

**Gwynedd-Mercy College  
School of Arts and Sciences  
Natural Science/Mathematics Division**

**A Handbook for  
Biology Majors**

**Fall 2008**

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This handbook represents the policies and procedures of the Biology baccalaureate degree program which are in effect as of the date of your matriculation into the program in August 2008. These policies and procedures are subject to change and may differ from those which apply to students matriculated into the program in past or future years. These policies and procedures do not replace or supersede those in the College catalogue. If you have any questions about the material in this Handbook, contact your academic advisor or the Biology Program Director, Dr. Michelle McEliece, for clarification.

**Student** \_\_\_\_\_

**Academic Advisor** \_\_\_\_\_

## **The Mission of the Natural Science/Mathematics Division**

The mission of the Natural Science/Mathematics Division is to provide for each student of the College an education in the natural sciences and mathematics essential for the achievement of professional goals, appropriate for the fostering of scientific literacy and life-long learning, and nurturing of the ethical and moral values inherent in the Mercy tradition. To fulfill this mission, the Division

- sponsors baccalaureate degree programs in biology and in mathematics, an associate degree program in the natural sciences and minor concentrations in mathematics and the natural sciences;
- provides the basic science and mathematics foundation of programs in allied health, nursing, and education;
- offers courses that are components of the general education of all students.

The goals of the Division are

- to provide the best quality education, both in curriculum design and in course content, keeping these two fundamental components up-to-date in the rapidly changing fields of science and mathematics;
- to provide flexibility for the particular needs of our students whether they need a single course or a complete degree program. This must include a comprehensive education for those seeking the baccalaureate degree as their professional goal as well as for those contemplating the continuation of their education in professional and graduate school.

## **The Mission of the Biology program**

The mission of the baccalaureate degree programs in biology is to provide the student an education not only comprehensive in modern biology theory and practice, but also literate in the arts and sciences. This education is rooted in the core values of the College; this education should qualify the student for post-graduate employment or continued education, should give a foundation in the liberal arts, should provide the students with opportunities and encouragement for service to the community, and should contribute to the development of a framework of ethical and moral values. To fulfill this mission, the Division has established for the biology program the following goals.

Graduates who earn the bachelor's degree in biology should

- possess the ability to think logically and clearly;
- possess the ability to analyze and abstract;
- appreciate the complexity of life and respect the dignity of life in all its forms;

- possess a thorough knowledge of biology including molecular, cellular, and organismal levels;
- possess a thorough knowledge of chemistry, physics, and mathematics that is integral to an understanding of biological principles;
- possess a base of knowledge that is comparable to that of other baccalaureate graduates in biology;
- possess a base of knowledge and skills appropriate and sufficient for specialized study or employment in a related field;
- understand the history of biology and its impact on society and the development of technology;
- understand the interdependence of all the natural sciences and the interrelationships of all the biological disciplines;
- be familiar with the process of scholarly research and be able to present the results of such research in a written or oral presentation;
- be familiar with scientific methodology and the techniques of modern laboratory investigations;
- be familiar with the techniques of field studies;
- possess a broad base of knowledge in areas of language, literature, arts, social science, humanities;
- possess the ability to communicate in a variety of formats both scientific and non-scientific ideas to audiences of varying sophistication;
- be literate in the technologies of information retrieval, analysis and presentation with particular emphasis on the literature of the discipline.

These goals incorporate the learning outcomes which Gwynedd-Mercy College has established for all students: communication skills, professional competency, moral and ethical judgment, problem solving, critical thinking, leadership in society, and the critical and competent use of technology.

### **The Biology Major**

The biology major at Gwynedd-Mercy is a rigorous course of study. When you graduate from Gwynedd-Mercy College with a bachelor's degree in biology, you will have the knowledge and the skills to succeed in graduate or professional school or in employment in a variety of technical fields. Graduates of the biology program will find their future in the science of the future. They will make their future by the skills they acquire and the firm base of scientific knowledge on which they build. They will step into their future by the careers that are available to them and by the endless possibilities to use their abilities to improve the future of others.

But success in the biology major requires commitment and dedication on your part – you must take responsibility for your own education and be an active learner. You must commit to attending all classes and labs and to completing all assignments when due. There may be conflicts between your academic commitments and those of varsity athletics or employment or personal commitments. You must recognize that these conflicts do not excuse you from attending classes or labs or submitting assignments when due. A doctor's note may explain why you missed a class, but it does not excuse you from the responsibility for the work you missed. There are no make-up classes or labs in the courses of the biology curriculum

### ***The courses of the Biology major***

The courses you must complete to earn a baccalaureate degree in biology from Gwynedd-Mercy College are specified in the curriculum sheet which appears in Appendix I. The curriculum of the biology major consists of two major components: the required/elective general education courses (referred to as “gen ed” courses) and the required/elective biology courses (referred to as “major” courses).

### ***The general education curriculum***

The general education curriculum is designed to prepare graduates to be self-sufficient, life-long learners who are informed, responsible, caring citizens of a diverse global community. This curriculum of general education, which is titled “Growth through Mercy Connections”, focuses on integration of Mercy values, enabling students to be prepared to become graduates who are professionally competent and infused with the Mercy ethos of service to society. The curriculum serves as a beacon, guiding students toward habits of thought and behavior that will assist them in the search for truth in all its complexity and promotes the values that incorporate the ideals of integrity, compassion, and mercy. The general education curriculum is a mixture of signature or core courses and a distribution of courses in each of the major liberal arts disciplines. With these distribution courses, you can cultivate your personal interests, or complete a minor, such as psychology, music, or English.

