



COLLEGE OF PHARMACY
CLINICAL PHARMACY
UNIVERSITY OF MICHIGAN

Clinical Pharmacy
Translational Sciences
Graduate Student Handbook

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GUIDE TO GRADUATE STUDENT REQUIREMENTS

This document provides a summary of the requirements that must be fulfilled to earn the Ph.D. degree in Clinical Pharmacy Translational Sciences (CPTS) as well as the PharmD/PhD and the timeline for meeting these requirements. In considering the PhD program, years will be denoted as CP1, CP2, CP3, CP4, and CP5. In considering the PharmD/PhD Program, years will be denoted as P1, P2, P3, P4, P5, P6, and P7. Exceptions to the policies in this Handbook may be considered on a case-by-case basis, as determined to be appropriate by the Graduate Program Director (GPD) in consultation with the Department faculty and members of Dissertation Committees.

The CPTS program resides in the University of Michigan College of Pharmacy (UM COP), and the program is approved by the Rackham Graduate School. Important individuals in the College who can assist you with questions include the following:

CPTS Staff and Faculty

Jennifer Bronson (jennmfb@med.umich.edu), Department of Clinical Pharmacy executive assistant. Ms. Bronson is the department's executive assistant. She assisted you in your interview process when you first interviewed with us, and she assists the Chair of the department.

Daniel Hertz (DLHertz@umich.edu), PharmD, PhD, CPTS Graduate Program Director (GPD). Dr. Hertz is Director of the CPTS Graduate program, and he supports students in the program, ensures faculty/students complete Individual Development Plan (IDP) requirements and helps ensure student's academic progress in collaboration with faculty.

Karen Farris (KFarris@umich.edu), PhD, Associate Dean for Faculty Affairs and Graduate/Undergraduate Education. Dr. Farris oversees all graduate education programs in the College, delegating day-to-day oversight to the Directors of the programs.

Amit Pai (amitpai@umich.edu), PharmD, Chair, Department of Clinical Pharmacy. Dr. Pai is Chair of the Department of Clinical Pharmacy, and he oversees the financial aspects of the graduate funding in collaboration with the Dean, CPTS faculty, CPTS GPD, and Student Affairs Program manager.

UM COP Staff

Sneha Strodel (snehar@umich.edu) is Student Affairs Program Manager. Ms. Strodel manages graduate student support, including admissions, data maintenance, and student records, for the UM COP doctoral programs, including communications with Rackham.

Eileen Brussolo (efc@umich.edu) is Student Affairs Program Manager. Ms. Brussolo manages student financial support, including appointments in the College for all students, in collaboration with the department chair.

Antoinette Hopper (acast@umich.edu), Student Affairs Program Manager. Ms. Hopper establishes, conducts and manages professional development training, resources, and other activities (such as those related to community building and wellness) primarily for graduate students at the UM COP.

I. FUNDING

PHD. Full funding for each student admitted into the PhD program is provided and includes a full tuition waiver, stipend, and health benefits for self and dependents. Up to five years of funding is guaranteed. Funding sources can include any combination of fellowship, teaching, research, or traineeship.

Students who have their own external funding, or who receive funding from an external source during their time in the program, are required to share the details of their support package with the COP. To ensure that all graduate students receive no less than the College's current support package, the College will supplement a student's external award to cover any funding gaps between the external award and the College's current support package. If the external award provides full support, equivalent to the current graduate student support package, no additional College support will be provided. All external awards will follow the COP [PhD Student Policy for External Fellowships and Scholarly Awards](#) and will be reviewed on a case-by-case basis.

Students will be supported through completion of the Ph.D. program requirements provided they are making satisfactory progress towards the completion of the degree (See Section IX).

For students whose Ph.D. studies extend beyond the 5th year, their Ph.D. mentor must contact the Department Chair describing their support plan for the student and completion plan for meeting all Ph.D. degree requirements. The Associate Dean for Graduate Studies must also approve any College funding beyond the 7th year.

PHARM/PHD. Funding for Dual PharmD/PhD students is intended to support their research efforts as early as possible to ensure successful completion of the dual program in a timely manner. New students admitted to the dual program will enjoy the following support:

- Up to three funded summers of research support beginning with the summer prior to the didactic start of the program P2 year (stipend and health benefits for self and dependents).
- \$35,000 forgivable grant for the PharmD portion of the dual program (P2 to P4). Note, if a student does not complete either the PharmD or PhD portion, this grant turns into a low interest loan that must be repaid over time. Current PharmD that apply to and are accepted into the dual program after starting either program will receive support commensurate with when they were admitted to the dual program.
- Full funding for the PhD portion of the dual program (Fall semester of P4 year and Fall of P5 year) which includes a full tuition waiver, stipend, and health benefits for self and dependents. Funding sources can include any combination of fellowship, teaching, research, or traineeship.
- During terms where students are dual enrolled the University charges the higher tuition level of either school/college. In instances where Rackham tuition is higher than Pharmacy tuition (i.e., non-resident tuition), the COP will pay the difference between Pharmacy tuition and Rackham.

GUIDELINES FOR QUALIFYING FOR IN-STATE TUITION

Guidelines for Qualifying for In-State Tuition are established by the Board of Regents of the University of Michigan. If you believe that you qualify for in-state tuition rates, submit the Application for In-State Tuition to the University Residency Classification Office. The review process takes a minimum of three months after you submit your application.

You may qualify for in-state tuition in any of the following three ways:

1. Residence. By demonstrating that you are a permanent legal resident of the State of Michigan as defined by the Guidelines (see Part I of the guidelines at the link below);
2. Attendance. By demonstrating that you attended an accredited Michigan high school and accredited Michigan middle or junior high school (see Part II); OR
3. Service. By demonstrating that you or a family member are serving or have served in the U.S. military or Public Health Service (see Part III).

The Guidelines and application can be obtained through the following website: <https://ro.umich.edu/tuition-residency/residency>. Please read the Guidelines carefully before submitting an application; although you may be eligible under more than one track, you are only required to demonstrate your eligibility by one of the three distinct application methods, described in detail under Parts I, II and III of the Guidelines.

II. GETTING STARTED

A. FIRST-YEAR GRADUATE STUDENTS

PHD. New graduate students are assigned an academic advisor, typically the CPTS Graduate Program Director (GPD), for their first semester in the graduate program. This advisor will help you with course selection and other aspects of the first semester. Thereafter, your primary mentor/PhD advisor will assist you.

PHARMD/PHD. Students in this program will be admitted after completing the P1 PharmD year. Application to the PharmD/PhD program will be submitted in February of the P1 year, after having talked with the GPD and faculty in the department about your research interests. Interviews will occur in March of P1 year. Admission to the CPTS graduate program in April of P1 year will be conditional on strong academic performance in the P1 year. Any conditionally accepted PharmD/PhD applicant with cumulative GPA < 3.50 will undergo a complete review of academic performance and readiness for PharmD/PhD. Any grades of C+ or below, or a total of 3 or more B+ or below, from the P1 year will be considered concerning. The final admission decision will be made in May of P1 year by a committee of 3 individuals including the GPD, Department Chair, and one additional tenure-track faculty who has not worked directly with the applicant.

