The content of this manual applies to all graduate students in the Department of Biology and Microbiology who will graduate after Fall 2017.
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I—OVERVIEW

This document is intended to supplement and summarize but not replace the SDSU Graduate Program Bulletin and Biology and Microbiology Dept. Graduate Degree Assessment Plan. This is a summary of critical information that will help you and your advisor navigate your way through your graduate program in the Department of Biology and Microbiology. The Graduate School provides booklets containing instructions for thesis and dissertation. If you have detailed questions, refer to your Bulletin or contact the Graduate School at 688-4181, Admin 130. See also the Graduate School’s web page:

http://www.sdstate.edu/graduate/index.cfm

Degrees currently offered by the Department of Biology and Microbiology
- MS in Biological Sciences (Plan A - Thesis): Minimum 2 years duration
- MS in Biological Sciences (Plan B - Research Paper): Minimum 2 years duration
- PhD in Biological Sciences (Dissertation): Minimum 4 years duration (beyond BS)
- PhD in Biological Sciences (Dissertation): Minimum 3 years duration (beyond MS)

Administration of the Program - The Graduate Coordinator administers the graduate program on behalf of the Dept. Graduate Committee.

Qualifications to enter the program — Applicants to the graduate program in the department must be admitted to the SDSU Graduate School and are required to have an earned Bachelors/MS degree with a minimum GPA of 3.00 during the last two years of undergraduate work. The applicant must also take the Graduate Record Examination (GRE - General test). Students earning a ranking of 50th percentile or above on the GRE are preferentially considered for admission. Students whose first language is not English are required to take the TOEFL exam and earn a score of 90 or above, or a score of 6.5 or above on the IELTS. With the consent of the major advisor and the Graduate Coordinator/Dept. Head, students with a low TOEFL score may be admitted; however, such students will not be eligible for a GTA support until the English has improved to the satisfaction of the Undergraduate Coordinator.

Graduate Assistantships — Graduate students are required to have a faculty advisor. However, admission into the Graduate Program in Biology & Microbiology does NOT guarantee financial support, nor any fixed duration of financial support. GRA/GTA financial support is a privilege and this support can be revoked if the student fails to meet the responsibilities set forth by their immediate supervisor/advisor and the Department of Biology and Microbiology. Students placed on academic probation by the graduate school will also forfeit their assistantship, and must, therefore maintain a minimum GPA of three. A Graduate Assistant is a student, and this student status is the most important role in the Graduate Assistant/Faculty Supervisor relationship. Students receiving GTA/GRA appointments must meet the academic requirements established by the Graduate School and must be enrolled in at least one credit of graduate coursework in that academic semester.

Graduate Research Assistantships (GRA) GRA’s are linked to specific advisers, either through a grant or the Agricultural Experiment Station. Graduate students with research assistantship support are directly involved in research projects that are funded externally. Typically, GRA’s do not have teaching responsibilities; however, some teaching may be assigned on an individual basis. The faculty advisor of a GRA serves as research mentor and provides guidance to the Graduate Assistant in fulfilling the responsibilities assigned as part of the research assistantship (research and coursework).

Graduate Teaching Assistantships (GTA) — GTAs are allocated by the Department Head based on departmental teaching needs. All international students, and students whose first language is not English, may be required to interview with the departmental undergraduate and graduate coordinators, who will determine whether their command of spoken English is sufficient for teaching. Teaching assistantships are limited to five semesters for MS students, and 9 semesters for PhD students. Extensions may be granted at the discretion of the Department Head. Teaching assistants assist the Department in the teaching of undergraduate laboratories. These students are not only accountable to their faculty advisor (research and coursework), but also to the faculty member responsible for the course in which the student is teaching. Prior coursework in the assigned teaching role and prior teaching experience are strongly recommended.
Overall expectations: Before a degree is granted, the student must meet all the requirements of the Advisory Committee, the Major Department and the Graduate School. Graduates are required to follow the guidelines described in the Department of Biology and Microbiology 'Graduate Degree Assessment Plan (Fall 2012)'. Students should note that graduate studies represent advanced work and research in a discipline that go beyond basic course work.

II—COURSEWORK AND CREDIT REQUIREMENTS

Requirements for passing a graduate course - The student must maintain a "B" average (GPA of 3.0) for all courses in the graduate program. No credit is given toward a graduate degree for any grade below "C" in graduate-level courses, or below "B" in 300/400-level courses. Consult the Graduate Catalog for specific course requirements of M.S. and Ph.D. degree programs.

Thesis (Plan A), Research Paper (Plan B), Dissertation Credits - Graduate students usually register for thesis/paper/dissertation credit over several semesters. Thesis credits (BIOL 798 or MICR 798) or dissertation credits (BIOS 898D) are graded on a S/U (Satisfactory/Unsatisfactory) basis during the semester they are taken.

Seminars - The department offers BIOL 790 – Graduate Seminar in both fall and spring semesters. Seminar course requirements are outlined in the table below. Seminars course (BIOL 790) will be graded on A, B, C, D and F grade basis.

BIOL 790 – Graduate Seminar. This course has two sections as BIOL 790 S01 (1-credit) and BIOL 790 S02 (2-credits). BIOL 790 S01 mainly focuses on the poster and oral presentation skills and is offered in fall semester only. BIOL 790 S02 focuses on the science proficiency which includes both scientific writing skills and science general skills (research ethics, hypothesis, experimental design, record keeping, etc.) and is offered in spring semester only. Each graduate student is required to take both BIOL 790 S01 (1-credit) and S02 (2-credits) courses during MS or Ph.D. program. When student takes either of BIOL-790 courses first time, he/she will be required to give an oral presentation on the student’s proposed research project, generally involving a review of pertinent literature, a statement of the research problem, and a proposed research plan, including methodologies and statistical design. When student takes either of BIOL-790 courses second time, he/she will be required to give a poster presentation on the student’s research project and research findings. Attendance at Life Science seminar presentations of other presenters is mandatory. Students can take BIOL 790 S01 and S02 in any sequence and these courses are not perquisite to each other.

BIOL 792: Grant writing, 1Credit course –a mandatory course for all Ph.D. students and will be offered in fall semester only. This course will be of limited enrollment for Bio- Micro and Veterinary and Biomedical Sciences students only. BIOL 792 course will be graded on A, B, C, D and F grade basis.

Minimum Credit Hour Requirements — (A) Thesis; (B) Research Paper

<table>
<thead>
<tr>
<th>Master’s Program</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total hours</td>
<td>30*</td>
<td>32*</td>
</tr>
<tr>
<td>To include:</td>
<td>5-10</td>
<td>0 Thesis credits</td>
</tr>
<tr>
<td>Research Problem</td>
<td>0</td>
<td>2-3</td>
</tr>
<tr>
<td>BIOL 790 S01 (fall semester)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 790 S02 (spring semester)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>STAT 500 and above level</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 662</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Take any one of these elective courses (mandatory)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOS 664 Molecular Plant Physiology (spring)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 665 Cell Biology (spring)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 667 Bacteriology (spring) (Not ready yet)</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

* At least 19 of the credits must be earned in the major area (includes course, thesis and transfer credits)
Doctoral Program

<table>
<thead>
<tr>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>90*</td>
<td>Total hours</td>
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<tr>
<td>35 - 50 credits of BIOS 898D Dissertation</td>
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</tr>
<tr>
<td>1</td>
<td>BIOL 790 S01 (fall semester)</td>
</tr>
<tr>
<td>2</td>
<td>BIOL 790 S02 (spring semester)</td>
</tr>
<tr>
<td>1</td>
<td>BIOL 792, Grant writing (fall semester)</td>
</tr>
<tr>
<td>1</td>
<td>GSR 601, Research Regulations Compliance</td>
</tr>
<tr>
<td>3</td>
<td>STAT 500 and above level</td>
</tr>
<tr>
<td>3 (Within first 2 years of the program)</td>
<td>ABS 705</td>
</tr>
<tr>
<td>3</td>
<td>BIOS 662</td>
</tr>
</tbody>
</table>

Take any one of these elective courses (mandatory)

- BIOS 664 Molecular Plant Physiology (spring) 3
- BIOS 665 Cell Biology (spring) 3
- BIOS 667 Bacteriology (spring) (Not ready yet) 3

* At least 60 of the 90 credits must be earned in the major area and in the program (includes course, dissertation and transfer credits)

$: Score a minimum grade of ‘B’ in BIOS 662 and one of the mandatory elective courses as a requirement for passing Ph.D. qualifying examination.

Doctoral Program with earned MS in same discipline

<table>
<thead>
<tr>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>60**</td>
<td>Total hours</td>
</tr>
<tr>
<td>30 - 40 credits BIOS 898D Dissertation</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>BIOL 790 S01 (fall semester)</td>
</tr>
<tr>
<td>2</td>
<td>BIOL 790 S02 (spring semester)</td>
</tr>
<tr>
<td>1</td>
<td>BIOL 792, Grant writing (fall semester)</td>
</tr>
<tr>
<td>1</td>
<td>GSR 601</td>
</tr>
<tr>
<td>3</td>
<td>STAT 500 and above level</td>
</tr>
<tr>
<td>3 (Within first 2 years of the program)</td>
<td>ABS 705</td>
</tr>
<tr>
<td>3</td>
<td>BIOS 662</td>
</tr>
</tbody>
</table>

Take any one of these elective courses (mandatory)

- BIOS 664 Molecular Plant Physiology (spring) 3
- BIOS 665 Cell Biology (spring) 3
- BIOS 667 Bacteriology (spring) (Not ready yet) 3

** At least 40 of the 60 credits must be earned in the major area and in the program (includes course, dissertation and transfer credits)

$: Score a minimum grade of ‘B’ in BIOS 662 and one of the mandatory elective courses as a requirement for passing Ph.D. qualifying examination.

