U-CAAC Review of New Program Proposal

This form provides committee-wide feedback on the following proposed program.

Undergraduate ☑ Graduate ☐ College: Science

Proposal Name: BS in Genetics and Genomics

Proposer's Name and Email: Pascale Charest <pcharest>

Reviewers: Anne Pagel <pagela>, James Hunt <jeh>, Lucinda Rankin <crankin>

1. **Rationale.**
   Is the mission of the program well justified?

   Described need for a comprehensive, stand alone Genetics program. This focused program will also provide the opportunity to create a pipeline for the existing graduate Genetics Interdisciplinary program and an eventual accelerated masters program (AMP).
2. **Academic Standards/Compliance.**
   Do the curriculum and student support provisions meet the academic and policy standards of the university?

   Yes, the curriculum and design of the program meet the academic and policy standards of the university. Student advising will be supported through the MCB program in collaboration with the College of Science. The student needs can be met with current College of Science resources.
3. **Overlaps.**
   Are there perceived duplications with other UArizona programs? Conversely, could shared interests and emphases lead to collaborative or synergistic programs with other parts of the university? (These could take the form of co-ownership, co-delivered courses, shared faculty, shared facilities, etc.)

   There are no overlapping majors.
   - Both MCB and EEB offer a few courses in genetics and genomics but as course options for other majors.
   - MCB has a sub plan for Genetics and Human Health, but it only offers a few
4. **Viability.**
   Is the program likely to enroll enough students to meet UArizona benchmarks for productive programs? Is there plausible evidence to back up enrollment predictions and budget projections?

   Projected numbers look feasible, market demand will determine future viability.

5. **Other feedback/comments.**

   Additional opportunities for collaboration would include the ACBS department in CALES (i.e. ACBS 318) and possibly some courses from Physiology in the College of Medicine (i.e. PSIO 404)

6. **Approval or Revisions Requested.**

   The committee recommends that this program be approved.

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New Academic Program Workflow Form

General

Proposed Name: Genetics and Genomics

Transaction Nbr: 00000000000247

Plan Type: Major

Academic Career: Undergraduate

Degree Offered: Bachelor of Science

Do you want to offer a minor? Y

Anticipated 1st Admission Term: Fall 2026

Details

Department(s):

SCNC

DEPTMNT ID	DEPARTMENT NAME	HOST
0417	Molecular & Cellular Biology	Y
0420	Ecology & Evolutionary Biology	N

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

Admission application terms for this plan: Spring: Y Summer: Y 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: 26.0801, Genetics, General.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Major in Genetics and Genomics

Transcript: Y Genetics and Genomics

Conditions for Admission/Declaration for this Major:

Minimum GPA of 2.0

Requirements for Accreditation:

n/a

Program Comparisons

University Appropriateness

The new major is designed to prepare students through a rigorous foundation in genetics and genomics, providing a structured and comprehensive approach while fostering connections across the biological sciences. The curriculum integrates the molecular precision of MCB approaches with the evolutionary and ecological perspectives of EEB, creating a unique synergy that will distinguish this program from existing offerings.

The proposed B.S. in Genetics and Genomics addresses the need for a comprehensive, stand-alone undergraduate genetics program at the University of Arizona. Currently, both MCB and EEB offer courses in genetics and genomics, but as part of different majors. MCB offers an MCB degree sub-plan in Genetics and Human Health, but this includes only a few genetics courses that narrowly focus on human health applications of genetics. In contrast, the proposed degree spans molecular, cellular, organismal, and population-level applications of genetics and modern genomics across diverse biological systems, providing a broad and thorough understanding of these disciplines. With an increasing market demand for genetics and genomics experts, the educational depth and integration requirements for developing such expertise requires a dedicated degree.
Importantly, an Accelerated Master¿s Program (AMP) in Genetics and Genomics accompanying the proposed B.S. program is also planned to be developed in the near future, thereby complementing U. Arizona¿s well-established Genetics Graduate Interdisciplinary Program (GIDP). Currently, the Genetics GIDP recruits most students from outside UA, and this new B.S. program (eventually accompanied by an AMP) will facilitate a smoother transition for students interested in pursuing advanced degrees in genetics at the University.

The program aligns with the University of Arizona's land-grant mission to provide accessible education that meets workforce needs
and advances scientific knowledge. As the only dedicated undergraduate genetics program in Arizona, it will attract students interested in exploring foundational genetics courses and modern topics and prepare them for careers in marketable areas such as biotechnology, healthcare, agriculture, and conservation.

Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
1	Bio Sci-Genetics, Cell & Dev	BS	500	ASU Tempe and Online	N

Peer Comparison

The proposed B.S. in Genetics and Genomics program strongly aligns with both Michigan State University and University of Wisconsin-Madison programs in several key areas:
- All three programs require extensive prerequisite coursework in the same fundamental areas: biology, chemistry (including organic chemistry), physics, and mathematics/statistics.
- Each program features a core Genetics curriculum covering molecular genetics, genomics, and specialized genetics topics, followed by upper-level specialized coursework. All integrate molecular, cellular, organismal, and population-level approaches to Genetics education.
- All three programs mandate hands-on research experience.
- The programs share similar educational goals of developing students' abilities to understand genetic principles, conduct research, communicate scientific findings, and apply ethical reasoning to genetic issues.
- The programs prepare students for identical career paths: graduate study (PhD programs), professional schools (medical, veterinary), and careers in biotechnology, healthcare, agriculture, and research. All three emphasize preparation for genetic counseling, research science, medicine, and data analysis careers.

The proposed program stands out from the peer programs in several key ways:
- It incorporates big data analysis in the current, rapidly developing AI-assisted era into its curriculum.
- It represents a collaboration between Molecular and Cellular Biology (MCB) and Ecology and Evolutionary Biology (EEB) departments, creating molecular-to-population level integration that differs from MSU's microbiology/immunology focus or UW-Madison's traditional genetics department structure.
- It includes a mandatory bioethics course (MCB 404) as a core requirement with writing emphasis, ensuring ethical reasoning is central to the curriculum rather than optional.

Resources

Library

Acquisitions Needed:

Physical Facilities & Equipment

Existing Physical Facilities:

The B.S. in Genetics and Genomics is designed to leverage existing resources while creating a distinctive program. Rather than requiring new infrastructure, the program will primarily utilize the established resources of the MCB and EEB departments, creating synergies and maximizing efficiency. To support the proposed program, the college envisions:

- Utilizing existing laboratory spaces and equipment for genetics and genomics that are already in place within both
departments, reducing the need for significant capital investments.

Additional Facilities Required & Anticipated:

Modest equipment upgrades for teaching laboratories by year 3.

Other Support

Other Support Currently Available:

-Sharing teaching resources across departments, with faculty from MCB and EEB who already teach courses in the core curriculum of genetics and genomics, with the support of Plant Sciences, Neuroscience, and Cellular and Molecular Medicine¿s Genetic Counseling program, ensuring smooth program delivery.
- Integration with current academic and career advising services.
- Leveraging current administrative structures within the College of Science.

Other Support Needed over the Next Three Years:

Development of 2-3 new specialized courses by year 3.

Comments During Approval Process

9/11/2025 9:14 AM
RGUTENK

Comments
Approved.

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NEW ACADEMIC PROGRAM – MAJOR
Preliminary Proposal Form

I. **Program Details**
   a. **Name and Degree Type of Proposed Academic Program:** Bachelor of Science (B.S.) in Genetics and Genomics
      i. **Emphases (if applicable):** Genetics; Genomics; Global Health
   b. **Academic Unit(s)/College(s):** Molecular and Cellular Biology (in collaboration with Ecology and Evolutionary Biology), College of Science
   c. **Campus/Location(s):** Main Campus
   d. **Desired CIP Code:** 26.0801
   e. **First Admission Term:** *Fall 2026*
   f. **Primary Contact and Email:** *Pascale Charest, pcharest@arizona.edu*

II. **Executive Summary:**

The Bachelor of Science (B.S.) in Genetics and Genomics is an interdisciplinary degree that provides students with an integrated understanding of genetics and genomics, with applications spanning biotechnology, medicine, agriculture, and conservation. Market analysis indicates exceptional job growth in genetics and genomics-related occupations in Arizona (e.g. healthcare, biotechnology, clinical sectors), with projections for a 10-year growth rate of 41.5% by 2032, surpassing the national average of 27.1%. In addition, demand for a Genetics program is supported by the number of students graduating from similar programs in peer institutions, such as from the University of Wisconsin – Madison, with 100 graduates in AY2 23-24 and 123 graduates in AY 24-25. However, there are no such genetics program offered in Arizona nor in the entire Mountain West region. Importantly, a B.S. program in Genetics and Genomics will complement the already existing Graduate Interdisciplinary Program (GIDP) in Genetics at the University of Arizona, with a plan to also add an Accelerated Master's Program (AMP) in the near future. Together, these degrees will establish the University of Arizona as the premier provider of genetics education in the Mountain West region, preparing students for diverse careers in rapidly expanding fields of study.