STUDENT SUPPORT. The CPTS Department seeks to be a welcoming environment for all people including students from groups underrepresented in the biomedical sciences. One of the most important areas for equitable treatment of all students is providing accommodations in the classroom and the lab for students with physical and mental disabilities. To assist any graduate students with disabilities, CPTS and the UM COP will partner with U-M Services for Students with Disabilities (<https://ssd.umich.edu>) and Rackham Graduate School (<https://rackham.umich.edu/rackham-life/students-with-disabilities/>) to implement disability accommodations and services. Students may contact the Student Affairs Program Manager for *Student Affairs and Admissions* for information about campus resources and to request an accommodation. Examples of reasonable accommodations include, but are not limited to: note taking services, captioning, interpreter services, and adjusting time limits on exams.

B. BEFORE FALL

PHD. If you have a pharmacy degree, you may want to come to Ann Arbor early so that you can secure a position at the Michigan Medicine hospital, after you obtain your pharmacy license. We will connect you to the Human Resources at the Department of Pharmacy to assist you. Please send an email to Jennifer Bronson (jennmfb@med.umich.edu) indicating your interest in this assistance. During graduate school, however, you are expected to work no more than 10 hours per week on average, in an outside position.

Alternatively, you may want to come to Ann Arbor early and start a summer research project with one of the department faculty. The Department of Clinical Pharmacy will partner with the faculty to provide financial support for you during the summer. You must work for a minimum of 6 weeks. Depending on funds available and the number of requests, it is expected that the department will provide 50% (up to \$2500) of the summer salary*, for a maximum of 10 weeks. Note that this summer research does not count as an official rotation, and you must do research rotations in the Fall term.

To apply for summer funding, the faculty member who has agreed to mentor you during the summer should send an email to Jennifer Bronson (jennmfb@med.umich.edu) indicating your name, a brief title or description of what you will do for your research, the time frame for the summer research, and a description of how the faculty member will provide their half of the support. No funds are available for supplies, travel, etc. Requests should be submitted by April 30. Funding will be allotted on a rolling basis, so earlier requests are more likely to be approved. The salary will be equivalent to the current graduate student stipend without fringe benefits.

C. ONBOARDING

PHD. You will attend an orientation for all graduate students to complete all paperwork for health insurance and other administrative details in CP1 Fall. You will be assigned space in North University Building Room 2560 if you do not have lab space in your rotation advisor's lab.

PHARMD/PHD. You will attend an orientation for all graduate students to complete all paperwork for administrative details in P2 Fall.

D. RESEARCH ROTATIONS

ALL STUDENTS. To assist you in your choice of a primary mentor and research group, and to gain understanding of the breadth of research in the CPTS program, all new graduate students are expected to participate in three research rotations of four weeks each, and if interested, may be allowed to complete a fourth. You will work with the GPD, who will be in communication with the Department Chair and Departmental Faculty, to select labs in which to rotate. What is most important is that we find the fit for your interest for your graduate studies.

PHD. You are expected to complete your research rotations during CP1 Fall. This is included as part of the course, Clinical Pharmacy 990: Dissertation Pre-Candidacy (see Curriculum section).

PHARMD/PHD. You are expected to complete your research rotations in summer of your rising P2 year or during P2 year. You will use one month to complete your P2 IPPE and 3 months to complete your three research rotations. Faculty will be flexible to work around the P2 IPPE. Alternatively, students may complete research rotations during the P2 Fall and Winter semesters, take Biostats 521/522 during P2 year, and select an advisor before Fall P3.

ALL STUDENTS. It is expected that you will elect to do your dissertation research in one of the labs in which you complete a rotation, or worked in over the summer or some other time for at least 4 weeks. Students are encouraged to spend as much time as possible when you are not in class in their rotation labs during M-F, 8-5, even when not actively working on their projects. This will help you become acclimated to the program and to the research environment. Postdocs who may be working in labs where you rotate may be valuable resources, not just for their rotation projects, but also for classes, professional development, etc.

Details about the research rotation requirements are provided by the faculty with whom your work. An evaluation of each research rotation will be submitted to the COP online Individual Development Plan (IDP) system by your rotation advisor or the GPD.

E. PHD ADVISOR

ALL STUDENTS. After your research rotations, you will work with the GPD and potential faculty advisers with whom you are interested in working to determine which labs you could join. Faculty members may not be able to accept all interested students for any number of reasons. Faculty members may need to discuss funding with the Chair of the department before accepting a potential student. It is expected that you will identify your PhD advisor by the beginning of CP1 Winter (PhD). PharmD/PhD students should select an advisor before P2 Fall if they intend on taking CP801/802 P2 year, or may select an advisor before Fall P3 year. At the time that you identify an advisor, you and your advisor will develop a Mentor Agreement within the IDP system.

F. MEETING CLINICAL FACULTY

ALL STUDENTS. Your advisor will introduce you to clinical faculty in the college and/or Michigan Medicine who work in your research field/domain. These individuals may be future collaborators, mentors or members of your dissertation committee.

III. GENERAL PROGRAM REQUIREMENTS

ALL STUDENTS. The expectation is that you view all aspects of your training/program as a full-time position. ‘Work’ includes your own coursework, experiments, literature review, writing, data analysis, seminar preparation and attendance, and GSI preparation and attendance. This academic “way of life” is your job. The CPTS Program follows the UM COP Graduate Student Vacation Policy.

A. PROFESSIONAL DEVELOPMENT PROGRAM AND INDIVIDUALIZED DEVELOPMENT PLANS (IDP)

ALL STUDENTS. The COP IDP online electronic documentation system will be used to document your academic and professional progress throughout the program. During your first Term (CP1 Fall for PhD, P2 Fall for PharmD/PhD) you will participate in the COP Graduate Program Professional Development Program, during which you will complete your professional goals assessment and create a professional CV. Thereafter, the IDP online program will be used to align expectations and evaluations of students, and maintain your current CV. You are expected to upload your CV every April. These expectations will include your mentored research as well as generation of scientific products and professional development. Setting goals with timelines will help to ensure your progress in the program, and you are expected to meet the timelines agreed upon by you and your advisor or committee. The IDP has two main components, a Mentor Agreement for the upcoming year and a Mentor Evaluation of the previous year.

MENTOR AGREEMENT. When the student selects their advisor (CP1 Winter for PhD or P2 Fall for PharmD/PhD), and every April afterward, the student will complete a Mentor Agreement. The Mentor Agreement describes the student’s and advisor’s expectations for the coming year in regards to scientific (e.g., abstracts, conferences, publications, grants) and professional (e.g., workshops, teaching, internships) development, and student-advisor communication (e.g., meetings, emails). The advisor will review and sign the Mentor Agreement in May of each year.

MENTOR EVALUATION. During April of each year, the student will complete a reflection of their progress and accomplishments during the preceding year, including whether they completed all programmatic requirements and achieved the goals described in the Mentor Agreement. During May of each year, concurrent with completing their annual evaluation (FED), the advisor will review the student’s evaluation and provide their own evaluation.

DEPARTMENT EVALUATION. Each summer the CPTS faculty will review the information in your IDP and your current CV and evaluate each student’s progress, including their Mentor Evaluation and completion of all programmatic requirements. The GPD will complete a program evaluation and provide written feedback regarding student’s progress within the IDP system. Concerns that arise about the quality of performance and/or the time course of activities will be addressed proactively, in collaboration with you, your advisor, selected dissertation committee members and the GPD.