A list of graduate courses for the Biology and Microbiology Graduate Program is available as Appendix 11.

All graduate students are strongly encouraged to take discussion-based courses such as ‘Journal Clubs’ to enhance their skills in regards to the critical evaluation of the scientific literature and to hone their oral communication skills.

Minimum Credits to Maintain Full-time Status

Full time students are required to take a minimum of 9 credits. Half-time students are required to take a minimum of 5 credits. Three-fourths time students are required to take a minimum of 7 credits. Students may take a maximum of 12 credits per semester. Domestic students must be enrolled at least half-time (5 credits) to receive Federal Aid. Loan deferment may also require full or part-time status. Eligibility varies with financial aid programs and students should contact their lender for requirements.

Incomplete Grades - When a graduate student is given an ‘Incomplete’ grade (I), the instructor must indicate in writing what remaining work must be completed and file this information with the Graduate School. If the work is not
completed as prescribed, the instructor may change the ‘Incomplete’ grade to the appropriate grade, or leave the grade as an ‘Incomplete’. Once the degree is awarded, an ‘Incomplete’ grade cannot be changed to a letter grade.

**Academic Difficulty** - Students who encounter academic difficulty will be advised by the Graduate School and may be dismissed from their program and the university if the situation cannot be resolved. The Graduate School has an academic appeal process for resolution of student/faculty grievances e.g., prejudicial academic evaluation, cheating, plagiarism, etc. Procedures for appeals are available from the Graduate School.

**Credit Loads** - In calculating credit loads, courses being audited and undergraduate courses are included at full value for Graduate School, but are not allowable for loan deferral, full/part time certification, or financial aid. Graduate assistants must be registered for at least one credit each semester. The determination of student status (0.25-0.75) is based primarily on credit hours for which a student is enrolled in a given term. The Graduate Bulletin describes an alternate method in limited situations. Consult the Graduate School for details.

**Obsolete Program and Coursework** - If the PhD degree is not completed within 8 years from the time of admission to work toward the degree, a reconsideration of the student's program will be required. Courses completed more than 8 years before completion of the doctorate or 6 years before completion of the MS, and not part of a previous degree, are regarded as obsolete coursework. Consult the Graduate School for details.

### III—**GRA/GTA WORKLOAD**

Graduate Assistant workloads are based on an average number of hours of work per week. However, this may vary slightly depending on assignment. “Work” refers to hours spent on the assigned teaching or research duties. This stipend does not support time spent on coursework or effort expended on your own thesis / dissertation research.

1. One-half time (0.49; minimum of 20 hours/week) workloads apply to all Graduate Assistants (GRA/GTA).
2. The designated supervisors are responsible for monitoring GRA/GTA performance/hours.
3. GTA hours of work per week include instruction, meetings with the course coordinator, office hours for student consultation, and other such work-related expectations requiring the time of the Graduate Teaching Assistant.
4. GRA hours of work per week include laboratory and / or field work, data analysis and other research-related activities instructed by the supervisor (allocator of the GRA). GRA work is conducted for the salary, not for the thesis / dissertation. Supervisors may choose to allocate GRA time toward thesis / dissertation work. Students are expected to work on their own research over and above the time for which they are compensated.

**Graduate Assistants (Graduate catalog 2016-17)**

(SDSU Policy 2:16)
All graduate assistants must register for a minimum of one (1) credit (including summer) in order to receive an assistantship.

Credits needed for full-time student status for graduate assistants:

<table>
<thead>
<tr>
<th></th>
<th>Spring/Fall</th>
<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% time assistantship</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>49% time assistantship</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

**International students** on a visa need to have a load of at least 9 credits during the fall and spring semesters. Students holding a 49% GTA or GRA position are required to work 20 hours per week, fulfilling 4 credits (one graduate credit = 5 hpw). In this case a minimum of 5 credits of coursework / thesis / dissertation is required to maintain full-time status. In order to attain full-time status, international students need to submit a “Request for reduced course load” form to the Office of International Affairs & Outreach each semester.

**Determination and reporting of compensable hours for Graduate Research Assistantship (GRA):**
To conform to the Affordable HealthCare Act (ACA), Regental Institutions must document hours for Graduate Assistants. Under ACA, any employee who averages 30 or more hours per week must be provided healthcare.
Graduate Teaching Assistants (GTAs) are not subjected to tracking hour; however, Graduate Research Assistants (GRAs) are subjected to documenting hours as they accrue. GRAs will record their hours in the ACA Work Log and based on general guidelines developed by BOR office. The BOR office indicates GRA work should be divided into either ‘educational’ or ‘compensable’ hours, with the former not generally subject to ACA and with the latter generally subject to ACA. Determination of compensable hours should be conducted by the supervisor on a case-by-case basis. Supervisors will determine compensable hours on daily, on-going, and flexible basis. The following guidelines are supplied to provide guidance to supervisors when making these distinctions.

Educational hours (also called ‘non-compensable’ hours) are not recorded for ACA and include self-directed research, which is research by a GRA undertaken for completion of a degree overseen by chair, supervisor and/or committee.

Compensable hours generally are recorded for ACA and includes directed-research, which is research undertaken by an employee which is assigned and controlled by a supervisor. Specific tasks which are generally recorded for ACA may include menial tasks, travel time and mandatory meetings.

Note: ACA Work Log is for GRAs only and not for GTAs.
ACA Hours must be submitted by GRA then approved by the supervisor.
Log in site for ACA hours reporting: https://acahourslog.sdbor.edu
Use your SNAP credential to login. ACA hours will not determine pay; however, their reporting must be aligned with payroll dates. ACA Hours should be submitted by GRA by 5:00 pm on 21st of each month and approved by supervisor by 10:00am on 22nd.

IV—SALARY, BENEFITS AND HEALTH INSURANCE

Full Assistantships—Typically, the goal is to have Graduate Assistant salaries that are market competitive, equitable within a college, and not less than a designated University minimum.

<table>
<thead>
<tr>
<th>FY2018 PhD. Student</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12 month 49%</td>
<td>$ 21,268</td>
</tr>
<tr>
<td>9 month 49%</td>
<td>$ 15,951</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FY2018 MS Student</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12 month 49%</td>
<td>$ 16,543</td>
</tr>
<tr>
<td>9 month 49%</td>
<td>$ 12,407</td>
</tr>
</tbody>
</table>

Tuition—The SDSU policy is that graduate students on assistantship will receive free tuition and fees, but will still be responsible for the General Activity Fee of $33.90 per credit hour. The General Activity Fee (GAF) is charged to support student health, wellness center, student union, and student activity programs such as admission to plays, athletic events, athletic facilities, and partially funded judging, music, and forensic programs.

Benefits—Graduate Assistants do not accumulate sick leave and annual leave, nor do they qualify for health insurance or retirement benefits.

Taxation—The Graduate School holds that a person with 1 credit of course work retains eligibility for a graduate assistantship. However, the Social Security Administration requires a full load (i.e., 6 credits) to be exempt from social security (FICA). This interpretation is consistent with the OASI Office of the state auditor's office in Pierre. Receipt of VA benefits is dependent on a 5-credit load. Current Internal Revenue Service interpretations indicate the Social Security (FICA) taxes will not be withheld if a student is enrolled for at least 5 credits during a spring/fall semester or 3 credits during the summer.

Expanded Appointments—By nature of the graduate assistant commitment to the University, a 0.49 graduate assistant is ineligible to work more than the amount contracted by the graduate assistant appointment. Placing the graduate assistant on an additional hourly payroll on campus, or any employment outside of SDSU is not possible. Employment outside the 0.49 assistantship is not permitted.
Foreign National Students Health insurance - Foreign National students, except for those entitled to establish a legal domicile in South Dakota, who have enrolled in any Board of Regents university, are required to purchase the South Dakota Board of Regents endorsed student health insurance plan. Spouse and dependents are required to have proof of insurance and must submit this to their university representative. Exemptions to this student requirement may be granted by the system myHealth plan administrator. This can only occur when comparable or superior health insurance is provided for the student by the student's sponsoring agency or government; or the student is covered by an employer policy so long as they have the eligibility requirement documented under the myHealth plan. Students who transfer to a university in the spring and summer terms may also be exempted by the system myHealth plan administrator, provided that their previous institution required the purchase of comparable, non-refundable coverage and that coverage is still in force for the remainder of the school year. Students who do not have a waiver or are not enrolled and who have spouse and dependents not covered may be withdrawn from the university.

Those Foreign National students who have not completed a waiver and have not applied for insurance during the application period will be auto-enrolled into the default plan driven by their birth date on the enrollment file. Those students will be defaulted to having a pre-existing period according to federal/state laws and will be required to work with the insurance vendor to provide documentation of prior coverage.

