<u>INSTITUTE OF PHARMACY</u>

LAHORE COLLEGE FOR WOMEN UNIVERSITY, LAHORE

SELF-ASSESSMENT REPORT

<u>M.Phil Pharmacology</u>

Submitted to

Quality Enhancement Cell,

Lahore College for Women University, Lahore

Dated: <u>14-06-2019</u>

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CRITERION 1: PROGRAM MISSION, OBJECTIVES AND OUTCOME

Institute of Pharmacy

The Department of Pharmacy was established in 2002 when the first batch was admitted in Pharm – D with the aim of providing access of education to female students desirous of acquiring knowledge of Pharmacy in a friendly environment.

The globally recognized profession of Pharmacy is an essential and integral part of a National Health Care system of any country. This profession is concerned with the Art and Science of preparation of drugs followed by safe delivery and rational use.

The pharmacist is the only person who is in a unique position of exercising complete drug expertise and its application. Keeping in view of the growing demand and job opportunities of pharmacist at National and International level and the significance of this profession, Lahore College for Women University is the pioneer female institute to undertake this noble task of offering Pharm – D, (five years degree program) and M.Phil program in the subjects of Pharmacology & Pharmacy Practice.

Department of Pharmacy has been up-graded to an Institute of Pharmacy in 2014 which is comprised of the following departments.

1. Department of Pharmacology
2. Department of Pharmaceutics
3. Department of Pharmaceutical Chemistry
4. Department of Pharmacognosy
5. Department of Pharmacy Practice

<u>**Standard 1-1:**</u>

Learning Objectives

1. To develop a cohesive research strategy which may assist the Pharmacology researchers in designing, monitoring and implementing clinical trials, toxicological studies and intervention studies.

2. To learn application of biostatistics in research and relevant fields

3. To strengthen logical and analytical skills.

4. To prepare students for carriers in Academia, Regulatory affairs,Pharmacovigilance, Clinical study coordination, drug safety monitoring, Immunology etc

Table 4.1: Program objectives assessment.

Objectives	How Measured	When Measured	Improvements Identified (Based on outcome Examination)	Improvements Made
1.To develop a cohesive research strategy which may assist the Pharmacology researchers in designing, monitoring and implementing clinical trials, toxicological studies and intervention studies.	1 year research project	At the end of semester III and IV	**I.**Need of sound research methodologies **II.**Designing of project according to society's health needs **III.**Evaluation of synopsis for plagiarism through turnitin	**I.**Implementation of Proposal defense before initiation of research **II.**Doctoral Committee **III.**Evaluation of thesis by turnitin for plagiarism
2.To learn application of biostatistics in research and relevant fields	**I.**Through class presentations **II.**Research thesis	During semester III and IV as per	Need for hands on trainings to use new statistical software	Improvements being made in designing

	Skill in statistical software	course requirements	packages and implementations in drug based pharmacological research	program based learning
3.To strengthen logical and analytical skills.	**I.**Regular assessments of student knowledge and ability to exhibit the skill by the teacher: **II.**Tests are designed **III.**Presentations and assignments **IV.**Written examination& quizzes	**I.**Test I and test II during the semester before final term **II.**Once in a semester **III.**As per university calendar **IV**.As per course requirements	**I.**Course/Curriculum revision to enhance outcomes **II.**Enhancing teaching skills **III.**Attendance regularity **IV.**Student tutorials and faculty feedback	**I.**Curriculum revised and approved by BOS& ASRB **II.**Hands on short training programs for students and faculty have been arranged **III.**Attendance rules are applied strictly as per university criteria.
4. To prepare students for carriers in Academia, Regulatory affairs,Pharmacovigilance, Clinical study coordination, drug safety monitoring, Immunology etc	**I.**Carrier counseling by the faculty **II.**Seminars/talks by reputed health care professionals	**I.**Throughout the session **II.**Organized periodically in the institute and by Carrier counselling and job placement centre of University	**I.**Such sessions must be carried out on more regular basis **II.**Students' attendance should be made compulsory	**I.**Studentsare being more focused about their carrier choice according to appropriate and learned research skills coupled with orientation sessions.