The Honors Program in Liberal Studies offers academically talented students an enriched general education curriculum. The Honors Program replaces six of the distribution courses in the general education curriculum with a series of six interdisciplinary, team-taught courses developing the theme “The Quest for Community and Freedom: The Individual and Society.” The courses are conducted as small seminar classes, emphasizing interactive learning and critical thinking; they are taught by teams of faculty members with a strong commitment to interdisciplinary and collaborative teaching and learning. Eligible students are invited to join the Honors Program upon matriculation into the College; students may also apply to the Honors Program based on their academic transcript. Students may join the Honors Program at any point in their academic career, and need not take an Honors course every semester. Students are awarded their baccalaureate degrees with honors upon achievement of a 3.0 GPA in the six Honors courses and a 3.35 overall average. Eligible biology majors are strongly encouraged to participate in the Honors Program, since the program cultivates habits of scholarship much valued by professional and graduate schools.

## *The Biology major curriculum*

The Biology major courses are designed so that you will study every level of the hierarchy of biological structure and develop a solid foundation in the physical sciences and mathematics. The courses required by the program and the recommended sequence of these courses are listed in Figure 1.

|   |                                       |
|---|---------------------------------------|
| The recommended sequence of required courses for entering freshmen* is  |                                       |
| <b>FRESHMAN YEAR</b>  | <b>SOPHOMORE YEAR</b>                 |
| Calculus I <sup>?</sup> and Probability and Statistics  | Organic Chemistry I and II (with lab) |
| Principles of Chemistry I and II (with lab)   | General Physics I and II (with lab)   |
| General Biology I and II (with lab)   | Ecology                               |
|   | Genetics (with elective lab)          |
| <b>JUNIOR/SENIOR YEARS</b>  |                                       |
| Biochemistry (with lab)   |                                       |
| Vertebrate Anatomy (with lab)   |                                       |
| Developmental Biology (with lab)  |                                       |
| Molecular Biology (with lab)  |                                       |
| Biology Seminar I (junior status required)  |                                       |
| Biology Seminar II and III (senior status required)   |                                       |
| In addition, <b>three</b> elective courses (a minimum of 9 credits) must be chosen from the following courses:                                      |                                       |
| Advanced Biochemistry   |                                       |
| Advanced Physiology I and II  |                                       |
| Biology of Microorganisms (with lab)  |                                       |
| Genetics Techniques Lab   |                                       |
| Immunology  |                                       |
| Independent Study (research)  |                                       |
| Internship  |                                       |
| Mycology  |                                       |
| Parasitology (with lab)   |                                       |
| Virology  |                                       |
| Special Topics in Biology   |                                       |
| Special Topics in Chemistry   |                                       |
| *Transfer students are integrated into the program based on recognized credits earned.  |                                       |
| <sup>?</sup> Students whose mathematical preparation is insufficient for Calculus I must follow a different timetable for math and physics courses. |                                       |

**Figure 1: Recommended Sequence of Courses of the Biology Program Curriculum**

The recommended sequence of courses is based upon the idea that the foundations of modern biology are molecular and the study of biology requires a firm grounding in chemistry. Therefore, you will take the Principles of Chemistry courses with or before the General Biology courses and you must complete organic chemistry before the study of biochemistry and molecular biology. The required and elective courses of the program are also designed so that you will have the opportunity to achieve every goal of the biology program through the curriculum. In addition, the instructional activities in the required and elective courses of the program are designed to help you to achieve the College-wide learning outcomes.

If you are interested in earning Pennsylvania state certification to teach biology on the secondary level, you must complete the same courses of the biology curriculum as other biology majors. However, as a secondary certification candidate, you are limited to specific courses to fulfill the Humanities and Behavioral/Social Sciences requirements and you must commit your open electives to education courses.

### ***The scheduling***

The courses of the biology major are offered every year on a three-year cycle; courses are offered as day classes in two of those years and as an evening class in the third year. In some instances, both a day and an evening section are offered in the third year. The selection of courses offered in the evening varies on a three-year cycling sequence. This assures that full-time students can complete their upper division courses in two years during the day with appropriate planning; while part-time and evening students can proceed toward degree completion at an appropriate pace.

The Division maintains a five-year projection of course offerings to assist student planning; the most recent projection appears in Appendix II. The five-year projection is subject to annual review, refinement and adjustment in course scheduling to accommodate student needs. This projection allows students to plan their course sequence and prepare for graduation far in advance of the actual event. This is especially important for part-time students; with foresight and planning, the entire set of Divisional requirements for the biology degree program may be completed totally through registration in evening classes. It is important to note that both day and evening classes demand the same academic rigor and offer the same laboratory experiences; with few exceptions, they are taught by the same full-time faculty.

### ***The requirements for graduation***

Biology majors must earn a total of at least 125 credits of course work (major requirements, general education requirements and electives) including any approved Advanced Placement or transfer credits. However, secondary certification candidates must earn a total of at least 135 credits to satisfy the additional requirements for certification.

The minimum acceptable grade for each major course - those listed in Figure 1 - in the Biology major is a "C"; a "C-" grade does not satisfy the requirement of a major course. A student may achieve less than a "C" grade in only two major courses, and may repeat a given major course only once. If a student, regardless of cumulative grade point average, achieves less than a "C" grade on a third major course, or fails to bring a major course grade up to a "C" after one repeat, the student may be dismissed from the program. Note that for this policy, a lecture course and its co-requisite lab will be counted as two major courses.

All Biology majors must compile a portfolio of their work which progress toward achieving the learning outcomes of the College and of the Biology program. The portfolio contributes to the final grade in the program capstone course, BIO-4003 (Biology Seminar III), but the contents are collected during the student's tenure in the Biology major, beginning in freshman year. Complete details on the process of compiling a portfolio are presented at a workshop on the portfolio requirement conducted early in the first semester of freshman year.

