospects of Horticultural Industry in Pakistan. 28th to 30th March, 2007. Institute of Horticultural Sciences, University of Agriculture, Faisalabad. pp. 165-169.

68. Mukhtar,T., R. Ahmad and M. A. Khan. 2006. Studies on the distribution, ecology and management of Citrus Nematode, Tylenchulus semipenetrans. Proceedings of International Symposium on Sustainable Crop Improvement and Integrated Management. September 14-16, 2006. pp. 223-230.
69. Mukhtar,T., R. Ahmad and N. Javed, 2001. Control of Meloidogyne javanica by two antagonistic plants and a nematophagous fungus and effects of antagonistic plants on the activity of fungus. Proceedings of 3rd Conference of Plant Pathology, pp. 129-132.
70. Javed, N., S. R. Gowen, T. Mukhtar and M. Ashfaq. 2002. Effect of neem products on hatching, mobility, mortality and development of juveniles of Meloidogyne javanica. Proceedings of National Symposium of Nematology, 67-75.
71. Javed, N., R. Ahmad and T. Mukhtar. 2001. Nematode control: biological approach. Proceedings of 3rd Conference of Plant Pathology, pp. 116-121.A
72. Mukhtar, T., R. Ahmad and H. U. Khan. 1999. Effect of leaf extracts of some plants on the growth of nematophagous fungus Verticillium chlamydosporium. Proceedings of 2nd Conference of Plant Pathology, 179-182.
73. Mukhtar,T., R. Ahmad and S. R. Gowen. 1999. Effect of a cropping sequence on the management of Meloidogyne javanica and Pasteuria penetrans build up. Proceedings of 2nd Conference of Plant Pathology, pp. 175-178.

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

Sr #	Name of project	Funding Agency	Amount in Rs. M
1	Distribution and Management of Root-knot nematodes	Endowment Fund, UAF	2.222
2	Genetic diversity and phylotyping of *Ralstonia solanacearum* strains causing bacterial wilt of chilies in major chili growing areas of Pakistan	Higher Education Commission of Pakistan	5.347
3	Nematodes infecting temperate fruits in Pakistan and their management	Pakistan Science Foundation	5.246

Other Research or Creative Accomplishments	*List patents, software, new products developed, etc.*

Selected Professional Presentations

.

Annexure -I

Resume of Faculty Members

Faculty Resume-2

Name	**Prof. Dr. M. Inam-ul-Haq**
Personal	*May include address(s) and phone number(s) and other personal information that the candidate feels is pertinent.* **Present Position & Address**: Professor Department of Plant Pathology Faculty of crop & food sciences PMAS Arid Agriculture University Rawalpindi-46300 **Telephone:** Office: 051-92 Fax: e. mail: dr.inam@uaar.edu.pk

Experience

List current appointment first, each entry as follows:

Date, Title, Institution.

Date From	Date To	Title	Institution
03-03-2008	To-date	Professor	Department of Plant Pathology, Faculty of Food and Crop Sciences, PMAS- Arid Agriculture University, Rawalpindi
28-01-2011	11-12-2013	Director Advanced Studies	Directorate of Advance Studies PMAS- Arid Agriculture University, Rawalpindi
27-12-2013	27-12-2014	Manager, Business Incubation Centre	ORIC, PMAS- Arid Agriculture University, Rawalpindi
23-09-2008	02-03-2015	Associate Professor	Department of Plant Pathology, Faculty of Food and Crop Sciences, PMAS- Arid Agriculture University, Rawalpindi
23-12-2006	22-09-2008	Associate Professor	Department of Plant Pathology, Faculty of Food and Crop Sciences, PMAS- Arid Agriculture University, Rawalpindi
23-10-2000	22-12-2006	Assistant Professor	Department of Plant Pathology, Faculty of Agriculture, University of Agriculture Faisalabad
27-2-1992	22-10-2000	Lecturer	Department of Plant Pathology, Faculty of Agriculture, University of Agriculture Faisalabad

Honor and Awards

List honors or awards for scholarship or professional activity.

i)

Memberships

List memberships in professional and learned Societies, indicating offices held, committees, or other specific assignments.

i) Life member of Pakistan Phytopathological Society
ii) Life member of Pakistan Botanical Society
iii) Life member of Asian PGPR Society
iv) Reviewer: Canadian Journal of Microbiology
v) Reviewer: Pakistan Journal of Agricultural Sciences

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.

Years	**Degree**	**Name**	**Contributed as**
2014	M.Sc.(Hon)	Adeela Altaf	Supervisor
2014	M.Sc.(Hon)	Muhammad Sufiyan	Supervisor
2013	M.Sc.(Hon)	Shagufta Bibi	Supervisor
2013	M.Sc.(Hon)	Sundas Shakoor	Supervisor
2012	M.Sc.(Hon)	Farooq Azam	Supervisor
2012	M.Sc.(Hon)	Muhammad Nasir	Supervisor
2012	M.Sc.(Hon)	Saima Sadiq	Supervisor

Service Activity

List University and public service activities.

- Teaching courses to M.Sc., M. Phil. and Ph.D. Student
- Supervision of Research Theses of M.Sc., M. Phil. & Ph.D. students
- Development and Execution of donor funded Research & Development Projects.
- Management of the Department of Plant Pathology

Brief Statement of Research Interest

May be as brief as a sentence or contain additional details up to one page in length.

- Bacteriology and Biological Control

Publications

List publications in standard bibliographic format with earliest date first.

- Manuscripts accepted for publication should be included under appropriate category as "in press;"
- 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).

Articles published by refereed journals

1. Khan, N.A., M. Ajmal, M. Inam-ul-haq, N. Javed, M. Asif Ali, Rana Binyamin and S.A. Khan. 2012. Impact of sawdust using various woods for effective cultivation of Oyster mushroom. Pak. J. Botany 44(1): 399-402.

2. Naqvi, S.F., M.Inam-ul-Haq, M.I.Tahir and S.M.Mughal. 2012. Screening of sesame germplasm for resistance against the bacterial blight caused by *Xanthomonas campestris* pv. *sesami*. Pak. J. Agri. Sci. 49(2):131-134.

3. Iqbal, S., M. Ashfaq, H. Shah, M. Inam-ul-Haq and Aziz-ud-Din. 2012. Prevalence and distribution of Cucumber Mosaic Virus (CMV) in major chilli growing areas of Pakistan. Pakistan Journal of Botany 44(4):1749-1754.

