Assessment Report – For the College of Pharmacy to the University Assessment Committee for the 2009-2010 academic year

The following summarizes the College’s annual report of assessment activities as entered into the online assessment matrix. Each program has a more detailed report available in the online matrix.

I. Mission: The mission of the College of Pharmacy & Pharmaceutical Sciences is to educate students to meet the pharmaceutical needs of society, to advance pharmaceutical knowledge through research and to serve the profession and the community. Guiding principles are personal integrity, respect for humanity and human diversity, and professionalism.

II. Accreditation: The Doctor of Pharmacy program is fully accredited by the American Council on Pharmaceutical Education. The college will be visited for re-accreditation in Fall 2011.

III. Student Learning Outcomes: The student learning outcomes for all graduates (BSPS, PharmD, MS, PhD) of the college are the following:

A. The goals of the educational programs of the college are to develop graduates with the following abilities:

1. Have a broad knowledge base of pharmaceutical and/or clinical/administrative/behavioral sciences.

2. Apply fundamental concepts and critical thinking skills to solve problems

3. Effectively communicate verbally and in writing

4. Be effective team members

5. Self-assess on an ongoing basis to maintain and continue professional development (life-long learning)

6. Serve as leaders in their organizations, profession and community

7. Display responsible professional and ethical characteristics and behaviors which benefit patients, society, and the student’s chosen profession.
B. Specific learning outcomes for each degree program have also been defined as follows:

BSPS (approved 4/13/2010):

1. Apply principles of physical, biological, and administrative sciences to successfully solve problems in the pharmaceutical sciences.
   
   (a) Interpret the results of studies as presented in reviews and in the primary literature.
   
   (b) Apply the concepts of controlled experimentation and evidence-based practice.
   
   (c) Be able to use primary literature and reference materials to acquire and evaluate relevant information and frame questions requiring further research.
   
   (d) Be able to begin a process of a critical evaluation of technical issues related to the pharmaceutical sciences.

2. Communicate effectively, both orally and in writing, with other professionals and the public; write an interpretable technical report and/or business plans.

3. Work cooperatively as part of both disciplinary and interdisciplinary teams.

4. Understand the basic principles of chemistry, life science, medicinal chemistry, pharmacology and biochemistry as they apply to the activity of drugs, biologicals, and toxins.

5. Be able to apply appropriate computer technology to create effective written, graphic, and oral presentations.

6. Apply computer technology to the collection, processing, and analysis of data appropriate to a student’s specialty.

7. Understand the organization of the scientific community and the roles of academia, government, and private industry as well as how this organization affects research, drug development, health care, and technical decision making.

8. Develop skills to carry out duties in accordance with accepted legal, ethical, social, economic, and professional practices and interact in a professional manner with managers, colleagues, and subordinates.

9. Develop the skills necessary to maintain professional competence and incorporate new developments and technologies into practice.

10. Recognize key contemporary problems in a discipline, and understand how these are being addressed through research.
Doctor of Pharmacy: (Approved by College Faculty 8-19-2005)

1. Assess patients, utilizing patient-specific data (e.g., physical exam, laboratory tests, history, procedures), in order to provide pharmaceutical care.

2. Evaluate and prioritize patient problems and triage patients to other health professionals, as appropriate.

3. Design, implement, monitor, evaluate, and adjust a patient-specific, evidence-based pharmaceutical care plan or recommend modifications of an ongoing pharmaceutical care plan.

4. Identify, assess, and solve medication-related problems and/or issues.

5. Report and manage medication errors and adverse drug reactions.

6. Recommend and monitor non-pharmacological, nutritional, alternative, and non-prescription therapies for patient-centered and population-based pharmaceutical care in an evidence-based manner.

7. Retrieve, interpret, evaluate, and apply scientific, lay, and professional information to specific patient care, population-based health care, and health policies.

8. Effectively communicate and collaborate with prescribers, allied health professionals, care-givers, policy makers, members of the community, administrative personnel, supportive personnel, and other involved providers of health care.

9. Safely and accurately evaluate, compound, package, and dispense prescriptions in appropriate dosage forms.

10. Communicate with patients in order to obtain appropriate patient-specific information on their health condition and medication history in order to ascertain the patients’ compliance, monitor medication use, determine the effectiveness of their current medical regimens, and, when applicable, devise a new medical regimen or suggest modifications to the current regimen.

