

# STUDENT HANDBOOK

## 2010/2011



# MARYWOOD UNIVERSITY

## Science Department

**2300 Adams Avenue, Scranton, PA 18509**

**(570)348-6265**

**<http://www.marywood.edu/science/>**

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## I. INTRODUCTION

This Student Handbook has been compiled to give you information regarding the policies and procedures of the Science Department at Marywood University. At any time during the course of an academic semester, a student may consult with the Science Department Chair for clarification of these policies and procedures.

Marywood University, in accordance with applicable provisions of federal law, does not discriminate on grounds of race, color, national origin, sex, age, or handicap in the administration of any of its educational programs or activities, including admission or with respect to employment. Inquires should be directed to: Ms. Patricia Dunleavy., Coordinator of Act 504 and Title IX, Marywood University, Scranton, PA 18509-1598, Phone: (570) 348-6220, or Ms. Diane Taylor, Director of Disability Services, (570) 340-6045, [dtaylor@es.marywood.edu](mailto:dtaylor@es.marywood.edu) .

## **II. INFORMATION ABOUT THE SCIENCE DEPARTMENT**

### **A. ADMISSIONS REQUIREMENTS**

Basic Requirements for Admission are as follows:

1. An official transcript which reflects all course work in which a person has enrolled in secondary school and, if applicable, in college. The secondary school transcript should indicate the person's rank in class.
2. A letter of recommendation from the candidate's guidance counselor, teacher or principal. A person who has been away from formal education for a few years may ask another individual who can offer an appraisal of the candidate's academic skills and personal character to submit a letter of recommendation.
3. Official scores from the College Board's Scholastic Aptitude Test or the American College Testing Program's ACT.
4. An official report of the scores from the General Education Development Test (GED), if applicable.

### **B. TRANSFER STUDENTS FROM OTHER INSTITUTIONS**

Transfer students from other institutions should be aware of the following:

1. The Science Department has a 7-year statute of limitations. Science courses taken more than seven years ago will be accepted by the Science Department upon approval by dept. Chair. Please refer to the Statute of Limitations Policy.
2. The department will accept a maximum of 16 science transfer credits toward a major science degree; additional credits considered subject to Chair approval. (These courses will only be accepted if they are equivalent to Marywood's courses.)
3. The department will accept a maximum of 8 science transfer credits toward a minor program. (These courses will only be accepted if they are equivalent to Marywood's courses.)
4. You must take a minimum of 60 credits at Marywood in order to be eligible for a degree.
5. Once a transfer student is accepted as a Science Major at Marywood University, all future science courses must be taken at Marywood. Only under unusual circumstances, for sufficient reason, and with special permission of the Chairperson of the Science Department may a science course be taken off campus.

### **C. TRANSFER STUDENTS WITHIN THE UNIVERSITY**

Undeclared students and students from other majors must have earned a minimum Q.P.A. of 2.33 to transfer into the Science Department.

## D.

## DEGREE REQUIREMENTS

The major programs are:

1. Biology (Pre-medical, Pre-dental and Pre-veterinary track available)
2. Biotechnology (Pre-medical, Pre-dental and Pre-veterinary track available)
3. Pre-chiropractic
4. Environmental Science
5. Medical Laboratory Science (MLS)
6. Teacher Certification in Biology and/or General Science
7. Pre-Physician Assistant

To be considered for retention, progression and graduation, students must maintain a **minimum Q.P.A. of 2.33** in the major area of study. Pre-PA students need to be aware of the 3.0 major QPA average minimum required for consideration by the PA MS program.

A minimum of 2.0 Q.P.A. is required for all liberal arts courses.

Science Majors and students pursuing a science minor are required to take their science courses at Marywood University.

Major Programs for the Science Department are as follows:

## Course Requirements – Biology (Pre-Professional, Biology)

Required Program Courses – 44 credits	
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> Science Literacy Capstone (BIOL 410)	<input type="checkbox"/> Mol.&Cell Bio (BIOL 440+L) <b>OR</b> Genetics (BIOL 446+L)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L)
<input type="checkbox"/> General Physics I (PHYS 213+L)	<input type="checkbox"/> General Physics II (PHYS 214+L)
<input type="checkbox"/> Statistics for the Behav & Soc. Sciences (MATH 216)	<input type="checkbox"/> Mathematical Applications in Biology (MATH 170) <b>OR</b> <input type="checkbox"/> Calculus/Analytical Geometry I (MATH 201)***
Plus 30 Credits of Additional Science Electives	
<input type="checkbox"/> Human Gross Anatomy (BIOL 201+L) (4)	
<input type="checkbox"/> Human Physiology (BIOL 202+L) (4)	
<input type="checkbox"/> General Microbiology (BIOL 235+L) (4)	
<input type="checkbox"/> Introduction to Biotechnology (BIOL 281) (3)	
<input type="checkbox"/> Fundamentals of Neuroscience (BIOL 305) (3)	
<input type="checkbox"/> Immunology (BIOL 332+L) (4)	
<input type="checkbox"/> Evolution (BIOL 351) (3)	
<input type="checkbox"/> Biochemistry (BIOL 421+L) (4)	
<input type="checkbox"/> Undergraduate Research (BIOL 454) (2)	
<input type="checkbox"/> Internship (BIOL 498) (3)	
<input type="checkbox"/> Independent Study (BIOL 499) (1,2, or 3)	
<input type="checkbox"/> Environmental Chemistry (CHEM 312) (3)	
<input type="checkbox"/> Chemical Analysis (CHEM 398+L) (3)	
<input type="checkbox"/> Independent Study (CHEM 499) (1,2, or 3)	
<input type="checkbox"/> Ecology (ENVS 420+L) (4)	
<input type="checkbox"/> Calculus with Analytical Geometry II (MATH 202) (3)***	

Students who plan to apply to a professional school are advised to explore the entrance course requirements and then discuss the science elective options with their advisor. \*\*\*Pre-Professional students will choose elective science courses based on the requirements of the professional school and on the list of courses suggested and/or recommended by those medical, dental, or veterinary schools. Calculus I (MATH 201) and Calculus II (MATH 202) are required. Other science elective courses can be taken with the permission of the Science Department Chairperson. Ultimately, it is the responsibility of the student to meet all of their major and liberal arts course requirements of the University. **(TOTAL NUMBER OF CREDITS TO GRADUATE = 126)**

## HEALTH PROFESSIONS PROGRAM

The track in health pre-professional studies at Marywood University is designed for the qualified and highly science-oriented students who plan to apply to schools of medicine, dentistry, optometry, podiatry and veterinary medicine.

Although most undergraduates who expect to attend health professions schools choose Biology or Biotechnology as their major, the program offers sufficient flexibility to prepare students for future studies in law, business administration, and to enter the allied health fields. The Association of American Medical Colleges recommends that pre-professional students have strong backgrounds in the natural sciences and develop oral and written communication skills. Honors courses, internships, independent study and student research are also strongly recommended. In addition, social science and humanities courses are also encouraged.

The student's choice of science electives is based on the requirements for the professional schools and on the lists of courses suggested or recommended by those schools in which the students is interested.

Many graduates of Marywood University are employed in the health professions or are presented attending professional schools.

## BS BIOTECHNOLOGY PROGRAM

Required Program Courses – 54 credits	
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> Introduction to Biotechnology (BIOL 281)	<input type="checkbox"/> Statistics for the Behavioral & Soc. Sci. (MATH 216)
<input type="checkbox"/> Bioinformatics (BIOL 302)	<input type="checkbox"/> General Microbiology (BIOL 235+L)
<input type="checkbox"/> Emerging Medicines & Technologies (BIOL 383)	<input type="checkbox"/> Cell Culture (BIOL 401)
<input type="checkbox"/> Science Literacy Capstone (BIOL 410)	<input type="checkbox"/> Senior Research Project (BIOL 455)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L)
<input type="checkbox"/> Bioethics (PHIL 404 preferred--also counts as a L.A.)	
<input type="checkbox"/> Molecular & Cellular Biology (BIOL 440+L) OR <input type="checkbox"/> Genetics (BIOL 446+L)	<input type="checkbox"/> Mathematical Applications in Biology (MATH 170) OR <input type="checkbox"/> Calculus/Analytical Geometry I (MATH 201)***
Plus 18 Credits of Additional Science Electives	
<input type="checkbox"/> Ecology (ENVS 420+L) (4)	
<input type="checkbox"/> Environmental Chemistry (CHEM 312) (3)	
<input type="checkbox"/> Chemical Analysis (ENVS 398+L) (3)	
<input type="checkbox"/> Fundamentals of Neuroscience (BIOL 305) (3)	
<input type="checkbox"/> Internship (BIOL 498) (3)	
<input type="checkbox"/> Biochemistry (BIOL 421+L) (4)	
<input type="checkbox"/> Immunology (BIOL 332+L) (4)	
<input type="checkbox"/> Human Gross Anatomy (BIOL 201+L) (4)	
<input type="checkbox"/> Human Physiology (BIOL 202+L) (4)	
<input type="checkbox"/> General Physics I (PHYS 213+L) (4)	
<input type="checkbox"/> General Physics II (PHYS 214+L) (4)	
<input type="checkbox"/> Calculus with Analytical Geometry II (MATH 202) (3)***	

Students who plan to apply to a professional school are advised to explore the entrance course requirements and then discuss the science elective options with their advisor. \*\*\*Pre-Professional students will choose elective science courses based on the requirements of the professional school and on the list of courses suggested and/or recommended by those medical, dental, or veterinary schools. Calculus I (MATH 201) and Calculus II (MATH 202) are required. Other science elective courses can be taken with the permission of the Science Department Chairperson. Ultimately, it is the responsibility of the student to meet all of their major and liberal arts course requirements of the University. **(TOTAL NUMBER OF CREDITS TO GRADUATE = 126)**

# MS BIOTECHNOLOGY PROGRAM REQUIREMENTS

<b><u>I. Interdisciplinary</u></b>	<b><u>Course Description</u></b>	<b><u>Credits</u></b>
COM 503	Public Presentation	3
PSY 501	Research Methods, Stats	3
PUB 511	Ethics Management	3
BUS 500+**	Graduate Business (MBA)	3
BUS 500+**	Graduate Business (MBA)	3
BUS 500+**	Grduate Business (MBA)	3
<b>Interdisciplinary Total Credits = 18</b>		
<b><u>II. Science</u></b>	<b><u>Course Description</u></b>	<b><u>Credits</u></b>
BIOL 501+Lab	Cell Culture	3
BIOL 502	Bioinformatics	3
BIOL 520	Literature Review	2
BIOL 540+Lab	Molecular and Cell Biology	4
BIOL 583	Emerging Medicines and Technologies	3
<b>Science Total Credits = 15</b>		
<b><u>III. Science Electives (Choose 2 electives)</u></b>		
ENVS 520+Lab	Ecology	3 (4)
BIOL 521+Lab	Biochemistry	3 (4)
BIOL 530	Laboratory Instruction	3
BIOL 532+Lab	Immunology	3(4)
BIOL 595	Reasearch	3
<b>Science Elective Total Credits = 4-6</b>		

**\*Graduate Business (MBA) required courses: choose total of three (3):**

BUS 542	Financial Plannign and Management	3
BUS 556	Business Venture and Entreprenuer	3

At the UG level, BUS 321 is recommended before taking BUS 542 and BUS 556.

