

**Biology Honors Student Information Sheet** (voted for by Biology faculty in spring 2009; most recent updates: 06/12/23, 07/07/20, 10/3/19, 8/30/18, 4/19/18, 1/18/18, 2/8/17, 10/12/16)

**Outline of Honors and Biology requirements for Honors Biology majors** (see page 3-11 for more specific information; Biotech majors should consult the Biotechnology Program Director for your Honors College information)

Biology majors have their choice of four pathways, only three of which are actually in Honors:

1. Graduate with an **Honors Interdisciplinary Studies minor** by completing 19 credit hours (CH) comprised of Honors 100/101 (1 CH), and 18 CH of Honors courses, which must include a diversity or global engagement course, and an experiential learning course. See the [Honors program advising sheet](#) for more information.
2. Graduate as an **Honors Scholar with Distinction in Biology** by completing pathway 1, and a departmental capstone/senior thesis/senior project, which is BIO 499A, 499B, and 499C (2 CH each for 6 CH). This has additional Honors and Biology course requirements, including BIO 491H and BIO 495/6H, which are explained below.
3. Graduate as an **Honors Scholar** by completing pathway 1, and a senior portfolio project (SPP). This has additional Honors course requirements that are discussed in the Honors college website.
4. Graduate with **Distinction in Biology** by just doing a departmental capstone/senior thesis/senior project, which is BIO 499A-C (2 CH each for 6 CH). This does not require being in the Honors College and has no additional Honors or Biology course requirements.

#### Important messages to students, advisors and readers:

Honors Biology majors must choose among pathways 1-3 by fall term of their junior year, but there are good reasons to make their choice earlier.

Since the BIO 491H and BIO 495/6H requirements for pathway 2 are preferably met in sophomore or junior year (BIO 491H could also be done in senior year), it is in the best interests of students and project advisors that students interested in doing a senior thesis make this decision in their freshman or sophomore year.

The required package of BIO 491H (2 CH) and BIO 495/6H (1 CH) courses is to ensure that students establish a working relationship with a future advisor and have acquired some writing training and research experience before starting thesis work. This is why students are expected to take these courses in their sophomore and junior years, and why students are encouraged to search for a research advisor in their area of interest in sophomore year, if not earlier. As BIO 491H and BIO 495/6H are not required for pathway 4, this pathway is generally available only to students who have already worked in the advisor's lab doing BIO 495/6/7 courses prior to spring of their junior year.

Students and their advisor must register for BIO 499A in spring of junior year, and for BIO 499B and 499C in the fall and spring of senior year respectively. This involves completing and signing

a yellow permission form, submitting it to the Biology main office, and the student looking for and registering for the course in MyMadison.

BIO 499A requires the student and advisor to find two readers who will contribute to the development and completion of the research project. The student is required to produce and submit a thesis proposal (see below for specifics) that is approved by advisor, readers, and Honors liaison, in that order, before the student submits it and a capstone application form to the Honors college by the deadline posted by the [Honors College](#).

BIO 499C requires the student to produce and submit an advisor- and reader-approved thesis to the Honors college and give a public presentation (see below for specifics) by the deadline posted by the [Honors College](#).

BIO 499A-C all require the student to commit a minimum of 8 hours per week; the student to meet with advisors and readers at least twice per term to discuss research progress; and the advisor and readers to set deadlines and give regular advice and feedback to ensure that adequate research progress is being made.

Per the [Honors College guidelines](#) that a department thesis policy takes precedence over the Honors College thesis policy, BIO 499A-C are for research projects, not creative projects.

Neither the Honors College nor the Biology department guarantees that students will find a thesis or senior portfolio advisor.

### Important messages to research advisors:

The BIO 491H and BIO 495/6H requirements are conveyed to students by this document, and by advising from the research advisor (you if you have Honors students in your lab), the Honors liaison (me), Julia Stutzman, and the Honors college advisors. Since these requirements can only be implemented *once* a student commits verbally with their advisor to doing a thesis, the sooner advisors speak with their Honors students about making this decision, the better.

There is no GPA requirement for a non-Honors student to start a thesis project or to stay in the project once started. The GPA requirements for joining the Honors College apply only to students joining the Honors Interdisciplinary Studies Minor, and the GPA requirement to stay in the Honors College (a GPA of 3 or higher in Honors classes only) are checked and implemented entirely by the Honors College staff.