B. PROGRAM TIMELINE

PHD. The general time course for the PhD is 1.5 semesters of coursework and 2.5 to 3 years of mentored research. Advancement to candidacy will occur during CP2 Winter, after which your academic progression will be overseen by your Dissertation Committee. The committee will use the program requirements and policy on academic progress to consider instances when the time course is affected.

PHARM/PHD. The general time course for the PharmD/PhD is 2.5 semesters of coursework, summer coursework and 2.5 to 3 years of mentored research. Advancement to candidacy will occur during P4 Winter, after which PhD academic progression will be overseen by the Dissertation Committee. The committee will use the program requirements and policy on academic progress to consider instances when the time course is affected. The PharmD requirements will be completed P5 Fall.

| Graduate Activity | PHD Timeline | PHARMD/PHD Timeline |
|-------------------------------|-------------------|---------------------------------------|
| Lab Rotations | CP1 Fall | Rising P2 summer (or P2 Fall/Winter*) |
| Identify Dissertation Advisor | CP1 Winter | P2 Fall (or P3 Summer*) |
| Name Dissertation Committee | Rising CP2 Summer | By P3 Winter |
| Candidacy Exam | CP2 Fall | P4 Fall |
| Oral Dissertation Defense | CP4-CP5 | P7-P8 |

*PharmD/PhD students are recommended to do rotations rising P2 summer, name an advisor P2Fall, and take CP 801/802 P2 year. Alternatively, they may do rotations P2 Fall/Winter, name an advisor P3 Summer, and take CP 801/802 P3 year.

C. DISSERTATION COMMITTEE

ALL STUDENTS. Our program is committed to providing you a mentored research experience during the dissertation. Your Candidacy Exam Committee and your Dissertation Committee will have the same members to allow for consistency between the candidacy exam and your progression through the dissertation. The CPTS GPD may serve as ex officio in circumstances where he/she is not a member of the committee.

Rackham requires four members on each committee, and three must be graduate faculty. The committee will be comprised of Chair/co-Chair (from within department), primary mentor (may be co-Chair), 1-2 additional Department/College faculty and one faculty from an outside department (cognate). Clinical faculty may serve on dissertation committee with approval from Rackham. The chair of the dissertation committee is expected to be a senior member of the Department and the primary mentor may be named as co-Chair. The cognate member of the committee will be identified from outside the department, typically through our existing network of external collaborators.

The dissertation committee is a valuable resource of expertise that you and your mentor should access to support your dissertation research and professional development. Specifically, the committee members are responsible for reviewing the proposal defended for candidacy in CPTS 803 to ensure agreement on its aims, attending the Candidacy Exam, and serving as examiners for the final oral defense.

PHD. You will identify your dissertation committee the rising summer of CP2.

PHARMD/PHD. You will identify your dissertation committee in P3 Winter.

D. PREPARING FOR CPTS 803

ALL STUDENTS. A draft of a specific aims page should be developed in collaboration with your advisor during the rising summer of CP2 and is required for your enrollment in CPTS 803. This is critically important because you are expected to develop your dissertation proposal in CPTS 803, and your likelihood of success is much higher if some work has been done on your topic prior to 803. You may want to consider engaging members of your dissertation committee in the development of your dissertation proposal as well.

E. SEMINAR

ALL STUDENTS. Students will present public seminars up to annually within the CPTS 850 Seminar Course on their research, encompassing background, goals, progress to date, and plans for the future. Early seminars (CP1-CP2/P2-P4) will focus on the development of your dissertation research in CPTS 802 and 803. Latter seminars (CP3-CP7/P5-P8) will focus on your dissertation work and should be used as an opportunity to practice and obtain feedback on your dissertation presentation from your dissertation committee and colleagues. Seminars that you present should be noted in your CV and annual evaluation.

F. TEACHING REQUIREMENT

ALL STUDENTS. Although our program emphasizes research training for our students, we recognize that a substantial number of students will take positions in academic institutions where they will have teaching responsibilities. Therefore, you are expected to gain teaching experience by serving as a graduate student instructor (GSI) for at least one term during the course of your graduate training, which will often occur the Winter semester of your 2nd year once you achieve candidacy.

PHD. If you have funding from the College, then you are required to serve as a GSI during the semester that you receive funding. This may include serving as a GSI for up to three semesters during years CP2 to CP4.

PHARMD/PHD. You may participate as a graduate student instructor (GSI) after you have completed all of your PharmD requirements. If you have funding from the College, then you are required to serve as a GSI for up to three semesters during years P5 to P7.

In the latter years of your program, you may want to participate in the UM “Preparing Future Faculty” program. In collaboration with Rackham Graduate School, the UM Center for Research on Learning and Teaching (CRLT) offers seminars and symposia to help graduate students prepare for their first faculty jobs. Topics include preparing for the job market, learning about current issues in higher education, tenure and faculty work life, and effective teaching for a diverse student body. The CRLT also hosts an annual conference on “Preparing Future Faculty” <http://crlt.umich.edu/programs/pff>. Topics covered have included: Getting Started with your CV; Negotiating an Academic Job Offer; Developing your Teaching Philosophy; Practicing Interviews; Starting and Running a Research Lab; Dual Career Issues; and Faculty Work-Life Balance. One aspect of this program is the UM Graduate Teaching Certificate, which provides graduate students with orientation, exposure, mentorship and experience in graduate level teaching in a month-long short course of study and “hands-on” experience. You will also have the opportunity to participate in the University of Michigan Pharmacy Resident Teaching Certificate program for clinician educators.

G. PUBLICATION REQUIREMENT

Students are required to have at least one primary research manuscript on which they are first or senior author accepted for publication in a peer reviewed journal prior to graduation.

H. INTERNSHIPS

ALL STUDENTS. Students are allowed to participate in internships during their PhD candidacy years by approval of their primary mentor. The dissertation committee should be notified that the student is participating in an internship, including the value of the internship to the students scientific and/or professional development. Internships may delay the student’s PhD progress, which may affect student funding and time to graduation. Students on unpaid internships will receive their usual stipend and health benefits from COP. Students on paid internships will receive supplemental support from the COP such that their total payment is equal to their typical stipend and includes benefits. Students on paid internships that exceed their stipend will receive only the internship payment, in full. Students who participate in internships during Fall or Winter semesters will be required to pay their tuition. Rackham provides financial support for students who are participating in internships, with application deadlines for each semester:

<https://rackham.umich.edu/professional-development/rackham-doctoral-intern-fellowship-program/>

IV. CURRICULUM

ALL STUDENTS. The CPTS PhD academic program is divided into two tracks (i.e., Precision Pharmacotherapy Research [PPR] and Health Services Research [HSR]) with separate courses specific to these areas of research and shared coursework to maintain the commonality in the basic fundamentals of Clinical Pharmacy research. All listed courses in the CPTS PhD curricula in the tables on the following three pages are considered “core” courses. Course descriptions are provided in Appendix 1. The CPTS Program has established that a grade of “B” is the minimum passing grade for any core course. Failure to achieve a “B” in any core course will result in the student being placed on academic probation (See Section IX). A grade of “B” must be earned within the first two attempts at taking any core course. Students who have already completed a core course or a similar within another program and want to waive that course must speak with the GPD to review their courses and approve any to the core curriculum.

Students are required to complete at least 1 elective and may take additional optional elective courses throughout their training. A grade of “C-“ is the minimum passing grade for any elective course and there is no limit to the number of times a student may attempt to take an elective course.