BUS 541	Organization Behavior and Development	3
BUS 568	Legal Apsects of the Administrative Process	3
BUS 570	Marketing and Strategic Planning	3

At the UG level, BUS 341 is recommended before taking BUS 541, BUS 568 and BUS 570.

BUS 546	Managing the Organization in the Marketspace	3
BUS 569	Mangement of Technologoy	3

At the UG level, BUS 301 is recommended before taking BUS 546 and BUS 569.

**ADMISSION PROCEDURES AND REQUIREMENTS.** The program has a rolling admission policy, and each applicant is reviewed by the Department of Science Graduate Admissions Committee. To be considered for the program, applicants are required to submit an application for admission, along with a \$30 application fee, and official college transcripts showing an undergraduate GPA of 3.0 or higher. Prerequisite course work at the undergraduate level include (i) general biology I & II with labs, (ii) general chemistry I & II with labs, and (iii) organic chemistry I & II with labs. In addition, one semester of microbiology with lab, an upper-level math course (e.g., calculus), and an upper-level biology or chemistry course (including a lab) are required. Two letters of recommendation, a two-page essay describing the candidate's career objectives and how the degree will assist with such goals, a GRE score, a TOEFL score (if applicable).

## M.S. BIOTECHNOLOGY (External Candidates)

Required Program Courses – 19-21 credits	
<input type="checkbox"/> Bioinformatics (BIOL 502)	<input type="checkbox"/> Cell Culture (BIOL 501)
<input type="checkbox"/> Literature Review (BIOL 520)	<input type="checkbox"/> Molecular & Cellular Biology (BIOL 540+L)
<input type="checkbox"/> Emerging Medicines & Technologies (BIOL 583)	<input type="checkbox"/> Science Elective (SCI 500+)
<input type="checkbox"/> Science Elective (SCI 500+)	
Plus 18 Credits of Interdisciplinary Electives	
<input type="checkbox"/> Ethics in Management (PUB 511) (3)	
<input type="checkbox"/> Public Presentation (COMM 503) (3)	
<input type="checkbox"/> Research Methods & Statistics (PSY 501) (3)	
<input type="checkbox"/> Business Elective (MBA) (BUS _____) (3)	
<input type="checkbox"/> Business Elective (MBA) (BUS _____) (3)	
<input type="checkbox"/> Business Elective (MBA) (BUS _____) (3)	

## B.S./M.S. 5-Year Biotechnology

Required Program Courses – 54 credits	
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> Introduction to Biotechnology (BIOL 281)	<input type="checkbox"/> Statistics for the Behavioral & Soc. Sci. (MATH 216)
<input type="checkbox"/> Bioinformatics (BIOL 302)	<input type="checkbox"/> General Microbiology (BIOL 235+L)
<input type="checkbox"/> Emerging Medicines & Technologies (BIOL 383)	<input type="checkbox"/> Cell Culture (BIOL 401)
<input type="checkbox"/> Science Literacy Capstone (BIOL 410)	<input type="checkbox"/> Senior Research Project (BIOL 455)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L)
<input type="checkbox"/> Bioethics (PHIL 404 preferred--also counts as a L.A.)	
<input type="checkbox"/> Molecular & Cellular Biology (BIOL 440+L) OR <input type="checkbox"/> Genetics (BIOL 446+L)	<input type="checkbox"/> Mathematical Applications in Biology (MATH 170) OR <input type="checkbox"/> Calculus/Analytical Geometry I (MATH 201)***
Plus 18 Credits of Additional Science Electives	
<input type="checkbox"/> Ecology (ENVS 420+L) (4)	
<input type="checkbox"/> Environmental Chemistry (CHEM 312) (3)	
<input type="checkbox"/> Chemical Analysis (ENVS 398+L) (3)	
<input type="checkbox"/> Fundamentals of Neuroscience (BIOL 305) (3)	
<input type="checkbox"/> Internship (BIOL 498) (3)	
<input type="checkbox"/> Biochemistry (BIOL 421+L) (4)	
<input type="checkbox"/> Immunology (BIOL 332+L) (4)	
<input type="checkbox"/> Human Gross Anatomy (BIOL 201+L) (4)	
<input type="checkbox"/> Human Physiology (BIOL 202+L) (4)	
<input type="checkbox"/> General Physics I (PHYS 213+L) (4)	
<input type="checkbox"/> General Physics II (PHYS 214+L) (4)	
<input type="checkbox"/> Calculus with Analytical Geometry II (MATH 202) (3)***	
Plus 20 Credits of Interdisciplinary* Electives	
<input type="checkbox"/> Literature Review (BIOL 520) (2)* (Science Department course required by all MS students)	
<input type="checkbox"/> Ethics in Management (PUB 511) (3)	
<input type="checkbox"/> Public Presentation (COMM 503) (3)	
<input type="checkbox"/> Research Methods (PSY 501) (3)	
<input type="checkbox"/> Business Elective (MBA) (BUS _____) (3)	
<input type="checkbox"/> Business Elective (MBA) (BUS _____) (3)	
<input type="checkbox"/> Business Elective (MBA) (BUS _____) (3)	

*Students who plan to apply to a professional school are advised to explore the entrance course requirements and then discuss the science elective options with their advisor. Pre-Professional students will choose elective science courses based on the requirements of the professional school and on the list of courses suggested and/or recommended by those medical, dental, or veterinary schools. Other science elective courses can be taken with the permission of the Science Department Chairperson. Ultimately, it is the responsibility of the student to meet all of their major and liberal arts course requirements of the University.*

## B.S. BIOLOGY PRE-CHIROPRACTIC PROGRAM

Required Program Courses – 51 credits	
<input type="checkbox"/> Human Gross Anatomy (BIOL 201+L)	<input type="checkbox"/> Human Physiology (BIOL 202+L)
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> General Microbiology (BIOL 235+L)	
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L)
<input type="checkbox"/> General Physics I (PHYS 213+L)	<input type="checkbox"/> General Physics II (PHYS 214+L)
<input type="checkbox"/> Molecular & Cellular Biology (BIOL 440+L) OR <input type="checkbox"/> Genetics (BIOL 446+L)	<input type="checkbox"/> Statistics for the Behav & Soc. Sciences (MATH 216) OR <input type="checkbox"/> Calculus/Analytical Geometry (MATH 201)
Additional Courses from NYCC*	
<input type="checkbox"/> Cell and Tissue Biology (ANO 6102) (5)	
<input type="checkbox"/> Neuroscience I (ANA 6104) (5)	
<input type="checkbox"/> Neuroscience II (ANA 6205) (5)	
<input type="checkbox"/> Biochemistry of Nutrition/Metabolism (BCH 6203) (2)	
<input type="checkbox"/> Principles of Biochemistry (BCH 6101) (3)	
<input type="checkbox"/> Basic Human Nutrition I (AST 6304) (2)	

\*Normally, these courses (or their equivalents) from New York Chiropractic School are accepted based on the discretion of the Marywood Science Department Chair.

A student will be given priority admission to NYCC if a minimum Q.P.A. of 3.25 is maintained for 3 years at Marywood University. An overall minimum Q.P.A. of 2.50 is required at the completion of 90 credits to apply to NYCC. Ultimately, it is the responsibility of the student to meet all of their major and liberal arts course requirements of Marywood University. **Upon acceptance to NYCC, a student must complete a Leave of Absence form from the Registrar's Office.**

A student who completes at least 22 credits of coursework electives in the first two trimesters at NYCC, and has maintained a minimum Q.P.A. of 2.50, will be granted a B.S. degree in Biology from Marywood University. The student must also complete the appropriate paperwork to transfer credits from NYCC each trimester prior to the May commencement date for graduation. All official transcripts must be sent directly to the Registrar's Office at Marywood University. In addition, a student must register for DEAN 050 during their spring semester of their second trimester at NYCC in order to be eligible to graduate in May from Marywood University.

