

## New Academic Program Workflow Form

### General

**Proposed Name: Molecular and Cellular Biology**

Transaction Nbr: 00000000000200

Plan Type: Major

Academic Career: Undergraduate

Degree Offered: Bachelor of Arts

Do you want to offer a minor? N

Anticipated 1st Admission Term: Fall 2024

### Details

Department(s):

#### SCNC

DEPTMNT ID	DEPARTMENT NAME	HOST
0417	Molecular & Cellular Biology	Y

Campus(es):

#### MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

#### ONLN

LOCATION	DESCRIPTION
ONLN	Online

**Admission application terms for this plan:** Spring: Y Summer: N Fall: Y

**Plan admission types:**

Freshman: Y Transfer: Y Readmit: Y Graduate: N

Non Degree Certificate (UCRT only): N

Other (For Community Campus specifics): N

**Plan Taxonomy:** 26.0406, Cell/Cellular and Molecular Biology.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

**Print Option:**

Diploma: Y Bachelor of Art in Molecular and Cellular Biology

Transcript: Y Bachelor of Art in Molecular and Cellular Biology

**Conditions for Admission/Declaration for this Major:**

None

**Requirements for Accreditation:**

NA

## **Program Comparisons**

### **University Appropriateness**

The BA in Molecular and Cellular Biology complements the existing BS in Molecular and Cellular Biology and expands the College of Science's BA offerings. As of Fall 2023, the College of Science offers BA degrees in chemistry, biochemistry, computer science, general science, geosciences, mathematics, psychology, statistics, and data science.

These programs allow students who wish to pursue STEM degrees to tailor their education with additional coursework in the humanities, the arts, law, business, and communication. Specifically, the BA in Molecular and Cellular Biology provides students who do not want to pursue research or medicine the opportunity to gain broad training in molecular biology, cell biology, genetics, and biotechnology while taking additional coursework in writing and ethics. We hope the degree will also increase retention in STEM by providing a degree path that does not require calculus or physics. Our goal is to develop a cohort of graduates who can understand life at the molecular level, read primary molecular and cellular biology literature, and translate that knowledge to other disciplines and the general public.

This proposed degree aligns with the University of Arizona's strategic pillars:

1. Wildcat Journey, preparing students with the skills and mindsets to lead in the 4th Industrial Economy
2. Arizona Advantage, advancing our land grant mission to drive social, cultural, and economic impact

## Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
1	Ecology & Evolutionary Biology	BS	90	University of Arizona	N
2	Ecology & Evolutionary Biology	BA	9	University of Arizona	N
3	Biology	BA	72	Arizona State University	N
4	Biology	BS	875	Arizona State University	N
5	Biochemistry	BS	341	University of Arizona	N
6	Biochemistry	BA	86	University of Arizona	N

### Peer Comparison

We selected three programs at peer institutions: the BA in Molecular, Cellular, and Developmental Biology at the University of Colorado Boulder, the BA in Biology at the University of Iowa, and the BA in Biology at the University of North Carolina at Chapel Hill. The University of Iowa and the University of North Carolina Chapel Hill offer BA and BS degrees in Biology (similar to our plan). In contrast, the University of Colorado Boulder offers only the BA. Our proposed BA in MCB is similar to these programs in that they are designed to have a flexible curriculum that allows students to combine biology with courses in other fields of interest. These degrees do not require as much calculus or physics as the typical BS degree in biology. All four programs target students interested in a range of careers beyond traditional laboratory medicine or pre-health.

Our BA in Molecular and Cellular Biology is the only program that requires coursework in statistics, bioethics, and technical writing to complete the degree. Our peer institutions include these courses as options from a list of courses or electives. We made them part of our core courses to ensure our graduates are prepared to understand current research, analyze the potential impacts on society, and communicate to a variety of audiences. These skills are part of our program learning outcomes and will be reinforced and assessed in our BA in MCB capstone course, which is also unique to our proposed program. Finally, the courses have been selected to ensure students can complete the program in person, online, or by taking classes in both modalities. This will allow students on both the main and AZ online campuses to pursue the same degree. Our peer programs are only offered in person.

## Resources

### Library

Acquisitions Needed:

None

**Physical Facilities & Equipment**

Existing Physical Facilities:

There is no need for additional facilities for this program. Courses will be held online or in centrally scheduled classrooms.

Additional Facilities Required & Anticipated:

None

**Other Support**

Other Support Currently Available:

The program will utilize existing academic, business, and IT support in the MCB department. As all but one class is currently offered, we do not anticipate the need for additional academic support.

Other Support Needed over the Next Three Years:

This course will be developed by existing faculty. As noted on the budget project, we anticipate needing an additional 0.10 FTE of academic advising, which should be covered by increased revenue.

**Comments During Approval Process**

12/1/2023 4:39 PM

TMGINGRAS

<b>Comments</b>
submitting document 12/1 at 4:39pm

12/2/2023 9:43 AM

LREZENDE

<b>Comments</b>
Approved.

12/5/2023 4:54 PM

MELANIECMADDEN

<b>Comments</b>
Approved.



## NEW ACADEMIC PROGRAM – MAJOR Preliminary Proposal Form

### I. Program Details

- a. **Name (and Degree Type) of Proposed Academic Program:** Molecular and Cellular Biology (BA)
  - i. **Emphases (if applicable):**
- b. **Academic Unit(s)/College(s):** Molecular and Cellular Biology
- c. **Campus/Location(s):** Main, Arizona Online
- d. **First Admission Term** *Spring 2024*
- e. **Primary Contact and Email:** *Lisa Rezende, Associate Professor of Practice, MCB Director of Online Education, lrezende@arizona.edu*

### II. Executive Summary:

- The BA in Molecular and Cellular Biology provides the opportunity for students who are interested in careers outside of medicine or laboratory research to gain a strong foundation in molecular biology, cell biology, and genetics while taking course work in the humanities, arts, business, social sciences, or law.
- The BA in Molecular and Cellular Biology provides students with the flexibility to add a second major in a non-STEM discipline.
- The majority of biology-related degrees at the University of Arizona are Bachelor of Science. While we currently offer a BA in Biochemistry and a BA in Ecology and Evolutionary Biology, a BA in Molecular and Cellular Biology differs by requiring additional writing and ethics coursework.
- The BA in Molecular and Cellular Biology can be completed as a 100% online program.

### III. Brief Program Description:

Molecular and cell biologists study the building blocks of living organisms. The Bachelor of Arts in Molecular and Cellular Biology is designed for students who wish to use their knowledge of biology in careers outside the laboratory including science policy, communication, informatics, business, education, public health, and law. Students take courses in biology, genetics, chemistry, bioethics, writing and more. Students can customize their studies by completing a minor or double major in their secondary field of interest.

