
Graduate Programs
in
Biomedical Sciences

Handbook
2024-2025

Program Description
Curriculum
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Graduate Programs

1. 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, teachers, and health-related professionals through scholarship and research that fosters creativity, discovery, and intellectual independence.

Study for the Ph.D. degree emphasizes independence in scientific pursuit, with a particular emphasis on research. Course work and independent research are designed to bring the student to a high level of competence in biomedical science with particular expertise in the area chosen for the dissertation. Students will be expected to demonstrate a high capacity for original and independent thought, and to combine these skills with knowledge of the scientific method to perform original research. While students will receive significant guidance from their Major Advisor at the beginning of the program, students will quickly become responsible for the direction and progress of their own research project. In this context, the Major Advisor will act as a guiding resource in a collaboration whose ultimate goal is the creation of a novel scientific contribution to the chosen discipline.

Study for the M.S. degree emphasizes successful completion of didactic course work as well as completion of a research study with close supervision by a Major Advisor. Course work and a research project are designed to bring the student to master a particular area of study which may be technical or ideological based.

2. 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 molecular and cellular biology and in their field of specialization.
2. Demonstrate ability in independent analytical thinking, both within and beyond the scope of their thesis or dissertation project.
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 both basic, and state of the art, laboratory techniques.

5. Exhibit the oral communication skills necessary for active participation in scientific gatherings, both as a presenter and as a discriminating member of the audience.
6. Exhibit the written communication skills necessary for preparation of clear and concise abstracts, manuscripts, and grant applications.
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 your knowledge and skills in the service of others.

3. FINANCIAL AID

On entering either the M.S. or Ph.D. program, students will receive tuition remission and health insurance. Students entering the Ph.D. program will receive a stipend for living expenses. This stipend will come from either the Department or the Major Advisor's grants or laboratory budget. Students receiving a stipend must devote **full time and effort** to their class work and research project. Continued stipend support will be reviewed on an annual basis and ideally will not exceed four years. On the occasion that stipend support must exceed four years, the Major Advisor of the student wishing to extend support needs to petition the Graduate Program Committee in writing and provide a reason why an extension should be granted and a timeline to completion of degree requirements.

All students will be enrolled as full-time students with a minimum of 8 credit hours during each fall, spring, and summer term. Exceptions can be made with the combined consent of the Major Advisor and the Graduate Program Committee.

As implied in the previous paragraph, all students will be expected to perform research throughout the calendar year including breaks indicated in the graduate school calendar. It is during these times when classes are not in session that students can make significant progress on their research project. Vacations or personal days are permitted and encouraged but must be coordinated with the Major Advisor to ensure that students do not miss important deadlines and research milestones. Please see section 14 for further information on vacation policy.

4. DOCTORAL DEGREE CURRICULUM (*credit hours in parentheses*)

Foundation Course

BMS 622 Biochemistry, Molecular and Cell Biology (4)

Tool Courses

IDC 601 Responsible Conduct of Research (1)

IDC 625 Introduction to Biostatistics for the Biomedical Sciences (3)

IDC 627 Research Methods (3)
IDC 701 Research Writing (3)

Repeating Courses

BMS 791 Seminar (1)
BMS 792 Journal Club (1)
BMS 797 Directed Independent Research (3-6 per semester)
(a maximum of 45 credits of BMS 797 can be applied to the degree)

Elective Courses – at least 2 courses, at least 6 credits

See list of courses in section 20. Note that this list of courses may change during the course of the student's degree program.

Degree Completion Course

BMS 899 Doctoral Dissertation (3-6 per semester)
(minimum of 3 credits; a maximum of 20 credits can be applied to the degree)

The Ph.D. degree requires a minimum of 90 credit hours.

5. MASTER'S DEGREE CURRICULUM (*credit hours in parentheses*)

Foundation Course

BMS 622 Biochemistry, Molecular and Cell Biology (4)

Tool Courses

IDC 601 Responsible Conduct of Research (1)

Repeating Courses

BMS 791 Seminar (1)
BMS 792 Journal Club (1)
BMS 797 Directed Independent Research (3-6 per semester)

Elective Courses – at least 2 courses, at least 6 credits

In addition to the Elective Courses listed in section 20, "Tool Courses" listed under the Doctoral Degree Program may be used to fulfill part or all of this requirement provided that the student's advisory committee approves of the student's overall Program of Study.

Degree Completion Course

BMS 799 Master's Thesis (1-3 per semester)
(a maximum of 6 credits can be applied to the degree)

The M.S. degree requires a minimum of 30 credit hours.

6. EXAMPLE PROGRAM FOR THE Ph.D. DEGREE

(Note: this timeline will vary depending on the courses taken, the parameters of the research project, and the student's rate of progress)

1st year

Fall	Biochemistry, Molecular and Cell Biology (4) Responsible Conduct of Research (1) Seminar (1) Journal Club (1) Directed Independent Research (3)
Spring	Research Methods (3) Elective 1 (3) Seminar (1) Journal Club (1) Directed Independent Research (4)
Summer	Introduction to Biostatistics for the Biomedical Sciences (3) Directed Independent Research (5)

2nd year

Fall	Elective 2 (3) Seminar (1) Journal Club (1) Directed Independent Research (6)
Spring	Research Writing (3) Seminar (1) Journal Club (1) Directed Independent Research (6)
Summer	Directed Independent Research (8)

3rd and 4th year (and additional semesters as needed)

Fall	Seminar (1) Journal Club (1) Directed Independent Research (6)
Spring	Seminar (1) Journal Club (1) Directed Independent Research (6)
Summer	Directed Independent Research (8)

Final semester

	Seminar (1) Journal Club (1) Directed Independent Research (3) Doctoral Dissertation (3)
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7. MD/PhD PROGRAM

The MD/PhD program is administered by the School of Medicine under the direction of Mark Reisbig, M.D., Ph.D., Dept. of Anesthesiology. Students within this program follow a prescribed curriculum for the first two years and then transition into the Dept. of Biomedical Sciences to complete the research requirements for the Ph.D. degree.

