Graduate Programs in Biomedical Sciences

Handbook 2015-2016

Program Description
Curriculum
Faculty Information
Degree Checklist

Revised and Approved 8/14/2014
Graduate Programs

I. INTRODUCTION

The mission of the Department of Biomedical Sciences graduate programs is to provide excellent academic programs that educate and train the next generation of scientists, educators, and health-related professionals through scholarship and research that fosters creativity, discovery, and community service.

Study for the Ph.D. degree emphasizes independence in scientific pursuit, with a particular emphasis on research. Course work and dissertation research are designed to bring the student to a high level of competence in biomedical science with particular expertise in the area chosen for dissertation research. You will be expected to demonstrate a high capacity for original and independent thought, and apply this creativity, educational background, and knowledge of the scientific method to dissertation research. While you will rely to a certain extent on your Major Advisor at the outset, you will soon assume primary responsibility for your research project. In this context, the Major Advisor will act as a resource person intimately acquainted with the research, but not directing the project.

II. PROGRAM OBJECTIVES

Within the context of Creighton as a Jesuit, Catholic University, the Graduate School provides value-centered education for students to develop mastery of their chosen field of study. The Biomedical Sciences programs offer an environment ideal for fostering critical judgment, scholarly initiative, and disciplined inquiry. At the completion of the graduate program in Biomedical Sciences, students will:

1. Demonstrate advanced knowledge in a foundation of molecular and cellular biology and in their field of specialization.

2. Demonstrate independent critical and analytical thinking, both within their field of study, and beyond for the use of their knowledge in service to others.

3. Identify and suggest possible solutions to ethical dilemmas that occur in their work and field of study, and understand the importance of professional ethics in all aspects of scientific communication and laboratory work.

4. Demonstrate competence in the laboratory, including application of the scientific method and appropriate use of basic and state of the art laboratory tools and techniques.

5. Demonstrate written and oral skills necessary for communication of research, knowledge, and ideas to scientists and non-scientists alike.
III. **FINANCIAL AID**

On entering the Ph.D. program, you may receive a stipend for living expenses. This stipend may come from the Department or from your Major Advisor. Continued Departmental support will be reviewed on an annual basis, and normally will not exceed four years. If you are receiving a stipend, it is essential that you devote full time and energy to your class work and research project. Masters program students do not receive Departmental stipends. Arrangements for support must be made with your Major Advisor. You will be required to enroll as a full-time student (8 credit hours minimum each fall and spring term and 3 credit hours minimum each of the two summer terms). Exceptions can be made with the consent of your Major Advisor or the Graduate Program Director if there is no Major Advisor. **In addition, you will be expected to continue your research endeavors over the summer break and other breaks that are standard for undergraduate students.** It is during these times, when classes are not in session, that you can often make significant progress on your research project. Any vacations or personal days should be coordinated through your Major Advisor to ensure that you do not miss mandatory graduate student meetings, seminars, etc.

III. **TERMINAL OBJECTIVES AND CURRICULUM**

Upon the completion of the doctoral program, you should be able to:

1. Demonstrate advanced knowledge in molecular and cellular biology and in their field of specialization.
2. Demonstrate ability in independent critical and analytical thinking, both within and beyond the scope of his/her research, as evidenced by independent execution of the thesis research project, literature review, experimental design, proper inclusion of controls, critical analysis of data, and troubleshooting.
3. Demonstrate skill in critical analysis of published scientific literature including experimental design, proper use of controls, and interpretation of data.
4. Exhibit competence in the laboratory, including application of the scientific method and appropriate use of basic and state of the art laboratory tools and techniques.
5. Exhibit the oral communication skills necessary for active participation in scientific gatherings, both as a presenter and a discriminating member of the audience. These skills include presentation of published scientific data, presentation of one’s own scientific data, presentation of brief research presentations for regional and national meetings, and active participation as an audience member in seminars and journal club.
6. Demonstrate skill in written scientific communication including manuscript preparation, grant preparation, and abstract/poster/oral presentation for scientific meetings.
7. Comprehend the importance of professional ethics in all aspects of scientific communication and laboratory work.
8. Exhibit the scientific independence required to assume the next professional position.
9. Develop the necessary skills required to effectively educate and train others in the classroom, laboratory, and workplace.
10. Use his or her knowledge and skills in the service of others.

V. DOCTORAL DEGREE CURRICULUM

Core Courses (credit hours in parenthesis)
1. BMS 604 Fundamentals of Cell and Molecular Biology (6)
2. IDC 601 Responsible Conduct of Research (1)
3. CTS 601 Statistical and Data Analysis for Evidence-Based Practice (3)
4. Must enroll and complete a minimum of 9 credits distributed over at least 3 courses from the following list:
   a. BMS 601 Human Physiology (4)
   b. BMS 602 Human Gross Anatomy (6)
   c. BMS 603 Microscopic Anatomy (4)
   d. BMS 605 Fundamentals of Genetics and Molecular and Cellular Pathology (2)
   e. BMS 606 Proteins: Structure-Function Relationships (4)
   f. BMS 611 Medical Bioinformatics and Functional Genomics (3)
   g. BMS 624 Human Neuroanatomy (5)
   h. BMS 667 Developmental Biology (3)
   i. BMS 703 Advanced Cell Biology (3)
   j. BMS 704 Advanced Molecular Biology (3)
   k. BMS 705 Advanced Neuroscience (3)
   l. BMS 747 Cellular and Molecular Mechanisms of Transmembrane Signaling (3)
   m. IDC 662 Introduction to Neurobiology (3)
   n. CAN 630 Human Neuroanatomy (4)
   o. MMI 740 Host Defense (3)
   p. PHR 711 Receptor and Molecular Pharmacology (3)
5. Electives approved by the student's Advisory Committee addressing the specific needs of the student from the BMS course listing and 600-700 courses offered in other departments and programs.
6. BMS 791 Seminar (every semester but optional for the final semester)
7. BMS 792 Journal Club (every semester but optional in the final semester)
8. BMS 797 Directed Independent Research (maximum 45 hrs as per Graduate Bulletin)
9. BMS 899 Doctoral Dissertation (maximum 20 hrs as per Graduate Bulletin)

The doctoral degree requires a minimum of 90 credit hours.
VI. MASTERS DEGREE PROGRAM

Core Courses (credit hours in parenthesis)
1. BMS 604 Fundamentals of Cell and Molecular Biology (6)
2. IDC 601 Responsible Conduct of Research (1)
3. Must enroll and complete a minimum of 6 credits from the following list:
   a. BMS 521 Biochemistry (4)
   b. BMS 611 Medical Bioinformatics and Functional Genomics (3)
   c. BMS 601 Human Physiology (4)
   d. BMS 603 Microscopic Anatomy (4)
   e. BMS 605 Fundamentals of Genetics and Molecular and Cellular Pathology (2)
   f. BMS 606 Proteins: Structure-Function Relationships (4)
   g. BMS 624 Human Neuroanatomy (5)
   h. BMS 667 Developmental Biology (3)
   i. BMS 703 Advanced Cell Biology (3)
   j. BMS 704 Advanced Molecular Biology (3)
   k. BMS 705 Advanced Neuroscience (3)
   l. BMS 747 Cellular and Molecular Mechanisms of Transmembrane Signaling (3)
   m. CTS 601 Statistical and Data Analysis for Evidence-Based Practice (3)
   n. IDC 662 Introduction to Neurobiology (3)
   o. CAN 630 Human Neuroanatomy (4)
   p. MMI 740 Host Defense (3)
   q. PHR 711 Receptor and Molecular Pharmacology (3)
4. Electives approved by the student's Advisory Committee addressing the specific needs of the student from the BMS course listing and 600-700 courses offered in other departments and programs.
5. BMS 791 Seminar (every semester except for final semester)
6. BMS 792 Journal Club (every semester but optional for final semester)
7. BMS 797 Directed Independent Research
8. BMS 799 Masters Thesis (maximum 6 hrs as per Graduate Bulletin)

The master's degree requires a minimum of 30 credits.

VII. ACADEMIC REQUIREMENTS

A minimum grade of "B" is required to earn graduate credits in "500-series" (advanced undergraduate) courses. In courses numbered 600 and above (open exclusively to graduate students) the minimum acceptable grade is "C". If you accumulate more than 6 hours of "C"s or any grade less than a "C", regardless of the credit hours involved, you will be dismissed from the program.

The Executive Board of the Graduate School hears all appeals for removal of probation, academic suspension, transfer of credits, or change in program. Petitions are filed in writing to the Dean as described in the Graduate Bulletin.
VIII. SELECTION OF MAJOR ADVISOR

Prior to the selection of a permanent Major Advisor, the Graduate Program Officer will serve as your *ad hoc* advisor.

Students receiving a departmental stipend, but not those funded from a research grant, have the opportunity to rotate between labs when they first enter the program. Rotations will be 4-6 weeks in length in order to achieve 2-3 rotations during the entering semester. Upon entering the program, you will begin laboratory rotations within the first two weeks of your first semester. You should identify two or three areas of research interest and spend 4-6 weeks within each laboratory.

Available laboratory rotations provided to incoming doctoral students is based on:

1. The faculty member being willing to accept students into his or her laboratory.
2. The faculty member having sufficient research funds or notice of a grant award.

By the end of the first semester, you will select your Major Advisor (and area of research interest). If you enter the program having already identified a laboratory and Major Advisor, laboratory rotations during the first semester are still encouraged.

Your Major Advisor will serve as the chair of your graduate advisory committee and will direct your research program. He or she will have the responsibility to provide the necessary funding for your research project(s). However, you will be encouraged to apply for extramural funding with the help of your Major Advisor to provide valuable training in all aspects of grant writing.