### IV. Program Rationale:

The BA in Molecular and Cellular Biology complements the existing BS in Molecular and Cellular Biology and expands the College of Science’s BA offerings. As of Spring 2023 the College of Science offers BA degrees in Chemistry, Biochemistry, Computer Science, Mathematics, Psychology, and Statistics and Data Science. Additional BA degrees in Geosciences and General Science are in the approval process. These programs provide students who wish to pursue STEM degrees the opportunity to tailor their education with additional coursework in the humanities, the arts, law, business, and communication. Specifically, the BA in Molecular and Cellular Biology provides students who do not want to pursue research or medicine the opportunity to gain broad training in molecular biology, cell biology, genetics, and biotechnology while taking additional coursework in writing and ethics. Our goal is to develop a cohort of graduates who can understand life at the molecular level, read primary literature in molecular and cellular biology, and translate that knowledge to other disciplines and the general public.

This proposed degree aligns with the University of Arizona strategic pillars:

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2. Arizona Advantage, advancing our land grant mission to drive social, cultural, and economic impact

V. **Projected Enrollment for the First Three Years:**

Based on other COS BA programs, we expect about 10% of MCB majors to pursue the BA once the program is established.

Year 1	Year 2	Year 3
10	25	40

VI. **Evidence of Market Demand:**

1. The US Department of Labor estimates the job growth for people with bachelor’s degrees in biology will increase by 4-7% in the next 10 years. Many of the jobs that do not require further education are in the fields of management and education rather than the research and medicine. Providing students who do not plan on going to medical or graduate school a more flexible degree will allow them to explore areas where they can apply their STEM training to careers outside of healthcare of the laboratory.
2. Lightcast forecasting report for Cell/Cellular and Molecular Biology programs projects a 9.2% increase in jobs for people with MCB degrees by 2027.
3. A Spring 2022 survey of MCB majors and MCB 181R students showed that students are interested in the BA option.
  - a. 27% of non-MCB majors said they would consider a BA in MCB as a major or second major. Another 24% said they were interested but unsure.

- b. 28% of current MCB majors said they would be interested in a BA in MCB as a major or second major. Another 22% said they were interested but unsure.
- c. Comments included:
  - i. "I think its a nice opportunity for people. i wish i had the option to choose that because i may have ended up doing the BA instead of a BS if i was offered it."
  - ii. "It sounds like a good option for someone who may not be pre-med."
  - iii. "This is a fantastic opportunity for other students! I do not fit the target audience because I am interested in research and am graduating this year, but I do personally know several people who would have absolutely loved to have done this had it been an option."
  - iv. "I think this would be a great option for people double-majoring, so I really support its creation."
  - v. "I graduate at the end of this current semester. if i was a freshman entering college and this option was available, I would take the BA route in a heartbeat."
  - vi. "I have always been interested more on the bioethical side of genetics rather than research and would like an opportunity to study this instead."

VII. **Similar Programs Offered at Arizona Public Universities:** *List existing programs at Arizona Public Universities, including affiliated programs at The University of Arizona, which deliver similar concepts and competencies to the proposed new program.*

- ASU BA Biology
- UArizona BA Biochemistry
- UArizona BA Ecology and Evolutionary Biology

VIII. **Resources**

- a. **Summarize new resources required to offer the program:** None- all but one course is developed.
- b. **Estimate total expected cost:**
  - Year one: \$8,580
  - Year two: \$8,795
  - Year three: \$9,014
- c. **Estimate total expected revenue of the program:**
  - Year one: \$40,240
  - Year two: \$90,855
  - Year three: \$125,390

IX. **Required Signatures** (*the following should be included in the notification memo to campus after ABOR approval*):

a. **Program Director/Main Proposer:**

i. Signature: \_\_\_\_\_  \_\_\_\_\_

ii. Name and Title: Lisa Rezende, PhD, Associate Professor of Practice, MCB Director of Online Education

iii. Date: 5/16/2023

b. **Managing Unit/Department Head:**

i. Signature: \_\_\_\_\_  \_\_\_\_\_

ii. Name and Title: Joyce Schroeder, PhD, Professor and Head, MCB

iii. Date: 5-16-23

c. **College Dean/Associate Dean:**

i. Signature: \_\_\_\_\_  \_\_\_\_\_

ii. Name and Title:

iii. Date: 5-20-23





ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

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I. MAJOR REQUIREMENTS–

UNDERGRADUATE

Total units required to complete the degree	120
Upper-division units required to complete the degree	42
Foundation courses	
<a href="#">Second language</a>	4 <sup>th</sup> semester proficiency
<a href="#">Math</a>	Moderate (M-Strand)
<a href="#">General education requirements</a>	1 unit- UNIV-101 3 units English Foundation 4 courses/12 units: Exploring Perspectives (one course from each) -Humanist -Artist -Social Scientist -Natural Scientist 3 courses/9 units: Building Connections 1 unit- UNIV 301
List any special requirements to declare or gain admission to this major	None
Major requirements	
Minimum # of units required in the major	37
Minimum # of upper-division units required in the major	26
<a href="#">Minimum # of residency units to be completed in the major</a>	18
Required supporting coursework	<u>Complete 1 of the following math courses:</u> <ul style="list-style-type: none"> <li>• Math 113 (3) Elements of Calculus</li> <li>• Math 122A (1) Functions of Calculus &amp; Math 122B (4) First semester Calculus</li> <li>• Math 125 (3) Calculus</li> </ul>

ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

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	<p><u>Complete two semesters of general chemistry with a laboratory</u></p> <ul style="list-style-type: none"> <li>• Chem 141 and 145 (4 units) General Chemistry Lecture and Lab I: Quantitative or Chem 151 Chemical Thinking I (4 units) or Chem 161 Honors Chemical Thinking I (4 units)</li> <li>• Chem 142 and 146 (4 units) General Chemistry Lecture and Lab II: Quantitative or Chem 152 Chemical Thinking II (4 units) or Chem 162 Honors Chemical Thinking II(4 units)</li> </ul> <p><u>Complete 1 semester of organic chemistry:</u></p> <ul style="list-style-type: none"> <li>• Chem 241A (3 units) Organic Chemistry Lecture</li> </ul>
<p><b>Major requirements.</b></p>	<p><u>Core (28 units minimum)</u></p> <ul style="list-style-type: none"> <li>• MCB 181R and MCB 181L Introductory Biology I Lecture and Lab (4 units)</li> <li>• ECOL 182R and ECOL 182L Introductory Biology II Lecture and Lab (4 units)</li> <li>• Math 163 or 263 (3 units) Statistics or Biostatics</li> <li>• ECOL 320 or MCB 304 (4 units) Genetics or Molecular Genetics</li> <li>• MCB 410 Cell Biology (3 units) or MCB 305 (4 units)</li> <li>• MCB 411 Molecular Biology or *MCB 301 (3 unit)</li> <li>• MCB 404 Bioethics (3 units)</li> <li>• ENG 308 Technical Writing or ENG 313 Introduction to Professional and Technical Writing (3 units)</li> <li>• MCB 401- MCB Capstone (1 unit)</li> </ul> <p><u>Upper Division Electives: Select 3 from (9 units minimum):</u></p> <ul style="list-style-type: none"> <li>• MCB 325 Biology of Cancer (3 units)</li> <li>• MCB 422 Problem Solving with Genetic Tools (4 units)</li> <li>• MCB 425 Cancer Discoveries (3 units)</li> <li>• MCB 482 Modeling Human Disease (3 units)</li> </ul>



