University of Iowa College of Pharmacy

Drug Discovery and Experimental Therapeutics (DDET) Graduate Program Student Handbook

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Handbook Purpose and Authority

The purpose of this handbook is to provide guidance on curriculum and policies for students who have been admitted to the Drug Discovery and Experimental Therapeutics graduate program (DDET students) at the University of Iowa (UI) College of Pharmacy (COP). DDET students are also subject to, and are encouraged to read and understand, the UI Graduate College Manual of Rules and Regulations, the UI Graduate Student Employment Standards, and the UI Policy Manual. The Graduate College Manual of Rules and Regulations and the Graduate Student Employment Standards are available on the UI Graduate College website. The Policy Manual is available on the UI website. If a conflict exists between this Handbook, and Federal, State, and/or municipal law, the Federal, State, and municipal law shall take precedence.

DDET Program Summary

The Drug Discovery and Experimental Therapeutics graduate program incorporates multidisciplinary approaches to train students in drug target discovery and the development of novel therapeutics. The program is administered and taught by faculty within the Department of Pharmaceutical Sciences & Experimental Therapeutics (PSET). Student participants in the DDET program learn to conduct research using a wide range of experimental models to tackle challenging topics including drug uptake in the brain, dermal (i.e., skin-based) drug delivery, drug target identification and development for neurogenerative and cardiometabolic diseases, and cancer. Other areas of interest include biomarker discovery and validation, molecular pharmacology, and High Throughput Screening of small molecules. Students also learn synthetic methodologies to construct anti-infective, anti-cancer, and anti-viral agents. Graduates of the program will be awarded a Doctor of Philosophy (PhD) degree in Pharmacy (with DDET listed as discipline), and then go on to careers in academia, pharma-biotechnology companies, regulatory agencies, government, and much more.

General Timeline and Completion Date

Years 1-2	Didactic Coursework and Seminars, Research rotations and adviser lab selection, Conceptualization of Dissertation project
Year 3	Comprehensive Examination, Continuing Dissertation Research Dissertation committee meeting
Year 4	Continuing Dissertation Research, Dissertation committee meeting
Year 5	Final Examination and Dissertation Defense

DDET students usually earn a degree in this program in about five and one half (5.5) years. It is expected that all DDET students complete a degree in this program in seven (7) or fewer years. Students who believe they may exceed seven (7) years to earn this degree must meet with their adviser and PSET Department Chair and request formal written permission from the PSET Department Chair and DDET faculty to continue with the degree program beyond seven (7) years. After meeting with the DDET student at least once, the PSET Chair, under consultation with DDET faculty, shall either decline the student request and dismiss the student from the program upon failure

to complete the degree program within seven (7) years, or the PSET Chair shall establish a written deadline, as part of this written permission to continue the program, stating the date by which the student must complete the degree. The student will be dismissed from the degree program if they do not complete the degree by this written deadline.

Cultural Competency, Diversity and Inclusion

All faculty, students and staff within the DDET graduate program are committed to the values and mission of the UI-College of Pharmacy which firmly recognizes that a diverse, completely accessible and equitable environment is vital to the success of everyone in the organization. Such an environment strengthens the institution, enhances teamwork and learning, and aids in the process of scientific discovery and translation to the clinic. More information about cultural competency resources available to students within the UI-College of Pharmacy can be found at https://pharmacy.uiowa.edu/about/diversity.

Program Coursework Requirements

The Graduate College requires that all graduate students, including DDET graduate students, complete at least seventy-two (72) semester hours (s.h.) of coursework and research hours *within discipline* to earn a PhD degree. The DDET graduate faculty may require matriculating 1st year students lacking certain required basic knowledge and skills to complete one or more prerequisite courses during their first (1st) and second (2nd) years of the program. For details on course requirements and possible elective courses for the DDET program, please see Appendices C and D, respectively. DDET students should choose their elective courses based upon individual research objectives and under guidance from their adviser or the DDET Graduate Program Director. Most students complete the didactic course requirements during the first two (2) years of the degree program.

All first (1st) year DDET students must take BIOS 4120: Introduction to Biostatistics during their first (1st) year in the program. Exemptions are rarely approved by the DDET Graduate Program Director unless a student has already completed a similar course elsewhere, and this decision is ultimately made by DDET faculty. First (1st) year DDET students also must complete a minimum of two 8-week rotations in two separate DDET faculty labs (see Laboratory Research Rotations below). In their second (2nd) year, DDET students must also register for PHAR 6504: Mastering Reproducible Science and BMED 7270-71: Scholarly Integrity & Responsible Conduct of Research (see Responsible Conduct of Research section below). During the first four (4) years of the program, DDET students must also register for PHAR 6515: Perspectives in DDET, and in PHAR 5510: PSET Seminar throughout the duration of their time in the program. The requirements and details for PHAR 6515 can be viewed in the syllabus for that course, and details for PHAR 5510 are described in Appendix A below.

DDET graduate students seeking full-time enrollment should typically take twelve (12) semester hours of courses per semester until a comprehensive examination that occurs during the third (3rd) year of study. Twelve (12) s.h. per semester also happens to be the maximum allowed by the Graduated College because of the additional research and/or teaching obligations of each DDET student.

The Graduate College requires graduate students to maintain continuous registration following the comprehensive examination. As such, after fulfilling the first two (2) years of courses and passing the comprehensive examination, students have the option in years 4-5 to opt for 'short hours' registration, which typically entails registering for 3 s.h. per semester while completing their dissertation and preparing for their dissertation defense and final examination. DDET students should refer to the DDET course sample plan in Appendix E for a broad timeline and plan of study.

PSET Seminar Program (PHAR:5510)

PSET hosts a weekly seminar during the academic year with a diverse range of presenters including internal researchers, external speakers, and professional development events. All graduate students are encouraged to attend and will be sent a calendar invite for all seminars. Students must register for the PSET Seminar series, which provides them with one (1) semester hour of credit. Any absences must be reported to the PSET Seminar Committee. Students are encouraged to work with their PIs to nominate and host an external speaker.