**TOTAL NUMBER OF CREDITS NEEDED TO GRADUATE = 127**

## TIMELINE FOR APPLYING TO NYCC

- Immediately upon entering Pre-Chiro Program at Marywood University**  
Students with assistance of advisor must forward to NYCC a letter stating that they are enrolled in a 3+1 program, noting in which term they anticipate on starting at NYCC.
  - Applications are due 6 months – 1 year prior to anticipated start date at NYCC**  
NYCC advises students to apply 6 months to a year in advance of when they wish to enroll. Students should start providing recommendation letters and transcripts to NYCC by this point, if not before.
  - Contact with NYCC – Online** - NYCC will send progress reports to the students. These detail the information they have received from each student, including what they still need to complete. Updated reports will be sent each time NYCC receives documents from the student. These can be viewed online.
  - Transcripts and Immunization Records** - Students are required to provide to NYCC transcripts from any college/university that they have attended, along with immunization records for Measles, Mumps, and Rubella.
  - NYCC Interview Process Begins** - Upon receiving required documents, NYCC will determine when the interview process, for each student, will begin.
  - Interview Process** - The NYCC formal interview is one conducted by a faculty Doctor of Chiropractic. Within a week of the interview, NYCC will contact students with their decision.
  - Criteria** - The committee considers the student's background, education, caliber of program/school, references, experience with chiropractic, the interactions with his/her admissions counselor, and the doctor's recommendations from the interview.
  - Acceptance** - NYCC's acceptance rate is 50%. Upon acceptance, a student has 30 days to accept the NYCC offer and must send in a deposit of \$400 to hold their seat in that class.
  - LOA** – Upon acceptance, the student must fill out a Leave of Absence form from the Registrars Office.
- 
- NYCC Transcripts must be sent to Marywood University Science Department**  
Upon completion of each semester at NYCC, a copy of transcripts must be sent to the Marywood Science Chair. Failure to do so will jeopardize completion of the B.S. Biol. degree
  - Successful Completion @ NYCC** - Upon completion of required NYCC courses, the Chair of the Science Department must authorize your eligibility for graduation.
  - Register for Graduation** - Register for DEAN 050 for the final semester prior to Marywood University graduation to re

## B.S. Environmental Science Program

### Required Program Courses – 51 credits

<input type="checkbox"/> General Biology I (BIOL 150+L) (4)	<input type="checkbox"/> General Biology II (BIOL 151+L) (4)
<input type="checkbox"/> General Microbiology (BIOL 235+L) (4)	<input type="checkbox"/> Science Literacy Capstone (BIOL 410) (2)
<input type="checkbox"/> General Chemistry I (CHEM 131+L) (4)	<input type="checkbox"/> General Chemistry II (CHEM 132+L) (4)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L) (4)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L) (4)
<input type="checkbox"/> General Physics I (PHYS 213+L) (4)	<input type="checkbox"/> General Physics II (PHYS 214+L) (4)
<input type="checkbox"/> Statistics for the Behav. & Soc. Sci. (MATH 216) (3)	<input type="checkbox"/> Mathematical Applications in Biology (MATH 170) (3)
<input type="checkbox"/> Ecology (ENVS 420+L) (4)	<input type="checkbox"/> Environmental Chemistry (CHEM 312) (3)

### Plus 21 Credits of Additional Science Electives

<input type="checkbox"/> Earth Science I (Geology) (ENVS 261) (3)	<b>***Recommended elective***</b>
<input type="checkbox"/> Earth Science II (Oceanography & Meteorology) (ENVS 262) (3)	<b>***Recommended elective***</b>
<input type="checkbox"/> Environmental Management & Policy (ENVS 345) (3)	<b>***Recommended elective***</b>
<input type="checkbox"/> Evolution (BIOL 351) (3)	<b>***Recommended elective***</b>
<input type="checkbox"/> Chemical Analysis (CHEM 398+L) (3)	<b>***Recommended elective***</b>
<input type="checkbox"/> Human Gross Anatomy (BIOL 201+L) (4)	
<input type="checkbox"/> Human Physiology (BIOL 202+L) (4)	
<input type="checkbox"/> Introduction to Biotechnology (BIOL 281) (3)	
<input type="checkbox"/> Undergraduate Research (BIOL 454) (2)	
<input type="checkbox"/> Internship (BIOL 498) (3)	
<input type="checkbox"/> Independent Study (BIOL 499) (1,2, or 3)	
<input type="checkbox"/> Resource Conservation I (ENVS 215) (3)	
<input type="checkbox"/> Resource Conservation II (ENVS 216) (3)	
<input type="checkbox"/> Environmental Law (ENVS 340) (3)	
<input type="checkbox"/> Environmental Ethics (PHIL 328) (3)	<b>***Also counts toward L.A. core PHIL elective***</b>
<input type="checkbox"/> Environmental Specialty Course (ENVS 300+) (3-4)	
<input type="checkbox"/> Undergraduate Research (ENVS 454) (2)	
<input type="checkbox"/> Internship (ENVS 498) (3)	
<input type="checkbox"/> Independent Study (ENVS 499) (1,2 or 3)	
<input type="checkbox"/> Independent Study (CHEM 499) (1,2 or 3)	
<input type="checkbox"/> Astronomy (PHYS 112+L) (4)	

It is the responsibility of the student to meet all of their major and liberal arts course requirements of the University.  
**TOTAL NUMBER OF CREDITS NEEDED TO GRADUATE = 126**

## BS MEDICAL LABORATORY SCIENCES

Required Program Courses – 35 credits	
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> General Microbiology (BIOL 235+L)	<input type="checkbox"/> Immunology (BIOL 332+L)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L)
<input type="checkbox"/> Statistics for Behav. & Soc. Sci. (Math 216)	
Additional Science Electives – 12 credits**	
<input type="checkbox"/> Anatomy & Physiology I (BIOL 121+L)	
<input type="checkbox"/> Anatomy & Physiology II (BIOL 122+L)	
<input type="checkbox"/> Human Gross Anatomy (BIOL 201+L)	
<input type="checkbox"/> Human Physiology (BIOL 202+L)	
<input type="checkbox"/> Molecular & Cellular Biology (BIOL 440+L)	
<input type="checkbox"/> Genetics (BIOL 446+L)	
<input type="checkbox"/> Biochemistry (BIOL 421+L)	
<input type="checkbox"/> Chemical Analysis (CHEM 398+L)	
<input type="checkbox"/> General Physics I (PHYS 213+L)	
<input type="checkbox"/> General Physics II (PHYS 214+L)	
<b>**All science elective courses must be taken concurrently with the accompanying laboratory course</b>	

The MLS student spends their 4<sup>th</sup> year at an accredited hospital program and upon acceptance to the clinical internship, the student **must complete a Leave of Absence form through the Registrar's Office**. MLS majors must complete all the Liberal Arts academic course requirements before beginning their clinical internship program. A minimum major QPA of 2.33 and an overall QPA of 2.0 are required, however most Medical Laboratory Science hospital programs require a major QPA of 2.5. A student receive their B.S. degree on the University graduation date that follows the successful completion of 30 credits transferred from their clinical internship program. Students must register for DEAN 050 during their final semester as seniors. See the student handbook regarding procedures for financial aid during the clinical internship phase. Students must notify Marywood University Financial Aid Office prior to internship enrollment. Ultimately, it is the student's responsibility to meet all major and liberal arts course requirements of the University.

**TOTAL NUMBER OF CREDITS NEEDED TO GRADUATE = 126**

## B.S. BIOLOGY/SECONDARY EDUCATION/CERTIFICATION PROGRAM

Program Courses – 52 credits	
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> General Microbiology (BIOL 235+L)	<input type="checkbox"/> Anatomy & Physiology II (BIOL 122+L)
<input type="checkbox"/> Evolution (BIOL 351)	<input type="checkbox"/> Current Methods & Materials (BIOL 411B)
<input type="checkbox"/> Science Literacy Capstone (BIOL 410)	<input type="checkbox"/> Mol.&Cell Biol. (BIOL 440+L) <b>OR</b> Genetics (BIOL 446+L)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Ecology (ENVS 420+L)
<input type="checkbox"/> General Physics I (PHYS 213+L)	<input type="checkbox"/> Statistics for the Behav. & Soc. Sci. (MATH 216)
Additional Math Elective (Choose One)	
<input type="checkbox"/> Calculus I/Analytical Geometry (MATH 201)	<input type="checkbox"/> Calculus for Life Sciences (MATH 170)
Professional Education Requirements for Teacher Education Programs – 34 credits	
<input type="checkbox"/> Field Experience (EDUC 001-003) – ongoing	
<input type="checkbox"/> Introduction to Education (EDUC 100/101)	
<input type="checkbox"/> Characteristics of Students with Disabilities (S ED 100)	
<input type="checkbox"/> Developmental Psychology (PSY 251)	
<input type="checkbox"/> Educational Psychology (EDUC 311)	
<input type="checkbox"/> Behavioral Management (S ED 367) <b>***Student can elect ANY S ED course*** (S ED 367 is recommended)</b>	
<input type="checkbox"/> Effective Instruction (EDUC 411A)	
<input type="checkbox"/> Social Foundations (EDUC 414)	
<input type="checkbox"/> Methods, Materials, and Assessment ELL (EDUC 561)	
<input type="checkbox"/> Student Teaching (EDUC 442) *includes a 3-credit course, S ED 300 – Curriculum Adaptations	

In addition, General Science Education majors must fulfill the course requirements of the Department of Education, which is a total of 34 credits. These curriculum requirements are subject to change based on the guidelines established by the Pennsylvania Department of Education. Students are required to complete an additional 37-40 credits in other L.A. Core Curriculum courses. Additional information is contained in the Education Department section of the Undergraduate course catalog. Ultimately, it is the responsibility of the student to meet all of their major and liberal arts course requirements of the University. **TOTAL NUMBER OF CREDITS NEEDED TO GRADUATE = 126-129.**

## B.S. GENERAL SCIENCE/SECONDARY EDUCATION

### Required Program Courses – 55 credits

<input type="checkbox"/> Anatomy & Physiology I (BIOL 121+L)	<input type="checkbox"/> Anatomy & Physiology II (BIOL 122+L)
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> Evolution (BIOL 351)	<input type="checkbox"/> Current Methods & Materials (BIOL 411B)
<input type="checkbox"/> Science Literacy Capstone (BIOL 410)	<input type="checkbox"/> Statistics for the Behav. & Soc. Sci. (MATH 216)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Ecology (ENVS 420+L)
<input type="checkbox"/> General Physics I (PHYS 213+L)	<input type="checkbox"/> General Physics II (PHYS 214+L)