All Biology majors must take the Field Test in Biology from the Educational Testing Service to satisfy the requirements for the degree. This standardized, nationally-normed examination is specifically designed as an exit exam for biology majors. It allows the Biology program faculty to determine how GMC graduates compare in knowledge with the biology graduates of other institutions. The Field Test is administered on campus to graduating seniors in the spring semester and the fee is funded by the Natural Science/Mathematics Division. The score on the Field Test contributes to the final grade in the program capstone course, BIO-4003 (Biology Seminar III); this provides an incentive to students to prepare for the test.

Candidates for secondary certification in biology must take the PRAXIS examinations in both education and subject areas in order to be certified to teach in public schools in Pennsylvania. No student enrolled in the Gwynedd Biology/Secondary Certification degree program has failed to pass all sections of the PRAXIS examination. However, success on the PRAXIS exam is not required to earn the degree in biology, nor does the PRAXIS exam replace the Field Test requirement.

### ***Writing in the Discipline***

The Biology program has a common style manual for all program courses. The manual, *A Short Guide to Writing about Biology*, 6<sup>th</sup> edition by Jan A. Pechenik, provides for students a uniform documentation style (CSE style recommended by the Council of Science Editors) as well as a synopsis of the writing process, sentence grammar and style, punctuation and mechanics, and the research process. This manual is used as the style reference in every program course from the freshman courses General Biology and Principles of Chemistry to the senior capstone courses Seminar II and III.

### ***The Faculty***

The full-time faculty members of the Biology program are recognized for their academic and professional expertise as well as their service to the College.

Richard A. Coletta, Sr., M.S., Instructor of Biology, received his B.A. from Villanova University and his M.S. from Temple University. Mr. Coletta joined Gwynedd's full-time faculty in fall 2008, but he has been a member of the College's adjunct faculty since 1980. Mr. Coletta served as Chair of the Biology Department of Plymouth-Whitemarsh High School, where he taught general and advanced placement biology, chemistry and his specialty, microbiology. He has participated in research on interferon and the role of fetal antigens in cancer and he is currently is associated with the Center of Technical Studies in Montgomery County, where he teaches biomedical technology. At Gwynedd-Mercy College, Mr. Coletta teaches microbiology courses for nursing and allied health students, as well as the parasitology course for biology and medical technology majors and the Signature science course. Mr. Coletta also supervises the field experiences of biology and mathematics secondary education candidates at Gwynedd.

Felicia Corsaro-Barbieri, Ph.D., Professor of Chemistry, has been a member of the Gwynedd faculty since 1974. Dr. Barbieri earned her B.S. in chemistry from Chestnut Hill College and her Ph.D. in chemistry from the University of Pennsylvania. Before joining the Gwynedd faculty, Dr. Barbieri was a post-doctoral teaching fellow at the University of Pennsylvania. At Gwynedd, Dr. Barbieri teaches Principles of Chemistry, Biochemistry, Advanced Biochemistry, Chemistry for the Allied Health Professions, and the Signature science course; she is a recipient of the Lindback Award for Distinguished Teaching. Her research interests include applications of analytical biochemistry. Dr. Barbieri serves as the Director of the Pre-professional Advising Office.

Anne M. Donigan RSM, Ph.D., Associate Professor of Biology, joined the Gwynedd faculty in 1993. Sister Anne earned her B.A. in Liberal Arts from Gwynedd, her M.S. in science education from the University of Pennsylvania and her Ph.D. in microbiology and immunology from Temple University. Prior to becoming a member of the Gwynedd faculty, Sister Anne was an instructor at Archbishop Wood High School, Cardinal O'Hara High School, and Walsingham Academy. Sister Anne teaches Ecology and the Molecular Biology lab and supervises the Senior Seminar and Internship programs; she has also taught Microbiology and General Biology. Her research interests include cell biology. Sister Anne serves as Chair of the Natural Science/Mathematics Division, supervisor of the Biology secondary education candidates, and faculty mentor for the Biology Student Association.

J. Wade Farris, Ph.D., Associate Professor of Biology, has been a member of the Gwynedd faculty since 1984. Dr. Farris earned his B.A. in chemistry and B.A. in economics from the University of North Carolina, his M.A. in mycology from the University of North Carolina at Greensboro and his Ph.D. in microbial genetics from North Carolina State University. Before joining the Gwynedd faculty, Dr. Farris was a post-doctoral fellow at the Wistar Institute and a faculty member at Southern Junior College and at Neumann College. At Gwynedd, Dr. Farris teaches Anatomy and Physiology, Vertebrate Anatomy, Microbiology, Virology, Immunology, Mycology, Parasitology and Pathophysiology. His research interests include skin bacteria. Dr. Farris serves as advisor to the Beta Delta chapter of the Sigma Zeta Honor Society.

Christian Hellings, Ph.D., Assistant Professor of Mathematics, has been a member of the Gwynedd faculty since 2004. Dr. Hellings earned his B.A. in mathematics and physics from LaSalle University and his Ph.D. in mathematics from the University of Virginia. Before joining the Gwynedd faculty, Dr. Hellings was an analyst for Metron, Inc. Dr. Hellings teaches Calculus I and II, Multivariable Calculus, Sets Relations & Functions, Linear Algebra, College Geometry, Differential Equations, Topics of Mathematics, Elementary Mathematical Models. His research interests include operator theory, indefinite inner product spaces and complex function theory.

Michelle Kulp McEliece, Ph.D., Associate Professor of Biology, joined the Gwynedd faculty in 2003. Dr. McEliece earned her B.S. in biology with a concentration in genetics and developmental biology from the Pennsylvania State University and her Ph.D. in molecular biology from Lehigh University. Before joining the Gwynedd faculty, Dr. McEliece was a post-doctoral fellow at Fox Chase Cancer Center and a member of the Biology faculty at Arcadia University. At Gwynedd, Dr. McEliece teaches General Biology, Genetics, Molecular Biology and Microbiology. Her research interests include genetics, *Drosophila* embryogenesis, cellular aging and cancer. Dr. McEliece serves as Director of the Biology program.

