Phar 6742: Practice-based Problem Solving with Evidence-based Methods I: Foundations
Course Syllabus Spring 2016 – Fall 2016
1.0 Credits

Syllabus subject to revision as circumstance warrants. Students will be apprised of such revisions.

This course adheres to the items listed in the College of Pharmacy Central Syllabus: https://docs.google.com/a/umn.edu/document/d/1artQ5e1rbzxe8lEtWo7BE8k8snZAEgMMz_QcW8yJ-ll/edit?pli=1

Meeting Times & Locations

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Duluth Room</th>
<th>Twin Cities Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursdays</td>
<td>2:30-4:25</td>
<td>Per Course Schedule</td>
<td>Moos 1-450</td>
</tr>
</tbody>
</table>

Technology Help, Duluth: 218-726-8847 itsshelp@d.umn.edu
Technology Help, Twin Cities: 612-301-4357 help@umn.edu

Course Instructional Team

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Course Overview

Course Vision

The goals of the “Practice-based Problem Solving with Evidence-based Methods (PPS)” sequence are to: 1) foster problem-solving skills in students by gaining experience with primary or secondary scientific research and 2) illustrate how PPS is relevant to the generalist practitioner. By completing the PPS sequence, students will be able to construct research questions and use evidence and/or data to answer these well-constructed questions. The PPS sequence will build on Domain 6 competencies and evidence-based medicine (EBM) skills established in the first year. This sequence will illustrate similarities between the EBM process students learn in their PDI year (i.e. Ask, Acquire, Appraise, Apply) and the scientific method. Additional goals of this course are to foster communication skills in students. Specifically, students will gain experience communicating research methods and results to an audience of peers using written and verbal communication. Lastly, a goal of the course is to instill peer review abilities in students. This course (Foundations) is designed to precede the second course (Applications) and provides the foundations necessary to enable the students to conduct a meaningful literature-based review and contribute to the design and execution an original research study.

This course is designed to engage students in a real scholarly research and publication process. The key assignments and deliverables in this course will be done as a submission to an actual online open access journal called “Advances in Pharmacy: Journal of Student Solutions to Pharmacy Challenges.” The student submissions will be processed via the journal’s editorial system which will assign faculty and peer-reviewers to each submission. In the end, the papers describing student projects in this course will be published in this journal and become publicly available to the larger community via the University of Minnesota libraries.

Sequence (Foundations and Applications) Workflow

[Diagram of the workflow process]


**Stars in the diagram above indicate course sequence deliverables**

Notes:

1. Students pursuing the Primary research direction are encouraged to enroll in the Research Emphasis program at COP.
2. Students may self-assemble into groups of no more than 3 or may work individually. This does not apply to students in the Research Emphasis track, where work must be performed on an individual basis.
3. COP faculty panels will be assembled to evaluate and provide feedback on course deliverables: the Specific Aims, the Methods section, and the Final Paper milestones.
4. Presentations of the final paper will take place in the format of a scientific conference with parallel tracks. The faculty from each Faculty Panel will be responsible for moderating scientific sessions.
5. For the purposes of this course sequence “primary research” is defined as research where data is generated (this includes use of electronic health records). “Secondary research” is defined as research that utilizes literature as the data to answer the research question. “Applied EBM research” is defined as research related to co-curricular activities. Regardless of type of project chosen, all papers will be literature reviews.

### Sequence of Courses and Timelines

<table>
<thead>
<tr>
<th>PD 2 Spring</th>
<th>PD2 Summer</th>
<th>PD3 Fall</th>
<th>PD3 Spring</th>
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<tbody>
<tr>
<td><strong>Foundations</strong>&lt;br&gt;PHAR 6742</td>
<td><strong>Student does additional background work and develops research topic</strong></td>
<td><strong>Student posts draft of Methods section, receives feedback from Faculty Panel</strong></td>
<td><strong>Application</strong>&lt;br&gt;PHAR 6782</td>
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**Part I: RESEARCH QUESTION (2 weeks)**

> Students learn to identify background information in an area of interest and to gain experience/expertise necessary to develop a research question.

> Students investigate one of several pre-defined areas of interest in groups and individually. The starting point for this investigation consists of medical myths and Minnesota Society of Health-system Pharmacists (MSHP) topics.

> Students individually practice literature search specific to a research question related to a medical/pharmacy myth of their choosing.