A. CURRICULUM FOR PHD ONLY

Green courses are the shared CPTS PhD curriculum. All listed courses (i.e., not “Elective”) are “core” courses. Purple courses are for students in the Precision Pharmacotherapy Research track and orange courses are for students in the Health Services Research track.

| Curriculum for CPTS PhD Program | | | | | |
|--|-----------|--|---------|-----------------|---------|
| Fall | Credits | Winter | Credits | Summer | Credits |
| <i>CP1 Curriculum</i> | | | | | |
| CPTS 801 Research Grant Proposal I | 2 | CPTS 802 Research Grant Proposal II | 2 | Research in Lab | NA |
| CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| BIOSTAT 521 or higher | 3 | BIOSTAT 522 or higher | 3 | | |
| CPTS 990 Research Credits (<i>Independent Study</i>) | 2 | CPTS 990 Research Credits | 2 | | |
| MedChem 660 - Responsible Conduct of Research | 0.5 | MedChem 660 - Responsible Conduct of Research | 0.5 | | |
| Elective (Optional: 1 required before candidacy) | 0-4 | Pharmacy 647 Clinical Trial & Observ Research | 2 | | |
| CPTS 820+PS/INT700 PK or 824 Metab-/Proteomics | 3 | Elective (Optional: 1 required before candidacy) | 0-4 | | |
| CPTS 851 Translational Science Journal Club | 1 | CPTS 822 Res and Clin Trans in PGx | 3 | | |
| CPTS 832 Pharmacy Informatics or 834 PRO | 3 or 2 | CPTS 830 Pharmacy Health Services Research | 3 | | |
| Total Semester Credits (without elective) | 10.5-12.5 | | 13.5 | | |
| <i>CP2 Curriculum</i> | | | | | |
| CPTS 803 Research Grant Proposal III | 2 | CPTS 995 | 1 to 8 | Research in Lab | NA |
| CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| BIOINF 527 or higher or other methods | 3-4 | Optional Elective | 0-4 | | |
| CPTS 990 Research Credits | 1-2 | | | | |
| Elective (1 required before candidacy) | 2-4 | | | | |
| CPTS 820+PS/INT700 PK or 824 Metab-/Proteomics | 3 | | | | |
| CPTS 832 Pharmacy Informatics or 834 PRO | 3 or 2 | | | | |
| Total Semester Credits (without elective) | 10-12 | | 9-13 | | |
| <i>PhD Candidacy Status at Winter</i> | | | | | |
| <i>CP3 Curriculum</i> | | | | | |
| CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | Research in Lab | NA |
| CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| Optional Elective | 0-4 | Optional Elective | 0-4 | | |
| Total Semester Credits | 9-13 | | 9-13 | | |
| <i>CP4 Curriculum</i> | | | | | |
| CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | Research in Lab | NA |
| CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| Optional Elective | 0-4 | Optional Elective | 0-4 | | |
| Total Semester Credits | 9-13 | | 9-13 | | |
| PhD Completion in CP4 year | | | | | |

B. CURRICULUM FOR PHARMD/PHD PRECISION PHARMACOTHERAPY RESEARCH

Green courses are for the PhD program, orange courses are for the PharmD program. This curriculum has been approved by the College's PharmD Curriculum and Assessment Committee, with a specified, acceptable number of shared credits.

| Curriculum for PPR PharmD/PhD Program | | | | | | |
|--|--|---|---|---------|--------------------------------------|---------|
| Term | Fall Courses | Credits | Winter Courses | Credits | Summer | Credits |
| P1 | PharmSci 508 - Drug Delivery & Solutions | 3 | PharmSci 518 - Dispersed/Solid Forms | 3 | P603 Community IPPE ^a | 2 |
| | MedChem 500 - Principles of Drug Action I | 3 | MedChem 510 - Principles of Drug Action II | 4 | | |
| | Pharmacy 504 - Pharmacy Practice Skills I | 3 | Pharmacy 514 - Pharmacy Practice Skills II | 3 | | |
| | Pharmacy 506 - Patient Communications | 2 | Pharmacy 516 - Health Care Systems | 2 | | |
| | Pharmacy 501 - Introduction to Pharmacy | 2 | Pharmacy 512 - Self-Care | 4 | | |
| | Pharmacy 511 - Life Long Learning | 0.5 | Elective(s) | 2-3 | | |
| | Pharmacy 503 - Social Determinants of Health | 2 | | | | |
| P2 | PharmSci 608 - Pharmacokinetic Concepts | 4 | MedChem 610 - Principles of Drug Action IV | 4 | P703 Institutional IPPE ^a | 2 |
| | MedChem 600 - Principles of Drug Action III | 4 | Pharmacy 612 - Therapeutic Problem Solv II | 4 | | |
| | Pharmacy 602 - Therapeutic Problem Solv I | 4 | Pharmacy 616 - Health Systems | 2 | | |
| | Pharmacy 613 Ambulatory care IPPE | 0.5 | Pharmacy 611 - Life Long Learning | 0.5 | | |
| | CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 801 Res Grant Proposal I* | 2 | CPTS 802 Res Grant Proposal II* | 2 | | |
| | MedChem 660 - Responsible Conduct of Research | 0.5 | MedChem 660 - Responsible Conduct of Research | 0.5 | | |
| | | Pharmacy 647 Clinical Trial & Observ Research | 2 | | | |
| P3 | MedChem 700 - Principles of Drug Action V | 3 | PharmSci 719 - Adv Pharm Biotechnology | 2 | APPE Rotations (3 completed) | 12 |
| | Pharmacy 702 - Therapeutic Problem Solv III | 4 | Pharmacy 712 - Therapeutic Problem Solv IV | 4 | | |
| | Pharmacy 704 - Ethics/EBM Clin Applications | 2 | Pharmacy 733 - Pharmacy Practice Skills IV | 2 | | |
| | Pharmacy 723 - Pharmacy Practice Skills III | 2 | Pharmacy 716 - Law | 2 | | |
| | Pharmacy 706 - Health Care Outcomes | 2 | Pharmacy 714 - TB Clinical Decision Making | 2 | | |
| | CPTS 850 CPTS Seminar | 1 | Pharmacy 711 - Life Long Learning | 0.5 | | |
| | CPTS 820+PS/INT700 PK or 824 Metab-/Proteomics | 3 or 2 | CPTS 850 CPTS Seminar | 1 | | |
| | BIOSTAT 521 or higher* | 3 | CPTS 822 Res and Clin Trans in PGx | 3 | | |
| | | | BIOSTAT 522 or higher* | 3 | | |
| | | | | | | |
| P4 | Pharmacy 730 Seminar (sp/su & fa) | 1 | APPE Rotations (3 completed) | 12 | APPE rotations (2 completed) | 8 |
| | CPTS 850 CPTS Seminar | 1 | P 731 Life Long Learning | 0.5 | | |
| | CPTS 820+PS/INT700 PK or 824 Metab-/Proteomics | 3 or 2 | | | | |
| | CPTS 803 Research Grant Proposal III | 2 | | | | |
| | CPTS 900 Research Credits | 1 to 4 | | | | |
| | BIOINF 527 or higher or other methods | 4 | | | | |
| PhD Candidacy Status at Winter. April P4 Year - Walk with PharmD class. PharmD awarded after 2nd P4 Summer | | | | | | |
| P5 | CPTS 850 CPTS Seminar | 0 | CPTS 850 CPTS Seminar | 0 | | |
| | Optional PhD Elective (1 required this year) | 2 or 3 | Optional PhD Elective (1 required this year) | 2 or 3 | | |
| | CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | | |
| P6 | CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | | |
| P7 | CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | | |
| PhD Completion in P7 year | | | | | | |

*Recommend CPTS 801/802 during P2 year and Bios 521/522 P3 year, however, these can be flipped, particularly if the student has not completed research rotations over the rising P2 summer and selected an advisor before P2 Fall. ^aMoved from Fall/Winter to Summer by EE.