4. M. Inam-ul-Haq, S. Mehmood, H. M. Rehman, Z. Ali and M.I. Tahir. 2012. Incidence of root rot diseases of soybean in Multan Pakistan and its management by the use of plant growth promoting rhizobacteria. Pak. J. Bot. 44(6):2077-2080.

5. Naqvi, S.F., M. Inam-ul-Haq, M. Ahsan Khan, M. Ibrahim Tahir, Zahid Ali and H.M. Rehman. 2013. Morphological and biochemical characterization of *Xanthomonas campestris* (Pammel) Dawson pv. *sesami* and it's management by bacterial antagonists. Pak. J. Agri. Sci., 50(2): 229-235

6. Rashid, A., M. Shahjahan, M. Inam-ul-Haq, M. Shahid, M. Ehetisham-ul-Haq, I. H. Waris, M. Farooq, E. Perveez and M. Ashraf. 2013. Distribution of black chaff disease of wheat caused by *Xanthomonas campestris* pv. *translucens* in different ecological zones of Pakistan and its management through plant extracts and bio-products. European Journal of Experimental Biology, 3(4): 261-266.

7. Tahir, M.I., M. Inam-ul-Haq, M. Ashfaq, N.A. Abbasi. 2014. Surveillance of *Ralstonia solanacearum* infecting potato crop in Punjab. Pak. J. Phytopathol., 26(1): 43-50.

Books

Papers published in refereed conference proceedings:

1. Khan, M.M., M.A. Khan, M. Inam-ul-Haq, R. Ahmad and I. Aziz. 1992. Incidence of citrus canker caused by *Xanthomonas campestris* pv. *citri* in kinnow orchards in Faisalabad. District. Proceedings of the First International Seminar on Citriculture in Pakistan, 2-5. December 1992, Page 311-314.

2. Ahmed, R., M. Z. Kayani, N. Javed and M. Inam-ul-Haq. 1992. Effect of different inoculum levels of citrus nematode *Tylenchulus semipenetrans cobb*. on the growth of seedlings. Proceeding of the First International Seminar on Citriculture in Pak., 2-5. December 1992, Page 319-320.

3. Ahmad. R., M.Z. Kayani, M. Inam-ul-Haq and N. Javed. 1992. Effect of seasonal fluctuation on the population dynamics of citrus nematode (*Tylenchulus semipenetrans cobb*.) Proceedings of the second international Workshop on plant Nematology. November 22-26 1992, Karachi University Pakistan.

4. M.Inam-ul-Haq, R. Ahmad and M.Y. Khan. 1999. Evaluation of various concentrations of *Pseudomonas fluorescens* for the biological control of chickpea wilt. Proceeding of 2nd National Conference of Plant Pathology, Sept. 27-29, Univ, Agri. Faisalabad. Pages. 293-295.

5. M.Inam-ul-Haq, and R. Ahmad. 1999. Evaluation of various methods of application of plant growth promoting rhizobacteria for the biological control of chickpea wilt. Proceeding of 2nd National Conference of Plant Pathology, Sept. 1999. Univ, Agri. Faisalabad. Pages. 296-300.

6. M. Inam-ul-Haq, M.I. Khawar, M.I. Tahir, S. KR. Yellareddygari and M.S. Reddy. 2011. Induction of systemic resistance by rhizobacteria for the management of root-knot nematodes in tomato. Proceedings of the 2nd Asian PGPR Conference. Plant Growth-Promoting Rhizobacteria (PGPR) For Sustainable Agriculture: August 21-24, 2011, Beijing, P.R. China. pp. 308-321.

7. Shahid, A.A., Yasin, S., Inam-ul-Haq, M., Ali, M. and Saleem Haider, M. 2013. "Use of Rhizobacteria for the Management of Soft Rot Disease of Potato" Athens: ATINER'S Conference Paper Series, No: AGR2013-0770.

8. M. Ibrahim Tahir, M. Inam-ul-Haq, Farooq Azam and M.S. Reddy. 2013. Utilization of *Pseudomonas fluorescens* and *Bacillus subtilis* for the root knot nematode management of chili and their effect on chili growth. In: Recent Advances in Biofertilizers and Biofungicides (PGPR) For Sustainable Agriculture. Proceedings of 3rd Asian Conference on Plant Growth-Promoting Rhizobacteria (PGPR) and other Microbials Manila, Philippines April 21-24, 2013. Chapter 30. pp. 366-377.

9. M. Inam-ul-Haq, M. Ibrahim Tahir, M.S. Reddy. 2013. Disease suppression of fungal root pathogens of chickpea using antagonistic rhizobacteria and neem cake. In: Recent Advances in Biofertilizers and Biofungicides (PGPR) For Sustainable Agriculture. Proceedings of 3rd Asian Conference on Plant Growth-Promoting Rhizobacteria (PGPR) and other Microbials Manila, Philippines April 21-24, 2013. Chapter 31. pp. 378-392.

ABSTRACTS (Papers Presented in Conferences)

RESEARCH/TECHNICAL REPORTS (unpublished)

POPULAR ARTICLES/BOOKLETS

1. Some recommendations to get rid from cotton leaf curl virus 1993. Zari Digest. 27(3): 15-16.

2. Mango diseases and their control 1996. Zari Digest 29/330 (4/1): 48-50.

3. Controlling chickpea diseases. Article published in the daily Newspaper, 'The Nation" on May 21, 2000.

4. N.A. Khan, M. Inam-ul-haq and M.A.Khan. 2008. Little Wonders. Nutritional Value of Oyster Mushroom and its cultivation on paddy straw. Nation, July, 20. p.36

5. M. Inam-ul-Haq, Shazia Shahzaman, Ch. Abdul Rauf. 2011. Chanay ki Kasht. A booklet.

Research Grants and Contracts.

Entries should include:

Date Title Agency / Organization
Total Award Amount

Segment the list under following headings:

Completed

1. Endowment Fund UAF: Rhizobacterial Formulations Application Technology for the Control of major Pathogenic root infecting fungi in chickpea for sustainable Crop Production".

2. HEC project: "Surveillance and pathogen characterization of bacterial canker of stone fruits using biochemical and molecular methods and its biomanagement".

3. PARB funded Project: "Development of Bio-pesticide for the Control of Soil-borne Diseases of Tomatoes and Chilies caused by *Pythium* and *Phytophthora spp*."

4. Evaluation of different plant materials for their nematicidal potential against root-knot nematode *Meloidogyne* spp. on tomato and brinjal (1993-94). Funded by UGC, Islamabad.

5. Biological control of chickpea wilt by the use of Plant growth promoting rhizobacteria (PGPR). 1999. Funded by UGC, Islamabad.

