

# INTRODUCTORY BIOLOGY 152 Independent Project (IP) FAQ's

**NOTE:** This FAQ does not provide all of the guidance you will need to develop an adequate understanding and establish an Independent Project (either library or mentored) for Intro Bio 152. If you did not take Intro Bio 151, you need to read the series of 10 documents that you can find here: <https://uwmadison.box.com/s/wb6qumsozpxtc5i45718lzan0le8fm67>. You can also schedule an appointment with your course coordinator before beginning Intro Bio 152.

## A. GENERAL

### What is the Independent Project (IP)?

All students in Introductory Biology 152 conduct an IP. It is a semester-long research project in which you will propose a novel research question, work on answering that question either through experiment or literature meta-analysis, and finally, communicate your findings in a formal scientific paper and presentation. As the name suggests, you will work on this project independently (clever, eh?). However, what is not so readily apparent from the name is that you will also be working under the auspices of a larger group – either a professional research lab (for experimental research) or with a group of your peers (for meta-analysis). Because we are scientists, of course we have jargon. For the IP, we usually call the experimental research option “Mentored” (because if you choose this option you will be working with a mentor in a lab), and we call the meta-analysis option “Library” (because the bulk of your research will come from scientific literature).

### How do the two – the Library and Mentored Research options – differ?

**Library research** is focused on analysis of data available in the literature. As you examine the scientific literature, you soon discover that even scientists do not always agree with each other. For example, in studying the effects of cholesterol on heart disease, you may find that the some studies found a significant correlation between the two, while others found there was no relationship at all; still other studies might have found that there is a correlation but that the significance of that relationship is not as strong as the first set of studies you read about. When this occurs, the question is still “unsettled” in the literature – and this type of question is ripe for a meta-analysis. Your goal in this type of research is to discover:

- What we know – For example, are there any parts of the question or issue that the studies agree on?
- What we don't know – Based on your analysis, what parts of the question or issue are still unclear and why (for what reasons) do these remain unclear?
- Where the research should go from here – Which of the questions that remain are most in need of further analysis?

You will attempt to address these unknowns through a **quantitative analysis** of the data that you extract from the studies you find, and in so doing, you will propose an answer to that unsettled question. You are, in essence, conducting an “analysis of analyses.” Your final paper will follow specific guidelines established for this type of analysis of the literature.

**Mentored research** is focused on analysis of the experimental data you gather under the guidance of a research mentor (e.g., a professor, graduate student, post doc, or other scientist on campus). If you conduct mentored research, your paper will follow a strict format that parallels the guidelines scientists must adhere to if they want their papers published in refereed journals.

### How is the IP related to COMM-B?

Completing all components of the IP and our instructional labs with a passing grade will satisfy your Comm-B requirement. The specific requirements, as taken from <https://writing.wisc.edu/wac/node/112>, are below.

- Students must complete numerous assignments, spaced through the semester, that culminate in oral or written presentations.

- Students should submit at least 30 pages of writing and give two or more formal oral presentations totaling at least 5 minutes.
- There should be at least one individual conference with each student, preferably early in the semester, to discuss the student's writing and/or speaking.
- There should be an information-gathering component beyond a beginning level, normally involving two hours of instructional time in one of the campus libraries.

### **If I have already satisfied my Comm-B requirement, must I still complete an IP?**

Yes. The Independent Project is a major component of the course.

## **B. LIBRARY RESEARCH**

### **If I want to do library research how do I start?**

**1) Find one or two partners.** It is a requirement that all library IPs be conducted in a group of 2 to 3 students. If you are having difficulty finding a partner, your coordinator will supply you with a link to sign up on or some other method of finding partners. Check with your coordinator for specific details.

**2) Determine what area of biology is of most interest to you as a group, e.g., heart disease, cancer, ecology, etc.** Next, find out what questions are being examined and debated in the literature in this area. A quick Google search will provide you with a lot of references. Use these articles to help narrow the focus of your question. (Note: You can use general web sites to help focus your question. However, your analysis and final paper must be based on primary research published in scientific journals.)

**3) Assign each member of the group a particular aspect of the question.** As a group you will be investigating a relatively broad research question; each individual will be narrowing her/his focus to a more specific sub-question. For example, if your group is looking at the effect of a particular pollutant on an aquatic ecosystem, one member could research the effects on zooplankton, another could investigate the effects on the algae and aquatic plants, and the third could concentrate on the effects on fish species.

**4) If you're doing the three steps above between semesters, once you've completed those three steps, wait for the semester to begin.**

### **Can I partner with someone in a different lab section?**

Yes. You may partner with anyone who is currently enrolled in 152.

## **C. MENTORSHIP**

### **If I want to do mentored research what are the requirements?**

We are fairly liberal when it comes to what kind of research you conduct for your mentored IP. However, we are very strict on five criteria:

**1) Your work must be biological.** Our class is an introductory biology course. As such, we are expecting you to do biological research. That doesn't mean your potential lab needs to be in a biology department. See "Can I do research in anthropology or psychology?" below for more details. If you're unsure whether your project fits this criterion, contact your coordinator.

**2) You must work 100-150 hours (10-12 hours per week) in your mentored lab, conducting research.** This can include literature search and training. It cannot include writing drafts of your paper.