Responsible Conduct of Research

The University of Iowa must ensure that faculty, staff, and students conducting research are trained in the responsible conduct of research (RCR). Certain Federal and private funding bodies require funding recipients, such as the University of Iowa, to satisfy RCR training. Further, the University of Iowa mandates RCR training to ensure that its researchers responsibly fulfill the University's research mission. In the University of Iowa, the Office of the Vice President for Research (OVPR) and the Graduate College have oversight to ensure all required persons meet their RCR training requirements. All students engaged in federally funded research from entities such as National Science Foundation (NSF), National Institutes of Health (NIH), Health and Human Services (HHS), National Institute of Food and Agriculture (NIFA) and U.S. Department of Agriculture (USDA) must complete the Collaborative Instructional Training Initiative (CITI) training and must complete all required RCR courses. Other Federal and private bodies may also require RCR training.

At the beginning of their first (1st) year in the program and before they can engage in laboratory activities, DDET students must complete the Biomedical Sciences CITI course, then complete the discipline specific required RCR courses if involved in animal or human subjects research. This is typically done during Orientation week, and students do not receive academic credit for the CITI and RCR courses. Additionally, in their second (2nd) year of study, DDET students must enroll in PHAR 6504: Mastering Reproducible Science and BMED 7270-71: Scholarly Integrity & Responsible Conduct of Research. These courses satisfy all federal funding body requirements and also provide students with practical, case-based strategies and best practices to ensure their research is ethical, reproducible, and advance-able. DDET students supported by extramural fellowships may need to complete supplemental or additional training in the Responsible and Ethical Conduct of Research (RECR).

Grade Point Average Requirements

All graduate students at the University of Iowa must maintain Cumulative Grade Point Average (GPA) of at least 3.00 in order to remain in good academic standing with Graduate College. If a DDET student does not maintain a Cumulative GPA of at least 3.00, the program will follow the academic probation and dismissal requirements outlined in the Graduate College Manual of Rules and Regulations, and in this DDET Handbook.

Assigned Workspace

First (1st)-year DDET students receive an assigned workspace in the COP building that may vary depending on departmental needs and space availability. During their laboratory research rotations, DDET students will typically be assigned space with their rotating adviser's laboratory. Once DDET students have been matched with a faculty adviser for their dissertation project, it is the responsibility of the adviser to find workspace for the student.

Laboratory Research Rotations

Each DDET student must complete a minimum of two successive 8-week rotations in two separate research laboratories during their first (1st) semester in the program (typically Fall). After completion of these rotations, the student will rank their preferred choice for a dissertation project/adviser on a form which is part of PHAR 6820 course requirements. DDET students will match with a faculty advisor through mutual agreement and after approval by the Graduate Program Director and DDET faculty. If a third (3rd) rotation is required, this must be approved by the DDET Graduate Program Director and will take place during the second (2nd) semester of the student's first year (typically Spring). During each rotation, students are expected to be on time, spend a minimum of 10 hours carrying out research (typically much more), be respectful, and prepare a brief (10 minute) seminar that will be presented to the DDET faculty and students as part of the PHAR 6820 course during the first (1st) semester in the program. At the end of each rotation, DDET students will be evaluated by their rotation adviser according to the DDET Lab Rotation Rubric and receive a letter grade (A – F) for their rotation. Extremely poor grades (i.e. D-F) during the rotation projects will result in a poor final grade for PHAR 6820 and may be grounds for placing the student on academic probation and potentially even dismissal from the program.

Faculty Adviser Selection and Role

During their first (1st) year in the program, DDET students will not have one formal adviser but rather be guided by the DDET Graduate Program Director and their rotation lab advisers. After the laboratory rotations during their first (1st) semester of their first (1st) year have been completed, DDET students must match to a faculty advisor through mutual agreement between the student and the faculty advisor before or during the second (2nd) (usually spring) semester of their first (1st) year. DDET students should ordinarily aim to match with a faculty advisor based upon availability of funds and shared research interests/goals. Students may need to do a third (3rd) or even fourth (4th) rotation, if a match is not made after two rotations. At the end of the first (1st) year in the program, if a DDET student fails to match with an adviser, the DDET faculty will convene to discuss the case and may

recommend that the student be offered placement on the Master's degree track if alternative laboratory placements cannot be arranged or identified.

The faculty adviser serves an extraordinarily important role for each DDET student, serving as the student's research adviser, mentor and life coach. Some of the most important roles for the faculty adviser are to:

1. oversee and guide the student's research with the goal of completing a dissertation
2. help students develop and finalize coursework and schedules
3. assist with assembling the faculty committees for comprehensive exam and dissertation
4. regularly meet with the students
5. provide funding to support the student's research and stipend
6. assist the students with identifying and securing their own fellowships and funding
7. assist the students with their presentations and publications
8. assist the students with securing internships
9. draft letters of recommendation for the students
10. help their students find and transition to employment after graduation

Dissertation Topic Selection

In addition to coursework, DDET students must complete an original research project and write it up as a document report in the form of a dissertation. A dissertation is an original document that comprehensively describes research on a particular subject. Together with their faculty advisor, students will design an original research project for their dissertation prior to taking the comprehensive examination (and discussed by the committee during the examination). The dissertation must describe experiments, analyses, results, and conclusions sufficiently novel to publish in peer-reviewed journals. The Graduate College website contains specific information regarding the formatting and submission, that the University of Iowa requires for all dissertations.

Comprehensive Examination, Overview

At the beginning of the third (3rd) year of graduate study, following at least two (2) years of full-time courses, DDET students must take a predoctoral comprehensive examination that has two (2) parts-written and oral. DDET students must successfully complete and receive a *satisfactory* rating on the written examination component prior to taking the oral examination component. A DDET student must receive a *satisfactory* rating from the comprehensive examination committee on both the written and oral components of the comprehensive examination to continue in the PhD program and be admitted to doctoral candidacy. The comprehensive examination intends to evaluate each student's mastery of their respective field and a holistic knowledge of pharmacological sciences (i.e. biological and chemical), including all relevant techniques and research approaches.