Biological control of root knot nematode *Meloidogyne* spp. of vegetables, (1995-96) Funded by UGC, Islamabad.

Funded and in progress

6. PSF funded Project entitled "Utilization of Plant Growth Promoting Rhizobacteria for the Induction of Systemic Resistance in Potato Seed against Bacterial Rot and Wilt Diseases".

7. Endowment Fund UAF: Rhizobacterial Formulations Application Technology for the Control of major Pathogenic root infecting fungi in chickpea for sustainable Crop Production".

8. HEC project: "Surveillance and pathogen characterization of bacterial canker of stone fruits using biochemical and molecular methods and its biomanagement".

9.	PARB funded Project: "Development of Bio-pesticide for the Control of Soil-borne Diseases of Tomatoes and Chilies caused by *Pythium* and *Phytophthora spp*."

In review

1. One project is in pipeline with the foreign professor from University of Reading. Link is continued here in PMAS-Arid Agriculture University Rawalpindi (Copy of Memorandum of Linkage is enclosed).

Other Research or Creative Accomplishments	*List patents, software, new products developed, etc.*
Selected Professional Presentations	

Annexure -I

Resume of Faculty Members

Faculty Resume-3

Name	**Dr. Muhammad Ashfaq**
Personal	*May include address(s) and phone number(s) and other personal information that the candidate feels is pertinent.* **Present Position & Address**: Associate Professor Department of Plant Pathology Faculty of crop & food sciences PMAS Arid Agriculture University Rawalpindi-46300 **Telephone:** Office: +92 051 9292123 e. mail: mashfaq@uaar.edu.pk

Experience

List current appointment first, each entry as follows:

Date, Title, Institution.

Date From	Date To	Title	Institution
1-7-2004	To-date	**Assisstant Professor**	Teaching and Research experience
May, 2009 to May, 2010			Visiting Scientist at SCRI/JHI, Dundee, UK, from May

Honor and Awards

List honors or awards for scholarship or professional activity.

i) Promotion to Assistant professor, 2010

ii) Visiting Scientist, Scottish Crop Research Institute/James Hutton research

Institute, Dundee, Scotland, UK, 2009-2010.

iii) HEC PhD Approved Supervisor

iv) Reviewer of National and International Scientific Journals.

v) Subject editor in Plant Virology of Pakistan Journal of Phytopathology (Pak. J. Phytopathol.,)

vi) Research supervision of PhD, M.Sc. (Hons.) and B.Sc. (Hons.) students.

iii) *precious services and big contribution to farmer community through IPM-FFS approach".*

Memberships

List memberships in professional and learned Societies, indicating offices held, committees, or other specific assignments.

vi) Member of Editorial Board of Austin Journal of Plant Biology (AJPB).

vii) Member of Editorial Board of Asian Journal of Agriculture & Biology (AJAB).

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.

Year	Degree	Name	Contributed as
2012	M.Sc.(Hons)	Anam Saleem	Supervisor
2013	M.Sc.(Hons)	M.Zeeshan	Supervisor
2013	M.Sc.(Hon)	Sehrish Saba	Supervisor
2014	M.Sc.(Hons)	Zargham Abbas	Supervisor

Service Activity

List University and public service activities.

- Teaching courses to M.Sc (Hons) and Ph.D. Student
- Supervision of Research Theses of M.Sc., M. Phil. & Ph.D. students

Brief Statement of Research Interest

May be as brief as a sentence or contain additional details up to one page in length.

- Molecular Plant Virology, Functional study of viral genes, Development of transgenic plants resistant to virus infection, Study of virus-encoded silencing suppressor proteins, Virus- Plant interactions, Biochemistry and Physiology of Viral Diseased Plants, Epidemiology of Plant Viruses, Integrated Disease Management.

Faculty Resume-4

Name	Dr. Gulshan Irhad
Personal	Organization (main): PMAS Arid Agriculture University Rawalpindi Phone: +92 51 92 90 230 Mob: +92 333 593 8344 Email: gulshanirshad@gmail.com Gulsha.irshad@uaar.edu.pk

Experience	***Date,*** ***Title,*** ***Institution*** 2007 Lecturar PMAS AAUR 2014 Assissstant Professor PMAS AAUR
Honor and Awards	Lecturer (Plant Pathology) PMAS-AAUR, Pakistan 2004
Memberships	Pakistan Phytopathological society (life member) Pakistan Botanical society (life member)
Brief Statement of Research Interest	Aero mycology, Fungal Taxonomy, Seed Pathology, Wind Borne Diseases, Post Harvest Pathology, Beneficial Microorganisms.

Publications

Articles published by refereed journals

Irshad. G., F. Naz. M. I. Haque and A. Rauf. 2013. Population dynamics of aeromycoflora at three sites of Rawalpindi by evaluating two sampling methods. Pak. J. Phytopathology. 25 (01): 31-36.

Fahim.M.A.,F.Naz and **G.Irshad**. 2013. Important fungal diseases of potato and their management – a brief review. Mycopath 11(1)**:** 45-50.

Fahim. A, C. A. Rauf and **G. Irshad**. 2014. Nucleotide evidence of capsid protein (CP) gene of potato virus Y (PVY) from a Pakistani isolate. Nucleotide evidence of CP gene. Pakistan Journal of Agricultural Sciences. (Accepted).

Irshad. G, Z. Haider, Z. Ikram, A. Iqbal. S. Hadair and M. I. Haq. 2014. Chemical control of fungal diseases of stored *Solanum lycopersicum* fruit by potassium bicarbonate and calcium chloride. Pak. J. Phytopathology. 26(02).281-287.**)**

Sultana. K, M. U. Shabaz, M. I. Haque, and **G**. **Irshad.** 2014. *Trinacrium anchorum*,a new hypomyceteous fungus from Pakistan. Journal of Plant Taxonomy and Geography. 69(1): 75-77.

Sultana, K. M. U. Shahbaz, **G. Irshad** and M. A. Iqbal. 2014. Addition of hypomyceteous fungi to the hypomycetes of Pakistan. Comunicata Scientiac.

Sultana, K. N. Raiz. **G., Irshad** and A. N. khan. 2014. Research note: Contribution to Mushroom Flora of Rawalpindi-Islambad, Pakistan. Journal of Bio resources management. 1(1):27-31.

Aurangzeb,W.,**G. Irshad**, N. Mehammod and N. Beghum. 2014. A seed borne mycoflora associated with local and imported paddy seed lots in Pakistan. Journal of Phtyopathology. 26(2). 241-246.