C. CURRICULUM FOR PHARMD/PHD HEALTH SERVICES RESEARCH

Green courses are for the PhD program, orange courses are for the PharmD program. This curriculum has been approved by the College's PharmD Curriculum and Assessment Committee, with a specified, acceptable number of shared credits.

| Curriculum for HSR PharmD/PhD Program | | | | | | |
|--|---|--|---|---------|--------------------------------------|---------|
| Term | Fall Courses | Credits | Winter Courses | Credits | Summer | Credits |
| P1 | PharmSci 508 - Drug Delivery & Solutions | 3 | PharmSci 518 - Dispersed/Solid Forms | 3 | P603 Community IPPE ^a | 2 |
| | MedChem 500 - Principles of Drug Action I | 3 | MedChem 510 - Principles of Drug Action II | 4 | | |
| | Pharmacy 504 - Pharmacy Practice Skills I | 3 | Pharmacy 514 - Pharmacy Practice Skills II | 3 | | |
| | Pharmacy 506 - Patient Communications | 2 | Pharmacy 516 - Health Care Systems | 2 | | |
| | Pharmacy 501 - Introduction to Pharmacy | 2 | Pharmacy 512 - Self-Care | 4 | | |
| | Pharmacy 511 - Life Long Learning | 0.5 | Elective(s) | 2-3 | | |
| | Pharmacy 503 - Social Determinants of Health | 2 | | | | |
| P2 | PharmSci 608 - Pharmacokinetic Concepts | 4 | MedChem 610 - Principles of Drug Action IV | 4 | P703 Institutional IPPE ^a | 2 |
| | MedChem 600 - Principles of Drug Action III | 4 | Pharmacy 612 - Therapeutic Problem Solv II | 4 | | |
| | Pharmacy 602 - Therapeutic Problem Solv I | 4 | Pharmacy 616 - Health Systems | 2 | | |
| | Pharmacy 613 Ambulatory care IPPE | 0.5 | Pharmacy 611 - Life Long Learning | 0.5 | | |
| | CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 801 Res Grant Proposal I* | 2 | CPTS 802 Res Grant Proposal II* | 2 | | |
| | | | Pharmacy 647 Clinical Trial & Observ Research | 2 | | |
| P3 | MedChem 700 - Principles of Drug Action V | 3 | PharmSci 719 - Adv Pharm Biotechnology | 2 | APPE Rotations (3 completed) | 12 |
| | Pharmacy 702 - Therapeutic Problem Solv III | 4 | Pharmacy 712 - Therapeutic Problem Solv IV | 4 | | |
| | Pharmacy 704 - Ethics/EBM Clin Applications | 2 | Pharmacy 733 - Pharmacy Practice Skills IV | 2 | | |
| | Pharmacy 723 - Pharmacy Practice Skills III | 2 | Pharmacy 716 - Law | 2 | | |
| | Pharmacy 706 - Health Care Outcomes | 2 | Pharmacy 714 - TB Clinical Decision Making | 2 | | |
| | CPTS 850 CPTS Seminar | 1 | Pharmacy 711 - Life Long Learning | 0.5 | | |
| | BIOSTAT 521 or higher* | 3 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 832 Pharmacy Informatics or 834 PRO | 3 or 2 | BIOSTAT 522 or higher* | 3 | | |
| | MedChem 660 - Responsible Conduct of Research | 0.5 | MedChem 660 - Responsible Conduct of Research | 0.5 | | |
| | | CPTS 830 Pharmacy Health Services Research | 3 | | | |
| P4 | Pharmacy 730 Seminar (sp/su & fa) | 1 | APPE Rotations (3 completed) | 12 | APPE rotations (2 completed) | 8 |
| | CPTs 832 Pharmacy Informatics or 834 PRO | 3 or 2 | P 731 Life Long Learning | 0.5 | | |
| | CPTS 803 Research Grant Proposal III | 2 | | | | |
| | CPTS 900 Research Credits | 1 to 4 | | | | |
| | BIOINF 527 or higher or other methods | 3 to 4 | | | | |
| PhD Candidacy Status at Winter. April P4 Year - Walk with PharmD class. PharmD awarded after 2nd P4 Summer | | | | | | |
| P5 | CPTS 850 CPTS Seminar | 0 | CPTS 850 CPTS Seminar | 0 | | |
| | Optional PhD Elective (1 required this year) | 2 or 3 | Optional PhD Elective (1 required this year) | 2 or 3 | | |
| | CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | | |
| P6 | CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | | |
| P7 | CPTS 850 CPTS Seminar | 1 | CPTS 850 CPTS Seminar | 1 | | |
| | CPTS 995 | 1 to 8 | CPTS 995 | 1 to 8 | | |
| PhD Completion in P7 year | | | | | | |

*Recommend CPTS 801/802 during P2 year and Bios 521/522 P3 year, however, these can be flipped, particularly if the student has not completed research rotations over the rising P2 summer and selected an advisor before P2 Fall.^aMoved from Fall/Winter to Summer by EE.

V. DOCTORAL CANDIDACY REQUIREMENTS

ALL STUDENTS. Once all requirements (described below) are met, you can be admitted into candidacy by the Rackham Graduate School, upon recommendation of the CPTS graduate faculty. This marks the transition from a largely classroom-based experience to one focused on mentored research.

A. CANDIDACY ELIGIBILITY

Faculty in the department determine the academic integrity of the degree in terms of specific requirements, achieving milestones, and completing the degree. If you follow our prescribed curricula, all requirements will be satisfied automatically. The Rackham Graduate School requirements for admission into candidacy include:

- A. Bachelor's degree or equivalent awarded by an accredited institution.
- B. Maintain a cumulative minimum GPA of "B" (3.0 on a 4.0 point scale) or higher. The CPTS Program has established that a grade of "B" is the minimum passing grade for any "core" course (See Section IV), and must be earned within the first two attempts at taking the course.
- C. Ph.D. students must complete 18 hours of graded coursework (including the grade of S-Satisfactory) in-residence during the pre-candidacy stage of your doctoral studies. That means 18 credits of "real" classes on campus. You may accumulate more than 9 credits of "in-residency" courses in a single term. CPTS 990 and any courses that are taken as "visit/audit" do NOT count toward the "in-residency" credits.
- D. At least 4 credits must be from a course in a "cognate" field that is outside the department.
- E. Complete training in the Responsible Conduct of Research and Scholarship.
- F. Successful completion of the Candidacy Examination.

In order to maintain "full-time" status, graduate students (pre- and post-candidacy) must enroll for a minimum of 8 credits in each of the Fall and Winter terms. You do NOT have to enroll for either the Spring or Summer term.

