The Pre-Health Professional Curriculum at UWRF

The Biology major, Biomedical track, includes courses to meet the requirement for a Bachelor of Science degree in Biology, as well as prepare the student for Graduate/Professional School in a Health Profession, or a career in many areas of biomedical research. Students can also declare a minor and meet all of the requirements for that as well. Pre-med, pre-dent, pre-physical therapy, pre-physician assistant etc. are not majors on their own.

Minor
Students at UWRF are not required to choose a minor. If chosen, the choice of a minor is completely up to the student. Because some of the health-professional schools require several courses from many departments (PT, OT etc.), no declared minor is advised, allowing students to compile a selection of classes to meet the requirements. Medical schools in particular appreciate a student that is well-rounded and broadly educated, and although most minor in Chemistry, many others choose minors in Psychology, Art, History, Spanish, Philosophy and others.

The health professions schools and programs are not concerned with what your major or minor is, they look solely at the classes you take. It does not help to double major, particularly in two sciences. They are looking for students that have a strong ability in science and are broadly educated. They value students who have breadth in their classes.

Prerequisites
The courses listed in the following pages are the prerequisite courses required by most professional schools in a particular field. Your primary advice regarding courses and preparation for future careers should be obtained from your faculty advisor. Advisors are equipped to give suggestions as to selection and sequence of courses that will match your abilities and interests, as well as fulfill the university and major requirements. Advisors will give advice, but the final responsibility for proper course selection and completion of graduation requirements rests with you.

Grades
A high GPA is important if you are to be a competitive applicant for a health professions program. It is important to get off to a good start, and to learn/adopt good, strong study habits right away. If you run into trouble, there are many resources available on campus to help you, and you should seek them early on and not wait until failure of a test or of a class. GPA is not the only thing that professional schools consider when examining an application for admission, but it is an important consideration. The professional schools have to be convinced you are capable of success in their harder, faster curriculum.

Other skills
Skills such as writing and speaking clearly, problem solving ability, good judgment, listening, leadership ability, and teamwork are clearly critical for working in the health fields. In addition, volunteering and helping people who need help shows commitment to humanity and to the community. Shadowing is of great value in exploring a field and determining if you are suitable for a particular profession, and professional schools will look for this experience in making sure you understand that career path.

The following page lists some of the other qualities, skills and experiences that you can spend your college years developing. IT IS NOT A CHECKLIST. No one has them all. That is very important to note right now! Do not try to do them all. If you don't have interest in something, DON'T DO IT! The schools aren't looking for the best pre-health applicant, they're looking for the best you! Seek out opportunities to show you are doing your best with what you have been given.

Becoming a Health Professional takes a sustained commitment to classes and experiences. You should not view your undergraduate years as something to get through until you do what you really want to do. Those experiences you have in your undergraduate years will be the ones that develop required competencies and convince an admissions committee that you are the student they want for their school. Remember, it's supposed to be hard. It requires grit to go after the long-term goal of becoming a health professional. Develop your study habits and your resilience so that you are rewarded in the end.

The Pre-Health Professions students at River Falls have an active club and they welcome new members to join. They can be found on the OrgSync Web site, or look for the bulletin board on the 4th floor of AgSci outside Lab 416. This club can be a wealth of information and experiences. There is also a Pre-Health Professions newsletter to which you can subscribe.
To do so, go to lists.uwrf.edu/scripts/wa.exe?SUBED1=PREHEALTHPROFESSIONS&A=1. This newsletter will give you up-to-date information and opportunities pertaining to pre-health professions students.

Although this was developed by the AAMC (American Association of Medical Colleges) for pre-med students, it also applies well to most of the pre-health professions. Remember that each of you are a mix of innate qualities and experiences. You can not have them all.
Pre-Medical (Osteopathic and Allopathic)

The recommended curriculum below meets the required and recommended pre-requisites of most of the schools, as well as to prepare you for the Medical College Admission Test (MCAT). Additional courses are needed to meet requirements for the biology degree and for graduation.

**Biology**
- Biology 150 or 160 (General Biology)
- Biology 230 (General Zoology)
- Biology 240 (Cell Biology)
- Biology 324 (Microbiology)
- Biology 341 and 342 (Anatomy and Physiology I and II)
- Biology 350 (Genetics)

Keep in mind that additional biology courses are required for the Biology major.