Scholarly and / or creative activity

1. "Review of the implementation of Biodiversity Action Plan of Pakistan – current status and future steps". A report for Ministry of Environment/ IUCN-P, Islamabad. 2005.
2. Study report on population of selected mammals and birds of Machiara National Park. PAMP-MNP, AJK Fisheries and Wildlife Department, Muzaffarabad AJK. 2006.
3. "Review of Protected Areas Management and Performance Effectiveness in Pakistan". A report for the Ministry of Environment/IUCN-P, Islamabad. 2007.

Research Grants and Contracts.	1. Screening of substrate mass production of biological control agent. (**PMAS AAUR**) 2008-2009 2. Induction of systemic resistance through Rhizobacteria in tomato. (**PMAS AAUR**) 2010-2011 3. Impact of aeromycoflora –dynamics on prevailing plant flora and human allergens. (submitted to **Pakistan science foundation**)
Other Research or Creative Accomplishments	Nil
Selected Professional Presentations Nil	

Faculty Resume-5

Name	Dr. Farah NAZ
Personal	Department of Plant Pathology University of Arid Agriculture, Rawalpindi, Pakistan Ph: +92-51-9062626, Cell +92-300-5075319 Email: nazfrh@yahoo.co.uk farahnaz@uaar.edu.pk
Experience	**Date, Title, Institution.** 1-4-2010 to date **Assistant Professor PMAS AAUR** 7-5-2007 - 31-3-2010 **Lecturer PMAS AAUR** 1-11-2003 - 31-10-2006 **Research Associate PSF/ PMAS UAAR Project No 69** **7-1-2000 - 31-10-2000 Lecturer (Biology) Rawalpindi**
Honor and Awards	-
Memberships	• Member of "American phytopathological Society" • Life Member, "Pakistan Phytopathological Society".

	• Life Member, "Pakistan Botanical Society". • Councilor, Pakistan Phyto Pathological Society Pakistan 2010-11 • Councilor, Pakistan Phyto Pathological Society Pakistan 2016-17
Graduate Students / Undergraduate Students	***Supervision of Students*** **Years** **Degree** **Name** 2013 P.hD. Gulshan Irshad 2012 Msc (Hons) Sania Shoukat 2013. Msc (Hons) Sidra Hafeez 2014 Msc (Hons) Aliya Tariq 2014 Msc (Hons) Alveena Mumtaz
Service Activity	➢ *Teaching courses to Msc.(Hons). and Ph.D. Students* ➢ *Supervision of Research Theses of the Msc.(Hons)/ Ph.D. students* ➢ *Conducting Research Projects funded by HEC and PMAS-AAUR.*
Brief Statement of Research Interest	• Fungal Molecular Biology, • fungal plant pathology, • plant disease diagnosis. • genetic variation in plant pathogenic fungi • on-farm participatory research, • integrated disease management,

Publications

a) Articles published by refereed journals:

C.A.Rauf **, Farah Naz**, I. Ahmad, I.U.Haque and A. Riaz. (2014). Management of black scurf of potato with effective microbes, biological potassium fertilizer(BPF), and *Trichoderma harzianum*. Int. J. Agric. Biol., 17: 601–606. **[IF=0.902]**

Tayyaba Sultana, Farah Naz, M. IrfanUl-Haque, Shahid Butt and M. Fahim Abbas (2014) Characterization and relative contribution of fungal and bacterial pathogens involved in Sudden Death Syndrome of chillies. Pak. J. Phytopathol., 26 (01):53-61.

Rubab Altaf, Ch.A.Rauf, Farah Naz, Ghulam Shabbir. (2014) Surveillance and characterization of Fusarium isolates associated withlentil wilt. Pak. J. Phytopathol., 26 (01):83-90. **(HEC Recognized Journal)**

Muhammad Fahim Abbas**, Farah Naz**, Gulshan Irshad. (2013). Important fungal diseases of potato and their management-a brief review. ***Mycopath*** 11 (1), 245 47

Ahmed, R., Riaz, A., Zakria, M. & **Naz, F**. (2013). Incidence of karnal bunt (*Tilletia indica* Mitra) of wheat (*Triticum aestivum* l.) in two districts of Punjab (Pakistan) and identification of resistance source. ***Pak. J. Phytopathol.***, 25(1), 01-06.

Gulshan Irshad **, Farah Naz**, Muhammad I. U. Haq, Chaudhary A. Rauf. (2013). Population dynamics of aeromycoflora at three sites of Rawalpindi by evaluating two sampling methods. Pak. J. Phytopathol., 25 (01) 31-36. **.**

Zia-Ul-Hussnain, S., C. A. Rauf, M. I. Haque, S. Afghan, T. Mukhtar , **F. Naz**, M. K. N. Shah and A. Shahzad. (2013) Comparison of DAC-ELISA and tissue blot immunoassay for the detection of *Acidovorax avenae* subsp. *avenae*, causal agent of red stripe of sugarcane. ***J Plant Pathol Microb*** 2013, 4:4 http://dx.doi.org/10.4172/2157 7471.1000172

Abid Riaz, J. Nicklin, I. Haque, C.A.Rauf, G.Qadir and **Farah Naz. (**2013). Toxicity induced by solanapyrone in chickpea shoots and its metabolism through glutathione/ glutathione-s- transferase system. ***Pak.J. Bot*.,** 45(1): 135-139.

Khola Rafique, Awais Rasheed, Alvina Gul Kazi, Hadi Bux, **Farah Naz.** Tariq Mahmood and Abdul Mujeeb-Kazi. 2012. Powdery mildew resistance in some new wheat amphiploids (2n = 6x = 42) derived from A- and S-genome diploid progenitors. **Plant Genetic Resources**, 10(1):1-16. **[IF=0.27]**

Research Grants and Contracts.	**a) *Completed Projects*** 1 **Inhibition of *Rhizoctonia solani* with Isothiocyanates produced by Brassicaceae Species** " sponsored by PMAS UAAR, (2009 -2010) **(**Completed**)**

	2 "**Management of black scurf of potato**" sponsored **By:** Pakistan Science Foundation (PSF) (01/12/2003 - 11/30/2006) **(**Completed**)** 3 "Surveillance and Characterization of Pathogens Infecting Loquat in Pakistan". sponsored **By:** Pakistan Science Foundation. PSF/NSLP/P-UAAR (501) Rs. 2.27 Million (10/03/2014 - **(Ongoing)** 4. Optimization of organic mushroom technology at Koont Farm (Chakwal); Income Generation and poverty alleviation through transfer technology. PARC – ALP Rs.3.19 Million
members	• Member of "American phytopathological Society" • Life Member, "Pakistan Phytopathological Society". • Life Member, "Pakistan Botanical Society". • Councilor, Pakistan Phyto Pathological Society Pakistan 2010-11 Councilor, Pakistan Phyto Pathological Society Pakistan 2016-17-