Dorothy Zeiser, M.A., M.S., Assistant Professor of Mathematics, has been a member of the Gwynedd faculty since 1982. Ms. Zeiser earned her B.A. in mathematics from Gwynedd, and her M.A. in mathematics and her M.S. in computer science from Villanova University. Before joining the Gwynedd faculty, Ms. Zeiser was an instructor at Gwynedd-Mercy Academy and at Bishop McDevitt High School. At Gwynedd, Ms. Zeiser teaches Discrete Mathematics, Number Theory, Abstract Algebra, Probability Theory and Mathematics Seminar; she has also taught Topics of Math, Elementary Mathematical Models, Elementary Functions, Calculus, Multivariable calculus, Probability and Statistics, and Linear Algebra. Her research interests include cryptology, applications of abstract algebra, and applications of number theory. Ms. Zeiser serves as the Director of the Mathematics program.

### ***Student Organizations***

The **Biology Student Association (BSA)** provides opportunities for students to further their biological inquiries outside the classroom and to establish good fellowship among the students. The organization provides a communication link among the biology students and with the rest of the Gwynedd-Mercy College community. The annual membership, under the guidance of the elected officers, determines the direction of student experiences to be shared during the academic year. As Mercy Leaders, the students are dedicated to integrating the core values of GMC into both their personal and professional lives. The activities of the group include both educational experiences, such as field trips and museum visits, and service projects, such as fundraising for charitable causes, mentoring of newer students, landscaping the Lady Garden, and construction of a bioretention basin. Membership is open to all students of the College, regardless of major, who have an interest in biology. Sister Anne Donigan serves as the faculty advisor to the group, which is recognized by the Program Board of Student Government Association. Interested students should contact Sister Anne for more information.

In 1996, the **Beta Delta Chapter of Sigma Zeta** was chartered. Sigma Zeta is a nationally chartered Honor Society recognizing student achievement in Mathematics and Science, programs that are generally acknowledged to be academically rigorous. Membership in Sigma Zeta is a prestigious addition to a student/alumnus resume. Election to Sigma Zeta requires that the candidate must have completed 30 credits in math/science courses at Gwynedd-Mercy College with a science/math GPA of 3.3 and an overall GPA of 3.0. Since being chartered, the Beta Delta Chapter has inducted 110 students, faculty, staff and alumni into the Society. Dr J. Wade Farrior serves as faculty advisor for the group. Members of Sigma Zeta are expected to participate in Division service projects, such as mentoring new students.

### **Program Policies and Procedures**

#### ***Academic Integrity***

The Academic Integrity Policy of Gwynedd-Mercy College states:

*Academic honesty is fundamental to the quest for truth, which is deeply rooted in our core values at Gwynedd-Mercy College. The College highly values academic integrity and expects that each student will conduct his/her academic life in accordance with this expectation. A violation of this core value is considered a serious offense. Violations may include, but are not limited to the following: cheating on an assignment, quiz, test,*

*or examination; falsifying data; grade alteration; deception to avoid meeting course requirements; plagiarism in any form; or assisting another student in cheating or plagiarizing, or receiving such aid. (College catalogue, p. 41).*

The complete College Academic Integrity Policy, including violations, sanctions and procedures, can be found on the Student Intranet.

As a Biology major, you must understand that, whether in the academic or research laboratory, ethical conduct is an essential and expected part of scientific investigation. Trust in data reported by other investigators and respect for intellectual property form the foundation of the scientific method. Therefore, the faculty of the biology program highly value academic and scientific honesty and expect all students to strictly adhere to the Academic Integrity Policy of the College in all academic endeavors. Students who violate any feature of the policy will be subject to its sanctions.

### ***Advising***

You will be assigned a full-time faculty member from the Natural Science/Mathematics Division as your academic advisor upon matriculation into the biology program. This partnership will continue until graduation as long as you are a biology major, unless you request a change in advisor from the Program Director. Your academic advisor is listed on page 1 of this Handbook. You must see your advisor for pre-registration each semester, but your advisor is also available to discuss a variety of other concerns such as class performance, curriculum planning and career issues. Introduce yourself to your advisor early in your first weeks at Gwynedd.

### ***Pre-registration***

Before pre-registration begins in November and March, the Registrar's Office will post the next semester's course schedule on the College's Web site. You must meet with your academic advisor before pre-registration, not only to select your next semester's schedule, but also to review your progress toward the degree and to plan future semesters. Advisors will post sign-up sheets for appointments. Once you have selected your course schedule, you must submit the schedule to the Registrar's Office via the PowerCAMPUS Self-Service on-line registration process. You are not registered until you have submitted the schedule electronically and it has been approved electronically by your advisor.

Pre-registration is accepted by class rank; pre-registration is open first to seniors, followed by juniors, then sophomores and freshmen. It is to your advantage to pre-register as soon as you are eligible, since you are more likely to get your choice of general education courses. Therefore, you should arrange to meet your advisor before pre-registration begins. There is no pre-registration fee for full-time students.

### ***PowerCAMPUS Self-Service***

PowerCAMPUS Self-Service is an on-line tool to help you and your advisor select courses, register for courses, track your grades and plan your progress through the Biology degree. On Self-Service you can view your Academic Plan to see how you are completing the requirements of the Biology degree. You can view your grades. You can see the enrollment in

the courses you are selecting. You can access Self-Service from the drop-down menu on the Current Students page of the College's website or directly at <https://selfservice.gmc.edu/Selfservice/Home.aspx>.

### ***Drop/Add***

If you need to make changes in your course schedule, you can do this before the end of the Drop/Add period (usually the first five days of the semester). You must meet with your advisor to discuss the proposed changes. Your advisor will fill out and sign a Drop/Add form. You must bring the Drop/Add form to the Registrar's Office for the changes to become official; you cannot Drop/Add via Self-Service.

