Lead Serve Inspire (LSI) Curriculum Research Advanced Competency

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Topics

Overview of the ACAE in Research
Responsibilities of the Research Mentor
The Grading Rubric
Important Dates and Deadlines
The Purpose

- The purpose of the LSI Advanced Competency (AC) options is to offer specialized learning opportunities in which students gain in-depth knowledge and experience which establishes a level of “competence” in a focused area. Typically these options will be available in LSI Part III (Year 4 of medical school).

- However, in 2014 and 2015 Med II students will have the opportunity to choose an AC alternate experience (ACAE) to bridge a 7 week gap period between the end of Year II and beginning of Year III.
Who is Eligible for the ACAE in Research?

- Medical Students Entering their 3rd year of medical school in 2014 and 2015

- Medical Students who have previously completed a mentored research project at the OSUWMC supervised by a COM or other OSU faculty member.
Examples of Primary and Secondary Learning Objectives for the ACAE in Research:

Students Continuing an ongoing Research Project:

1. Analyze, interpret and prepare graphic representation of experimental data
   a. Use graphic software/applications to graph experimental data (5)
   b. Determine the reliability/reproducibility and validity of experimental results (5)
   c. Apply appropriate statistical methods as part of data analysis (10)
Primary and Secondary Learning Objectives:

2. Demonstrate advanced scientific communication skills
   a. Prepare a research abstract and poster presentation to disseminate research results (5)
   b. Prepare an oral research presentation to disseminate research results (10)
   c. Prepare a manuscript for publication in a peer-reviewed journal to disseminate research results (20)

OR

   a. Prepare a proposal for research funding to an extramural sponsor (25)

*Note that learning objectives are assigned maximum number of points which can be earned towards the level of competence achieved in research. Mentors will need to determine the quality of the work and performance by assigning points earned for each of the learning objectives which are identified in advance of the ACAE in Research experience. Students are expected to work towards at least 45-55 points for this ACAE during this designated time period.
Primary and Secondary Learning Objectives:

- **Key Body of Knowledge:** Each student will enhance their knowledge and critical thinking skills relevant to a specific biomedical research topic and focused area of research. At the completion of the Research AE the student will earn points towards the Advanced Competency in Clinical and Translational Research. (see AC rubric)

- **Student and Faculty mentor identifies**
  - Specific Category of Research (basic, translational, clinical)
  - Specific Biomedical Research Topic
  - Specific Research Primary & Secondary Learning Objectives
ACAE in Research Requirements

Key Body of Knowledge: Each student will identify a specific biomedical research topic and focused area of research. At the completion of the Advanced Competency in Clinical and Translational Research, the student will have gained an advanced comprehension of the foundational and clinical science underlying a particular topic relevant to human health and disease as well as the research skills necessary to directly engage in discovery.

Curriculum (includes reading assignments, self-directed learning, one on one and small group learning)

Preparation in advance of ACAE: Students will meet with the course director, research mentor (and research staff if applicable) and course coordinator to identify the biomedical research topic, curricular expectations based on prior research relevant to the project and the amount of time dedicated to the research project in the Research AC option. Students will develop a timeline, and review and discuss the mentor/mentee agreement in advance of the ACAE.
ACASE in Research Requirements

Weekly Schedule:
✓ One on one meeting with research advisor (1 hour)
✓ Direct performance of laboratory or clinical research (minimum 35 hours/week; note students will receive 250 credit hours for this ACAE)
✓ Attendance at research advisor weekly lab meeting (1-2 hours)
✓ Attendance at a clinical or research conference relevant to the biomedical research topic (attendance at a multi- or inter-disciplinary conference is encouraged)
✓ Attendance at a journal club if relevant (once a month)
✓ Attendance at a multi-lab meeting if relevant (once a month)

Monitoring Student Progress:
✓ Student prepares progress report every 2 weeks
✓ Final report
✓ Log of journal articles or other resources reviewed or used during the course
✓ Submission of a copy of the figures/figure legends generated, poster presentations, manuscripts, reviews, grant applications submitted or other scholarly work achieved during the ACAE
Research Advisor Requirements

- Currency of research compliance required for student to conduct research study

- Agreement to provide research mentorship to the student (documented in signature of the mentor/mentee compact) and availability during the ACAE time period

- Availability of resources to support conduct of the student’s research
Mentor Commitments

As a mentor, I will provide a written performance evaluation (using the ACAE in research rubric) with narrative comments to the Associate Dean for the student’s final grade. Proper credit can only be granted to the student for this rotation when all requirements, evaluations, and grading are completed.