> Students practice developing a document describing their Specific Aims, including their question

**Part II: RESEARCH TYPES (5 weeks)**

> Students learn about different types of research including experimental, survey, database, and systems analysis approaches. This part of the course will rely on a selection of articles from the British Medical Journal and other high impact medical journals’ holiday issues.

> Students that choose primary research work on identifying and establishing a working relationship with a Faculty Advisor prior to PD 3 Fall semester. These students must independently secure a COP faculty advisor to proceed with this option.

> Students that choose to do secondary research may seek advice from COP faculty or those outside of COP but may also work independently on gathering evidence for their questions.

> Students that choose the applied EBM direction must select and register for one of the approved competitions (e.g. Clarion). These students are free to rely on advisors in the competition but may also require feedback.

> Students continue to work on gathering evidence to answer their questions and formulate their research methods.

> Students submit a draft of their Methods for lit reviews to a panel consisting of COP faculty for evaluation and feedback by the last instructional day.

> Students begin review and submit written comments on completed Methods sections of at least two group-mates prior to second week of the Applications course.

> Students complete and polish paper, citing references, using tables and scientific writing style.

> Students submit completed paper to Moodle site for review and written comments from faculty reviewers

> Students develop a 5-minute presentation based on their paper prior to Spring Break. Presentation and accompanying Abstract are posted to Moodle site

> Students review presentations and accompanying Abstract of at least two group mates and provide feedback

> Students meet with faculty face-to-face during 3 in-class sessions to consult on their papers and presentations
<table>
<thead>
<tr>
<th>Part III: RESEARCH PROCESS (6 weeks)</th>
<th></th>
<th>Part IV: DEFINE NEXT STEPS: (2 weeks)</th>
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<tr>
<td>&gt; Students practice compiling and presenting a detailed research study protocol reconstructed from assigned readings (scientific articles presenting results of different types of research). The protocol, including those for conducting lit reviews, must include data collection instruments (questionnaires, scales, etc.) as well as consent forms and descriptions of procedures.</td>
<td></td>
<td>&gt; Students identify the type of experience they want to pursue and work on a detailed plan to execute their projects.</td>
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<td>&gt; Students present and critique protocols in their peer-groups and work together to compile the final research study protocol for their group.</td>
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<td>&gt; Students practice working with the IRB – learn about levels of review, exemption categories, required training and elements required for review. Practice protocols developed by students will be used to compile IRB application packets.</td>
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<td>&gt; Students complete an exercise using REDCap to create data collection instruments, collect data and view descriptive stats.</td>
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<td>&gt; Students in groups discuss the statistical analysis methods used in assigned readings to identify their potential strengths and weaknesses.</td>
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<td>&gt; Students learn how to interpret the data and results of analysis. In class, we discuss the factors that can have a profound impact on data collection and interpretation including various sources of bias, sampling issues, and violations of assumptions behind various statistical tests.</td>
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<td>Part IV: DEFINE NEXT STEPS: (2 weeks)</td>
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<td>&gt; Students practice their presentations in-class to classmates to ensure timing and receive final feedback prior to Conference Day.</td>
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<td>&gt; Students may change the type of project only up until the beginning of PD 3 Fall semester. After that, only minor alterations to the question will be allowed, but the students will not be able to switch project type.</td>
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<td>&gt; Students present research paper to classmates, faculty, and clinical and industry attendees during the Conference Day (May, 2017).</td>
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<td>&gt; Students declare their project type and topic (in the format of a 1 page NIH style specific aims) on Moodle (June 2016).</td>
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Prerequisites
Students will apply the acquiring and appraising they learned in PHAR 6700-Becoming a Pharmacist, PHAR 6704-Foundations of Social & Administrative Pharmacy (SAPh) and PHAR 6706-Foundations of Pharmaceutical Care. They will also apply the research design skills to which they were introduced in PHAR 6704-Foundations of Social & Administrative Pharmacy (SAPh), and/or the drug or patient care-related knowledge they obtained in their pharmacy courses prior to this course. Finally, students will apply writing skills - including punctuation and grammar - that they learned in their pre-pharmacy and earlier pharmacy courses, and apply the skills they learned in these earlier courses to organize a scholarly or scientific paper.

Course Format
Foundations of PPS is the first of a two-semester, two-course sequence. In Foundations of PPS, students will learn how to form an answerable question, acquire, appraise and apply evidence to answer the question. In Applications of PPS during the PD3 Spring semester, students will complete their papers and verbally present their projects to classmates and faculty. During the intervening period between Foundations of PPS and Applications of PPS, each student will work on their project.