The following courses are normally completed during the first two years in the program:

Foundation Course

CIB 103 Foundational Science (5) in the SOM curriculum

Students take part in the following courses during the Ph.D. portion of the program:

Tool Courses

IDC 601 Responsible Conduct of Research (1)

IDC 625 Introduction to Biostatistics for the Biomedical Sciences (3)

IDC 627 Research Methods (3)

IDC 701 Research Writing (3)

Repeating Courses

BMS 791 Seminar (1)

BMS 792 Journal Club (1)

BMS 797 Directed Independent Research (variable credit)

(a maximum of 45 credits of BMS 797 can be applied to the degree)

The following elective course requirement is waived, pending successful completion of the first two years of medical school:

Elective Courses – at least 2 courses, at least 6 credits

However, individual Advisory Committees may require students to complete additional elective courses if it is felt that these courses would significantly benefit the student's educational experience.

The following course is required to complete the Ph.D. portion of the program:

Degree Completion Course

BMS 899 Doctoral Dissertation (3-6 per semester)

(minimum of 3 credits; a maximum of 20 credits can be applied to the degree)

In addition, students must complete the Advancement to Candidacy Exam (ACE) during their first year in the Ph.D. portion of their curriculum.

8. 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, the minimum acceptable grade is "C". If you accumulate more than 6 credits of grades less than "B-", or any grade less than "C", you will be dismissed from the Graduate School. If your cumulative GPA falls below 3.00 at the end of any term, you will be placed on academic probation. A student who fails to remove the probationary status by regaining a cumulative 3.00 GPA within 6 credit hours will be dismissed from the Graduate School.

Students dismissed from the Graduate School are allowed to appeal to the Graduate Board for reinstatement to the program. The Graduate Board also hears appeals for removal of probation, academic suspension, transfer of credits, or change in program. Procedures for submitting appeals are described in the Graduate Bulletin and should be executed in consultation with Graduate Dean's Office.

9. SELECTION OF MAJOR ADVISOR

Prior to the selection of a permanent Major Advisor, the Graduate Program Director will serve as each student's *ad hoc* advisor.

During the first semester in the program, students are expected to experience the research environment in at least three different faculty laboratories to gain exposure to faculty, other students, and various techniques. These experiences are referred to as "lab rotations". Each lab rotation will last approximately 5-6 weeks, thus providing the potential for having a research opportunity in at least three laboratories prior to making a decision on the selection of a Major Advisor. Additional rotations can be arranged if a suitable Major Advisor was not identified.

Laboratory rotations are made available to incoming doctoral students based on:

1. The willingness of faculty members to accept students into their lab.
2. The availability of sufficient funds to support the student's research activities within the selected lab.

Students funded by and recruited directly to a specific Major Advisor's lab will not participate in rotations and will begin immediately in the Major Advisor's lab. Students may also be admitted into the program under alternative support mechanisms that may require focus on specific research areas that limit their rotation opportunities.

By the end of the first semester, students are expected to select a Major Advisor along with a specific area of research interest. The Major Advisor will be expected to assist students in defining the direction of their research program. The Major Advisor will also be responsible for providing the resources necessary for completing the research project. However, students are expected to apply for extramural funding as part of their education and career development in order to acquire the skills necessary for writing future grant applications.

The Major Advisor must hold a primary appointment within the Department of Biomedical Sciences as either a tenured or tenure-track faculty member. In rare cases, students may select a Major Advisor with a secondary appointment in the Department of Biomedical Sciences. In this case, this appointment must be approved by the Graduate Program Committee and the student must have a sponsoring Co-Advisor with a primary appointment in the Department of Biomedical Science. The Co-Advisor is responsible for making sure that the student satisfies the requirements of the program and remains on a reasonable timeline for completing the program.

Making a change of Major Advisor once a student's research project in underway is normally strongly discouraged. However, under unusual circumstances, students may petition the Graduate Program Director for a change of Major Advisor. This change must be approved by the Graduate Program Committee.

10. THE ADVISORY COMMITTEE AND COMMITTEE MEETINGS

Students are responsible for selecting an advisory committee in consultation with their Major Advisor. The advisory committee will consist of the Major Advisor and a minimum of three other graduate faculty members. (This requirement sets a minimum total of four members, but students are strongly encouraged to have five faculty members on their advisory committee.) At least three committee members must be tenured or tenure-track faculty who have primary appointments in the Department of Biomedical Sciences and at least one member must have a primary appointment outside the Department of Biomedical Sciences.

The first meeting of the advisory committee should be scheduled in the first semester of which the student is assigned a Major Advisor . During this meeting, you will outline your planned coursework and introduce your general research question or topic area.

Subsequent committee meetings are progress reports which are to be held at least once every fall and spring semester.

At the beginning of each committee meeting, the advisory committee should briefly meet individually with the Major Advisor and Student, to provide an opportunity for each to share comments or concerns with the advisory committee independent of one another. Students will be evaluated by their advisory committee following each meeting on the basis of their knowledge, communication skills, ability to evaluate their data, ability to answer committee members' questions, and overall progress of the research project. These evaluations should be appropriate for the level of the student's experience within the program.

11. ADVANCEMENT TO CANDIDACY EXAM

Doctoral students are required to pass an Advancement to Candidacy Exam (ACE) at after their second full academic year. The ACE is composed of a

combination of a proposed grant application, an oral presentation of the research project contained within the proposed grant application, and an oral defense of the research project to the student's advisory committee. Upon successful completion of the ACE, the student will be considered to have become a degree candidate.

