

## Class of 2024 Graduation Requirements

# Master of Science in Applied Life Sciences (MS)

Students in the MS program are required to complete 54.0 credits over two years of study. Of the 54.0 total credits, students must complete 15.0 credits of Core Science/Professional Development courses and 39 credits of Elective courses. The MS students can declare a concentration that would provide depth to their degree, but a non-concentration ("a la carte") option is also available.

Six concentrations are available to MS in Applied Life Sciences students. They are Translational Research (TR), Clinical Research (CR), Public Health Research (PHR), Infectious Diseases Research (IDR), Bioprocessing Research (BPR), and Team Master's Project (TMP). Each concentration requires the completion of 15.0 credits comprised of a capstone project (12.0 or 6.0 credits depending on the concentration option selected) plus concentration-required course(s).

### Program Requirements

Core Requirements	Credits
Core Science & Professional Development Courses	15.0
Electives (Including the following intersecting requirements)	39.0
Advanced Technical and General Electives (including Concentration-Required Courses)	
Capstone Project (Research Thesis/TMP)	
<b>Subtotal</b>	<b>54.0</b>

## Core Science and Professional Development Courses

All students must complete the Core Science and Professional Development courses for the MS in Applied Life Sciences. Students who have taken PDEV 5400 as part of their PPC/PPA program are not required to take PDEV 5100.

Core Courses	Credits
<b>SCI 5000</b> Molecular Biotechnology	1.5
<b>SCI 5100</b> Molecular Basis of Disease	1.5
<b>SCI 5300</b> Pharmaceutical Discovery	1.5
<b>SCI 5310</b> Pharmaceutical Development	1.5
<b>SCI 6000</b> Advanced Biotechnology	1.5
<b>SCI 6100</b> Pharmacogenomics and Precision Medicine	3.0
<b>PDEV 5100</b> Professional Development	0.0
<b>PDEV 5220</b> Bioindustry Ethics and Society	1.5
<b>MATH 5020</b> Clinical Biostatistics	3.0
<b>Subtotal</b>	<b>15.0</b>

## Advanced and General Technical Electives

All MS students are required to complete additional credits of any KGI courses to achieve the required 54.0 credit total. Students are encouraged to consult with the MS program director for course selection. Not all electives are offered every year. Refer to the Henry E. Riggs School of Applied Life Science course list for course designation information.

## Concentrations

Below are the six concentrations available to Master of Science in Applied Life Sciences students:

- Translational Research (TR)
- Clinical Research (CR)
- Public Health Research (PHR)
- Infectious Diseases Research (IDR)
- Bioprocessing Research (BPR)
- Team Master's Project (TMP)

## Concentrations

A total of 15.0 credits comprising all the required courses in the concentration and a selection from the electives are required in partial fulfillment of the 39.0 total elective credits necessary for graduation. Students are encouraged to consult with the MS program director for course selection. To complete the MS degree with a Translational, Clinical, Infectious Diseases, Public Health, or Bioprocessing Research thesis, students must complete a 12.0-credit RES 6200 or 6.0-credit 6201 Master's Research Thesis capstone. Students registered for 6.0 credits as part of their Master's Research Thesis capstone per semester must dedicate at least 18 hours per week to the project. Those who choose a 3.0-credit research course per semester must devote at least 9 hours per week to the project.

The students must submit contracts within the first week of the fall semester of the 2<sup>nd</sup> year of studies. Please refer to the [KGI MS webpage](#) and [RES 6200/6201 Master's Research Thesis syllabus](#) for more information.

### Translational Research Concentration

Students planning to pursue the Translational Research Concentration are strongly recommended to enroll in Independent Research / Independent Study during their first year.

Translational Research Concentration Courses	Credits
<b>RES 6200</b> Master's Research Thesis	12.0
<b>SCI 6400</b> Fundamental Papers in Applied Medicine <b>OR</b> <b>SCI 6401</b> Fundamental Papers in Molecular Biology and Biotechnology	1.5
<b>SCI 6410</b> Fundamental Papers in Applied Medicine	1.5

### Clinical Research Concentration

Students in the Clinical Research Concentration may apply through the KGI-COPE application website or consult the MS program director to identify a project. The MS program director must approve the projects.

Clinical Research Concentration Courses	Credits
<b>RES 6200</b> Master's Research Thesis	12.0
<b>SCI 5230</b> Medical Harm Reduction <b>OR</b> <b>SCI 5210</b> Clinical Pharmacology I	3.0

### Public Health Research Concentration

Students planning to pursue the Public Health Concentration should consult the MS program director to identify a project. The MS program director must approve the projects.

Public Health Research Concentration Courses	Credits
<b>RES 6200</b> Master's Research Thesis	12.0
<b>SCI 6600</b> Infectious Disease Epidemiology	3.0

### Infectious Diseases Research Concentration

Students enrolled in the Infectious Diseases Concentration must work on a thesis project related to infectious diseases (drug discovery, medical devices, bioinformatics, the molecular basis of a disease, etc.). [Option A](#) (6.0-credit Master's Research Thesis) and [Option B](#) (12.0- credit Master's Research Thesis) are available. The MS program director must approve the projects.

Infectious Diseases Concentration (Option A) Courses	Credits	Infectious Diseases Concentration (Option B) Courses	Credits
<b>RES 6201</b> Master's Research Thesis	6.0	<b>RES 6200</b> Master's Research Thesis	12.0
<b>SCI 6300</b> Advanced Pharmaceutical Discovery	1.5	<b>SCI 6500</b> Virology	1.5
<b>SCI 6301</b> Advanced Pharmaceutical Discovery Lab	1.5	<b>SCI 6510</b> Medical Microbiology and Infectious Diseases	1.5
<b>SCI 6500</b> Virology	1.5		
<b>SCI 6510</b> Medical Microbiology and Infectious Diseases	1.5		
<b>SCI 6600</b> Infectious Disease Epidemiology	3.0		

## Bioprocessing Research Concentration

Students enrolled in the Bioprocessing Research Concentration must enroll in the concentration-required courses starting from the 1<sup>st</sup> year. [Option A](#) (6.0-credit Master's Research Thesis) and [Option B](#) (12.0- credit Master's Research Thesis) are available. The MS program director must approve the project.

Bioprocessing Research Concentration (Option A) Courses	Credits	Bioprocessing Research Concentration (Option B) Courses	Credits
<b>RES 6201</b> Master's Research Thesis	6.0	<b>RES 6200</b> Master's Research Thesis	12.0
<b>ENG 5160</b> Introduction to Bioprocessing	1.5	<b>ENG 5160</b> Introduction to Bioprocessing	1.5
<b>ENG 5131</b> Mammalian Cell Culture Lab	1.5	<b>ENG 5100</b> Bioprocess Engineering Principles	1.5
<b>ENG 5141</b> Introduction to Bioseparations Engineering Lab	1.5		
<b>ENG 5130</b> Mammalian Cell Biotechnology	1.5		
<b>ENG 5140</b> Bioseparations Engineering and Science	1.5		
<b>ENG 5100</b> Bioprocess Engineering Principles	1.5		

## Team Master's Project Concentration

Students in the Team Master's Project Concentration should indicate their intent to participate in the TMP by submitting the Concentration Declaration form signed by the MS program director to the Registrar.

TMP Concentration Courses	Credits
<b>PDEV 6000</b> Team Master's Project	12.0
<b>BUS 6400</b> Organizational Behavior	3.0