Selected Professional Presentations

- "**Participated IN "**14 th National Training Course on "Modern Techniques in Biotechnology" April 18-22, 2016 at NIBGE, Faisalabad
- Oral Presentation 5th International and 14th National conference of Botany organized by Pakistan Botanical Society at University of Karachi, Karachi on 15-18 January 2016
- Oral Presentation **in** 5th International / 10th National Conference of ***Pakistan Phytopathological Society*.** Institute of Agricultural Sciences, University of the Punjab Lahore November 23-25, 2015
- Oral Presentation in **12th National and 3rd International Conference of Botany**" Quaid-i- Azam University Islamabad (1/9/2012-3/9/2012)
- **Participated in FSC & RD-NAPHIS "National training course in seed Mycology and Nematology" 16-19 June 2014at Islamabad.**
- Oral Presentation **in 3rd International Conference of Pakistan Phytopathological Society. Department of Agriculture and Agribusiness Management, University of Karachi, Pakistan January 23-25, 2014**
- Oral Presentation in **12th National and 3rd International Conference of Botany**" Quaid-i- Azam University Islamabad (1/9/2012-3/9/2012)

- Participated in **International Conference of Plant Scientists** organized by Pakistan Botanical Society held from 21-24th April 2007 in Faisalabad Agriculture University
- Poster Presentation in **Third National Conference of Plant Pathology** on "Histopathology of sunflower seedlings infected with *Macrophomina phaseolina*", NARC, Islamabad, Pakistan, October 1-3, 2001.
- Attended National Training Course on **Seed Virology** Organized by FSC&RD / NAPHIS, Ministry of Food and Agriculture, Govt. of Pakistan, held from 22nd to 24th December 2008.

1.

Annexure -I

Resume of Faculty Members

Faculty Resume-6

Name	Muhammad Usman Raja
Personal	Department of Plant Pathology, PMAS-Arid Agriculture University Rawalpindi, Pakistan Faculty of Crop & Food science Off: Tel. +92 051 9292123 Cell: +92 51 345 0538643 Email: usman2012@uaar.edu.pk

Experience

List current appointment first, each entry as follows:

Date, Title, Institution.

Date From	Date To	Title	Institution
06-11-2006	To-date	Assistant Professor	Department of Plant Pathology, PMAS-Arid Agriculture University Rawalpindi, Pakistan
24-11-2001	06-11-2006	Lecturer	. Department of Plant Pathology, PMAS-Arid Agriculture University Rawalpindi, Pakistan

Honor and Awards

List honors or awards for scholarship or professional activity.

i) Received outstanding student scholarship for pursuing M.Phil. degree.

Memberships

List memberships in professional and learned Societies, indicating offices held, committees, or other specific assignments.

i. Life member of Pakistan Society of Plant Pathology

ii. Life member of Pakistan Botanical society

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.**

Years	Degree	Name
2014	M.Sc.(Hon)	Komal Zafar

Service Activity	List University and public service activities. Teaching and Research Major Area of Interest: Phytobacteriology, Plant Disease Resistance, Post Harvest diseases Undergraduate and Post-graduate student advisor Tutorship Member of department team for quality control Provide diagonostic and advisory services to farmers of peripheral area
Brief Statement of Research Interest	*May be as brief as a sentence or contain additional details up to one page in length.* • Plant disease resistance • Post- harvest disease management • Phyto-bacteriology

Publications

Publications with Impact factor

Publications in peer reviewed journals:

Abstract

1. Raja, M.U. and Ali M.W. Screening of commericial PEA (*Pisum sativum* L.) varieties against *Pseudomona syringae pv pisi* through different pathogenicity assays. 5th International conference of Pakistan Phytopathology Society, November 23-25, 2015, Lahore
2. Gul-e-lalah, Raja, M. U.,Gardezi, S R,A., Irshad,G., Akram,A.2015. A morel story of Poonch district AJK. 5th International conference of Pakistan Phytopathology Society, November 23-25, 2015, Lahore

Research Grants and Contracts.

Control of post-harvest diseases of fruits and vegetables by unconventional methods (resistance inducers, botanical and antagonist) **Ongoing**

Detailed Course Contents of Under Graduate Scheme of Studies Plant Pathology

PP-401 INTRODUCTION TO PLANT PATHOGENS 2(1-2)

Theory:

Types of Plant Pathogens, General taxonomy, characteristics, morphology, and ecology of Plant Pathogens (Fungi, Bacteria, Virus, Nematode, Phytoplasma, Higher Parasitic Plants).

Practicals

Preparation of media and isolation techniques for plant pathogens.Demonstration of various plant pathogens through slides, live specimens and their comparative study.

Books Recommended

Text:

1. Agrios, G.N. 2005. Plant Pathology, 4th edition, Academic Press, New York, USA.

Reference:

1. Singh, R.S. 1982. Plant Pathogens: The Fungi. Oxford and IBH Publishing Company, New Delhi, India
2. Singh, R.S. 1989. Plant Pathogens: The Prokaryotes. Oxford and IBH Publ. Company, New Delhi, India
3. Alexopoulos, C. J., C.W. Mims and M. Blackwell. 1996. Introductory Mycology. 4th edition, John Wiley and Sons, Inc., New York, USA
4. Lucas,J.A. 1999. Plant Pathology and Plant pathogens.Blackwell Scientific Publications, Oxford, U.K.
5. Johnson, R. 1999. Plant Pathology.Blackwell Scientific Publications, Oxford, U.K.

PP-402 INTRODUCTION TO PLANT PATHOLOGY 3(2-2)

Theory:

Definition of disease in plants; Nature and causes of plant diseases.Effects of disease on host plant; Nature of losses and economic importance of plant diseases.Symptoms, etiology, methods of perpetuation, disease cycle and management of representative parasitic diseases of field and horticultural crops.Principles of plant disease management.

Practicals:

Collection and preservation of diseased specimens, plant disease identification.Study of symptoms of plant diseases.Demonstration of equipments and machinery used in plant disease management.

Books Recommended:

Text:

1. Agrios, G.N. 2005. Plant Pathology, 4th edition, Academic Press, New York, USA.

Reference:

1. Mehrotra, R.S. 1980. Plant Pathology. Tata McGraw Hill Publishing Company, New Delhi, India.
2. Hafiz, A. 1986. Plant Diseases. Pakistan Agricultural Research Council, Islamabad, Pakistan.
3. Johnson, R. 1999. Plant Pathology.Blackwell Scientific Publications, Oxford, U.K.
4. Lucas,J.A. 1999. Plant Pathology and Plant pathogens. Blackwell Scientific Publications, Oxford, U.K.