Your Major Advisor must hold a primary or secondary appointment within Biomedical Sciences as a tenured or tenured-track faculty member. The Graduate Program Committee must approve Major Advisors who hold secondary appointments and you must have a faculty member with a primary appointment in Biomedical Science serve as a Co-Major Advisor.

*A change in your Major Advisor is strongly discouraged. However, under unusual circumstances you may petition to the Graduate Program Officer, and must receive the approval of the department chair.*

IX. THE ADVISORY COMMITTEE AND COMMITTEE MEETINGS

You are responsible for selecting an advisory committee through consultation with your Major Advisor. The advisory committee will consist of the Major Advisor and a minimum of three other graduate faculty members (minimum total of four members). At least three committee members must be tenured or tenured-track faculty having primary appointments in Biomedical Sciences and at least one member must have a primary appointment outside Biomedical Sciences.
The first meeting of the advisory committee should be scheduled within the first semester of the first year of your doctoral program. During this meeting you will outline your planned coursework.

Committee meetings are to be held every fall and spring semester. If a committee meeting is not held the student will not be able to register for class (spring, summer and fall semesters).

Your advisory committee will evaluate each meeting with an emphasis on oral skills, presentation of data, progress in the research project, ability to answer questions, and ability to critically evaluate your data. Future studies may be suggested as well. A copy of the evaluations should be submitted to the Biomedical Sciences Graduate Program Committee.

X. COMPREHENSIVE AND QUALIFYING EXAMS

Doctoral students entering in the spring, summer, or fall semesters of one calendar year will initiate the advancement to candidacy exams at the end of their second full academic year. The comprehensive exam is a written, closed-book exam that assesses the student’s mastery of the content of the core curriculum. Students given waivers for any of the core courses will still be responsible for and test on the subject matter found in these courses. Students must pass the comprehensive exam before proceeding to the qualifying exam. For the qualifying exam, doctoral students must write a research proposal, present a research seminar, and pass both a written (the research proposal) and oral exam in order to advance to candidacy.

For the written portion of the qualifying exam, a specific aims page must be presented to the advisory committee for approval prior to writing the grant proposal and if necessary, modified within two weeks and resubmitted to the advisory committee. The completed NIH-style 12-page proposal must be written alone with minimal guidance from the Major Advisor. After the oral defense, if the proposal document requires more revision, the student can make those changes, the Major Advisor verifies that it has been completed, and the student submits the final document to the Graduate Program Director for placement in the student’s file. These final revisions must be completed within 2 months.

If necessary, students may re-take the comprehensive exam and qualifying (proposal/oral) exam should they fail their first attempt. Re-examination will be scheduled six months following the original exam. Students are expected to complete both requirements within the third academic year.

The timeline for these exams is:

1. Comprehensive exam (re-examination if required)
   By June 15 of their second year (by December 15)
2. Qualifying (proposal/oral) exam (re-examination if required)
   Specific aims page of the proposal: by August 1 of that same year (by February 1)
   Modification/approval of the proposal: by August 15 of that same year (by February 15)
   Submission of the completed NIH-style 12-page proposal: by October 1 of that same year (by April 1)
   Defense/oral exam: by November 15 of that same year (by May 15)
In the rare occasion that an exception is granted for these deadlines (e.g., student health or family issues), the Major Advisor of the student wishing to extend these deadlines needs to petition the Graduate Program Committee in writing stating the reason why an extension should be granted and an alternate date for the deadline.

XI. PROGRAM AND PROGRAM OFFICERS

The Graduate Program Officer will serve as a liaison between the graduate students and faculty. Duties of the Officer are:

1. Serves as a temporary advisor for incoming students who, by the first day of the semester, do not yet have an advisor;
2. Functions as a liaison or ombudsman for graduate students to resolve student-associated problems;
3. Monitors the program of each graduate student, reviews the progress of each student on a semi-annual basis, and assures the maintenance of appropriate academic standards; and
4. Reports to the Graduate Program Committee on student progress.

Grievances (Conflict Management)

From time to time, the student and advisor relationship may experience discord; however, such periods are to be expected and should be resolvable. In rare cases, the advisor and student relationship is not mutually successful and the discord irresolvable. In such cases, the Graduate Program Officer and then the Graduate Program Director should be consulted. The Graduate Program Committee will then decide whether a termination of the relationship is appropriate. It is the responsibility of the student to identify a new faculty member willing to assume the role of advisor. Once the student and the new faculty member have agreed to work together, the Graduate Program Committee should be consulted and the appointment made.

Academic Status

If a student is on academic probation, he or she must see his or her advisor and the Graduate Program Officer or Director at the beginning of the semester and reassess the choices of the courses that are to be taken that semester. The Graduate Program Director is authorized by the Program to require the student to take various remedial courses in conjunction with or before enrolling in specified courses administered by the Program.

XII. THESIS/DISSERTATION RESEARCH AND DEFENSE

Once you have completed writing your dissertation, you must get approval from your major advisor before submitting it to members of your advisory committee. To ensure that committee members are given adequate time to read and critique the thesis/dissertation, the oral defense may not be scheduled any sooner than 30 days after committee members have been provided with the dissertation.

You will give an oral presentation of your thesis/dissertation research. A public seminar notice must be completed at least three weeks in advance.
and promoted to the Department and University. The Graduate School must also be notified three weeks prior to the defense (see the form in the Appendix). The defense of your dissertation will follow the presentation and will include questions to evaluate:

1. The thesis/dissertation itself (i.e., quality and completeness of the research, validity of the methods used, validity of conclusions, etc.);
2. Your capacity for independent thought;
3. The depth of your knowledge in the areas related to the dissertation topic and;
4. Your knowledge of all areas fundamental to your general research area.

A successful defense must satisfy the majority of the advisory committee. The decision of the advisory committee is final.

The advisory committee may require revision of the thesis/dissertation. On completion of any revisions, bound copies must be provided to the Department and to the Graduate School.

XIII. LEAVE OF ABSENCE AND VACATION

Requests for a Leave of Absence must be endorsed by the student's Major Advisor and the graduate program director and then submitted to the Graduate School (see form in this Handbook). Leave of absences are strongly discouraged but are permitted in unusual circumstances. Resumption of financial support is not guaranteed upon re-entry to the graduate program. Vacation time is to be arranged with and is at the discretion of the student's major advisor.

XIV. POLICY ON ACADEMIC HONESTY

All Creighton University graduate students are subject to the standards of academic integrity required by the University, and to the possible penalties for academic misconduct in course work. In addition, students must also observe additional standards announced in writing by faculty members for particular courses.

Student academic misconduct includes, but is not limited to:

a. Cheating: The deliberate use or attempted use of unauthorized material in an academic exercise, including unauthorized collaboration with classmates.

b. Plagiarism: The deliberate representation of the words, ideas or work of others as one’s own in an academic exercise; the appropriation of the language, ideas or thoughts of another and representation of them as one’s own original work.

c. Falsification: Falsifying documents, correspondence, reports, or records of any kind, or knowingly providing false information or evidence to University or School personnel, or to others external to the University.
d. Fabrication: The deliberate generation or augmentation of data, information, citation or result in an academic exercise.

e. Improprieties of Authorship: Improper assignment of credit or misrepresentation of material as original without properly referencing the original authors.

f. Facilitating Academic Dishonesty: The deliberate assistance or attempted assistance of another student to commit an act of academic misconduct.

g. Theft or destruction of library materials or other academic resources.

h. Violation of codes of conduct described in the University’s Student Handbook, program or department policies, and/or articulated by instructors either verbally or in writing.

Further information regarding academic or academic-related misconduct, and disciplinary procedures and sanctions regarding such misconduct, may be obtained by consulting the current edition of the Creighton University Graduate Bulletin.

XV. ACCOMMODATIONS FOR QUALIFYING DISABILITIES

Creighton University will provide reasonable accommodations for persons with documented qualifying disabilities. However, it is the student’s responsibility to request accommodations. Students requiring special accommodations need to get a letter documenting the specific disability from the Office of Disability Accommodations located in the Old Gym, Room 408 (402-280-2166). This letter should be presented to instructor at the beginning of the course, so the accommodation can be discussed with your instructor.

XVI. INDIVIDUAL DEVELOPMENT PLANS FOR GRADUATE STUDENTS

Individual Development Plans (IDPs) are recognized for fostering professional development. A well-crafted IDP serves both as a planning and communications tool, allowing graduate students and postdoctoral fellows to identify their research and career goals and to communicate these goals to their mentors, PIs, and advisors. By defining their career goals early on, graduate students and postdoctoral fellows are better able to identify and participate in professional development opportunities and target their training toward achieving their specific career objectives.

Purpose of the Individual Development Plan (IDP)

The Individual Development Plan (IDP) is a tool designed to assist with:

1) identifying professional goals and objectives;

2) assessing one’s skill set relative to their career goals;

3) developing a plan to acquire the skills and competencies needed to achieve short- and long-term career objectives.
The IDP will set a course for your future profession that will match your skills to your career ambitions. Given your skills and goals will likely change over time, your IDP will be an evolving document that you should return to with your mentor and advisor over the course of your time in our department. The purpose of the IDP is to build upon your current strengths by identifying areas for development and crafting a plan to address those areas. You should work with your mentor and advisors to develop an IDP that will allow you to be productive while positioning you to be successful in your chosen career.

Given the mission and goals of the BMS graduate program, we have put in place a program whereby graduate students and postdoctoral fellows, along with their mentors and CU faculty, develop and implement an IDP as a way to ensure these conversations take place at least annually. Graduate students and postdoctoral fellows prepare an IDP highlighting research goals, presentations, and skills training needed to reach their goals and discussed them with their mentor(s) on a regular basis.