PHD. The typical timeline is that you will complete all requirements for candidacy by the end of your CP2 Fall semester. In 3 semesters, you will complete at least 28 credits in either the HSR or PPR program prior to candidacy. This is a combination of graded courses that include 6 credits of grant writing, 7-9 credits of theory, 9-12 credits methodology and 3 credits of CPTS Seminar as required curriculum, and up to 10 credits of electives. All requirements must be completed by the end of your CP3 Fall semester, unless you receive a written extension from the GPD.

PHARMD/PHD. As outlined in our curriculum, it is expected that you will complete all requirements for candidacy for P4 Winter. Over your P2 to Fall P4 years, you will complete at least 28 credits in the HSR or PPR programs. All requirements must be completed by P5 Winter, unless you receive a written extension from the GPD.

B. CANDIDACY EXAMINATION CONTENT

ALL STUDENTS. The candidacy exam will assess your knowledge and research skills in the fundamental scientific disciplines underlying your proposed PhD research. The exam will assess your proposal, progress to date, and research accomplishments.

Your PhD advisor, dissertation committee, and you are responsible for guiding the scientific content of this proposal. You will work with your advisor the summer before CP2 to identify your dissertation committee and finalize your research idea.

You are required to write and orally defend a proposal consistent with the format and content of an NIH R36 (or R03, R21) that will outline the focus of your research during your graduate training/mentored research.

Your candidacy proposal will be developed during CPTS 803 with the course coordinators, presentation/feedback from class participants and your PhD advisor. See Section III.F of this handbook for how to prepare for CPTS 803. The proposal should describe a research project in the broad area of Clinical Pharmacy Translational Sciences. The written proposal must take the form of an NIH R36 (R03, R21) proposal using the following format (approximate page guidelines):

- Title Page (1 page)
- Abstract (1/2 page)
- Specific Aims (1 page)
- Approach (6 page limit)
 - Significance (1 to 1.5 page)
 - Innovation (0.5 page)
 - Pilot data and/or illustration of competency in methods (0.5 page)
 - Approach (3-4 pages)
- References (no limit)
- Your proposal may be supplemented by comprehensive literature review of 10-15 pages, as required by the PhD advisor. This may be the review and/or updated review from CPTS 802.

C. CANDIDACY EXAMINATION PROCESS

ALL STUDENTS. An oral defense of your proposal and set of work will be held in December, and this activity (proposal writing and defense) is the Candidacy Exam. The Candidacy Exam will focus on your preparation and readiness to embark on your dissertation research, including your proposal, previous research/lab work, and pertinent research skills.

The candidacy exam will take the form of an oral presentation and defense of the research proposal. You should prepare an oral presentation of about 30 minutes, including a limited number (≤ 25) of slides (usually a PowerPoint presentation). You will not be expected to rely entirely on the proposal or visual aids to answer the questions put forth during the examination. Including questions and answers, it is expected that the exam will take no more than 2 hours. Students should be prepared to answer any relevant questions from the project or required CPTS course material, most of which should be expected to fit in the following categories:

1. Basic knowledge questions about the scientific and/or clinical problem.
2. Basic knowledge of theoretical or mechanistic approach applied to the problem.
3. Methods questions about pros/cons of different methodological options.
4. What research means on a larger scale (i.e., to science, patients, society).
5. Follow-up questions relating to the particular issue or consideration in the area of a question previously asked, if the student does not know the answer or satisfactorily answer an initial question.

Immediately following the exam, the committee determines whether you Pass, Pass with Revisions, or Do Not Pass. The committee's evaluation is submitted to the Clinical Pharmacy office on the Candidacy Exam Form, which is stored in your student file. If Revisions are required, these should be detailed on the Form and a timeline should also be included. It is expected that a Pass with Revisions will have revisions that can be achieved to meet the deadline for Winter candidacy. In the event that the committee deems your performance Do Not Pass, you will be granted a second attempt at the exam after being placed on academic probation (See Section IX). In this case, this attempt must be made during CP2 Winter and this second exam must be passed to continue in the PhD program.

Doctoral candidacy will be recommended to Rackham after you successfully complete the exam. It is anticipated that candidacy status will be conferred for Winter semester.

D. CANDIDACY EXAM COMMITTEE

Your dissertation committee will serve as the Candidacy Exam Committee. The Candidacy Examination Committee will be chaired by your dissertation committee chair, in most instances. The Chair of the exam committee is responsible for moderating the examination and preparing and submitting the Candidacy Exam Form to the department office.

E. CANDIDACY TIMELINE

PHD. It is anticipated that doctoral candidacy will be achieved by CP2 Winter.

PHARMD/PHD. It is anticipated that doctoral candidacy will be achieved by P4 Winter.

VI. TOWARDS THE DISSERTATION DEFENSE

A. TWICE YEARLY DISSERTATION COMMITTEE UPDATES

ALL STUDENTS. You will update your dissertation committee twice annually, typically in January and July. At least one of these must be a meeting with your entire dissertation committee, typically over the summer. During this meeting, you and your committee should review last year's Mentor Evaluation and this year's Mentor Agreement. The second update, typically in January, can be another meeting or an email update to your committee describing your progress toward the agreed upon goals for that year.

B. POST-CANDIDACY REQUIREMENTS

ALL STUDENTS. You must enroll for 8 credits in CPTS 995 each term. Per Rackham guidelines, candidates may also elect to take up to 4 credits each term with no additional tuition fees. Tuition for additional courses will be assessed.

You are expected to register for CPTS 850 seminar and participate.

C. RESULTS MEETING

ALL STUDENTS. Approximately 3 (2-6) months before the final defense, a Dissertation Committee meeting will be held to discuss the results generated from your research and to identify any required, final analyses. In all cases, the meeting should be documented in the IDP. As well, the PhD advisor should keep copies of the reports, the PowerPoint presentations and the evaluation/feedback forms for their records.

VII. DISSERTATION DEFENSE

ALL STUDENTS. Please check the Rackham website for the most up-to-date references.

- Dissertation Timeline: <http://www.rackham.umich.edu/students/navigate-degree/dissertation-timeline> Doctoral Degree Deadlines: <https://rackham.umich.edu/navigating-your-degree/doctoral-degree-deadlines/>
- Formatting Guidelines and link to Dissertation Handbook:
- <http://www.rackham.umich.edu/students/navigate-degree/formatting-guidelines>
- Pre-Defense: <http://www.rackham.umich.edu/students/navigate-degree/completing-doctoral-degree-requirements#before>
- Post-Defense: <http://www.rackham.umich.edu/students/navigate-degree/completing-doctoral-degree-requirements#after>

The oral defense of the dissertation is a public seminar presentation that includes attendance by your Dissertation Committee as well as CPTS faculty, other graduate students and fellows, and the public. The presentation will last about 30 minutes and will be followed by up to 2 hours of question/answer. Non-committee members will have an opportunity to ask questions immediately after the presentation, and will then be excused. The committee will then have a private opportunity to ask additional questions. The Dissertation Committee will hold a private vote on the outcome of your defense at the end of the defense.

There are specific Rackham timeline requirements, as noted here.