PP-501 INTRODUCTORY MYCOLOGY 3(2-2)

Theory:

Introduction and importance of fungi, taxonomy, morphology, nutrition and reproduction of fungi with special reference to families and genera of agricultural and industrial importance.

Practicals:

Collection, isolation, preservation and identification of fungi important to agriculture; study of key morphological characters of fungi, the basis of classification of various groups of fungal pathogens.

Books Recommended:

Text:

1. Alexopoulos, C.J., C.W. Mims and M. Blackwell. 1996. Introductory Mycology. 4th edition, John Wiley and Sons, Inc.New York, USA.

Reference:

1. Barnett, H. 1976. Fundamentals of Mycology.2nd edition, Edward Arnold, London, UK.
2. Sharma, P.D. 1987. The Fungi, Rastogi and Company.,Meerut, India.
3. Talde, U.K. 1994. Advances in Mycology and Aeriobiology Vol-20.TTPP Publishers, New Delhi, India.

PP-503 INTRODUCTORY PLANT NEMATOLOGY 3(2-2)

Theory:

Introduction, history and importance of nematodes; taxonomy, morphology and biology of plant parasitic and soil inhabiting nematodes; plant-nematode relationship; distribution and means of spread; management of nematodes.

Practicals:

Sampling, extraction, staining and identification of nematodes from soil and infested plant materials; methods of maintenance and culturing of nematodes; use of nematicides and cultural practices for the management of nematode diseases of plants.

Books Recommended:

Text

1. Perry, R.N. and Moens, M. 2006, Plant Nematology.
2. Dasgupta, M.K. 1998, Phytonematology. TTPP Publishers, India.
3. Jairajpuri, M.S.,2002. Nematodes Structures

4. Dropkin, V.H. 1989. Introduction to Plant Nematology. John Wiley and Sons, Inc., New York, USA

Reference:

1. Mai, M.F. and H.H. Lyon. 1975. Pictorial Key to Genera of Plant Parasitic Nematodes, 4th edition. Comstock Publishing Association, Cornell University Press, Ithaca, USA.
2. Whitehead, a.D. 1998. Plant Nematode control. CAB International, Ferry Lane, Kew, Surrey, England.
3. Trivedi, P.C. 1998. Plant Nematode management: A Biological Approach. CAB International, Ferry Lane, Kew, Surrey, England.

PP-505 INTRODUCTION TO PROKARYOTES 3(2-2)

Theory:

Introduction, history, taxonomy, morphology, structure, cultivation, growth, reproduction, metabolism, cultural characteristics, mode of infection and transmission of bacteria and mollecutes (phytoplasmas & spiroplasmas) and their management.

Practicals:

Isolation, purification, staining and preservation of plant pathogenic prokaryotes.Morphological, cultural and biochemical characteristics for identification of plant pathogenic prokaryotes.

Books Recommended:

Text:

1. Singh, R.S. 1989. Plant Pathogens: The Prokaryotes. Oxford and IBH Publishing Company, New Delhi, India. Reference

1. Agrios, G.N.1996. Plant Pathology.4th edition.Academic Press, New York, USA.
2. Bradbury, J.F. 1986. Guide to Plant Pathogenic Bacteria, CAB Intnational Mycological Instt., Kew, Surrey, UK.

3. Lelliott, R.A. and Stead, D.E. 1987. Methods for the diagnosis of bacterial diseases of plants. BSPP, Blackwell Scientific Publications, London, UK.
4. Schaad, M.W. 1988. Guide for Identification of Plant Pathogenic Bacteria, 2nd edition. American Phytopathological Society. Saint Paul, Minnesota, USA.
5. Johnson, R. 1999. Plant Pathology.Blackwell Scientific Publications, Oxford, U.K.

PP-507: INTRODUCTION TO PLANT VIRUSES 3(2-2)

Theory:

Introduction, virus symptomatology; study of virus composition; morphology and structure; physiology of virus infected plants; virus transmission and movement; serology and serological methods, ecology, and management; study of specific virus diseases in Pakistan.

Practicals:

Study of symptoms and methods of transmission of important virus diseases.Identification of plant viruses by symptomatology, serology, indicator plants and host range.

Books Recommended:

Text:

1. Mathews. R. E. F. 1992. Fundamentals of Plant Virology.Academic Press, New York, USA. Reference

1. Boss, L. 1983. Introduction to Plant Virology. Longman, London, UK.
2. Walky, D.G.A., 1985. Applied Plant Virology. Longman, London, UK
3. Bashir, M. and S. Hassan. 1998. Diagnostic Methods for Plant Viruses. Pakistan Agricultural Research Council, Islamabad, Pakistan.

PP-509:BENEFICIAL MICROORGANISMS 3(2-2)

Theory:

Morphology, classification and cultivation of edible fungi. Useful microorganismS of industrial importance; role of microorganisms in degradation of industrial

products; production of industrial products; microorganisms as biological agents; mycorrhizae and their role in soil fertility and plant disease mmanagement.

Practicals:

Spawn production and cultivation of edible mushrooms. Identification of edible and poisonous mushrooms, isolation and identification of microorganisms from different agricultural and industrial wastes.Isolation and identification of mycorrhizal fungi.Demonstration of antagonism, competition and antibiosis.

Books Recommended:

Text

1. Bahl, N. 1988. Handbook on Mushroom.2nd edition.Oxford and IBH Publishing Company New Delhi, India.
2. Gopi, K., D. David and K. Douds.- Current Advances in Mycorrhizae Research. American Phytopathological Society, St. Paul, Minnesota, USA.

Reference:

1. Atkins, P.C. 1972. Mushroom Growing Today.Faher and Faher Ltd. London, UK.
2. Aneja, K.R.1996. Experiments in Microbiology, Plant Pathology ,Tissue Culture and Mushroom. Wiley Publishing Company, U.K.

PP-502: INTRODUCTION TO MOLECULAR PLANT PATHOLOGY 3(2-2)

Theory:

Introduction to molecular biology; Molecular biology and plant pathology; Macro mollecules in Plant pathology, Proteins, Carbohydrates, Lipids, Terpenoides, Nucleotides, Nucleosides and their role; Structure of DNA, RNA; Genes and Gene expression, Protein synthesis, Chromosomes, Mitotic and meiotic behaviour of genes, DNA replication & repair mechanism. Mutagenesis and sequences.

