

Department of Microbiology Ten-Year Action Plan

Summary of Review Panel Recommendations

1. Ensure sufficient faculty, instructional and laboratory support personnel FTEs to support a growing and successful program.
2. Find a way to expand laboratory instruction to keep pace with enrollment demand.
3. Review the role of GTAs in department laboratory course instruction.
4. The very good current curriculum will benefit from careful examination to ensure that contemporary topics are represented appropriately.
5. Departmental curriculum committee should advise the Chair directly regarding course assignments, content and scheduling. The committee should include involvement from junior faculty, GTAs and undergraduate students.
6. Ensure that faculty teaching assignments and relative effort are transparent, to display, both internally and externally, a strong sense of shared community. Be certain to highlight undergraduate independent research as a uniquely valuable teaching component.

Additional Goals as Identified by Department

- Maintaining community among Microbiology majors with diverse scientific interests as numbers grow and as they select curriculum options.
- Full integration of the BHS major and associated students into the Microbiology Department.
- Strategies for attracting, retaining, and graduating underrepresented minority students.

Recommendation 1 Action Plan

Ensure sufficient faculty, instructional and laboratory support personnel FTEs to support a growing and successful program. *(This recommendation is highly dependent on resources outside of the direct control of the program.)*

During the last year of the 10-year review period, the Department of Microbiology personnel roster consisted of 16 tenured/tenure-track (T/TT) faculty, 2 instructional faculty, 2 laboratory support personnel and 2 administrative positions. Due to split appointments with other colleges, 8.9 T/TT FTE is located within the College of Science and the remaining 7.1 FTE is located in other Academic Colleges, primarily within College of Agricultural Sciences. The instructional faculty and laboratory support personnel provide an additional 4.0 FTE, and are fully housed in the College of Science. During the ten-year review period, one of the administrative positions was a split appointment between the Department of Microbiology and the Department of Biochemistry and Biophysics equating to 1.5 FTE of administrative support for the Department of Microbiology. The number of undergraduate students in the microbiology (MB) major remained relatively steady at ~100 students between 1995 and 2009. Since 2009, the number of MB undergraduate students has steadily risen to its current level of ~350 students in 2015. We have requested funding for an additional 1.0 FTE of instructional/advising faculty to support our growing program, but as yet have not received funds from the College of Science. Due to the significant need for this position, we moved forward with the hire despite the lack of clear funding for the position.

Additionally, the Department of Microbiology recently accepted responsibility for the newly re-designed BioHealth Sciences (BHS) major, which has a population of 600-750 undergraduate students. The

original agreement with the College of Science when our department accepted the BHS program and students included 3.0 FTE of professional advisor positions and 0.5 FTE administrative support. As a result of the departure of one of the original BHS advisors and College of Science budget issues, this advising position is being replaced with a 0.25 FTE position in the department, with 0.75 FTE in the School of Life Sciences (SLS). For now, the agreement is that this position will support departmental programs and facilitate integration of the BHS program. However, as student numbers shift between departments in the SLS the advising loads will need to be reconsidered. This information is summarized in the following table 1.

	2005 level	Current
T/TT FTE (COS)	8.9	8.9
Instructional FTE*	2.0	3.0 ¹
Advisor FTE	-	2.0 – 2.25 ²
Lab Support FTE	2.0	2.0
Administrative FTE	1.5	2.5
Undergraduate Students	100 (Microbiology)	950-1050 (BHS and Microbiology)

Table 1. COS FTE and Undergraduate Student Numbers.

* Instructors also have a prominent role in advising

¹ 1.0 FTE funded by Department

² Currently 2 advisors, hiring for 1 advisor approved with 0.25 FTE in Microbiology and 0.75 in the School of Life Science with flexibility to serve the department

Additionally, several of our senior tenured research faculty will be retiring within the next three years (Drs. Bottomley and Geller). In addition Dr. Trempey currently has a 10 month administrative assignment. Combined, these will result in a 2.25 T/TT FTE (COS) loss. In addition, both of our laboratory support personnel will be retiring within three years (Ms. Partridge and Fisher).