Faculty Panels COP faculty will serve on expert panels to provide feedback and evaluation on student deliverables in the sequence (Specific Aims, Methods, Final Paper and Presentation). The faculty serving on panels in this course will be appointed by the Department Chairs of the 5 COP departments: PCHS, ECP, Pharmaceutics, Med Chem, and PPPS and will comprise a group of approximately 30 faculty. These faculty panels will convene at designated times to review deliverables, offer feedback and guidance for revisions and assess the revised deliverables using a system similar to those used by journals and funding agencies.

Responsibilities of Student
• Submit assignments by deadlines
• Actively participate in peer review sessions
• Be pro-active in outside of class activities especially between in class sessions
• Actively seek feedback on their work within and outside of COP
• OWN their projects
• If you have any questions or problems, contact the Course TA’s and/or Co-Directors.

Class Readings: All required and recommended readings for the course are posted on our course site in Moodle. The readings are meant to acquaint students with key issues surrounding conducting and using research as well as serve as a source of examples and a platform for in-class work.

In the Face-to-Face Component, students will meet face-to-face with faculty and classmates of up to 120-minutes per session. Not all 120 minutes will be utilized every class period (see detailed course outline below). It is expected that students will come to class prepared to fully participate in class discussions by reading assigned articles and viewing assigned presentations prior to class sessions.

Out-of-Class Component: Most of the work for this course will take place in class (thus attendance is critical). Some of the work for this course will occur outside of class, and students can expect to devote at least 1 hour of work outside of class for every 2-hour class period.

Communication between Campuses via ITV: When you are called upon in class to give a response or ask a question, please speak loud enough so that you may be heard by students on both campuses. Do not talk out of turn, wait to be recognized before speaking and do not try to dominate a discussion with your questions or comments – give others a fair opportunity to participate. Keep questions on the topic at hand. If you have questions off the current topic, address these outside of class at office hours or by email with the instructor
Computer/Technology Requirements

The University of Minnesota computer requirements are listed here:

- [http://www1.umn.edu/moodle/start/technical.html](http://www1.umn.edu/moodle/start/technical.html)
- Students are required to bring laptop computers or electronic tablets to class each day to conduct Internet searches of course-related topics as required during class.
- Each day, students are required to bring a device to class that is capable of interacting with the classroom’s audience response system.

Course Materials

Required

1. *The Grammar Guy’s Helpful High School Writing Hints* by Tim Stratton (revised Summer, 2014). Handout posted in the Resource section of the course Moodle site to aid students and faculty in assessing the quality of student writing “by the numbers.”
2. Internet access: To successfully post materials to the Moodle course site and review teammate’s postings.
3. A PDF binder of course readings – available on Moodle.

Optional – Provided in the Resource section of the course Moodle site


Optional – Provided by students at their own expense


“How to Lie with Statistics” by Darrel Huff – PDF available on Moodle

This course employs “green practices.” Course readings and assignments can be found on our course site in Moodle ([https://ay15.moodle.umn.edu](https://ay15.moodle.umn.edu)).

Course Objectives

These objectives are linked to the College’s Competency Domains: [Link to full competency domain document](https://ay15.moodle.umn.edu).