Students must first write an abstract and specific aims page for the proposed research project, and have these two elements approved by their advisory committee prior to writing the proposed grant application. The proposed grant application will be written in the format of an NIH F31 grant application and should be completed with only minimal guidance from the Major Advisor. This proposal must be distributed to the advisory committee at least three weeks before the student presents the research project to the department. Public notice of the ACE must occur two weeks prior to the presentation date. During this seminar the student will present the elements of the proposal and answer questions from the general audience related to the seminar. Following a brief recess the student will then defend their proposal to the advisory committee. If, following the oral defense the proposal requires revision, the student will be provided the opportunity to make revisions and the Major Advisor will have responsibility for approving the revised version. These revisions should be completed within two months and the final document shall be deposited in the student's department file at that time.

Students are required to complete the ACE within the first semester of their third full academic year. A proposed timeline for the exam is:

1. Abstract and specific aims page by August 1
2. Approval of the abstract and specific aims page by August 15
3. Submission of the completed proposal to the student's advisory committee by October 1
4. Defense and oral exam by November 15
5. Submission of the proposal to the NIH by the December 8 deadline

On the rare occasion that an exception is needed to complete the ACE within the first semester of the third year (*e.g.*, student health or family issues), the Major Advisor of the student wishing to extend the deadline needs to petition the Graduate Program Committee in writing stating the reason why an extension should be granted and an alternative timeline for the ACE.

Students must pass the ACE to advance to the status of degree candidate. Failure of the ACE will require a re-take of the exam, which following to the guidelines of the Graduate School requires a 6-month waiting period before reexamination.

12. THESIS/DISSERTATION RESEARCH AND DEFENSE

Once a written draft of a master's thesis or doctoral dissertation has been completed, the student degree candidate must get approval from their major advisor before submitting it to members of their advisory committee. The student will then give a final seminar and oral defense (together referred to as the "Oral Defense") of their thesis or dissertation.

To ensure the timely completion of the degree, the Graduate Program Committee strongly recommends the following timeline:

Submission of the final draft of the thesis or dissertation to the student's advisory committee 8 weeks prior to the intended Hooding ceremony.

Public notice of the defense and oral examination of the thesis or dissertation 6 weeks prior to the intended Hooding ceremony.

Defense and oral examination of the thesis or dissertation 4 weeks prior to the intended Hooding ceremony.

Submission of the final version of the thesis or dissertation, signed by the Major Advisor and the Advisory Committee, to the Dean of the Graduate School 2 weeks prior to the intended Hooding ceremony.

Note: public notice of the defense and oral examination should include notification of the faculty of the Department of Biomedical Sciences, the Dean's Office of the Graduate School (see the appropriate form in the Appendix) and the appropriate administrator in the other basic science departments along with prominent public display of the notice outside the department office.

During the final seminar portion of the Oral Defense, the student will present the elements of their thesis or dissertation research and answer questions from the general audience related to their scholarly activity. Following a brief recess, the student will then defend their thesis or dissertation to their advisory committee.

In general terms, the final seminar and oral defense of the thesis or dissertation will be used to evaluate the:

1. thesis or dissertation itself (i.e., quality and completeness of the research, appropriate selection and technical performance of the methods used, validity of conclusions, etc.);
2. capacity of the student for independent thought;
3. depth of the student's knowledge in areas related to the topic of the thesis; and
4. depth of the student's knowledge of scientific areas fundamental to their chosen discipline.

Following the Oral Defense, the advisory committee may require revision of the thesis or dissertation prior to formal acceptance of the written document.

Successful completion of both the written thesis or dissertation and the Oral Defense will be determined by a majority opinion of the advisory committee, and the decision of the advisory committee is final.

Paper and digital copies of the final version of the thesis or dissertation must be provided to both the Department of Biomedical Sciences and the Dean of the Graduate School in accordance with the requirements of the Graduate School at the time of degree completion.

13. GRADUATE PROGRAM DIRECTOR AND DEPUTY DIRECTOR

The Graduate Program Director will serve as a liaison between graduate students and the faculty. The Graduate Program Director will:

1. serve as a temporary advisor for incoming students who have not yet

- selected a Major Advisor;
2. act as a liaison or ombudsman for graduate students seeking to resolve degree program-related problems;
3. oversee the program of each graduate student, review the progress of each student on a semi-annual basis, and ensure the maintenance of appropriate academic standards; and
4. report to the Graduate Program Committee on student progress.

The Graduate Program Deputy Director is responsible for assisting, and may serve as a proxy for, the Graduate Program Director in the administration of the departmental graduate programs.

Grievances (Conflict Management)

From time to time, the student-advisor relationship may experience minor discord. Such periods are frequently resolved over the course of a few days or weeks. In the rare case that the advisor-student relationship cannot be successfully resolved in a timely manner, the Graduate Program Director should be consulted. In coordination with the Graduate Program Director, the Graduate Program Committee will then decide whether termination of the relationship is appropriate. It is the responsibility of the student to then identify a new faculty member willing to assume the role of Major Advisor. Once the student and the new Major Advisor have agreed to work together, the Graduate Program Committee should be consulted so that any necessary arrangements can be made for the successful completion of the student's degree program.

Academic Status

If a student is on academic probation, he or she must see his or her advisor and the Graduate Program Director at the beginning of the semester and reassess the choice of 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, specific courses administered by the Program.