**This outline is presented for quick reference only.** Students, advisors and readers are encouraged to read the remainder of this document for additional information and advice, as well as for the rationales, details, restrictions, flexibility and exceptions that apply to particular steps, and the recommendations for problem and conflict resolution. As deadline dates are set by the Honors College, students and faculty are asked to get these from the [Honors College deadline webpage](#) directly.

**If you have questions**, contact me, Chris Rose, Biology Honors Liaison, at [rosecs@jmu.edu](mailto:rosecs@jmu.edu).

## **General description of Honors Biology requirements:**

Biology has emerged as a pre-eminent science of our times, impacting society on issues as diverse as environmental deterioration, global warming, energy production, human reproduction, science education and the battles against cancer, pathogens and age-related and genetic diseases. Having a detailed understanding of how biological research is done is becoming increasingly important for making informed decisions about social and political policies as well as for entering into the many biology-related career paths now available. Biology Honors thesis projects (BIO 499, also called senior research or capstone projects) are intended to give high-caliber students first-hand experience in designing and carrying out biological research on a subject of interest to them. By working in close relation with one or more experienced faculty members, students are also exposed to the collaborative nature of research activity, which is vital to doing innovative and productive science. BIO 499 projects can also be “hands-off” scholarship projects, meaning strictly library/internet research and writing projects on research or the history of research in Biology, or related fields.

Honors Biology Majors are required to take a 3-credit hour course package of BIO 491H (2 credit hours) and BIO 495/6H (1 credit hour) courses during their sophomore and junior years and before starting BIO 499A. This package is to ensure that students establish a working relationship with a future advisor and acquire some writing training and research experience before starting thesis work. The three credit hours earned in these courses count towards the 19 credit hours required for the Honors Interdisciplinary Minor. Faculty are encouraged to have their non-Honors research students take BIO 491H (as BIO 491), as this course is open to all majors with permission of the instructor. Permission is granted by the student getting a yellow pre-registration form signed by the Honors liaison, submitting it to the Biology main office, and looking for the course to appear in MyMadison. Advisors and students must also use the yellow pre-registration form to register for BIO 495/6H.

## **General description of the senior research (or Honors thesis) project:**

Biology Majors are free to work with faculty outside Biology and to earn credits toward the 40 credit hour Biology Majors requirement as long as they register in BIO 499, select subject matter that is related to Biology, and have a co-advisor within the Biology department who assumes the responsibility of ensuring that the student fulfills the requirements for Honors projects in Biology as stipulated on this form. Such students must get signatures on all Honors documents from their advisor and Biology co-advisor plus the AUH of Biology and the dean of CSM. Biology Majors must also have completed all four Biology core courses (BIO 140, 150, 240, 250) prior to starting a Bio 499 Honors project. BIO 499 gives credit for research projects but not creative projects.

Biology Majors can choose to earn honors thesis credits in other departments or colleges (e.g. CHEM 499, HONORS 499) that do not count toward the 40 credit hour Biology Majors requirement. This alternative includes a cross-disciplinary writing project that is done as HONORS 499 and can be supervised by a committee of faculty from any part of the university. Students who are not Biology Majors and who wish to do a project with Biology faculty can do so for BIO 499 credit, and are subject to the requirements and credit system of Biology honors projects.

Students can also arrange with their advisor to do the research as a collaborative project involving two or more students. This arrangement must follow the [Honors College guidelines for Collaborative Projects](#) and the justification and plan for submitting the final project must be provided in the proposal.

Honors thesis projects in Biology are usually done in three consecutive semesters and require registration in three 2-credit hour BIO 499 courses (BIO 499A, 499B, and 499C). These courses are usually taken in spring semester of junior year, and fall and spring semesters of senior year. However, students, with the permission of their faculty advisor (see below), can start the program earlier, in the fall semester of junior year, or later, in the summer session between junior and senior years. Students who start an Honors thesis project in their junior year can but are not required to do research during the summer between their junior and senior years. How they register to do summer research (i.e., in a BIO 499, BIO 497 or another course), what credit hours they receive, and if and how they are paid must be determined by arrangement with the faculty advisor. One BIO 499 course (499A or 499B) can be taken in summer school, but the other two BIO 499 courses must be taken during fall and spring semesters. Students are discouraged from taking BIO 499 courses as eight-week block courses since it requires double the weekly time commitment (see red text below for the one exception).

## Steps for arranging a thesis project:

**1.** At the beginning of their junior year or earlier, **students must go to the Handbook page of the Honors College website**, read through the Honors Project Info section and obtain an application form from the Honors Project Forms section.