### ***Withdrawal***

Sometimes you need to withdraw from a course rather than risk an unsatisfactory grade. You must do this before the last day to withdraw deadline. You should first discuss your withdrawal with the course instructor. You must meet with your advisor to discuss the proposed withdrawal. You must be careful to make sure that your withdrawal does not adversely affect your financial aid arrangements. Your advisor will fill out and sign a Course Withdrawal form. You must bring the Course Withdrawal to the Office of the Vice President for Academic Affairs for your withdrawal to become official. You cannot withdraw from a course via Self-Service. If your form is received by the Office of Academic Affairs after the deadline, you are not allowed to withdraw from the course.

If you stop attending class but do not officially withdraw from a course, you will receive an "F" on your permanent transcript for the course.

### ***Applying for graduation***

You must apply for graduation during the semester prior to your intended graduation. Your advisor will remind you of this requirement during your last pre-registration advising session. Application forms are available at the Office of the Registrar and at the Office of the Vice President for Academic Affairs. There is a deadline for filing the application for graduation. Students who miss the deadline may not be allowed to graduate as expected.

### ***Transfer Credits***

Credits for college-level courses taken at other institutions can be transferred to Gwynedd-Mercy College and will count towards the credits required for graduation. To receive credit for a course taken elsewhere, submit the transcript of the course as well as a copy of the course description to the Registrar's Office. The Registrar will determine if the course satisfies an equivalent course at Gwynedd.

If you wish to take a course at another institution, for example, during the summer, you must obtain approval before registering for the course to insure that the credits will be accepted for transfer to Gwynedd. Complete the request for off-campus study form and have it signed by the Division Chair, who will certify that the course is equivalent to one at Gwynedd. Submit the form to the Office of the Vice-President for Academic Affairs. If the course is approved, you

will receive a form from the Office of the Vice-President for Academic Affairs to take with you when you register at the other institution. At the end of the course, be sure to request a transcript sent to the Gwynedd Registrar.

There are restrictions upon courses you may transfer from another institution. You may not transfer courses from a two-year institution once you have achieved junior status (earned 60 credits). You must take the last 30 credits required for your degree at Gwynedd. The minimum transferable grade is a “C”. The grades earned for courses off-campus will not be included in your Gwynedd grade-point average (GPA), but they will be included in the GPA you calculate for application to graduate or professional school.

A hallmark of the Gwynedd biology degree is the interrelationship of the courses in the program and the integration of the Gwynedd learning outcomes throughout those courses. To protect the integrity of the Gwynedd-Mercy College degree in biology, a student who has matriculated into the program may transfer no major courses (required or elective) from another institution. The only exceptions to this rule will be made if the course under consideration will not be offered by the program before the student’s anticipated date of graduation or will seriously impede the student’s progress toward the degree. Therefore, careful planning of your academic schedule is critical; this is especially important for part-time students. The Division Course Projection Schedule found in Appendix II can provide valuable information for this planning. Permission to take a major course off-campus may be granted only by the Biology Program Director.

The ability to cross-register between SEPCHE schools contributes to the diversity of offerings available to students in the Gwynedd Biology program. Cross-registration is available to students who have been full-time undergraduates for at least one year, who pay full-time tuition and who are matriculated in a degree program. You may register for two courses per academic year if the courses or their equivalent are not available at Gwynedd and if you met the course prerequisites. Consult the College catalogue and your advisor for more details about the program and about the registration process.

Students may earn credit for college courses via the Advanced Placement program. In the biology program, the following exam equivalencies are applied.

| <b>Examination</b>     | <b>Course Equivalent</b>                                  | <b>Minimum Score for Credit</b> |
|------------------------|---|---------------------------------|
| Calculus AB            | MTH-245: Calculus I                                       | 3                               |
| Calculus BC            | MTH-245/246: Calculus I and II                            | 4                               |
| Statistics             | MTH-234: Probability and Statistics                       | 4                               |
| Chemistry              | CHM-151/151L: Principles of Chemistry I with lab          | 4                               |
| Biology                | BIO-203/203L: General Biology I with lab                  | 4                               |
| Physics B              | PHY-241/241L/242/242L: General Physics I and II with labs | 4                               |
| Physics C (both tests) | PHY-241/241L: General Physics I with lab                  | 3                               |

Students interested in attending medical or dental school should be aware that many professional schools will not accept Advanced Placement credits in lieu of prerequisite courses and other schools will accept them only if additional and more advanced coursework in the field is completed.

### ***Change of major***

A student who wishes to transfer from the biology major must first be accepted into another program at the college. The directors of both the biology program and the new program will complete the change of major form.

### ***Addition of minor***

If you wish to add a minor to your course of study, you should consult your advisor to determine if you qualify for the minor and if you can complete the requirements by your projected graduation date. You must complete the Change of Major form which includes an option to add a minor. If the minor is offered by another Division, the chair of that Division must also sign the form. Then you must submit the completed form to the Office of the Vice-President for Academic Affairs.

### ***Counseling***

There may be some issues that your advisor will not feel qualified to address. The college counseling center provides personal counseling to help students with social and emotional wellness. All counseling contacts are confidential and private. Meetings are voluntary; it is up to you to contact the Center. Your advisor may refer you to the Center but will not know if you see a counselor. To make an appointment, contact Tracey Weant at X571.

### ***Mid-semester deficiency notices***

At the mid-term of each semester, each instructor must report to the Office of the Vice-President for Academic Affairs any student whose status in the course is less than satisfactory, i.e., whose current grade is less than “C”. These reports are called Grade Deficiency Reports. If a biology major receives a Grade Deficiency Report in any course, copies of the report are sent to the student, to the Chair of the Natural Science/Mathematics Division and to the student’s advisor. The report does not become part of the permanent record of the student. Instead, the report is designed to encourage the student to determine the reason for the deficiency and to correct the deficiency in the second half of the semester to earn a satisfactory grade. If you receive a Grade Deficiency Report in any course, you should immediately contact your instructor and your advisor to discuss your strategy for remediating the deficiency before the end of the semester.