1. Explain PPS can help pharmacists improve patient care.
2. Identify a problem in clinical or scientific practice, formulate a well-constructed question that will frame/guide investigations and determine the methods to respond to or investigate that question.
3. Utilize established methods for identifying, selecting, appraising, and applying literature in response to a defined question.
4. Formulate brief and effective written communications to describe problems and solutions to peers
5. Demonstrate an ability to effectively verbally present the problem and solutions to peers
6. Provide effective peer-review for Specific Aims and Methods documents.
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<thead>
<tr>
<th>#</th>
<th>Date Due</th>
<th>Title</th>
<th>Brief description</th>
<th>Assessment Objective</th>
<th>Points</th>
<th>% of final grade</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 28</td>
<td><strong>Assessment 1:</strong> Self-paced exercise designed to maximize completeness of literature searches. Student must complete 3 searches using an online system to check their completeness. Print the final scorecard as evidence of completion.</td>
<td>Learning Obj 1, 2</td>
<td>5</td>
<td>5%</td>
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<td>2</td>
<td>Feb 4</td>
<td><strong>Assessment 2:</strong> Online quiz on literature searching</td>
<td>Learning Obj 3</td>
<td>5</td>
<td>5%</td>
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<td>3</td>
<td>Mar 3</td>
<td><strong>Assessment 3:</strong> Online quiz on types of research designs (survey research, lit review, meta-analysis, etc.)</td>
<td>Learning Obj 2, 3</td>
<td>5</td>
<td>5%</td>
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<td>4</td>
<td>Mar 24</td>
<td><strong>Assessment 4:</strong> Write a 1-1.5 page practice Specific Aims proposal on a topic of your choice. Read and score 5 randomly assigned Specific Aims written by other students.</td>
<td>Learning Obj 6</td>
<td>10</td>
<td>10%</td>
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<td>5</td>
<td>Apr 14</td>
<td><strong>Assessment 5:</strong> Online quiz on IRB</td>
<td>Learning Obj 2, 3</td>
<td>5</td>
<td>5%</td>
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<td>6</td>
<td>Apr 21</td>
<td><strong>Assessment 6:</strong> NIH Human Subjects training OR CITI Training (post certificate of passing training on Moodle)</td>
<td>Learning Obj 2, 3</td>
<td>10</td>
<td>10%</td>
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<td>7</td>
<td>April 28</td>
<td><strong>Assessment 7:</strong> Students write a short (1-2 page) research plan and a timeline for how they will proceed in the next 8-9 months to prepare for Applications of PPS Course. Post on Moodle.</td>
<td>Learning Obj 2, 3</td>
<td>10</td>
<td>10%</td>
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<td>8</td>
<td>June 15</td>
<td><strong>Assessment 8:</strong> Students submit a 1-1.5 page NIH style Specific Aims proposal for the project they plan to pursue in Applications of PPS. This proposal constitutes a commitment to a topic and cannot be modified after first day of Fall Semester, 2016. This proposal will be submitted to the Advances in Pharmacy journal submission site as an initial submission for subsequent faculty review.</td>
<td>Learning Obj 2, 3</td>
<td>25</td>
<td>25%</td>
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<td>9</td>
<td>Dec (TBD)</td>
<td><strong>Assessment 9:</strong> Students submit a 2-3 page description of the Methods that they used independently for their proposed project during Fall Semester. This Methods section will be submitted to the Advances in Pharmacy journal submission site as a revision of the initial Specific Aims submission for subsequent faculty review.</td>
<td>Learning Obj 2, 3</td>
<td>25</td>
<td>25%</td>
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<td></td>
<td><strong>Total</strong></td>
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<td>100</td>
<td>100%</td>
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Assignments

Reading assignments: Reading assignments will be due almost every week throughout the course: See the Detailed Course outline below for schedule. Students must do the reading outside of class and come to class prepared to discuss the readings.

Non-reading assignments:
1. Write a practice Specific Aims proposal: Develop a NIH-style 1-1.5 page Specific Aims proposal for a project of your choice. Submit online on Moodle. This is a practice proposal that will be only peer-reviewed and may be done on any topic – you can be as creative as you’d like. If you have already firmly decided on your project, you may use that topic for this proposal as well as for Assignment #8.

2. Peer-scoring of the practice Specific Aims: (DUE: Week 8). Review 5 Specific Aims from other students and submit scores on Moodle. The scoring should be done following NIH peer-review guidelines discussed in class.

3. Individual Protocols: Develop a reasonably detailed research protocol for the topic for which you wrote the Specific Aims.

5. NIH Human Subject Research Participants: Complete the NIH Human Subject Research Participants training at http://phrp.nihtraining.com/users/login.php. This course takes approximately 3 hours to complete. You do not have to finish the entire training in one sitting (so, you can start early!). Upload your certificate of completion to the course site. You can copy/paste certificate into a Word document or convert the certificate into a .pdf document. Keep a copy for your records as you may need this in the future. You have the option of submitting the CITI certification instead of the NIH, if you have already completed the training module. If you have already completed either of these trainings, simply upload the certificate of completion.

6. IRB submission packet: Prepare and submit a complete packet for IRB review based on the protocol submitted in the previous assignment (#3).

7. Next Steps: Develop a detailed plan and a timeline for how you will conduct your research project during the Summer and Fall between the Foundations of PPS and Applications of PPS courses.