Standard 1-2: Outcomes

> Production of professionally skilled graduates for health care system, Academia, Regulatory affairs & pharmaceutical Research

M.Phil PharmacologyProgram Outcomes

1. Students shall have the expertise to handle and analyze critical research problems.
2. Students shall be equipped with advanced techniques and standards to qualify for higher studies in reputed national and international universities.
3. Students shall be able to stream line themselves with the research culture and development in various pharmaceutical sectors.
4. Students shall be able to achieve educational standards and appropriate skills to fit in the challenging job market.

Table 4.2: Outcomes versus Objectives

Program Objectives	Program Outcomes			
	1	2	3	4
1	*	*	*	◊
2	*	*	*	*
3	*	*	*	*
4	*	*	*	*

An interrelation between the program objectives and the program outcomes

Program Objectives	Program Outcomes	
	1	2
1	*	*
2	*	*

Standard 1.3: The results of program's assessment and the extent to which they are used to improve the program must be documented.

Actions taken based on results of periodic assessments.

- Revised Pharmacy Practice curriculum approved from BOS and ASRB
- Upgradation of Pharmacology research lab with purchase of new equipments.
- Development of various experimental models for Mphil Pharmacology in process .
- Faculty development through trainings

Standard 1.4: The department must assess its overall performance periodically using quantifiable measures.

1.4.1 Performance Measures:

Ta**ble 3: No. of Students Enrolled**

Program	Session	No. of Students
M.Phil Pharmacology	2015-2017	20
	2016-2018	20

ii) **Table 4: Student-Faculty Ratio**

Year	No. of Students	No. of Faculty Members	Student-Faculty ratio
2015-2017	20	5	1:4
2016-2018	20	6	1:3.3

iii)   Table 5: <u>No. of Students Passed Out</u>

Program	Passing out Year	No. of Students
M.Phil Pharmacology	2017	18
	2018	None (Thesis writing)

IV)   Table 6: <u>Percentage of Honor Students & Attrition Rate</u>

Year	%age of Honor Students **Criteria:** CGPA 3.75 and above	**Attrition Rate** <u>(Admitted –pass out) *100</u> Admitted
2017	5 %	20

v)   Table 7: <u>Faculty Training, Seminars and workshops (Appendix A)</u>

Year	No. Of Trainings, Seminars and workshops
2017	1

vi)   <u>Papers Published at National & International Level</u>

Table 8: <u>Number of Publications (Appendix B)</u>

Year	Papers published
2017	4

vii) <u>Books in Library</u>

400-500

<u>Research Areas</u>

The Faculty is involved in research in the following areas:

- Drug toxicological studies and use of natural/ herbal remedies
- Drug metabolism studies
- Behavioral pharmacology (neuropsychopharmacology)

- Study of antibacterial actions of various natural plants/extracts using standard drugs
- Histopathological studies of treated or intoxicated animal subjects.
- Population Pharmacokinetic studies.

Collaborations

MoUs with the reputable pharmaceutical Companies/Industries and Universities

The Institute of Pharmacy has signed MoUs with the following reputable pharmaceutical Companies/Industries and Universities:

- Pharmawise (Pvt.) Limited, Lahore.
- MICKO Industrial Chemicals Company (Pvt.) Limited, Lahore.
- Himont Laboratories (Pvt.) Limited, Lahore.
- BM (Private) Limited, Lahore.
- King Edward Medical University, Lahore.
- University of Veterinary and Animal Sciences, Lahore.
- Punjab Institute of Preventive Ophthalmology, Lahore.
- Pak Heim International (Pvt) Limited, Lahore.

Departmental Achievements (others)

Hands on workshop on computational methods for drug discovery.	LCWU, LHR.	11th October, 2017 to 13th October, 2017

Lahore Journal of Pharmaceutical Sciences (LJPS)

The Institute of Pharmacy has recently launched Lahore Journal of Pharmaceutical Sciences, a peer reviewed, biannual multi-disciplinary pharmaceutical sciences journal. LJPS publishes original research articles, reviews, case studies and short communications in Pharmaceutical and Allied health sciences.