The full doc is at: [http://www.sdbor.edu/policy/3-Student_Affairs/documents/3-14.pdf](http://www.sdbor.edu/policy/3-Student_Affairs/documents/3-14.pdf)

V—PRIVILEGES

Computers/Ethernet access—Students are expected to furnish their own computer. Wireless connectivity is available at some locations. Graduate student areas in McFadden Biostress Building and Alfred Dairy Hall have wireless connectivity to internet. Some advisors may make laboratory computers and internet connections available. Otherwise, computer labs are available in Briggs Library and various other buildings on campus.

Keys—Building and Lab keys are leased from the Department of Biology and Microbiology main office in Alfred Dairy Hall. Student desks are allotted to students and student desk keys are available in Bio-Micro offices in Alfred Dairy Hall (room 228) and Northern Plain Biostress Building (room 252). Students requiring keys need to obtain the signature of their advisor/supervisor on a “key card” or supervisor need to send an email to the Dept. secretary requesting the keys for his/her student. There is a $15.00 deposit required on all keys; the deposit will be returned once the key is returned to the department main office.

Supplies—GTAs are allowed sufficient materials necessary to their teaching responsibility. Office materials are not for personal use.

Copying and Printing—Graduate students are responsible for printing and copying the materials required for preparation and submission of course assignments. This includes examination and final copies of thesis/dissertation.

Thesis/Dissertation copies—Printing and copying of your thesis/dissertation are the student’s responsibility unless covered by your advisor or a research grant account.

Travel—Participation in regional, national and international meetings is an important component of graduate education and career development. Advisors are not obliged to cover the cost of conference attendance. The department does have a limited travel fund, and students who are presenting a paper or poster at a meeting may apply through the graduate coordinator. These funds are limited and will be awarded at the discretion of the graduate committee. The graduate student travel award applications are accepted under three cycles every year with January 3, May 1, and Sept 1 deadlines. You will need to fill out a ‘TRAVEL GRANT FOR GRADUATE STUDENTS’ form that can be
obtained from the Graduate Coordinator or main office. A copy of this form is also provided as an Appendix 9 at the end of this document.

Before you travel:
1. If you are on a GTA, you must make arrangements with your instructor to be sure that all lab sections are covered during your absence.
2. You should discuss travel arrangements and funding with your advisor well in advance.
3. You must fill out an out-of-state travel request at least 15 days in advance. This form must be filled out for any business-related trip, even if you are traveling on your own funds.

When you travel:
1. Keep receipts for all lodging, travel and miscellaneous expenses. In addition to requiring these for tax purposes, you must have the original receipt in order to be reimbursed. Meal receipts are not needed.
2. If you are traveling by car, call the motor pool at least 2 weeks in advance to reserve a vehicle. If motor pool does not have a car, then you can be reimbursed for the use of your own car. However, if there are vehicles available and you use your own car, you will be reimbursed at a much lower rate. You must keep a mileage log and gas receipts to receive reimbursement for your own car.

When you return:
1. If your trip is being covered by a grant of the department, you need to pick up a Travel Voucher from SNP 252. Fill this form out, sign it, attach all receipts and a copy of the meeting agenda, and return it to the secretary in SNP 252.
2. Make sure that motor pool cars are returned on time, the tank filled and the log completed.

VI—ADVISORY COMMITTEE AND ANNUAL ASSESSMENT

With the assistance of their major advisor, all graduate students are required to select their graduate advisory committee, develop a plan of study, and identify a thesis problem (MS Plan A and PhD), or a research paper topic (MS Plan B). Students who have not met any of the requirements as outlined below may petition to the Dept. Head for an extension.

The Advisory Committee is responsible for assisting the student in developing a suitable graduate program, providing continuing guidance and counsel, and certifying the completion of the degree requirements to the Dean of the Graduate School. The Advisory Committee should approve the Plan of Study (POS) before end of the first semester, and any revisions of it, approves the thesis/dissertation proposal, conducts the examinations appropriate to each option, supervises the validation of courses, and ensure that professional standards have been met in completing the degree requirements. The Advisory Committee will be composed of at least three faculty members (MS) or four faculty members (PhD). The committee members are chosen by the graduate students in consultation with their advisors. The Dept. Head, in consultation with major advisor, will appoint a ‘Department representative’ to each Ph.D. graduate committee. This should be documented after the committee composition is submitted to the Graduate Coordinator. In addition, the Dean of the Graduate School will select the Graduate Faculty representative from a department not closely related to the major/minor/supporting areas. This member ensures the regulations are followed and acts as the student’s advocate.

The Advisory Committee membership should be reported to the Graduate Coordinator and to the Dean of the Graduate School by the major advisor before the end of the first semester. To assign a Graduate Faculty representative, a memo needs to be sent to the Graduate School from the student’s advisor listing all Committee Members. Three of the four members of a PhD committee must be on the Graduate Faculty. Additional members of the committee may be requested by the student or the major advisor and assigned to the committee by the Dean of the Graduate School.

VII—PLAN OF STUDY INFORMATION AND OTHER EXPECTATIONS

During the first semester of graduate work the Advisory Committee will meet with the student to approve both a Plan of Study and the Research Proposal for the thesis, dissertation or research paper. The Plan of Study should be prepared on the appropriate form from the Graduate School and approved by the Advisory Committee and the Dean of the
Graduate School before the end of the first semester of study. Courses for the major must be taken in the major department or in closely related areas. At least 50% of the credits on a Plan of Study must be in courses open only to graduate students (600-series or above). The student should make sure that all the minimum required courses for the specific graduate program are included in the plan of study to meet departmental minimum requirements for courses. Delay in submitting a Plan of Study may result in disapproval of courses already taken. Changes in the approved Plan of Study must be requested on a form furnished by the Graduate School and must be approved by the Advisory Committee and the Dean of the Graduate School.

Teaching, presentation/publication expectations—Graduates need to be skilled in presenting and defending scientific findings to peers. In order to improve these skills, students are expected to communicate their work on a minimum number of occasions as outlined below:

1. Masters students:
   a. Two presentations in Graduate Seminar (BIOL 790) (oral and poster presentations).
   b. At least one manuscript judged to be publishable by the student’s committee, or an equivalent activity as judged by the committee. An equivalent activity may include a significant dataset intended for inclusion in a manuscript to a high-ranking journal, or data subject to intellectual property considerations.
   c. A presentation (paper or poster) at a state/regional/national scientific meeting. A limited number of departmental graduate student travel awards will be available to help subsidize travel to these meetings.
   d. A public (announced, 30 min long) oral presentation of research findings preceding the thesis/research proposal defense.

2. Doctoral students:
   a. Two presentations in Graduate Seminar (BIOL 790) (oral and poster presentations)
   b. At least two semesters of teaching experience as Graduate Teaching Assistant (GTA) or an equivalent activity (such as training undergraduate research student) as approved by Graduate Coordinator and/or Dept. Head.
   c. At least one paper accepted/published as first or first co-author or one patent/intellectual property item as major contributor.
   d. A second manuscript (minimally) submitted to a peer-reviewed journal, or an equivalent activity as judged by the committee (significant dataset intended for inclusion in a manuscript to a high-ranking journal, or data subject to intellectual property considerations).
   e. At least two presentations at state/regional/national scientific meeting. A limited number of departmental graduate student travel awards will be available to help subsidize travel to these meetings.
   f. At least one oral presentation on the dissertation or related research topic in the Departmental Life-Sciences Seminar Series.
   g. A public (30-45 min long) oral presentation of research findings immediately preceding the dissertation defense.

3. Graduate students are strongly encouraged to participate in journal clubs where available.

4. Specific research groups may require their students to present their work on a more regular basis. This activity is strongly encouraged by the department.

VIII—THESIS/DISSERTATION RESEARCH

1. Topic of research
The research arena is complex, competitive and highly dynamic. One of the primary roles of the major advisor is to develop the research topic with the advisee. The thesis/dissertation, and more importantly, emanating publications, will play a central role in the student’s resume, and thereby in future career options. Students are, therefore, required to conduct a thorough and systematic search of relevant literature in order to plan work that can build on the current body of knowledge. This process should lead to the development of a research proposal, and be completed before the end of the first semester.

2. Research proposal and literature review
In order to demonstrate a familiarity with the pertinent literature, a substantial literature review must be prepared. The student is required to develop a research proposal by the end of the first semester. The proposal should contain a short introduction, statement of problem, research hypothesis/hypotheses, and an overview of the experimental
approach and intended mechanism for data analysis. This proposal should be reviewed by the committee, revised where required, and approved before end of the first semester.

3. Submission of documents to Graduate coordinator

Before the end of their first semester in the program, the student must prepare and submit to the Graduate Coordinator the following: graduate committee composition based on graduate school guidelines; plan of study; and a short (1-4 pages) research proposal agreed upon after consultation with the major advisor and/or advisory committee. Failure to submit these documents before the end of the semester may lead to suspension of the GTA/GRA at the discretion of the Dept. Head and/or Graduate Coordinator.