8. Final Specific Aims proposal (DUE: June 15, 2016): Prepare and submit the Specific Aims proposal for the project that you will pursue for the Applications of PPS course and ultimately for publication in Advances in Pharmacy journal. This proposal will be reviewed by faculty assigned to the course and detailed feedback will be provided for revision.

9. Methods section (DUE: December, 2016): Prepare and submit the Methods section for your project.

Statement on Penalties for Late Work

University Make-up Assignment Policy

As a rule, we will not accept late assignments for full credit! However, late assignments may be excused under the following conditions: illness (verified by note from a physician); a family emergency (verified by note from a professional in attendance); a University sponsored event (verified by a University official or a note from the leader of the sponsoring organization); and military duties (verified by a note from a commander).

In this course, assignments posted after the published deadline but before the next class period will be assessed a 5-point penalty. Assignments posted after the start of class but within 72 hours will be assessed a 10-point penalty. Assignments posted after 72 hours of the published deadline will receive zero points for the assignment, but must still be completed as a requirement of the course.
Exam Policy
See the Central Syllabus.

Grading Information
http://www.policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html

Course Letter Grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D</th>
<th>F</th>
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<tr>
<td>%</td>
<td>100-93</td>
<td>92-90</td>
<td>89-87</td>
<td>86-83</td>
<td>82-80</td>
<td>79-77</td>
<td>76-73</td>
<td>72-70</td>
<td>69-60</td>
<td>59-0</td>
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This is a longitudinal course spanning three semesters. At the end of each semester, students will be awarded an X or K grade (depending on campus of registration), if they are making satisfactory progress. This signifies to the university that satisfactory progress is being made. Final grades will be posted in Fall 2016.

Important: To earn an X or K for spring, students must complete all assignments and quizzes #1 through #7 (50% of the final grade). To maintain the X grade in summer, students must declare their project type, secure their advisor (if applicable) and submit their Specific Aim by the last instructional day of the summer term. During the Summer and Fall semesters, students revise their Specific Aims, if needed, and submit their Methods by the last instructional day of the semester (assignments #8 and #9 – 50% of the final grade). A final grade is then calculated for Foundations based on all assignments #1 through #9. Students enter the Application course in spring of their PD3 year.

Statement on Extra Credit
Extra credit is not available in this course.

Minimum Passing Level
Per University and College Policy, students who receive a grade below D in this course must successfully repeat the course before advancing to courses which require this course as a prerequisite.

Attendance Policy
Students are expected to attend every class for which they are registered. Students are expected to attend classes on the campus where they are enrolled. Full attendance is expected for the face-to-face class sessions. However, reasonable issues such as illness, natural disasters, or acts of Nature are sufficient to warrant an absence. Students who miss a class period (whether an excused absence or not) will be required to demonstrate to the course directors that the student meets the learning objectives for the missed class session. Students are responsible for arranging such demonstrations of competency with the course director on their respective campus.

Honor Code
Academic misconduct is any unauthorized act which may give a student an unfair advantage over other students, including but not limited to: falsification, plagiarism, misuse of test materials, receiving unauthorized assistance and giving unauthorized assistance. Instructors or a fellow student may report academic misconduct during an exam to the Course Directors and the Honor Council for investigation.

Course Evaluations
Students will have an opportunity to complete online course evaluations for instructors and the course itself (including instructional strategies, etc.) at the end of the semester. You are encouraged to contact one of the course directors any time you have concerns about the course or your progress in the course.

University of Minnesota and College of Pharmacy Policy Reference (Centralized Syllabus)
This page includes all required UMN and CoP policies, e.g., Academic Freedom; Copyright; Course Evaluations; Disability Accommodations; FERPA, etc.
Part I: The first two weeks of the course will be dedicated to the general course overview and to introducing the students to several specific research questions and approaches to gaining the necessary background knowledge and/or experience needed to formulate these research questions. Additionally, time will be spent establishing how skills learned in this course will be relevant to students in their future careers.

Jan 13, 14: PDADs

**Week 1 (Jan 21)**

**TC in Moos 1-450; Duluth in 163 Lsci**

**INTRODUCTION to course**

Faculty: TC: Serguei Pakhomov, and Shannon Reidt  
Duluth: Derek Jennings and TBN

(Obj #1) Explain how developing PPS can help pharmacists improve patient care

(Obj #2) Identify a problem in clinical or scientific practice, formulate a question that will frame/guide investigations and determine the methods to response to or investigate that question.