III. **Brief Program Description:**

The Bachelor of Science in Genetics and Genomics prepares students for careers at the forefront of biological discovery and application. This interdisciplinary program provides comprehensive training in the rapidly evolving fields that uncover the fundamental principles of inheritance and genome function across all living systems. The program features a strong core curriculum in genetics and genomics, complemented by specialized coursework in areas such as molecular biology, bioinformatics, human genetics, plant genetics, and evolutionary genetics, all while incorporating big data analysis in the current, rapidly developing AI-assisted era. Students gain hands-on experience through laboratory courses, research opportunities, and internships.

Housed within the College of Science as a collaboration between the Molecular and Cellular Biology and the Ecology and Evolutionary

Biology departments, the program leverages diverse faculty expertise across disciplines, ensuring that students receive a well-rounded education that integrates molecular, organismal, and population-level approaches.

Graduates are well prepared for advanced training in medical and graduate schools or pursuing careers spanning biotechnology, pharmaceuticals, healthcare, personalized medicine, genetic counseling, forensics, agriculture, and conservation. The versatility of this degree also opens doors to careers in patent law, science policy, and science communication in an increasingly genetics-driven world.

IV. Program Rationale:

The new major is designed to prepare students through a rigorous foundation in genetics and genomics, providing a structured and comprehensive approach while fostering connections across the biological sciences. The curriculum integrates the molecular precision of MCB approaches with the evolutionary and ecological perspectives of EEB, creating a unique synergy that will distinguish this program from existing offerings.

The proposed B.S. in Genetics and Genomics addresses the need for a comprehensive, stand-alone undergraduate genetics program at the University of Arizona. Currently, both MCB and EEB offer courses in genetics and genomics, but as part of different majors. MCB offers an MCB degree sub-plan in Genetics and Human Health, but this includes only a few genetics courses that narrowly focus on human health applications of genetics. In contrast, the proposed degree spans molecular, cellular, organismal, and population-level applications of genetics and modern genomics across diverse biological systems, providing a broad and thorough understanding of these disciplines. With an increasing market demand for genetics and genomics experts, the educational depth and integration requirements for developing such expertise requires a dedicated degree.

Importantly, an Accelerated Master's Program (AMP) in Genetics and Genomics accompanying the proposed B.S. program is also planned to be developed in the near future, thereby complementing University of Arizona's well-established Genetics Graduate Interdisciplinary Program (GIDP). Currently, the Genetics GIDP recruits most students from outside the University of Arizona, and this new B.S. program (eventually accompanied by an AMP) will facilitate a smoother transition for students interested in pursuing advanced degrees in genetics at the university.

The program aligns with the University of Arizona's land-grant mission to provide accessible education that meets workforce needs and advances scientific knowledge. As the only dedicated undergraduate genetics program in Arizona, it will attract students interested in exploring foundational genetics courses and modern topics and prepare them for careers in marketable areas such as biotechnology, healthcare, agriculture, and conservation.

V. Viability:

The B.S. in Genetics and Genomics is designed to leverage existing resources while creating a distinctive program. Rather than requiring new infrastructure, the program will primarily utilize the established resources of the MCB and EEB departments, creating synergies and maximizing efficiency.

To support the proposed program, the college envisions:

- Sharing teaching resources across departments, with faculty from MCB and EEB who already teach courses in the core

curriculum of genetics and genomics, with the support of Plant Sciences, Neuroscience, and Cellular and Molecular Medicine's Genetic Counseling program, ensuring smooth program delivery.
- Utilizing existing laboratory spaces and equipment for genetics and genomics that are already in place within both departments, reducing the need for significant capital investments.
- Integration with current academic and career advising services.
- Leveraging current administrative structures within the College of Science.

a. Summarize new resources required to offer the program:
- Modest equipment upgrades for teaching laboratories by year 3.
- Development of 2-3 new specialized courses by year 3.

Program costs are expected to be covered by tuition revenue. The strong job market and the program's unique positioning in the Mountain West region suggest robust enrollment potential, ensuring financial sustainability (see more details below).