**Chemistry**
- Chemistry 111 and 116, 112 and 116 (General Chemistry 1 and 2)
- Chemistry 231, 232 236, 237 (Organic Chemistry 1 and 2)
- OR
- Chemistry 130 and 233 (Introduction to and Foundations of Organic Chemistry)
- Chemistry 240 (Foundations of Inorganic Chemistry)
- Chemistry 360 (Biochemistry, 1 semester, 4 credits) OR Chemistry 361 and 362 (2 semesters, 6 credits)

**Physics**
- Physics 121 and 122, (2 semesters Algebra-Based Physics and Lab) OR
- Physics 131 and 132, (2 semesters Calculus-Based Physics and Lab)

**Math**
Most require or recommend Math through Math 149 (Pre-calculus), a very few require Math 166 (Calculus);
Statistics is required, Math 231

**Generals**
- Psychology 101 (General Psychology) is required for MCAT
- Sociology 100 (Introduction to Sociology) is required for MCAT
- Coms 101 (Speech)
- English 100 and 200 are usually required (2 writing classes).
- Most want to see humanities, upper level humanities, and social/behavioral sciences
- Philosophy 220 (Bioethics) strongly recommended

**Notes:**
Schools would like you to take more non-sciences, to broaden your perspective and interests. As a bio major you have already demonstrated your academic ability to do well in challenging science courses. Demonstrate that you are broadly educated.

A Doctor of Osteopathic Medicine (DO) and an Allopathic Medical Doctor (MD) are functionally equivalent: They can practice in the same fields and specialties at the same places. The difference is in the philosophy of patients as whole (DO) and patients as diseases (MD). After medical school, all residencies are open to MDs and DOs. They must also pass the similar licensing exams before treating people and prescribing medications. Attend seminars by pre-health society to learn more.

Before you apply, you will have to take (or at least set a date for) the Medical College Admission Test.

The Biology Department has an Early Provisional Acceptance Program with Lake Erie College of Osteopathic Medicine. See Dr Gerbec for more information.
Pre-Dental

The recommended curriculum below is suggested to meet the required and recommended pre-requisites of most of the schools, as well as to prepare you for the Dental Admission Test (DAT). Additional courses are needed to meet requirements for the biology degree and for graduation.

**Biology**
- Biology 150 or 160 (General Biology)
- Biology 240 (Cell Biology)
- Biology 324 (Microbiology)
- Biology 341 and 342 (Anatomy and Physiology I and II)
- Biology 350 (Genetics)

Keep in mind that additional biology courses are required for the Biology major.

**Chemistry**
- Chemistry 111 and 116, 112 and 117 (General Chemistry 1 and 2)
- Chemistry 231, 232, 236, 237 (Organic Chemistry 1 and 2) **OR**
- Chemistry 240 and 250 (Foundations of Inorganic and Analytical Chemistry)
- Chemistry 360 (Biochemistry, 4 credits) **OR**
- Chemistry 361 and 362 (Biochemistry I and Biochemistry II, 6 credits)

**Physics**
- Physics 121 and 122, (2 semesters Algebra-Based Physics and Lab) **OR**
- Physics 131 and 132, (2 semesters Calculus-Based Physics and Lab)

**Math**
- No math prerequisite, but Geometry, Algebra, and Trigonometry are covered in the DAT (Dental Admissions Test), so Math 147 is a good idea and is required for the Biology major. It is a very good idea to have some college-level math on your college transcript.
- Statistics is required, Math 231

**Generals**
- Psychology 101 (General Psychology)
- Coms 100 (Speech)
- Sociology 100 (Introduction to Sociology)
- English 100 or 200 are usually required or strongly recommended.
- Art 227 (Ceramics)
- Phil 220 (Bioethics)
- Coms 213 (Intercultural Communication)

Shadowing is required.

Students applying to Dental must take the Dental Application Test (DAT).

The Biology Department has an Early Provisional Acceptance Agreement with Lake Erie College of Osteopathic Medicine, School of Dental Medicine. See Dr Gerbec in Biology for more information, and example course sequence.
Pre-Optometry

The curriculum below is recommended to meet the required and recommended pre-requisites of most of the schools, as well as to prepare you for the Optometry Admissions Test (OAT). Additional courses are required to meet requirements for the biology degree and for graduation.

**Biology**
- Biology 150 or 160 (General Biology)
- Biology 230 (General Zoology)
- Biology 240 (Cell Biology)
- Biology 324 (Microbiology)
- Biology 341 and 342 (Anatomy and Physiology I and II)
- Biology 350 (Genetics)
Keep in mind that additional biology courses are required for the Biology major.

**Chemistry**
- Chemistry 111 and 116, 112 and 117 (General Chemistry 1 and 2)
- Chemistry 231, 232, 236, 237 (Organic Chemistry 1 and 2)
  OR
- Chemistry 130 and 233 (Introduction to and Foundations of Organic Chemistry)
- Chemistry 240 (Foundations of Inorganic Chemistry)
  also Chemistry 360 (Biochemistry, 4 credits)
  OR Chemistry 361 and 362 (Biochemistry I and II, 6 credits)

**PHYSICS IS EXTREMELY IMPORTANT IN OPTOMETRY SCHOOL**

**Physics**
- Physics 121 and 122, (2 semesters Algebra-Based Physics and Lab)  OR
- Physics 131 and 132, (2 semesters Calculus-Based Physics and Lab)
  The Calculus-based series is recommended.