4. Annual Assessment

Each academic year (Sept-Aug), the entire advisory committee should meet formally at least once wherein an annual assessment instrument (Appendix 1 and 2) will be filled out and signed by the advisory committee (at least 2 of 3 members for MS; 3 of 4 members for PhD). Students will provide their committee with a brief (1-2 page) progress report summarizing their progress during the previous year. This report should also include written goals for the upcoming year or remaining program period. The signed ‘Annual Assessment Forms’ (completed by each committee member) and the ‘Graduate Student Annual Evaluation Summary’ form (completed by major advisor) should be submitted to the Graduate Coordinator by the advisor to be placed in the student’s official file. These signed evaluations may be audited by the Departmental Graduate committee for departmental program assessment purposes. These meetings and their assessment instruments have two functions. First, to provide the student with an active mechanism for gauging their progress in research and coursework; second, to provide a mechanism for determining if the student has the skills and abilities needed to successfully complete the degree program. The first graduate committee meeting held for finalizing the ‘Plan of Study and Research Proposal’ during first semester is not considered as one of the annual evaluation meetings for the graduate program.

5. Records

Each student is required to keep detailed written records of research activities and the data gathered. This will take the form of a field notebook or research journal (laboratory book). The aim of the research journal is to maintain a readily accessible record of your research. This will enable you and your advisor to understand, repeat and evaluate your experimental / observational results, and to analyze data and write manuscripts and your thesis / dissertation. The field notebook or research journal remains the property of the Department of Biology and Microbiology, South Dakota State University when you graduate. You may make copies at any time, and take these with you.

6. Intellectual property

The South Dakota Board of Regents Policy Manual on Intellectual Property (number 4:34), stipulates that:

1. (2A) On behalf of the public, and subject to the exceptions provided in Section 4(C) and elsewhere in this policy, the Board, acting through the employing institution, will own intellectual property that institutional employees develop in the course of or as a direct result of their duties with the institution, if the properties were developed with the use of institutional funds or resources.

2. (2B) Where the institution receives an income from a publicly owned intellectual property, it will share revenues with the creator in proportion to the funds and resources each contributed to the creation of the property, except that the creator will be guaranteed a minimum share of revenues as provided in this policy even if all funds and resources were provided by the institution.

3. (2C) All employees whose duties involve the use of institutional resources to research or to develop inventions, or other properties that may be subject to protection under copyright law, patent law or as trade secrets, will enter into an agreement at the time of hire that binds them, upon request, to assign to the employing institution, the creator's rights to any properties determined to belong to the institution pursuant to this policy. Execution of this agreement shall be an essential condition of employment.

4. (P 1) All research data are considered to be subject to this policy, as intellectual property is often present in research data that are generated during research at the university. Research Data shall include, but not be limited to:
   a. lab notes, results of analyses, and so forth; or
   b. research notes, research data reports, and research notebooks, and so forth; or
c. x-ray film, photographs, negatives and slides, printouts, video and audio tape, computers and computer data storage devices, and synthetic compounds, organisms, cell lines, viruses, cell products, cloned coordinates, plants, animals and spectroscopic data, however recorded or preserved; or
d. any other records that are commonly accepted in the research community as necessary for the reconstruction, evaluation and validation of reported results of research and the events and processes leading to those results, regardless of the form or the media on which they may be recorded.

7. Authoring manuscripts for submission to peer-reviewed journals
The student is expected to develop each manuscript in cooperation with the major advisor. Writing a manuscript for a peer-reviewed journal is not an easy task, and requires much rigor, a self-critical approach, a team-approach / sounding board approach and perseverance. Even lower-ranking journals now practice high (~ 75%) rejection rates, emphasizing the need to prepare a flawless manuscript. Discuss authorship with your advisor early on. Various disciplines in biology have slightly different conventions on the order of author names. For example in the cellular / molecular sciences the student who did most of the work comes first, and the professor in whose lab the work was done, comes last. Generally persons who contributed significantly through ideas, funding, teaching specialized techniques, doing lab work and data analysis are considered for co-authorship. The student will confer with their research advisor regarding authorship of all publications resulting from the student’s research at SDSU.

IX—GRADUATE EXAMINATIONS

MS Exam terminology
- Yearly Evaluation (Research progress + Coursework)
- Presentation of Thesis/Paper (Public) during last semester of program
- Oral Defense of Thesis (Committee) during last semester of program
- Thesis (Plan A) -OR- Research Paper (Plan B) completion

PhD Exam terminology
- Yearly Evaluation (Research progress + Coursework)
- Comprehensive Written exam (mid-program)
- Comprehensive Oral exam (defense of written exam/research progress) (mid-program)
- Oral Presentation of Dissertation (public) during last semester of program
- Oral Defense of Dissertation (committee) during last semester of program
- Dissertation completion

MS Oral Examination and Thesis Defense— The date and time of the final thesis defense must be communicated to Graduate Coordinator in writing by the major advisor at least one week before the oral defense. Oral thesis defense title, date, and time will be publically advertised throughout the department via email communication to faculty and graduate students, and by posting public announcements of the presentation at least one week before the defense date. The oral examination will consist of a 30-minute long public presentation followed by an oral defense of the research work submitted by the student, and the course work. The audience should be given the opportunity to pose questions. The Advisory Committee determines the character and length of the oral examination; however, questions are usually distributed evenly among the thesis, coursework, and any additional recommended readings. These questions are intended to test the ability of the student to demonstrate their knowledge, judgment, and critical thinking. Each semester/summer carries a deadline date for taking the final examination. Contact the Graduate School for these deadlines. The advisory committee will have three options: 1) Pass, 2) Pass with conditions, 3) Fail. At the conclusion of thesis oral defense the major advisor must complete the MS Final Defense Examination Assessment Form (to be completed by each committee member), and the ‘Graduate Student Annual Evaluation Summary’ form after consultation with the committee members. These duly completed forms should be then submitted to Graduate Coordinator after the thesis defense. The final thesis or dissertation document will not be signed by the Dept. Head unless the required forms are duly completed, signed and submitted to Graduate Coordinator. The student will need to get verification on the completion of all the graduate program requirements
from the Graduate Coordinator on the Bio-Micro Department ‘Thesis/Dissertation Submission Form’ (check appendix) before the Dept. Head signs the final thesis.

**PhD Comprehensive Written and Oral Examinations**—The comprehensive exam will be given when coursework has been substantially completed and significant research progress has been made (in the second to fourth year of the program). The written examination will consist of two parts: writing a mock grant proposal based on a federal agency format and answering written questions on the grant proposal (Check Dept. Graduate Degree Assessment Plan document for details). Rubrics for grant proposals for comprehensive written examination are available as appendix 12. The comprehensive written examination is followed by an oral examination which may include a brief cross examination of the student’s written exam and course work. The oral examination will also consist of an oral defense of the research completed to date by the student. These examinations are to test the student’s knowledge and ability to integrate this knowledge in both the major and minor (or supporting courses) areas. Questions will be drafted by the advisory committee based on the student’s area of specialization and coursework. Usually the oral comprehensive exam is set two to several weeks after the written exam. Students in consultation with their major advisor and committee members will decide the date of both the written and oral comprehensive exams and total time/days allotted for the exams. The faculty advisor, after consultation with advisory committee, arranges for the comprehensive exams through a memo to the Dean of the Graduate School specifying date, time, and place for the exams. This memo initiates the "Certification and Notification of Action" form from the Graduate School to the advisor who uses the form to record results of the Comprehensive Examinations. Copies of the written examination are filed in the major department. The ‘Ph.D. Comprehensive Written and Oral Examination Assessment Forms’ are used for assessment by the committee and are submitted by the major advisor to the Graduate Coordinator upon completion of the exams. Both written and oral comprehensive examinations must be completed at least six months before the final dissertation defense is made. Upon satisfactory completion of the comprehensive examinations, a student is formally admitted to candidacy for the PhD degree. Unless a student receives the Doctor's degree within three years after becoming a candidate, comprehensive examinations must be repeated.

**PhD Dissertation Defense**—The date and time of the final dissertation defense must be communicated by the major advisor to the Graduate Coordinator in writing at least one week before the oral defense. Oral dissertation defense title, date, and time will be publically advertised throughout the department via email communication to faculty and graduate students, and by posting public announcements of the presentation at least one week before the defense date. The final defense cannot be taken earlier than six months following successful completion of the comprehensive examinations. Each semester/summer carries a deadline date for taking the final examination. Contact the Graduate School for these deadline dates. The defense begins with an oral 30-45 minutes long presentation of the research project to the general public. This is followed by a cross-examination by the Advisory Committee who determines the character of this final oral examination. However, questions are usually centered about (but not limited to) the dissertation and course work. These questions are intended to test the ability of the student to demonstrate the student’s knowledge, judgment, and critical thinking. The committee will have three options: 1) Pass: the student continues on to finish the PhD program. 2) Pass with conditions: the student will be required to review/rewrite the dissertation and defend it within three months of the first exam. 3) Fail: the student will be removed from the PhD program. Immediately upon conclusion of dissertation final oral defense the major advisor must complete the Ph.D. Final Defense Examination Assessment Form (to be completed by each committee member), and the ‘Graduate Student Annual Evaluation Summary’ form after consultation with the committee members. These duly completed forms should be then submitted to Graduate Coordinator after the dissertation defense. The final thesis or dissertation document will not be signed by the Dept. Head unless the required forms are duly completed, signed and submitted to Graduate Coordinator. The student will need to get verification on the completion of all the graduate program requirements from the Graduate Coordinator on the Bio-Micro Department ‘Thesis/Dissertation Submission Form’ (Check appendix) before the Dept. Head signs the final dissertation.