We have adopted the approach recommended by the Federation of American Societies for Experimental Biology (FASEB) and the American Association for the Advancement of Science (AAAS) that utilizes a website tool designed to help graduate students and postdoctoral fellows to create an IDP. This free website tool is called myIDP (http://myidp.sciencecareers.org). It provides:

- Exercises to help you examine your skills, interests, and values.
- A list of 20 scientific career paths with a prediction of which best fit your skills and interests.
- A tool for setting strategic goals for the coming year, with optional reminders to keep you on track.
- Articles and resources to guide you through the process. It also contains links to career resources and tools to help you develop concrete plans, attend workshops, networking etc.

For more information about the tool, see the editorial published in Science written by Bruce Alberts, Editor-in-Chief of Science, and Jim Austin, Editor of ScienceCareers.org. http://www.sciencemag.org/content/337/6099/1149.full

Outline of the IDP Process
The development, implementation, and revision of IDPs require a series of steps to be conducted by graduate students/postdocs and their mentors. These steps are an interactive effort, and so both the student and the mentor must fully participate in the process.
<table>
<thead>
<tr>
<th>Step</th>
<th>For Student/Postdoc</th>
<th>For Mentor/Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Conduct a self-assessment (using myIDP).</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>Explore career options and compare them with your skills, interests, and values.</td>
<td>Become familiar with available opportunities.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Write an IDP (using myIDP).</td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>Share IDP with mentor. Make concrete plans to improve your skills, build your network, and get the experience you need to meet your goals.</td>
<td>Review IDP and help revise.</td>
</tr>
<tr>
<td>Step 5</td>
<td>Implement the plan. Revise your IDP as needed.</td>
<td>Establish a regular review of progress. Provide opportunities to address needed skills/tools for career goal target.</td>
</tr>
<tr>
<td>Step 6</td>
<td>Survey opportunities with mentor.</td>
<td>Discuss opportunities with student/postdoc.</td>
</tr>
</tbody>
</table>

After completing the myIDP exercises and developing a plan, it will be necessary to establish a mentoring team (as described in myIDP) to help you reach your career goals. This team will likely include your major advisor and advisory committee members, or for postdoctoral fellows, their sponsor and/or supervisor. Likewise, it could include individuals outside your department or school. And as a student, your mentoring team serves a different purpose than your degree program's advisory committee. As you use myIDP to create your own plan, you should share selected portions of the plan with your mentoring team to discuss your accomplishments and goals in light of the BMS program objectives and your career aspirations. We strongly suggest you complete this process within three-six months of your initial appointment and re-visit the IDP at least annually.

To help assure that an IDP has been developed, we ask you to share parts of your IDP with your mentor, particularly your goals and general timeframe in which you want to reach those goals. We will also ask that certain elements be included in your annual SAP (Student Activity Profile) report due March of every year. Finally we ask that you re-visit your IDP plan annually to review your progress with your mentor(s) possibly reassessing your goals, recognizing it is an evolving process. For postdoctoral fellows, this should be part of your annual performance evaluation conducted with your supervisor/sponsor.
Soliciting Guidance†
As you use myIDP to create your own plan, you need to be prepared to share selected portions of the plan with your mentor/supervisor. You may introduce the topic by having your mentor provide feedback on your skills by completing the skills assessment portion of my IDP. The following are tips to facilitate the discussion:

• Make an appointment separate from other lab meetings. This should not be a ten-minute add-on to a discussion about your data. It needs to be a discussion focused on your career.
• An environment away from the lab will eliminate distractions.
• Start out on a positive note – “I've really enjoyed my last year in the lab. I feel I've made great progress on my research project and now I'm beginning to think ahead to the next step in my career”.
• Do not attempt to share your entire IDP. Prepare a concise outline of what you want to discuss. myIDP facilitates this by allowing you to print out a selected portions of your IDP.
• Be prepared to negotiate! If your plan A is to teach science in a liberal arts college, you will need to get comprehensive teaching experience (developing syllabus, delivering lectures, engaging students in active learning, writing exams, giving grades, etc.). As this will inevitably take time away from the laboratory, you need to agree on how the research will get done.

It is not reasonable to expect a single person to be an expert in everything you need to learn. You should expect to develop a "mentoring team" consisting of experts in different dimensions of science. As you identify skill areas that need work, you would be best served by seeking out different mentors for different skills. Extend your mentoring network beyond the bounds of your current department or institution.

For Mentors/Advisors
Step 1. Become Familiar with Available Opportunities
By virtue of experience you should have knowledge of some career opportunities, but you may want to familiarize yourself with other career opportunities and trends in job opportunities (refer to sources such as National Research Council reports and Science career reviews).

Step 2. Discuss Opportunities with the Graduate Student or Postdoctoral Fellow
This needs to be a private, scheduled meeting distinct from regular research-specific meetings.

Step 3. Review IDP and Help Revise
Provide honest feedback, both positive and negative, to help graduate students and postdoctoral fellows set realistic goals. Agree on a development plan that will allow them to be productive in the laboratory and adequately prepare them for their chosen career.

†From a pre-print article from ScienceCareers.org 2012 by P. Clifford, C. Fuhrmann, B. Lindstaedt, J. Hobin.
Expectations of a Successful Graduate Student
Department of Biomedical Sciences

Holds one’s self and experiments to the highest standard of scientific integrity.

1. Dedicated
   • Proactive in reading/ understanding all aspects of your project.

2. Productive
   • Conduct experiments in a timely manner.
   • Learn new techniques efficiently.
   • Work at least 40-50 hrs a week (experiments, reading, analyzing, designing) and have something to show for it. We will go over experiments weekly in one-on-one meetings.

3. Competent
   • Keep a detailed, daily lab book. We will be referencing lab books regularly and in one-on-one meetings.

4. Enthusiastic
   • Passionate about your research and have a high level of curiosity.

5. Displays Ingenuity
   • Think critically outside of the box when trouble-shooting and contemplating future directions.

6. Possess the desire to develop as a scientist
   • Know your strengths and weaknesses. Identify, set goals to improve and overcome your weaknesses.

7. Takes initiative
   • In completing your own tasks.
   • Offer to assist others.

8. Effective communication skills
   • Be a respectful team player.
   • Display collaborative integrity.
   • Be open-minded.
   • Practice accurate recordkeeping.

9. Be honest. You must follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin.

10. Manuscript preparation:
    • Graduate students will work on writing manuscripts of their experiments. Progress will be discussed during regular meetings. The final will be submitted to a scientific journal for peer-review.
DEPARTMENT OF BIOMEDICAL SCIENCES

John Yee, Ph.D., Chair
Philip Brauer, Ph.D., Graduate Program Director
Kirk Beisel, Ph.D., Graduate Program Officer
Graduate Program Committee members: Robert Mackin, Ph.D., D. David Smith, Ph.D., and Deniz Yilmazer-Hanke, M.D., Ph.D.
Senior Graduate Program Coordinator: Susan Johnson

THE GRADUATE FACULTY

Primary Appointees. Professors: Agrawal, Beisel, Bergren, Brauer, Bruce, Cullen, Hallworth, Hansen, He, Lovas, Quinn, Reidelberger, Soukup, Yee, Yilmazer-Hanke; Associate Professors: Govindarajan, Mackin, D. Nichols, D. Smith; Assistant Professors: Kramer, Patterson, Pisarri; Research Assistant Professors: Chen, H. Smith.

Secondary Appointees (primary appointment shown in parenthesis). Professors: Hulce (Chemistry), Kincaid (Pharmacy), Strauss-Soukup (Chemistry), Thomas (Surgery); Associate Professors: Cosgrove (Boys Town National Research Hospital), Knezetic (Pathology), M. Nichols (Physics), Threlkeld (Physical Therapy); Assistant Professors: Rocha-Sanchez (School of Dentistry).

Information about individual faculty and their research can be found on the Department of Biomedical Sciences website.
Courses Offered
Department of Biomedical Sciences
Graduate Program

Key:

(3): number of credit hours
I, II, or S: semester offered (Fall, Spring, or Summer)
Ay: Offered in alternate years
P: Pre-requisite course
IC: Instructor consent
DC: Department consent
Sr. Stdg.: Registered as a senior in good standing
Gr. Stdg.: Registered as a graduate student in good standing

BMS 503/603 Microscopic Anatomy (4) I
This course provides a comprehensive examination of the light microscopic
anatomy and ultrastructure of cells, tissues, and organs. A combination of lectures,
discussions, and laboratories is employed with a major focus on a laboratory
experience using the light microscope. P: Gr. Stdg. or IC.

BMS 511/611 Medical Bioinformatics and Functional Genomics (3) I
This course covers functional aspects of eukaryotic cells including gene
regulation/expression, signal transduction, and cell-cell interactions. The course will
be geared towards answering specific biological questions ranging from detailed
analysis of a single gene through whole-genome analysis, transcriptional profiling,
and functional genomics. P: IC.

BMS 521 Principles of Biochemistry (4) II
This course examines the fundamental principles of structural biochemistry,
enzymology, metabolism and molecular biology. P: CHM 323 and 324 (organic) or
equiv.; Sr. or Gr. Stdg. only with IC.

BMS 540 Nutrition: Facts and Fads (2) I, II, OD
A nutrition course designed for students with health care interests emphasizing
proper nutrition, omnivorous diets, and basic food science concepts. The
inadequacies of food faddism and identification of bogus claims and "quackery" will
also be considered. P: IC.

BMS 601 Human Physiology (4) II
This course examines basic concepts of cellular physiology and organ system
physiology of the nervous, endocrine, reproductive, muscle, cardiovascular,
respiratory, gastrointestinal, and renal systems, as well as multisystem integration.
P: Gr. Stdg. or IC.