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	<ul style="list-style-type: none"> <li>• MCB 442 Human Genetics: Sex, Crime, and Disease (3 units)</li> <li>• MCB 447 Big Data in Molecular Biology and Biomedicine (3 units)</li> <li>• BIOC 385 Metabolic Biochemistry (3 units)</li> <li>• ECOL 326 Genomics (3 units)</li> <li>• PSIO 380 Fundamentals of Human Physiology (4 units)</li> </ul>
Internship, practicum, applied course requirements (Yes/No).	no
Senior thesis or senior project required (Yes/No).	no
Additional requirements	none
Minor (specify if optional or required)	Optional
Any <a href="#">double-dipping restrictions</a> (Yes/No)?	No

II. CURRENT COURSES–

Course prefix and number	Units	Title	Pre-requisites	Modes of delivery	Typically Offered	Dept signed party to proposal?
MCB 181R	3	Introductory Biology		In-Person / Online	F / Sp / Su	Y
MCB 181L	1	Introductory Biology Laboratory	Requires either prior completion or coenrollment of the lecture course, MCB181R	In-Person / Online	F / Sp / Su	Y
ECOL 182R	3	Introductory Biology II		In-Person / Online	F / Sp / Su (in person only)	Y



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ECOL 182L	1	Introductory Biology II Laboratory		In-Person / Online	F / Sp / Su (in person only)	Y
Math 163	3	Basic Statistics	PPL 60+ or MCLG 88+ or SAT I MSS 640+ or ACT MATH 26+ or one recent course from MATH 108, 112, 113, 116, 119A, 122B, or 125. Some students may need to take Math 100, then Math 112 first	In-Person	F / Sp	Y
Math 263	3	Introduction to Statistics and Biostatistics	PPL 60+ or MCLG 88+ or SAT I MSS 640+ or ACT MATH 26+ or one recent course from MATH 108, 112, 113, 116, 119A, 122B, or 125. Some students may need to take Math 100, then Math 112 first	In-Person	F / Sp / Su	Y
ECOL 320	4	Genetics		In-Person	F / Su	Y
MCB 304	4	Molecular Genetics	MCB 181R and MCB 181L, Introductory Biology I and Laboratory CHEM 105A and CHEM 106A or CHEM 151, General Chemistry I CHEM 105B and CHEM 106B or CHEM 152, General Chemistry II CHEM 241A and CHEM 241B, Organic Chemistry I and II recommended MCB301 (or alternative) recommended	In-Person	F	Y
MCB 410	3	Cell Biology	MCB 181R or equivalent Introductory Biology course.	Online	F / Su	Y
MCB 305	4	Cell and Developmental Biology	MCB 181R, MCB 181L, MCB 182, CHEM 241/243, Math 124 or 125, and MCB 301 and 304. If you have already taken MCB 410, you cannot receive credit for 305. Students with a prior failed attempt may only retake the course once.	In-Person	Sp	Y
MCB 411	3	Molecular Biology	MCB 181R or equivalent Introductory Biology course.	Online	F / Su	Y
MCB 301	4	Molecular Basis of Life	Prior completion of Introductory Biology, MCB 181R; Prior completion of first-semester Organic Chemistry, CHEM 241A	In-Person / Online	Sp (in person only) / Su (online only)	Y

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MCB 404	3	Bioethics	One year of college-level introductory biology (MCB 181 and ECOL 182); botany is not acceptable. Satisfaction of the Mid-Career Writing Assessment (MCWA)	In-Person / Online	F / Sp / Su (online only)	Y
ENGL 308	3	Technical Writing	First-Year English Composition: (ENGL 101 and 102) or (ENGL 103H and 104H) or (ENGL 107 and 108) or ENGL 109H	In-Person / Online	F / Sp / Su (online only)	Y
ENGL 313	3	Introduction to Professional and Technical Writing	First-Year English Composition: (ENGL 101 and 102) or (ENGL 103H and 104H) or (ENGL 107 and 108) or ENGL 109H	In-Person / Online	F	Y
CHEM 141	3	General Chemistry Lecture I: Quantitative	PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 years. Must not have taken CHEM 105A/106A, CHEM 151, or CHEM 161/163	In-Person	F / Sp	Y
CHEM 144	1	General Chemistry Laboratory II: Quantitative	CHEM 151 or 141/143 or 161/163. Concurrent enrollment or completion of CHEM 142 and 1 of the following: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 yrs	In-Person	F / Sp	Y
CHEM 142	3	General Chemistry Lecture II: Quantitative Approach	CHEM 151 or 141 or 161 and 1 of the following: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or 1 course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 years	In-Person	F / Sp	Y
CHEM 146	1	Quantitative Chemistry Laboratory II	CHEM 151 or 141/143 or 141/145 or 161/163. Concurrent enrollment or completion of CHEM 142 and 1 of the following: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108/112/113/119A/120R/122B/125/129/223. Test scores expire after 2 yrs.	In-Person / Online	F / Sp	Y
CHEM 151	4	Chemical Thinking I	PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113,	In-Person	F / Sp / Su	Y



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			119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 years. Must not have taken CHEM 105A/106A, CHEM 151, or CHEM 161/163			
CHEM 152	4	Chemical Thinking II	CHEM 151 or 141/143 or 161/163 and 1 of the following: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 years	In-Person	F / Sp / Su	Y
CHEM 161	3	Honors Chemical Thinking I	PPL 92+ or SAT I MSS 730+ or ACT MATH 32+. Test scores expire after 2 years. Honors Active. Must not have taken CHEM 141/143 or CHEM 151	In-Person	F	Y
CHEM 162	3	Honors Chemical Thinking II	CHEM 161 or department consent. Student must be active in the Honors College	In-Person	Sp	Y
CHEM 241A	3	Lectures in Organic Chemistry	CHEM 142, CHEM 152, CHEM 162, or CHEM 182	In-Person	F / Sp / Su	Y
MATH 122A	1	Functions for Calculus	PPL 75+ or SAT I MSS 660+ or ACT MATH 28+ or recent MATH 120R with C or higher, or MATH 122A. Test scores expire after 1 year. Some students may need to take Math 100, then Math 112, then Math 120R first	In-Person	F / Sp / Su	Y
MATH 122B	4	First-Semester Calculus	(C or better, or concurrent enrollment in MATH 122A, transfer credit not allowed) or milestone level 05C	In-Person	F / Sp / Su	Y
MATH 125	3	Calculus I	PPL 92+ or SAT I MSS 730+ or ACT MATH 32+ or MATH 125 AP credit. Test scores expire after 1 year	In-Person / Online	F (in person only) / Sp	Y
MCB 325	3	Biology of Cancer	MCB 181R	In-Person* (plans for an online version)	F	Y
MCB 422	3	Problem Solving with Genetic Tools	MCB 181R and 181L	In-Person / Online	F (in person only) / Sp / Su (online only)	Y