At least three (3) weeks prior to comprehensive examination, students must complete and submit all required University of Iowa Graduate College Forms. Currently, these Forms include the *Doctoral Plan of Study Summary Sheet*, and the *Request for Doctoral Comprehensive Examination*. These Forms are currently available on the University of Iowa Graduate College website, and must be completed and submitted to the College of Pharmacy Graduate Program Coordinator.

A comprehensive examination committee evaluates each DDET student's written and oral component to determine whether the student's performance was *satisfactory* or *unsatisfactory*.
Each DDET student and their respective faculty advisor must follow these rules for selecting the comprehensive examination committee:

1. For the written component of the comprehensive exam, the committee must be comprised of at least four (4) DDET faculty members who are appointed to the University of Iowa tenure-track Graduate Faculty, of which one (1) member can be the student's adviser.

2. For the oral component of the comprehensive exam, DDET students may request that one (1) faculty member on the committee be from outside the program as long as that faculty member is appointed to the University of Iowa Graduate faculty. To make this request, a DDET student and their faculty adviser must first present the request to the DDET Graduate Program Director and the Associate Dean for Research and Graduate Education in the College of Pharmacy, who may consult with other DDET faculty as necessary. If the request is approved, the student may have this Professor serve on their committee for the oral exam.

Comprehensive Examination, Written

The written component of the comprehensive examination is the first phase of the exam. The written exam will take place on a day and time of the student's choosing, after consulting with their faculty adviser and exam committee. The exam itself will typically be comprised of eight (8) essay-style questions (two questions per committee member), and the content will vary based on discipline and expertise of the exam committee and the student's research field. Written exams typically take place between 8:00 AM to 5:00 PM on the scheduled day and will be proctored by PSET staff and/or DDET faculty. Students are not allowed to have internet access during the written exam period.

DDET students who receive a *satisfactory* rating (i.e., a score of $\geq 70\%$) for the written component of the comprehensive examination may begin developing a research proposal for the oral component of the comprehensive examination. DDET students who receive an *unsatisfactory* rating for the written component of the comprehensive examination may petition to retake and/or remediate the written component. The process of remediation will vary and depend on many factors (e.g. initial performance on the written exam, expectations of the committee, etc).

If a DDET student receives an *unsatisfactory* rating on the written component of the comprehensive examination a second (2^{nd}) time, the student will be dismissed from the PhD program.

Comprehensive Examination, Oral

A DDET student may begin the oral component of the comprehensive examination once the student has received a *satisfactory* rating for the written component. For the oral component, each student must prepare a NIH-format research proposal (see Appendix B), generally on the topic of their dissertation but not required, and must submit this proposal to their comprehensive examination committee two (2) weeks prior to the oral examination. The comprehensive examination committee shall review each research proposal and, prior to beginning the oral component of the exam,

determine if the proposal is *acceptable* for oral defense, or *unacceptable* for oral defense. If the committee determines the research proposal is *unacceptable* for oral defense, the DDET graduate student shall have a second (2nd) opportunity to prepare an *acceptable* research proposal for oral defense.

Once the comprehensive examination committee has determined the research proposal *acceptable* for oral defense, the student shall defend the research proposal during an oral examination by the comprehensive examination committee, typically lasting approximately one and one-half (1.5) to two (2) hours. Students should bring at least one (1) copy, electronic or paper, of the research proposal to the oral examination. During these examinations, students will provide a slideshow presentation (e.g., Power Point) summarizing their research proposal at the beginning of the oral component of the comprehensive examination. Committee members may question the DDET graduate student on any aspect of the research proposal at any time during the examination.

After the DDET student has completed the oral component of the comprehensive examination, the comprehensive examination committee shall rate the DDET graduate student's performance as *satisfactory*, *reservations*, or *unsatisfactory*. Students with *satisfactory* performance shall be admitted to Doctoral Candidacy and proceed with their research projects. To receive a *satisfactory* rating, at least two-thirds (or 66%) of the examination committee must rate the DDET graduate student's performance as *satisfactory*. If two (2) or more committee members rate the student's performance with *reservations*, the committee may require the student to remediate the oral exam which may include redrafting all or a portion of the research proposal, additional study and/or writing tasks, and potentially additional coursework. The DDET student's faculty advisor shall inform the student in writing of these reservations, the tasks needed to remediate these reservations, and the time allowed to address these reservations. If the student fails to complete the tasks needed to remove these reservations within the time allowed, the student shall receive an *unsatisfactory* performance rating.

For DDET students that receive an *unsatisfactory* score, the student may petition once to retake the oral component of the comprehensive examination not earlier than two (2) months after the first oral component has occurred. The committee may require the student to rewrite the original research proposal, or to write a new research proposal on a different topic.

If a DDET student receives an *unsatisfactory* rating on the oral component of the comprehensive examination a second (2nd) time, the DDET faculty reserve the right to dismiss a student from the program. Faculty will manage these situations on a case-by-case basis.

Registration After Comprehensive Examination

The Graduate College requires doctoral students to maintain continuous registration until receiving their degree after receiving a *satisfactory* rating on both components of the comprehensive examination. As such, after fulfilling the first two (2) years of courses and receiving a *satisfactory* rating on the comprehensive examination, DDET students should enroll in fewer s.h. each semester while completing their research and dissertation. Specifically, DDET students must register for PHAR:5510 PSET Seminar and, until the beginning of fifth (5th) year, must also register for PHAR:6515 Perspectives during the Fall semester. DDET students may also opt to register for additional required and/or elective courses within the discipline of their research. The Graduate

College Manual of Rules and Regulations provides further information about registration requirements and options following the comprehensive examination.

DDET students are strongly encouraged to maintain full-time student status throughout the degree program. The Office of the Registrar requires students seeking full-time student status to file a Short Hours Form with the COP Graduate Program Office to maintain full-time student status while registered for fewer than nine (9) s.h. per semester. The Short Hours Form is available on the Office of the Registrar website.