Honors and Awards

NA

CRITERION 2: CURRICULUM DESIGN AND ORGANIZATION

Provide the following information about the program's curriculum:

A. Title of degree program.
     M.Phil (2 year) Pharmacology

B. Definition of credit hour.
       36 credit hours

C. Degree plan:

- Prerequisites,

     5 years Pharm-D Degree holders with minimum 60 % Marks

- Core courses

  1. Bio Statistics
  2. Advanced concept of general Pharmacology
  3. Recent Advances in Ethnopharmacology
  4. Toxicological Screening Techniques
  5. Pharmacology Lab.
  6. Research Methodology
  7. Clinical Pharmacology
  8. Neuropsychopharmacology
  9. Biochemical & Molecular Pharmacology
  10. Pharmacology Lab.

D. Complete Table 4.3 showing curriculum breakdown in terms of mathematics and
basic sciences, major requirements, social sciences and other requirements.

- Not applicable

E. For each course in the program that can be counted for credit provide 1-2 pages specifying the following:

CC/M.PhIL-501   BIOSTATISTICS   2(2+0)

Course Objectives:

After successful completion of this course, the students shall understand the use of bio-statistics in biological & Pharmaceutical research and use of various test of significance and their interpretation.

Course Contents:

Introduction: What is biostatistics? Application of statistics in biological and pharmaceutical sciences Sample and population: Simple random sampling, sampling distribution and standard error, stratified random sampling, systemic and cluster sampling Test of hypothesis and significance: Statistical hypothesis and level of significance, test of significance, confidence interval, test involving binomial and normal distribution Goodness of fit test: Chi-square test distribution, it properties and applications, contingency tables, test of homogeneity Student t test and f distribution: Properties of "f" and "t" distribution, test of significance based on "t" and "f" distribution Analysis of variance: One way classification, partitioning of sun of squares and degree of freedom, two way classification, multiple compression test such as LSD, P-value, the analysis of variance model Experimental design (Advantages and Disadvantages): basic principles of experimental designs, the completely randomized designs (CR- Design), Randomized complete block design, Latin square design, factorial experimental design, computer methods of statistical evaluation. Co-relation and regression analysis

PCOL-502   ADVANCED CONCEPT OF GENERAL PHARMACOLOGY 3(3+0)

Course Objectives:

This course familiarize the students with the recent concepts and advances in the basic principal in various field of pharmacology. They would understand the new concepts of cellular as well as molecular pharmacology.

Course Contents:

Drug receptor interaction theories,Receptor occupation and response relationship
Receptor characterization methods:Receptor down regulation and upregulation.
Structure activity relationships, Transmembrane signal mechanisms
Desensitization and tachyphylaxis,Drug dependence and withdrawal responses.
Cell proliferation and apoptosis.

PCOL-503   RECENT ADVANCES IN ETHNOPHARMACOLOGY   3(3+0)

Course Objectives:

This course will acquaint the post graduates students with the various fields of ethno pharmacology. They would be able to critically analyze the research paper published in various impact factor journals of ethnopharmacology. They will be able to write down the review articles by consulting the data available in those journals. They will be familiar with the techniques used in ethnopharmacological research. They will be comfortable to design a project in this area for their dissertations.

Course Contents:

At least ten (10) research papers from impact factor journals in each of the following fields of Ethnopharmacology would be discussed. They will particularly be focusing on the medicinal plants having reported biological / pharmacology activities in the following diseases:

Metabolic disorders

Medicinal plants

Reproductive Steroids

Obesity, diabetics, hepataprotective etc.

Anti Arrtheritis, Analgesics, antipyretics

Anti Oxidants

Cardivascular diseases: congested heart failure, anti arrthymic, anti hypertensive

Psyconeuropharmacology such as anxiety, depression, alzymier, epilepsy, antimicrbials

PCOL-504   TOXICOLOGICAL SCREENING TECHNIQUES   3(3+0)

Course Objectives:

After the completion of this course, the students would be familiarize with some of the toxicological screening techniques used in drug discovery & development.