14. VACATION TIME AND TEMPORARY WITHDRAWAL

Vacation time is permitted, and encouraged, to support a positive work-life balance. Students are allowed up to two weeks (10 workdays) of vacation time per year (August-July). All effort should be made to ensure that vacation time does not overlap with and impede the student's academic responsibilities in the program. Vacation time should be managed with the Major Advisor. If there is a need to take vacation time that overlaps with the student's academic responsibilities, the student must obtain approval from the Major Advisor, all Course Directors whose scheduled activities are impacted by the student's absence, and the Graduate Program Director. If a student requests time away that is greater than two weeks during the course of the year, the student must obtain approval from the Graduate Program Director, and the student's additional absence may be granted as unpaid time off that reduces the student's stipend accordingly.

Temporary withdrawal is a prolonged absence in which the student is neither registered for courses nor participating in any program activities for a period of an entire semester or longer (Fall, Spring and/or Summer term). Request for a temporary withdrawal must follow Graduate School policy and be endorsed by the student's Major Advisor and the Graduate Program Director before submission to and approval by the Dean of the Graduate School. Temporary withdrawal is strongly discouraged but permitted in unusual circumstances, and it necessitates suspension of all financial support. Resumption of financial support is not guaranteed upon re-entry to the graduate program.

15. POLICY ON ACADEMIC HONESTY

All Creighton University graduate students are subject to the standards of academic integrity required by the University and will be subject to possible penalties for violating these standards. In addition, students may also be subject to additional standards as announced in writing by faculty members responsible for specific courses.

Student academic misconduct includes, but is not limited to:

- a. Cheating: The deliberate or attempted use of unauthorized material in an academic exercise, including unauthorized collaboration with classmates.
- b. Improprieties of Authorship: Improper assignment of credit or misrepresentation of material as original without properly referencing the original authors.
- c. Facilitating Academic Dishonesty: The deliberate assistance or attempted assistance of another student to commit an act of academic misconduct.
- d. Theft or destruction of library materials or other academic resources.
- e. Violation of codes of conduct described in the University's *Student Handbook*, program or department policies, or articulated by instructors either verbally or in writing.

In addition, graduate students in the program are participants in the act of scientific discovery and, as such, are required to adhere to the scientific community's standards of scientific conduct. Violation of these standards is referred to as scientific misconduct and is defined in University Policy 4.2.2 as including:

- f. Plagiarism: the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
- g. Falsification: the manipulation of research materials, equipment, or processes, or the changing or omission of data or results such that the research is not accurately represented in the research record.
- h. Fabrication: the making up of data or results, and the recording or reporting of them in the research record.

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

16. ACCOMMODATIONS FOR QUALIFYING DISABILITIES

Creighton University will provide reasonable accommodations for persons with documented qualifying disabilities. Students requiring special accommodations will need to acquire a letter documenting the specific disability from the University's Office of Disability Accommodations and present this letter to the course director at the beginning of the course so that any necessary accommodations can be arranged in a timely manner.

17. INDIVIDUAL DEVELOPMENT PLANS FOR GRADUATE STUDENTS

The American Association for the Advancement of Science (AAAS) has developed a web-based tool that allows graduate students (and postdoctoral fellows) to identify their research and career goals. This tool helps students to generate Individual Development Plans (IDPs), which can be used for fostering professional development. A well-crafted IDP serves both as a planning and communication tool, allowing graduate students to identify their research and career goals and to communicate these goals to their mentor and advisory committee. By defining their career goals early on, graduate students are better able to identify and participate in professional development opportunities and target their training toward achieving their specific career objectives.

Specifically, the IDP is 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.

Following completion of the web-based exercise, the site will provide:

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

The myIDP website can be accessed at: "myidp.sciencecareers.org". And further information about the tool can be found in an editorial published in Science, and available at: "sciencemag.org/content/337/6099/1149.full".

While the Dept. of Biomedical Sciences does not require the use of an IDP as part of its curriculum, it strongly encourages students to utilize this tool as part of their graduate education experience.

18. EXPECTATIONS OF A SUCCESSFUL GRADUATE STUDENT

Suggestions from the Graduate Program Committee include:

- Be proactive in reading/understanding all aspects of your project.

- Conduct experiments in a timely manner.
- Learn new techniques reliably and efficiently.
- Work at least 40-50 hours a week (studying for classes, reading the scientific literature; designing, performing and analyzing experiments, etc.) and be able to demonstrate continuous progress toward your goals.
- Keep a detailed, daily lab book. Major Advisors will review lab books regularly during one-on-one meetings.
- Be passionate about your research and demonstrate a high level of curiosity about your scientific discipline.
- Think critically and creatively when troubleshooting experiments and contemplating future directions.
- Constantly evaluate your strengths and weaknesses; and identify exercises to strengthen and improve your abilities.
- Offer to assist other members of your laboratory when they are experiencing difficulties.
- Be a respectful and inclusive member of the scientific community.
- Adhere to the ethical code of conduct as described both in the Creighton Graduate Student Bulletin and by the scientific community.
- Work to continuously improve your writing skills.
- Submit at least one manuscript to a peer-reviewed scientific journal during your graduate education.

19. DEPARTMENT ADMINISTRATION AND FACULTY

Administration

Chairman (Interim): Garrett Soukup, Ph.D.

Graduate Program Director: Garrett Soukup, Ph.D.

Graduate Program Deputy Director: Brian J. North, Ph.D.

Graduate Program Committee members: Litao Tao, Ph.D., and Justine Renauld, Ph.D.

Senior Program Coordinator: Sabina Coffiel

Faculty

Primary:

Kelsey Anbuhl, Ph.D. (Beginning December 2024)

Allison Coffin, Ph.D. (Beginning December 2024)

Laura Hansen, Ph.D.

David He, Ph.D.

Hui Hong, Ph.D. (Beginning January 2025)

Sandor Lovas, Ph.D.

Brian North, Ph.D.

Tom Pisarri, Ph.D.

Justine Renauld, Ph.D.