**Math**
- Math through Math 166 (Calculus), a select few require a second semester of Calculus
- Statistics is required, Math 231 (Biostatistics)

**Generals**
- Psych 101 (Introduction to Psychology)
- Coms 100 (Speech)
- Sociology 100
- English 100 and 200 are usually required or strongly recommended.
- Writing intensive or literature classes
- Most want to see humanities, upper level humanities, and social/behavioral sciences
- Coms 216 (Intercultural Communication)
- Phil 220 (Bioethics)

Shadowing is required

Students applying to Optometry school must take the Optometry Admissions Test (OAT)
Pre-Physician Assistant

The curriculum below is suggested to meet both the required and recommended pre-requisites of most of the schools. Additional courses are needed to meet requirements for the biology degree, general education and university requirements, and for graduation.

**Biology requirements include**
- Biology 150 or 160 (General Biology)
- Biology 240 (Cell Biology)
- Biology 243 (Biological Greek and Latin)
- Biology 324 (Microbiology)
- Biology 341 and 342 (Anatomy and Physiology I and II)
- Biology 350 (Genetics)

Keep in mind that additional biology courses are required for the Biology major.

**Chemistry**
- Chemistry 111 and 116, 112 and 117, (General Chemistry 1 and 2) and
- Chemistry 231, 232 236, 237 (Organic Chemistry 1 and 2) **OR**
- Chemistry 130 and 233 (Introduction to and Foundations of Organic Chemistry) and
- Chemistry 240 (Principles of General Chemistry)
- Chemistry 360 (4 credits) **OR**
- Chemistry 361 and 362 (Biochemistry I and II, 6 credits)

**Math**
- Math 149 (Pre-calculus), some require Math 166 (Calculus)
- Math 231 (Biostatistics)

**Physics**
- Not required for most schools, but Physics 121 or 131 is required for the Biology major

**Psychology**
- Psych 101 (Introduction to Psychology),
- Psych 245 (Lifespan Developmental Psychology) **OR**
- Psych 335 and Psych 336 (Childhood and Adolescence, Adult and Aging)
- Psych 325 (Abnormal Psychology)

**Generals**
- Most require speech (Coms 100)
- Recommend taking Bioethics (Phil 220)

Most schools require applicants to complete the GRE Exam.

All schools require clinical experience (with patient contact) for admission (500 hours minimum for some, most require a lot more). This may include (but is not limited to) CNA, CMA, Pharmacy Tech, EMT, PCA.
Pre-Occupational Therapy

The curriculum below is suggested to meet both the required and recommended prerequisites of most of the schools. Additional courses are needed to meet requirements for the biology degree, general education and university requirements, and for graduation.

**Biology**
Biology 150 or 160 (General Biology)
Biology 240 (Cell Biology)
Biology 341 and 342 (Anatomy and Physiology I and II)
Bio 243 (Biological Greek and Latin)
Keep in mind that additional biology courses are required for the Biology major

**Chemistry**
There is no chemistry requirement, but chemistry is required for the biology major.

**Psychology**
Psych 101 (Introduction to Psychology),
Psych 245 (Lifespan Developmental Psychology) OR
Psych 335 and Psych 336 (Childhood and Adolescence, Adult and Aging)
Psych 325 (Abnormal Psychology)

**Sociology**
Sociology 101

**Physics**
Physics 121 (Algebra-Based Physics I and Lab)

**Math**
Statistics (Math 231, or Psychology 201)

**Recommended Additional Courses**
PED 354 (Biomechanics)
Health 315 (Nutrition)
PED 245 Motor Development Throughout Life
Other appropriate Psychology or Health and Human Performance classes

Many schools require at least 50 hours of observation/internship/work at 3 different settings.
Pre-Physical Therapy

The curriculum below is suggested to meet both the required and recommended pre-requisites of most of the schools. Additional courses are needed to meet requirements for the biology degree and for graduation.

**Biology**

Biology 150 or 160 (General Biology)
Biology 341 and 342 (Anatomy and Physiology I and II)
Keep in mind that additional biology courses are required for the Biology major

**Chemistry**

Chemistry 111 and 116, 112 and 117 (General Chemistry 1 and 2) OR
Chemistry 130 and 233 (Introduction to and Foundations of Organic Chemistry)

**Math**

Math 147 or 149 (some (University of Minnesota) require 1 semester of Calculus (Math 166)
Statistics is required, Math 231 (Biostatistics)

**Physics**

Physics 121 and 122, (2 semesters Algebra-Based Physics and Lab) OR
Physics 131 and 132, (2 semesters Calculus-Based Physics and Lab)
Biomechanics (PED 354) can be taken in addition to/in place of Physics II for some schools

**Additional Recommended Courses**

Psych 245 (Lifespan Developmental Psychology) OR
Psych 335 and Psych 336 (Childhood and Adolescence, Adult and Aging)
Psych 325 (Abnormal Psychology)
PED 354 (Biomechanics)
Heal 315 (Nutrition)
Heal 366 (Exercise Physiology)

Most Physical Therapy schools require a number (usually 100) hours of observation prior to admission. Completion of the **GRE exam** (Graduate Record Exam) is also required.