### Additional Math Elective (Choose One)

- |  |  |
|--|--|
| <input type="checkbox"/> Calculus/Analytical Geometry (MATH 201) | <input type="checkbox"/> Calculus for Life Sciences (MATH 170) |
|--|--|

### Professional Education Requirements for Teacher Education Programs – 34 credits

- |  |
|--|
| <input type="checkbox"/> Field Experience (EDUC 001-003) – ongoing   |
| <input type="checkbox"/> Introduction to Education (EDUC 100/101)  |
| <input type="checkbox"/> Characteristics of Students with Disabilities (S ED 100)  |
| <input type="checkbox"/> Developmental Psychology (PSY 251)  |
| <input type="checkbox"/> Educational Psychology (EDUC 311)   |
| <input type="checkbox"/> Behavioral Management (S ED 367) <b>***Student can elect ANY S ED course*** (S ED 367 is recommended)</b> |
| <input type="checkbox"/> Effective Instruction (EDUC 411A)   |
| <input type="checkbox"/> Social Foundations (EDUC 414)   |
| <input type="checkbox"/> Methods, Materials, and Assessment ELL (EDUC 561)   |
| <input type="checkbox"/> Student Teaching (EDUC 442) *includes a 3-credit course, S ED 300 – Curriculum Adaptations                |

In addition, General Science Education majors must fulfill the course requirements of the Department of Education, which is a total of 34 credits. These curriculum requirements are subject to change based on the guidelines established by the Pennsylvania Department of Education. Students are required to complete an additional 37-40 credits in other L.A. Core Curriculum courses. Additional information is contained in the Education Department section of the Undergraduate course catalog. Ultimately, it is the responsibility of the student to meet all of their major and liberal arts course requirements of the University. **TOTAL NUMBER OF CREDITS NEEDED TO GRADUATE = 126-129.**

## B.S. PRE-PA/HEALTH SCIENCES

Required Program Courses – 42 credits	
<input type="checkbox"/> Gross Human Anatomy (BIOL 201+L)	<input type="checkbox"/> Human Physiology (BIOL 202+L)
<input type="checkbox"/> General Biology I (BIOL 150+L)	<input type="checkbox"/> General Biology II (BIOL 151+L)
<input type="checkbox"/> General Microbiology (BIOL 235+L)	<input type="checkbox"/> Statistics for Behav. & Soc. Sci. (MATH 216)
<input type="checkbox"/> General Chemistry I (CHEM 131+L)	<input type="checkbox"/> General Chemistry II (CHEM 132+L)
<input type="checkbox"/> Science Literacy Capstone (BIOL 410)	
<input type="checkbox"/> Nutrition I (ND 112)	<input type="checkbox"/> Dynamics of Speech (COMM 101)
Suggested Science Elective Courses – 20 credits	
<input type="checkbox"/> Introduction to Biotechnology (BIOL 281)	<input type="checkbox"/> Bioinformatics (BIOL 302)
<input type="checkbox"/> Neuroscience (BIOL 305)	<input type="checkbox"/> Immunology (BIOL 332+L)
<input type="checkbox"/> Mathematical Applications in Biology (MATH 170)	<input type="checkbox"/> Genetics (BIOL 446+L)
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L)
<input type="checkbox"/> General Physics I (PHYS 213+L)	<input type="checkbox"/> General Physics II (PHYS 214+L)
Suggested Other Elective Courses – 24 credits	
<input type="checkbox"/> Theory of Medical Nutrition Therapy I (N D 300)	<input type="checkbox"/> Nutrition II (N D 213)
<input type="checkbox"/> Physiological Psychology (PSY 314)	<input type="checkbox"/> Health Psychology (PSY 319)
<input type="checkbox"/> Computer Appl. in Psych & Health Sci (PSY 330)	<input type="checkbox"/> Dying & Death in American Society (SOC 402)
<input type="checkbox"/> Medical Sociology (SOC 350)	<input type="checkbox"/> Principles of Management (BUS 112)
<input type="checkbox"/> <b>P A Summer courses: 310, 322, 340, 370, 580**</b>	<input type="checkbox"/> <b>P A Fall courses: 311, 320A, 330, 341, 350, 371, 390**</b>
Liberal Arts Courses – 40 credits	
<input type="checkbox"/> Living Responsibly in an Interdependent World (UNIV 100)	
<input type="checkbox"/> Writing Skills (ENGL 160)	
<input type="checkbox"/> Introduction to World Literature (ENGL 180)	
<input type="checkbox"/> English Elective (ENGL 300+)	
<input type="checkbox"/> Fine Arts Elective (F A 100, 101, 102, or ART 218)	
<input type="checkbox"/> Foreign Language Elective	
<input type="checkbox"/> Foreign Language Elective	
<input type="checkbox"/> History Elective (HIST xxx)	
<input type="checkbox"/> History Elective (HIST xxx)	
<input type="checkbox"/> Introduction to Philosophy (PHIL 113)	
<input type="checkbox"/> Bioethics or other Upper Level PHIL course (PHIL 404 or PHIL xxx)	
<input type="checkbox"/> General Psychology (PSY 211)	
<input type="checkbox"/> Modern Belief (R ST 112)	
<input type="checkbox"/> Death and Afterlife or Upper Level R ST course (R ST 435 or R ST xxx)	

**\*\*For 4<sup>th</sup> year Pre-PA students who are unsuccessful academically in the PA Professional Program**

## MINOR IN CHEMISTRY

Course Options – 18 credits (total)	
<input type="checkbox"/> Organic Chemistry I (CHEM 331+L) (4 credits)	<input type="checkbox"/> Organic Chemistry II (CHEM 332+L) (4 credits)
<input type="checkbox"/> Biochemistry (BIOL 421+L) (4 credits)	<input type="checkbox"/> Environmental Chemistry (CHEM 312) (3 credits)
<input type="checkbox"/> Chemical Analysis (ENVS 398) (3 credits)	<input type="checkbox"/> Emerging Medicines & Techn. (BIOL 383) (3 credits)
<input type="checkbox"/> Independent Study (CHEM 499) (1, 2, or 3 credits)	

## MINOR IN SCIENCE – NUTRITION AND DIETETICS STUDENTS

Course Options – 18 credits (total)	
<input type="checkbox"/> Human Anatomy and Physiology (BIOL 136) (3 credits)	<input type="checkbox"/> Human Anatomy and Physiology (BIOL 137) (3 credits)
<input type="checkbox"/> Molecular Microbiology (BIOL 233+Lab) (3 credits)	<input type="checkbox"/> Organic Chemistry (CHEM 210) (3 credits)
<input type="checkbox"/> Intro to Biochemistry (CHEM 310) (3 credits)	<input type="checkbox"/> Science Elective (200+) (3 credits)

## MINOR IN ENVIRONMENTAL SCIENCE

Course Options – 18 credits (total)	
<input type="checkbox"/> Resource Conservation I (ENVS 215) (3 credits)	<input type="checkbox"/> Resource Conservation II (ENVS 216) (3 credits)
<input type="checkbox"/> Earth Science I – Geology (ENVS 261) (3 credits)	<input type="checkbox"/> Earth Science II – Oceanography & Meteorology (ENVS 262) (3 credits)
<input type="checkbox"/> Environmental Law (ENVS 340) (3 credits)	<input type="checkbox"/> Environmental Mngmt & Policy (ENVS 345) (3 credits)
<input type="checkbox"/> Chemical Analysis (ENVS 398) (3 credits)	<input type="checkbox"/> Ecology (ENVS 420+L) (4 credits)
<input type="checkbox"/> Environmental Chemistry (CHEM 312) (3 credits)	<input type="checkbox"/> Environmental Ethics (PHIL 327) (3 credits)

## MINOR ELEMENTARY EDUCATION

Required Courses – 18 credits (total)	
<input type="checkbox"/> Principles of Biology (BIOL 110+L) (4 credits)	<input type="checkbox"/> Introduction to Chemistry (CHEM 110) (3 credits)
Additional Course Options	
<input type="checkbox"/> DNA Forensics (BIOL 105+L) (4 credits)	<input type="checkbox"/> Sexually Transmitted Diseases (BIOL 107) (3 credits)
<input type="checkbox"/> Earth Science I – Geology (ENVS 261) (3 credits)  OR  <input type="checkbox"/> Earth Science II – Oceanography & Meteorology (ENVS 262) (3 credits)	<input type="checkbox"/> Water: The Essential Nutrient (ENVS 210) (3 credits)
<input type="checkbox"/> Intro to Meteorology (ENVS 212) (3 credits)	<input type="checkbox"/> Resource Conservation I (ENVS 215) (3 credits)
<input type="checkbox"/> Resource Conservation II (ENVS 216) (3 credits)	<input type="checkbox"/> Intro to Astronomy (PHYS 112+L) (4 credits)
<input type="checkbox"/> Physical Science (PHYS 210) (3 credits)	

Plus additional credits selected from other Science Department courses open to non-science majors.

## NEW CORE REQUIREMENTS

### I. First Year Experience – 4 credits

UNIV 100 Living Responsibly in an Interdependent World

Writing Skills: ENGL 160 (\*must achieve a minimum letter grade of C) (3 credits)

### II. The Human Condition in its **Ultimate Relationships**--12 credits

#### Religious Studies (6 credits)

#### Philosophy (6 credits)

Religious Studies 112

Philosophy 113

Religious Studies (above 100 level) \_\_\_\_

Philosophy (above 100 level) \_\_\_\_

### III. The Human Condition in the Context of the **Physical Universe**--6 credits

Mathematics

Science

### IV. The Human Condition in Relation to Self and the **Social Structure**- 3 credits

Social Science \_\_\_\_\_ (e.g. Psychology 211, Economics, Sociology, Political Science, Anthropology, Criminology or any other social science course)

### V. The Human Condition in its **Cultural Context** - 12-15 credits

#### World Literature (6 credits)

#### Modern Language (3-6 credits)

English 180

Foreign Language \_\_\_\_\_

English 300 level or above \_\_\_\_\_

Foreign Language \_\_\_\_\_

#### Fine Arts (3 credits)

Fine Arts \_\_\_\_\_

**TOTAL 43-46 credits**

#### \*Important Notes

If a student has completed 4 years of the same foreign language in high school, that student can choose to take just one, three credit course to satisfy the foreign language requirement. That course however, must be **above** the 212 level.