David Smith, Ph.D.
Garrett Soukup, Ph.D.
Peter Steyger, Ph.D.
Litao Tao, Ph.D.
Jemma Webber, Ph.D.
Marisa Zallocchi, Ph.D.

Secondary (primary appointment in parenthesis):

Ken Kramer, Ph.D. (School of Medicine, Medical Education)
Joe Knezetic, Ph.D. (School of Medicine, Pathology)
Sidharth Mahapatra, M.D., Ph.D. (Children's Hospital and UNMC, Pediatrics)
Mike Nichols, Ph.D. (College of Arts and Sciences, Physics)
Sonia Rocha-Sanchez, Ph.D. (School of Dentistry, Oral Biology)
Annemarie Shibata, Ph.D. (College of Arts and Sciences, Biology)

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

20. COURSE DESCRIPTIONS

Key: (N): number of credit hours
Fa, Sp, Su: semester offered (Fall, Spring, Summer)
OD: On Demand
P: Pre-requisite course(s)

FOUNDATION COURSE

BMS 622 Biochemistry, Molecular and Cell Biology (4) Fa

This course consists of lectures on the functional aspects of biochemistry, molecular and cell biology with an emphasis on eukaryotic cells.

TOOL COURSES

IDC 601 Responsible Conduct of Research (1) Fa

This required course for students in the graduate programs at Creighton University School of Medicine is designed to introduce fundamental concepts, principles and guidelines regarding scientific integrity in biomedical research. Through readings, lectures, and case discussion students are given an opportunity to reflect on ways in which they can help foster and maintain responsible conduct in research. They also become acquainted with existing regulations, guidelines, ethical themes and on-line resources regarding the ethics of their profession.

IDC 625 Introduction to Biostatistics for the Biomedical Sciences (3) Su

This course will provide instruction on the common statistical methods used in biomedical science and their correct application to the design and analysis of research study questions, in-class assignments will be given for each class session based specifically on the material covered during lecture. Students will be allowed to work together to complete assignments, but must complete and

submit their own work for credit. One comprehensive final exam will be given to evaluate student learning throughout the semester.

IDC 627 Research Methods (3) Sp

Study of modern experimental methods, instrumentation, and bioinformatics tools and approaches used in biomedical research. Major course components include detection, analysis, and genetic manipulation of nucleic acids, antibody-based experimental techniques, generation, detection, and analysis of recombinant proteins, microscopy, and various experimental model systems. **P: BMS 604 or IC.**

IDC 701 Research Writing (3) Sp

This course will provide instruction on grant preparation and strategy, using the NIH R21 as a model. Content will consider alternative sources of grant funding and be relevant to all research grant applications. Emphasis will be placed on writing clear English. **P: IDC 627 or IC.**

REPEATING COURSES

BMS 791 Seminar (1) F, Sp

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.

BMS 792 Journal Club (1) Fa, Sp

This course consists of readings and presentations of current scientific literature, followed by group discussion involving students and faculty members. This course is repeatable.

BMS 797 Directed Independent Research (3-6) Fa, Sp, Su

This course consists of original investigation under supervision and guidance of individual staff members.

ELECTIVE COURSES

BMS 609 Introduction to Data Omics Analysis (1) Sp, OD

This is an introductory course to familiarize students to the principles of data analysis of transcriptomics, genomics and epigenomics data. The course consists multiple sessions covering basic computational analysis skills, classical and cutting-edge techniques, standard workflows and advanced applications, and the utilization of public databases and a variety of computational resources.

BMS 630 Fundamentals of Hearing (3) Sp, OD

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.

BMS 680 Biology of Aging and Age-related Diseases (3) Sp, OD

This course covers the biology of aging at the molecular, cellular, and organismal level, as well as discussions on age-related diseases. Topics include sections on cellular and molecular pathways of aging, model organism of aging, and the interrelationship between aging and disease, including hearing loss, cardiovascular disease, neurodegeneration, and cancer.

BMS 708 Cancer Biology (2) Sp, OD

This course covers fundamental principles of cancer biology. Key topics include discussing the hallmarks of cancer; carcinogens; oncogenes and tumor suppressors; tumor immunology; cell biology of cancer including dysregulation of cell signaling, cell cycle, apoptosis and DNA damage and repair; and approaches to cancer therapy.

BMS 722 Mass Spectrometry and Biomedical Applications (3) Fa, OD

This is an advanced course on the principles and utility of mass spectrometry. Topics include providing a broad knowledge of the various mass spectrometers used in biomedical research, proper interpretation of mass spectra data, the design of appropriate methods for various research questions, and critical evaluation of the literature pertaining to mass spectrometry in biomedical research fields.

DEGREE COMPLETION COURSE

BMS 799 Master's Thesis (1-3) Fa, Sp, Su

This course consists of review of the literature and research data and the 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.

BMS 899 Doctoral Dissertation (3-6) Fa, Sp, Su

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.

ADDITIONAL ELECTIVES – Available by Special Arrangement

BMS 720 Advanced Topics in Molecular Structure/Function (3) OD

This course covers functional aspects of molecular structure, peptide chemistry, and molecular interactions. Topics will change with each iteration of the course, permitting students to enroll multiple times while covering different aspects of the discipline. The maximum number of credits from this course that can be applied toward the degree is six.

BMS 730 Advanced Topics in Cell and Molecular Biology (3) OD

This course covers functional aspects of eukaryotic cells including gene regulation/expression, signal transduction, and cell-cell and cell-substrate interactions. Topics will change with each iteration of the course, permitting

students to enroll multiple times while covering different aspects of the discipline. The maximum number of credits from this course that can be applied toward the degree is six.