**2. Students must identify a faculty adviser** before or at the beginning of their junior year. The best way to do this is to review the department webpage listings of Biology professors and their research projects, find several doing interesting research, and contact them by email to see if they have space in their labs and are willing to support a thesis student. Most students who do a thesis project in Biology find an advisor and start doing research before their junior year. The advantage of doing a BIO 495/6H before BIO 499A is that the professor and student are already familiar with each other at the start of BIO 499A, the professor can be more confident that the student has the ability and drive required to do an Honors project, and the student is aware in advance of the professor's expectations for an Honors project. Also, students who wait until the middle of their junior year to find a faculty advisor might have difficulty finding one whose research interests them and who is willing to take on an unfamiliar student at that time. Thus, it is important that the student act sooner, rather than later, to contact a professor and initiate research, as the longer one waits, the more difficult it can become. Students wishing to start the Honors project earlier or later than spring semester of their junior year must arrange this in advance with their faculty advisor. Once a student has found a faculty advisor, the advisor and student must agree upon and invite two faculty members to serve as committee members. The committee can be formed before starting a BIO 499A, but it should be formed at the very latest within the first month of BIO 499A. The advisor and readers must have a PhD or Masters and be permanent faculty members at JMU, though others including term faculty and faculty at other institutions can serve as additional committee members.

**3. The faculty advisor must ensure that** any student who requests to do a thesis project under their supervision has or will have completed the Biology core courses, exhibits sufficient drive and intellectual maturity to do a thesis project, and has a course load and extracurricular activity expectations that are compatible with completing it. Faculty advisors are advised to look at student degree progress reports for verifying core course requirements and to ask about student extracurricular activity and work schedules **before** taking on a student. Faculty advisors must also decide if and when a student should complete other cognate and biology course requirements as preparation for doing their particular thesis projects.

There is no GPA requirement for a non-Honors student to start a thesis project or to stay in the project once started. The GPA requirement for joining the Honors College ( $\geq 3.3$ ) applies only to students joining the Honors Interdisciplinary Studies Minor, and the GPA requirement to stay in the Honors College ( $\geq 3$  in Honors classes only) is checked and implemented entirely by the Honors College staff.

## **General requirements for BIO 499A, B and C:**

**Students are required to commit a minimum of 8 hours per week** to each BIO 499 course (or the equivalent if taken as a 7-week first or second block course or summer course). This includes time spent in lab and group meetings. Although faculty advisors recognize the need for flexibility in research schedules, missed BIO 499 time must be made up in subsequent weeks.

**Students should meet regularly throughout each term with their advisor and at least twice per term with their readers.** The main purpose of these meetings is for the advisor to oversee the project, i.e., develop the project, define a timeline of activities and a set of expectations for research activity and literature review, set deadlines, and discuss problems and trouble shooting. A second purpose is for the student, advisor and readers to stay abreast of the progress being made and to decide, if necessary, whether sufficient progress is being made to justify continuing the project. If the answer is no, options include transferring to a BIO 497 or BIO 495 or stopping research altogether. The criteria for the decision are the level of student performance, the reason for any underperformance, and the student's demonstrated levels of motivation and ability.

**Faculty advisors assign grades for BIO 499A, B and C.** An incomplete grade should not be given for BIO 499A and B, though it can be given for BIO 499C.

Though the GPA requirement to stay in the Honors College ( $\geq 3$  in Honors classes only) is checked and implemented now entirely by the Honors College, faculty should be aware that a B or higher is considered satisfactory for continuation in BIO 499.

**The advisor and student must submit a pre-registration form to the Biology main office for the student to be able to register for BIO 499A-C in MyMadison.**

## Specific requirements for BIO 499A:

**The faculty advisor and student must first decide upon the general nature of the project and select two faculty to be readers.** The advisor and student, with input from readers, develop a research project that can be done within the scope of three two-credit courses and work out a mutually acceptable timeline for carrying out the training, library research, writing, and research activity required to complete the project. Given the time-sensitive nature of much biology research, the scheduling of research training and activity over the course of BIO 499A, 499B and 499C is flexible. Students who start research with their advisor earlier than the start of BIO 499A might be required by their advisor to complete the library research and proposal requirements for a thesis project in a BIO 496 Research Literature course in the semester prior to BIO 499A. This would allow the student to participate more fully in research activity in BIO 499A. However, a proposal produced in a BIO 496 course still requires the approval of the readers who, if selected after the completion of the BIO 496, might ask the proposal to be revised to meet their requirements.