### ***Review of progress to the degree***

At the end of each academic semester, your progress toward the bachelor’s degree in biology will be reviewed by a committee composed of the full-time faculty of the Natural Science/Mathematics Division who teach the required and elective courses of the biology program (the “major” courses). If your progress toward the degree is considered unsatisfactory

(i.e., you have earned a final course grade below “C” in a major course), the committee will examine your transcript in detail. If the unsatisfactory final grade is a first-time occurrence, you will receive a letter from the Program Director notifying you of your unsatisfactory progress and reminding the student of the Program grade policy (see Section above). If the unsatisfactory grade is a second occurrence involving two different courses, then you will receive a letter from the Program Director notifying you of your continued unsatisfactory progress and placing you on program probation, with a strong warning of the consequences of a third unsatisfactory grade. If the unsatisfactory grade is a third occurrence or if it is a second unsatisfactory grade in a course you have repeated, this is grounds for dismissal from the program.

You may appeal the dismissal decision in writing and the committee will consider all circumstances before deciding whether the dismissal decision should be upheld or if you should continue on program probation. When a biology student receives a final grade below “C” in a major course, the instructor of the course submits a Course Deficiency Report to the Natural Science/Mathematics Division chair citing the reasons for the unsatisfactory grade (e.g., poor exam grades, poor attendance, failure to submit assignments, poorly done assignments). This information will be considered during the Committee’s deliberations on dismissal.

If you are facing dismissal from the Biology program for academic deficiencies, you may petition for a suspension from the program for one academic year instead of permanent dismissal. This suspension is designed to encourage you to examine your commitment to a future in biology and to remediate any circumstances which have contributed to your lack of academic progress. During this suspension, you may not enroll in any courses in the biology program; however, you may enroll in general education courses. At the end of the suspension, you may resume studies in the biology program; however, any future academic deficiency will result in immediate and permanent dismissal from the program.

### ***Professional conduct and demeanor***

When you matriculate into the Gwynedd biology program, you take your first step on the path to your future profession. Therefore, you should consider yourself a biologist from day one and conduct yourself in a professional manner.

#### *In the classroom*

Student conduct in the classroom is a demonstration of respect for your instructor and your fellow students. You are expected to dress and act appropriately. You are expected to arrive at class on time; late arrival to class is not acceptable since it is disrespectful and disruptive to the class. Turn off your cell phone and PDA before you enter the class room. You are expected to remain in the classroom except for an emergency, use the restroom before class starts. You are expected to participate in the class, to respect the contributions of others and to refrain from activities such as personal conversations, text messaging, reading other material, falling asleep, or doing assignments for another class.

If you know that you will miss a class, notify the instructor in advance. If you miss a class unexpectedly, contact the instructor as soon as possible. Regardless of the reason for your absence, the responsibility to obtain class notes and submit assignments remains yours.

### *In the laboratory*

Laboratory experimentation is the keystone of the study of biology. Your appropriate behavior and dress in the laboratory and your respect for equipment and the efforts of your fellow students will make the laboratory a safe and professional environment. Each laboratory course will have safety regulations particular to the subject matter; each instructor will distribute safety information at the first lab meeting. However, there are certain safety regulations which are common to all labs.

You should bring only your lab binders, lab manuals, lab notebooks, calculators and pens into the laboratory. Personal property (coats, backpacks, purses) is not permitted in the laboratory. These items should be left in a student locker outside the lab, secured with your personal combination lock or padlock. You may keep the locker for the semester, but all lockers must be emptied and locks removed at the end of the semester.

It is essential that you adhere strictly to safety procedures designated for the laboratory. You must wear approved safety eyewear at all times in the laboratory and lab aprons or coats over appropriate clothing. Appropriate safety goggles and lab aprons may be purchased through the Natural Science/Math Division laboratory manager in Room 236.

You will sign a safety contract for every laboratory course, agreeing to abide by the regulations concerning safe behavior in the laboratory; no student will be permitted to work in the laboratory until this contract has been signed. Consistent deliberate disregard for established safety procedures will be grounds for expulsion from the laboratory and may result in a failure for the lab course.

### ***Student research***

#### *Internship experiences*

Students may earn course credit toward the biology degree by participating in an internship experience. Students are encouraged to find summer internship experiences; the internship locations and programs may vary but all require student participation in the activity of the internship rather than simple observation. Examples of recent internships include employment at local pharmaceutical and biotechnology companies and a summer-long volunteer experience with the Montgomery County Detective Bureau's Crime Scene Unit. Several of these internships led to seminar research projects; others resulted in full-time employment after graduation. Although clinical experiences (working in a doctor's office or a hospital emergency department, participating in a premed hospital program) are invaluable to the pre-professional student, they are not activities suitable for biology internship credit.

To qualify for an internship, rising junior and senior biology majors must have a program GPA of 3.0 at the time of application. Students must apply for approval of an internship through the Biology Program Director; the internship must be approved before the student may register for the Internship course. Lists of possible internships are available from the Director.

The three-credit internship requires a minimum of 120 hours of participatory activity. In addition, to qualify for credit, the student must keep a journal, obtain an evaluation from the activity supervisor and give a presentation on the internship to peers.

### *Independent study*

A student who is interested in participating in a research project on campus has the opportunity to work with a faculty member via the Independent Study program. Contact your advisor for more information on Independent Study opportunities.

## **Resources**

### *E-mail account*

Students in the program should use their Gwynedd e-mail accounts to communicate with faculty, staff and fellow students. You may access your account via the College's homepage at <http://www.gmc.edu> or directly at <https://gmcmail.gmc.edu/exchange>. Your user name is generally lastname.firstinitial (or lastname.firstname) and your temporary password is tmpXXXX!, where XXXX is the last four digits of your social security number, for example – smith.j and temp6789!. If you have difficulty accessing your e-mail account, contact the Helpdesk **immediately** at X444.