Note: A Biology major/Biomedical Sciences option will provide good preparation for physical therapy programs and provide students with good preparation for many other fields of health care. Physical Therapy Programs look favorably on students who have successfully taken and demonstrated competence in upper level science classes. A major in Health and Human Performance (Option II) may be appropriate for students with secondary interest in sports training or kinesiology.


Pre-Chiropractic

UWRF has an affiliation agreement with Palmer College of Chiropractic in Davenport Iowa, which requires a fairly strict sequence of courses. The student attends UWRF for 6 semesters to take specific prerequisite classes needed for entrance into chiropractic school, as well as meet the general education and university requirements of UWRF. After one year at Palmer, the credits transfer back to UWRF, and the student graduates from UWRF with a BS in Biology. The student continues on with chiropractic training at Palmer. UWRF does not have an affiliation agreement with other schools. This page presents a suggested sequence of courses. It also meets both the required and recommended pre-requisites of most Chiropractic Schools.

**Biology**
- Biology 150 or 160 (General Biology)
- Biology 240 (Cell and Molecular Biology)
- Biology 324 (Microbiology)
- Biology 341 and 342 (Anatomy and Physiology I and II)

*Keep in mind that additional biology courses are required for the Biology major*

**Chemistry**
- Chemistry 111 and 116, 112 and 117 (General Chemistry 1 and 2)
- Chemistry 231, 232, 236, 237 (Organic Chemistry 1 and 2) **OR**
- Chemistry 130 and 233 (Introduction to and Foundations of Organic Chemistry)
- Chemistry 240 (Foundations of Inorganic Chemistry)
- Chemistry 360 (Biochemistry) **OR**
- Chemistry 361 and 362 (Biochemistry 1 and 2) is recommended

**Physics**
- Physics 121 (Algebra based Physics I with lab) **AND** Physics 122 (Algebra based Physics II with lab)
- Physics 131 (Algebra based Physics I with lab) **AND** Physics 132 (Algebra based Physics II with lab)

**Math**
- Math 231 (Biostatistics)
- Math 147 or Math 149 is required for the Bio major

**Psychology**
- Psychology 101 (General Psychology)
- One additional psychology class

**Social Sciences/Humanities**
- At least 15 credits

**Additional Requirements**
- Speech (COMS 100) is recommended

See following page for recommended sequence.
## Example Course Sequence for Articulation Agreement With Palmer Chiropractic
### Biology Major, Chemistry Minor

### First Year at UWRF
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Biology (150 or 160)</td>
<td>4</td>
</tr>
<tr>
<td>General Chemistry I (Chem 111 and 116)*</td>
<td>5</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>Introduction to Organic Chemistry I (Chem 130)*</td>
<td>5</td>
</tr>
<tr>
<td>CAS 101</td>
<td>3</td>
</tr>
<tr>
<td>Academic Reading/Writing (Engl 100)</td>
<td>3</td>
</tr>
<tr>
<td>Health/Wellness (PE 108)</td>
<td>1</td>
</tr>
</tbody>
</table>

**Bio 110 (Freshman Colloquium)** 1
**General Chemistry II (Chem 112 and 117)*** 5
**Intro to Organic Chemistry II (Chem 233)*** 5
**Fundamentals of Communications (Coms 101)** 3
**College Algebra and Trigonometry (Math 147)** 3
**Intro Psychology (Psych 101)** 3

### Second Year at UWRF
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellular/Molecular Biology (Bio 240)</td>
<td>3</td>
</tr>
<tr>
<td>Organic Chemistry I + lab (Chem 231)*</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>Foundations of Inorganic Chemistry (Chem 240)*</td>
<td>4</td>
</tr>
<tr>
<td>Reading, Writing, and the Disciplines (Engl 200)</td>
<td>3</td>
</tr>
<tr>
<td>Gen Ed (Humanities/Fine Arts)</td>
<td>3</td>
</tr>
<tr>
<td>Gen Ed (Humanities/Fine Arts)</td>
<td>2</td>
</tr>
</tbody>
</table>

**Microbiology** 4
**Organic Chemistry II + lab (Chem 232)*** 4
**Biostatistics (Math 231)** 3
**Ethical citizenship (Bioethics)** 3
**Gen Ed (Social/Behavioral Sciences)** 3