• As a mentor I agree to weekly meetings with the approved student and that I will be present during the ACAE programming period of 5/5/2014 through 6/20/2014.

• I will be committed to the mentoring of the medical student. I will be committed to the education and training of the medical student as a future member of the scientific community. Throughout the student’s time in my laboratory, I will be supportive, equitable, accessible, encouraging, and respectful. I will foster the student’s professional confidence and encourage critical thinking, and creativity.

• I will help plan and direct the student’s project, set reasonable and attainable goals, and establish a timeline for completion of the project.

• I will provide an environment that is intellectually stimulating, emotionally supportive, safe, and free of harassment.

• I will be committed to providing laboratory resources for the student as appropriate or according to my institution’s guidelines, in order for him/her to conduct the specific research project.
Mentor Commitments

• I will expect the student to share common laboratory responsibilities, utilize resources carefully, frugally.

• I will not require the student to perform tasks that are unrelated to his/her training program and professional development.

• I will discuss authorship guidelines for publications with the student. I will acknowledge the student’s scientific contributions to the work in my laboratory, and I will work with the student to publish his/her work in a timely manner.

• I will discuss intellectual policy issues with the student as needed with regard to disclosure, patent rights and publishing research discoveries.

• I will encourage the student to attend scientific/professional meetings and make an effort to secure and facilitate funding for such activities.

• I will provide career advice. I will provide honest letters of recommendation for his/her next phase of professional development. I will also be accessible to give advice and feedback on career goals.

• I expect the medical student research trainee to exhibit professional behavior and conduct research in keeping with the principles and guidelines of professionalism as described in the OSU College of Medicine’s Policy on Professional Behavior.
The Grading Rubric
(for 2 selected primary learning objectives)

<table>
<thead>
<tr>
<th>Competency</th>
<th>Product</th>
<th>Max Points</th>
<th>LSI Curricular Timeline, Responsibility for Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform supervised introductory short-term research under the guidance of a research advisor</td>
<td>Satisfactorily complete a research project performed (5 points per week or per 40 hour unit)</td>
<td>40-50</td>
<td>Previously Completed during the summer or Med I/II part-time with Supervision of OSU Research Advisor</td>
</tr>
<tr>
<td>Demonstrate “Inquiry” and critical thinking skills by proposing independent research stimulated by a patient encounter, clinical experiences or following an introductory research experience.</td>
<td>Identify an important research question and Develop concept for an independent research project with assistance of research mentor</td>
<td>10</td>
<td>Research Advisor</td>
</tr>
<tr>
<td>Demonstrate competency in “Inquiry” selection of an important biomedical research question and justify its significance based on critical review of the literature.</td>
<td>Perform a literature and information search and Write the Background &amp; Significance section for a research proposal with relevant references and annotate the references with the salient supporting data identify the gaps in knowledge and rationale for the research</td>
<td>10</td>
<td>Research Advisor</td>
</tr>
<tr>
<td>Demonstrate competency in formulation of a hypothesis relevant to a biomedical research question</td>
<td>Write a hypothesis and diagram the research paradigm based on the hypothesis</td>
<td>15</td>
<td>Research Advisor</td>
</tr>
<tr>
<td>Demonstrate competency in development of research/study design to address hypothesis and associated research questions</td>
<td>Write Specific Aims/Goals for a research study. Write Experimental Details, potential pitfalls, alternative approaches</td>
<td>25</td>
<td>Research Advisor</td>
</tr>
<tr>
<td>Demonstrate competency in application, performance and analysis of a variety of research methods</td>
<td>Demonstrate conceptual and methodological proficiency with at least 3 specific experimental methods (5 points per method)</td>
<td>15-25</td>
<td>Research Advisor</td>
</tr>
<tr>
<td>Demonstrate competency in critical analysis of experimental results, thorough interpretation of data, revision of hypothesis and/or experimental paradigm and identification of new questions</td>
<td>Prepare graphs and PowerPoint presentation of experimental data for at least 4 presentations (lab meeting, local or national conference etc) (20 max) Present and justify interpretation of experimental results in laboratory meeting or other comparable forum a minimum of 4 times (20 max)</td>
<td>40</td>
<td>Research Advisor and Evaluation Forms</td>
</tr>
<tr>
<td>Demonstrate competency in statistical analysis of experimental data</td>
<td>Select and apply appropriate statistical analysis for experimental dataset</td>
<td>10</td>
<td>Research Advisor or Biostatistician</td>
</tr>
</tbody>
</table>
# The Grading Rubric - continued