DDET students usually need not register for s.h. during the summer session unless the student is supported by a fellowship or other funding mechanism that require student registration during the summer session. If a student is unsure whether their funding mechanism requires registration during the summer session, the student may consult with the COP Graduate Program Coordinator.

Changing Degrees (PhD to Master's)

The DDET graduate program does not have a formal Master's degree program. In certain instances, DDET faculty may permit a student enrolled in the PhD degree program to leave the program with a Master's degree after completing the requirements for a Professional Master's degree set forth by the UI Graduate College, which requires a minimum of 30 semester hours *within the discipline of the DDET program* (i.e. pharmaceutical/biochemical sciences). DDET students seeking a Master's degree may elect to do either a Thesis- or Non-Thesis Master's degree. In the case of a Thesis Master's, the DDET student must assemble a committee of faculty under similar composition as described above for the dissertation. The student must also prepare a written thesis based on their research project (or progress on their dissertation project, to date), and then defend that thesis in an oral defense/final examination with their faculty committee, similar to a dissertation defense (although smaller in scope). Both Thesis and Non-thesis Master's students must participate in PHAR 6515 and present a seminar to the DDET students and faculty at least one (1) time during their enrollment in the program. The timeframe for when a student may receive the Master's degree will vary and depend on their status in the program, and the circumstances under which they are leaving the PhD program.

Dissertation Committee

Together with their faculty advisor, each student will choose the members of their dissertation committee no later than the end of the semester in which the comprehensive examination takes place. The dissertation committee is typically the same as the Comprehensive committee. The following rules must be followed when deciding on the comprehensive/dissertation committee:

1. Each committee must be comprised of faculty members with varying, but related, areas of expertise.

2. Each committee must have at least four (4) members, one of which must be the adviser. At least three (3) of the faculty members must hold appointments in DDET and also be appointed University of Iowa tenure-track Graduate Faculty members.

3. If the DDET student desires having a faculty member on their external to the University of Iowa, the Associate Dean for Research and Graduate Programs in the College of Pharmacy, and the Dean of the Graduate College, must approve the inclusion of that non-University of Iowa tenure-track Graduate Faculty member.

4. The final committee must be approved by the Graduate College.

Dissertation Committee Meetings and Progress toward Degree

Each committee must meet at least once per year with the student to update the committee on research progress and to provide guidance to the student. Students are encouraged to meet with their committee more than once a year if needed. Upon completing their courses and dissertation project, DDET students must have developed capability to exercise the following skills:

1. Identify important research problems through development of subject matter expertise and critical evaluation of the current state of knowledge in that area of expertise.

2. Develop testable hypotheses and/or research questions, and then utilize sound methodology to design research approaches to address them.

3. Conduct, analyze, and interpret independent original research that contributes new knowledge to the field of study.

4. Effectively communicate research results to a range of audiences in both written and oral formats. Development of communication skills is enhanced by the availability of resources such as *The Writing Center* (https://writingcenter.uiowa.edu/) and through the Office of Teaching, Learning & Technology (https://itsteach.prod.drupal.uiowa.edu/resources/collections/oral-presentations).

5. Conduct all aspects of research and communication of results with the highest ethical standards.

6. Be prepared for a diversity of career options in academia, industry, government, or other relevant fields. The Graduate College also provides extensive resources for career (https://grad.uiowa.edu/career-exploration-planning) and personal development (https://studentwellness.uiowa.edu/).

Individual Development Plans

The DDET program requires each graduate student to complete and update an Individual Development Plan (IDP) each year throughout their progression in the program. The IDP provides a formalized process that allows students to define and pursue their career goals with guidance from their faculty advisor. The goal of the IDP is for each student to evaluate their skills, interests, and values; predict career paths; set strategic goals for the coming year, and review articles and resources to support these tasks. IDPs must be completed annually by the DDET student after discussion with

their faculty advisor using the DDET approved template (https://myidp.sciencecareers.org/) according to the American Association for the Advancement of Science (AAAS) *My IDP Science Careers Individual Development Plan*.

Dissertation Defense and Final Examination

In order to graduate with a PhD, each DDET student is expected to prepare a dissertation/thesis describing their original research. DDET students must first receive assurance from their dissertation committee that they are ready to begin writing their dissertation (typically after a committee meeting/data session), and this document must be written entirely by the student. After the student and their adviser have determined that the dissertation is satisfactory, the student will submit the document to their dissertation committee at least two (2) weeks prior to the final examination. Each DDET student is responsible for scheduling their final examination, also known as a dissertation defense, with their dissertation committee. DDET students must reserve rooms for the dissertation seminar and the oral examination that immediately follows the seminar.

The final examination is a final oral examination administered on campus. The final examination includes a public seminar presentation followed by a closed meeting with the dissertation committee. During this closed meeting, the dissertation committee will engage in: (1) a critical inquiry into the purposes, methods, and results of the investigation, not a mere recapitulation of the procedures followed; and (2) intensive questioning on areas of knowledge constituting the immediate context of the investigation. The final examination typically lasts three to five (2-3) hours. Graduate College rules permit the public to attend the public seminar portion of the final examinations.

The dissertation committee shall determine whether the final examination earns a *satisfactory* or *unsatisfactory* rating. A DDET student shall have passed the final examination when at least two-thirds (66%) of the dissertation committee determines the student receives a *satisfactory* rating. A student with *unsatisfactory* performance may petition once to retake the final examination not earlier than the next session.

After the final examination, DDET graduate students must make the corrections to the dissertation that their committee requires, if any. After corrections are made, the student must submit their dissertations to the Graduate College by an established deadline. The Graduate College website has further information about dissertation deadlines and formatting requirements.

Program Costs and Funding

Students admitted to the DDET graduate program are financially supported through multiple mechanisms. These mechanisms include, though are not limited to, faculty research assistantships, graduate teaching assistantships, scholarships, fellowships, grants, awards, and departmental/collegiate funds. Faculty advisors may provide DDET students with support and assistance with applying for funding opportunities. The Graduate College also offers support and assistance with applying for funding opportunities through its Grad Success Center (https://grad.uiowa.edu/grad-success/fellowship-and-grant-support).

