



<p>Advanced Competency (AC) in Research Description</p>	<p>The student will develop advanced competency in research by engaging in a specific hypothesis-driven research project under the direct supervision of a current or prior OSU faculty research mentor. The student is expected to have already developed foundational research skills while working on a summer or Med I/II part-time research project under the supervision of his/her AC research mentor. The student and faculty mentor should discuss and identify at least 2 primary and secondary learning objectives (see example below) to be acquired during the AC in research over the AC period. AC in research Pre-Approval Forms are due to the Office of Medical Student Research via the online submission. Pre-Approval Forms include: <u>Form 2</u> (basic information about project title, mentor name and department, mentor/mentee acknowledgement of research commitments), <u>Form 3</u> (submitted online) Nature of the relationship of continuing research project to previous research project and AC learning objectives, <u>Form 4</u>: (submitted online) A 1 page research proposal with significance, hypothesis, specific aims, innovation, research design & brief methods. All documents must be submitted for approval prior to start date. The student will receive instruction and guidance in specific learning objectives which may include competencies in study design, research methods, statistical analysis, research inquiry and critical literature review (see AC in research evaluation rubric). The student is expected to commit a minimum of 150 hours.</p> <ol style="list-style-type: none"> 1. Orientation and Course Preparatory Materials: 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 AC, documentation of research compliance, project timeline, and signed mentor/mentee agreement. 2. Weekly schedule (at least "a" and 2 other activities below): <ol style="list-style-type: none"> a) One on one meeting with research advisor (1 hour) b) Attendance at research advisor weekly lab meeting (1-2 hours) c) Attendance at a multi-lab meeting if relevant (once a month) d) Attendance of a journal club (once a month) e) Attendance at a multi- or inter-disciplinary clinical or research conference relevant to the biomedical research topic 3. Monitoring of student progress will occur through a written weekly progress report and a final report by the student to be sent to the research mentor and Course Director on Monday of each week. The student will also submit a logging of journal articles or other resources read or used during the AC as well as a list (and dates) of the laboratory meetings, conferences, journal clubs etc. attended during the AC.
<p>Learning Objectives Description</p>	<p>At least two explicit educational goals and learning objectives must be established by the student and research mentor prior to beginning the research project. Examples provided below: Primary and Secondary Learning Objectives:</p> <ol style="list-style-type: none"> 1. Analyze, interpret and prepare graphic representation of experimental data <ol style="list-style-type: none"> 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) 2. Demonstrate advanced scientific communication skills <ol style="list-style-type: none"> 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) 3. Prepare a proposal for research funding to an extramural sponsor (25) 4. Other educational objective selected from AC in Research Evaluation Rubric (available at http://go.osu.edu/AC)
<p>Evaluation Description</p>	<p>Evaluation: The student will be graded on his/her initiative, knowledge and critical thinking, and effectiveness in a research setting. The student will also be required to submit a 1-3 page report on the research project and summary of research accomplishments 1 week prior the end of the rotation. Assessment & Feedback</p> <ol style="list-style-type: none"> 1. Assessment: Assessment of performance in the advanced competency in research will be performed by the student's research advisor by 1) completion of an evaluation form (see AC rubric modeled after the nationally established CTSA core competencies (attached) which will be used to assess performance on pre-identified learning objectives in addition to 2) a summary narrative (1-2 paragraphs) prepared by the research advisor to describe and evaluate the quality of the student's performance during the AC in Research. 2. Feedback: The student receives weekly feedback from the research advisor
<p>Prerequisites</p>	<ol style="list-style-type: none"> A. Agreement of an OSU faculty research mentor to organize and supervise student research training and evaluate student performance in the AC in research for the specified time period and B. Submission of Student Preparatory Materials to The Office of Medical Student Research via the online submission. C. Approval of the AC in research Preparatory Materials by the Associate Dean of Research Education (Ginny Bumgardner MD PhD) is required for the AC in Research. D. All students will be notified if they are approved for enrollment



Students Name: _____ Students Email: _____

Research Mentor: _____ Division/Department: _____

Mentor's Email: _____ Mentor's Phone: _____

Administrative/Lab Assistant: _____ Contact: _____

Project Title: _____

I understand that it is the joint responsibility of the student and the Research Mentor to organize activities to satisfy both the research project goals and educational learning objectives for the Med 3-4 Advanced Competency AC in Research.

- **As student**, I will keep both my OSU Faculty Research Mentor and the AC in research Course Director informed regarding my progress. I will perform supervised research during the AC programing period.
- I acknowledge that I have the primary responsibility for the successful completion of my research project. While engaged in research I will maintain a high level of professionalism, self-motivation, engagement, scientific curiosity, and ethical standards.
- I will meet weekly with my research advisor and provide him/her with updates on the progress and results of my activities and experiments. I will strive to meet established deadlines. I will be responsive to advice and constructive criticism.
- I will attend and actively participate as a team member in laboratory meetings, seminars and journal clubs while a member of the research team.
- I will comply with all institutional policies. I will comply with both the letter and spirit of all institutional safe laboratory practices and animal-use and human-research policies at my institution.
- I will be a good lab citizen. I will agree to take part in shared laboratory responsibilities and will use laboratory resources carefully and frugally. I will maintain a safe and clean laboratory space. I will be respectful of, tolerant of, and work collegially with all laboratory personnel.
- I will maintain a detailed, organized, and accurate laboratory notebook. I am aware that my original notebooks and all tangible research data are the property of my laboratory.
- I will discuss policies on work hours, sick leave and vacation with my research advisor. I will consult with my advisor and notify fellow lab members in advance of any planned absences.
- I will discuss policies on authorship and attendance at professional meetings with my research mentor. I will work with my mentor to submit all relevant research results that are ready for publication in a timely manner.

Student's Signature

Date

- **As a mentor**, I will provide a written performance evaluation (using the AC 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 AC programing period.
- 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.
- 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.

Research Mentor's Signature

Date

Approval:

Associate Dean for Research Education

Date



(This portion is to be completed online, do not submit with application)

Research Plan

My proposed project is:

- A continuation of my previous project
- A project involving new experiments related to the previous project
- A new project designed based on results of my previous project
- Other (explain below)

Select at least 2 Primary (and associated Secondary) Learning Objectives:

Explicit educational goals and objectives must be established by the student and research mentor prior to beginning the research project.

Primary and Secondary Learning Objectives:

- 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)

- 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)

- Prepare a research fellowship/scholarship or other grant proposal to an extramural sponsor for consideration of research funding
 - a. Develop a novel hypothesis (5)
 - b. Identify research funding opportunities relevant to the student's area of research (5)
 - c. Prepare grant proposal according to sponsor specifications (15)

- Or other Learning Objectives selected from AC Rubric



(This portion is to be completed online, do not submit with application)

1 Page AC Research Proposal:

- Significance of the Research Project (up to 250 words)
- Hypothesis (up to 100 words)
- Specific Aims (up to 100 words)
- Preliminary Data (1-3 figures or tables)
- Research Design or Plan to Accomplish Research Learning Objectives (up to 500 words)
- Plan for Statistical Analysis (if relevant, up to 150 words)