Deficits in the COS budget and resulting changes in the budgetary management mean that we will need to carefully examine our future needs and justify our requests strategically.

Departmental Actions Assuming Appropriate Resources are Provided:

It is imperative that we receive support from the College of Science to, at minimum, provide support for our current positions and replace our retiring faculty and staff. In some cases, as for laboratory support staff, this should be done quickly to allow for a period of training. As a department, we propose the following as creative ways to maximize our capacity with our limited FTE. Several of these proposals will also help to address other recommendations of the review panel and our own goal of fully integrating the BHS program within the department.

- Increase T/TT faculty FTE commensurate with the growth in undergraduate enrollment, and provide replacement hires of T/TT research faculty FTE to maintain our ability to offer current courses and to enable the development of new courses to ensure that our courses are relevant to the current issues and topics in microbiology. This would also address Recommendation 4.
- Preemptive replacement hire for laboratory support personnel.
- Develop a GTA training program to allow the MB 230 and MB 303 laboratories to be facilitated by graduate students in the department. This would allow an expansion of laboratory offering, including evening and/or weekend lab offerings, and it would enable the current instructors to

develop and instruct other needed courses, including expanding departmental Ecampus courses. This would also address Recommendations 2, 3 and 4.

- Develop a GTA training program to allow co-development of Summer/Ecampus courses by senior GTAs with faculty mentors. This would reduce bottlenecks in graduation (and improve our graduation rate), meet outside interests in Microbiology and also address Recommendation 3.
- Replace 1.0 FTE of BHS professional advisor capacity with 1.0 FTE of BHS instructor (with advisory responsibilities) capacity. This would allow expansion of BHS course offerings during periods of lighter advisory pressures, and build on the current (and successful) model used in the MB program of MB instructors with advisory responsibilities. This would also address the departmental goal of BHS integration.
- Increase involvement of non-T/TT Senior Research Faculty in the development and implementation of new courses. This would also address Recommendation 4.

Because budgetary constraints are a constant, our proposals outlined above do not require any additional funding of FTE above that which we currently have as outlined above. It does require funding from the College of Science to replace our recent and impending losses.

Departmental Actions Assuming Loss of Resources:

With a loss of resources, we would not be able to maintain our current course and laboratory offerings. Our upper-division course offerings would diminish. Loss of the laboratory support personnel would increase lab supply costs as we would have to purchase commercially available agar plates which are more expensive than our in-house production. Additionally some agar plates are not commercially available. Some possible modifications that could be made to allow the program to function, albeit at a lower quality, include the following actions.

- Assign graduate students to lab prep, including pouring hundreds of agar plates each term culturing, maintaining and aliquoting bacterial cultures for the various laboratory courses and sections. However, assigning graduates to these roles would significantly impair their progress in toward graduation.
- Assign faculty to order their own materials for their various laboratory courses.
- Redesign lab courses to decrease lab activities (would impact quality of the laboratory experience).
- Decrease 400-level course offerings.
- Development of GTA programs would be useful under this plan, but we would not have faculty resources to develop and run these programs.

Recommendation 2 Action Plan:

Find a way to expand laboratory instruction to keep pace with enrollment demand.

As stated previously, the undergraduate student population within the department of microbiology has increased from ~100 students to about 350 students in the last six years. Although the College of Science and the university as a whole has seen an increase in total student numbers, ours are greater than the university or COS average. This has increased the burden on course capacities to the extent that the time of graduation may be extended for some students because they are unable to take a key course in a timely manner. Historically, the days and times of our lab offerings were restricted to certain days to avoid loss of a lab week due to holidays, and avoid time conflicts between departmental course and lab offerings.

Additionally, with the addition of the BHS degree to the department, the capability of offering sufficient WIC courses for the BHS student population has also become a capacity issue for our department.