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MCB 425	3	Cancer Discoveries	Students are recommended to have taken MCB 305, 325 or 410 and required to have taken 181	In-Person	Sp	Y
MCB 482	3	Modeling Human Disease	MCB 181R	In-Person	Sp	Y
MCB 442	3	Human Genetics: Sex, Crime, and Disease Human Genetics	MCB 181R and MCB 304 or ECOL 320 or an equivalent upper-division genetics course	In-Person	Sp	Y
MCB 447	3	Big Data in Molecular Biology and Biomedicine	MCB 181R (Introductory Biology) or equivalent Math 263 (Introduction to Statistics and Biostatistics) or equivalent Math 119A, 122B, or Math 125 (Calculus) or equivalent	In-Person	F (odd years)	Y
BIOC 385	3	Metabolic Biochemistry	MCB 181R and (CHEM 142 or CHEM 152 or CHEM 105B or CHEM 162) and (CHEM 241A or CHEM 242A or CHEM 246A). BIOCBA and BIOCBS Students may not enroll	In-Person / Online	F / W / Sp / Su	Y
ECOL 326	3	Genomics		In-Person	F / Su	Y
PSIO 380	4	Fundamentals of Human Physiology	Not available to students who have previously taken PSIO 201 or PSIO 202 or students who are a PSIO major or PSIO major or PSIO major or PSIO major	In-Person / Online	F / Sp (in person only)	Y

III. NEW COURSES NEEDED –

Course prefix and number	Units	Title	Pre-requisites	Modes of delivery	Status*	Anticipated first term offered	Typically Offered	Dept signed party to proposal?	Faculty members available
MCB 325	3	Biology of Cancer	MCB 181R	In-person/Online	A (online in development)	Summer 2025	F/Su	Yes	Yes
MCB 401	1	MCB Capstone	MCB majors only	Online	D	Spring 2025	F/Sp/Su	Yes	Yes



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			Completion of MCB 301, 304, and 305 or MCB 410 and 411						
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\*In development (D); submitted for approval (S); approved (A)

**IV. FACULTY INFORMATION-**

Faculty Member	Involvement	UA Vitae link or Box folder link
Dr. Pascale Charest	Director of MCB Undergraduate Program, Teach MCB 325	<a href="https://profiles.arizona.edu/person/pcharest">https://profiles.arizona.edu/person/pcharest</a>
Dr. Lisa Rezende	Director of MCB Online Education, Program Assessment, Teach MCB 181R, MCB 181L, MCB 301, and MCB 442, Develop MCB 401	<a href="https://profiles.arizona.edu/person/lrezende">https://profiles.arizona.edu/person/lrezende</a>
Dr. Angel Pimentel	Teach MCB 181R, MCB 410, and MCB 404	CV in Box: <a href="https://arizona.app.box.com/file/856962284693">https://arizona.app.box.com/file/856962284693</a>
Dr. Nancy Horton	Teach MCB 301	<a href="https://profiles.arizona.edu/person/nhorton">https://profiles.arizona.edu/person/nhorton</a>
Dr. Andrew Paek	Teach MCB 304	<a href="https://profiles.arizona.edu/person/apæk">https://profiles.arizona.edu/person/apæk</a>
Dr. Lisa Nagy	Teach MCB 305	<a href="https://profiles.arizona.edu/person/lnagy">https://profiles.arizona.edu/person/lnagy</a>
Dr. Guang Yao	Teach MCB 416a	<a href="https://profiles.arizona.edu/person/guangyao">https://profiles.arizona.edu/person/guangyao</a>



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Semester 1		Semester 2		Semester 3		Semester 4	
Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units
CHEM 151 or 161 or 141/145	4	CHEM 152 or 161 or 142/146	4	CHEM 241A	3	MCB 411 or 301	3-4
MATH 113 or MATH 125	3	ENGL 102	3	MCB 181R	3	ENGL 308	3
UNV 101	1	ECOL 182R	3	MCB 181L	1	Gen Ed EP	3
ENGL 101	3	ECOL 182L	1	MATH 163 or 262	3	Second Language IV	4
Second Language I	4	Second Language II	4	Second Language III	4		
<b>Total</b>	15	<b>Total</b>	15	<b>Total</b>	14	<b>Total</b>	13-14

Semester 5		Semester 6		Semester 7		Semester 8	
Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units
MCB 304 or ECOL 320	4	MCB 305/MCB 410	3-4	Upper Division MCB Elective	3	MCB 401	1
MCB 404	3	Upper Division MCB Elective	3	Upper Division MCB Elective	3	Writing Elective	3
Gen Ed EP	3	Gen ED BC	3	Gen Ed BC	3	Free Elective	3
Gen Ed EP	3	Gen Ed BC	3	Fee Elective	3	Free Elective	3
Free Elective	3	Free Elective	3	Free Elective	3	Free Elective	3
				UNV 301	1	Free Elective	3
<b>Total</b>	16	<b>Total</b>	15-16	<b>Total</b>	16	<b>Total</b>	16



ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

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VI. Curriculum Map and Assessment Map -

Program: BA in MCB

<b>Learning Outcome #1:</b> Demonstrate understanding of the molecular and cellular mechanisms that govern life and apply that understanding to novel scenarios
<p><b>Concepts:</b> Students will apply knowledge of how chemical principles govern the activity of life to novel problems.</p> <ul style="list-style-type: none"> <li>* how cells sense and respond to internal and external cues</li> <li>* how traits are inherited</li> <li>* how molecules, cells, and organisms evolve</li> <li>* how phenotypes emerge from interactions among molecules and cells</li> <li>* how research with model organisms sheds light on all these questions.</li> </ul>
<b>Competencies:</b> Students will demonstrate disciplinary knowledge in molecular and cellular biology. .
<b>Assessment Methods:</b> This outcome will be by administering the national GenBio-MAPs assessment (direct) and senior exit survey (indirect).
<b>Measures:</b> The national GenBio-MAPs assessment (direct) and senior exit surveys (indirect).
<b>Learning Outcome #2:</b> Communicate effectively in writing about scientific ideas and methods.
<b>Concepts:</b> Students will effectively write summaries of scientific research and/or explanation of scientific concepts.
<b>Competencies:</b> Students will demonstrate their understanding of biological concepts and methods in writing.
<b>Assessment Methods:</b> This outcome will be assessed in capstone paper and presentation (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of papers and presentations (direct) and senior exit survey (indirect).
<b>Learning Outcome #3:</b> Evaluate the reliability of sources of information about biology.
<b>Concepts:</b> Students will read and critique texts, essays, scholarly reviews, and primary literature in biology.
<b>Competencies:</b> Students will demonstrate their ability to locate and evaluate reliable sources of information in scholarly and popular sources.
<b>Assessment Methods:</b> This outcome will be assessed in capstone paper (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of capstone paper (direct) and senior exit survey (indirect).
<b>Learning Outcome #4:</b> Interpret and explain experimental data to a variety of nonexpert audiences.
<b>Concepts:</b> Students will effectively communicate in a variety of modalities (written, oral, graphic, and/or media) the concept, methods, and practices of biology to a variety of nonexpert audiences.
<b>Competencies:</b> Students will demonstrate their ability to synthesize and explain reliable scientific information for the public.
<b>Assessment Methods:</b> This outcome will be assessed in capstone course public understanding communication project (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of capstone course public understanding communication project (direct) and senior exit survey (indirect).



ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

To be used once the preliminary proposal has been approved.

<b>Learning Outcome #5:</b> Demonstrate ability to analyze the role of biology in societal decisions and apply ethical decision-making to evaluate existing and new scientific approaches
<b>Concepts:</b> Students will identify ethical issues, assess the relevant stakeholders, and use ethical reasoning to propose solutions to societal problems.
<b>Competencies:</b> Students will demonstrate their ability to evaluate the effects of new scientific approaches on a variety of audiences. .
<b>Assessment Methods:</b> This outcome will be assessed in capstone case study (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of capstone case studies (direct) and senior exit survey (indirect).

Curriculum Map

Outcomes	Courses							
	MCB 181R and L	ECOL 181R and L	MCB 301 or MCB 411	MCB 304 or ECOL 320	MCB 305 or MCB 410	MCB 404	ENG 308 or 313	MCB 401
<b>Learning Outcome #1:</b> Students will apply knowledge of how chemical principles govern the activity of life to novel problems.	I	I	R	R	R			M Assessment Activity
<b>Learning Outcome #2:</b> Communicate effectively in writing about scientific ideas and methods.	I	I	R	R	R	R		M Assessment Activity
<b>Learning Outcome #3:</b> Evaluate the reliability of	I	I	R	R	R	R		M Assessment Activity



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ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

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sources of information about biology.								
<b>Learning Outcome #4:</b> Interpret and explain experimental data to a variety of nonexpert audiences.						R	I	M Assessment Activity
<b>Learning Outcome #5:</b> Demonstrate ability to analyze the role of biology in societal decisions and apply ethical decision-making to evaluate existing and new scientific approaches	I			R		R		M Assessment Activity

VII. PROGRAM ASSESSMENT PLAN-

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Capstone exam: GenBio-MAPs assessment	Score items aligned with concepts in LO#1 on the validated national GenBio-MAPs assessment.	After completion of core course



ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

*To be used once the preliminary proposal has been approved.*

Capstone paper	Score on rubric criteria aligned with LO#2 and LO#3. Rubric criteria adapted from AACU Inquiry and Analysis, Written Communication, Critical Thinking, and Information Literacy Value Rubric.	During capstone course.
Capstone case study analysis.	Score on rubric criteria aligned with LO#3-LO#5. Rubric criteria adapted from AACU Written Communication, Information Literacy Value Rubric, and Ethical Reasoning Value Rubric.	During capstone course
Public understanding communication project.	Score on rubric criteria adapted from AACU Written Communication and Information Literacy Value Rubrics.	During capstone course
Senior survey	Response to questions asking graduating students how well the major prepared them to master LO#1-LO#5.	During capstone course.
Graduate School Admissions and Job Placement Statistics	Student/Alumni Survey	At graduation and as part of alumni survey
Academic Program Review	Reviewers' responses	Every 7 years

VIII. ANTICIPATED STUDENT ENROLLMENT-

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year
Number of Students	9	18	27	35	40

Data/evidence used to determine projected enrollment numbers:

1. The US Department of Labor estimates the job growth for people with bachelor's degrees in biology will increase by 4-7% in the next 10 years. Many of the jobs that do not require further education are in the fields of management and education rather than research and medicine. Providing students who do not plan on going to medical or graduate school a more flexible degree will allow them to explore areas where they can apply their STEM training to careers outside of healthcare or the laboratory.



ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

*To be used once the preliminary proposal has been approved.*

2. Lightcast forecasting report for Cell/Cellular and Molecular Biology programs projects a 9.2% increase in jobs for people with MCB degrees by 2027.
3. A Spring 2022 survey of MCB majors and MCB 181R students showed that students are interested in the BA option.
  - a. 27% of non-MCB majors said they would consider a BA in MCB as a major or second major. Another 24% said they were interested but unsure.
  - b. 28% of current MCB majors said they would be interested in a BA in MCB as a major or second major. Another 22% said they were interested but unsure.
  - c. Comments included:
    - i. "I think its a nice opportunity for people. i wish i had the option to choose that because i may have ended up doing the BA instead of a BS if i was offered it."
    - ii. "It sounds like a good option for someone who may not be pre-med."
    - iii. "This is a fantastic opportunity for other students! I do not fit the target audience because I am interested in research and am graduating this year, but I do personally know several people who would have absolutely loved to have done this had it been an option."
    - iv. "I think this would be a great option for people double-majoring, so I really support its creation."
    - v. "I graduate at the end of this current semester. if i was a freshman entering college and this option was available, I would take the BA route in a heartbeat."
    - vi. "I have always been interested more on the bioethical side of genetics rather than research and would like an opportunity to study this instead."

**IX. ANTICIPATED DEGREES AWARDED-**

PROJECTED DEGREES AWARDED ANNUALLY					
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	5 <sup>th</sup> Year
Number of Degrees	10	15	20	20	20

Data/evidence used to determine number of anticipated degrees awarded annually:

Based on other COS BA programs, we expect the number of BA degrees conferred will be about 10% of the number of BS degrees conferred once the program is established. We also expect at least the same number of graduates from the Online only program.

**X. PROGRAM DEVELOPMENT TIMELINE-**



## ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

*To be used once the preliminary proposal has been approved.*

Spring 2024: Complete approval process and establishment with AZ Online

Spring 2024-Summer 2024 Work with AZ online on marketing plan. Send notice to current MCB majors and include in advising for incoming freshman.

XI. **Program Fees and Differential Tuition (PFDT) Request** – None

**Appendix A. Minor or Master’s Requirements.** Not applicable.

**Appendix B. Emphasis Print Information-** Not applicable.

**Appendix C. ABOR Form**

### Request to Establish New Academic Program in Arizona

**University:** University of Arizona

<b>Name of Proposed Academic Program:</b> BA in Molecular and Cellular Biology
<b>Academic Department:</b> Molecular and Cellular Biology, College of Science
<b>Geographic Site:</b> Tucson- Main Campus and Arizona Online
<b>Instructional Modality:</b> Online
<b>Total Credit Hours:</b>



ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

To be used once the preliminary proposal has been approved.