BMS 602 Human Gross Anatomy (6) I
This course examines the detailed structure of the human body, including dissection
of the cadaver, combined with conferences, lectures, and assigned readings. P: Gr.
Stdg. or IC.

BMS 604 Fundamentals of Cell and Molecular Biology (6) I
This course consists of lectures on the functional aspects of cell and molecular
biology with an emphasis on eukaryotic cells. P: IC.
BMS 605  **Fundamentals of Genetics and Molecular and Cellular Pathology (2)** I
This course is an introduction to fundamentals in patterns of inheritance, genetic diseases, cytogenetics, cell injury, and neoplasia. Topics will include Mendelian genetics and genetic diseases, cytogenomics, use of online genomic databases, wound healing, and molecular basis of neoplasia as well as basic principles of pathology. **P: Gr. Stdg. or IC.**

BMS 606  **Proteins: Structure-Function Relationships (4)** I or II
Topics covered include primary structure, principles of secondary and tertiary structures, enzyme kinetics, chemical modifications and their effects, protein-protein interactions, protein complementation and prediction of conformation. Presentation and model building by students are integral parts of this course. **P: Gr. Stdg. or IC.**

BMS 610  **Bone Biology Fundamentals (3)** II, Ay
This course examines fundamental aspects of skeletal biology, including the microscopic anatomy and ultrastructure of bone, morphogenesis and embryologic development of the skeletal system, bone modeling and remodeling, biomechanics of bone, skeletal physiology, mineral homeostasis, and clinical evaluation of bone and mineral disorders. **P: IC.**

BMS 621  **Teaching Practicum in Gross Anatomy (3)** I
This course provides practical experience in teaching human gross anatomy. **P: IC.**

BMS 624  **Human Neuroanatomy (5)** II
This course consists of examination of the fundamental structure and function of the human central nervous system. **P: Gr. Stdg. or IC.**

BMS 630  **Fundamentals of Hearing (3)** I, II, S
This is an advanced graduate level course focusing on the anatomy and physiology of the auditory system. The course will introduce students to the basics of normal human hearing with a focus on the peripheral auditory system, neural coding of sound, and the perception of simple sounds. **P: Gr. Stdg. or IC.**

BMS 667  **Developmental Biology (3)** II
This course covers cellular and molecular events underlying animal development and cell differentiation in vertebrate and invertebrate organisms. Topics will include the early body plan, cell determination and diversity, organogenesis, morphogenesis, and stem cells, and includes vertebrate (mouse, chick, frog, fish, human) and invertebrate (fly, worm) models. **P: Gr. Stdg. or IC.**

BMS 703  **Advanced Cell Biology (3)** II, Ay
This course consists of detailed consideration of the functional aspects of cell biology with emphasis on eukaryotic cells. Topics include signal transduction, neuronal cell biology, synthesis, transport and processing of secretory proteins, extracellular matrix proteins, cell adhesions, and cytoskeleton. **P: IC.**

BMS 704  **Advanced Molecular Biology (3)** II, Ay
This course consists of detailed consideration of the structure, function and synthesis of DNA, RNA, and proteins with emphasis on eukaryotic cells. Topics include DNA structure, transcription, translation, replication, recombinant DNA technology, eukaryotic viruses and control of cellular differentiation in normal and abnormal states such as cancer. **P: IC.**
BMS 705 Advanced Neuroscience (3) I, Ay
This course will develop a detailed understanding of the fundamentals of neuroscience at the molecular, electrophysiological, and systems levels. Topics will include neurotransmitters and receptors, synaptic mechanisms, neural development, membrane physiology, ion channel structure and function, and neural networks. Emphasis will be placed on emerging areas and leading-edge techniques. P: IC.

BMS 720 Advanced Topics in Molecular Structure/Function (3) I, II, S
This course covers functional aspects of molecular structure, peptide chemistry, and molecular interactions. Topics vary will change with each iteration of the course permitting students to repeatedly enroll in the course but with each covering a different topic. Nine credit hours are the maximal applicable toward the degree. P: IC.

BMS 730 Advanced Topics in Cell and Molecular Biology (3) I, II, S
This course covers functional aspects of eukaryotic cells including gene regulation/expression, signal transduction, and cell-cell and cell-substrate interactions. Topics vary will change with each iteration of the course permitting students to repeatedly enroll in the course but with each covering a different topic. Nine credit hours are the maximal applicable toward the degree. P: IC.

BMS 740 Advanced Topics in Physiology (3) I, II, S
This course covers specific aspects of physiology and pathophysiology of whole organisms and organ systems as well as cellular physiology. Topics vary will change with each iteration of the course permitting students to repeatedly enroll in the course but with each covering a different topic. Nine credit hours are the maximal applicable toward the degree. P: IC.

BMS 747 Cellular and Molecular Mechanisms of Transmembrane Signaling (3) I, II, S
Detailed analysis of how an external signal is transduced into a cell language resulting in a response. Intracellular pathways involved in signal transduction will be examined. Discussions on various cell proteins and cross-talk among intracellular signal transduction pathways. P: IC.

BMS 750 Advanced Topics in Morphology and Anatomy (3) I, II, S
This course covers functional morphology ranging from cellular ultrastructure to gross anatomy and embryology. Topics vary will change with each iteration of the course permitting students to repeatedly enroll in the course but with each covering a different topic. Nine credit hours are the maximal applicable toward the degree. P: IC.

BMS 760 Advanced Topics in Neuroscience (3) I, II, S
This course integrates the areas of neuroanatomy, neurophysiology, neuropharmacology, and neuropathology at both the cellular and organismal level. Topics vary will change with each iteration of the course permitting students to repeatedly enroll in the course but with each covering a different topic. Nine credit hours are the maximal applicable toward the degree. P: IC.

BMS 790 Research Methods (3-5) I, II
This course consists of methods and techniques used in on-going research projects. P: IC.
BMS 791  Seminar (1) I, II
This course consists of formal oral presentations and critical discussions of assigned subjects to familiarize students with the nature and extent of research literature, the analysis of research papers, and the collation and presentation of scientific information. This course is repeatable. P: DC.

BMS 792  Journal Club (1) I, II
This course consists of readings and presentations of current scientific literature, followed by group discussion involving students and faculty members. This course is repeatable. P: DC.

BMS 795  Directed Independent Study (2) I, II, S
Each student, supervised by faculty members, will pursue in-depth reading and discussions on current research topics of interest to faculty and students. The purpose is to provide an environment whereby the student is introduced to scientific research methods and can improve critical thinking and reading skills as well as exchanging scientific information. P: IC.

BMS 797  Directed Independent Research (3-6) I, II, S
This course consists of original investigation under supervision and guidance of individual staff members. P: IC.

BMS 799  Master's Thesis (1-3) I, II, S
This course consists of review of the literature and research data; writing of the thesis. Students must register for this course in any term when engaged in formal preparation of the Master's thesis; however, six credit hours are the maximum applicable toward the degree. P: IC.

BMS 899  Doctoral Dissertation (3-6) I, II, S
This course consists of review of the literature and research data and the writing of the dissertation. Students must register for this course in any term when engaged in formal preparation of the doctoral dissertation; however, twenty credit hours are the maximum applicable toward the degree. P: IC.
Course Description
The purpose of the course is to expose you to a broad range of current research topics in biomedical sciences. All graduate students are encouraged to attend as many seminars as possible, not only in semester(s) during which you are registered. It is useful for you to attend even when the topic seems unrelated to your research - indeed, seminars provide the best way for you to round out your knowledge by exposing you to current research in areas that are not directly related to your own research. This course consists of seminars that will be presented roughly once a week. Generally, after the speaker is finished, there is a question and answer period where the audience can ask any questions they might have that were not answered during the seminar.

Course Objectives
Upon successful completion of this course, students will:
• develop an overall understanding of the principles of oral communication in science including accepted presentation techniques, listening skills, critical analysis of scientific presentations, participation in scientific discussions and introduction of speakers and invited guests;
• demonstrate an ability to listen to a scientific presentation, critically evaluate the research presented, and ask pertinent questions regarding the material presented; and
• actively participate in a discussion of strengths and weaknesses of a speaker's presentation and/or the scientific merit of the research presented.

Academic Honesty and Accommodations For Qualifying Disabilities
Students are required to follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin. Creighton University will provide reasonable accommodations for persons with documented qualifying disabilities. Students requiring special accommodations need to get a letter documenting the specific disability from the Office of Disability Accommodations. This letter should be presented to the instructor at the beginning of the course, so the accommodation can be discussed.

Assignments and Grading Criteria
To receive credit, students must attend all departmental seminars and prepare a short summary report for at least two departmental seminars presented by faculty, post-docs, or guest speakers during the term. An excused absence for a regularly scheduled departmental seminar must be arranged with the Course Director. Any unexcused absence will result in a failing grade for the course. The following criteria will be used to assess performance and assign an overall course grade. Scale from (1) Does not meet expectations, (2) generally meets expectations, but with areas of concern, (3) meets expectations, and (4) exceeds expectations.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Scale 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asked questions of the speaker.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actively participated in a discussion with the speaker or colleagues after the presentation.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Two written summaries of departmental seminar speakers with terminal degrees (~400 words each)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Described their opinion (positive and negative) about the research.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Noted aspects strengths and weaknesses of the presentation</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Identified items they particularly liked and those that could be improved (and how).</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Identified open issues related to the problem area but were not addressed in the presentation.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Presented their perspective and position on the topic of seminar.</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Other (write in here)</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Please provide specific comments regarding the strengths and weaknesses of the performance of this student during the current term.
**BMS 792 Journal Club**

**Syllabus and Assessment Club Criteria**

**Student Name___________________________**  **Instructor Name___________________________**

**Term (Fall, Spring)___________________________**  **Meeting time and location___________________________**

---

**Course Description and Objectives**

Each student will pursue in-depth reading and discussions on current research topics of interest to faculty and students. The purpose is to provide an environment whereby the student is taught the elements that make for careful reading, good writing, and critical thinking of scientific papers and to be able to effectively present and discuss scientific information with others. Upon successful completion of this course, students will:

- be familiar with the scientific literature and with different styles of scientific writing;
- recognize the elements of a good abstract, introduction, methods, results, and discussion section of a paper;
- develop skills in critical reading and evaluation of scientific writing;
- become comfortable presenting, questioning, and discussing scientific information with others including the general public; and
- keep abreast of current research and new methodological approaches relevant to their field of study.