Departmental Actions:

- The Pathogenic Microorganisms laboratory course was redesigned to be able to accommodate the Memorial Day holiday during spring term, so that the lab space can be utilized on Mondays during spring term.
- The Introduction to Microbiology laboratory course was redesigned to accommodate Veteran's Day during fall term, which also allows it to be offered during other terms on days of the week in which a holiday occurs.
- Development of a GTA training program to allow the MB 230 and MB 303 laboratories to be facilitated by graduate students in the department. This would allow an expansion of laboratory offering, including evening and/or weekend lab offerings.
- The additional need for BHS WIC courses is being address by the recent departmental hire of a new instructor who is developing a WIC course to be offered each term with GTA support to allow enrollment of 40 undergraduate students per term.

Recommendation 3 Action Plan:

Review the role of GTAs in department laboratory course instruction.

Our departmental use of graduate students in our teaching laboratories has fluctuated in the past ten-year period. One suggestion of reviewers was that we under-utilizing our graduate students.

Departmental Actions:

- Develop a GTA training program to allow the MB 230 and MB 303 laboratories to be facilitated by graduate students in the department. This would allow an expansion of laboratory offering, including evening and/or weekend lab offerings.
- Develop a GTA training program to allow co-development of Summer/Ecampus courses by senior GTAs with faculty mentors.

These programs will require a significant shift in the current culture among both the faculty and the graduate students of the department in order for the programs to be successful. This will require more time and commitment from the students, but they will also benefit by gaining experience in teaching and course development. It will also require commitment of funding for GTA positions from COS. Additionally, GTA needs will need to be concretely determined prior to the beginning of the normal academic year, so that GTA training and development is meaningful for the GTA and the quality of the undergraduate student courses does not diminish.

Recommendation 4 Action Plan:

The very good current curriculum will benefit from careful examination to ensure that contemporary topics are represented appropriately.

Our departmental meetings and retreats have been very fruitful in regards to developing positive changes in our curriculum. These discussions have been spurred by faculty replacement hires which happened in the past several years, the restructuring of the College of Science to include a School of Life Sciences, and the new university Marine Science Initiative.

Departmental Actions:

- Refresh and update our current course materials.
- Develop new courses for the program including a Human Microbiomes course and an Aquatic Microorganisms course.
- Collaborate in development of an extra-departmental Data Sciences major/minor. While the Bioinformatics major/minor is not a part of the Microbiology Department, our faculty are involved in its development and we feel that many of our MB undergraduates would be very interested in obtaining this minor.
- Develop new Summer/Ecampus course offerings. There are currently 3 Ecampus courses offered: MB 230, MB 302 and MB 480 Parasitology. We are currently developing an Ecampus Immunology course which would complement BHS degree requirements, and which would appeal to a diverse group of students with a basic biology background. With the successful implementation of a GTA training program where graduate students co-develop Ecampus courses with departmental faculty, we would be able to develop additional Ecampus courses within the department. Offering additional Summer courses would alleviate some of our current bottlenecks to graduation.
- Revise our Microbiology minor. In its current form, the minor is not practical as it requires a student to take all but 9 credits of the microbiology major (due to current prerequisite requirements). Redesigning our minor to make it more accessible to students from a variety of other degree programs and colleges (including College of Engineering, Public Health and Human Sciences, and Agriculture) would increase the development of students (our future researchers and leaders) in thinking with an interdisciplinary lens about the issues facing our global society.

Recommendation 5 Action Plan:

Departmental curriculum committee should advise the Chair directly regarding course assignments, content and scheduling. The committee should include involvement from junior faculty, GTAs and undergraduate students.

Our current MB curriculum committee consists of five faculty members and one undergraduate student. With the acquisition of the BHS degree, we had developed a BHS curriculum committee that consisted of MB faculty and the BHS advisors. As a result of the Review Panel recommendations and our own goal to fully integrate the BHS degree into our department we propose the following changes.