11. Communicate with patients in order to counsel them regarding the purposes, proper uses, therapeutic and adverse effects, and self-monitoring of their medications and to promote wellness and health.
12. Manage medication use systems, through the ability to apply patient- and population-specific data, quality assurance strategies, and research processes, in order to minimize drug misadventuring, optimize patient outcomes, contribute to the development of drug use and health policy, and collaborate on the design of pharmacy benefits.

13. Manage human, physical, medical, informational, and technological resources, through the ability to assure efficient, cost-effective utilization of these resources in the provision of patient care.

14. Perform the proper administration of medications via nasal, inhalation, otic, optic, and injectable (subcutaneous and intramuscular) routes.

15. Develop skills to carry out duties in accordance with legal, ethical, social, economic, and professional guidelines and to interact in an appropriate professional manner with healthcare providers and patients.

16. Develop the skills necessary to maintain professional competence by identifying and analyzing emerging issues, products, and services and to become self-directed lifelong learners.

MS Industrial Pharmacy – Learning Outcomes

1. The program will develop the student's ability to work effectively with colleagues, other scientists and industrial professionals and administrators.
2. The program will develop the student's ability to search for and interpret information applicable to specific projects in pharmaceutical manufacturing.
3. The program will foster problem-solving and decision-making skills that may be applied to the development, testing and production of pharmaceutical dosage forms.
4. The program will encourage the student to become involved in professional associations at national and regional levels where applicable.
5. The program will develop the student's ability to ascertain the types of pharmaceutical products that are currently used and those that may be needed in the future. It will also develop the student's ability to design dosage forms to meet these needs.
6. The program will provide the student with specific training in industrial pharmacy that will provide a competitive edge in the pharmaceutical industry job market over graduates of other less focused programs which do not emphasize industrial pharmacy.
MS Pharmacy and Healthcare Administration – Learning Outcomes

Each student graduating from the program should have basic proficiency in each of the four focus areas, namely, Outcomes Research, Pharmacoconomics, Administrative Sciences, and the Sociobehavioral sciences. Students electing a specific track should exhibit higher levels of expertise in that area. Specifically, upon graduation, students will be able to:

1) Exhibit a basic understanding of the US Health Care System and pharmacy’s role within that system.

2) Exhibit a basic understanding of theoretical concepts and application of the administrative sciences, primarily management and marketing, within the global pharmaceutical marketplace.

3) Exhibit a basic understanding of the theory and application of the socio-behavioral sciences as they relate to pharmaceutical care. Primary attention is paid to the concepts of Cultural Competence, Health Literacy, Behavioral models, Health Disparities and Access to Care.

4) Describe the role of outcomes research and pharmacoconomics in the evaluation of pharmaceutical and pharmacy services.

5) Identify and describe different types of clinical, economic, and humanistic outcomes and their proper evaluations.

6) Be able to read, interpret, and critically evaluate literature related to the four focus areas.

7) Effectively present a seminar on a topic relevant to the program focus areas.

8) Extract, manage, and analyze data from various sources including databases, patient charts, data collection forms, and survey instruments.

9) Provide significant input on research project collaborations with fellow students and PHCA faculty.

10) Design, implement, and analyze the results of an independent research project.

11) Communicate and defend research findings orally and in writing.
MS – Pharmacology/Toxicology

1. Apply principles of chemical, biological, pathological, physiological, pharmacological and toxicological sciences to successfully solve problems in the pharmaceutical sciences.
2. Understand and be able to discuss results of studies as presented in primary literature.
3. Conduct experiments that lead to a written thesis to solve a problem or answer a specific question in the fields of pharmacology, physiology or toxicology and also provide data that can lead to a publication.
4. Be able to solve technical problems, issues related to the experiments being conducted, and be able to work independently.
5. Develop excellent communication skills, both oral and written in the fields of science in general, and pharmacology and toxicology in particular.
6. Develop abilities to work in a team.
7. Be able to statistically analyze research data.
8. Develop computer skills to process and analyze research data.
9. Develop ethical skills to carry out duties of practices after graduation.
10. Be prepared to either pursue Ph.D. studies in the fields of Pharmacology/toxicology or gain employment in the fields of pharmaceutical industry, academia or government.
11. Be able to catch up with contemporary problems or new issues in pharmacology and toxicology, and understand how these are being addressed through research.