### Third Year at UWRF
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy/Physiology I w/Lab (Bio341)</td>
<td>4</td>
</tr>
<tr>
<td>Foundations of Biochemistry (Chem 360)</td>
<td>4</td>
</tr>
<tr>
<td>General Physics I + lab (Physics 121 or 131)</td>
<td>5</td>
</tr>
<tr>
<td>Evolution (Biol 103)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Anatomy/Physiology II w/Lab (Bio 342)** 4
**Genetics (Bio 350)** 3
**American Cultural Diversity** 3
**General Physics II (Physics 122 or 132)** 5
**Global Perspectives/Multidisciplinary** 3

**16**

### During one summer or J-term – Lifespan Development Psychology (Psych 245) for 3 credits

* There are 2 possible sequences available to students for chemistry.
  * "Organic First" – Chem 130, Chem 233, Chem 240 OR
  * "Traditional" – Chem 121, Chem 122, Chem 231 + 236 (lab), Chem 232 + 237 (lab)
  
All classes have labs.

May take classes that double count.

This course sequence contains all classes that are prerequisites for the Chiropractic program, as well as those needed to graduate from UWRF with a Biology Major, Chemistry Minor once the year at Palmer is completed.
**Pre-Pharmacy**

The recommended curriculum below is suggested to meet both the required and recommended pre-requisites of most of the schools. Additional courses are required to meet requirements for the biology degree and for graduation. Students may choose any major as long as they fulfill the prerequisite classes, some choose to major in Chemistry and minor in Biology, and others choose to major in Biology and minor in Chemistry.

*Note- Most pharmacy schools WILL take AP test credit, as long as it is noted and credited on your college transcript.

**Biology requirements include**
Biology 150 or 160 (General Biology)
Biology 240 (Cell and Molecular Biology)
Biology 324 (Microbiology), some, such as NDSU, want medical microbiology
Biology 341 and 342 (Anatomy and Physiology I and II)

*Keep in mind that additional biology courses are required for the Biology major or minor*

**Chemistry**
Chemistry 111 and 116, 112 and 117, (General Chemistry 1 and 2)
Chemistry 231, 232 236, 237 (Organic Chemistry 1 and 2)
OR
Chemistry 130 and 233 (Introduction to and Foundations of Organic Chemistry)
Chemistry 240 and 250 (Foundations of Inorganic and Analytical Chemistry)
Chemistry 360 (Biochemistry, 4 credits) OR
Chemistry 361 and 362 (Biochemistry I and II, 6 credits)

**Math**
Math 166 (Calculus 1); Econ 156 is not acceptable; Some require Calculus 2 (Math 167), because the requirement is content based
Math 231 or (Biostatistics)

**Physics**
Physics 121 and 122, (2 semesters Algebra-Based Physics and Lab) OR
Physics 131 and 132, (2 semesters Calculus-Based Physics and Lab)

**General Education/Liberal Arts Requirements**
Psychology 101 (General Psychology)
Sociology 100 (Anthropology 100)
Economics 201 (Principals of Microeconomics)
English 100 and English 200
COMS 100 (Speech)
Philosophy 220 (Bioethics)

Cultural Diversity Course that focuses on the multicultural aspects of life in US Society, some want Intercultural Communication (COMS 213)

The departments of Chemistry and Biology have an Early Provisional Acceptance Agreement with Lake Erie College of Osteopathic Medicine, School of Pharmacy. See Dr Gerbec in Biology for additional information, and for an example course sequence.
Medical Lab Scientist

The UWRF has an agreement with the University of Minnesota Department of Medical Lab Sciences for students who are interested in a career as a Medical Lab Scientist (MLS). This agreement will allow UWRF students to take 3 years of specific classes here, then attend MLS required classes and clinical experiences at the University of Minnesota for 15 months. Credits will be transferred back to UWRF, and the student will at that time earn a BS from the UWRF, certification as a Clinical Lab Scientist, and be eligible to sit for the national MLS exam. Following is an example schedule with a Bio major, Chem minor.

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Biology (150 or 160)</strong></td>
<td>3-4</td>
</tr>
<tr>
<td><strong>General Chemistry I (Chem 111 and 116)</strong>*</td>
<td>5</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction to Organic Chemistry I (Chem 130)</strong>*</td>
<td>5</td>
</tr>
<tr>
<td><strong>CAS 101</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Academic Reading/Writing (Engl 100)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Health/Wellness (PE 108)</strong></td>
<td>1</td>
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<tr>
<td></td>
<td><em>15-16</em></td>
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</tbody>
</table>