BMS 740 Advanced Topics in Physiology (3) OD

This course covers specific aspects of physiology and pathophysiology of whole organisms and organ systems as well as cellular physiology. Topics will change with each iteration of the course, permitting students to enroll multiple times while covering different aspects of the discipline. The maximum number of credits from this course that can be applied toward the degree is six.

BMS 750 Advanced Topics in Morphology and Anatomy (3) OD

This course covers functional morphology ranging from cellular ultrastructure to gross anatomy and embryology. Topics will change with each iteration of the course, permitting students to enroll multiple times while covering different aspects of the discipline. The maximum number of credits from this course that can be applied toward the degree is six.

BMS 760 Advanced Topics in Neuroscience (3) OD

This course integrates the areas of neuroanatomy, neurophysiology, neuropharmacology, and neuropathology at both the cellular and organismal level. Topics will change with each iteration of the course, permitting students to enroll multiple times while covering different aspects of the discipline. The maximum number of credits from this course that can be applied toward the degree is six.

BMS 795 Directed Independent Study (2) OD

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.

ADDITIONAL ELECTIVES – Other Programs and Departments

600-level or higher didactic course offerings from other departments including Medical Microbiology and Immunology and Pharmacology & Neuroscience may be taken for elective credit in the Biomedical Science graduate programs with the approval of the student's Advisory Committee and the Program Director. Students should consult the Graduate School Catalog for current course offerings.

BMS 791 Seminar Syllabus and Assessment Criteria

Student Name _____ Term (Fall, Spring)/Year _____

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.*

Asked questions of the speaker.	1	2	3	4
Actively participated in a discussion with the speaker or colleagues after the presentation.	1	2	3	4
Two written summaries, and one synopsis, of departmental seminar speakers with terminal degrees (~500 words each)				
Described their opinion (positive and negative) about the research.	1	2	3	4
Noted aspects strengths and weaknesses of the presentation.	1	2	3	4
Identified items they particularly liked and those that could be improved (and how).	1	2	3	4
Identified open issues related to the problem area but were not addressed in the presentation. ...	1	2	3	4
Presented their perspective and position on the topic of seminar.	1	2	3	4
Other (write in here).....	1	2	3	4

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 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.*

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

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

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. Use the scores and specific comments to determine the overall course grade. 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
---	---	---	---	----

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.

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.

1	2	3	4	NA
---	---	---	---	----

Maintained accurate and complete laboratory records as assessed by regular review by instructor.

1	2	3	4	NA
---	---	---	---	----

Applied at least 40-50 hrs a week of effort reading, analyzing, designing, learning techniques, and conducting experiments.

1	2	3	4	NA
---	---	---	---	----

Learned existing techniques in the current laboratory efficiently

1	2	3	4	NA
---	---	---	---	----

Exhibited willingness and ability to troubleshoot to overcome technical obstacles.

1	2	3	4	NA
---	---	---	---	----

Identified, developed or brought new approaches or technology to the laboratory.

1	2	3	4	NA
---	---	---	---	----

Made expected progress on research topic; submitted summaries of ongoing and completed research on a regular basis to the Instructor

1	2	3	4	NA
---	---	---	---	----

Prepared manuscripts or presented research results when sufficient data was collected and experiments were completed.

1	2	3	4	NA
---	---	---	---	----

Displayed professionalism in collaboration by assisting others in the laboratory.

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.

Degree Checklist
Department of Biomedical Sciences
Graduate Program

Date

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 electronic copy of final signed thesis to the Creighton Digital Repository

Submission of at least one research manuscript for peer-reviewed publication prior to graduation

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

**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)

Course Number	Title of Course	Semester & Year
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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)

Title of course taken during reporting semester	Course Number	Title of course taken during reporting semester	Course Number
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Signatures:

Committee Members:

Major Advisor: _____ Date: _____

Student: _____ Date: _____

Graduate School

Student:	Date of evaluation:
Department: Biomedical Sciences	

Please rate the above student according to the following scale:
(Mark an "X" in the appropriate box)

0 = Unsatisfactory 1 = Year 0-1 2 = Year 1-2 3 = Year 2-3 4 = Year 3-4 5 = Year 4-5 6 = PhD Ready

(A mark below or above current year requires comment)

(Some categories will only be evaluated by the primary mentor; leave blank if not applicable)

Knowledge/ Interpretation							Critical Thinking & Problem Solving Skills							Affective Skills									
	0	1	2	3	4	5		6	0	1	2	3	4		5	6	0	1	2	3	4	5	6
General Knowledge								Quality of Presentation								Oral Speaking Skills							
Knowledge of Basic Science								Accuracy of Data Collections								Interpersonal Skills with Faculty, Staff, and Students							
Interpretation of Data and Development of Experiments								Quality of Written Records and Reports								Enthusiasm, Amount of Effort, Participation & Responsibility							
Preparation for Meeting – Handouts, Figures, etc.								Critical Reasoning and Judgment								Takes Initiative							
Responses to Questions								Research Progress								Reliability and Dependability							
								Ability to Identify Problem(s)								Progress in Coursework							

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 below or above current year requires comment)

Continue on Back

EVALUATOR NAME: _____ Signature of EVALUATOR: _____
 Original to: Department Graduate Program Director

Advancement to Candidacy 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.