MS Medicinal Chemistry

1. Identify and describe the biochemical and molecular mechanisms that maintain the normal function of cells, tissues and organs.
2. Summarize basic principles of the rational design of therapeutics, including target identification based on an understanding of disease mechanisms, and the design of biological and small molecule therapeutics.
3. Have sufficient laboratory and technical skills to conduct research in an area of specialization relevant to the rational design of therapeutics. These skills depend on the area and typically include in depth knowledge of the fundamental principles of their area of specialization, working knowledge of analytical techniques, and/or skill in synthetic organic chemistry.
4. Be able to critically evaluate original research reports and identify gaps of current knowledge.
5. Be able to design experiments and execute a research program in an area of specialization relevant to modern drug development and discovery. This includes the development of testable hypotheses.
6. Communicate research plans and results in writing and orally.
7. Work in a team that conducts a research program.
8. Be able to know and comply with standards of ethical and responsible conduct of research.
9. Be able to describe how the scientific community functions and be able to play an active role in it. This student should know the role of publicly funded research (universities, research institutes etc), pharmaceutical companies, and professional organizations in the development of new therapeutics.

10. Be in a position to find employment in the general field of pharmaceutical sciences and related fields.

PhD Medicinal Chemistry

1. Identify and describe the biochemical and molecular mechanisms that maintain the normal function of cells, tissues and organs.
2. Summarize basic principles of the rational design of therapeutics, including target identification based on an understanding of disease mechanisms, and the design of biological and small molecule therapeutics.
3. Have sufficient laboratory and technical skills to conduct research in an area of specialization relevant to the rational design of therapeutics. These skills depend on the area and typically include in depth knowledge of the fundamental principles of their area of specialization, working knowledge of analytical techniques, and/or skill in synthetic organic chemistry.
4. Be able to critically evaluate original research reports and identify gaps of current knowledge.
5. Be able to independently design, plan and execute a research program in an area of specialization relevant to modern drug development and discovery. This includes the development of testable hypotheses.
6. Communicate research plans and results in writing and orally.
7. Work in a team and lead a team that conducts a research program. Our Ph.D. students work with undergraduate students to develop the ability to delegate components of a research program.
8. Be able to know and comply with standards of ethical and responsible conduct of research.
9. Be able to describe how the scientific community functions and be able to play an active role in it. This student should know the role of publicly funded research (universities, research institutes etc), pharmaceutical companies, and professional organizations in the development of new therapeutics.
IV. Data Collection

Numerous types of assessment data are collected in all programs offered in the College of Pharmacy and Pharmaceutical Sciences. These data include course evaluations (with each course offering), preceptor and advisor evaluations of students in each research and experiential courses (evaluated by the respective program director), and student evaluations of experiential courses (each experience), retention rates, progress to degrees, job/residency and graduate school placement rates, and maintenance of required GPA’s. Additionally, information from faculty observations of student learning and departmental and course faculty discussions mold enhancements of individual courses and course series on an annual and semester basis.

For Doctor of Pharmacy program assessment, numerous standardized national tools are available from the American Association of Colleges of Pharmacy (AACP) which are used to evaluate Graduate, Faculty, Alumni and Preceptor impressions of the program. In addition, the college has adapted the AACP Graduate Survey into an End of Year Survey which is provided to each Doctor of Pharmacy class annually to document progression of competency development as well as the students’ impressions of college policies, administration, and resources. The Doctor of Pharmacy program also participated in NABP’s Pharmacy Curricular Outcomes Assessment examination for the first time in 2009-2010 and plans to have cohorts of P3 and P4 students participate in that examination annually. In addition, the Doctor of Pharmacy program has a number of key assessment points (practical examinations, major papers and a seminar course) which serve as capstone events which assist with monitoring the impact of course level curricular changes. Individual course-related changes are considered and made by involved faculty and shared with the Director of Assessment annually. Annual licensure board examination (NAPLEX, MJPE) passage rates serve as additional tools which document the quality of the program. The data utilized, timelines and responsible parties for assessment of the Doctor of Pharmacy program are depicted in Table 2.