<https://rackham.umich.edu/navigating-your-degree/dissertation-timeline/> The Dissertation Committee members are provided with copies of the dissertation at least 2 weeks prior to the defense. See the Rackham website for further administrative guidelines regarding the dissertation defense process and dissertation format instructions. (http://www.rackham.umich.edu/dissertation_information/)

Reserving Room for Oral Defense Seminar. To reserve a room for the oral defense seminar, send an e-mail with the requested room, date, start time and end time (reserve for 3 hours) to:

- College of Pharmacy or North University Building, email: cop.facilities@umich.edu
- If no rooms are available in the COP, contact: <http://www.rackham.umich.edu/rackham-building/room-scheduling/scheduling-guidelines#who-may-schedule>, e-mail: RackhamScheduling@umich.edu.
- Also reserve a room (allow at least 1 hour) for the private meeting with the committee immediately after the seminar. This can be in the seminar room itself. Note that the department will provide refreshments ONLY if the defense seminar is in the College of Pharmacy.

Flyer and Website Information. The date, time, and location of defense and the title of the dissertation are due to the CP office at least 30 days before the defense. E-mail this information to Jennifer Bronson (jennmfb@med.umich.edu).

Final Steps after oral defense:

- Provide your forwarding address and e-mail contact to the department administrative assistant Jennifer Bronson (jennmfb@med.umich.edu).
- Schedule an exit interview with the Clinical Pharmacy Department Chair
- Complete the exit survey and exit interview with the Dean

VIII. ACADEMIC DISPUTE

The UM COP has procedures for managing student conflict with faculty. You may manage the conflict yourself using the process below or you may reach out to the Rackham Resolution Officer in the College (Mr. Mark Nelson, mnelson@med.umich.edu) who can assist you in formulating your communications and approach. As well, you may contact the Student Affairs Program Manager (Ms. Antoinette Hopper for graduate programs) for assistance.

In terms of process, you are first asked to try to resolve any issue with the faculty in question. If the faculty member is not your PhD Advisor, you should then go to your PhD Advisor for assistance. If you continue to have concerns, you should involve the Dissertation Committee Chair (if applicable) and CPTS GPD to resolve the problem. The Department Chair will likely be informed of the situation by the GPD unless you request otherwise or you can also talk with the Department Chair. Issues that remain unresolved will move to the Associate Dean for Research and Graduate Education, prior to moving to the Dean of the College. The issue can then be taken to the Rackham Graduate School if needed after this stage.

In terms of documentation, at each stage of the process, it is anticipated that you will email the person to schedule a meeting, provide a written agenda for the meeting, and develop a summary of the meeting thereafter. The summary will be for you to keep for yourself and to share with the person with whom you met.

Students may file a Professional Concern note if preferred. <https://pharmacy.umich.edu/mycop/dei/concern-reporting>.

There are also specific guidelines in Appendix 4 for related to academic progress, academic probation and program dismissal.

IX. ACADEMIC PROGRESS (Rackham and CPTS Program Policy)

A. ACADEMIC PROGRESS

The CPTS graduate program will follow the Rackham policy for academic progress, unsatisfactory academic standing, and academic probation and dismissal from doctoral programs, approved April 25, 2018.

Deficiencies in Academic Progress. You will meet at least once each semester with your advisor to discuss your academic performance and progress toward the degree. The CPTS graduate program will immediately notify you in writing when your performance falls below an acceptable level. The CPTS minimum acceptable level of academic progress is a grade of “B” in each core course, earned within the first two attempts at taking the course, and a cumulative GPA of “B” (3.0 on a 4.0 point scale). In response to your academic deficiencies, the Graduate School may take any of the following actions:

- Place a note of “unsatisfactory academic standing” on your academic record
- Place you on academic probation;
- Require you to withdraw from the University; or
- Not confer a degree or certificate.

Unsatisfactory Academic Standing. The Graduate School will place a notation of “unsatisfactory academic standing” on your academic record at the end of the term in which your cumulative GPA falls below a B (3.0 on a 4.0 point scale). Unsatisfactory academic standing may be a basis for placing you on academic probation. With unsatisfactory academic standing, you may not advance to candidacy, will not be awarded a degree or graduate certificate, and may change programs and transfer credits only with permission of the CPTS program.

B. ACADEMIC PROBATION AND DISMISSAL FOR ACADEMIC REASONS

Academic Probation. Academic probation is normally required before you are dismissed for academic reasons. As an exception, and only with advance notice, CPTS policy may allow dismissal without probation if you fail to pass candidacy or preliminary exams. Academic probation will be noted on your transcript.

The advisor or CPTS GPD may recommend that you be placed on academic probation. The decision to place you on probation will be made by a faculty group of at least three persons, including: the Department Chair (or the chair’s designee), the CPTS GPD, your advisor, and members of the CPTS graduate faculty.

Length of the Probationary Period. The probationary period may be no shorter than two months of the fall or winter term and ordinarily conclude at the end of that term. If you are placed on probation within two months of the end of the fall term, the probationary period will extend into the winter term for a total of at least two months. If you are placed on probation within two months of the end of the winter term, the probationary period may include the spring or summer half-terms or the following fall term, for a total of at least two months. You may be placed on probation starting in the spring or summer half term for a minimum of two months, and do not need to be enrolled during these half terms.

Notifications. The CPTS GPD must notify you, the Department Chair, Student Affairs Program Manager, Associate Dean for Faculty Affairs and Graduate/Undergraduate Education, and Rackham Office of Academic Records and Dissertations (OARD) in writing before your probationary period begins, explaining the reasons and conditions of probation; the start and end dates of the probationary period; funding support (see below); conditions, if any, for returning to satisfactory standing; and options for appeal (see below). You may request a leave of absence from Rackham or withdraw. The leave or withdrawal will stop the clock on your probationary period, which resumes when you return to active status or are reinstated. Your probation will remain in effect until the conditions are remedied or you are dismissed.

Funding while on Probation. Your level of funding prior to probation will be continued through your probationary period.

End of the Probationary Period and Dismissal. At the end of probation, and upon the recommendation of the CPTS GPD and the consent of the Graduate School, you may either be returned to good academic standing or dismissed from the program. The decision to dismiss will be made by a faculty group of at least three persons including: the Department Chair (or the chair's designee), the CPTS GPD, your advisor, and members of the CPTS graduate faculty. The CPTS GPD will notify you, the Department Chair, Student Affairs Program Manager, Associate Dean for Faculty Affairs and Graduate/Undergraduate Education, and Rackham Office of Academic Records and Dissertations (OARD) in writing for dismissal.

C. APPEAL

You must be notified of options to appeal academic probation or dismissal. The CPTS program will constitute a separate committee of review to consider appeals. You may use the Graduate School's Academic Dispute Resolution process only for procedural issues of fair and equal treatment under the policy of the program, and not to appeal the academic reasons for the decision.

If you fail to meet standards of academic or professional integrity or have been found responsible for violations of other University standards of conduct, you may be dismissed in accordance with separate procedures described in Rackham Academic and Professional Integrity Policy (section 11).

APPENDIX 1. COURSE DESCRIPTIONS

CPTS 801 Research grant proposal I (2 credit). The purpose of this course is for the learner to gain knowledge and experience in writing innovative research questions and hypotheses for grant applications. The course consists of several interactive lectures and workshops about the process of grant writing. Students will select a topic from one of several options, and complete most aspects of an NIH R21/R02 grant. A writing group discussion and/or presentation to the group for peer feedback is expected several times throughout the course. Farris and Hertz, Fall.

CPTS 802 Research grant proposal II (2 credit). The purpose of this course is for the learner to gain knowledge and experience in synthesizing literature and writing a review article. The course consists of several interactive lectures and workshops about the process of researching and writing a review. Students will write a review article within the topic of their dissertation research and submit it for publication as a review article. Zhu and Coe, Winter.