Successful		Unsuccessful
Written Proposal	Provided an adequate analysis and synthesis of literature.	Misread or misused the literature and displayed a narrow understanding of the field.
	Adequately identified gaps in the existing literature meriting study.	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.
	Extensively used primary literature as a source.	Use of primary scientific literature lacking. Contained sections teetering on plagiarism or would be considered plagiarism.
	Adequately formed a hypothesis that was clearly stated accompanied by appropriate specific aims.	Did not state or provide sufficient background for a hypothesis to be deduced. Lacked appropriate or relevant specific aims.
	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.	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.
	Followed appropriate convention for academic written English and communicated essential information with clarity, precision, and coherence.	Did not consistently follow academic writing convention. Transitions and logical flow were poorly developed and prevented the reader from following the argument.
	Used a solid approach applying appropriate theory, methods, and techniques.	Showed a poor understanding of laboratory methods as evident from the proposed experimental design. Used inappropriate or incorrect methods.
	Recognized pitfalls and shortcomings/limitation of the proposed experimental design and methods.	Failed to identify potential pitfalls and shortcomings/limitation of the proposed experimental designs and methods.
Provided alternative hypotheses should the results not turn out as expected. Proposed approaches to address the alternatives.	Did not provide alternative hypotheses should results not turn out as expected.	
Comments Regarding Written Portion:		

		Successful	Unsuccessful
Oral Presentation and Exam		Conveyed the important and relevant background for formation of the hypothesis that was suitable for the audience in the time assigned.	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.
		Visual aids and distributed materials complemented the oral presentation.	Visual aids and distributed materials were of poor quality, distracted from the oral presentation or were inappropriate.
		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.	Delivery was inappropriate for this level of work.
		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.	Presentation and responses to questions were inadequately supported by literature, preliminary data, and showed poor knowledge regarding the subject area.
		Adequately discussed many of the major implications of the position(s) taken or hypothesis proposed.	Did not discuss many of the major implications of the position(s) taken or hypothesis proposed.
		Thoroughly articulated responses clearly, effectively, and fluently. Answered questions succinctly, accurately, and effectively, reflecting solid knowledge of the research topic.	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.
		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.	Lacked or showed weakness in the ability to analyze, critique, and evaluate a problem using research literature and working knowledge.
Comments Regarding Oral Portion:			

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

_____ has submitted his/her research proposal
(Student's Name)
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

Application for Final Oral Examination

For the Masters 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 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

Syllabus and Assessment Criteria for BMS 799 Masters Thesis and Defense

Student Name _____ Major Advisor _____ Final Grade _____

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)	Very Good (B)	Conditional (C)	Unacceptable (F)
Written Thesis Introduction			
<input type="checkbox"/> Asked a new question addressing a significant gap in knowledge.	<input type="checkbox"/> The question or problem addressed was logical or validated previous work.	<input type="checkbox"/> Question or problem was very limited in scope and of minor importance.	<input type="checkbox"/> Looked at a question or problem that was, weak or already solved.
<input type="checkbox"/> Exhibited critical thinking and displayed a very good understanding of the literature surrounding the problem.	<input type="checkbox"/> Contained original and astute observations. Showed clear understanding of the subject matter.	<input type="checkbox"/> Displayed a narrow understanding of the field. Missed relevant literature.	<input type="checkbox"/> Did not show an understanding of basic concepts or conventions of the discipline. Sources were misread or misused.
<input type="checkbox"/> Proposed a well developed hypothesis with appropriate specific aims.	<input type="checkbox"/> A hypothesis was stated and accompanied by appropriate specific aims.	<input type="checkbox"/> A hypothesis could be inferred but was not stated. Some aims did not directly test the hypothesis.	<input type="checkbox"/> Did not state or provide sufficient background for a hypothesis to be deduced. Lacked an understanding of what constitutes a hypothesis.
Methods and Techniques			
<input type="checkbox"/> Had a clever and effective research design.	<input type="checkbox"/> Included a well-executed research design.	<input type="checkbox"/> Research design had weaknesses throwing into question interpretation of some results.	<input type="checkbox"/> Research design had major faults, negating validity of most results.
<input type="checkbox"/> Used or tested new tools, methods, and/or types of analyses.	<input type="checkbox"/> Used appropriate and traditional methods and laboratory techniques.	<input type="checkbox"/> Missing some appropriate controls. Alternative methods should have been used.	<input type="checkbox"/> Used inappropriate or incorrect methods. Poor execution of methods was evident from the results.
Results			
<input type="checkbox"/> Results tested the stated hypothesis leading to either its further refinement or to an alterative hypothesis.	<input type="checkbox"/> Obtained solid, reliable results that tested the hypothesis.	<input type="checkbox"/> Results were not relevant toward testing the hypothesis.	<input type="checkbox"/> Had data that was flawed, false, or misinterpreted. Included results already well known.
<input type="checkbox"/> Analysis was comprehensive, complete, and convincing. Utilized proper statistical methods throughout.	<input type="checkbox"/> Analysis was adequate and valid.	<input type="checkbox"/> Had an unsophisticated analysis—did not explore possibilities and missed connections. Failed to utilize proper statistics.	<input type="checkbox"/> Had wrong, inappropriate, incoherent, or confused analysis.
<input type="checkbox"/> Showed skill and ability to use advanced technologies and instruments. Understood principles behind the technologies and obtained reliable and repeatable results.	<input type="checkbox"/> Exhibited competency in laboratory techniques and reliability in the data and results obtained.	<input type="checkbox"/> Some difficulty in acquiring repeatable results. Exhibited limited understanding of the principles behind the techniques used in the study.	<input type="checkbox"/> Laboratory competency woefully inadequate. Not confident in the accuracy of the data collected. Often failed to follow appropriate technical procedures.

<input type="checkbox"/> Effort and productivity exceeded expectations for a student at this degree level resulting in both presentations and publications.	<input type="checkbox"/> Effort and productivity met expectations for a student at this degree level. Results are publishable.	<input type="checkbox"/> Effort and productivity was just adequate. Independent of technical hurdles, research progress was protracted.	<input type="checkbox"/> Effort and productivity was poor and completion of the thesis required contributions by others.
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Discussion and Conclusions

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

Writing, Figures, Tables, Legends, and Citations

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

Oral Presentation and Defense

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

Comments:

Syllabus and Assessment Criteria for BMS 899 Doctoral Dissertation and Defense

Student Name _____ Major Advisor _____ Final Grade _____

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.