Course Contents:

Determination of Maximum Tolerated Dose (MTD) and LD50 .Allergenicity testing, dermal toxicity.Cytotoxicity determination byMTT,LDH and neutral red uptake assay.Types of genetic toxicity testing, AMES test, BCOP test, Comet assay, Embryonic stem cell test, Eye irritation test, HET CAM, HPRT Assay, Mouse lymphoma assay, skin corrosion test, skin irritation test , RBC test, Phototoxicity assay, photogenotoxicity assay, Surian Hamster Embryo (SHE) cell transformation Assay

PCOL-505   PHARMACOLOGY LAB   1(0+1)

Course Objectives:

After the completion of this course, the students would be able to use various pharmacological techniques used in recent pharmacological research. They would be particularly focusing on the use of dry lab. as well as wet lab. in pharmacology.

Course Contents:

Principles of Experimental Pharmacology,

Common laboratory animals in pharmacological research, limitations of animal tests, alternatives to animal use Regulations for the care and use of laboratory animals. Experiments based on receptor occupancy and dose response relationship study, Bioassays, experiment on intact animals & isolated tissues, aspects of bioavailability & pharmacokinetics, spectroscopy, sophisticated chromatographic techniques.

CC/M.Phil-502   RESEARCH METHODOLOGY   2(2+0)

Course Objectives:

This course will enable the students to choose the right path for doing research in various field of pharmacology.

Course Contents:

Sources of Literature, Literature Survey, Reference Methodology, Writing techniques of thesis, Data Analysts using statistical Techniques, Research & Clinical Ethics, (TDR/PRD/ETHICS/2000.1 "Operational Guidelines for Ethics Committees That Review Biomedical Research" by World Health Organization (WHO) Geneva 2000 Page No. 5 (4.5.2), Animal Use ethical Committees.

PCOL-506   CLINICAL PHARMACOLOGY 3(3+0)

Course Objectives:

After the successful completion of this course, the students will learn rational use of drugs for the treatment of various diseases particularly related to female patients.

Course Contents:

Cardovascular& Renal on CVS.Asthama and drug induced lung diseases. Gastroenteritis, Hepatitus, Jaundice & other Hepatic disorders.Endocrine & metabolic disorders (diabetes mellitus, Osteoporois, Reproductive steroids, another related disorder.). Dermatological disorders (acne, eczema, psoriasis & melanoma disorders (Hypertention, CHF & other coronary disorders), adverse effects of cardiovascular drugs, drug induced skin problem) Drug therapy in pregnant and breast feeding women, clinical pharmacokinetic &Pharmacodynamic, nutrinutional problems in women, Pharmacoepidemology

PCOL-507   NEUROPSYCHOPHARMACOLOGY 3(3+0)

Course Objectives:

This course will enable the students to understand the recent advances in pharmacology in the field of Neuropsycopharmacology.

Course Contents:

Neurological disorders (Dementia, Sclerosis, Stroke) and Drugs induced neurological disorders,

Drug addication, Narcotic Analgesics, Antipsychotics, Anti anxiety, Antidepressants, Anti-Parkinsonism, Anti-Epileptics.

PCOL-508   BIOCHEMICAL AND MOLECULAR PHARMACOLOGY 3(3+0)

Course Objectives:

This course will develop an integrated approach in students. They will be able to explore and integrate various disciplines of science such as physiology, pathology, microbiology, bio-chemistry, biology and pharmacology and their importance in the drug development by using recombinant DNA technology.

Course Contents:

Transcription and Translation of Genes, Neurohumoral Transmission and signal transduction

Separation, Purification and Characterization of Proteins, Nuclenic Acids and Phospholipids, Sequenecing and Synthesis of Nuclic Acids and Peptides, Study of drugs metabolosium and relevant enzyme, radio immunoassay, radio labeling, Flourescent Spectroscopy and Immunodetection. Gene therapy, Recombinant DNA Technology and drugs prepared using this thecnology. Animal tissue culture.