**Faculty presentation** on overview of Foundations of PPS and Applications of PPS course sequence.

**Panel of practitioners** and scientists discussing how they use PPS in their daily practice.

**Assignment:** Students read the BMJ feature articles “Medical Myths” (2007) “Festive medical myths” (2008) and prepare to discuss the role of scientific evidence in practicing medicine. Students search for pharmacy myths and bring them to class discussion next week.

**Week 2 (Jan 28)**

**TC in Moos 1-450; Duluth in 163 Lsci**

**PROBLEM IDENTIFICATION**

**LITERATURE SEARCH**

Faculty:  
TC: Serguei Pakhomov, and guest - Frank Sayre (UMN library)  
Duluth: Derek Jennings and TBN

(Obj #2) Identify a problem in clinical or scientific practice, and formulate a research question and develop a process to respond to or investigate that question.

(Obj #3) Utilize established methods for identifying, selecting and appraising literature in response to a defined question.

**Activity:** Group discussions of “pharmacy myths” and ideas for gathering necessary background information.

**Faculty presentation:** on Literature Searching. Resources will include: Pubmed/Medline, Cochrane reviews.

**Activity:** Students will use class time to apply search techniques to find literature exploring a myth or a topic of their choosing.

**Assignment:** Students read 2 review articles in detail:  
1. “Frankincense: systematic review”  
2. “Nintendo-related injuries”
### Assessment 1: Self-paced exercise on maximizing completeness of literature searches.

**Part II:** The next 5 weeks (3-7) will be dedicated to reviewing different types of secondary and primary research studies, their elements and their presentation. The students will be asked to pick one of the medical/pharmacy myths discussed in the first two weeks and determine which type of secondary and/or primary research study would work best to address the myth.

| Week 3 (Feb 4)  | STUDY DESIGNS (Meta-analyses/Systematic Review) | (Obj #2) Identify a problem in clinical or scientific practice, and formulate a research question and develop a process to respond to or investigate that question. | Activity: Group discussion of the 2 articles from assigned readings. The objective is to identify major elements and strategies used by authors. |
| TC in Moos 1-450; Duluth in 163 Lsci | Faculty: TC: Serguei Pakhomov, and Shannon Reidt Duluth: Derek Jennings and TBN | (Obj #3) Utilize established methods for identifying, selecting and appraising literature in response to a defined question. | **Assignment:** Students read 3 database analysis articles: |
| | | | 1. “A statin a day keeps the doctor away” |
| | | | 2. “Silent night: retrospective database study assessing possibility of “weekend effect” in palliative care” |
| | | | 3. “Were James Bond’s drinks shaken because of alcohol induced tremor?” |
| Week 4 (Feb 11)  | STUDY DESIGNS (Databases) | (Obj #2) Identify a problem in clinical or scientific practice, and formulate a research question and develop a process to respond to or investigate that question. | **Assessment 2:** Complete online quiz on Literature Searching |
| TC in Moos 1-450; Duluth in 163 Lsci | Faculty: TC: Shannon Reidt Duluth: Derek Jennings and TBN | (Obj #3) Utilize established methods for identifying, selecting and appraising literature in response to a defined question. | |
| | | | **Activity:** Group discussion of the 2 articles from assigned readings. The objective is to identify major elements of meta-analyses and database studies used by authors. Strengths, weaknesses, challenges. |
| | | | **Assignment:** Students read 2 articles – one is a retrospective cohort study and one is a prospective cohort study |
| | | | 1. “Transmissibility of the Ice Bucket Challenge among globally influential celebrities” |
| | | | 2. “Utility of Hippocrates’ prognostic aphorism to predict death in the modern era” |
| Week 5 (Feb 18)  | STUDY DESIGNS (Cohort studies) | (Obj #2) Identify a problem in clinical or scientific practice, and formulate a research question and develop a process to respond to or investigate that question. | **Activity:** Group discussion of the 3 articles from assigned readings. The objective is to identify major elements |
| TC in Moos | Faculty: TC: Shannon Reidt | | |
| | | | |