### *Blackboard account*

Most instructors at Gwynedd-Mercy College have web sites associated with their courses. These web sites are hosted by the Blackboard course management system and are accessible only to students enrolled in the course. These sites can be accessed directly at <http://blackboard.gmc.edu> or via the Current Students page of the College's web site at <http://www.gmc.edu>. Your user name and password are the same as for your e-mail account. If you have difficulty accessing your Blackboard account, contact the Helpdesk **immediately**. Instructors use the Blackboard sites to post course information, announcements, notes, assignments, answer keys and grades, to administer quizzes and examinations and to conduct discussion boards. Students can contact classmates and conduct a course chat room.

### *Facilities*

#### *Laboratories*

The laboratories and faculty offices of the Biology program are located on the second floor of Keiss Hall; in addition, courses in the program are scheduled in the lecture and seminar rooms on the first and second floor. There are four teaching laboratories dedicated to biology, two dedicated to chemistry, one dedicated to physics and math as well as a cell culture room and an instrumentation room. There are also two labs dedicated to faculty/student research.

#### *Equipment*

Instrumentation includes UV-Vis spectrophotometers, a FTIR spectrophotometer, gas chromatographs, HPLC chromatographs, Abbe refractometers, polarimeters, vertical and horizontal electrophoresis equipment, a thermal cycler, a fluorescent microscope, a phase contrast microscope, laminar flow hoods, etc. All equipment and instrumentation owned by the program is for the use of students in regularly scheduled labs; no equipment is designated strictly for faculty research.

### *Computer labs*

There are three computer labs available to students: on the second floor of Keiss Hall, in the Academic Resource Center on the second floor of Lourdes Library, and in Room 12 of Saint Bernard's Hall. These labs are equipped with Pentium 4 computers with DVD/CD burners, USB ports and access to the Internet and the College's Intranet. Scanners and printers are also available. Students who use these labs are expected to observe the College's Computer Use Policy.

### *Lourdes Library*

Lourdes Library is a valuable resource for the biology major. The library houses nearly 100,000 volumes and 10,000 media titles and receives over 700 current periodical subscriptions in print and microfilm. Several hundred additional titles are available full text online. The library's holdings can be identified in the computerized catalog, which can be accessed via the library's homepage at [www.gmc.edu/library](http://www.gmc.edu/library). The library provides access to on-line databases of journal citations and full text articles, including many that are related to biology. All can be accessed from on or off-campus, requiring only your network user name and password. The library provides instruction on the use of its resources and services and reference staff is available to assist users. Wireless laptops can be borrowed for use in the library.

Using their Gwynedd IDs, students can borrow materials from the seven other libraries of SEPCHE. All SEPCHE libraries can be searched via SEPCHE-CAT on the library web page. With a letter of introduction from the library, students may borrow materials from the 42 members of the Tri-State College Library Cooperative.

Check Lourdes Library's homepage for more information on its resources and policies.

### *The Academic Resource Center*

The Academic Resource Center (ARC) is located on the second floor of Lourdes Library. It provides academic support for the members of the Gwynedd community. The ARC offers peer tutoring, academic workshops, mathematics modules, and an academic computing lab with reference and instructional software.

### *Disability Support Services*

If you have a disability-related need for modifications or accommodations in your courses, contact the Disability Support Services Coordinator at X427. Your instructors should be notified as early as possible regarding the need for modification or reasonable accommodations in your courses. Within the bounds of its resources, the Biology program intends to allow reasonable accommodations to meet challenges and needs so that students accepted into the Biology program can effectively meet their academic and professional goals.

### **Your Future in Biology**

You've decided on a future in biology, but do you realize just how many choices you have for that future? You might find yourself in research, in health care, in environmental management, or in education. You might specialize in biotechnology, microbiology, genetics, forensic science,

biochemistry, anatomy, epidemiology, ecology or molecular biology. Or perhaps your path will lead to a nontraditional career in policy, law, management, marketing, or writing. Check out the American Institute of Biological Sciences at [www.aibs.org/careers](http://www.aibs.org/careers) or the Society for Integrative and Comparative Biology at [www.sicb.org/careers/index.php3](http://www.sicb.org/careers/index.php3) for more information about careers in biology.

What do Gwynedd biology students do after graduation? Everything! Gwynedd graduates are physicians, dentists, optometrists and veterinarians. They are physical therapists and physician assistants. They are college professors and high school teachers. They are research scientists and laboratory technologists. They are lawyers and business persons. Their examples demonstrate that your opportunities with a biology degree from Gwynedd are virtually limitless.

### ***Post-graduate education***

#### *Physician assistant*

In 2003 the College signed an articulation agreement with Arcadia University that connects the Gwynedd Biology program and the MS degree in Physician Assistant program at Arcadia. This agreement guarantees two places in the Arcadia program to Gwynedd Biology graduates, provided the applicants meet all requirements for admissions to Arcadia. If you are interested in a career as a physician assistant, contact Dr. McEliece for more information about the Arcadia connection.

#### *Doctoral health professions*

At Gwynedd-Mercy College, the School of Arts and Sciences sponsors the Preprofessional Advisory Office and the Preprofessional Evaluation Committee. The purpose of the Preprofessional Advisory Office is to help Gwynedd students make informed decisions about their futures as doctoral health professionals – physicians, dentists, veterinarians, optometrists, podiatrists. The Office provides students with up-to-date information about professional school admissions requirements, testing programs, and application procedures. The Office maintains a library of literature on doctoral health professions education. The Office assists students with the application process and coordinates credentials files; it helps students formulate interim or alternative career plans.