PCOL-509   PHARMACOLOGY LAB   1(0+1)

Course Objectives:

The students would be familiarize with various techniques used in of bio-chemical, hematological, and molecular biology.

Course Contents:

Study of Hematological & Biochemical Parameters Level in patient's blood.

Determination of toxicological parameters in patients' blood or urine suffering with nephrotoxicity, hepatotoxicity etc.(Total protein, Alkaline phosphatase, SGOT, SGPT, Creatinine, Urea Nitrogen, Uric Acid, bilirubin). Analysis of following urinary constituents in patients: Na^+, K^+, Ca^{++}, Glucose, Albumin, creatinine and other physiological factors relationship with disease, clinical implication and interpretation,Determination of the antibacterial spectrum of antibiotics (Determination of MIC & Zone of inhibition), Isolation of plasmids,Isolation of DNA and RNA,Estimation of DNA and RNA,Polymerase Chain reaction, Purification of PCR Products, Restriction digestion, Gel Electrophoresis Any other practical/exercises related to pharmacology can be designed.

THIRD & FOURTH SEMESTER

PCOL-601 & PCOL-602

The research work will be carried out in any branch of Pharmacology. The thesis shall embody the results of research, which may either be contribution to the existing knowledge of the subject, or application of known methods of research to some technical problems. These semesters will also include seminars and viva-voce examination concerning research topics. Three copies of Research Thesis printed or type written shall be submitted for the examination at the end of the fourth semester for evaluation and comprehensive examination.

Recommended Books:

Sr. No.	Title of Book	Author Name
1.	Rand &Dales's Pharmacology 8th edition (IE)	Rang/Dale
2.	Clinical Pharmacy and Therapeutics 5th edition (IE)	Walker R.
3.	Basic and clinical Pharmacology 13th edition (IND/ED)	Katzung B.G
4.	Goodman & Gilman's The Pharmacological basic of therapeutics 12th edition	Laurence Brunton, Bruce Chabner, Bjorn Knollman
5.	Richard D. Howland Pharmacology: Lippinoteillmtneter review	
6.	Singnal, K.C.Pharmacology Laboratory Manual I, II, 2nd edition CBS, New Delhi; 1997	
7.	Nijkamp, F.P Principles of ImmnopharmacologyBirlakhansarverlogy, Botton, 2005	
8.	Fox, Stuart I. Human Physiology. 13th edition, Mcgraw	
9.	Widmaiern, EP, Vender's human Physiology 13th edition MCGRAW HILL, 2011	
10.	Hansten, Philip D. Drug Interactive: Analysis & management 2014. WoltersKhawer	
11.	Watson, David. Pharmaceutical Analysis: AT.B of Pharmacy students, Elsevier 2012	
12.	Pommerville, T.C. Alcamo's Fundamentals of Microbiology 10th edition Jones &Bartlete.W.Y	
13.	Pillay, W modern medical toxicology 3rd edition Jaypee. New Delhi; 2005	
14.	Hayes, A. Wallace. Principles and methods of toxicology 5th edition infarma, N.Y. 2007	

15.	Barile, FranlaA. Principles of Toxicology testing. Infarma. New York, 2007	
16.	Krishnan, Kannan. Quantitative modeling in toxicology wiley. New York. 2010	

Standard 2.1: The curriculum must be consistent and supports the program's documented objectives.

- Describe **how the program content (courses) meets the program objectives**.
- Complete the **Table 4.4** **linking courses to program outcomes**. List the courses and tick against relevant outcomes. A sample of such a matrix is shown below.

Courses or Group of Courses	Program Outcomes			
	1	**2**	**3**	**4**
BIOSTATISTICS	Use of bio-statistics in biological & Pharmaceutical research	Application of various tests of significance and their interpretation.		
ADVANCED CONCEPT OF GENERAL PHARMACOLOGY	Understanding of recent concepts and advances in the basic principal in various field of pharmacology.	Application of new concepts of cellular as well as molecular pharmacology.		