Departmental Actions:

- Create one departmental undergraduate curriculum committee with two co-chairs.
- Restructure the committee membership to ensure representation from T/TT faculty, instructors, advisors, graduate and undergraduate students. We also recognize the need to have regular meetings with a quorum of members in attendance.
- Establish a clear mandate for the committee to evaluate faculty teaching loads and course bottlenecks, and provide recommendations to the Department Head.

Recommendation 6 Action Plan:

Ensure that faculty teaching assignments and relative effort are transparent, to display, both internally and externally, a strong sense of shared community. Be certain to highlight undergraduate independent research as a uniquely valuable teaching component.

Because many of our departmental faculty have partial appointments in other Colleges (7.1 FTE in other Colleges vs. 8.9 FTE within College of Science among our T/TT faculty), and because normalized teaching loads among faculty (graduate courses vs. undergraduate courses, high capacity vs. low capacity, lectures vs. labs, GTA support etc) has not been developed in the College of Science, we have found this to be a challenge within our department. Additionally, as the panel review highlights, we have also not given appropriate weight to faculty who actively promote and mentor independent undergraduate research within the department.

Departmental Actions:

- Develop our own internal normalization of teaching load process, and annually assess departmental faculty responsibilities.
- Develop a means for recognition of mentoring independent undergraduate research by T/TT faculty.
- Develop a means for recognition of TT faculty who advise undergraduates to balance advising loads in the department. For example, faculty who take on advising (e.g. senior students that are interested in graduate school) may receive some release from teaching.
- Provide opportunities for teaching and course development by non-T/TT research faculty and co-development between faculty and GTAs to develop a stronger sense of shared community within the department.

Additional Goals as Identified by Department Action Plan:

Integrate the BHS major and associated students into the Microbiology Department and at the same time maintain community among Microbiology majors with diverse scientific interests.

The microbiology major has grown from ~ 100 to ~ 350 students per year. This growth requires a change in the way we approach building and maintaining community. With the acquisition of the BHS major, we are particularly interested in developing a plan to fully integrate the BHS program and its students within the Microbiology Department. As the Review Committee emphasized, our current model of instructors with advisory capacities has been very successful in developing a sense of belonging within the MB student population and serves as a good model for the BHS program.

Departmental Actions:

- Recent hire of an additional instructor/advisor so that we could maintain our ability to meet regularly with MB students. This position is currently supported by the Department.
- Development of a yearly service-learning event in which all MB and BHS students can participate to serve the greater campus community.
- Replace 1.0 FTE of BHS professional advisor capacity with 1.0 FTE of BHS instructor (with advisory responsibilities) capacity. This would allow expansion of BHS course offerings during periods of lighter advisory pressures, and build on the current (and successful) model used in the MB program of MB instructors with advisory responsibilities. This objective is subject to additional resources.

- Cross list MB and BHS orientation courses, taught by a single MB/BHS instructor or advisor. The individual orientation courses could be developed thematically to target groups of MB and BHS student with similar career options (e.g. pre-pharm, pre-med, undecided).
- Cross list our capstone course (MB 490) with BHS and expand offerings into all terms. This objective is subject to additional resources.
- Clearly establish outreach events as departmental outreach events open to volunteers from both the Microbiology Student Association and the BHS Student Club.
- Development of a yearly service-learning event in which all MB and BHS students can participate to serve the greater campus community.
- Development of a student survey to assess student opinions of both the MB and BHS programs.

Strategies for attracting, retaining, and graduating underrepresented minority students.

We are becoming increasingly aware of the challenges faced by underrepresented minority students and working to develop departmental resources to reduce and/or remove obstacles for student success in these populations.

Departmental Actions:

- Develop departmental mentoring programs.
- Build a tutoring program to be offered through the various cultural centers on campus.
- See competitive funding opportunities (for example, through NSF and USDA) to provide incentives, additional support and training for students and faculty.

Summary of Goals and Assessments

Short-term goals (AY2016-2017).