**Academic Honesty and Accommodations For Qualifying Disabilities**

Students are required to follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin. Creighton University will provide reasonable accommodations for persons with documented qualifying disabilities. Students requiring special accommodations need to get a letter documenting the specific disability from the Office of Disability Accommodations. This letter should be presented to the instructor at the beginning of the course, so the accommodation can be discussed.

---

**Grading Criteria**

Using the following scale, indicate your assessment for this student during the current term using the following suggested criteria or by substituting your own. Use the scores and specific comments to determine the overall course grade. Scale from (1) Does not meet expectations, (2) generally meets expectations, but with areas of concern, (3) meets expectations, and (4) exceeds expectations NA=not applicable.

<table>
<thead>
<tr>
<th>Attendance in journal club...</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chose an appropriate article for presentation from the primary literature at the journal club. ............</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Reviewed the article accurately. Demonstrated an understanding of key concepts in the paper........</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>All parts of the article were appropriately critiqued, addressing strengths and weaknesses and impact of the study..</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Reported on new and developing technologies found within the article and was able to explain them.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Presentation was clearly organized and made the paper easy to follow. ........................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Presentation was enthusiastic and pace was well-suited for the content and time allotted..........</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Involved the audience in the discussion; was able to answer audience questions effectively and completely..................................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Presented their perspective and position on the topic of the paper........................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>As a participant, showed evidence that he/she thoroughly read the papers before the journal club meeting. .................................................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Contributed to discussions during the course and was able to apply the content of readings and personal knowledge to what he/she said. ........................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Other ..........................................................................................................................</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Please provide specific comments regarding the strengths and weaknesses of the performance of this student during the current term.

---

Revised 8-14-2014  20
# BMS 795 Directed Independent Study

## Syllabus and Assessment Criteria

### Student Name ____________________________  Instructor Name ____________________________

### Term (Fall, Spring, Summer)/Year ____________________________

## Course Description and Objectives

Each student, supervised by faculty members, will pursue in-depth reading and discussions on current research topics of interest to faculty and students. The purpose is to provide an environment whereby the student is introduced to scientific research methods and can improve critical thinking and reading skills as well as exchanging scientific information. Upon successful completion of this course, students will:

- effectively analyze, synthesize, and interpret biological data and critically evaluate scientific information;
- identify and suggest possible solutions to ethical dilemmas that occur in their field of study, and understand the importance of professional ethics in scientific communication and laboratory work;
- write effective research papers and reports; and
- be able to communicate their results through oral presentations.

## Academic Honesty and Accommodations For Qualifying Disabilities

Students are required to follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin. Creighton University will provide reasonable accommodations for persons with documented qualifying disabilities. Students requiring special accommodations need to get a letter documenting the specific disability from the Office of Disability Accommodations. This letter should be presented to the instructor at the beginning of the course, so the accommodation can be discussed.

## Grading Criteria

Using the following scale, indicate your assessment for this student during the current term using the following suggested criteria or by substituting your own. Meet multiple times with the student during the term to discuss his/her progress in meeting the criteria. *Scale from (1) Does not meet expectations, (2) generally meets expectations, but with areas of concern, (3) meets expectations, and (4) exceeds expectations NA=not applicable.*

| Identified and read the latest literature in the topic area and was proactive in expanding literature review. | 1 | 2 | 3 | 4 | NA |
| Developed accurate and focused bibliography on a topic. Included relevant sources representing various points of view. | 1 | 2 | 3 | 4 | NA |
| Reported on new and developing technologies found in the literature being applied to the topic area. | 1 | 2 | 3 | 4 | NA |
| Organized evidence to reveal important patterns, differences, or similarities related to the topic. | 1 | 2 | 3 | 4 | NA |
| Used quantitative analysis of data as the basis for competent judgments, drawing reasonable and appropriately qualified conclusions from work in the literature. | 1 | 2 | 3 | 4 | NA |
| Exhibited the aptitude or improved ability to analyze and synthesize gaps in knowledge in the field. | 1 | 2 | 3 | 4 | NA |
| Completed written assignments that demonstrate clarity of thought and expression regarding the topic discussed. | 1 | 2 | 3 | 4 | NA |
| Presented own perspective and position on the topic studied. | 1 | 2 | 3 | 4 | NA |
| Other | 1 | 2 | 3 | 4 | NA |

Please provide specific comments regarding the strengths and weaknesses of the performance of this student during the current term.

Revised 8-14-2014

---

21
BMS 797 Directed Independent Research
Syllabus and Assessment Criteria

Student Name_________________________________  Instructor Name_________________________________
Term (Fall, Spring, Summer)/Year _____________________________

Course Description and Objectives
This course consists of original investigation under supervision and guidance of the instructor and individual staff members. Upon successful completion of this course, students will:
• acquire the skills necessary to perform experiments, assess, and interpret results;
• conduct research addressing specific scientific problems and place their results in the context of previous knowledge;
• demonstrate competence in the laboratory, including application of the scientific method and appropriate use of laboratory tools and techniques;
• effectively analyze, synthesize, and interpret biological data;
• improve their ability to communicate their results; and
• work collaboratively within groups.

Academic Honesty and Accommodations For Qualifying Disabilities
Students are required to follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin. Creighton University will provide reasonable accommodations for persons with documented qualifying disabilities. Students requiring special accommodations need to get a letter documenting the specific disability from the Office of Disability Accommodations. This letter should be presented to the instructor at the beginning of the course, so the accommodation can be discussed.

Grading Criteria
Using the following scale, indicate your assessment for this student during the current term using the following suggested criteria or by substituting your own. Use the scores and specific comments to determine the overall course grade. Meet with the student multiple times during the term to discuss their progress in meeting the criteria. Scale from (1) Does not meet expectations, (2) generally meets expectations, but with areas of concern, (3) meets expectations, and (4) exceeds expectations NA=not applicable.

Read suggested literature and was proactive in expanding literature review as assessed by one-on-one meetings/conversations.  
Maintained accurate and complete laboratory records as assessed by regular review by instructor.  
Applied at least 40-50 hrs a week of effort reading, analyzing, designing, learning techniques, and conducting experiments.  
Learned existing techniques in the current laboratory efficiently  
Exhibited willingness and ability to troubleshoot to overcome technical obstacles.  
Identified, developed or brought new approaches or technology to the laboratory.  
Made expected progress on research topic; submitted summaries of ongoing and completed research on a regular basis to the Instructor  
Prepared manuscripts or presented research results when sufficient data was collected and experiments were completed.  
Displayed professionalism in collaboration by assisting others in the laboratory.  
Other

NA
1 2 3 4

Please provide specific comments regarding the strengths and weaknesses of the performance of this student during the current term.

Revised 8-14-2014
Degree Checklist  
Department of Biomedical Sciences  
Graduate Program

Selection of Major Advisor

Selection of Advisory Committee. Submit completed Committee Member form to: Senior Graduate Program Coordinator.

First Advisory Committee meeting to approve Plan of Study. Submit to: Senior Graduate Program Coordinator.

At least one meeting of the student’s Advisory Committee shall be held each Fall and Spring semester. Reports of these meetings shall be submitted to the Senior Graduate Program Coordinator.

Ph.D. Comprehensive Examination:
• Submission of research proposal to Advisory Committee by end of second year.
• Oral defense of proposal as a seminar, with approval of Advisory Committee.
• Oral examination of proposal and field of study by Advisory Committee immediately after seminar.
• Report result of exam to Graduate Program Director and Dean of Graduate School.

File Application for Degree through NEST by October 15, February 15, or June 10 for graduation at the end of the Fall, Spring and Summer terms, respectively, with a copy to Graduate Program Director.

Submission of draft of thesis/dissertation to Advisory Committee 30 days prior to thesis/dissertation defense.

Application for Final Oral Examination (must be submitted 3 weeks prior to scheduled defense).

Prepare notification brochure for defense seminar with help from Senior Graduate Program Coordinator (submitted 2 weeks prior to seminar).

Oral defense of theses/dissertation (and oral comprehensive examination for M.S. degree).

Submission of thesis/dissertation to Dean of the Graduate School 30 days prior to graduation.

Submission of Final Report to the Graduate Program Director of Biomedical Sciences.

Submission of bound copies of thesis to Dean of the Graduate School and the Department of Biomedical Sciences (Senior Graduate Program Coordinator).

Submission of electronic copy of final signed thesis to the Creighton Digital Repository

Date

Note: All original forms submitted to the Graduate Program Officer will be forwarded to the Dean of the Graduate School.