Research and Teaching Assistantships

DDET graduate students who are not supported by fellowships have two (2) options of financial support: research assistantships (RA's) and teaching assistantships (TA's). RA's serve two (2) purposes: (1) to provide faculty with personnel capable of learning and performing the research; and (2) to provide students with first-hand experience in the design, conduct, and reporting of original research. RA's give DDET graduate students direct and continuing experience with the research process through rational study design and planning, collection and analysis of data, and preparation of a scholarly paper. The bulk of the research will be related to a DDET graduate student's dissertation, and at times may include collaborations within and external to the faculty adviser's lab.

TA's serve two (2) purposes: (1) to provide faculty with assistance in the instructional program of the University; and (2) to provide students with training and experience to prepare them as future educators. TA's give DDET students direct and continuing experience with the teaching process through instruction and evaluation of students in the class for which the DDET graduate student serves as a TA. Most DDET students usually serve as TA's during their first (1st) year in the graduate program. After being placed in a faculty adviser's lab, DDET students will then continue to serve as TA's or RA's throughout duration of the degree program.

Graduate assistantships are awarded to students annually. The nature of the assistantship (e.g. RA or TA) is determined based on research funding available to the faculty adviser and consultation between the PSET Department Chair and DDET Graduate Program Director. Additional guidance, policies, and requirements for graduate student employment as a RA or a TA are codified in the University of Iowa Graduate Student Employment Standards, available on the Graduate College website. These standards include a Collective Bargaining Agreement between the State of Iowa Board of Regents and UE Local 896 / COGS, available on the Graduate College website.

Before beginning work as a RA or as a TA, the University of Iowa must verify a DDET student's identity and eligibility for employment. A person with authority in the COP, usually a Human Resources Official, shall inform DDET students of the document(s) that the students may use to establish identity and eligibility for employment. Students must then present these documents to this person with authority in the COP, usually a Human Resources Official, who shall physically examine these documents to verify a student's identity and eligibility for employment.

Appointments to a RA or TA position are for a fixed period, usually one (1) academic semester, one (1) academic year, or one (1) fiscal year for each appointment. DDET students must notify their supervisor(s) of unplanned and planned absences during their appointments and may take paid leave with the approval of their supervisor(s) (See Extended Leave section below).

DDET graduate students may lose their assistantship(s) for one or more of the following reasons: failure to maintain adequate student enrollment status, failure to make satisfactory academic progress in the DDET degree program, failure to follow the Code of Student Life, loss of funding, proper cause related to job performance, and/or failure to return to assistantship duty following an approved leave of absence. The Code of Student Life is available from the University of Iowa, Division of Student Life, and appears on the Division of Student Life website.

DDET renews graduate assistantships based upon the supervisor's evaluation of the student under the above-listed criteria, and the collective judgment of the faculty. Regardless of supervisor evaluation and collective faculty judgment, all graduate assistantship renewals are contingent upon continued availability of certain University, State, and Federal funds for DDET student support.

Scholarships, Fellowships, Grants, and Awards

The University of Iowa has fellowships, awards, and programs available to certain graduate students across the University, including though not necessarily limited to the following:

- Graduate College Iowa Recruitment Fellowships
- LuLu Merle Johnson Recruitment Fellowships
- Graduate College Post-Comprehensive Research Awards
- ACT Scholars Program
- Graduate College Summer Fellowships
- Ballard and Seashore Dissertation Semester Fellowship

DDET students can find additional information about these funding opportunities and other funding opportunities from the Graduate College, and on the Graduate College website. DDET students can also find additional information about funding assistance from the University of Iowa Office of Student Financial Aid, and on the University of Iowa Office of Student Financial Aid website.

The University of Iowa Policy Manual summarizes how the University of Iowa handles Federal and State income taxes on scholarships and fellowships.

Extended Leave and Vacations

DDET students must request permission from their faculty advisers for any extended leaves of absence or vacation during their time in the DDET graduate program. During the first (1st) year of study and prior to placement with an adviser, all requests and accommodations for leave must be directed to the DDET Graduate Program Director. In general, and with exception of major holidays, academic breaks are not automatic vacation days. Time off during these periods must be treated the same as any other time and permission must be granted by the faculty adviser.

TA vacation: During the academic year, extended leave and vacation while classes are in session will only be granted for TA students in exceptional cases (e.g., serious illness, conference participation travel, etc). *TA's must obtain permission from both the major professor/director of their assigned course, as well as their adviser (or DDET Program Director), prior to taking any time off.* TA's are responsible for working with the director of their course to find a suitable substitute or alternate arrangement for their assigned course. Since TA's are often responsible for pre-course prep or final grading at the end of a term, this policy also applies to those windows of time as well.

RA/Fellowship vacation: All extended absences from research project work for non-emergent reasons must be requested from the student's adviser prior to the absence. Individual faculty will have varying policies regarding vacations/leave within their group and it is the responsibility of each student to

communicate with and work with their faculty adviser to make arrangements for extended time off. In some cases, vacation/leave requests may not be granted for various reasons, and these include but are not limited to- looming grant and/or manuscript deadlines, time-sensitive project work, lack of suitable expertise or personnel available to manage project resources (e.g., animal husbandry, cell isolation and culture, etc) during the absence, and more.

Purchasing Supplies and Services

The University of Iowa, as a type of Agency or Instrumentality of the State of Iowa, is exempt from paying Iowa sales tax on purchases used for public purposes. As such, DDET graduate students incurring costs for which DDET graduate students seek reimbursement from the University of Iowa must make diligent efforts to ensure the vendor does not charge sales tax to ensure the University of Iowa does not pay sales tax when reimbursing DDET graduate students.

Student Organizations

DDET graduate students can find information about Student Organizations in which they may want to participate from the University of Iowa, Division of Student Life. The University of Iowa currently has over six hundred (600) Registered Student Organizations (RSOs). PSET encourages DDET graduate students to become involved in student organizations.