The purpose of the Preprofessional Evaluation Committee is to evaluate the credentials of student applicants and to compose the letter of evaluation sent to professional schools as part of the application process. Each applicant submits to the Committee a credentials file containing transcripts, a resume, the personal statement and faculty evaluations. The members of the Committee study the file and interview the applicant to evaluate the potential of the candidate for success in professional school and in the chosen career before formulating the evaluation.

Gwynedd students have an outstanding record of success in application to professional school and once matriculated, no Gwynedd student has failed to graduate from professional school for academic reasons. Gwynedd graduates are alumni of Boston University School of Medicine, the Medical College of Pennsylvania, Hahnemann University School of Medicine, Temple University School of Medicine, Temple University School of Dentistry, Pennsylvania State University School of Medicine, Philadelphia College of Optometry, Philadelphia College

of Osteopathic Medicine, Nova Southeastern School of Osteopathic Medicine, University of Pittsburgh School of Dental Medicine, Purdue University School of Veterinary Medicine, Ross University, the American University of the Caribbean and the University of Pennsylvania School of Veterinary Medicine.

If you are interested in a career in medicine, dentistry, veterinary medicine, optometry, or podiatry, contact Dr. Barbieri for more information on pre-professional education at Gwynedd.

### *Graduate school*

Students considering furthering their education in post-graduate study have a multitude of opportunities available to them; however, it is often difficult to decide if any of those opportunities are right for them and, if so, which ones. Your Gwynedd-Mercy degree will have provided you with a broad-based training in the biological sciences. Graduate study will allow you to specialize in a particular field of interest, whether that be genetics, biochemistry, ecology, physiology, microbiology, or cell biology, just to name a few. You may also choose to explore graduate study in a field somewhat or only minimally related to biology.

In deciding whether graduate study is right for you, the first thing to consider is what, exactly, you expect to gain from graduate study and why you are interested in a graduate program. Graduate study is rigorous and is not simply to prolong entry into “the real world.” You should expect a rigorous combination of coursework, research, and perhaps even a teaching load. Examine what you are interested in doing with your future and determine if a graduate degree is something you would need to pursue that goal. For many jobs in biotechnology, a Master’s degree is preferable, but not required if the applicant has experience. Many students opt to enter the workforce with the intent of going back to graduate school later in their career; there is no rule that states you must attend graduate school immediately upon graduation.

Another decision is to what level to take your post-graduate study, should you choose that path. Are you interested in a Master’s degree or a Ph.D.? Ph.D. programs are highly competitive. This may be a good choice for you if you are willing to work hard and have a particular interest in a single area of study. If your chosen career path requires top credentials, you want to teach at the college level, or you plan to immerse yourself in heavy research where you direct the research, a Ph.D. is a likely path for you. If you are looking for an advanced degree to obtain a higher than entry-level research position, you want to explore an area of specialty, or hope to advance to a higher level in secondary education, a Master’s degree may be the better option. Some programs require you first obtain your Master’s degree prior to the Ph.D.; however, many programs now offer opportunities to bypass the Master’s degree entirely and enter the Ph.D. track. You should decide which option is best for you.

If you have decided that graduate school is for you, how should you proceed? Graduate programs are competitive and also smaller than undergraduate programs, so there is no guarantee that you will be accepted into a graduate program, even with good grades. There are generally a limited number of openings and a large number of applications. In general, by your junior year of college, you should be investigating graduate school opportunities. By your junior year, you will have experienced many varied areas of the biological sciences and should have some idea of where your interests lie. Even if you aren’t sure exactly *what* you want to do, you may realize you have a specific interest in microbiology and ecology. This gives you a place to start.

Graduate school programs are more specialized, so you should not be in graduate school trying to decide what your area of interest is. Once you know *what* you want to study, you can begin to investigate *where* you wish to go. Investigate programs in your areas of interest and take into account any factors that may play into your decision to attend. Examine faculty interests, the primary focus of the program, and factors relating to the institution, itself, from location, to size, cost, amount of financial support, etc.

By the summer/fall of your senior year, you should be narrowing your choices and requesting application materials from your programs of interest. You should plan to take the appropriate admission exam in the appropriate discipline as early as possible. In most cases, this exam is the Graduate Record Examination (GRE). The GRE offers a general test as well as specific subject tests. You should investigate which exams are required of the institutions to which you are applying. You should also contact any members of the faculty from whom you wish to obtain letters of recommendation. Meet with them and provide them with a resume of your accomplishments to allow them to write the best possible letter of support. Many applications also require a personal statement, so you should begin working on that as well. Most graduate school applications are due by early in the spring semester, so make sure your application is complete, you have your letters secured, transcripts sent, graduate exam taken with scores sent to appropriate institutions, and personal statement together by fall break.

You should also consider how you will pay for graduate school. Many students apply for loans. Institutional financial aid is competitive. Some programs offer research fellowships, graduate assistantships, or teaching assistantships to their graduate students. There is generally more funding available to science Ph.D.'s than to Master's students. Investigate funding opportunities at the institutions to which you are applying and also investigate federal aid and personal loans. In addition, you should be preparing for options if you do not get accepted into graduate school immediately after graduation. Although you may still be waiting for admission offers, you should also be compiling and sending your resume out in the instance that no graduate school offers arrive. You will need a back-up plan, and job experience gained if you don't enter graduate school immediately will be a wonderful addition to your application if and when you apply to graduate school again.

The graduate application process can be daunting. The responsibility for researching programs and applying to graduate school is solely yours, however, the biology faculty is always available to answer questions, help you make informed decisions, and guide you through the process. Faculty members are willing to discuss options with you, advise you how to proceed, write letters of recommendation, review your personal statements, and provide you with insight into graduate schools and the application process. You are encouraged to seek their guidance when needed.

# **Appendix I**

# **Curriculum Sheets**

# **Appendix II**

# **Course Projections**