**Summer Year 1** (both online)

| Bio Greek and Latin          | 2 |

**Orientation to CLS** 1 *(offered all semesters)*

<table>
<thead>
<tr>
<th>Semester 3</th>
<th>Semester 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cellular/Molecular Biology (Bio 240)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Organic Chemistry 1 + lab (Chem 231)</strong>*</td>
<td>4</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td><strong>Foundations of Inorganic Chemistry (Chem 240)</strong>*</td>
<td>4</td>
</tr>
<tr>
<td><strong>Reading, Writing, and the Disciplines (Eng 200)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Gen Ed (Humanities/Fine Arts)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Gen Ed (Social/Behavioral Sciences)</strong></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><em>16</em></td>
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</table>

<table>
<thead>
<tr>
<th>Semester 5</th>
<th>Semester 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biochemistry (Chem 360)</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>General Physics 1 + lab (Physics)</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Global Perspectives</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Anatomy and Physiology I</strong></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><em>16</em></td>
</tr>
</tbody>
</table>

**Summer before entrance to CLS Program**

| Laboratory Methods (CLS Class, UM) | 4 |
| Educational and Professional Issues (CLS, UM) | 2 |

Note: 
- Timing of General Education/University Requirement is flexible. Some double counting is possible.
- This course sequence contains all classes that are prerequisites for the MLS program, as well as those needed to graduate from UWRF with a Biology Major/Chem Minor once the year at UM is completed.

Mayo School of Health Sciences also has a program that requires completion of a BS before entry. A number of Biology students have matriculated to this program.

The Univ. of Minnesota also has a Masters’ level program in Medical Lab Sciences. Completion of these prerequisite classes and a BS from UWRF are required for entry.
Nursing

UWRF does not offer an undergraduate program in nursing leading to a BSN/RN degree/license. For students at UWRF interested in nursing, there are a number of options:

1) Transfer as soon as possible to a school with an undergraduate nursing school.

2) Complete some of the requirements for admission to an undergraduate nursing program at UWRF, then transfer to an undergraduate program in nursing at another school. Students should look up the requirements for their particular chosen schools, because the prerequisites vary. These usually include completion of at least 30 semester credits including:
   - English 100
   - Introduction to Psychology (Psychology 101)
   - General Biology (Biology 160)
   - General Chemistry (Chemistry 111 and 116, 112 and 117)
   - Sociology 100 or Anthropology 100
   - College Algebra (Math 146)

3) Some schools want more credit hours (60), which include
   - Biostatistics (Math 231)
   - Human Nutrition (Health 315)
   - Anatomy and Physiology (Biol 341 and 342)
   - More chemistry, including Organic Chemistry (Chem 231, 232, 236, 237) and Biochemistry (Chem 360)
   - Lifespan Development (Psych 245)

This is a tough route because by the time students are in biochemistry they are here 3 years, and students take a lot of chemistry, and time. You don't have to. A better option might be #4

4) Accelerated Bachelor of Science in Nursing/ Registered Nurse (Some offer an MSN in preparation for RN licensure) – This is a degrees for students with a BS in an area other than nursing, such as Biology. These programs typically take between 12-18 months. This is a good route for someone who may be interested in a specialty, such as nurse anesthetist, since it affords you the science background you will need. Many employers value graduates of accelerated programs because they are typically more mature, possess strong science and clinical skills, and are quick studies on the job. There are over 300 accelerated nursing programs in the US, with more in the planning stage.

Additional courses are required to meet requirements for the biology degree and for graduation

   - General Biology (Biology 150 or 160)
   - Microbiology (Biology 324)
   - Evolution (Bio 103)
   - Anatomy and Physiology I and II (Biology 341 and 342)
   - Human Pathology (not offered at UWRF, but many school will substitute Immunology (Biology 345). There is also an online Pathology Course offered by the Univ of Minnesota that many students take (LAMP 4177)
   - Human Nutrition (Health 315)

Chemistry 111 116, and 112 and 117; more chemistry, including Organic, Biochemistry and Pharmacology, is better. There are a couple of other options available,

   - Algebra and Trigonometry (Math 147) and Biostatistics (Math 231)
   - General Psychology – (Psychology 101)
   - Lifespan Development – (Psychology 245)
   - Abnormal Psychology (Psychology 220)
   - Sociology- (Sociology 100)
   - Bioethics (Philosophy 220)

Cultural Diversity Classes, including Intercultural Communication (COMS 213)

Many want CNA certification and experience, volunteering in clinical settings

"The typical accelerated nursing students are bright (GPA 3.0 min, but typical is higher), inquisitive and sophisticated consumers of higher education who actively pursue learning opportunities."
**Echocardiology**

The UWRF has an affiliation agreement with the Mayo School of Health Sciences (MSHS) for students who are interested in a career as an Echocardiologist (An ultrasound technologist who specializes in the examination of and diagnosis of heart condition and diseases). This agreement will allow UWRF students to take 3 years of specific classes here, then attend MSHS required classes and clinical experiences at the MSHS for 21 months. Credits will be transferred back to UWRF, and the student will at that time earn a BS from the UWRF, certification as an Echocardiologist, and be eligible to sit for the national licensing exam. Following is an example schedule with a Bio major.