One course in a student's curriculum must fulfill a **global studies** requirement. Courses that fulfill this category will be designated as such in the course description and course listings.

Transfer students are exempt from UNIV 100 (core curriculum credits will total 42-45 credits)

All Marywood Undergraduate degrees require a **minimum** of 126 credits.

## **E. SCIENCE COURSES**

Science Majors must take all science courses at Marywood University. Only under unusual circumstances, for sufficient reason, and with special permission of the Chairperson of the Science Department may a science course be taken off campus.

All laboratory and lecture courses must be taken concurrently. In rare instances, the department chairperson may give a student permission to register for only one component of the course, providing he/she sign a waiver form available in the Science Dept. office.

Students whose major QPA is less than 2.33 after completing four major courses (16 credits) will not be permitted to register for upper level major courses until the minimum QPA of 2.33 is earned.

## **F. SPECIAL FEES**

In addition to tuition, there are laboratory fees.

## **G. ADVISEMENT**

Each student is assigned to a particular faculty advisor. That advisor will assist the student in course selection in conjunction with the Science Department requirements, as well as Marywood's requirements for graduation.

A minimum of 126 credits is required for graduation. Ultimately, it is the student's responsibility to meet all major and liberal arts requirements of the University.

During the advisement period, faculty office hours are posted on the 3rd floor Science bulletin board in CNHS (across from the desk in the reception area). A student is asked to sign his/her name and phone number next to the day and time they would like to meet with their faculty advisor. Since it is necessary for the advisor to review the student's file before the appointment, no appointments will be taken without 24-hour advance notice. If a student is unable to keep the appointment he/she is asked to contact the Science Department Secretary or the faculty member. It is the student's responsibility to meet with his/her advisor at least one time each semester. The Science Department will not assume any responsibility for students who do not show up for advisement.

## **H. CLINICAL AGENCIES AND ASSIGNMENTS FOR MEDICAL LABORATORY SCIENCES (MLS) MAJORS**

Medical Laboratory Science Majors must complete all of Marywood's academic requirements before starting the internship program. A minimum major Q.P.A. of 2.33 and an overall Q.P.A. of 2.0 is required. Students who do not adhere to this directive will not be granted a degree from Marywood University.

Students have the option of interning at one of the following institutions during their senior year:  
Robert Packer Hospital, Sayre, Pennsylvania

Additional placements are also available for the convenience of the students.

MLS students who are receiving financial aid should meet with the Director of Financial Aid before beginning the clinical internship program.

MLS Majors receive their degrees on the university graduation date, which follows the successful completion of their internship program.

### MLS Informational Timeline

MLS Majors must complete all of Marywood's academic requirements before starting the internship program. **The student spends the fourth year in an accredited hospital program.** A minimum Major Q.P.A. of 2.5 and an overall Q.P.A. of 2.0 is required. Students receive their degrees on the University graduation date, which follows the successful completion of their internship program. Students must register for DEAN 050 during their final semester as seniors.

### Internship Timeline

The following is a list of hospitals offering a Med Tech internship that are affiliated with Marywood University. The student does have the option of attending other accredited programs nationwide.

- Robert Packer Hospital, Sayre, PA
- Fall – Sophomore Year - Notify your Marywood University Advisor of your plans for a Med Tech Internship
- Mid Sophomore Year – Apply to a Hospital Med Tech Program Internship
- Upon acceptance & confirmation– notify your Advisor immediately
- Contact Registrars office and complete a LOA (Leave of Absence) form obtaining the appropriate signatures and return to Registrar's office.
- Contact Financial Aid, outlining your plans for the Internship.
- Your first week at your internship – Very Important - CONTACT Marywood University Registrar's & Financial Aid Office
- Mid Way through the Internship – the student needs to report into the Registrar's Office and Financial Aid Office.
- Upon completion of the Internship, a copy of your transcripts need to be sent to the Chair of the Science Department.
- After successful completion of the Internship, set up a meeting with your advisor.
- Registration for Graduation – Dean 050.

## **I. CHANGE OF NAME/STATUS**

It is the student's responsibility to notify both the Academic Registrar and the Science Department Secretary of any change in name, address, phone number, or marital status.

## **J. SNOW DAYS**

In case of bad weather, students should call Marywood's Snow Information Line at (570) 961-4SNO. This phone line message will indicate the following:

1. if Marywood is operating according to its normal class schedule
2. if classes are on a compressed schedule
3. if classes are canceled
4. or other important information about meetings, conferences, extra-curricular activities, etc.

Commuter students should use their own discretion about traveling when the University is operating on a regular schedule during bad weather. Students should check with course instructors about how their decisions will affect their academic performance.

# III. STUDENT OPPORTUNITIES

## A. HONORS PROGRAM

A minimum of 24 Honors credits is required to earn an Honors Degree. A Senior Honors Thesis (3 cr.), the topic of which is related to the student's major program is also required. Students pursuing an Honors Degree must maintain a minimum overall Q.P.A. of 3.25.

Qualified science majors who wish to enroll in a science course for Honors credit must adhere to the following procedure:

The student is required to seek approval from:

1. The science faculty member who teaches the course
2. The Science Department Chairperson
3. The Director of the Honors Program

After approval has been granted, the student will then register for the course designated as Honors (H) (i.e. Biol H446).

A student may withdraw from an Honors course during the regular Add/Drop period at the University. When the Add/Drop period has passed, the student who is registered for the Honors course is held accountable for the additional requirements of the Honors course.

## B. LAB ASSISTANTSHIPS

Qualified science majors may apply for a position of laboratory assistant during the academic year. A laboratory assistant works in a specialized laboratory (Chemistry, Biology, Physics, Microbiology, etc.) under the direct supervision of a science faculty member and the Laboratory Manager. Laboratory assistants are selected on the basis of merit by appropriate science faculty and approved by the Science Department Chairperson.

The Work Study Program supports a majority of the available positions. However, the University may finance a limited number of qualified students who are ineligible for the Work Study Program. A list of interested students is compiled at the April Student-Faculty Meeting. Selected students will be notified in writing by the Department Chairperson. The position of laboratory assistant is a valuable experience, since it provides an opportunity to gain knowledge and skills beyond the classroom setting.

**Laboratory assistants are expected to submit time sheets to their appointed supervisor in accordance with payroll deadlines** (every other Thursday by noon for Department-paid assistants or by 9:00AM on the Monday before the cut-off date for work-study). Failure to do so will result in **NO PAYCHECK** for that time period.

## C. INDEPENDENT STUDY

The Science Department provides an opportunity for qualified students (minimum major and overall Q.P.A. of 3.0) to engage in Independent Research under the supervision of a science faculty member. Students have the option of enrolling in BIOL 499/ENVS 499/CHEM 499 Independent Study for 1, 2 or 3 credits. Students align themselves with an appropriate faculty mentor. In addition,

the student must submit an outline of the proposed study to the Department Chairperson for approval.

## D. INTERNSHIPS

Students are strongly advised to participate in internships that are related to their major areas of study. BIOL 498/ENVS 498/CHEM498 Internship allows students to earn 3 credits for their work. Students are required to have a minimum major Q.P.A. and overall Q.P.A. of 3.0. A science faculty member monitors the activity and assigns a grade.

### Procedure for Registering for Research Related Courses

- 1) View scheduled offerings and thus faculty members listed for the upcoming semester (e.g. BIOL 455, 454, 499)
- 2) From the Science dept. website examine the research activities and interests for those faculty listed (look up the faculty member you wish to work with)
- 3) Meet with that faculty member, to request participation in the upcoming semester
- 4) If approved by that professor, obtain an approval note from him/her
- 5) Bring note to dept. chair for final approval.
- 6) Bring notes to your advising session, so your advisor can sign off on the registered research course and your other courses.

## E. EVALUATION OF STUDENT INTERNSHIP/INDEPENDENT STUDY

1. Regular maintenance of a log/journal/notebook of activity
2. Thirty (30) hours is required for each credit earned (3 credits = 30 x 3 = 90 hours minimum for an Internship)
3. Submission of an ***original*** research paper of a minimum of 10 pages to include:
  - A description of the Internship/Independent Study
  - How did the student learn of the opportunity and describe the application process (if applicable)
  - What was the relevance of the Internship/Independent Study to the student's major program or career goal?
  - How did this experience contribute to the student's education?
  - Detailed description of the duties, methods, and activities undertaken
  - What were the final results and outcomes of this activity?
4. Preparation of a 10-15 min PowerPoint presentation or Poster presented in a public forum

## F. STUDENT ORGANIZATIONS

Science majors are expected to become active members of appropriate extra-curricular clubs. Both graduate schools and potential employers view such activities as positive criteria for admission and employment.

The Science Student Organizations are:

1. Biology Club
2. Pugwash Club (Environmental Science)
3. Chemistry (ACS)
4. Health Professions Society

Science Education Majors are expected to become active members of Student PSEA.

## **G. UNDERGRADUATE RESEARCH**

BIOL 454/ENVS 454/CHEM 454 Undergraduate Research is an elective open to science majors whose major Q.P.A. and overall Q.P.A. is at least 3.0.

Adherence to the following guidelines is mandatory:

1. The student must choose a research topic and a mentor who directs all aspects of the investigation by the end of junior year. In addition, the student must meet with the Science Department Chairperson to receive approval for the proposed project.
2. The research project must be a library/laboratory-based investigation, which involves data collection.
3. Students register for BIOL 454/ENVS 454/CHEM 454 Undergraduate Research for 2 credits in the semester in which the research will be completed.
4. At the conclusion of the research activity the student is required to submit a written report to his/her mentor for final evaluation, or provide a presentation to the Science department.