<table>
<thead>
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<th>LSI Curricular Timeline, Responsibility for Assessment</th>
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</table>
| Demonstrate competency in verbal communication of research findings to a  | • To lay public (5 max)  
• To a group of 6+ peers (5)  
• To scientific audience in a lab meeting, (5)  
• To a scientific audience at a local conference/research in progress or seminar (5)  
• To a scientific audience by abstract selection for presentation at a regional conference (10)  
• To a scientific audience by abstract selection at a national scientific meeting (20)  
Minimum of 4 occurrences (any combination)                                                                                                                                  | 40         | Research Advisor and Evaluation form                   |
| scientific audience by oral presentation of research results             |                                                                                                                                                                                                        |            |                                                        |
| Demonstrate competency in written communication of research findings to | Submit a 1st authored manuscript for publication (20)  
Manuscript revision and response to reviewer comments (10) or Acceptance of manuscript for publication (60)                                                                 | 60         | Research Advisor and documents below:  
• Manuscript Draft  
• Manuscript Revised Draft and Author Response  
• Published Manuscript                                                                                                                                                    |            |                                                        |
| a scientific audience by submission and acceptance of a 1st authored     |                                                                                                                                                                                                        |            |                                                        |
| publication of research findings in a peer reviewed journal              |                                                                                                                                                                                                        |            |                                                        |
| Demonstrate competency in critical analysis of the literature by         | Critical analysis of selected scientific manuscripts at a minimum of 3 occurrences of journal club, lab meeting, seminar. (5 each)                                                                 | 15         | Research Advisor and Evaluation Form                   |
| discussing strengths and weaknesses of a selected scientific manuscript  |                                                                                                                                                                                                        |            |                                                        |
| at a journal club or lab meeting                                         |                                                                                                                                                                                                        |            |                                                        |
| Demonstrate competency in responsible conduct of research by             | Summarize in written form the research compliance and ethical issues and principles for a research project or selected published manuscript. (Minimum of 1 page, minimum of 2 topics) (5 points per topic) | 10         | Research Advisor                                      |            |                                                        |
| identifying and discussing the research compliance and ethical issues    |                                                                                                                                                                                                        |            |                                                        |
| relevant to the research project.                                        |                                                                                                                                                                                                        |            |                                                        |
| Demonstrate competency in competition for research funding by identify   | Identify sources of funding for an independent research project (5)  
Prepare a competitive research or scholarship application to support an independent research project (20) or Successful award of a competitive research application to an extramural sponsor (40) | 40         | Research Advisor and documents below:  
• List of research sponsors  
• Submitted grant proposal  
• Award Notification                                                                                                                                                    |            |                                                        |
| sources of funding for selected research project, preparing and         |                                                                                                                                                                                                        |            |                                                        |
| submitting a research grant application to a national sponsor and        |                                                                                                                                                                                                        |            |                                                        |
| analyzing review score, comments, outcome.                              |                                                                                                                                                                                                        |            |                                                        |
Levels of Mastery

- Expert: (450-650 points)
- Proficient: (251-449 points)
- Competent: (101-250 points)
- Intermediate: (51-100 points)
- Introductory: (40-50 points)
Important Dates

- Submission of ACAE in Research Preparatory Materials for Review and Approval:
  - Deadline 5:00 pm January 13, 2013

- Faculty Research Advisor available to supervise research project during the time period **May 5, 2014– June 20, 2014**

- A 1-3 page final report for the ACAE in Research including a summary of research accomplishments and copies of scholarly work submitted by **June 27, 2014**

- **Faculty Evaluation of Student due July 7, 2014** (narrative and completion of evaluation rubric for the primary and secondary learning objectives identified by the mentor and the student in advance of the ACAE).