**Example Course Sequence for Association Agreement with Mayo Echocardiology Program**

**Biology Major**

*Timing of General Education/University Requirement classes is flexible.*

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Biology (150 or 160)</strong></td>
<td>3-4</td>
</tr>
<tr>
<td><strong>General Chemistry I (Chem 111 and 116)</strong></td>
<td>5</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction to Organic Chemistry I (Chem 130)</strong></td>
<td>5</td>
</tr>
<tr>
<td><em>Academic Reading/Writing (Engl 100)</em></td>
<td>3</td>
</tr>
<tr>
<td><strong>CAS 101</strong></td>
<td>3</td>
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<td></td>
<td>15</td>
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<tr>
<td><strong>Semester 3</strong></td>
<td><strong>Semester 4</strong></td>
</tr>
<tr>
<td><strong>Cellular/Molecular Biology (Bio 240)</strong></td>
<td>3</td>
</tr>
<tr>
<td><em>Reading, Writing, and the Disciplines (Eng 200)</em></td>
<td>3</td>
</tr>
<tr>
<td><strong>Gen Ed (Humanities/Fine Arts)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Bioethics (Philosophy 220)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Zoology (Bio 230)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Health/Wellness (PE 108)</strong></td>
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<td></td>
<td>16</td>
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<tr>
<td><strong>Semester 5</strong></td>
<td><strong>Semester 6</strong></td>
</tr>
<tr>
<td><strong>Cultural Diversity</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>General Physics 1 + lab (Physics 121)</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Gen Ed (Humanities/Fine Arts)</strong></td>
<td>3</td>
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<td><strong>Anatomy and Physiology I</strong></td>
<td>4</td>
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</tr>
</tbody>
</table>

Note: This course sequence contains all classes that are prerequisites for the Echocardiography program, as well as those needed to graduate from UWRF with a Biology Major once a year at Mayo is completed.

**Additional Requirements for Echocardiology Program**

1) Must have ACT composite score of 20 or higher  
2) Enrollment in affiliated Bachelors’ Degree Program (UWRF meets this criteria)  
3) **Prerequisite** courses less than 10 years old  
4) Prerequisite courses complete, with GPA at least 3.0, including math and science courses  
5) Must have patient care certification and experience as one of the following: Certified Nursing Assistant (C.N.A.), Registered Medical Assistant (C.M.A.), Registered Nurse (R.N.) or Licensed Practical Nurse (L.P.N.) Emergency Medical Technician (E.M.T.), Respiratory Therapist. Any course involving direct patient care, many health internships would qualify too.  
6) Must have observed Echocardiographic Procedure  
7) Must have immunizations and TB test up-to-date  
8) Must have health insurance  
9) Must have complete background check within 12 months of beginning rotation.  
10) Must have excellent communication skills, physical and mental stamina, critical thinking skills.  
11) Must show professional and ethical conduct, emotional and mental stability, sound judgment and empathy.  
12) Must be able to learn and function in a wide variety of didactic and clinical settings.
# Radiography

## Course Sequence for Affiliation Agreement with Mayo Radiography Program

**Biology Major**

*Timing of General Education/University Requirement classes is flexible.*

<table>
<thead>
<tr>
<th>Semester 1</th>
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<tbody>
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<td>General Biology (150 or 160)</td>
<td>Bio 110 (Freshman Colloquium)</td>
</tr>
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</tr>
<tr>
<td>Introduction to Organic Chemistry I (Chem 130)</td>
<td>Intro to Organic Chemistry II (Chem 233)</td>
</tr>
<tr>
<td>*Academic Reading/Writing (Engl 100)</td>
<td>Math (Minimum 147 or 149)</td>
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<tr>
<td>CAS 101</td>
<td>Evolution (Bio 103)</td>
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<thead>
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<th>Semester 3</th>
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<td>Biology Elective</td>
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<td>General Physics 1 + lab (Physics 121)</td>
<td>Health Psychology (Psych 245)</td>
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<td>Anatomy and Physiology I</td>
<td>Anatomy and Physiology II</td>
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Note: This course sequence contains all classes that are prerequisites for the Radiography program, as well as those needed to graduate from UWRF with a Biology Major once the 18 months at Mayo is completed.