The student may be asked to give a public presentation of the research investigation. A copy of the research will be filed in the Science Department.

## **H. SPECIAL AWARDS AT GRADUATION**

Medal for Excellence in Biological Studies founded in memory of Sister Maria Laurence Maher, I.H.M. on behalf of her family members.

The criteria for the award are:

- (1) Primary major QPA of 3.33
- (2) Overall Marywood QPA of 3.50
- (3) Active membership in one or more department student clubs
- (4) Participated in a student research project or internship
- (5) Service to the department (lab assistant, work-study, tutor, club officer, etc.)

Sister M. Sylvia Morgan Medical for Pre-Professional Studies founded by Elizabeth King Young Arvad, M.D.

The criteria for the award are:

- (1) Primary major (biology/biotechnology) QPA of 3.33
- (2) Overall Marywood QPA of 3.50
- (3) Active membership in Biology club
- (4) Participated in a student research project or internship
- (5) Service to the department (lab assistant, work-study, tutor, club officer, etc.)

Philip E. Mulry Medal for Excellence in Chemistry founded by the Mulry family in memory of Philip E. Mulry, Sr.

The criteria for the award are:

- (1) Primary major QPA of 3.33; minor in chemistry
- (2) Overall Marywood QPA of 3.50
- (3) Active membership in one or more department student clubs
- (4) Participated in a student research project or internship

(5) Service to the department (lab assistant, work-study, tutor, club officer, etc.)

## **SCIENCE DEPARTMENT AWARDS**

### Award for Excellence in Environmental Science

- (1) Primary QPA of 3.33
- (2) Overall Marywood QPA of 3.50
- (3) Service to the department (lab assistant, work-study, tutor, club officer, etc.)

### Award for Excellence in Biotechnology

- (1) Primary QPA of 3.33
- (2) Overall Marywood QPA of 3.50
- (3) Service to the department (lab assistant, work-study, tutor, club officer, etc.)

### Award for Excellence in Science Education

- (1) Primary QPA of 3.33
- (2) Overall Marywood QPA of 3.50
- (3) Service to the department (lab assistant, work-study, tutor, club officer, etc.)

Service Medals are given out to those students who have demonstrated outstanding service to the department and/or student department clubs.

**NOTE:** Regarding the awards and medals, criteria #2, #3 and #4 may be waived in senior year for students who are participating in internships or student teaching.

## **IV. STUDENT REQUIREMENTS**

### **A. STUDENT-FACULTY MEETINGS**

Student-Faculty Meetings are held at the beginning of the Fall Semester and then again at the end of the Spring semester. The Fall semester meeting will be an introductory meeting for the year. The spring meeting will be a “Senior Awards Ceremony” and a meeting to close out the year. There will be a few meetings per semester depending on the guest speakers we obtain. These meetings will be at 3:00 PM in the Center for Natural and Health Sciences. Meeting announcements are made in science classes and signs are posted in the Center for Natural and Health Sciences. All students will also receive an email message announcement a week prior to each meeting.

Attendance at the first Student-Faculty Meetings is mandatory, since course offerings and policy and procedural changes are addressed. The student is responsible for acquiring all of the information disseminated at the meeting.

## **V. POLICIES AND PROCEDURES AFFECTING SCIENCE STUDENTS**

### **A. ACADEMIC STANDING POLICY**

All science majors must maintain a minimum Q.P.A. of 2.33 in major courses (Primary Q.P.A.). Students whose major Q.P.A. is less than 2.33 after completing four major courses (16 credits) may

(lower case is okay) not be permitted to register for upper level major courses until the minimum Q.P.A. of 2.33 is earned. In addition, students who do not receive a satisfactory grade in an upper level course or who drop a course may repeat one course, one time, space permitting.

The Grade Review Committee in the Science Department reviews the science majors' grades at the end of each academic semester. Letters are sent to students whose Q.P.A. is less than 2.33. A student who has a Q.P.A. below 2.33 will be placed on academic probation for two semesters. At the end of the probation period, he/she will be re-evaluated and a decision will be made about his/her status as a student in the Science Department. The Committee reserves the right to tell a student who does not achieve a 2.33 primary Q.P.A. after the probation period that it is no longer feasible for he/she to continue as a Science Major and that he/she should seek another major. The GRC will also evaluate Pre-PA majors in accordance with the 3.0 average QPA (major courses) that is needed for PA MS consideration.

In addition, students who receive grades of (D, D+, C-, C, C+) may be notified stating the recommendation of the committee. The Science Department strongly recommends that students retake any major courses in which a grade of "D" or "D+" has been issued. Once a grade of "D" or "D+" is received, it is difficult to raise the primary Q.P.A. unless the course is retaken. In some instances, the Grade Review Committee will state that a student must retake a course or courses, especially students who do not achieve a 2.33 after completing four major courses (16 credits).

In addition, congratulatory letters are sent to all currently enrolled students who have earned a primary Q.P.A. above 3.5.

Approved by Faculty: Effective September 1, 1996 (Revised: January, 2002)

## **B. CLASS AND LABORATORY ATTENDANCE POLICY**

Students are expected to attend all classes and laboratory sessions. On rare occasions and only for sufficient reason students may be granted an "excused absence." Course attendance requirements are clearly specified in each faculty member's course and laboratory outlines. Unexcused absences may affect a student's final grade.

Absences should be reported to the class instructor or the Science Department secretary (570) 348-6265. Abuses of the attendance policy are formally reported to the Assistant Director of Student Development Services

## **C. "D or D+" GRADES IN MAJOR SCIENCE COURSES**

The Science Department strongly recommends that a student retake any major courses in which a grade of "D" or "D+" has been issued. Once a student receives a "D" or "D+" in a major course, it is difficult to raise the primary Q.P.A. unless the course is retaken. The Grade Review Committee may tell students who have a Primary Q.P.A. below 2.33 that they must retake a course or courses with a "D" or "D+".

## **D STATUTE OF LIMITATIONS REGARDING SCIENCE CREDITS**

The statute of limitations for acceptable science credits (e.g. transfer) is 7 years, unless waived by the Science dept. Chair under special circumstances.

## **E. POLICY ON LETTERS OF RECOMMENDATION**

Letters of recommendation for students will be written only if the faculty member chooses to do so, and is under no obligation to do so. Ideally, the instructor will have taught the student for at least two semesters. That way the faculty member knows the student better and is better informed to write a representative letter. The science faculty prefers to write recommendations that are confidential between the faculty member and the person/ organization they are recommending the student to. If the recommendation is not confidential, the faculty member will list only basic facts, such as name of the course taught and the grade that the student earned.

## **F. STUDENT GRIEVANCES AND APPEALS POLICY**

A student who has a grievance has the right to pursue that grievance through the University's Academic Appeals Policy and Procedure.

The procedural steps to be followed in order to resolve the grievance are:

1. The student contacts the individual faculty member involved and attempts to resolve the grievance.
2. If no resolution was arrived at between the student and the individual faculty member, the student then forwards a written description of the nature of the grievance to the Department Chairperson. The Department Chairperson will then set up a meeting with himself/herself, the student and the faculty member. If the issue is still not resolved, the Academic Dean will be notified.

The previously mentioned procedural steps will resolve most grievances. However, two additional steps are available:

1. A Review Committee may be convened by the Dean to resolve the grievance.
2. An appeal may be made directly to the President.

The Academic Appeals Policy and Procedure is available in the Dean's Office and in the Science Department Chairperson's Office.

## **G. POLICY STATEMENT OF ACADEMIC HONESTY**

The Marywood University Community functions best when its members treat one another with honesty, fairness, and trust. The entire community, students and faculty alike, recognize the necessity and accept the responsibility for academic honesty. Students must realize that deception for individual gain is an offense against the entire community.

### **Violations of Academic Honesty**

Cheating and Plagiarism are behaviors destructive of the learning process and of the ethical standards expected of all students at both the graduate and undergraduate levels.

Cheating is defined as (but not limited to) the following:

1. having unauthorized material during an examination
2. copying from another student or permitting copying by another student in a testing situation
3. completing an assignment for another student (e.g. exam, paper, laboratory or computer report)
4. submitting out-of-class work for an in-class assignment

5. changing grades
6. unauthorized retention of exams
7. unauthorized submission of the same paper in two different classes
8. inventing data or falsifying an account of data collection

Plagiarism is defined as the offering as one's own work, the words, ideas, existing imagery, or arguments of another person without appropriate attribution by quotation, reference, or footnote.

Additional examples of violations of Academic Honesty may include the provision of material to another person with knowledge of improper use, possessing another student's work without permission, selling or buying material for class assignments, changing another student's assignment, forging a signature on official academic documents, and altering any official student record including grades.

### **Sanctions and Guidelines**

Sanctions for violations of Academic Honesty are ordinarily determined by the Instructor. If necessary, the Chairperson and/or appropriate Dean may become involved. Sanctions determined by the Instructor may include a grade of "F" for the coursework and/or course in which the infraction occurred. Academic probation, dismissal from the program and/or dismissal from the University are sanctions determined by the appropriate Dean after consultation with the Chairperson.

Students are to be notified of the alleged violation of academic honesty in writing within two weeks of discovery of the occurrence. This notification must include: the nature of the violation; possible sanctions that might be imposed; whether further review by Department Chairperson and/or appropriate Dean is being sought and student's right to appeal through the Academic Appeal Process.

Approved by Faculty: Effective March 15, 1995

## **H. POLICY FOR STUDENTS WITH DISABILITIES**

### Accommodating Students with Disabilities

Marywood University declares and reaffirms a policy of equal educational opportunity, equal employment opportunity, and non-discrimination in the provision of educational and other services to the public. Marywood University will provide an accommodation to qualified students with known disabilities provided the accommodation does not pose an undue hardship on the University.