Outstanding (A)	Very Good (B)	Conditional (C)	Unacceptable (F)
Written Thesis Introduction			
<input type="checkbox"/> Asked a new question or addressed an important problem leading to new avenues of research.	<input type="checkbox"/> The question or problem addressed was logical and traditional.	<input type="checkbox"/> Question or problem was highly derived from the advisor's work.	<input type="checkbox"/> Looked at a question or problem that was trivial, weak, unoriginal, or already solved.
<input type="checkbox"/> Exhibited mature, independent thinking.	<input type="checkbox"/> Had some original ideas, insights, and observations.	<input type="checkbox"/> Displayed a narrow understanding of the field.	<input type="checkbox"/> Did not show an understanding of basic concepts or conventions of the discipline.
<input type="checkbox"/> Displayed a deep understanding of complicated literature.	<input type="checkbox"/> Showed understanding and mastery of the subject matter.	<input type="checkbox"/> Demonstrated understanding at a simple level.	<input type="checkbox"/> Missed relevant literature; sources were misread or misused.
<input type="checkbox"/> Argument was focused, logical, thoroughly researched, and sustained.	<input type="checkbox"/> Made a strong, comprehensive, and coherent argument.	<input type="checkbox"/> Could sustain an argument, but the argument was not imaginative or convincing.	<input type="checkbox"/> Had a weak, inconsistent, unconvincing, or invalid argument.
<input type="checkbox"/> Using well-developed rational, an intriguing hypothesis with clever specific aims was proposed.	<input type="checkbox"/> A hypothesis was clearly stated accompanied by appropriate specific aims.	<input type="checkbox"/> A hypothesis could be inferred but was not stated; some of the aims did not test the hypothesis.	<input type="checkbox"/> Did not state or provide sufficient background for a hypothesis to be deduced.
Methods and Techniques			
<input type="checkbox"/> Had a research design with the potential to change the experimental approaches others use to resolve their questions.	<input type="checkbox"/> Included well-executed research using a solid approach.	<input type="checkbox"/> Showed the ability to do research and demonstrated technical competence.	<input type="checkbox"/> Poor execution of laboratory methods was evident from the document and results.
<input type="checkbox"/> Used or developed new tools, methods, or types of analyses.	<input type="checkbox"/> Used appropriate theory, methods, and techniques.	<input type="checkbox"/> Missing some appropriate controls.	<input type="checkbox"/> Used inappropriate or incorrect methods..
Results			
<input type="checkbox"/> Results were highly important, interesting, and relevant to the hypothesis.	<input type="checkbox"/> Obtained solid, expected results that addressed the hypothesis.	<input type="checkbox"/> Results were not noteworthy or relevant to the hypothesis.	<input type="checkbox"/> Had data that was flawed, false, or misinterpreted. Included results already known.
<input type="checkbox"/> Analysis was comprehensive, complete, sophisticated, and convincing.	<input type="checkbox"/> Analysis was adequate and valid.	<input type="checkbox"/> Had an unsophisticated analysis—did not explore all possibilities and missed connections.	<input type="checkbox"/> Had wrong, inappropriate, incoherent, or confused analysis.
<input type="checkbox"/> Pushed the discipline's boundaries and opens new areas for research.	<input type="checkbox"/> Made a modest contribution to the field but did not open it up.	<input type="checkbox"/> Made a small contribution that was narrow in scope.	<input type="checkbox"/> Did not make a contribution.

<input type="checkbox"/> Effort and productivity exceeded expectations resulting in peer reviewed publications and presentations.	<input type="checkbox"/> Effort and productivity met expectations resulting in published abstracts and presentations.	<input type="checkbox"/> Effort and productivity was only adequate. Independent of technical hurdles, research progress was protracted.	<input type="checkbox"/> Effort and productivity was poor and completion of the thesis required contributions by others.
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Discussion and Conclusions

<input type="checkbox"/> Exhibited command and authority over the material. Had a point of view presented with a confident, independent, and authoritative voice.	<input type="checkbox"/> Applied known literature to the problem studied.	<input type="checkbox"/> Presented the literature but was not critical of it.	<input type="checkbox"/> Showed a poor understanding of the literature; showed a lack of basic knowledge or careful thought; did not explain or interpret results.
<input type="checkbox"/> Conclusion tied the whole thesis together and was extremely well written.	<input type="checkbox"/> Identified what observations were important and was well organized.	<input type="checkbox"/> Had a weak structure and organization and did not discuss what was important.	<input type="checkbox"/> Had unsupported or exaggerated interpretation. Contained errors or mistakes.
<input type="checkbox"/> Showed a deep understanding of theory.	<input type="checkbox"/> Explored interesting connections but missed some opportunities.	<input type="checkbox"/> Displayed little creativity, imagination, or insight.	<input type="checkbox"/> Did not handle theory well, or the theory was missing or wrong.

Writing, Figures, Tables, Legends, and Citations

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

Oral Presentation and Defense

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

Comments:

CREIGHTON UNIVERSITY
GRADUATE SCHOOL

FINAL REPORT ON CANDIDATE FOR GRADUATE DEGREE

Name of Candidate _____
(Last) (First) (Middle) (Degree)

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 _____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Thesis/Dissertation Title: _____

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

Creighton

UNIVERSITY

Graduate School

Request for Transfer Credit

Student Name _____ **Student Net ID** _____

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.

Creighton University Course for Which Credit is Requested	Course Completed	Institution	Credit Hours

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	
<input type="checkbox"/> Request for transfer credit approved	<input type="checkbox"/> Request for transfer credit denied
_____ Program Director	_____ Date
_____ Graduate Dean	_____ Date