The University of Iowa COP has a Student Chapter of the American Association of Pharmaceutical Scientists (AAPS). Founded in 1986, the AAPS is a professional, scientific organization of approximately seven thousand (7,000) individual members and over ten thousand (10,000) actively participating stakeholders employed in academic, industry, government, and other pharmaceutical science related research institutes worldwide. The AAPS mission is to advance the capacity of pharmaceutical scientists to develop products and therapies that improve global health. PSET encourages DDET graduate students to participate in the University of Iowa AAPS Student Chapter. Participation is optional.

Departmental Probation Procedures

PSET follows the probation procedures in the Graduate College Manual of Rules and Regulations, Section IV.E.

Student Right to Review After Dismissal

The Graduate College Manual of Rules and Regulations requires each Department to establish procedures for student right to review after receiving notice of dismissal from the degree program. These procedures for DDET graduate students are set forth below.

1. After receiving written notice of dismissal from the PhD in DDET degree program, the former DDET student shall have thirty (30) days from the date on the written notice to appeal the dismissal from the program.

2. The former DDET student must submit their appeal in writing to the PSET Department Chair and must set forth the basis for the appeal with enough specificity to put PSET on notice of every reason the former DDET student believes the dismissal was improper. In this written appeal, the former DDET student must also recommend at least three (3) PSET faculty members that the former DDET student wishes to review the dismissal decision. The three (3) PSET faculty members that the former DDET student recommends to review the dismissal decision must be PSET faculty members who were not involved with the decision to dismiss the former DDET student. In this written appeal, the former DDET student must state the date on which they submitted the appeal, sign the written appeal, and make a complete statement of the remedy or remedies that the former DDET student requests.

3. Within one (1) week after the date on the former DDET student's appeal, the PSET Department Chair shall appoint a committee (the "Review Committee") of at least three (3) PSET faculty members who were not involved in the dismissal decision to review the dismissal decision. These PSET faculty members appointed to the Review Committee may or may not be the same as those PSET faculty members the former DDET student recommended for the Review Committee. The Review Committee is not obligated to use the Review Committee members the former DDET student requested.

4. The Review Committee shall review all information relevant to the dismissal decision. The Review Committee shall complete its review of the former DDET student's appeal within two (2) weeks after the date upon which the PSET Department Chair appointed the Review Committee.

5. Within one (1) week after the Review Committee completes its review, the Review Committee shall meet with the former DDET student in person at least one (1) time to discuss the dismissal decision. Additional meetings are optional, but all meetings with the Review Committee must take place within this one (1) week period.

6. Within two (2) weeks after the last meeting with the former DDET student, the Review Committee shall make written factual findings and recommendations describing whether, and if so how, the dismissal decision should change. The Review Committee shall submit these factual findings and recommendations to the PSET Department Chair.

7. Within two (2) weeks after receiving the Review Committee's written factual findings and recommendations, the PSET Department Chair shall make and issue a written final decision on the former DDET student's appeal.

8. Under limited circumstances, former DDET students dismissed from the DDET program who receive an unfavorable review of the dismissal decision from PSET may appeal the Departmental dismissal decision through the Graduate College Academic Grievance Procedure (AGP). The Graduate College website contains additional information about the AGP. DDET students should note that not all Departmental dismissal decisions are eligible for review under the AGP.

Appendix A: Descriptions of graduate courses taught by DDET faculty

Course
PHAR:6515 Perspectives in DDET (1-2 s.h.) (DDET Faculty and students): Contemporary research in chemical and biological sciences ongoing in DDET faculty labs. Individual DDET faculty will discuss projects at each meeting.
PHAR:5512 Drug Discovery and Mechanisms (3 s.h.) (Roman): Process of modern drug discovery, focus on high throughput screening strategies, target validation, pharmacological characterization of new compounds; mechanism of drugs targeting G protein coupled receptors, ion channels and transporters, targets in biological systems.
PHAR:5541 Total Synthesis of Natural Products (3 s.h.) (Jin): Total synthesis of natural products; use of strategies, tactics, efficiency, selectivity, synthetic maneuvering. Consent of instructor required.
PHAR:6501 Principles and Mechanisms of Chemical Toxicology (1 s.h.) (Doorn): Principles and mechanisms of chemical toxicology related to drugs and environmental agents. Modern methods used to conduct toxicological research.
PHAR:6502 Toxic Agents and Concepts in Toxicology (1 s.h.) (Doorn): Specific classes of toxicants and non-organ directed toxicity, including chemical carcinogenesis, oxidative stress, teratogenesis; clinical toxicology, antidotes, methods and models in toxicology.
PHAR:6503 Target-Organ Toxicity (1 s.h.) (Doorn): Role of drugs/toxicants in systems toxicity (target organ); hepatotoxicity, neurotoxicity, cardiotoxicity, and toxic responses of immune system.
PHAR:5545 Current Medicinal Chemistry (3 s.h.) (Kerns): Modern techniques used in drug discovery; important drug classes, their chemical mechanism of action.
PHAR:5549 Analytical Biochemistry (3 s.h.) (Rice): Application of modern chromatographic and detection methods used to isolate, characterize, and quantify drugs and macromolecules.
PHAR:5244 (BMB:5244) Molecular Recognition (1 s.h.) (Spies): Focus on determinants in protein small molecule binding, particularly involving pharmaceutically relevant enzymes and receptors; how modern structure-based drug discovery is greatly aided by the ability to employ protein structures in discovery and design of certain classes of drugs; structural approaches for predicting and improving drug affinity and selectivity, which have made a lasting impact across a number of diseases; important contemporary topics include in-depth lectures on fragment based drug discovery (FBDD), use and pitfalls of *in silico* docking and other screening methods, and emergence of covalent drugs..
PHAR:7701 Principles of Experimental Therapeutics (3 s.h.) (Anderson & Milavetz): Broad introduction to research methodology in experimental and clinical pharmacology. Students will be taught to think critically about study design, research methods (scaling from *in vitro* studies to preclinical testing and clinical trials), drug disposition, toxicity and efficacy. Students will also be trained how to peer review and critique clinical and experimental research articles, how to critique grants and contract proposals, and to design studies based on small molecules and/or disease topics assigned by the instructors.
PHAR:5400 1 Principles of Pharmacogenomics (3 s.h.) (Gaine): Provide instruction on basic molecular biology in the context of pharmaceutical science and drug discovery, and promote critical/analytical thinking necessary for basic scientific research. A variety of topics are scheduled to be covered, including genetics, epigenetics, genomics, and bioinformatics.
PHAR:5510 PSET Seminar (1,2) (Gaine / Nejad Nik/McLendon): PSET Seminar is a 1 semester hour (s.h.) required course for all students, including first-year students. Attendance is required. The department meets once per week (usually on Tuesday) and attendance is mandatory for students. Every week there is a different guest speaker. Guest speakers come from both on-campus and off-campus and include professors from other institutions, previous students (alumni), and industry professionals.