The policy and practice of Marywood University is non-discriminatory against applicants, employees and students on the basis of race, sex, color, national or ethnic origin, age, creed, ancestry and religion. In addition, Marywood University does not discriminate against persons with disabilities and is in full compliance with the Rehabilitation Act of 1973 and the Americans with Disabilities Act.

The Affirmative Action Program is an explicit civil, legal application of the formulation of beliefs already cherished in Marywood's religious commitment, objectives and practices.

### Students Requesting Accommodation

A student who requests accommodation must begin by submitting documentation either to the Admissions Office of the school to which he/she is admitted, at the time of accepting the offer of

admission, or to the Advisor or Coordinator for Students with Disabilities at the time of requesting accommodation. Appropriate documentation is that supplied by a certified or licensed professional, on the basis of examination conducted within the last four years, including a description of the nature of the disability and how the accommodation is related to the disability and the student's education curriculum. If the disability is physical, including hearing or vision impairment, or has any other medical implications, including psychiatric, the student should so indicate on the University Health Form.

There is no one list of reasonable academic adjustments that service the needs of all students who have disabilities. Following are some basic ways that faculty and Advisors for Students with Disabilities may be able to help:

- A. Offer extended time on examination papers and projects.
- B. Allow a reader or a taped version of an objective exam.
- C. Provide exam in alternate format (if appropriate to subject matter), e.g., objective instead of essay; oral, tapes, or taped instead of written; computer etc.
- D. Allow students to take exams in a separate room that is a distraction-free environment.
- E. Accept alternative methods of demonstrating mastery of course objectives, e.g., a project, demonstration, oral presentation, research project, or paper.
- F. Provide alternatives to computer-scored answer sheets.
- G. Allow students to tape when necessary.
- H. Provide a suggested time line when making long-range assignments.
- I. Provide study partners, notetakers and tutors, as needed.
- J. Change classes to accessible locations.
- K. Provide sign language interpreters.
- L. Provide readers for vision impaired.
- M. Provide the necessary accommodations and appropriate texts if a student has a documented print-disability. This includes not only blindness and vision impairments, but also learning disabilities and other physical impairments that affect reading.

Students with a physical disability will find parking at strategic points throughout the campus.

<u>Contact:</u> Coordinator of Act 504 and Title IX	<u>Inquiries concerning Title IX, contact</u>
Advisor to Students with Disabilities	Affirmative Action Office
Ms. Patricia Dunleavy	Patricia Dunleavy
Liberal Arts Center – Room 86E	Liberal Arts Center - Room 86E
Telephone: 570-348-6220	Telephone: 570-348-6220

Director of Disability Services  
Ms. Diane Taylor  
Telephone: 570-340-6045

## I. PROCEDURE FOR THE MAINTENANCE AND CARE OF A MICROSCOPE

### Transporting a Microscope and Preparing it for Use

Use both hands to transport a microscope. The microscope is properly transported by grasping the arm of the microscope with one hand and resting the base of the microscope on the palm of the other hand. Carry the microscope upright. If it is inverted, oculars may fall out. It should not be carried in the manner of a briefcase or an umbrella.

Place the microscope on a level area of the workbench or worktable and directly in front of you. Raise the condenser to its highest level.

Assuming the use of a microscope with a built-in lamp, connect the microscope to an appropriate electrical outlet, turn the switch to ON and set the voltage to an intermediate setting using the voltage regulator lever or knob. If the microscope has a neutral density filter, put this filter into position to prevent an overly bright field. If the microscope lacks a neutral density filter, close the iris diaphragm partially to achieve a comparable effect.

### Cleaning a Microscope

The lenses of a microscope, such as the objective and ocular lenses are subject to contamination with dirt and grease. The proper kinds of cleaning solutions (solvents) and tissues must be used. For a cleaning solvent, lens cleaning solution is appropriate and for wiping, Microscope Lens Paper is suitable. Do not use facial tissues, handkerchiefs or cloth to wipe the lenses.

After using the microscope for the study of specimens adapt the following routine:

- Wipe the ocular(s) with a dry clean sheet of Microscope Lens Paper. If there is any left over evidence of foreign matter, such as dirt or sweat deposits from the eye, take another dry clean sheet of Microscope Lens Paper. Moisten the paper with a drop of distilled water and then wipe the ocular(s) once again. If foreign matter still persists, consult the laboratory instructor about using a solvent for cleaning purposes.
- Wipe the objectives with a dry clean sheet of Microscope Lens Paper in a sequential manner beginning with scanning objective, then the low power objective, next the high power objective and lastly the oil immersion objective which becomes coated with oil necessary for performing oil

immersion microscopy. If the oil immersion objective becomes caked with oil, dip a cotton swab in a solvent such as lens cleaning solution and then proceed to wipe off and remove the oil. Any stray lint or fibers on lenses can be dislodged with a puff of air from an air syringe.

Before storing or returning the microscope to its cupboard rotate the scanning objective into position and cover the microscope to protect it from dust, the enemy of all lenses.

## J. LABORATORY DISSECTION POLICY

**Students enrolled in BIOL 122L and BIOL 151L are required to purchase a dissection kit. Dissection kits must be purchased from the Pugwash club. Club members will be available to sell dissection kits the first few weeks of the semester. Kits are also available in the Lab Manager's office (CNHS 104). Students will not be allowed to participate in dissection labs without their dissection kit.**

Students who are opposed to dissection activity must discuss alternative dissection options with the laboratory instructor and the department Chair.

Following is the LABORATORY ASSISTANT GUIDE TO SAFETY. All students should read this section because it can provide valuable information to all, especially in the case of an emergency.

## K. STUDENT GUIDE TO SAFETY

### Chemical Hygiene Plan

#### 1. Introduction

The first and most important rule is: **DO NOT USE OR HANDLE A CHEMICAL UNLESS YOU ARE FAMILIAR WITH IT'S PROPERTIES.** Read the label. If necessary, seek out additional information from the MSDS. The MSDS are attached to the online Science Department chemical inventory CHEMSWLive. There are also MSDS copies of the most commonly used chemicals in each lab in MSDS binders where the chemicals are stored.

Follow all safety instructions carefully. Be sure to follow instructor's advice and seek out additional information as necessary. If you are unsure of a procedure or instructor's directions, **DO NOT GUESS.**

#### 1.1 Eye Protection

All persons in the lab area (where chemicals are used) must wear approved eye protection. Wearing of contact lenses in a laboratory is normally forbidden. If the use of contact lenses is required, splash proof goggles must be worn at all times. **Students enrolled in CHEM 131L, CHEM 132L, CHEM 121L, CHEM 210L, CHEM 331L, CHEM 332L, BIOL 421L/521L courses are required to purchase a pair of indirect vent splash proof goggles from the Marywood University Bookstore. Students will not be allowed to participate in lab without their goggles.**

#### 1.2 Laboratory Clothing

Clothing worn in the laboratory should not be loose fitting, and should cover and protect as much skin as possible. The clothes should be made of materials that are resistant to chemicals, such as cotton or other natural fibers. Jeans and long-sleeved t-shirts are great examples of appropriate laboratory attire. Long or loose hair must be tied back. Remove jewelry (including necklaces, rings, bracelets and watches) to prevent chemicals from seeping underneath them. Shoes must have closed toes

and have soles of a good gripping material. Clogs, perforated shoes, sandals, flip-flops and cloth shoes do not provide protection against spilled chemicals and are not to be worn in the lab. Lab coats are required when working in the laboratory. They should be buttoned and the sleeves should be rolled down. Remove them when you leave the lab, which reduces the chance of spreading contaminants to other areas. Vinyl aprons are required for pouring/mixing strong acids or bases and must be worn over the lab coat. **All students enrolled in science laboratory courses are required to purchase a lab coat from the Marywood University Bookstore. Students will not be allowed to participate in lab without their lab coat.**

### **1.3 Food and Beverages**

Do not bring any food or beverages into the laboratory wing or chemical prep areas. Eating and drinking is forbidden in areas where chemicals are used or stored.

### **1.4 Personal Hygiene**

Wash hands frequently, especially when you are ready to leave the work area. Do not apply cosmetics in the work area. Confine long hair.

### **1.5 Leaving the Work Area**

Do not allow any electrical device to run unattended. Turn off all electricity, hoods, gases, water and vacuum. Lock the work area. Let the instructor or Department Secretary know you are leaving.

### **1.6 Working Alone**

It is against departmental policy to work alone in the labs. General housekeeping work may be done alone, provided someone knows you are working in the laboratory wing. All other lab work including research **must not** be done alone. Research assistants must always have their principle investigator in the lab/building. If lab set up or research is to be done on weekends, late nights or holidays when the building is closed, the principle investigator, the Science Department Chairperson or the Lab Manager must be notified.

## **2. SAFETY TRAINING**

A mandatory meeting is conducted each September for all Laboratory instructors and assistants typically during the first week of the fall semester. Science Department Laboratory safety training is required for all new lab assistants, research assistants, visiting researchers, and graduate assistants prior to working in the research or teaching laboratories. This training is assigned by the Laboratory Manager and may be in consultation with the Principle Investigator if the appointment involves a research project. Additional online training may be required for research assistants and graduate assistants by the Office of Research and Community Collaboration.

### **2.1 Chemical Hazards**

All students and staff will be given instructions regarding the hazards of chemicals being used in the lab areas. Pay attention to the instructor's directions regarding the safe handling and disposal of chemicals. **IT IS THE LABORATORY ASSISTANT'S RESPONSIBILITY TO SEEK ADVICE AND GUIDANCE WHENEVER THEY ARE IN DOUBT ABOUT SAFETY PROCEDURES OR POTENTIAL HAZARDS IN THEIR LABORATORY WORK.**

### **2.2 Responsibility for Training**

Instructions should be given to all students by the instructor responsible for the lab area where chemicals are in use.