RECENT ADVANCES IN ETHNOPHARMACOLOGY	critical analysis of the research papers published in various impact factor journals of ethnopharmacology.	Gaining ablility to write down the review articles by consulting the data available in those journals.	Familiarity with the techniques used in ethnopharmacological research.	Designing of a project in this area for dissertations.
TOXICOLOGICAL SCREENING TECHNIQUES	Familiarity with some of the toxicological screening techniques used in drug discovery & development.			
PHARMACOLOGY LAB	Ability to use various pharmacological techniques used in recent pharmacological research.	use of dry lab. as well as wet lab. in pharmacology		
RESEARCH METHODOLOGY	Learning of methods for doing research in various fields of pharmacology			
CLINICAL PHARMACOLOGY	Learning about rational use of drugs			

	for the treatment of various diseases particularly related to female patients.			
NEUROPSYCHO PHARMACOLO GY	Understanding of the recent advances in pharmacology in the field of Neuropsycopharmac ology.			
BIOCHEMICAL AND MOLECULAR PHARMACOLO GY	ability to explore and integrate various disciplines of science such as physiology, pathology, microbiology, bio-chemistry, biology and pharmacology	Learning importance in the drug developme nt by using recombina nt DNA technology.		
PHARMACOLO GY LAB	familiarity with various techniques used in of bio-chemical, hematological, and molecular biology.			

- **<u>Computer usage</u>**

  Separate Computer lab for Mphilnot available.

- **<u>Laboratory</u>**

  Research lab for M.phil Pharmacology is designated but not fully equipped due to lack of resources.

  Animal house allocated.

Table 13: <u>Elements of Courses</u>

Elements	Courses	No of Courses
Theoretical background	Advanced concepts of general Pharmacology Recent Advances in Ethanopharmacology Toxicological Screening Techniques Research Methodology Clinical Pharmacology Neuropsychopharmacology Biochemical & Molecular Pharmacology	7
Problem solving	Bio Statistics	1
Solution design	Pharmacology Lab (PCOL-505 & PCOL-509)	2

Standard 2.3: The curriculum must satisfy the core requirements for the program, as specified by the respective accreditation body.

Satisfies all the core requirements of the respective accreditation body

Standard 2.4: The curriculum must satisfy the major requirements for the program as specified by the respective accreditation body.

Satisfies all the major requirements of the respective accreditation body

Standard 2.5: The curriculum must satisfy general education, arts, and professional and other discipline requirements for the program, as specified by the respective accreditation body/council.

Table A.1   Minimum Requirements for Each Program
(Program Semester Credit hours)

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

- Research methodology
- Biostatistics
- Pharmacology lab

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

Oral and written communication skills of the student are developed by Presentations, assignments, quizzes and class participation of students.
Applied by Research proposal, Review article and original article writing.

CRITERION 3: LABORATORIES AND COMPUTING FACILITIES

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

- Manuals/documentation/instructions for experiments are available to faculty and students.
- Laboratories standards are complying with the SOPs.

Standard 3.2: There must be adequate support personnel for instruction and maintaining the laboratories:

- Support personnel not adequate in number.
- Dire need for hiring of Laboratory technicians and Laboratory assistants.

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

- Not adequate
- Separate class room for Mphil students is not available.

CRITERION 4: STUDENT SUPPORT AND ADVISING

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

- Courses are offered yearly
- Course outline is provided before the start of each semester which includes the structure of course work to be studied in the semester

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

- Presentations
- Quizzes
- Assignments

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

- Students are informed about program requirement by respective faculty
- They are also provided guidance regarding carrier opportunities by faculty.
- Lectures and seminars are arranged from well reputed pharmaceutical professionals to give insight into practical opportunities for students.

CRITERION 5: PROCESS CONTROL

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:

- Program admission criteria are followed according to University admission policy.
- M. Phil Self supporting (afternoon) 2 years degree program
- Eligibility criteria to apply: 5 years Pharm.D degree holders with mimimum 60 % marks.
- Students shall obtain 50 % marks in written test to qualify for interview.