CPTS 803 Research Grant Proposal III (2 credit). Students will build upon the proposal skills obtained in CP 801 and the background information reviewed in CP 802 to draft a research proposal in the format of an NIH R03/R21-type grant for submission. The finished product will serve as the dissertation proposal for candidacy, which will be orally presented to the CP faculty. Stringer and Farris, Fall.

Pharm 647 Clinical trial and observational research designs (2 credits). The purpose of this course is for the learner to gain knowledge in designing and conducting clinical and observational trials, with a focus on threats to internal and external validity. This interprofessional course will also include a longitudinal group project to develop a clinical trial protocol and informed consent document. Pogue, Winter.

MED CHEM 660 Responsible Conduct of Research and Scholarship (RCRS) in Pharmaceutical Sciences. This course is REQUIRED for the ALL first year graduate students entering the UM COP (this includes Medicinal Chemistry, Pharmaceutical Sciences, CPTS, and Masters of Science in Integrated Pharmaceutical Sciences) and is designed to satisfy the requirement of many government and national funding agencies for a standard course in the responsible conduct of research and scholarship in the biomedical sciences. This course meets once a month in the early evening for the entire school year (9 classes), and pizza and drinks are provided. Attendance and active participation is REQUIRED for every new graduate student in the COP. For each session, a chapter in an ethics book will be assigned to read as well as a short case study to each student to be presented to their classmates with class discussion following each presentation. Details about the requirements and procedures for this course can be found in the course syllabus. Every Fall and Winter.

CPTS 850 Clinical Pharmacy Seminar (1-2 credits). Weekly presentations of graduate students, faculty and/or visitors regarding current studies in pharmaceutical clinical and translational sciences. Professional development and skill development such as writing specific aims or giving job/chalk talks will also be included. Rotated among faculty, Fall and Winter.

CPTS 990 Dissertation pre-candidacy (1-8 credits). Election for dissertation work by doctoral students not yet admitted to candidacy. Fall and Winter.

CPTS 995 Dissertation candidacy (8 credits). Election for dissertation work by doctoral student admitted to candidacy. Fall and Winter.

Precision Pharmacotherapy Research Focus

CPTS 820: Clinical Translation in Pharmacokinetics (1.0) This course is taken in combination with PS 700 or INTRPHRM 700. INTRPHRM 700 is an online version of PS 700 for the MSIPS students. We recommend PS 700 for students conducting pharmacokinetics research within their dissertation and students interested in a stronger PK foundation, including those interested in pursuing careers in Clinical Pharmacology within the pharmaceutical industry. Pai, Every other Fall.

CPTS 822: Research and Clinical Translation in Pharmacogenomics (3.0). This course focuses on methods for research and clinical translation of DNA (genetics and epigenetics) and RNA (transcriptomics) in precision pharmacotherapy, which we

globally refer to as "pharmacogenomics". Students will learn research methods such as genomic data generation, analysis, and experimental models. Students will also learn methods for clinical translation such as genomics-driven clinical trials and how pharmacogenetics is implemented in clinical practice. Luzum, Every Winter.

CPTS 824: Research and Clinical Translation in Metabolomics and Proteomics (3.0) The proteome and metabolome are critical to understanding functional genomics and systems biology of diseases and drug response. The close proximity of the proteome and metabolome (i.e., enzymes are proteins) make them important for the discovery and validation of biomarkers for precision pharmacotherapy and for the identification of molecular targets for therapy and prevention. This course will introduce students to the basic theories, analytical methods, data analysis approaches and bioinformatics for data interpretation in proteomics and metabolomics. The complexity of specimens, nuances of sample collection and the extreme dynamic range of protein and metabolite concentrations will also be discussed. Stringer and Zhu, Every other Fall

Health Services Research Focus

CPTS 830: Health Services Research (3.0) Patient behavior is an important factor in how medications are used and the ultimate impact that they have on health. The purpose of this course is to introduce the learner to relevant theory and study designs that are used to study medication use outcomes. Health behavior and topics including medication adherence, care transitions, health disparities and pharmacy practice form the context for this course, in that all methods will use these contexts as examples. Specific methods for health services research will include survey designs, qualitative methods, mixed methods, practice-based research and secondary datasets/analyses. Coe and Farris, Every Winter.

CPTS 832: Pharmacy Informatics Research (3.0) Informatics is an important system factor in how medication use may be impacted. The purpose of this course is for the learner to gain knowledge and experience in the use of pharmacy informatics to support their research. This course is structured around three major components of pharmacy informatics research, including human factors engineering, medication data analytics, and human-computer interaction. Within each core module, we focus on theories, methodologies, and applications in pharmacy to answer interesting research questions in the discipline. Students will facilitate discussions based on the required readings each week. In addition, a semester-long project will hone their ability to apply the concepts learned and build their research skills. Dorsch and Lester, Every other Fall.

CPTS 834: Patient Outcomes (2.0) This course examines the role of patient outcome measures in studying the impact of illness and the effects of pharmaceutical products and services. The course provides an overview of the theoretical foundations underlying the assessment of outcomes, reviews methods used to develop and assess the psychometric properties of outcome measures, and examines how these measures are currently used in research and practice. Farris and HSR-related Faculty, Every other Fall.

Minimum Statistics Courses

Biostat 521 (3 credits, P1 Fall): Applied Biostatistics. This course is recommended for graduate students with limited background in biostatistics. Student with a strong statistics background should opt-out for a more advanced course. P1 Fall, Offered every Fall

Biostat 522 (3 credits, P1 Winter): Biostatistical Analysis For Health-Related Studies. This course is recommended for graduate students with limited background in biostatistics. Student with a strong statistics background should opt-out for a more advanced course. P1 Winter, Offered every Winter

Bioinf 527 (4 credits, P2 Fall): Introduction to Bioinformatics & Computational Biology. This course is strongly recommended for PhD students, particularly those in the PPR track who will be conducting -omics (genomics, metabolomics, proteomics) studies. This course is not recommended for students using primarily kinetics or other general informatics or analytics approaches. P2 Fall, Offered every Fall.

Other Statistics or Bioinformatics Courses Recommended by Former CPTS Students

Biostat 512 Analyzing Longitudinal And Clustered Data Using Statistical Software. This course has been strongly recommend for HSR students and is great for understanding correlation between (in)dependent variables. Winter

Bioinf 606 Intro Biocomputing. We have not received any feedback regarding this course. Fall

Bioinf 580 Introduction to Signal Processing and Machine Learning in Biomedical Sciences. This course has been recommended as a potential elective for PPR students. Winter

LHS 610 Exploratory Data Analysis for Health. This course has been strongly recommend for anyone wanting to learn R. Winter

Other Availablee Statistics, Bioinformatics, or Methods Courses

BIOINF 501 Math Fndtns Bioinf

BIOINF 575 Prog Lab in Bioinf

BIOSTAT 620 Introduction to Health Data Science

BIOINF 580 Introduction to Signal Processing and Machine Learning in Biomedical Sciences

LHS 660 Eval Methods in HI

LHS 621 Implementation Science I

SOC 523 Qualitative Research Methods

BA 870 Research Methods in the Behavioral and Social Sciences

PHRMACOL 601. From Molecules to Patients: Basic Quantitative Principles of Pharmacology.

PHRMACOL 603. Practical Statistics: Data Processing and Analysis for Biomedical Scientists