11
| Week 6  
(Feb 25)  
TC in Moos 1-450;  
Duluth in 163 Lsci | STUDY DESIGNS  
(RCT’s and observational studies)  
Faculty:  
TC: Serguei Pakhomov  
Duluth: Derek Jennings and TBN | (Obj #2) Identify a problem in clinical or scientific practice, and formulate a research question and develop a process to respond to or investigate that question.  
(Obj #3) Utilize established methods for identifying, selecting and appraising literature in response to a defined question | Activity: Group discussion of the 2 articles from assigned readings.  
Assignment: Students read 3 articles: one represents survey research and two diagnostic accuracy/validation studies  
1. “Like a virgin (mother): analysis of data from a longitudinal, US population representative sample survey”  
2. “Pain over speed bumps in diagnosis of acute appendicitis: diagnostic accuracy study”  
3. “Use of Google Translate in medical communication: evaluation of accuracy” |
| Week 7  
(March 3)  
TC in Moos 1-450;  
Duluth in 163 Lsci | STUDY DESIGNS  
(Survey and diagnostic validity studies)  
Faculty:  
TC: Serguei Pakhomov  
Duluth: Derek Jennings  
(lead on discussion of article #3) and TBN | Activity: Group discussion of the 3 articles from assigned readings.  
Assignment: Read the article on responding to peer-review feedback – “Snappy answers to stupid questions: an evidence-based framework for responding to peer-review feedback”  
Assessment 3: On-line quiz on different types of studies and the justification for matching study type(s) with their chosen myth. |

**Part III:** Review of research study types is over at this point. The students are expected to have a working understanding of what's involved in different types of scientific studies and how to match
them with research questions. In the next 4 weeks, the students will work on formulating and polishing a research question and testable hypotheses using one of the medical/pharmacy myths, justifying their significance to the audience, determining what steps need to be taken and what instruments need to be used to gather data to address these questions and how to work on regulatory issues involved in human subjects research.

<table>
<thead>
<tr>
<th>Week 8</th>
<th>RESEARCH QUESTION &amp; SPECIFIC AIDS</th>
<th>Faculty presentation: Review of well-constructed questions and instruction on writing NIH-style 1-page Specific Aims for a research proposal and how to evaluate it using criteria for Significance, Innovation, Scientific Methods, and Feasibility.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(March 10)</td>
<td>Faculty: TC: Serguei Pakhomov, Duluth: Derek Jennings and TBN</td>
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</tr>
<tr>
<td>TC in Moos 1-450; Duluth in 163 Lsci</td>
<td>(Obj #2) Identify a problem in clinical or scientific practice, and formulate a research question and develop a process to respond to or investigate that question.</td>
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<td></td>
<td>(Obj #6) Provide effective peer-review for Specific Aims and Methods document.</td>
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<tr>
<td>March 14 – 17: Spring break</td>
<td>Faculty presentation: Review of well-constructed questions and instruction on writing NIH-style 1-page Specific Aims for a research proposal and how to evaluate it using criteria for Significance, Innovation, Scientific Methods, and Feasibility.</td>
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<tr>
<td>Week 9</td>
<td>RESEARCH PROTOCOL</td>
<td>Faculty presentation on components of a research protocol. Included in this instruction will be components of a literature review protocol.</td>
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<tr>
<td>(March 24)</td>
<td>Faculty: TC: Serguei Pakhomov and guest - Michael Kotlyar</td>
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<tr>
<td>TC in Moos 1-450; Duluth in 163 Lsci</td>
<td>Duluth: Derek Jennings and TBN</td>
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<td>(Obj #4) Formulate brief and effective written communications to describe</td>
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<td></td>
<td>Assignment: Develop and submit via</td>
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Activity: Use class time to start formulating research questions for one of the medical/pharmaceutical myths and sketch out specific aims.

Assignment: Continue to develop and present a refined research topic (1-page Specific Aims) to teammates for peer review on Moodle
<table>
<thead>
<tr>
<th>Week 10</th>
<th>SPECIFIC AIMS &amp; RESEARCH PROTOCOL</th>
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<tbody>
<tr>
<td>(March 31)</td>
<td>Faculty: TC: Serguei Pakhomov, Duluth: Derek Jennings and TBN</td>
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<tr>
<td>TC in Moos 1-450; Duluth in 163 Lsci</td>
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<tr>
<td><strong>Research Day</strong></td>
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<td><strong>Activity:</strong> Refresh lessons learned from the SOB and SOS scales of the 1-page specific aims reviews. Work with group members to peer review research protocols in a constructive and productive manner.</td>
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<tr>
<th>Week 11</th>
<th>REGULATORY ISSUES</th>
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<tbody>
<tr>
<td>(April 7)</td>
<td>Faculty: TC: Serguei Pakhomov, and guest Tim Stratton Duluth: Derek Jennings and TBN</td>
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<tr>
<td>TC in Moos 1-450; Duluth in 163 Lsci</td>
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<tr>
<td><strong>Faculty presentation</strong> on ethical and regulatory issues related to research. Will review levels of review.</td>
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<tr>
<td><strong>Activity:</strong> Work with group members to review protocols from previous weeks and determine what level of IRB review is required, locate and download, appropriate forms from the UMN IRB site. Examine the forms and define the key elements of the IRB submission for their specific project including consent forms, HIPAA waiver forms (if necessary), additional personnel, etc.</td>
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### Week 12 (April 14)
**TC in Moos 1-450; Duluth in 163 Lsci**