### **2.3 Fire Drills and Evacuation**

Note location of closest fire alarm and extinguisher in each work area.  
Note location of emergency phone numbers.

## **2.4 Safety Equipment**

Note location and operation of safety showers and eye wash fountains in each of the work areas.

## **3. EMERGENCY ACTION**

### **3.1 Dealing with an Emergency**

Report the nature of the emergency to the appropriate medical or fire facility. Note location of emergency numbers. **THE CLOSEST PHONE IS USUALLY IN THE LAB NEAR THE INSTRUCTOR'S DESK.** Give the location of the emergency. For the record, we are located in the laboratory wing of the Science Center.

**EMERGENCY 911 PHONE ACCESS:**

If, when dialing 911, you experience a delay, stay on the phone.

**IF INDIVIDUALS ARE INJURED, REPORT NATURE OF INJURY AND WHETHER THERE IS A CHEMICAL OR ELECTRICAL FIRE. DIRECT EMERGENCY RESPONSE TO APPROPRIATE LOCATION AS BEST AS POSSIBLE.**

Notify others about the emergency. This would normally mean reporting to the Secretarial Area. If necessary, have someone go outside to direct the emergency response team.

In order to insure that the cost of medical treatment will be covered for the injured individual, he/she must go to Moses Taylor Emergency Department, 700 Quincy Avenue, Scranton, PA 18510. Please make sure that it is noted that the accident happened at Marywood University. In addition, an incident report must be filled out by the Science Department as soon as possible.

## **4. HANDLING CHEMICALS**

### **4.1 General Precautions**

All chemicals are potentially harmful. Avoid contact with any chemical. It is especially important to keep chemicals from your face and clothing. Many substances are absorbed into the body through the skin or through inhalation or ingestion. Remember that chemicals can be transferred to the eyes from your hands. The following general precautions are recommended:

- Know the properties of the chemical.
- Keep hands and face clean.
- Never taste a chemical.
- Do not use a chemical from an unlabeled or doubtful container.
- Respiratory hazards should be dispensed in the fume hood.
- Carefully read labels before picking up the container.
- Hold the bottle with the label side toward your palm.
- If a stopper or lid is stuck, use extreme caution in opening.
- **SPECIAL SAFETY NOTE: IF A CONTAINER OF AN ORGANIC LIQUID HAS A SOLID DEPOSIT AROUND THE LID AREA, DO NOT TOUCH THE BOTTLE OR LID IN ANY MANNER. IT MAY CONTAIN EXPLOSIVE PEROXIDE MATERIALS, WHICH MAY DETONATE ON CONTACT.**
- Do not use more material than directed.

- Always use fume hoods for pouring hydrochloric acid, bromine and volatile solvents.
- Always pour and transfer slowly. Do not dump chemicals.
- Always pour concentrated solutions into water slowly with stirring.
- Make sure containers are adequately supported.
- Never look into the opening of a vessel containing a chemical.
- Never use mouth suction to pipet.
- Never add a chemical to a hot solvent unless specified.
- Use impact-resistant containers to carry chemicals.

## 4.2 Chemical Spills

### NOTIFY INSTRUCTOR AND FOLLOW GUIDELINES

#### 1. Be Prepared

Know the properties of the chemicals which are present in your work area. At a minimum you should know its flammability, volatility, corrosivity and toxicity properties. Information on chemicals should be obtained from your instructor or from the MSDS.

#### 2. Protect Yourself from Injury

Never expose yourself to a spill situation unless you have the proper protective equipment. At a minimum this means goggles, gloves and lab coat.

#### 3. Alert Other Lab Assistants and Students in the Area

Keep others away from the spill.

#### 4. Isolate the Spill from Related Hazards

If a volatile, flammable material is spilled, turn off all flames and spark-producing equipment such as motors or stirrers. (KEEP HOODS ON.)

#### 5. Contain the Spill

Liquid spills of DILUTE AQUEOUS SOLUTIONS may be cleaned up with dampened paper towels and rinsed with water.

The appropriate ABSORBENT MATERIAL should be used to contain Concentrated ACID SPILLS and concentrated BASE (ALKALINE) SPILLS. These absorbents are located in the spill control boxes in CNHS 97, CNHS 107 and CNHS 304.

Clay absorbents or vermiculite should be used for ORGANIC materials. Circle the spill with the material and use caution, since mixing absorbents and certain organics may cause a SLIP HAZARD.

#### 6. Clean up the Absorbed Material

A dustpan or brush should be used to place the material in a plastic bag.

#### 7. Label Bag and Place in Hood

Instructor will dispose of material as directed on the MSDS.

#### 8. Clean Yourself Up

Make sure you wash all parts of your body which may have been exposed to the chemicals.

#### 9. Learn From the Experience

How could you have prevented the spill in the first place?

### 4.3 Chemicals on the Skin

Immediately flush the area with cold running water for at least fifteen minutes. Wash gently with soap and water, removing jewelry immediately as necessary.

Notify instructor.

Get prompt medical attention and explain exactly what happened.

For chemicals contaminating a large area of the body or clothing, use the safety shower immediately. Remove contaminated clothing immediately. Be careful not to spread the chemical to additional areas of skin, especially into the eyes. **KEEP SAFETY GOGGLES ON UNLESS EYES ARE AFFECTED.** Immediately, flood entire area with water for at least fifteen minutes. Get prompt medical attention.

## 5. GENERAL HOUSEKEEPING

### 5.1 General

**Laboratory doors are to be kept closed at all times. Doors may be propped at the beginning of the lab period to allow for students to enter. Once the lab has begun, the doors must be closed. This includes the propping of research lab and chemical storage room doors. These doors are fire rated and must be kept closed.**

Keep all work areas clean and uncluttered. Keep cabinets and doors closed, as much as possible.

Never store materials, especially chemicals, on the floor.

Keep aisles clear of wastebaskets and carts as much as possible.

Clean glassware promptly at the sink or dishwasher. Use hot water and detergent for cleanup. Consult the instructor for more difficult stains.

Wear gloves where appropriate.

Laboratory storage and prep room storage of large amounts of chemical should be avoided as much as possible.

Return large containers of chemicals to the storage room as soon as possible. Use the safety secondary carriers for the large jugs.

Use carts to transfer chemicals across the hall back and forth between the various work areas. Be sure all containers are secured on the carts.

If chemicals are moved between the floors of the facility, they should be secured on the carts and transported on the elevator. Do not carry chemicals on stairwells.

Do not use the large "mobile modules" to transfer chemicals. These are good only for boxed equipment and other large items of a non-chemical nature.

## 5.2 Waste Management and Disposal Procedure

Chemical wastes from experiments will be collected as directed in the experimental procedure and outlined by the instructor. Containers should be clearly labeled as to contents with the chemical name(s), and concentration if possible. These containers should be placed in the hood in the Chemical Prep Room before the next scheduled laboratory.

The hood in Room 304 is the area designated for chemical waste treatment and storage. The flammables cabinets in Room 304 and Room 309 are also used for storage of appropriate wastes.

Management of wastes is the responsibility of the Chemical Safety Officer (currently Dr. Deanne Dulik-Garver). Wastes are segregated as to type and transferred to the appropriate storage container. These wastes are recycled if possible (ie. methylene chloride from an extraction experiment). If recycling is not possible, the wastes are treated as outlined in the guidelines in Mahn, W.V., Academic Laboratory Chemical Hazards, Von Nostrand Press, 1991, pp. 70-76.

Wastes are stored for lab packing in the hood and flammables cabinet in Room 304 (Chemistry Prep Room) and room 309 (chemical storeroom). An EPA-approved waste-hauler is contracted for proper labeling, transport, and disposal.

Records regarding disposal are on file in the Science Department Laboratory Manager's Office and also in the Physical Plant Management Office.

### **L. SPECIAL INSTRUCTIONS FOR THE PREPARATION OF DILUTE ACIDS AND BASES AND OTHER CHEMICALS FROM CONCENTRATES**

The general rule is: ALWAYS ADD THE CONCENTRATE TO WATER, NEVER THE REVERSE. ADD THE CONCENTRATE SLOWLY WITH STIRRING AND COOLING.

#### **Concentrated Acids to Diluted Acids**

1. Place large beaker (800 ml or larger) in a water or ice bath.
2. Add measured amount of distilled water and cool down.
3. Measure concentrated acid in graduated cylinder (SAFETY GOGGLES, GLOVES).
4. Pour concentrated acid slowly with good stirring into the cold distilled water.
5. Allow the diluted solution to cool further.
6. Continue the dilution with distilled water as necessary.

#### **Sodium Hydroxide Solutions from Pellets**

1. Place large beaker (800 ml or larger) in water or ice bath.
2. Add measured amount of distilled water and cool down.
3. Weigh out sodium hydroxide pellets on paper or plastic container as rapidly as possible (SAFETY GOGGLES AND GLOVES).
4. Add the pellets slowly with CONSTANT STIRRING until dissolved. COOL.

#### **Storage and Dispensing Acid Solutions**

Concentrated acids should be dispensed from the "RED LABEL" Bottles only. Small quantities may be taken by using dropper tubes; larger quantities by careful pouring by grasping the bottle from the label side.

Diluted acids should be dispensed from screw cap bottles only. Diluted acids should not be put in the red label bottles. The red label bottles are for concentrated acids only.

Diluted base solutions are stored in **plastic bottles not glass** since they will etch glass. Lids must be fastened tightly to avoid absorption of carbon dioxide.

## **VI. RIGHTS RESERVED**

Marywood University Department of Science reserves the right to:

- Change requirements for Admission, Progression and Graduation as outlined in this bulletin.
- Change arrangements, scheduling and content of courses.
- Determine books and outlines used.
- Formulate school regulations and policies affecting students.

All changes in existing school policies will be communicated to students before they become effective. Students are expected to be in compliance with current policies as they become effective.

The materials and information presented in this Student Handbook are to be considered as an agreement between the student and the Department of Science.