Revised 8-14-2014  23
Advisory Committee
Creighton University Graduate School

Department: ________________________________

(Name of Student) ___________________________ (Degree) ___________________________

Major Advisor:

(Printed Name) ___________________________ (Signature/Date) _______________________

Co-Advisor (if applicable):

(Printed Name) ___________________________ (Signature/Date) _______________________

Committee Members:

(Printed Name) ___________________________ (Department) __________________________ (Signature/Date) _______________________

(Printed Name) ___________________________ (Department) __________________________ (Signature/Date) _______________________

(Printed Name) ___________________________ (Department) __________________________ (Signature/Date) _______________________

(Printed Name) ___________________________ (Department) __________________________ (Signature/Date) _______________________

(Printed Name) ___________________________ (Department) __________________________ (Signature/Date) _______________________

Original to: Department Graduate Program Director
Copy to: Graduate School Office
Plan of Study
Creighton University Graduate School

Department: ________________________________

(Name of Student) (Degree)

(Major Advisor) (Date of Selection)

(Co-Advisor, if applicable)

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title of Course</th>
<th>Semester &amp; Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Plan Approved:

Committee Member: ________________________________ Date: __________
Committee Member: ________________________________ Date: __________
Committee Member: ________________________________ Date: __________
Committee Member: ________________________________ Date: __________
Committee Member: ________________________________ Date: __________
Student’s Signature: ________________________________ Date: __________
Major Advisor’s Signature: __________________________ Date: __________

Original to: Department Program Director
Copy to: Graduate School Office
Progress Report

Department of Biomedical Sciences
Graduate Program

Reporting Period: ____________________________ (Fall or Spring Semester) ____________________________ (Year)

(Name of Student) ____________________________ (Degree) ____________________________ Year Admitted

(Major Advisor) ____________________________ (Date of Last committee Meeting)

<table>
<thead>
<tr>
<th>Title of course taken during reporting semester</th>
<th>Course Number</th>
<th>Title of course taken during reporting semester</th>
<th>Course Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Signatures:

Committee Members:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Major Advisor: __________________________________________ Date: ________________

Student: __________________________________________ Date: ________________

Original to: Chairman, Biomedical Sciences
Revised 8/06/2012
Permission to Register

Creighton University Graduate School

Student: ___________________________________________  Net ID: _________

Department: ___________________________________________________________

Semester: _____________________________________________________________

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credit Hours

Signatures:

Student ____________________________  Date __________

Major Advisor or Member of Graduate Student Coordination Committee ____________________________  Date __________

Warning: Registration for courses NOT authorized may result in dismissal from the graduate program.

Original to: Department Graduate Program Director
**Student Committee Evaluation Form**

**Student:**

**Department:**

**Date of evaluation:**

---

Please rate the above student according to the following scale:

1 = Unsatisfactory  
2 = Needs Improvement  
3 = Competent/Solid  
4 = Excellent  
5 = Superior/Exceptional

(A mark of 1, 2, or 5 REQUIRES COMMENTS)

(Leave blank if not applicable)

---

<table>
<thead>
<tr>
<th>Knowledge/Interpretation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of Basic Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpretation of Data and Development of Experiments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Written Records and Reports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical Reasoning and Judgment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Progress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to Identify Problem(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Overall progress in research project:**

☐ SATISFACTORY: Adequate level of knowledge. Able to correctly demonstrate and apply knowledge in relevant situations.

☐ INADEQUATE: Inadequate knowledge in the discipline. Unable to relate learning to research situations. Distant and/or showed little interest.

---

**COMMENTS:** STRENGTHS/WEAKNESSES (A mark of 1, 2, or 5 REQUIRES COMMENTS)

---

☐ Continue on Back

---

**EVALUATOR NAME:** ___________________________ **Signature of EVALUATOR:** ___________________________ **Original to:**

Department Graduate Program Director

---

Revised 8-14-2014 28
# Advancement to Candidacy (Part 2) Rubric: Grant Proposal and Oral Exam

Students should be able to:
- Demonstrate sufficient knowledge of the subject matter to become a PhD Candidate.
- Demonstrate knowledge of and the ability to analyze, synthesize and taxonomize previous research on a specific problem through a written and oral qualifying exam.
- Define and justify a hypothesis and set of original research objectives in a formal research proposal.
- Define and defend a set of research methods and analyses that will achieve the research objectives in an ethical and responsible manner.
- Demonstrate the ability and/or aptitude for thinking clearly and solving problems through a written and oral preliminary exam.

<table>
<thead>
<tr>
<th>Written Proposal</th>
<th>Successful</th>
<th>Unsuccessful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided an adequate analysis and synthesis of literature.</td>
<td>Misread or misused the literature and displayed a narrow understanding of the field.</td>
<td></td>
</tr>
<tr>
<td>Adequately identified gaps in the existing literature meriting study.</td>
<td>Failed to identify gaps in knowledge meriting study. Missed required content, had poor design, and exhibited an overall poor quality necessitating major revisions or a complete rewrite of the proposal.</td>
<td></td>
</tr>
<tr>
<td>Extensively used primary literature as a source.</td>
<td>Use of primary scientific literature lacking. Contained sections teetering on plagiarism or would be considered plagiarism.</td>
<td></td>
</tr>
<tr>
<td>Adequately formed a hypothesis that was clearly stated and accompanied by appropriate specific aims.</td>
<td>Did not state or provide sufficient background for a hypothesis to be deduced. Lacked appropriate or relevant specific aims.</td>
<td></td>
</tr>
<tr>
<td>Provided a well-organized and well-reasoned overview of the subject matter. Created a logical argument for the need and significance of the proposed research.</td>
<td>Failed to make a coherent argument. Had a weak, inconsistent, unconvincing, or invalid argument. Lacked organization and did not support a reasoned argument for doing the study.</td>
<td></td>
</tr>
<tr>
<td>Followed appropriate convention for academic written English and communicated essential information with clarity, precision, and coherence.</td>
<td>Did not consistently follow academic writing convention. Transitions and logical flow were poorly developed and prevented the reader from following the argument.</td>
<td></td>
</tr>
<tr>
<td>Used a solid approach applying appropriate theory, methods, and techniques.</td>
<td>Showed a poor understanding of laboratory methods as evident from the proposed experimental design. Used inappropriate or incorrect methods.</td>
<td></td>
</tr>
<tr>
<td>Recognized pitfalls and shortcomings/limitation of the proposed experimental design and methods.</td>
<td>Failed to identify potential pitfalls and shortcomings/limitation of the proposed experimental designs and methods.</td>
<td></td>
</tr>
<tr>
<td>Provided alternative hypotheses should the results not turn out as expected. Proposed approaches to address the alternatives.</td>
<td>Did not provide alternative hypotheses should results not turn out as expected.</td>
<td></td>
</tr>
</tbody>
</table>

**Comments Regarding Written Portion:**
<table>
<thead>
<tr>
<th>Oral Presentation and Exam</th>
<th>Successful</th>
<th>Unsuccessful</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conveyed the important and relevant background for formation of the hypothesis that was suitable for the audience in the time assigned.</td>
<td>Was sloppy, confusing, and did not communicate what would be done or why. Extremely hard to follow, lacked organization, overran time, and appeared to have been hurriedly assembled.</td>
</tr>
<tr>
<td></td>
<td>Visual aids and distributed materials complemented the oral presentation.</td>
<td>Visual aids and distributed materials were of poor quality, distracted from the oral presentation or were inappropriate.</td>
</tr>
<tr>
<td></td>
<td>Provided an effective delivery, spoke clearly and loudly enough for the audience to hear. Used scholarly terms correctly and language was appropriate for the audience.</td>
<td>Delivery was inappropriate for this level of work.</td>
</tr>
<tr>
<td></td>
<td>Presentation and responses to questions were adequately supported by the existing literature presented and/or preliminary studies. Showed evidence of developing a knowledge base across multiple areas of discipline.</td>
<td>Presentation and responses to questions were inadequately supported by literature, preliminary data, and showed poor knowledge regarding the subject area.</td>
</tr>
<tr>
<td></td>
<td>Adequately discussed many of the major implications of the position(s) taken or hypothesis proposed.</td>
<td>Did not discuss many of the major implications of the position(s) taken or hypothesis proposed.</td>
</tr>
<tr>
<td></td>
<td>Thoroughly articulated responses clearly, effectively, and fluently. Answered questions succinctly, accurately, and effectively, reflecting solid knowledge of the research topic.</td>
<td>Questions were answered superficially or inaccurately and did not reflect appropriate knowledge of the research topic. Questions were not answered even when prodded by the audience or advisory committee.</td>
</tr>
<tr>
<td></td>
<td>Demonstrated potential for critical thinking regarding the scientific method. Had the ability to analyze, critique, and evaluate a problem using appropriate research literature and working knowledge.</td>
<td>Lacked or showed weakness in the ability to analyze, critique, and evaluate a problem using research literature and working knowledge.</td>
</tr>
</tbody>
</table>

**Comments Regarding Oral Portion:**
<table>
<thead>
<tr>
<th><strong>Successful</strong></th>
<th><strong>Unsuccessful</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrated an ability to integrate what was learned in coursework and apply it toward developing a proposal and to answer questions.</td>
<td>Did not integrate basic knowledge from coursework in developing a proposal or answering questions.</td>
</tr>
<tr>
<td>Demonstrated a capability for independent research in the area of study and potential ability for identifying and solving scientific problems.</td>
<td>Did not provide evidence for the ability to identify a problem, recognize shortcomings and limitations, or solve a simple hypothetical problem.</td>
</tr>
<tr>
<td>Showed the ability to discuss and communicate in a clear and well-organized manner.</td>
<td>Gave confusing explanations and did not provide evidence for the ability to synthesize and integrate information.</td>
</tr>
<tr>
<td>Provided evidence of creative organization and synthesis of information in the structure and breadth of the proposal content and in response to questions.</td>
<td>Provided responses that were short sighted and did not demonstrate an ability to integrate information, suggest solutions, or answer questions.</td>
</tr>
<tr>
<td>Showed an aptitude for identifying important components of a scientific problem and critically assessing and analyzing the validity of the published literature.</td>
<td>Showed little or no potential for an ability to identify and develop possible approaches to address scientific problems.</td>
</tr>
</tbody>
</table>

**Overall Comments:**

After considering the criteria above, please indicate your recommendation regarding this portion of the Advancement to Candidacy exam.