Practical:

DNA isolation and amplification.Isolation of Protein; Visits to research labs with related facilities.

Books Recommended:

Text:

1. Devi, P. 2005. Principles and Methods of Plant Molecular Biology, Biochemistry, Biotechnology and Genetics. Student Edition, India.
2. Pena, L. 2005. Transgenic Plants.Methods and Protocol.HUMANA, JN, USA.
3. Mathew, J. D., 2003. Molecular plant pathology.Bios Scientific Publishers, LTD., UK.
4. De Roberties, E.D.P. and DeRoberties, E.M.T. Jr. 1992. Cell and MSolecularBiology. 8th ed. John Willey & Sons, USA.

Reference:

1. Hafeez, F,Y, Zafar, Y and Khalid, A. M. 2005. Modern techniques in Biotechnology. A theoretical Manual, NIBGE, Faisalabad.
2. Albert, B., Bray. D and Lewis Raff, M. Robert K. and Watson J.D. 994. Molecular biology of cells 3rd ed. Garland Publications, N.York
3. Gardner, Simmons, Snusted 1991, Principles of genetics, 5th Edition, John Wiley & Sons Inc., Canada.

PP-504: DISEASES OF FIELD CROPS 3(2-2)

Theory:

Detailed study of symptoms, etiology, nature and extent of losses, disease cycle, methods of perpetuation, epidemiology and control of major diseases of field crops particularly those prevalent in Pakistan such as: Wheat (rusts and smuts, bunts, powdery mildew, ear cockle, etc.) Maize (fungal and bacterial blights, stalk rot, smuts, etc.) Rice (blast, bakanae, blight) Cotton (boll rot, root rot, leaf curl, bacterial blights etc.) Sugarcane (red rot, whip smut, ratoon stunt etc.) Sorghum (smuts, blights) Tobacco (black shank, tobacco mosaic etc.) Oil Seed Crops for example Sunflower, Canola (charcoal rot, Alternaria blight, downy mildew)

Chickpea (blight, wilt) Lentil (rust, blight, wilt and mosaic) Peanut (Cercospora, Alternaria leaf spots rust and wilt).

Practicals:

Field visits and identification of diseases on the basis of symptoms and isolation of the pathogens.Collection and preservation of diseased specimens; preparation of permanent mounts; crop loss assessment.

Books Recommended:

Text:

1. Nyal. R.F. 1989.Field Crops Disease Handbook. AVI Publishing Company Inc. Westport, Connecticut, USA.

Reference:

1. Hafiz A. 1986. Plant Diseases. Pakistan Agricultural Research Council, Islamabad, Pakistan.
2. Kenaga, C.B., E.B. Williams, and R.J. Green. 1971. Plant Disease Syllabus. Balt Publishers, West Lafayette, Indiana, USA.
3. Singh, R.S. 1988. Plant Diseases. 6th edition, Oxford and IHB Publishing Company (Pvt.) Ltd. New Delhi, India.
4. Compendia of wheat, rice, maize, cotton, sorghum, pea, peanut diseases. American Phytopathogical Society, St. Paul, Minnesota, USA.
5. Rao, G.P. 1994. Current Trends in Sugarcane Pathology. TTPP Publishers, New Dheldi, India.
6. Thind, T.S. 1998. Diseases of Field Crops and their Management. VBS Publishers, India.
7. Gangopadhay, S. 1992. Current Concepts on Fungal Diseases of Rice. 1998. TTPP Publishers, New Dhelhi, India.

PP-506: DISEASES OF HORTICULTURAL CROPS 3(2-2)

Theory:

Nature and extent of losses, disease cycle, methods of perpetuation and control of major diseases of fruits and vegetable crops such as:

Pome fruits - scab, root rot, powdery mildew and fire blight

Stone fruits - shot hole, brown rot, leaf curl, root rot, die-back and crown gall

Citrus - withertip, root rot, Tristeza, citrus greening, canker

Mango - malformation, anthracnose, powdery mildew, bacterial leaf spot, fruit rot, dieback and quick decline.

Banana- finger tip rot and banana bunchy top.

Grapes - downy and powdery mildew, fanleaf.

Solanaceous Blights, wilts, scabs, black scurf, orobanche, collar

Vegetables rot, powdery mildew, golden cyst, root knot and virus diseases.

Cucurbits Downy and powdery mildew, mosaics, fruit rots and wilts

Crucifers White rust, head rots and mosaics.

Legumes Powdery mildew, mosaics and blights.

Onion Downy mildew, purple blotch and root rots.

Garlic Rust and charcoal rot.

Practicals: Identification of diseases on the basis of symptoms and isolation of pathogens. Field visits, collection and preservation of diseased specimens; preparation of permanent mounts, crop loss assessment.

Books Recommended:

Text:

1. Pathak, V.N. 1981. Diseases of Fruit Crops.Oxford and IBH Publishing Company, New Delhi, India.
2. Sherf, A.F., and A.A. Macnab. 1986. Vegetable Diseases and Their Control. John Wiley and Sons, Inc., New York, USA.

Reference

1. Dixon, D.R. 1981. Vegetable Crop Diseases. McMillan Press, London, UK.
2. Compendia of cucurbits, onion and garlic, potato, tomato and pea diseases. American Phytopathological Society, St. Paul, Minnesota, USA.

3. Horst, R.K. 1997. Compendium of Chrysenthemum Diseases.APS Press, Saint Paul, MN, USA.

PP-508 LINICAL PLANT PATHOLOGY 3(1-4)

Theory:

Plant disease clinic; the concept and farmers expectations. Dealing with the clients – how to interact. Collection of specimens, their transport, handling in the laboratory and labeling, formulating and filling in proformas for record keeping and history.Equipment, glassware, chemicals and reagents for an ideal plant disease clinic.Diagnosis protocols. Additional knowledge of allied sciences required for plant pathologists working in plant disease clinic.

Practicals:

Collection of plant disease specimens and their identification. Developing recommendations and report preparation for the clients.

Books Recommended:

Text:

1. Fox, R.T.V. 1994. Principles of Diagnostic Techniques in Plant Pathology. CAB International, UK.

Reference:

1. Gangopadhyay, S. 1984. Clinical Plant Pathology.Kalyani Publishing Company, New Delhi, India.
2. Ahmad, I., M. Aslam and A. Munir. 1992. Phytopathological Diagnostic Techniques,.Pakistan Agricultural Research Council, Islamabad, Pakistan.
3. Schots, A., F.M. Dewey and F. Oliver. 1994. Modern Detection Assays for Plant Pathogenic Fungi. CAB International, UK.
4. Waller, J.M. 1998. Plant Clinic Handbook. CAB International, Ferry Lane, Kew, Surrey, England.