120
<b>Proposed Inception Term:</b>
Fall 2024
<b>Brief Program Description:</b>
<p>Molecular and cell biologists study the building blocks of living organisms. The Bachelor of Arts in Molecular and Cellular Biology is designed for students who wish to use their knowledge of biology in careers outside the laboratory including science policy, communication, informatics, business, education, public health, and law. Students take courses in biology, genetics, chemistry, bioethics, writing and more. The BA in MCB complements our existing BS in MCB and allows students to customize their studies by completing a minor or double major in their secondary field of interest.</p>
<b>Learning Outcome #1:</b> Demonstrate understanding of the molecular and cellular mechanisms that govern life and apply that understanding to novel scenarios
<p><b>Concepts:</b> Students will apply knowledge of how chemical principles govern the activity of life to novel problems.</p> <ul style="list-style-type: none"> <li>* how cells sense and respond to internal and external cues</li> <li>* how traits are inherited</li> <li>* how molecules, cells, and organisms evolve</li> <li>* how phenotypes emerge from interactions among molecules and cells</li> <li>* how research with model organisms sheds light on all these questions.</li> </ul>
<b>Competencies:</b> Students will demonstrate disciplinary knowledge in molecular and cellular biology. .
<b>Assessment Methods:</b> This outcome will be by administering the national GenBio-MAPs assessment (direct) and senior exit survey (indirect).
<b>Measures:</b> The national GenBio-MAPs assessment (direct) and senior exit surveys (indirect).
<b>Learning Outcome #2:</b> Communicate effectively in writing about scientific ideas and methods.
<b>Concepts:</b> Students will effectively write summaries of scientific research and/or explanation of scientific concepts.
<b>Competencies:</b> Students will demonstrate their understanding of biological concepts and methods in writing.
<b>Assessment Methods:</b> This outcome will be assessed in capstone paper and presentation (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of papers and presentations (direct) and senior exit survey (indirect).
<b>Learning Outcome #3:</b> Evaluate the reliability of sources of information about biology.
<b>Concepts:</b> Students will read and critique texts, essays, scholarly reviews, and primary literature in biology.





ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

To be used once the preliminary proposal has been approved.

<b>Competencies:</b> Students will demonstrate their ability to locate and evaluate reliable sources of information in scholarly and popular sources.
<b>Assessment Methods:</b> This outcome will be assessed in capstone paper (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of capstone paper (direct) and senior exit survey (indirect).
<b>Learning Outcome #4:</b> Interpret and explain experimental data to a variety of nonexpert audiences.
<b>Concepts:</b> Students will effectively communicate in a variety of modalities (written, oral, graphic, and/or media) the concept, methods, and practices of biology to a variety of nonexpert audiences.
<b>Competencies:</b> Students will demonstrate their ability to synthesize and explain reliable scientific information for the public.
<b>Assessment Methods:</b> This outcome will be assessed in capstone course public understanding communication project (direct) and senior exit survey (indirect).
<b>Measures:</b> Instructor grading of capstone course public understanding communication project (direct) and senior exit survey (indirect).
<b>Learning Outcome #5:</b> Demonstrate ability to analyze the role of biology in societal decisions and apply ethical decision-making to evaluate existing and new scientific approaches
<b>Concepts:</b> Students will identify ethical issues, assess the relevant stakeholders, and use ethical reasoning to propose solutions to societal problems.
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<b>Assessment Methods:</b> This outcome will be assessed in capstone case study (direct) and senior exit survey (indirect).
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Curriculum Map

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<b>Learning Outcome #1:</b> Students will apply knowledge of how chemical principles govern the activity of life to	I	I	R	R	R			M Assessment Activity



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### ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

*To be used once the preliminary proposal has been approved.*

novel problems.								
<b>Learning Outcome #2:</b> Communicate effectively in writing about scientific ideas and methods.	I	I	R	R	R	R		M Assessment Activity
<b>Learning Outcome #3:</b> Evaluate the reliability of sources of information about biology.	I	I	R	R	R	R		M Assessment Activity
<b>Learning Outcome #4:</b> Interpret and explain experimental data to a variety of nonexpert audiences.						R	I	M Assessment Activity
<b>Learning Outcome #5:</b> Demonstrate ability to analyze the role of biology in societal decisions and apply ethical decision-making	I			R		R		M Assessment Activity



ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

*To be used once the preliminary proposal has been approved.*

to evaluate existing and new scientific approaches								
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XI. PROGRAM ASSESSMENT PLAN-

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Capstone exam: GenBio-MAPs assessment	Score items aligned with concepts in LO#1 on the validated national GenBio-MAPs assessment.	After completion of core course
Capstone paper	Score on rubric criteria aligned with LO#2 and LO#3. Rubric criteria adapted from AACU Inquiry and Analysis, Written Communication, Critical Thinking, and Information Literacy Value Rubric.	During capstone course.
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Graduate School Admissions and Job Placement Statistics	Student/Alumni Survey	At graduation and as part of alumni survey
Academic Program Review	Reviewers' responses	Every 7 years

Projected Enrollment for the First Three Years:



## ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

*To be used once the preliminary proposal has been approved.*

Based on enrollment in other College of Science majors with both BS and BA degrees available, we conservatively estimate that annual enrollment in the BA in MCB will be about 10% of the annual enrollment in the existing BS in MCB. Availability of the program online may drive these numbers higher.

Year 1	Year 2	Year 3
10	25	40

### Evidence of Market Demand:

1. The US Department of Labor estimates the job growth for people with bachelor’s degrees in biology will increase by 4-7% in the next 10 years. Many of the jobs that do not require further education are in the fields of management and education rather than the research and medicine. Providing students who do not plan on going to medical or graduate school a more flexible degree will allow them to explore areas where they can apply their STEM training to careers outside of healthcare of the laboratory.
2. Lightcast forecasting report for Cell/Cellular and Molecular Biology programs projects a 9.2% increase in jobs for people with MCB degrees by 2027.
3. A Spring 2022 survey of MCB majors and MCB 181R students showed that students are interested in the BA option.
  - a. 27% of non-MCB majors said they would consider a BA in MCB as a major or second major. Another 24% said they were interested but unsure.
  - b. 28% of current MCB majors said they would be interested in a BA in MCB as a major or second major. Another 22% said they were interested but unsure.
  - c. Comments included:
    - i. “I think its a nice opportunity for people. i wish i had the option to choose that because i may have ended up doing the BA instead of a BS if i was offered it.”
    - ii. “It sounds like a good option for someone who may not be pre-med.”
    - iii. “This is a fantastic opportunity for other students! I do not fit the target audience because I am interested in research and am graduating this year, but I do personally know several people who would have absolutely loved to have done this had it been an option.”
    - iv. “I think this would be a great option for people double-majoring, so I really support its creation.”
    - v. “I graduate at the end of this current semester. if i was a freshman entering college and this option was available, I would take the BA route in a heartbeat.”
    - vi. “I have always been interested more on the bioethical side of genetics rather than research and would like an opportunity to study this instead.”

### Similar Programs Offered at Arizona Public Universities:



THE UNIVERSITY OF ARIZONA

ACADEMIC PROGRAM – ADDITIONAL INFORMATION FORM

To be used once the preliminary proposal has been approved.

- ASU BA Biology
- UArizona BA Biochemistry
- UArizona BA Ecology and Evolutionary Biology

FOR CURRICULAR AFFAIRS USE ONLY

Objection(s) Raised by Another Arizona Public University? YES NO

Has another Arizona public university lodged a written objection to the proposed program with the proposing university and the Board of Regents within seven days of receiving notice of the proposed program?

If Yes, Response to Objections:

Please provide details of how the proposing university has addressed the objection. If the objection remains unresolved, please explain why it is in the best interests of the university system and the state that the Board override it.

New Resources Required? (i.e., faculty and administrative positions; infrastructure, etc.):

No infrastructure. We anticipate 0.1 FTE of new advisor time to advise the BA in MCB students.