The Bachelor of Science in Pharmaceutical Sciences Program utilizes the standardized methods outlined for all UTCPPS programs above. The assessment plan for this program is depicted in Table 3. Unique assessment measures of this program include performance in key Capstone level courses (evaluated by departmental faculty), observations of practicum preceptors, participation in undergraduate research and subsequent publications, as well as observations from job placement interviews. Responsibility for assessment in the BSPS program lays with the program director, the Director of the Institute for Professional Advancement the Pharmaceutical Sciences, BSPS program staff and the departmental faculty.

The Masters of Science in Pharmaceutical Sciences, the Masters of Science and Doctor of Philosophy in Medicinal Chemistry programs utilize the standardized methods outlined for all UTCPPS programs above. Additional parameters used to enhance these curricula and improve student learning include student performance on key exams, student performance in research lab courses, evaluations of written and oral thesis defense presentation, progress on thesis projects, presentations at national and international
meetings, and interactions at small group meetings between faculty and students. The PhD program in Medicinal Chemistry additionally utilizes a qualifying examination at the end of the first year of study. Departmental faculty, program directors and departmental chairs are responsible for assessment of these programs. Most of these aspects are evaluated annually and continuously.

The accredited Doctor of Pharmacy program has well established assessment processes. The four tracks of the BSPS, three tracks of the MSPS, and the graduate programs in Medicinal Chemistry have just recently been identified as individual programs which should report assessment data, findings and changes. Each of these programs is beginning to plan its assessment processes including the identification of key indicators of student learning. Many of the processes (e.g., graduate, alumni and end of year surveys) used in the PharmD program will likely be used as templates for tools to be used in the other programs.

V. Student and Faculty Involvement

Faculty and students are both integrally involved with the assessment processes within the UTCPPS. Faculty evaluate student work on examinations, exercises, projects, research and practice laboratories, experiential rotations, thesis projects, group meetings, as well as interactions with external members of the respective professions, and student conduct during job placement processes. Faculty also evaluate student course evaluations and individually interact with students to obtain feedback on quality of instruction. Faculty utilize a number of standardized instruments to evaluate students during many of these required curricular elements. Faculty also evaluate results of standardized national and college level surveys which evaluate student perceptions of the program and their progression toward achieving programmatic competencies, as well as alumni and preceptor surveys. The faculty are members of the college’s curriculum and assessment committees who monitor the college’s assessment processes and curricular quality.

Students are also integrally involved with the assessment processes with the UTCPPS. They evaluate all courses, all experiential rotations, internships, and all research experiences. The Doctor of Pharmacy students participate in standardized surveys annually as well as a nationally standardized examination and the licensure examination. They participate in practical and capstone events which may need to be remediated if not passed at defined standards. They provide feedback informally during small group meetings. In addition they are members of the curriculum committee, the assessment committee and a number of ACPE accreditation self-study committees.

Summaries of the college’s assessment plans which depict the involved parties in the college’s assessment activities are depicted in Tables 1 and 2.
VI Findings

The assessment processes in the UTCPPS have documented effective teaching and learning as well as areas for improvement. Previous assessment processes documented the Doctor of Pharmacy students’ need for more early experiential education which would allow them to better understand the relevance of core concepts in the pharmacy curriculum. Similarly, it was previously identified that increased integration between clinical and basic sciences throughout the curriculum would allow students to fully understand important core content. Similarly, it has been appreciated that the BSPS students had learning objectives which were different from the Doctor of Pharmacy students and which were not entirely being met by taking basic science coursework which was very similar to that of the Doctor of Pharmacy students.

Key findings were noted in the Doctor of Pharmacy program, the BSPS program and the graduate programs. The Doctor of Pharmacy program continues to successfully prepare students for licensure (100% NAPLEX passage rate). The Doctor of Pharmacy program participated in the NABP Pharmacy Curricular Outcomes Assessment examination for the first time this year. The randomly selected cohort of P3 and P4’s scored well above national averages for their year in all but 2 (of 27) areas. In the P4 capstone Seminar course, faculty had noted that the grading scheme was allowing students to pass the course with substandard presentations in terms of either content or verbal presentation skills.