**The faculty advisor and student must then decide whether the project will be done collaboratively.** Collaborative projects must follow the guidelines provided at the [Honors College Collaborative Project guidelines](#). Most importantly, *“Each student working collaboratively on a project must submit a separate application and proposal.”*

**Students are required to complete and submit a thesis proposal with the following sections:** Introduction, Methods, Timeline, and References. The introduction must place the proposed research in a broader theoretical or conceptual context and explain why the research is important in terms of theory, application and/or generation of new knowledge. It must also describe what is currently well established in the broader area, identify unanswered questions that relate to the proposed research, and indicate how the proposed research will answer those questions or fill in a gap in our knowledge. The introduction should finish by explicitly stating the hypothesis or question being addressed (or the objectives of the research), and if appropriate, providing predictions of objectives or tests. The methods section should describe the methods in sufficient detail for committee members to evaluate their adequacy, feasibility and appropriateness for the tasks in question. This section should also provide details on data analysis, including statistical tests. The timeline should outline when major aspects of the research will be accomplished and when writing will commence. Biology thesis proposals are generally at least 1250 words long, and have a minimum of 7 references to scientific journal articles, review articles, and scientific texts, which must be properly cited and referenced. The writing style must be polished and free of typos.

For hands-off’ scholarship projects, meaning library/internet research and writing projects on research or the history of research in Biology, the proposal would follow the same general outline and requirements, the introduction would indicate one or more questions to be asked and the methods would indicate a strategy for how information or data will be collected and analyzed to answer the question(s). These requirements are in keeping with the general intention of thesis experiences to be guided inquiry and discovery, as opposed to merely description.

**If parts of two or more separate (i.e., non-collaborative) proposals overlap, to avoid the appearance and possible charge of plagiarism, all parts of each thesis proposal must be written by**

the student whose name goes on it, even if, for example, the materials and methods are exactly the same in multiple projects.

### **Schedule for completion of the proposal:**

**The advisor and readers are required** to return comments on drafts of a proposal to the student on a timely basis and to ensure that the proposal complies with their expectations for scholarship before they approve it.

**Students are required to have their proposal completed and approved by the advisor and readers at least one week before the Honors College deadline at the end of the 499A semester**, which is usually in late November or mid April, or the end of summer for students who do BIO 499A in summer session.

**If this is not feasible**, and the advisor think that an extension of 1-2 weeks will solve the problem, then the advisor must request an extension from the Honors college and the Honors liaison. If the advisor does not think an extension of this length will solve the problem, then the advisor is requested to consult the liaison for advice. Keep in mind that Honors deadlines are already set to maximize the time available for completing the work, and that extensions can only work if students are likely to complete proposals and get them approved in time for grades to be assigned before the grade posting deadline.

**Once the proposal has been approved by the advisor and readers**, the student submits the proposal to the Honors liaison for a final check that it meets the Biology department requirements regarding the minimum numbers of words and references, and being polished writing.

**Once the proposal has been approved by the Honors liaison**, the students emails it and the thesis application form to the Honors college.

**Once the Honors college email backs to the department to ask for final approval**, the liaison alone responds to convey approval on behalf of all parties.



## Specific requirements for BIO 499B and BIO 499C:

In the event that a student who has already started or committed to start a BIO 499A with an advisor learns that they **need to graduate a semester early**, they are advised to register for BIO 499B and BIO 499C as separate blocks in the second semester. This option must be agreed upon by the advisor who must ensure that the project meets the same expectations in scope and depth as a three-semester honors project. **This is the only option available for completing BIO 499A-C in two semesters and there is no option available for completing BIO 499A-C in one semester.**

BIO 499B usually involves research activity, and BIO 499C usually involves completing the planned research activity, writing the thesis, responding to revisions requested by the faculty adviser and committee members, and preparing the final document for submission to the Honors College. In addition to the two required meetings with the student per term, advisors and readers can elect to schedule additional meetings to review progress in research activity and early drafts of the thesis.

**The advisor and readers are required** to provide students with unambiguous instructions and a clearly defined timeline for completing various drafts of the thesis, and to return comments on each draft on a timely basis.

**The student is required to comply with the committee's instructions** according to the timeline, respond to all requests for thesis revisions, and otherwise fulfill the committee's expectations for research and scholarship activity.