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**X—Theses and Dissertations**

**MS Thesis (MS Option A)**

A thesis should be written in paper format unless determined otherwise by the committee. Research chapters should be in a format ready for submission to a journal. The entire project / study needs to be placed in context by a substantial literature review and an overall concluding chapter. All references should be listed at the end of the thesis. Students are strongly encouraged to use EndNote for managing their references (available free from the SDSU library). Thesis must meet the requirements of the Department of Biology and Microbiology and the Graduate School. The
thesis accounts for 5 to 10 semester credit hours in the major. The student should distribute one copy to each member of the advisory committee, including the Graduate Faculty Representative at least ten working days before the dissertation defense date.

Research Paper (MS Option B)
Students following MS Option B must complete at least 2-3 credits for a Research Problem and present a written research paper. The content, style, and format of the paper must meet the requirements of the Department of Biology and Microbiology. The Research paper must be approved by the Advisory Committee and filed in the major department. A copy of the paper should be provided to each committee member, including the Graduate Faculty Representative, at least 10 working days prior to the final oral examination.

PhD Dissertation
The dissertation should be written in paper format unless determined otherwise by the committee. The entire project / study needs to be placed in context by an extensive literature review and an overall concluding chapter. All references should be listed at the end of the dissertation. The dissertation must represent a scholarly contribution to research knowledge in the major field, and demonstrate the candidate's mastery of the subject. A research area for the dissertation topic should be chosen after consultation with the major advisor in the first semester of the student's program. Students are strongly encouraged to use EndNote for managing their references (available free from the SDSU library). The student should distribute one copy to each member of the advisory committee, including the Graduate Faculty Representative at least ten working days before the dissertation defense date.

Thesis and Dissertation Fees— The cost for submission and binding thesis/dissertation copies is the responsibility of the student. Check with the Graduate School (website) and the Library for specific details.

Thesis and Dissertation Submission: The thesis must conform to the style outlined in “Thesis & Dissertation Guidelines” available on the Graduate School web page: [http://www.sdstate.edu/graduate/current/guidelines.cfm](http://www.sdstate.edu/graduate/current/guidelines.cfm). After the defense, corrections should be made if prescribed. Once the thesis or dissertation has been accepted by the committee, the student must upload the document on D2L for a format check by the graduate school. Upon submission of the Final Oral exam form to the Graduate School, the student will gain access to the Graduate School D2L sandbox. Student must follow the “Thesis & Dissertation Submission Instructions” available on the Graduate School URL: [http://www.sdstate.edu/graduate/current/submission-instructions.cfm](http://www.sdstate.edu/graduate/current/submission-instructions.cfm). Each semester the Graduate School publishes deadlines for graduation candidates on the Graduate School URL: [http://www.sdstate.edu/graduate/current/important-dates.cfm](http://www.sdstate.edu/graduate/current/important-dates.cfm). Students wishing to graduate during the respective semester must follow all deadlines in order to meet degree requirements. Failure to follow the deadlines may result in delay of the graduate degree.

XI - NAVIGATION GUIDE FOR PROSPECTIVE GRADUATE STUDENTS

1. **Application procedure**
   Apply online at: [http://www.sdstate.edu/admissions/graduate/admission-requirements.cfm](http://www.sdstate.edu/admissions/graduate/admission-requirements.cfm)
   For International applicants, additional information may be found at: [http://www.sdstate.edu/international-affairs/index.cfm](http://www.sdstate.edu/international-affairs/index.cfm)

   The following documentation must be submitted in hard copy to the SDSU Graduate School:

   1. Application form before semester begins (April 15 for Fall and August 15 for Spring semester for international applicants; April 15 (for Fall) and October 1 (for Spring) for domestic students)
   2. Application fee
   3. Baccalaureate or Masters degree certificate from previous Institutions
   4. Official University transcripts. International transcripts must be interpreted by a transcript service such as WES and ECE.
   5. Proof of immunization
6. Two letters of recommendation and Personal Reference Form from University Faculty or other relevant persons.
7. Minimum undergraduate GPA of 3.0 (or the equivalent): conditional admission may be granted under special circumstances.
8. Minimum Graduate Record Examination (GRE) score above the 50th percentile is expected and preferred: conditional admission may be granted under special circumstances.
9. Formal resume (CV)
10. A personal statement, highlighting your area of interest, your relevant experience and your future career goals.
11. A list of potential research Faculty in the Department of Biology and Microbiology
12. For international students:
   a. Minimum TOEFL score of 90 or IELTS score of 6.5
   b. Evidence of financial support (e.g. pre-assigned assistantship from the department (see point 3 under “Criteria for acceptance” below)
   c. Medical records

2. **Criteria for acceptance**
   Acceptance into the graduate program in the Department of Biology and Microbiology is based on two major criteria:
   1. Fulfill all the requirements listed above.
   2. Provisional acceptance by a Research Advisor. The Department only accepts graduate students who have contacted and have been accepted into the program by a particular faculty member/advisor. It is important to specify an area of interest, together with as many potential research advisors as possible.
   3. In order to qualify for a graduate teaching assistantship (GTA), all international applicants and students whose first language is not English may have to interview telephonically with the Graduate and Undergraduate coordinators, who will evaluate English speaking proficiency.

3. **What happens once you have been accepted into the program?**
   Once a research advisor has accepted you, the graduate coordinator in the Department of Biology and Microbiology will notify the SDSU graduate school of your acceptance, and will verify what kind of financial support is available (assistantship) where applicable. The SDSU Graduate School will then send a letter of acceptance to the address given in your application. You are then requested to notify the Departmental graduate coordinator and your Research Advisor if you accept the offer. You may then register as a graduate student.

   **International students:** For all international students, the SDSU Graduate School will notify the International-Affairs (http://www.sdstate.edu/international-affairs/index.cfm) office who will proceed to apply for an I-20. This I-20 and any other relevant documentation, including evidence of financial support, will be mailed to the address you have provided in your application. You are responsible for applying for a student Visa and for arranging for an interview at a US Consulate.

4. **How do you start?**
   1. Contact your major advisor as soon as possible to confirm that you will be accepting the offer to register for a graduate degree program under their guidance.
   2. Agree on a time frame for joining SDSU with your major advisor.
   3. If you do not have one, apply for a Social Security Number from the Social Security Administration.
   4. As soon as possible after arrival on campus, international students need to report to the International Affairs Office. Here you will be guided on further steps that need to be taken based on your particular visa conditions.
   5. If you have not already obtained an ID number, register for your first semester courses at registration in the Administration building. You will receive an ID number here.
6. Obtain a Student Card in the Yeager Hall.
7. Visit the departmental accountant in the main office to complete paperwork. Bring the offer letter along.
8. Submit personal information as required at Payroll (Administration Building).
9. Once you have an ID number, you can now open your WebAdvisor account at https://wa-sdsu.prod.sdbor.edu/webadvisor using your initials and last name as User ID (e.g. jjdoe). Use your ID number as the password. You can then change your password.
10. Your Mystateonline account will be activated 3 days after initial registration. To log in for the first time:
    a. Your login name is the same as your WebAdvisor User ID.
    b. Your initial password is the $ followed by your 7 digit student ID number (e.g. $1234567).
11. To Activate your Jack’s e-mail address:
    a. Go to https://mystateonline.sdstate.edu
    b. Click on “Jacks E-mail Activation Instructions”. This will open a new window.
    c. In the new window, click on “Instructions to Activate My Jacks E-Mail”. This will open another window.
    d. Follow all of the instructions to activate your Jacks e-mail.
12. Your D2L account for access to class information will be activated 3 days after initial registration. Go to https://d2l.sdbor.edu. To reset his password, he need to visit this site: https://boris.sdbor.edu/idm/retrieve-email.cfm?new
13. As soon as possible after arrival on campus, arrange a meeting with your research adviser to discuss:
    a. First courses to be taken
    b. Setting up a committee
    c. Defining a plan of study
14. If you require full time status as international student, ensure that you comply to the requirements by submitting a “Request for reduced course load” form to the International Student Affairs office.

XII-MENTOR-MENTEE CONTRACT
Biology and Microbiology dept. developed a mentor-mentee contract which was approved by SDSU Graduate Dean on Oct 19, 16 and by Bio-Micro faculty on Nov 9, 16. This mentor-mentee contract signed by each student and his/her advisor needs to be submitted to the dept. Graduate Coordinator at the start of the graduate program. The copy of the mentor-mentee contract is attached at the end of graduate manual as Appendix 10.

XIII-FORMS
All the departmental forms and documents required by graduate students for the annual evaluation, comprehensive examinations, thesis/dissertation defense or submission, travel grant and mentor-mentee contract are available at the end of graduate manual as appendices. Copies of printed forms are also available in the Bio-Micro office in McFadden Biostress building.
### I. Appendix 1 Annual Assessment Form (to be completed by each committee member).