**3) You must be actively engaged in generating results.** If a lab wants to hire you strictly as a technician (e.g., where you

will only be washing glassware or preparing media), by all means, you can take that job. However, that can't be the basis for your IP – we need you to be able to write a scientific paper about your work. Please note that “actively engaged in generating results” does NOT mean that you have to be working on your own project – it's very rare that that happens. What you'll probably do is work with a graduate student on their research. You might also be given the opportunity to analyze already collected data, rather than collecting it yourself (this is common in medical research, where undergrads rarely have the training and clearance to collect clinical data on people). This is also okay, as your analysis becomes the basis of your research paper. In general, so long as you're an actual part of the process, and generating some sorts of data, it'll be fine. Again, if you're unsure whether your project fits this criterion, contact your coordinator.

**4) You must be able to write about your results.** It is imperative that, near the beginning of your work in your mentored lab, you talk with the Principal Investigator (i.e., the “owner” of the lab) to make sure that it's okay for you to write up the results of your research in a paper. It happens at least once a semester that a student approaches us just before they're ready to submit their final paper to tell us that their mentor told them that they can't submit anything because the results are confidential or proprietary. Every time so far, we've been able to talk with the mentor and ensure that the paper won't be public, and the student has been able to submit it. However, it's a definite possibility that someday, a mentor will say “no,” and that student will have to take an Incomplete and then start over with the IP the next semester. *Please don't let that happen to you.*

**5) You must attend the Mentored IP Poster Session, which will occur at a time specified on the lab syllabus.** You will construct a poster and display it there. This is mandatory for all mentored IP students.

### **How do I find a mentor?**

We have a document that walks you through this process. Look for this and other helpful documents on the course web site.

### **Can I get academic credits for the research I'm doing in my mentor's lab? If so, how do I enroll for them?**

We strongly recommend that you get credit. We have a document that walks you through this process. You can find it on the course web site also.

### **Are the credits I get from my mentor included in the five credits of Intro Bio 152?**

No. You will receive 5 credits for Intro Bio 152. Any credits you receive from your mentor (see previous question) will be granted by the mentor.

### **Am I exempt from attending regular Intro Bio 152 labs if I do mentored research?**

No, everyone enrolled in our course is required to complete all the instructional labs.

### **Can I do research in anthropology or psychology?**

Yes, but only if your specific topic is biological in nature. All the research done with animals is acceptable. Some of the research done on human subjects might be biological; some might not be. For example, let's say the lab you want to join is studying the effects of exam taking on stress in undergraduates (something you're well aware of). If the research involves surveying students' emotions or attitudes before and after an exam, that would not work for the IP. However, if it is measuring students' cortisol levels in the bloodstream before and after an exam, that would be perfect for an IP. If you think your potential research is at all questionable, it is best that you discuss it with us before you accept a position. *Note: We've listed those two departments, because they are the ones that our students ask about most often; however, these criteria hold for all potential departments in which you might want to do research.*

### **I am enrolled in CALS's Honors Program or the Undergraduate Research Scholars program. Can I use that research for an Intro Bio 152 mentorship?**

Yes, but you must meet with your coordinator about this. S/he can talk with you about how you might expand the project so that it can satisfy both requirements.

### **Who will actually oversee my work in the mentor's lab?**

Sometimes, the mentor her/himself will be the person who will train you and will guide you through the process. Alternatively, the mentor will designate another member of his/her staff (e.g., a post-doc, graduate student, lab technician, or associate scientist) to be your immediate supervisor.

### **What type of work am I expected to do in the mentor's lab?**

You must do hands-on and brains-on work. You must be an active participant in the lab. Ideally, you will attend the lab's weekly meetings. You will work out the specific details of the actual research itself with your Mentor or her/his designee.

### **When do I work in the lab?**

Your research schedule is decided by your mentor, according to the research needs and according to your available time. Often, after the project is under way, you will be able to adjust your schedule a little. Some mentors micromanage their labs according to very strict rules. Other mentors are very easy going. Regardless, you are expected to do the required work and you are expected to follow the mentor's guidelines.

### **Can I do some of the work in advance?**

Yes, if you have the time and if the mentor agrees. But you should expect to continue working in your mentor's lab during the semester in which you are taking our course. ***If you are expecting to complete all of your research before the semester begins (e.g., you're working on an ecology project and all fieldwork will be done before the semester starts), that's okay, but you must contact us in advance to make sure everything's all set. And you must maintain contact with your mentor throughout the writing process in 152.***

### **Will I have to do some cleaning and other menial tasks?**

Every successful scientist on campus has done a lot of dishwashing, a lot of clerical work, and a lot of supplies managing and ordering. This is not glamorous work but it is an essential part of research. Of course, this type of work should be a minor component of your overall workload. If the only things you do are prepare solutions, clean test tubes, refill micropipetter tip boxes, and order pizza; then, you are not doing a mentorship. Contact your coordinator if this type of situation occurs.

### **Does the time spent in training count toward the 2 credits of independent research?**

Yes it does. Any time wisely and effectively spent learning techniques, protocols, and "the ropes" does count toward your minimum. If you are required to get a license to operate a complex scientific instrument or to handle hazardous materials, the time spent getting such license does count toward the minimum. Some special training required to handle live animals also counts.