Appendix B: Written Research Proposal Format for Comprehensive Examination

DDET faculty recommends that students follow the following format and page limits for the NIH-format research proposal required in the comprehensive examination.

In general, DDET graduate students should draft research proposals as NIH R01 proposals with a one (1) page Specific Aims section and a twelve (12) page Research Strategy section.

The twelve (12) page Research Strategy section should include Significance, Innovation, Approach (including Background and Preliminary Results), and Timeline.

Form Pages (including the Face Page, Abstract, Biographical Sketch, Resources, Budget, Budget Justification), References Cited, and Vertebrate Animal Subjects Justification and Human Subjects Justification sections do not count toward the twelve (12) page limit. DDET graduate students should not have one or more sections for Vertebrate Animal and Human Subjects Justification if no vertebrate animal or human subjects will be used in the research.

PSET recommends the following format for the oral examination research proposal:

1. Specific Aims (1 page). Summarize the project and provide two (2) or three (3) succinct Aims the DDET graduate student shall pursue. State concisely and realistically the intended accomplishments and hypothesis to be tested of the research described in this proposal. Provide a brief explanation of each specific Aim to test the hypothesis.

2. Research Strategy (12 pages).

    a. Significance (~ 0.5-1.0 page). Provide the rationale for pursuing the study and a statement of the medical relevance. State the significance of this proposed work as it relates to the successful completion of the studies advancing science and medicine.

    b. Innovation (~ 0.5 page). Provide the key most important innovations that make the proposal novel. Explain how the research will challenge and perhaps shift current research paradigms. What are the innovative concepts, approaches, or methodologies in the research? Are new and innovative approaches utilized?

    c. Approach (10-11 pages, ~ 3.3 pages per Aim, average). Space and page ranges below are provided as examples.

        i. Aim 1. Restate the first Aim.

        ii. Rationale (~ 1 paragraph). State the rationale for Aim 1.

        iii. Relevant Background for Aim 1 (~ 0.5-1 page). Provide the background most relevant to this Aim including Figures and References.

iv. Key Preliminary Results to Support Aim 1 (~ 0.5-1 page). If applicable, provide any preliminary studies the DDET graduate student has completed that support this Aim (e.g. computer modeling, computational studies or calculations, etc.).

v. Aim1 Research Design (~ 2-3 pages). Provide a detailed set of experiments and controls, including figures, schemes and diagrams to illustrate the plans. Use additional subheadings to format this section.

vi. Expected Outcomes (~ 1 paragraph).

vii. Potential Problems and Alternative Strategies (~ 1 paragraph).

viii. Aim 2. Restate the second Aim.

ix. Rationale (~ 1 paragraph). State the rationale for Aim 2.

x. Relevant Background for Aim 2 (~ 0.5-1 page). Provide the background most relevant to this Aim including Figures and References.

xi. Key Preliminary Results to Support Aim 2 (~ 0.5-1 page). If applicable, provide any preliminary studies the DDET graduate student has completed that support this Aim (e.g. computer modeling, computational studies or calculations, etc.).

xii. Aim 2 Research Design (~ 2-3 pages). Provide a detailed set of experiments and controls, including figures, schemes and diagrams to illustrate the plans. Use additional subheadings to format this section.

xiii. Expected Outcomes (~ 1 paragraph).

xiv. Potential Problems and Alternative Strategies (~ 1 paragraph).

xv. Aim 3. Restate the third Aim.

xvi. Rationale (~ 1 paragraph). State the rationale for Aim 3.

xvii. Relevant Background for Aim 3 (~ 0.5-1 page). Provide the background most relevant to this Aim including Figures and References.

xviii. Key Preliminary Results to Support Aim 3. (~ 0.5-1 page). If applicable, provide any preliminary studies that you have completed that support this Aim (e.g. computer modeling, computational studies or calculations, etc.).

xix. Aim 3 Research Design (~ 2-3 pages). Provide a detailed set of experiments and controls, including figures, schemes, and diagrams to illustrate plans. Use additional subheadings to format this section.

xx. Expected Outcomes (~ 1 paragraph).

xxi. Potential Problems and Alternative Strategies (~ 1 paragraph).

3. Time Table (~ 1 paragraph). Provide a timeline for completion of key components of Aims One through Three (1-3).

4. Vertebrate Animals (if relevant to the proposal cover the points that NIH requires) and/or Human Subjects (if relevant to the proposal cover the points that NIH requires). These sections do not apply to the twelve (12) page limit and DDET graduate students should exclude these Sections if their proposal does not use vertebrate animal or human subjects.

5. References Cited (approximately 75+ but references may vary). Each reference must be complete and numbered in the order of their appearance in the Research Plan. Each citation must include the names of all authors, the full title of the article or chapter, the name of the journal or book, volume number, page numbers, and year of publication. For books, citation of the publisher and city is also required. The reference style must use consistent format.

6. Other Considerations for the Written Proposal:

    a. The proposal must use the following Forms that PSET shall provide: Title Page, Abstract Page, Budget and Budget Justification Pages, Biosketch Pages, and Facilities and Equipment Pages. DDET graduate students should follow instructions for these form pages with particular attention to keeping within space requirements when required and using continuation pages when allowed.

    b. DDET graduate students should assume they are employed as an Assistant Professor in DDET, and the facilities and equipment at the University of Iowa are available for their use.

    c. DDET graduate students must present a four (4) year modular budget according to NIH guidelines. This budget must include use of the appropriate budgetary percentages for institutional overhead and fringe benefits.