**South Dakota State University**  
**College of Agriculture & Biological Sciences**  
**Department of Biology & Microbiology**

Student Name: ________________________________

Major Advisor: ________________________________

Name of evaluator: ________________________________

Date of Evaluation: _____/_____/_____  Year in Graduate Program: _______

<table>
<thead>
<tr>
<th></th>
<th>Superior</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Course work progress</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2. Synthesis of knowledge from course work</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3. Research work progress</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4. Knowledge of relevant literature</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5. Knowledge of research methods</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>6. Written and verbal communication skills</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7. Thinking skills</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

**Specific Comments/Recommendations:**

☐ Academic Advisor  
☐ Thesis Advisor  
☐ Grad Faculty Representative  
☐ Support Representative  
☐ Department Representative  

Signature ________________________________
II. Appendix 2 Graduate Student Annual Evaluation Summary Form
Department of Biology and Microbiology

Student Name: _______________________________
Major Advisor: _________________
Date of Evaluation: ____/____/____  Year in Graduate Program: _________

1. The Graduate Advisory Committee for this student has been formed.  □ Yes  □ No
2. The Plan of Study has been approved.  □ Yes  □ No
3. The Research Proposal has been accepted.  □ Yes  □ No
4. Biol 790- S01 (Graduate seminar-I)  □ Passed  □ Failed  □ N/A
5. Biol 790- S02 (Graduate seminar-II)  □ Passed  □ Failed  □ N/A
6. Statistics course (500 level or above)  □ Passed  □ Failed  □ N/A
7. Bios 662 course or alternate course  □ Passed  □ Failed  □ N/A
8. Biol 792- Grant writing (Ph.D. only)  □ Passed  □ Failed  □ N/A
9. GSR 601 course (Ph.D. only)  □ Passed  □ Failed  □ N/A
10. ABS 705 course (Ph.D. only)  □ Passed  □ Failed  □ N/A
11. Overall Coursework Progress*  □ Satisfactory  □ Unsatisfactory  □ N/A
    Comments on coursework progress:

12. Familiarity with the literature*  □ Satisfactory  □ Unsatisfactory  □ N/A
13. Progress report for previous year & goals for next year submitted  □ Yes  □ No
14. Research Progress*  □ Satisfactory  □ Unsatisfactory  □ N/A
    Comments on research progress:

15. Research presented at scientific meeting(s)  □ Yes  □ No
    Details:
16. Research publication in peer-reviewed journals or patent
   Details of publication(s)/patent:
   □ Yes  □ No

17. Research presented at Life Sci. Sem. series (Ph.D. only) □ Yes (When__________)  □ No

18. Two semesters of teaching experience (Ph.D. only) □ Yes (When__________)  □ No

19. Written Comprehensive Exam status (Ph.D. only) □ Passed  □ Failed  □ Not yet

20. Oral Comprehensive Exam status (Ph.D. only) □ Passed  □ Failed  □ Not yet


22. Were remediation activities required from the previous annual evaluation? □ Yes  □ No
   If yes, describe the results of the remediation activities.

23. Are remediation activities required from this annual evaluation?* □ Yes  □ No
   If yes, attach a plan for the remediation activities including a timeline for completion.

Major Advisor: _________________  Date: _____/_____/_____

Signatures of Graduate Advisory Committee Members

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

Graduate Student  Date

*Based on majority committee votes.
III. Appendix 3  Ph.D. Comprehensive Written Examination Assessment Form  
Biological Sciences-Biology and Microbiology

Student Name: ____________________________

Exam Date: _____/_____/_____
Committee Member ________________________

Please indicate your estimate of the degree to which the above-named student has achieved the educational outcomes listed below based on his/her performance during this written examination.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction - Background, hypothesis and objectives clearly presented.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Literature review - relevant previous work is clearly and logically summarized and critically evaluated</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Procedures and approaches to conduct research and/or design are clearly presented and fundamentally sound</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Expected results and pitfalls are clearly described and analyzed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Impact of the research is described</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Appropriate references cited</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Responses to written questions are clear, responsive, correct, and demonstrate the ability to apply knowledge to other applications.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Demonstrates critical thinking skills and problem solving abilities.</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

1 = Unacceptable, 2 = Acceptable, 3 = Good, 4 = Very good, 5 = Excellent

Need at least average 2 based on committee votes in each category to pass   Total: _______
IV. Appendix 4 Ph.D. Comprehensive Oral Examination Assessment Form

Biological Sciences- Biology and Microbiology

Student Name: _______________________________

Exam Date: ____/____/____  Committee Member _________________

Please indicate your estimate of the degree to which the above-named student has achieved the educational outcomes listed below based on his/her performance during this oral examination.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge of research project.</td>
<td>1</td>
</tr>
<tr>
<td>2. Demonstrates critical thinking skills and problem solving abilities.</td>
<td>1</td>
</tr>
<tr>
<td>3. General knowledge of principles of biology, microbiology, chemistry, biochemistry, statistics, analysis and design related to selected areas in the biological sciences.</td>
<td>1</td>
</tr>
<tr>
<td>4. Responses to questions are clear, responsive, and correct</td>
<td>1</td>
</tr>
<tr>
<td>5. Demonstrates the ability to apply knowledge to other applications.</td>
<td>1</td>
</tr>
<tr>
<td>6. Communication skills</td>
<td>1</td>
</tr>
</tbody>
</table>

1 = Unacceptable, 2 = Acceptable, 3 = Good, 4 = Very good, 5 = Excellent

Need at least average 2 based on committee votes in each category to pass  Total: _______
V. Appendix 5 PhD Final Defense Examination Assessment Form

Biological Sciences-Biology and Microbiology

Student Name: _______________________________

Exam Date: _____/_____/______ Committee Member ______________________

Please indicate your estimate of the degree to which the above-named student has achieved the educational outcomes listed below based on his/her performance during this oral examination.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction-Background, motivation, and objectives are clearly presented.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Literature review-relevant previous work is clearly and logically summarized and critically evaluated</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Procedures and approaches to conduct research and/or design are clearly presented</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Results are clearly described and analyzed using appropriate statistics where needed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Conclusions-significant findings are clearly identified and evaluated along with expected impact and the next step in the research or “future work”</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Prepared a well-written dissertation, and appropriate references were cited</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Research judged to be publishable as at least two articles</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Responses to questions are clear, responsive and correct, and demonstrate the ability to apply knowledge to other applications.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. Demonstrates critical thinking skills and problem solving abilities.</td>
<td></td>
</tr>
<tr>
<td>10. Oral communication skills</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Comments:
1 = Unacceptable, 2 = Acceptable, 3 = Good, 4 = Very good, 5 = Excellent

Need at least average 2 based on committee votes in each category to pass       Total: _______
VI. Appendix 6 Master of Science Option A Thesis Defense Examination Assessment Form

Biological Sciences-Biology and Microbiology

Student Name: _______________________________

Exam Date: _____/_____/______ Committee Member ______________________

Please indicate your estimate of the degree to which the above-named student has achieved the outcomes listed below based on his/her performance during this oral examination and thesis defense.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction-Background, motivation and objective clearly presented.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Literature review-relevant previous work is clearly and logically summarized and critically evaluated</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Procedures and approaches to conduct research and/or design are clearly presented</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Results are clearly described and analyzed using appropriate statistics where needed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Conclusions-significant findings are clearly identified and evaluated along with expected impact and the next step in the research or “future work”</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Written thesis - clearly written, grammatically correct, and appropriate references were cited</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Research judged to be publishable as at least one article</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Responses to questions are clear, responsive and correct, and demonstrate the ability to apply knowledge to other applications.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. Demonstrated mastery of coursework in relevant areas of the biological sciences.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>10. Oral communication skills</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Comments:
1 = Unacceptable, 2 = Acceptable, 3 = Good, 4 = Very good, 5 = Excellent

Need at least average 2 based on committee votes in each category to pass Total _______

23
VII. Appendix 7 Master of Science Plan B Examination Assessment Form

Biological Sciences-Biology and Microbiology

Student Name: _______________________________

Exam Date: ______/_____/_____ Committee Member _________________

Please indicate your estimate of the degree to which the above-named student has achieved the outcomes listed below based on his/her performance during this oral examination.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction-Background, motivation and objective were clearly presented.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Literature review-relevant previous work is clearly and logically summarized, and critically evaluated</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Procedures and approaches in the conduct of research and/or design are clearly presented</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Results are clearly described and analyzed using statistics if needed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Conclusions-significant findings are clearly identified and evaluated along with expected impact and the next step in the research or “future work”</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Research Problem Paper- Clearly written, and appropriate references were cited</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Responses to questions are clear, responsive and correct, and demonstrate the ability to apply knowledge to other applications.</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Demonstrated mastery of coursework for principles of biology, microbiology, biochemistry, and statistics related to selected areas in the biological sciences.</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

Comments

1 = Unacceptable, 2 = Acceptable, 3 = Good, 4 = Very good, 5 = Excellent

Need at least average 2 based on committee votes in each category to pass  Total: _______
Appendix 8 Thesis/Dissertation Submission Form

Department of Biology and Microbiology

Student Name: _______________________________

Advisors Name: _______________________________

Name of the Program: ________________________

It is certified that all the Biology and Microbiology Graduate program graduation requirements based on the 2012-13 ‘Graduate student manual’ and ‘Graduate Degree Assessment Plan’ have been completed and final version of the thesis/dissertation approved by the major advisor and advisory committee is ready for the submission to the graduate school after signature of the Department Head. The final signed copy of the thesis will be submitted to Graduate School on__________________.