Plan to Request Program Fee/Differentiated Tuition? YES NO

Estimated Amount: N/A

Program Fee Justification: N/A

Specialized Accreditation? YES NO

Accreditor: N/A



New Academic Program  
PEER COMPARISON

Program name, degree, and institution	Molecular and Cellular Biology Bachelor of Arts University of Arizona	Molecular, Cellular, and Developmental Biology- Bachelor of Arts University of Colorado, Boulder	Biology Bachelor of Arts University of Iowa	Biology Bachelor of Art University of North Carolina at Chapel Hill
Current number of students enrolled		134	87	516 (BS and BA)
Program Description	<p>Molecular and cell biologists study the building blocks of living organisms. The Bachelor of Arts in Molecular and Cellular Biology is designed for students who wish to use their knowledge of biology in careers outside the laboratory including science policy, communication, informatics, business, education, public health, and law. Students take courses in biology, genetics, chemistry, bioethics, writing and more. The BA in MCB complements our</p>	<p>The undergraduate degree in molecular, cellular, and developmental biology emphasizes knowledge and awareness of:</p> <ul style="list-style-type: none"> <li>the biological sciences in general and a detailed understanding of currently important aspects of cellular biology, molecular biology, biochemistry, genetics, and developmental biology; and</li> <li>the relationship of the specialty area to broader areas of science and to</li> </ul>	<p>The major for the Bachelor of Arts prepares students for graduate study in the biological sciences and is especially appropriate for those interested in careers in biological science education at all levels. It also provides suitable preparation for professional positions in industry, laboratory, field research, or for professional study in medicine and other health-related fields.</p> <p>The BA program is broadly based. It introduces students to</p>	<p>Biology is the study of life from both basic and applied perspectives across a broad range of analytical levels, from the molecule and cell to the organism and ecosystem. The major in biology provides a broad education directed toward an appreciation of the complexity of nature and prepares students for careers in the biological, environmental, and medical sciences. This program is designed to provide greater flexibility than the B.S. degree in meeting broad student interests.</p>

	<p>existing BS in MCB and allows students to customize their studies by completing a minor or double major in their secondary field of interest.</p>	<p>society in general, including ethical issues raised by current biological research and by the rapid growth of biotechnology as an important shaping force for the future.</p> <p>In addition, students completing the degree in molecular, cellular, and developmental biology are expected to acquire the ability and skills to:</p> <ul style="list-style-type: none"> <li>• learn detailed laboratory - procedures rapidly when the need arises.</li> <li>• demonstrate a scientific vocabulary and an understanding of research methods that permits the comprehension of current journal articles, extraction of pertinent information and judgment of the</li> </ul>	<p>key concepts in important areas of biology and, compared to the BS program, provides more flexibility in choosing elective courses. Students working toward a Bachelor of Arts degree must complete the chemistry/math foundation; the biology core; three courses from the breadth menus; one course with a laboratory; and five or six elective courses, which may include one course in the history or philosophy of science.</p>	
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		<p>quality of the work described.</p> <ul style="list-style-type: none"> <li>• evaluate a biological problem, determine which aspects are understood and apply basic research methods and techniques to the unknown aspects; and</li> <li>• communicate scientific concepts and analytical arguments clearly and concisely, both orally and in writing.</li> </ul>		
Target Careers	Education, Law, Policy, Communication, Informatics or Business with a focus on Biotechnology and/or Biomedicine	Biology research, education, or communication.	Biology education	Biological, environmental, and medical sciences.
Emphases? (Yes/No)	No	No	No	No
Minimum # of units required	118-120	118-120	120	120
Level of Math required	Pre-calculus <u>and</u> Statistics (M-strand)	Statistics <u>or</u> Calculus I	Calculus I <u>and</u> Statistics	Precalculus <u>or</u> Statistics
Level of Second Language required	4 <sup>th</sup> semester proficiency	3 <sup>rd</sup> semester proficiency	4 <sup>th</sup> semester proficiency	4 <sup>th</sup> semester proficiency
Pre-Major? (Yes/No)	No	No	No	No
Special requirements to declare/gain admission?	None	None	None	None



Internship, practicum, or applied/experiential requirements?	None	None	None	None
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Additional questions:

1. How does the proposed program align with peer programs? Briefly summarize the similarities between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.
  - Flexible curriculum to allow students to have a minor in an unrelated field.
  - Less rigorous math and physics requirements as compared to BS degrees at the same institution.
  - Intended for students who wish to use biology in a broad number of degrees.
2. How does the proposed program stand out or differ from peer programs? Briefly summarize the differences between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

The BA in MCB program stands out from peer programs because.

- Only the BA in MCB requires courses in Bioethics and Technical Writing as part of the core curriculum.
  - Only the BA in MCB is offered in person and online.
  - The BA in MCB has a capstone course where students will work on case studies and communication projects that will demonstrate their mastery of the learning outcomes.
3. How do these differences make this program more applicable to the target student population and/or a better fit for the University of Arizona?

The University of Arizona BA in MCB has been intentionally designed to replace the extra math, physics, and second semester organic chemistry with coursework in ethics, technical writing, and statistics, providing students exposure to non-laboratory research careers. Students can complete the degree in-person, online, or a mix of both providing extra flexibility for students who cannot travel to the University of Arizona every semester.



BUDGET PROJECTION FORM

BA in Molecular and Cellular Biology

Budget Contact Person: Barb Johnson	Projected		
	1st Year 2024 - 2025	2nd Year 2025 - 2026	3rd Year 2026 - 2027
<b>METRICS</b>			
Net increase in annual college enrollment UG	10	25	40
Net increase in college SCH UG	190	415	550
Net increase in annual college enrollment Grad			
Net increase in college SCH Grad			
Number of enrollments being charged a Program Fee			
New Sponsored Activity (MTDC)			
Number of Faculty FTE			
<b>FUNDING SOURCES</b>			
<u>Continuing Sources</u>			
UG AIB Revenue	40,240	90,855	125,390
Grad AIB Revenue			
Program Fee Revenue (net of revenue sharing)			
F and A AIB Revenues			
Reallocation from existing College funds (attach description)			
Other Items (attach description)			
<b>Total Continuing</b>	<b>\$ 40,240</b>	<b>\$ 90,855</b>	<b>\$ 125,390</b>
<u>One-time Sources</u>			
College fund balances			
Institutional Strategic Investment			
Gift Funding			
Other Items (attach description)			
<b>Total One-time</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>TOTAL SOURCES</b>	<b>\$ 40,240</b>	<b>\$ 90,855</b>	<b>\$ 125,390</b>
<b>EXPENDITURE ITEMS</b>			
<u>Continuing Expenditures</u>			
Faculty			
Other Personnel (Add'l Advising .10 FTE)	6,500	6,663	6,829
Employee Related Expense	2,080	2,132	2,185
Graduate Assistantships			
Other Graduate Aid			
Operations (materials, supplies, phones, etc.)			
Additional Space Cost			
Other Items (attach description)			
<b>Total Continuing</b>	<b>\$ 8,580</b>	<b>\$ 8,795</b>	<b>\$ 9,014</b>
<u>One-time Expenditures</u>			
Construction or Renovation			
Start-up Equipment			
Replace Equipment			
Library Resources			
Other Items (attach description)			
<b>Total One-time</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>TOTAL EXPENDITURES</b>	<b>\$ 8,580</b>	<b>\$ 8,795</b>	<b>\$ 9,014</b>
<b>Net Projected Fiscal Effect</b>	<b>\$ 31,660</b>	<b>\$ 82,061</b>	<b>\$ 116,376</b>