Some key findings were noted in the BSPS program. The program was able to place 100% of its students into internships. Other key additional findings which correlate to programmatic changes include the following:

- Student inability to answer questions during placement interviews
- Student inability to perform scientific calculations
- Student inability to thoroughly and effectively write laboratory reports
- Student lack of awareness of process for application to graduate programs

The graduate programs also noted some key findings. Job placement rates for graduates are in excess of 90% with some students having multiple job offers. The majority of students present research at regional, national and international professional meetings. Key additional findings which correlate to programmatic changes include the following:
Emerging content areas that are not adequately covered, e.g. biotechnology and combinatorial chemistry in Medicinal Chemistry programs

- Student slow progress on thesis work and in the Pharmacy Outcomes Research Lab

## VII. Changes as a Result of Assessment Data

The 2009-2010 academic year was the first year of new curricula offered in both the Doctor of Pharmacy and the BSPS programs. The modified curriculum provided for a less intense PharmD curriculum (14 less required credit hours) along with increased early experiential coursework, more integration with basic pharmaceutical sciences throughout the curriculum and more opportunity for electives. The BSPS program modifications involved the offering of basic science courses designed specifically for the BSPS program compared to the previous curriculum which involved both licensure students and pharmaceutical science students taking the same courses. Feedback from students during the first offering of many newly designed courses is important and both programs will be closely monitored to assure that they continue to be successful.

In response to the Key Findings noted above, a number of changes have been developed. In the Doctor of Pharmacy program to address the two topic areas of weakness noted on the PCOA examination had already been noted as areas for content and laboratory expansion in the new curriculum. Additional didactic and laboratory work on Sterile Product Preparation has been added to the Professional Practice Development course series. In addition a lecture module on Pharmacoeconomics has been added to the Pharmacy Administration course series. Addition instruction is being provided to the students who are completing the last 3 years of the old curriculum to make up for these areas. The grading policy for the P4 Seminar course has been modified to require students who deliver substandard seminars based on either content or verbal presentation to remediate their seminar. Although course grades are very similar overall, the faculty is satisfied that students are all required to deliver a seminar which is professionally appropriate.

In the BSPS program a number of changes were made to provide for improvements in learning, curriculum and student services. The MBC 3330 course was increased in credit hour from 1-2
hours in order to better address scientific calculations. In addition this course was eliminated as a requirement in the Pharmacy Administration BSPS track as graduates in this area do not use these skills. To address the students’ poor performance at career interviews, the programmatic interviewing workshops were changed from voluntary to mandatory and workshops for interpersonal skills were developed and implemented. In the Pharmaceutics BSPS track new written laboratory reports were required in sufficient quantity to develop the students’ scientific writing skills. To acquaint all BSPS students with the process for applying to graduate schools a series of seminars was added to describe opportunities with a graduate degree, scope of programs and the application process.

The graduate programs also implemented changes to improve student learning and student services. In the Medicinal Chemistry programs additional content on biotechnology and combinatorial chemistry has been added. The MSPS Pharmacy and Healthcare Administration program has implemented weekly meetings with graduate students to keep them on track on thesis and other research projects and improve communication between students and faculty. The faculty have also designed and implemented a policy and procedure manual for the PCOR laboratory which defines timelines for student work, and data-tracking policies which help with workflow. The program is also providing continuous formative feedback to students to help them with their work habits. Graduate assistants are now being formally evaluated so that responsibilities are clear. As a result, graduate assistant job descriptions have been modified and one graduate assistant lost their position due to poor performance.

VIII. Dissemination of Assessment Findings

Assessment findings were disseminated to a variety of stakeholders (See Table 1 and 2). The college’s Annual Report includes significant assessment findings (board passage rates, publications and grants). Results of all standardized assessment tools (national surveys, board exam results, PCOA results) were shared with the faculty in summary form and placed on the pharmacy datashare. Key findings which were either points of pride or that initiated course or curricular change were shared with students in related courses. Notable findings were also shared with the Dean’s Partnership Board at semi-annual meetings. The board includes alumni, preceptors, and key pharmaceutical and healthcare industry stakeholders. Faculty committees, the Dean’s Cabinet, Pharmacy
Council, and Student Council were also provided with assessment results as appropriate. Feedback from stakeholders is requested when assessment data are shared.