### Additional Requirements for Radiography Program

1. Must have ACT composite score of 20 or higher
2. Enrollment in affiliated Bachelors’ Degree Program (UWRF meets this criteria)
3. **Prerequisite** courses less than 6 years old
4. Prerequisite courses complete, with GPA at least 3.0, including math and science courses. Competitive applicants will have higher.
5. Patient care certification and experience as one of the following will give a competitive advantage: Certified Nursing Assistant (C.N.A.), Registered Medical Assistant (C.M.A.), Registered Nurse (R.N.) or Licensed Practical Nurse (L.P.N.) Emergency Medical Technician (E.M.T.), Respiratory Therapist. Any course involving direct patient care, many health internships would qualify too.
6. Must have observed Radiographic Procedure (Job Shadow)
7. Must have immunizations and TB test up-to-date
8. Must have health insurance
9. Must have excellent communication skills, physical and mental stamina, critical thinking skills.
10. Must show professional and ethical conduct, emotional and mental stability, sound judgment and empathy.
11. Must be able to learn and function in a wide variety of didactic and clinical settings.
Sonography

Course Sequence for Affiliation Agreement with Mayo Radiography Program
Biology Major

Timing of General Education/University Requirement classes is flexible.

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Note: This course sequence contains all classes that are prerequisites for the Radiography program, as well as those needed to graduate from UWRF with a Biology Major once the 21 months at Mayo is completed.

Additional Requirements for Sonography Program

1) Must have ACT composite score of 20 or higher
2) Enrollment in affiliated Bachelor Degree Program (UWRF meets this criteria)
3) Prerequisite courses less than 10 years old
4) Must have GPA of 3.0, including sciences
5) Must have patient care experience as one of the following: Certified Nursing Assistant (C.N.A.), Registered Medical Assistant (C.M.A.), Registered Nurse (R.N.) or Licensed Practical Nurse (L.P.N.) Emergency Medical Technician (E.M.T.), Respiratory Therapist. Any course involving direct patient care, many health internships would qualify too.
6) Must have observed Sonographic Procedure (shadowing)
7) Must have immunizations and TB test up-to-date
8) Must have health insurance
9) Must have background check within 12 months of entering the program.
10) Must have excellent communication skills, physical and mental stamina, critical thinking skills.
11) Must show professional and ethical conduct, emotional and mental stability, sound judgment and empathy.
12) Must be able to learn and function in a wide variety of didactic and clinical settings.
**Pre-Audiology**

An audiologist is a Doctor that specializes in hearing and balance issues.

There is a great deal of variety within the field, and many specializations. Audiologists work with children, veterans, geriatric, and many others in clinics or private practice and schools, workplaces, recreation and others. Someone who is caring, competent and personable, flexible, a good patient advocate, and willing to educate and continue learning (as technology and knowledge is always changing) will make a great audiologist.

The curriculum below is suggested to meet both the required and recommended prerequisites of most of the schools. Additional courses are needed to meet requirements for the biology degree, general education and university requirements, and for graduation.

**Biology**
Biology 150 or 160 (General Biology)
Biology 240 (Cell Biology)
Biology 341 and 342 (Anatomy and Physiology I and II)
Bio 243 (Biological Greek and Latin)
Keep in mind that additional biology courses are required for the Biology major

**Chemistry**
There is no chemistry requirement, but one year of chemistry is required for the biology major.
Chemistry 111 and 116
Chemistry 112 and 117

**Physics**
Physics 121 (Algebra-Based Physics I and Lab) is required for Biology degree
Students must see chair of CSD to waive CSD 160, which is a prerequisite for all the CSD classes and CSD majors, but not necessary for our students.

**Math**
Math 147 or 149
Biostatistics Math 231

**Psychology**
Psych 101 – Introduction to Psychology
Psych 350 – Sensation and Perception

**Communication Sciences and Disorders**
CSD 261 Language Development
CSD 262- Phonetics (prerequisite for Speech Science)
CSD 263 -Speech Systems
CSD 360- Audiology I (Fall Offering)
CSD 466 Aural Rehabilitation (Spring Offering)
CSD 162- Introduction to American Sign language
CSD 264- Speech Science (Spring Offering)

*Note CSD 261, 466 and 360 are all offered in the summer as well

Most graduate programs in Audiology require the GRE (Graduate Record Exam)
Allied Health Sciences
There are many other Health Professions that afford very rewarding careers. Most require another semester or year of training, for certification and some require a graduate (Masters’ Degree). A partial list includes:

Surgical First Assistant:

Various Types of Cardiovascular Specialist:

Pathologist Assistant:

Anesthesiologist Assistant:

Nuclear Medical Technologist:

Respiratory Therapist:

Emergency Medicine Paramedic:

Public Health Specialist:

Prosthetics:

Audiologist:

Neurophysiology:

Genetics Counselor:

Histology Technician:

Respiratory Therapist:

The following web sites can also give you more information about preparing for a health career.

http://www.healthcareers.umn.edu/
http://explorehealthcareers.org/en/home
http://www.bls.gov/oco/
mayoclinic.org/careerawareness

For More Information, contact

Dr. Betsy Gerbec
Department of Biology
400 Agricultural Sciences Bldg
Betsy.Gerbec@uwrf.edu