- Replacement hires for T/TT research faculty FTE tied to increased enrollment to maintain our ability to offer our current courses, and to enable the development of new courses to ensure relevance to the current issues and topics in microbiology (dependent on resources).
- Develop a GTA training program to allow the MB 230 and MB 303 laboratories to be facilitated by graduate students in the department.
- Cross list the MB and BHS orientation courses, taught by a single MB/BHS instructor or advisor.
- Cross list our capstone course (MB 490) with BHS and expand offerings into all terms (dependent on resources).
- Restructure the departmental curriculum committee and establish a mandate to provide recommendations regarding faculty teaching loads to Department Head.
- Develop departmental mentoring programs.

Mid-term goals (AY2016-2024).

- Replace 1.0 FTE of BHS professional advisor capacity with 1.0 FTE of BHS instructor (with advisory responsibilities) capacity (dependent on resources).
- Develop new courses for the program including a Human Microbiomes course and an Aquatic Microorganisms course.
- Develop our own internal normalization of teaching load process, and annually assess departmental faculty responsibilities. Delineate teaching loads to clearly establish COS and non-COS assignments with FTE appointments.
- Develop means for recognition of mentoring undergraduate research by T/TT faculty.
- Develop new Summer/Ecampus course offerings to facilitate timely graduation.
- Development of a yearly service-learning event in which all MB and BHS students can participate to serve the greater campus community.
- Develop a GTA training program to allow co-development of Ecampus courses by senior GTAs with faculty mentors.
- Make use of non-T/TT Senior Research Faculty in the development and implementation of new courses.
- Develop a student survey to assess student opinions of both the MB and BHS programs, and a separate survey to assess GTA student opinions.
- Develop departmental tutoring in cultural centers.

Assessment to be completed during AY2024-2025 period.

- Analysis of student growth, retention and graduation rates within the major.
- Analysis of non-MB students receiving the Microbiology minor.
- Assessment of student survey results for MB/BHS students.
- Assessment of student survey results for GTAs.

Action	Metric	Anticipated Outcome/Goal	Who	When
Replacement Hires		Maintain Current Course Offerings	Dean of College of Science	As Needed
GTA Training Program	GTA Survey & Faculty Feedback	Expand Lab Course Sections; Provide increased responsibilities for GTAs	Laboratory Teaching Faculty	Development of program within two years.
Crosslist MB/BHS orientation and capstone courses	-	Integration of MB/BHS students into the department	MB and BHS Instructors; other faculty as needed	Within two years
Restructure curriculum committee	-	Include graduate and undergraduate student input on curricular decisions; create a mechanism to provide recommendation to Dept. Head on teaching assignments.	Dept Head	Immediately
Development of new courses	eSETs	Ensure that MB curriculum is applicable to current topics; Allows development of MB option to support the Marine Science Initiative; Allows modifications to MB minor	Department Faculty	On-going.
Dept Normalization of Teaching Load	Faculty Feedback	Ensure that departmental faculty are teaching appropriate loads that balance with running research programs; Establish clear evidence that faculty with joint appointments are fulfilling their obligations to COS	Dept Head and Executive Committee	Within 3 years
Recognition of Mentoring Undergraduate Research	P&T Process	Provide recognition to faculty who engage in undergraduate research; provide students with meaningful research opportunities	Dept P&T Committee	Within 3 years
Develop Ecampus Courses	eSETs	Expand our course offerings to summer term; allow students to take courses at a distance; increase college revenue	Department Faculty	On-going.
Service-Learning Event	UG Student Survey	Provide integration opportunities for MB/BHS students	Instructors/Advisors with MSA and BHS club	Within 3-6 years.
Use non-T/TT research faculty for teaching	eSETs	Maintain and expand course offerings	Non-T/TT research faculty	Within 3-6 years.
Develop UG and Grad Student Surveys	-	Provide data to assessment departmental changes and impacts.	Dept. Curriculum Committee	Within 3-6 years.
Develop Mentor Program	UG Student Survey	Improve student success, including underrepresented minority students.	Instructors/Advisors with MSA and BHS club	Immediately
Develop tutoring program.	UG Student Survey	Improve student success, including underrepresented minority students.	Department Faculty	Within 3-6 years.