**COURSEWORK - BA MCB**

	<b>Course</b>	<b>MCB Units</b>	<b>Other COS</b>	<b>Tot COS</b>
<b>Year 1</b>	MCB 181R	3		
	MCB 181L	1		
	ECOL 182R		3	
	ECOL 182L		1	
	Math 113 or 125		3	
	Chem 151		4	
	Chem 152		4	
	<b>Total Yr1</b>	<b>4</b>	<b>15</b>	<b>19</b>
<b>Year 2</b>	MCB 301 or 411	4		
	MCB 404	3		
	Chem 241A		3	
	Math 163		3	
	<b>Total Yr2</b>	<b>7</b>	<b>6</b>	<b>13</b>
<b>Year 3</b>	MCB 304 or 322	4		
	MCB 305 or 410	3		
	<b>Total Yr3</b>	<b>7</b>	<b>0</b>	<b>7</b>
<b>Year 4</b>	MCB Elec 1	3		
	MCB Elec 2	3		
	MCB Elec 3	3		
	MCB 401	1		
	<b>Total Yr4</b>	<b>10</b>	<b>0</b>	<b>10</b>
<b>PROGRAM TOTAL</b>		<b>28</b>	<b>21</b>	<b>49</b>

## AIB Model Drivers

	<b>SCH</b>	<b>ENROLL</b>
<b>FY25</b>	193	357
<b>FY26</b>	197	364
<b>FY27*</b>	201	371

FY25 & 26 pulled from AIB model published final YE-FY23

FY27 Projects 2% increase

November 29, 2023

**Subject: Arizona Online Support for the Molecular and Cellular Biology BA Program**

I am writing in support for Bachelor of Arts in Molecular and Cellular Biology. This strategic initiative is a timely response to the dynamic shifts in higher education and addresses the evolving needs of our student body and the broader workforce.

Our analysis indicates that the Molecular and Cellular Biology BA program is poised to be a significant and valuable addition to our existing academic offerings. Historical market trends and current demands in the field of science and technology underscore the relevance and potential success of this program. The introduction of this degree is expected to draw a diverse group of motivated students, keen on expanding their expertise and competencies in this critical area of study.

Moreover, the online delivery model of this program is particularly suited to meet the needs of post-traditional learners. It offers unparalleled flexibility, allowing students to balance their educational pursuits with personal and professional commitments. By providing an accessible and adaptable learning environment, we are enabling these learners to achieve their educational aspirations and career objectives more effectively.

To ensure the successful launch and sustainability of the Molecular and Cellular Biology BA, Arizona Online is committed to offering comprehensive support in both planning and implementation phases. This will include resources for curriculum development, marketing strategies, and student support services, ensuring that the program not only attracts but also retains a high caliber of students.

In conclusion, the introduction of the Molecular and Cellular Biology BA program represents a strategic step forward for Arizona Online, aligning with our mission to provide high-quality, accessible education.

Sincerely,



**Caleb Simmons, Ph.D.**

Executive Director, Arizona Online

CUES Distinguished Fellow  
Professor, Religious Studies



November 20, 2023

Dear Members of Curricular Affairs, Undergraduate Council (UGC), and College Academic Administrators Council (CAAC)

The Department of Physiology supports the proposal for the BA in Molecular and Cellular Biology. We agree to have the following course included as part of the program:

- PSIO 380 Fundamentals of Human Physiology (4 units)

This course is offered at least once a year and have the capacity to enroll any additional students in the BA in MCB program who wish to take the course(s).

Sincerely,



Mingyu Liang, MB, PhD  
Professor and Chair, Department of Physiology  
University of Arizona College of Medicine – Tucson

November 21, 2023

Dear Members of Curricular Affairs, Undergraduate Council (UGC), and College Academic Administrators Council (CAAC),

The Department of Ecology and Evolutionary Biology supports the proposal for the BA in Molecular and Cellular Biology. We agree to have the following courses included as part of the program:

- ECOL 182R Introductory Biology II Lecture (3 units)
- ECOL 182L Introductory Biology II Lab (1 unit)
- ECOL 320 Genetics (4 units)
- ECOL 326 Genomics (3 units)

All courses are offered at least once a year and have the capacity to enroll additional students in the BA in MCB program who need to take the course(s).

Sincerely,



Michael Worobey  
Department Head and Professor  
Ecology and Evolutionary Biology





THE UNIVERSITY OF ARIZONA  
COLLEGE OF SCIENCE

Mathematics

617 N. Santa Rita Avenue  
Tucson, Arizona 85721  
[www.math.arizona.edu](http://www.math.arizona.edu)

November 19, 2023

Executive Director  
Academic/Curricular Affairs  
University of Arizona

RE: Bachelor of Arts in Molecular and Cellular Biology

Dear colleagues,

I am writing to express the support of the Department of Mathematics for the proposed new Bachelor of Arts degree in Molecular and Cellular Biology to be offered by the Department of Molecular and Cellular Biology. In particular, the Math Department supports the inclusion of the following courses as electives or requirements for the new degree:

Math 113 Elements of Calculus (3 units)  
Math 122A Functions of Calculus & Math (1 unit)  
Math 122B First semester Calculus (4 units)  
Math 125 Calculus (3 units)  
Math 163 Basic Statistics (3 units)  
Math 263 Introduction to Statistics and Biostatistics (3 units)

We expect to offer these course each fall and spring, and we expect to be able to accomodate the additional students without any difficulties. Normal prerequisites and registration priorities will apply.

Sincerely,

Douglas Ulmer  
Professor and Head



November 17, 2023

Ryan Gutenkunst, PhD  
Professor and Interim Department Head  
Department of Molecular and Cellular Biology  
University of Arizona

Dear Dr. Gutenkunst,

The Department of Chemistry and Biochemistry supports the proposal for the BA in Molecular and Cellular Biology. We agree to have the following courses included as part of the program:

- Chemistry 141 General Chemistry I (Quantitative) Lecture (3 units)
- Chemistry 145 General Chemistry I (Quantitative) Lab (1 unit)
- Chemistry 142 General Chemistry II (Quantitative) Lecture (3 units)
- Chemistry 146 General Chemistry II (Quantitative) Lab (1 unit)
- Chemistry 151: General Chemistry (4 units)
- Chemistry 152: General Chemistry (4 units)
- Chemistry 161: Honors General Chemistry I (4 units)
- Chemistry 162: Honors General Chemistry II (4 units)
- Chemistry 241A Organic Chemistry Lecture (3 units)
- BIOC 385: Metabolic Biochemistry (3 units)

All courses are offered at least once a year and have the capacity to enroll any additional students in the BA in MCB program who wish to take the course(s). If there are any questions, please feel free to contact me directly.

Sincerely,



Craig Aspinwall, Ph.D.