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:

- Students are registered in the program based on criteria given by the Pharmacy Council of Pakistan.

- Academic progress is monitored through examinations, presentations and how their program of study is verified to adhere to the degree requirements.

> **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 its objectives:

- HEC and the Pharmacy council of Pakistan appointment criteria are strictly followed for hiring faculty members.

> **Standard 5.4:** The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives:

- Examinations, class tests and assignments.
- Teacher's evaluation by QEC.

> **Standard 5.4:** The process and procedures used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning

outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives:

- Students are evaluated by periodic Test session , Quiz and final assessment

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.

- Students are evaluated by periodic Test session , Quiz and final assessment

CRITERION 6: FACULTY

Standard 6.1: There must be enough full time faculty who are committed to the program to provide adequate coverage of the program areas/courses with continuity and stability. The interests and qualifications of all faculty members must be sufficient to teach all courses, plan, modify and update courses and curricula. All faculty members must have a level of competence that would normally be obtained through graduate work in the discipline. The majority of the faculty must hold a Ph.D. in the discipline:Complete the following table indicating program areas and number of faculty in e

Program Area of Specialization	Courses in the Area and Average Number of Sections per Year	Number of faculty Members in Each Area	Number of Faculty with Ph. D Degree
Pharmacology	5 / semester	3	2
Bio statistics	1/semester	1	1

Total	6/semester	4	3

Table 4.6: Faculty Distribution by Program Areas

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:

- Faculty development programmes are conducted routinely at the departmental and university level. Various trainings workshops and seminars conducted by DFDI and Institute of Pharmacy are very effective for faculty development.
- Faculty programmes are evaluated by QEC and results are used for further evaluation

Standard 6.3: All faculty members should be motivated and have job satisfaction to excel in their profession:

- Promotion and research incentives
- Faculty surveys conducted by QEC

CRITERION 7: INSTITUTIONAL FACILITIES

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

- Internet facility available to the students
- Access to HEC digital library of Institute of Pharmacy available but separate facility for M phil students is not allocated.

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:

- Adequate number of books on each subject in library are available.
  - Access to Journals however is too limited.

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

- Separate classrooms are not available for M.Phil.
- Common room for M. Phil students is not available.

CRITERION8: INSTITUTIONAL SUPPORT

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:

- Inadequate secretarial support, technical staff and office equipment
- Payment / credit hr. taught

Standard 8.2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. students:

Year	No. of M.Phil Students	No. of Research assistants
2015-2017	20	Nil
2016-2018	20	Nil

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

Financial resources for the stated facilities are managed from M.Phil evening program budget.

Appendix- A

- Public Private Partnership of Punjab Govt officers. April 17-19, 2017 by Management and Professional Development Department.

<u>Appendix- B</u>

1. Comparative Hepatoprotective Activity of Fumariafarviflora Lam. Leaf Extract and Silymarin on Isoniazid and Rifampicin-induced Hepatotoxic RatsH. M. Khan[*] and S. IqbalIndian J Pharm Sci 2017; 79(1): 124-130

2. Stability comparison of Two dermal emulsions containing Hippophaerhamnoides L. oil HinaHussain, Muhammad IrfanMasood, Muhammad Naeem Amir and HUmairaMajeed Khan. Pakistan journal of pharmaceutical sciences 30(5):1529-1534 · September 2017

3. Comparative efficacy of commonly used fixed- combination drugs with 0.5 % Timolol maleate in dexamethasone induced ocular hypertension rabbit's eye model. HumairaMajeed Khan, Aftab Ahmad Anjum, Sehrish Sultan. Brazilian Journal of Pharmaceutical Sciences. 2017

4. Antiviral, embryotoxic and cytotoxic activities of Astragalusmembranaceus root extracts. HumairaMajeed Khan, Syeda Mariam Raza, Aftab Ahmad Anjum, Muhammad Asas Ali and Hamid Akbar. 2017