**Unless they arrange to submit their thesis in journal format beforehand (see below), the student is required to produce a final thesis with the following:** an introduction with literature review and statement of the problem, methods, results, and discussion sections, and a bibliography with references that are properly formatted. The length of the thesis and the number of references cited must be sufficient to meet the committee's expectations for Honors scholarship activity. All parties are reminded that the Honors College requires that Honors theses resemble Masters theses in terms of scholarship, i.e. with strong emphasis on literature review and explaining how the science is done and why. Although the organization of the material is flexible, the thesis must conform to all format requirements specified at the [Honors College website](#). The writing style must be polished and free of typos.

**The student and faculty advisor can agree to have the thesis submitted in the format of a specific journal.** The final thesis must still contain a title page, table of contents, list of figures, acknowledgements and bibliography, and have consistent formatting throughout the text.

**The student is required to give a public presentation (talk or poster) of their research** in the presence of their advisor and/or readers at the Honors symposium, Biosymposium, a professional scientific conference such as NCUR or VAS, or another scientific setting outside of the classroom sometime before they graduate.

**Once the thesis is fully approved by the advisor and readers, the advisor and readers are required to send approval emails to [honors-project@jmu.edu](mailto:honors-project@jmu.edu), stating the name of the student, their major, the title of the thesis, and the role of the emailer (advisor or reader).**

**Once the thesis is fully approved, the student is required to email the final thesis as a properly named and formatted pdf to [honors-project@jmu.edu](mailto:honors-project@jmu.edu) by the deadline posted by the [Honors College](#).** It is not sent to the Honors liaison. Requests for an extension with justification should be made directly to the Honors College. Keep in mind that graduation dates might be impacted by late submissions, posing a real concern for students entering graduate schools or jobs.

**To be considered for the Outstanding Thesis Award in Biology,** a final version of the thesis must be received by the Biology Awards Committee by the deadline set by that committee.

**To be considered for the Phi Kappa Phi and Phi Beta Kappa best thesis awards,** the thesis must be submitted by the **deadline posted by the [Honors College](#).**

**The adviser is required to assign grades for BIO 499B and BIO 499C** based on their own rubric for assessing the progress made, the quality of the final product, and the ability of the student to meet deadlines and respond to requested revisions. A grade of Incomplete is acceptable for BIO 499B and BIO 499C given sufficient justification. Under no circumstances can a faculty advisor assign a grade other than Incomplete for BIO 499C until the thesis has been completed, approved and submitted to the Honors College.

**If advisor and readers decide that a senior thesis does not meet the high standards** necessary to receive Honors credit, they can assign a grade lower than B for the completion of work in BIO 499C. A grade lower than B will indicate that the student is being denied the opportunity to graduate as an “Honors Scholar” and/or “With Distinction in Biology”.

## **Problem and conflict resolution:**

Students, advisors and readers who have any complaint or dispute regarding the performance or completion of *anyone's* obligations for an Honors project are recommended to consult the Biology Department Honors Liaison person for advice on resolving the problem.

Students wishing to change advisors and/or readers for whatever reason are recommended to consult the Biology Department Honors Liaison person. The ability to change advisors or committees will be contingent on multiple factors, including but not limited to the timing of the request, the availability of suitable advisors and the reason for the request. Students wishing to discontinue their Honors project should address the issue with their faculty advisor.

Faculty advisors and readers are responsible for adhering to this policy and for taking reasonable and timely measures to promote the success of the Honor project. This could include requiring students to attend seminars on how to prepare talks and posters, to enroll in BIO 491 (Scientific writing, presentation and critical thinking) to hone their scientific writing skills, and to seek help from the University Writing Center for more general guidance on writing style.

The decision to terminate an Honors project prior to its completion or to deny the student the opportunity to graduate as an "Honors Scholar" and/or "With Distinction in Biology" should be made by the committee in consultation with the Honors liaison and only after the committee has documented evidence of the basis for their decision. The evidence could be of: (1) irresponsible, unethical or negligent behavior by the student, (2) when and how the committee conveyed their expectations to the student, and when and how the student failed to meet these expectations, and (3) measures taken by the committee that were not successful in addressing student underperformance, such as referring a student to the JMU writing center following their own efforts to help the student improve their writing. The committee should also be prepared to present this evidence in a hearing with the Honors liaison and/or Honors College director if requested. The Honors liaison's role in such hearings is as a nonpartisan mediator and not as an advocate or spokesperson for either party. Any decision to terminate an Honors project prior to its completion or to deny the student the opportunity to graduate as an "Honors Scholar" and/or "With Distinction in Biology" must be communicated to the Honors College office as soon as possible so they can update the registrar's office prior to graduation.