**DATA COLLECTION**
- **Faculty:** TC: Serguei Pakhomov, and guest Susan Marino
  - Duluth: Derek Jennings (lead intro to qualitative methods) and TBN

**Assignment:** Put together and submit on Moodle (NOT the IRB!) a complete IRB submission package.

**Alternative activity:** Super-tasting and relative scales.

**Assessment 5:** Online quiz on IRB.

### Week 13 (April 21)
**TC in Moos 1-450; Duluth in 163 Lsci**

**DATA ANALYSIS**
- **Faculty:** TC: Serguei Pakhomov, and Shannon Reidt
  - Duluth: Derek Jennings (lead lecture and discussion on qualitative data analysis) and TBN

**Activity:** Students create a REDCap account and a survey instrument, collect data and enter data in REDcap, examine descriptive stats.

**Assessment 6:** Complete CITI Training and HIPAA

### Part IV: The last two weeks of the course will be dedicated to defining the next steps for the Applications of PPS

### Week 14 (April 28)
**TC in Moos 1-450; Duluth in 163 Lsci**

**DEFINING NEXT STEPS**
- **Faculty:** TC: Serguei Pakhomov, Shannon Reidt
  - Duluth: Derek Jennings and TBN

**Faculty Presentation** on what the next course will look like and milestones to be achieved. Presentation will include what the deliverables should look like (specific aims, methods, scientific paper, presentation).

**Activity:** Students brainstorm with each other to discuss which pathways they might take and what topics they may pursue. Encourage students to use this time to search literature and bounce ideas off of one another.

**Assessment 7:** Students write a
<table>
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<tr>
<th>Event</th>
<th>Description</th>
<th>Details</th>
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<tbody>
<tr>
<td>April 29 – Pharmacy Day</td>
<td>Literature in response to a defined question.</td>
<td>Short (1-2 page) research plan and a timeline for how they will proceed in the next 8-9 months to prepare for Applications of PPS Course.</td>
</tr>
<tr>
<td>Week 15 (May 5) TC in Moos 1-450; Duluth in 163 Lsci</td>
<td>WRAP-UP Faculty: TC: Serguei Pakhomov, and Shannon Reidt Duluth: Derek Jennings and TBN</td>
<td>(Obj #1) Explain how developing PPS can help pharmacists improve patient care. (Obj #2) Identify a problem in clinical or scientific practice, formulate a question that will frame/guide investigations and determine the methods to response to or investigate that question. (Obj #3) Utilize established methods for identifying, selecting, and appraising literature in response to a defined question. (Obj #4) Formulate brief and effective written communications to describe problems and solutions to peers. (Obj #5) Demonstrate an ability to effectively verbally present the problem and solution to peers. (Obj #6) Provide effective peer-review for Specific Aims and Methods document.</td>
</tr>
<tr>
<td>Fall Semester of PD3 year</td>
<td>SPECIFIC AIMS</td>
<td>(Obj #2) Identify a problem in clinical or scientific practice, formulate a question that will frame/guide investigations and determine the methods to response to or investigate that question. From the time the Foundations of PPS ends and the beginning of Fall PD3 semester starts, students will solidify the direction in which their project will take. This includes self-identifying a faculty advisor for primary research or registering for an</td>
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<tr>
<td>PD3 Fall Semester</td>
<td>METHODS</td>
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**Assessment 8.** Regardless of track chosen, Students must submit a 1-1.5 page NIH style Specific Aims by June 15, 2016.

**Assessment 9.** Students are required to submit a draft of the Methods section of their project by December, 2016 (exact due date is TBD)

Students review and submit written comments on completed Methods sections of at least two classmates prior to first day of the Spring 2017 semester (exact due date is TBD).

* Subject to change at course instructor’s discretion.