Appendix C: DDET course requirements

Drug Discovery & Experimental Therapeutics (DDET) Graduate Program Course Requirements

The curriculum requires didactic courses as described below in addition to recurring courses PHAR 6515 (Perspective in DDET), PHAR 5510 (PSET Seminar), and PHAR 6820 (DDET Research).

Required Courses

BIOS 4120 Introduction to Biostatistics (Fall semester of 1st year, student may opt-out only in rare cases)
PHAR 6515 Perspectives in DDET
PHAR 5510 PSET Seminar
PHAR 6820 DDET Research
PHAR 6504 Mastering Reproducible Science (2nd year only)
BMED 7270-71 Scholarly Integrity & Resp. Conduct of Research (2nd year only)

A minimum of 4 courses must come from the list below.

PHAR 5545 Current Medicinal Chemistry
PHAR 7101 Principles of Experimental Therapeutics
PHAR 8148 Introduction to Pharmacokinetics/Pharmacodynamics (or 4146)
PHAR 5549 Analytical Biochemistry
PHAR 5512 Drug Discovery Mechanisms
PHAR 6501 Principles and Mechanisms of Chemical Toxicology
PHAR 5541 Total Synthesis of Bio-Active Natural Products
PHAR 5542 Molecular Recognition
PHAR 5400 Principles of Pharmacogenomics
PHAR 7102 Applied Clinical & Translational Science

Appendix D: Suggested Electives

List of suggested Electives for DDET students

(updated July, 2024)

Courses lists shown below are not comprehensive or exclusive, but rather intended to serve merely as a guide. Each student should discuss with their adviser about suggested electives most appropriate for their training during their course of study.

Medicinal Chemistry

CHEM:4372	Advanced Organic Chemistry
CHEM:5321	Spectroscopic Methods in Organic Chemistry
CHEM:5326	Organic Reactions
CHEM:5329	Advanced Organic Synthesis

Biomedical Sciences & Experimental Therapeutics

ACB:6225	Growth Factor Receptor Signaling
GENE:4213	Bioinformatics
GENE:7191	Human Molecular Genetics
MMED:6220	Mechanisms of Cellular Organization
MMED:6226	Cell Cycle Control
MMED:6227	Cell Fate Decisions
MMED:6230	Pathogenesis of Metabolic and Cardiovascular Disorders
MMED:6260	Methods for Molecular & Translational Medicine
NSCI:5212	Foundations in Behavioral & Cognitive Neuroscience
NSCI:5653	Fundamental Neurobiology I
NSCI:5654	Fundamental Neurobiology II
PCOL:3101	Pharmacology I: Drug's Fantastic Journey
PCOL:3102	Pharmacology II: Mechanisms of Drug Action
HHP:4510	Energetics in Health & Disease
MICR:3147	Immunology and Human Disease
MICR: 3170	Microbial Genetics & Physiology
BME:4310	Computational Biochemistry
BME: 5101	Biomaterials and Implant Design
BMI:5200	Biomedical Signal Processing
BME:5335	Computational Bioinformatics
BME: 5401	Biomaterials and Implant Design

Clinical Pharmaceutical Sciences

GENE:4213	Bioinformatics
IGPI:5110	Regression & ANOVA in Health Sciences
IGPI:5130	Applied Categorical Data Analysis
ACB:6200	Current Topics in Genetics
BIOS:4510*	Data Science Foundations in R

BIOS:6610*	Statistical Methods in Clinical Trials
BIOS:6234*	Basic Biostatistical Methods Genetics Apps
BIOS:#270	Genetics and Epidemiology
EPID:5241*	Statistical Methods in Epidemiology
PCOL:5136*	Pharmacogenetics and Pharmacogenomics
PHG:6270	Genetics and Epidemiology
MMED:5270	Pathogenesis of Major Human Diseases

Appendix E: DDET sample plan of study

1st Year

Fall		12 s.h. max
BIOS: 4120	Introduction to Biostatistics	3
XXXX	Elective or DDET required course[a,b]	1-3
XXXX	Elective or DDET required course[a,b]	1-3
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	X

Spring		12 s.h. max
XXXX	Elective or DDET required course[a,b]	1-3
XXXX	Elective or DDET required course[a,b]	1-3
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	4

2nd Year

Fall		12 s.h. max
BMED: 7270	Schol Integ Resp Cond Res	0
XXXX	Elective or DDET required course[a,b,c]	1-3
XXXX	Elective or DDET required course[a,b,c]	1-3
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	4

Spring		12 s.h. max
BMED: 7270	Schol Integ Resp Cond Res	0
PHAR:6504	Mastering Reproducible Science	1
XXXX	Elective or DDET required course[a,b,c]	1-3
XXXX	Elective or DDET required course[a,b,c]	1-3
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	4

Comprehensive Exam

Any term or semester after completion of 2nd year

3rd Year

Fall		9 s.h.
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	7

Spring		9 s.h.
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	7

4th Year (short hours)

Fall		3 s.h.
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	1

Spring		3 s.h.
PHAR:6515	Perspectives in DDET	1
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	1

5th Year (short hours)

Fall		2 s.h.
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	1

Spring		2 s.h.
PHAR:5510	PSET Seminar	1
PHAR:6820	DDET Research	1

Dissertation Defense

Any date deemed acceptable by student's faculty adviser and dissertation committee on individual basis.

Footnotes

[a] Please refer to Appendices C and D for lists of DDET Required and Elective courses, respectively. Course availability will vary as DDET faculty courses run every other year.

[b] Students should refer to course lists in Appendix of DDET program handbook for courses that might be appropriate for their training and research directions. These are not comprehensive lists and students are encouraged to work with the program director and/or their faculty adviser on individual basis to identify course needs and fit.

[c] Students appointed to fellowships may be expected to take additional courses and should follow guidelines specific for each.