Signature of Graduate student: _________________ Date: _____/_____/_____

Signature of Major Advisor: _________________ Date: _____/_____/_____

Signature of Graduate Coordinator: _________________ Date: _____/_____/_____

Signature of the Dept. Head: _________________ Date: _____/_____/_____

Note: This form should be submitted back to the Graduate Coordinator after Department Head signed the thesis/dissertation.
APPLIED FOR BIOLOGY AND MICROBIOLOGY
TRAVEL GRANT FOR GRADUATE STUDENTS
Please submit request by email to: radhey.kaushik@sdstate.edu

Deadlines: January 3 May 1 Sept 1

Name: Date:

Degree: Advisor:

Year in Program: Expected Graduation Date:

Department registered in: Date of Application:

The Department of Biology and Microbiology established a travel grant program to assist graduate students registered through the Department of Biology and Microbiology in attending professional meetings. The program is funded with faculty/ alumni donations and indirect costs accrued from grants in the department. The guidelines include the following criteria: (1) Student should be the senior author of the paper or poster; (2) Greater weighting is awarded for national and international versus regional or state meetings; (3) Student applying first time will be given preference (4) As the grant seeks merely to fill gaps, students towards the end of their program are given preference; and (5) Students must submit this request form (TYPED) outlining need and how the student's program will profit from the travel.

Meeting to be attended:

Location:

Date of Meeting:

Itemized budget estimate.
   a. Hotel
   b. Airfare
   c. Registration
   d. Meals
   e. Others
   f. Total estimated budget:

Funding sources:

1. Primary source of funding: a) Grant number and amount:
   b) Out-of-pocket amount:

2. Secondary source of funding if any: a) Grant number and amount:
   b) Out-of-pocket amount:

Amount requested from the Bio-Micro Department:
Previous meetings attended (Name of meeting, location and date):

Other Students or Faculty making trip to the conference:

Title, authors and abstract of paper or presentation:

Please indicate your need and how your program will profit from the travel:

Have you received the award earlier? No______ Yes______

If Yes:
   A. When (provide month and Year):

   B. Name of Conference:

   C. Amount awarded:
Appendix-10

Mentor-Mentee Contract for the Biology-Microbiology Dept.
(Approved by SDSU Graduate Dean on Oct 19, 16 and by Bio-Micro faculty on Nov 9, 16)

This document is a supplement to the Departmental Graduate Student Manual. If you have questions about either document, contact your advisor or the departmental graduate program coordinator.

As a member of my research laboratory, your goal will be to help publish our data in scientific journals. This will also have a great impact on your professional development and progress towards your degree. Below is a list of things we should expect of each other.

What to expect from me: I am committed to your education and training while you are in my lab, and to advising and guiding your career long after you leave. I will strive to be supportive and accessible. I will do my best to understand your unique situation, and mentor you accordingly.

1. I am your advocate, as well as your advisor. I will help you with professional problems you might have with other students, professors, or staff.
2. I will foster your professional confidence and will encourage your critical thinking and creativity.
3. I will help you navigate your graduate program of study. I will help you interpret departmental and college requirements, select appropriate coursework, and select your graduate committee members.
4. I will lead by example and facilitate your training in the skills you will need to be a successful scientist. These include: oral and written communication skills, grant writing, lab management, mentoring, and scientific professionalism.
5. If you feel uncertain, overwhelmed, or need additional support, please talk to me about it. I welcome these conversations and view them as necessary. Do not cancel meetings with me if you have not made adequate progress on your research. Such a meeting may be the most productive conversation of your career.
6. If provided with sufficient time and instruction, I will provide appropriate editing and feedback with provisos.

You will take ownership of your educational experience: You have the primary responsibility for the successful completion of your degree [Section VIII in the Dept. Grad. Manual]. I will help you set goals but I cannot do the work for you. This includes commitment to both your coursework and laboratory research work.

1. Be knowledgeable of the policies, deadlines, and requirements of both the Graduate School and our departmental graduate program.
2. Meet with me regularly to describe challenges, successes, and to communicate new ideas.
3. Keep up with the new literature and take time to dig into the classic papers in our field. Regularly spend several hours each week perusing journals or doing literature searches. Maintain a record/database/library of your literature searches.
4. You will exhibit excellence in all of your course work because those exercises will affect your success in my research laboratory.
5. You are obligated to present your data at meetings and seminars and then publish our findings as soon as the data are ready. This important process is the cornerstone of your education and of your career.

You will be a team player: You will help your lab mates comply with institutional policies and laboratory practices related to chemical safety, biosafety, and fieldwork. You will attend and actively participate in all lab meetings and weekly departmental seminars. You will show up on time and prepared for these meetings.

1. Respond promptly (<24 hours) to emails from me, the department admin staff, or from anyone in the lab.
2. As a member in this lab, you are expected to help each other or work together whenever possible. Teach each other your protocols, such cross-training could be valuable in the future.
3. You will present your research progress during our lab meetings. I expect you to actively contribute to our discussions and to support other lab members with shared insight.
4. Collaboration with students in and beyond our lab - always acknowledge the efforts of your collaborators. If you wish to add their name as an author to a paper, please discuss this with me early in the writing process.

You will demonstrate excellent research skills and responsible conduct in research: You will learn how to plan, design, and conduct high quality scientific research. You will be responsive to advice and constructive criticism from me, or your committee members, in terms of technique and procedure. You are strongly encouraged to respond with well-documented and well-argued counter-arguments.

1. Maintain detailed, organized, and accurate laboratory records. Back up your data on a regular basis.
2. You will always follow ethical and honest research conduct with integrity in accordance with SD-BOR policies.
3. Update your mentor on research progress on regular basis as mutually agreeable to mentor and mentee.
4. Your notes, records, and data are SDSU (SD-BOR) property and will stay in the lab. When you leave the lab, I encourage you to take a copy of your data with you [Section VIII-5 in the Dept. Grad. Manual].
5. Use our laboratory resources carefully and frugally. If your break something, or run out of reagents, tell me, and the lab members immediately so that we can adjust our schedules accordingly.
6. Be vigilant and attentive in the lab. Mistakes do happen but mistakes which result from carelessness should be avoided. Making mistakes with similar nature more than once are not acceptable.
7. You may be using equipment that does not belong to our lab. Respect and treat that equipment more carefully than our own. Return it as soon as possible in the same condition (or better) than you found it. If something breaks, tell me immediately so that we can fix or replace it.

You will strive to meet deadlines: We will establish mutually agreed upon deadlines for each phase of your project. It is your responsibility to tell me if you are having difficulty completing your work on time.
1. Update your calendar frequently regarding project benchmarks, conferences, submission deadlines, etc.
2. As long as you are meeting your deadlines and expectations, you can largely set your own schedule.
3. Prior to a submission deadline, you must plan to give me at least one week for me to respond to small things (conference abstracts, travel subsidy awards) and 3-4 weeks for me to work on chapter drafts, manuscripts, or grant proposals.

You will attend scientific meetings and publish your data: I expect you to attend at least one (for MS student) or two (for Ph.D. students) scientific conference(s) during your program [Section VII in the Dept. Grad. Manual]. These conferences provide irreplaceable insight into trends in our field and the behavioral norms of professional scholars. They provide an opportunity to network with new colleagues and to attend seminars dedicated to professional skills such as writing grant proposals or journal articles. Consider them to be a stepping stone to publishing your data and improving your chances of getting a job after graduation.
1. If grant money is available, I will make every effort to subsidize your travel to such meetings. However, you are a student, not an employee. As such, you can expect to pay for some of this educational experience. You should work with your cohort and strategize how to reduce expenses by driving together or even lodging together at major national conferences.
2. When you attend a conference, I expect you to attend scientific sessions and participate in conference activities during the entire time you are there. I will do my best to introduce you to my colleagues at these meetings.
3. You are encouraged to apply for the small travel scholarships that are often available through the Bio-Micro department and the conference sponsors.
4. It is important that we communicate openly about data ownership and authorship policies. This discussion is important because misunderstandings create unnecessary conflicts within the lab and among collaborators [Section VIII-7 in the Dept. Grad. Manual]. However, it is my general policy that students are listed as first-author on all work for which they lead the efforts on data collection, data analysis, and preparation of the initial draft of the manuscript.

We will evaluate you every year: We (graduate committee) will sit down to discuss your progress [Appendix I and II, Dept. Grad. Manual]. At that time, you must tell me if you are unhappy with any aspect of your program. If you feel that you need more guidance, tell me. If you feel that I am interfering too much with your work, tell me. If you would like to meet with me more often, tell me. We (graduate committee) will tell you if we are satisfied with your progress and if we think you are on track to graduate. I as your mentor will document and explain to you any perceived deficiencies, so that you can take steps to fix them. This meeting will be a good time for us to take care of any issues before they become major problems.