- [ ] Based on the proposal, presentation, and oral examination, this student is not prepared for successfully completing work at the PhD level at this point; candidacy deferred.

- [ ] Based on the proposal, presentation, and oral examination, this student is minimally prepared for successfully completing work at the next level. This student may struggle with the tasks necessary for successfully completing work at the next level. For example, a student at this level may have a difficult time stating research questions, identifying an appropriate research design, analyzing data, or interpreting the results without serious assistance from an advisor. **Recommended for candidacy but with closer supervision and more guidance.**

- [ ] Based on the proposal, presentation, and oral examination, this student is satisfactorily prepared for successfully completing work at the next level. A student at this level will have little difficulty producing quality work at the next level. However, some areas of improvement are recommended. **Recommended for candidacy.**
Advancement to Candidacy
Creighton University Graduate School

Department: ________________________________

_____________________________ (Student’s Name) has submitted his/her research proposal and/or comprehensive examination for advancement to candidacy for the Ph.D. degree.

After review, the committee recommends: _______ approval ________ disapproval

Committee Members: Date:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Major Advisor: Date:

________________________________________________________________________

Original to: Graduate Program Director/Department Chair

Copy to: Graduate School Office
INSTRUCTIONS
Submit this completed form to the Graduate School office at least three weeks before the final oral examination; or if the exam is waived, three weeks before the final thesis is due in the Graduate School office. All information must be typed.

STUDENT AND PROGRAM INFORMATION

Full Name ____________________________________________ CU Net ID ____________
Mailing Address ______________________________________

Degree □ MS □ MA

Major __________________________________________________

Dissertation Title _______________________________________

APPROVAL BY COMMITTEE CHAIR AND PROGRAM DIRECTOR

Final Oral Examination: ___________ ___________ ___________

Time Date Location

Signature, Committee Chair ____________________________ Date ___________ ___________

Signature, Program Director ____________________________ Date ___________ ___________

GRADUATE SCHOOL ACTION

Approved by Dean of Graduate School:

Signature ____________________________ Date ___________ ___________

Original to: Graduate School Office

Copy to: Department Graduate Program Director
Application for Final Oral Examination
For the Doctoral Degree | Graduate School

INSTRUCTIONS
Submit this completed form to the Graduate School office at least three weeks before the final oral examination; or if the exam is waived, three weeks before the final dissertation is due in the Graduate School office. All information must be typed.

STUDENT AND PROGRAM INFORMATION

Full Name ____________________________________________ CU Net ID ____________
Mailing Address ____________________________________________
Degree □ Ph.D. □ Ed.D.
Major ________________________________________________________________________________
Dissertation Title _______________________________________________________________________
______________________________________________________________________________________

APPROVAL BY COMMITTEE CHAIR AND PROGRAM DIRECTOR

Final Oral Examination: ________________________ __________________________
Time Date Location

Signature, Committee Chair __________________________ Date

Signature, Program Director __________________________ Date

GRADUATE SCHOOL ACTION

Approved by Dean of Graduate School: ________________________

Signature __________________________ Date

Original to: Graduate School Office

Copy to: Department Graduate Program Director

Revised 8-14-2014
Syllabus and Assessment Criteria for BMS 799 Masters Thesis and Defense

<table>
<thead>
<tr>
<th>Student Name ______________________________</th>
<th>Major Advisor ___________________________</th>
<th>Final Grade ______________</th>
</tr>
</thead>
</table>

Course Description and Objectives
This course consists of original investigation under close supervision and guidance of the major advisor and advisory committee. Upon successful completion of this course, students will:
- Demonstrate basic scientific knowledge fundamental to the research area investigated.
- Be able to assess the scientific literature and formulate possible research questions and hypotheses.
- Be able to suggest possible methods to address a research question and draw reasonable conclusions from experimental results.
- Demonstrate competency in basic scientific laboratory procedures using advanced technologies and laboratory instruments.
- Be able to place their experimental results into the larger context of their field of study.
- Be able to communicate their work with clarity and completeness both orally and in writing.

Academic Honesty: Students are required to follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin.

Grading Criteria: Using these guidelines, indicate your assessment for this student's thesis and presentation. Not all criteria may apply and not all have to be met within a category to assign a grade.

### Outstanding (A) |
- Asked a new question addressing a significant gap in knowledge.
- Exhibited critical thinking and displayed a very good understanding of the literature surrounding the problem.
- Proposed a well developed hypothesis with appropriate specific aims.
- Had a clever and effective research design.
- Used or tested new tools, methods, and/or types of analyses.
- Results tested the stated hypothesis leading to either its further refinement or to an alternative hypothesis.
- Analysis was comprehensive, complete, and convincing. Utilized proper statistical methods throughout.
- Showed skill and ability to use advanced technologies and instruments. Understood principles behind the technologies and obtained reliable and repeatable results.

### Very Good (B) |
- The question or problem addressed was logical or validated previous work.
- Contained original and astute observations. Showed clear understanding of the subject matter.
- A hypothesis was stated and accompanied by appropriate specific aims.
- Included a well-executed research design.
- Used appropriate and traditional methods and laboratory techniques.
- Obtained solid, reliable results that tested the hypothesis.
- Analysis was adequate and valid.
- Exhibited competency in laboratory techniques and reliability in the data and results obtained.

### Conditional (C) |
- Question or problem was very limited in scope and of minor importance.
- Displayed a narrow understanding of the field. Missed relevant literature.
- A hypothesis could be inferred but was not stated. Some aims did not directly test the hypothesis.
- Research design had weaknesses throwing question interpretation of some results.
- Missing some appropriate controls. Alternative methods should have been used.
- Results were not relevant toward testing the hypothesis.
- Analysis was adequate and valid.
- Some difficulty in acquiring repeatable results. Exhibited limited understanding of the principles behind the techniques used in the study.

### Unacceptable (F) |
- Looked at a question or problem that was, weak or already solved.
- Did not show an understanding of basic concepts or conventions of the discipline. Sources were misread or misused.
- Did not state or provide sufficient background for a hypothesis to be deduced. Lacked an understanding of what constitutes a hypothesis.
- Research design had major faults, negating validity of most results.
- Used inappropriate or incorrect methods. Poor execution of methods was evident from the results.
- Had data that was flawed, false, or misinterpreted. Included results already well known.
- Had wrong, inappropriate, incoherent, or confused analysis.
- Laboratory competency woefully inadequate. Not confident in the accuracy of the data collected. Often failed to follow appropriate technical procedures.

Grading Criteria: Some criteria may apply and not all have to be met within a category to assign a grade.
### Discussion and Conclusions

- **Effort and productivity exceeded expectations for a student at this degree level resulting in both presentations and publications.**
- **Effort and productivity met expectations for a student at this degree level. Results are publishable.**
- **Effort and productivity was just adequate. Independent of technical hurdles, research progress was protracted.**
- **Effort and productivity was poor and completion of the thesis required contributions by others.**

- Had a point of view presented with a confident and authoritative voice.
- Applied known literature to the problem studied.
- Presented the literature but was not critical of it.
- Showed poor understanding of the literature. Showed a lack of basic knowledge or careful thought. Did not explain or interpret results.
- Conclusion tied the thesis together. Was well written and organized.
- Identified what observations were important. Was well organized.
- Did not discuss what was important. Had a weak structure and organization.
- Had unsupported or exaggerated interpretation. Contained errors or mistakes.
- Showed a better understanding of theory than would be expected at this degree level.
- Explored interesting connections but missed some opportunities.
- Displayed little creativity, imagination, or insight.
- Did not handle theory well, or the theory was missing or blatantly wrong.

### Writing, Figures, Tables, Legends, and Citations

- Document was well organized. Figures, graphs, tables, and illustration effectively communicated the results and conveyed complicated ideas.
- Writing, figures, graphs and tables appropriately conveyed information and results.
- Format and writing needed significant revision. Figures, graphs and tables were rarely used when they could have effectively communicated results and ideas.
- Figures, graphs, and tables were inappropriate, misrepresented the results, and/or contained errors. Was poorly written and had numerous spelling and grammatical errors.
- Citations covered the topic well, were unbiased, and included a historical and up-to-date documentation of primary literature.
- Appropriate citations were used to document the thesis.
- Citations tended to be superficial in their coverage of the topic.
- Inappropriate and unrelated citations were used or were inappropriately applied. Little if any primary literature was cited.

### Oral Presentation and Defense

- Effectively illustrated key points and captivated the audience.
- Conveyed the major findings of the work and was suitable for the audience.
- Was just adequate in conveying what was done often requiring audience to ask for clarification.
- Was sloppy, confusing, and did not communicate what was done or why.
- Structure and flow was fluid, easily followed, and effectively conveyed the work and its significance.
- Presented in a logical manner to the audience.
- "Jumped around some" but still communicated what was needed.
- Extremely hard to followed, lacked organization, and appeared to have been hurriedly assembled.
- Media used was effective and creative.
- Media conveyed what was done and why.
- The media used was just adequate.
- Media used was inappropriate and failed to communicate the work.
- Questions were answered directly and succinctly.
- Most questions were answered satisfactorily and handled appropriately.
- Questions were answered if provided guidance by the audience or advisory committee.
- Questions were not answered even when prodded by the audience or advisory committee.