PP-510 PLANT RESISTANCE TO DISEASES 3(2-2)

Theory:

Importance of disease resistance in plants; resistance vs. susceptibility; Kinds & mechanisms of resistance; transgenic approaches for crop protection.Induced systemic resistance through biocontrol options.Screening of germplasm for resistance by using different rating scales/parameters.

Practicals:

Preparation of inocula, inoculation techniques for various plant pathogens; demonstration of hypersensitive reaction, resistance and susceptibility: screening of germplasm in field and green house against major plant pathogens disease assessment parameters.

Books Recommended:

Text:

1. Agrios, G. N, 2005. Plant Pathology, 5th edition, Academic Press, New York, USA.
2. Sadasivan, S and Thayumanavan, B. 2003. Molecular Host Plant Resistance to Pest.Marcel Dekker, USA.
3. Singh, D. P., 2002. Breeding for Resistance to Biotic Stress, International Books Distribution Co. India.
3. Staples, C. R., and G. H. Toenniessen. 1981. Plant Disease Control
4. Resistances and Susceptibility. John Wiley and Sons, Inc. New York, USA.
5.

Reference:

1. Moore, D. and Frazer, L. A. N., 2002. Essential Fungal Genetics. Springer Verlag, New York, USA.
2. Boland, G. J., David, L., and Kuykendall 1998. Plant Microbe Interactions and Biological Control. Marcel Dekker, Inc, USA.
3. Stubbs, R.W., J. M. Prescot, E. E. Sarri and H. J. Dubin. 1986. Cereal Disease Methodology Manual. CIMMYT, Mexico.

6. Russel, G. C. 1981. Plant Breeding for Pest and Disease Resistance. butterworths and Company, Ltd., London, UK.

PP-601 PRINCIPLES AND METHODS OF PLANT DISEASE MANAGEMENT 3(2-2)

Theory:

Understanding principles of avoidance, exclusion, eradication, protection, and immunization.Management of plant diseases by regulatory (quarantine and inspection), cultural (host eradiction, crop rotation, sanitation, tissue culture etc), biological (host resistance, cross protection, interference, hyperparasitism etc), physical (heat treatment, sterilization, refrigeration and radiation etc.) and chemical (soil and seed treatment, foliar spray and post harvest application) methods; integrated disease management.

Practicals:

Acquaintance with equipment and machinery used for disease management.Calibration of equipment. Safety measures for disease managing chemicals; handling and application procedures; Invitro management of pathogens through biological, chemical and physical means.

Books Recommended:

Text:

1. Fry, W. E. 1982. Principles of Plant Disease Management.Academic Press, New York, USA.

Reference:

1. Chattopadhyay, S.B. 1989. Principles and Procedures of Plant Protection, 2nd edition, Oxford and IBH PublishingCompany, New Delhi, India.

2. Lucas, C.B., C.L. Campbell and L.T. Lucas. 1985. Introduction to Plant Diseases: Identification and Management. The AVI Publishing Company Inc., USA.
3. Stakman, E. C., and J. G. Harrar. 1957. Principles of Plant Pathology. The Ronald Press Co., New York, USA.
4. Trivedi, P.C. 2000. Plant Diseases. CAB International, Ferry Lane, Kew, Surrey, England.

PP-603 RANGE AND FOREST PATHOLOGY 2(1-2)

Theory:

General introduction to forest and range ecosystem.damage to forest plants due to abiotic factors. specific fungi causing different diseases such as wood decay, discoloration, cankers and foliage diseases etc. study of bacteria, viruses, nematodes and parasitic higher plants causing diseases of forest plants and their control

Practicals:

Visits to different forest and range plantations of the country.study of specific diseases of forest and shade trees based on symptoms and their control.

Books Recommended:

Text:

1. Agrios, G.N. 2005. Plant Pathology, 4th edition, Academic Press, New York, USA.

Reference:

1 Smith, W.H. 1970. Tree Pathology. Academic Press, London.
2 Blanchard, R.O. and T.A. Tattar. 1981. Field and laboratory Guide to Tree Pathology. Academic Press, London.
3. Boyee, J.S. 1961. Forest Pathology. McGraw Hill Book Company, New York.
4. Chase, A.R. 1997. Foliage Plant Diseases: Diagnosis and control. APS Press, Saint Paul ,MN, USA.

PP-605 SEED & POST HARVEST PATHOLOGY 3(2-2)

Theory:

Morphology and anatomy of healthy and infected seed.Seed-borne diseases and their effect on seed germination.Histopathology of infected seed, seed transmission of pathogen, mechanism of infection.Effect of biotic & abiotic stresses and storage/transit conditions on shelf life of seed and perishables.Loss estimation and Seed health testing.Mycotoxins, their hazards.Management of seed and post harvest diseases.

Practicals:

Seed health testing, different techniques of isolation and identification of microorganisms associated with seeds and their effect on germination. Collection and identification of biotic and abiotic diseases of perishables.Use of safe chemicals for management of seed and postharvest diseases.

Books Recommended:

Text:

1. Bhutta, A.R., Hussain, A. and Rahman, M.R., 2004. Hand book on Seed Processing and Storage. Published by Federal Seed Certification and Registration Department, Islamabad, Pakistan.
2. Agarwal, V.K. and Sinclair, J.B. 1993. Principles of Seed Pathology.Vol. 1 & 11.CBS Publs.New Delhi.
3. Neergaard, P., 1979. Seed Pathology. Rev. ed. Mc Millan Press London.

Reference:

1. Chakraverty, A, Mujumdar, A.S.Raghavan, G.S.V and Ramaswamy, H.S, 2003. Hand book of Post harvest Technology, Publ. By Marcel Dekher. INC, New York, USA.
2. Bhutta, A.R. and Ahmad, I, 2001. Seed Pathological Techniques and their Application. Published by National Book Foundation, Islamabad, Pakistan
3. Dasgupta, M.K. and Mandal, N.C., 1986. Postharvest Pathology of perishables.Oxford & IBH Publs. Co., New Delhi.
4. Dennis, C.1983. Postharvest Pathology of Fruits and Vegetables.Academic Press.New York, USA.

PP-609 PROJECT PLANNING & SCIENTIFIC WRITING 2(1-2)

A workable project on one of the area of Plant Pathology in consultation of students will be designed. The students will be taught how to design a good research project. It will cover introduction, importance, objectives, materials and methods & results and discussions. The students will also be directed how to consult the various journals to collect and finally complete the literature.