________________________________________________________________________
Name of the supervisor

Signature of the supervisor

Signature date

Name of graduate student

Signature of graduate student

Signature date
List of Graduate Courses for the Biology and Microbiology Graduate Program

**Required courses:**
BIOS 662 Advanced Molecular Biology (3 Cr, Fall)
BIOL 790 Seminar (1 Cr, Fall) – focusses on oral communication
BIOL 790 Seminar (2 Cr, Spring) – scientific writing (1 Cr) and on Scientific proficiency (1 Cr).
One graduate Stats course – either:
STAT 541 Statistical methods II (3 Cr, every semester)
STAT 535 Bioinformatics (3 Cr, Spring)

**Required only for PhD students:**
ABS 705 Res Method-Mol Res & Diag Tech (3 Cr, Spring)
GSR 601 Research Compliance

**Electives:**
ABS 705 Res Method-Mol Res & Diag Tech (3 Cr, Spring)
BIOL 567 Parasitology (3 Cr, Spring)
BIOL 570 Cancer Biology (3 Cr, Spring)
BIOL 576 Advanced Mammalian Physiology (4 Cr, Fall)
BIOL 646 Bioimaging (2 Cr, Fall)
BIOL 792 S01 Topics in Cell and Molecular Biology (1Cr, Fall and Spring), Journal Club
BIOL 792 S02 Topics in Grant Writing (1Cr, Fall)
BIOS 663 Adv Concepts in Infectious Disease (6 Cr, Spring)
BIOS 664 Molecular Plant Physiology (3 Cr, Spring)
BIOS 665 Cell Biology (3 Cr Spring)
BIOS 667 Bacteriology (3 Cr, Spring); not yet on the system but will be offered from Spring 2019
BIOS 792 Topics – Epigenetics (2 Cr, Spring, but could change to Fall)
MICR 521 Soil Microbiology (3 Cr, Spring)
MICR 524 Medical and Veterinary Virology (3 Cr, Fall)
MICR 533 Medical Microbiology (3 Cr, Spring)
MICR 539 Medical and Veterinary Immunology (3 Cr, Fall)
MICR 550 Applied Microbiology and Biotechnology (3 Cr, Fall)
MICR 792 Topics in Biomedical Science (1Cr, Fall and Spring), Journal Club

All 500 level courses are senior undergraduate courses that can be taken by graduate students who take the same classes and exams, but need to do some additional assignments/exercises.
Appendix-12
Rubrics for Proposals Required for the PhD Comprehensive Written Exam-Fall 2017 onward

General requirements
The proposal must comply to the required format and page limit requirements as defined in the particular agency’s grant proposal guidelines. A “no” to this question will require revision and resubmission.

A proposal is acceptable and will be considered as “pass” if it earns an average of 75 out of 100 points from the examiners (Graduate Committee). The graduate committee evaluation of the proposal will be considered final, leading to the grade for the comprehensive exam.

Eligible Grant Agencies
- Students are encouraged to choose from among USDA-NIFA, NSF and NIH grant opportunities.
- Graduate students may choose to use any other federal agency’s grant writing formats upon the approval of their graduate committee.

For a USDA-NIFA proposal (Total 100 points)

Project Summary/Abstract (250 words) (20 points total)
- Clear description on the goals and the objectives of the research. (4 points)
- Brief description of the rationale and significance of the project. (4 points)
- Brief description of the methods and analysis tools to be used. (4 points)
- Brief description of the expected outcomes and how they can be used. (4 points)
- Brief outline of the relevance of the project to the goals/priorities of the agency. (4 points)

Project Narrative (18 pages) (75 points total)
A. Introduction (20 points)
   - The long-term goal(s) and supporting objectives of the proposed research. (2 points)
   - The body of knowledge and/or previous activities that substantiate the need for the proposed research. (10 points)
   - Description of ongoing or recently completed activities significant to the proposed research, including the work of key project personnel. (3 points)
   - Inclusion of preliminary data or information pertinent to the proposed research. (5 points)

B. Rationale and Significance (15 points)
   - Concise presentation of the rationale behind the proposed research. (5 points)
   - Description of the specific relationship of the research’s objectives to one of the Program Area Priorities. (5 points)
   - Impact of the proposed research on potential long-range improvement in and sustainability of U.S. agriculture and food systems. (5 points)

C. Approach (40 points)
   - A clear summary description of the activities proposed and the sequence in which the activities are to be performed. (10 points)
   - Methods to be used in carrying out the proposed research, including the feasibility of the methods. (10 points)
   - Expected outcomes and how they will be used. (5 points)
   - Means by which results will be analyzed, assessed, or interpreted. (5 points)
   - Pitfalls that may be encountered, the limitations to the proposed procedures, and alternatives to overcome these limitations. (5 points)
   - A timeline for attainment of project objectives, and for production of deliverables, to include annual milestones with specific, measureable outcomes. (5 points)

Literature Cited (5 points total)
- Each reference includes the names of authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. It must include bibliographic citations only and may not be used to provide parenthetical information outside of the 18-page project description. (3 points)
- In-text citations are uniform in style throughout the proposal (2 points)

**For an NSF proposal (Total 100 points)**

**Project summary (one page) (20 points total)**
- An overview of the proposed research (8 points)
- A brief statement of the intellectual merit of the proposed activities (6 points)
- A brief statement on the broader impacts of the proposed activities (6 points)

**Project description (15 pages) (75 points total)**

A. **Introduction (20 points)**
- A clear statement of the work to be undertaken (5 points)
- The goal and the objectives for the period of the proposed work (5 points)
- The expected significance (4 points)
- The relationship of this work to the present state of knowledge in the field and/or to work in progress by the Principal Investigator (PI) under other support. (6 points)

B. **The plan of work (40 points)**
- An outline of the general plan of work, including the broad design of activities to be undertaken. (8 points)
- A clear description of experimental methods and procedures, addressing why these should be performed. (15 points)
- Description of how they will determine if they succeed. (8 points)
- What benefits could accrue if the project is successful (4 points)
- A plan for data management and sharing of the products of research (5 points)

C. **Broader impacts 15 points**
- How the proposed research impacts the scientific field through the proposed activities (8 points)
- How advancement of scientific knowledge and activities by the proposed research contributes to the achievement of societally relevant outcomes (7 points)

**Literature Cited (5 points total)**
- Each reference includes the names of authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. It must include bibliographic citations only and must not be used to provide parenthetical information outside of the 15-page project description. (3 points)
- In-text citations are uniform in style throughout the proposal. (2 points)

**For an NIH Exploratory/Developmental Research Grant Award (R21) (Total 100 points)**

**Project Summary/Abstract (30 lines or less of text) and Project Narrative (no more than 2-3 sentences. (Total 20 points)**
- The goal and the objectives of the research are clearly stated. (4 points)
- The rationale and significance of the project are described briefly. (4 points)
- The methods and analysis tools to be used are described briefly. (4 points)
- The expected outcomes and how to use them are briefly described. (4 points)
- Project narrative: Relevance of the project to public health and the mission of the agency is stated. (4 points)

**Specific Research Plan:**
The research plan describes the background information on the research area, specific aims of the research project, proposed research stating its significance and innovation, and how it will be conducted. This include the following sections:

**Introduction and Specific Aims: One page or less. (20 points)**
Includes enough background information to enable the reader to understand the proposed work, and the reasoning to conduct the research. The research objectives and aims are briefly described, with a short explanation for each objective/aim.
Research Strategy: Total 6 pages or less. (55 points)

A. **Significance.** 20 points
   Evaluation criteria:
   - Does the project address an important problem or a critical barrier to progress in the field?
   - Is there a strong scientific premise for the project?
   - If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved?
   - How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field?

B. **Innovation.** (5 points)
   Evaluation criteria:
   - Does the application challenge and seek to shift current research or clinical practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, instrumentation, or interventions?
   - Are the concepts, approaches or methodologies, instrumentation, or interventions novel to one field of research or novel in a broad sense?
   - Is a refinement, improvement, or new application of theoretical concepts, approaches or methodologies, instrumentation, or interventions proposed?

C. **Approach.** (30 points)
   Evaluation criteria:
   - Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the specific aims of the project?
   - Have the investigators presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?
   - Are potential problems, alternative strategies, and benchmarks for success presented?
   - Are expected outcomes and alternative approaches section for each aim/objective included?
   - If the project is in the early stages of development, will the strategy establish feasibility and will particularly risky aspects be managed?
   - Have the investigators presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects?
   - If the project involves clinical research, are the plans for 1) protection of human subjects from research risks, and 2) inclusion of minorities and members of both sexes/genders, as well as the inclusion of children, justified in terms of the scientific goals and research strategy proposed?
   - If use of live vertebrate animals is proposed, do procedures adhere to the requirements of the Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals (Policy)?

**Literature Cited** (5 points)
   - Is a bibliography of all references cited in the Research Plan included?
   - Does each reference include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication?
   - Are only bibliographic citations included?
   - Are scholarly practices followed in providing citations for source materials relied upon when preparing any section of the application?
   - Are in-text citations uniform in style throughout the proposal?
I ______________________________ have received the electronic copies of
Department of Biology and Microbiology ‘Graduate Student Manual’ and ‘Graduate Degree
Assessment Plan’. I undertake to familiarize myself with their content, and accept all stipulations as
spelled out therein.

Signed: ___________________________

Date: ____________________________