### Comments:
Course Description and Objectives
This course consists of original investigation under supervision and guidance of the major advisor and advisory committee. Upon successful completion of this course, students will:

- Demonstrate a depth of knowledge in all areas fundamental to the general research area.
- Be able to resolve scientific problems independently, critically assess the scientific literature, and formulate clear research questions.
- Be able to test and examine the research question experimentally, process the results using adequate empirical methods, and draw proper conclusions from the study.
- Be able to communicate their work with precision, accuracy, clarity, and completeness both orally and in writing.
- Be able to demonstrate critical and independent thought.

Academic Honesty: Students are required to follow the Creighton University policy on proper academic conduct, as detailed in the current Creighton University Graduate Student Bulletin.

Grading Criteria: Using these guidelines, indicate your assessment for this student's thesis and presentation. Not all criteria may apply and not all have to be met within a category to assign a grade. Criteria listed are modified from "How to Grade a Dissertation: The Characteristics of Dissertations, 2005" by the American Association of University Professors.

<table>
<thead>
<tr>
<th>Outstanding (A)</th>
<th>Very Good (B)</th>
<th>Conditional (C)</th>
<th>Unacceptable (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Thesis Introduction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Asked a new question or addressed an important problem leading to new avenues of research.</td>
<td>☐ The question or problem addressed was logical and traditional.</td>
<td>☐ Question or problem was highly derived from the advisor’s work.</td>
<td>☐ Looked at a question or problem that was trivial, weak, unoriginal, or already solved.</td>
</tr>
<tr>
<td>☐ Exhibited mature, independent thinking.</td>
<td>☐ Had some original ideas, insights, and observations.</td>
<td>☐ Displayed a narrow understanding of the field.</td>
<td>☐ Did not show an understanding of basic concepts or conventions of the discipline.</td>
</tr>
<tr>
<td>☐ Displayed a deep understanding of complicated literature.</td>
<td>☐ Showed understanding and mastery of the subject matter.</td>
<td>☐ Demonstrated understanding at a simple level.</td>
<td>☐ Missed relevant literature; sources were misread or misused.</td>
</tr>
<tr>
<td>☐ Argument was focused, logical, thoroughly researched, and sustained.</td>
<td>☐ Made a strong, comprehensive, and coherent argument.</td>
<td>☐ Could sustain an argument, but the argument was not imaginative or convincing.</td>
<td>☐ Had a weak, inconsistent, unconvincing, or invalid argument.</td>
</tr>
<tr>
<td>☐ Using well-developed rational, an intriguing hypothesis with clever specific aims was proposed.</td>
<td>☐ A hypothesis was clearly stated accompanied by appropriate specific aims.</td>
<td>☐ A hypothesis could be inferred but was not stated; some of the aims did not test the hypothesis.</td>
<td>☐ Did not state or provide sufficient background for a hypothesis to be deduced.</td>
</tr>
</tbody>
</table>

Methods and Techniques

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Had a research design with the potential to change the experimental approaches others use to resolve their questions.</td>
<td>☐ Included well-executed research using a solid approach.</td>
<td>☐ Showed the ability to do research and demonstrated technical competence.</td>
</tr>
<tr>
<td>☐ Used or developed new tools, methods, or types of analyses.</td>
<td>☐ Used appropriate theory, methods, and techniques.</td>
<td>☐ Missing some appropriate controls.</td>
</tr>
</tbody>
</table>

Results

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Results were highly important, interesting, and relevant to the hypothesis.</td>
<td>☐ Obtained solid, expected results that addressed the hypothesis.</td>
<td>☐ Results were not noteworthy or relevant to the hypothesis.</td>
</tr>
<tr>
<td>☐ Analysis was comprehensive, complete, sophisticated, and convincing.</td>
<td>☐ Analysis was adequate and valid.</td>
<td>☐ Had an unsophisticated analysis—did not explore all possibilities and missed connections.</td>
</tr>
<tr>
<td>☐ Pushed the discipline’s boundaries and opens new areas for research.</td>
<td>☐ Made a modest contribution to the field but did not open it up.</td>
<td>☐ Made a small contribution that was narrow in scope.</td>
</tr>
<tr>
<td>Effort and productivity exceeded expectations resulting in peer reviewed publications and presentations.</td>
<td>Effort and productivity met expectations resulting in published abstracts and presentations.</td>
<td>Effort and productivity was only adequate. Independent of technical hurdles, research progress was protracted.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Discussion and Conclusions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhibited command and authority over the material. Had a point of view presented with a confident, independent, and authoritative voice.</td>
<td>Applied known literature to the problem studied.</td>
<td>Presented the literature but was not critical of it.</td>
</tr>
<tr>
<td>Conclusion tied the whole thesis together and was extremely well written.</td>
<td>Identified what observations were important and was well organized.</td>
<td>Had a weak structure and organization and did not discuss what was important.</td>
</tr>
<tr>
<td>Showed a deep understanding of theory.</td>
<td>Explored interesting connections but missed some opportunities.</td>
<td>Displayed little creativity, imagination, or insight.</td>
</tr>
</tbody>
</table>

| Writing, Figures, Tables, Legends, and Citations |  |  |  |
| Document was very well organized and the quality of writing outstanding. Figures, graphs, tables, and illustration effectively communicated the results and effectively conveyed complicated ideas to the reader. | Writing, figures, graphs and tables appropriately conveyed information and results. | Format and writing needed significant revision. Figures, graphs and tables were rarely used when they could have effectively communicated results and ideas. | Figures, graphs, and tables were inappropriate, misrepresented the results, and/or contained errors. It was poorly written and had numerous spelling and grammatical errors. |
| Citations covered the topic very well, were unbiased, and included a historical and up-to-date documentation of pertinent literature. | Appropriate citations were used to document the thesis. | Citations tended to be superficial in their coverage of the topic. | Inappropriate and unrelated citations were used or were inappropriately applied. |

| Oral Presentation and Defense |  |  |  |
| Effectively illustrated key points and captivated the audience. | Conveyed the major findings of the work and was suitable for the audience. | Was adequate in conveying what was done. | Was sloppy, confusing, and did not communicate what was done or why. |
| Structure and flow was fluid, easily followed, and effectively conveyed the work and it's significance. | Presented in a logical manner and provided a "take-home message" for the audience. | "Jumped around some" but still communicated what was needed. | Extremely hard to followed, lacked organization, and appeared to have been hurriedly assembled. |
| Media used was extremely effective and creative. | Quality of the media conveyed what was done and why. | The media used was just adequate. | Media used was inappropriate and failed to communicate the work. |
| Questions were answered directly, succinctly, and in an authoritative voice and manner that could change the way people think. | Most questions were answered satisfactorily and handled appropriately. | Questions were answered if provided guidance by the audience or advisory committee. | Questions were not answered even when prodded by the audience or advisory committee. |

**Comments:**
To the Dean of the Graduate School and the members of the Board of Graduate Studies:

The Department of ____________________________, in which this candidate has completed his/her degree requirement, reports upon the oral examination as follows:

Passed _______________________________

Failed _______________________________

____________________________

____________________________

____________________________

____________________________

____________________________

____________________________

The Committee, therefore, recommends that the degree (be, be not) ______________ conferred on the above named candidate.

Date _______________________________ Chair of the Committee

To the President and Board of Directors:

The Board of Graduate Studies recommends that the degree of ____________________________

______________________________ be conferred on the above named candidate.

Date _______________________________ (Dean of the Graduate School, and Chair of the Board of Graduate Studies)
LEAVE OF ABSENCE REQUEST FORM

Requests for a Leave of Absence must be endorsed by the student’s major advisor (if applicable) and the graduate program director, and then submitted to the Graduate School.

<table>
<thead>
<tr>
<th>Student: ______________________________</th>
<th>Mailing Address: ____________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department: __________________________</td>
<td>____________________________________</td>
</tr>
<tr>
<td>Net ID: _______________________________</td>
<td>____________________________________</td>
</tr>
<tr>
<td>Requesting leave of absence for the following term(s): ____________________________</td>
<td></td>
</tr>
</tbody>
</table>

**Reason for Leave of Absence (required):**

________________________________________________________________________

**Note:**
1) A leave of absence can be granted only to students who are in good academic standing. This includes the requirement of a zero balance on your Business Office account.
2) A leave of absence may not exceed one year.
3) Time limitations which pertain to the various degrees and the completion of courses in which a grade of “I” (Incomplete) was earned are not waived.
4) Students are not eligible for financial support (including fellowships or assistantships) during the Leave of Absence. Resumption of financial support is not guaranteed upon re-entry to the graduate program.

*Please be sure to notify your major advisor (if applicable), your graduate program director, and the Graduate School, in writing, of your intention to return. Failure to do so at least 30 days in advance of the start of classes may result in your withdrawal from the Graduate School.*

Signature of student: _______________________________________________________

Signature of Major advisor: ________________________________________________

Signature of Program Director: _____________________________________________

This request has been □ approved □ denied. _________________________________

Dean, Graduate School

Revised 8-14-2014 40
A graduate student who has taken a graduate-level course at another accredited institution that the student believes will substitute for a required or elective course in the graduate program at Creighton University may request transfer credit for the course. Only courses in which the student earned a grade of A or B may be considered for transfer credit. Ordinarily, not more than six (6) transfer credits can be applied toward a master’s program.

<table>
<thead>
<tr>
<th>Creighton University Course for Which Credit is Requested</th>
<th>Course Completed</th>
<th>Institution</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please attach a copy of the syllabus for each course for which transfer credit is accepted, along with an official transcript showing the grade and credit hours earned. Submit all items to the graduate program director. Transfer credit that is approved will be reflected on the student’s transcript; however, the credits will not be calculated in the student’s grade point average.

Creighton University Only

___ Request for transfer credit approved

___ Request for transfer credit denied

Program Director

Date

Graduate Dean

Date