VI. Projected Enrollment for the First Three Years:

Year 1, 20 students; Year 2, 40 students; Year 3, 60 students. These projections are conservative estimates based on several factors:
- The complete absence of undergraduate genetics program in Arizona.
- The strong job market with a 41.5% 10-year growth rate and median annual salaries of $86,736 to $102,336 in Arizona.
- Growing student interest in genetics and genomics applications across healthcare, biotechnology, and environmental sectors (Bombard *et al.* Am. J. Hum. Genet. 2022; Biotechnology Market Size and Share, Industry Report 2023; US Bureau of Labor of Statistics 2025).

VII. Evidence of Market Demand:

Market demand for genetics and genomics graduates is exceptionally strong, particularly in Arizona and the broader Mountain West region. Comprehensive labor market analysis (based on Lightcast reports) reveals multiple compelling indicators:

Educational Gap: The Mountain West region (Arizona, New Mexico, Utah, Colorado, Wyoming, Montana, Idaho, and Nevada) currently faces a severe lack of undergraduate genetics education options. Most students in this region must travel 550-1,000 miles to access undergraduate genetics programs with established capacities (primarily located in California, Wisconsin, Michigan, and Texas), creating significant barriers to entry.

Job Growth: Arizona's projected 10-year growth rate for genetics and genomics-related occupations (41.5% by 2032) significantly exceeds the national average (27.1%), with jobs increasing from 4,927 in 2022 to a projected 6,972 by 2032. This represents one of the strongest growing STEM fields in the state.

Compensation: The median hourly wage for genetics and genomics-related positions in Arizona ranges from $41.7 to $49.2 ($86,736 to $102,336 annually), making this an attractive career path for students and representing an excellent return on educational investment.

Active Hiring: Recent job posting data show 304 total postings (106 unique) from 59 different employers competing for genetics and genomics talent in Arizona and 25,983 total postings (9,912 unique) from 1,826 employers in the nation. The median posting durations of

25 days (AZ) and 24 days (nation) indicate a competitive hiring environment with employers actively seeking qualified candidates.

Employer Diversity: Top employers in the state span multiple sectors, including healthcare (Mayo Clinic, SpecialtyCare), biotechnology and clinical research (Abbott Laboratories, Sonora Quest), engineering firms (AECOM, Burns & McDonnell), educational institutions, and government agencies. This diversity demonstrates the broad applicability of genetics and genomics education across industries.

This market analysis clearly indicates a robust and growing demand for graduates with expertise in genetics and genomics in Arizona and throughout the Mountain West region, with particularly strong growth in research-oriented careers that require a bachelor's degree.

VIII. **Similar Programs Offered at Arizona Public Universities:**

Currently, no Arizona public universities offer an undergraduate degree specifically in Genetics and Genomics. Arizona State University offers an online B.S. in Biological Sciences with a concentration in Genetics, Cell and Developmental Biology, but this is not a dedicated genetics/genomics program and is offered only online.

Among our 15 ABOR-approved peer universities, several offer dedicated genetics programs:

- University of Wisconsin-Madison: B.S. Genetics and Genomics
- UC-Davis: B.S. Genetics and Genomics
- Michigan State University: B.S. Genetics and Genomics

The absence of dedicated genetics and genomics programs in Arizona creates a significant educational gap for students interested in this field, forcing them to leave the state to pursue a degree in this field or opt for less specialized majors.

IX. **Required Signatures**

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

i. **Signature:** _____

ii. **Name and Title:** Pascale Charest, Associate Professor, Director of Undergraduate and Master's Education in MCB

iii. **Date:** 17 June 2025

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

i. **Signature:** _____

ii. **Name and Title:** Ryan Gutenkunst, Department Head, Molecular and Cellular Biology

iii. **Date:** June 19, 2025

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

i. **Signature:** _____

ii. **Name and Title:** Rebecca Gomez, Associate Dean of Undergraduate Student Success, College of Science

iii. **Date:** 6/20/25

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Request to Establish New Academic Program in Arizona

University: University of Arizona

Name of Proposed Academic Program:

Bachelor of Science (B.S.) in Genetics and Genomics

Academic Departments:

Molecular and Cellular Biology (MCB) Department in collaboration with Ecology and Evolutionary Biology (EEB) Department

Geographic Site: Tucson – main campus

Instructional Modality: In-person, online.

Total Credit Hours: 120

Proposed Inception Term: Fall 2026

Brief Program Description:

Content: The B.S. in Genetics and Genomics is an interdisciplinary program that provides students with comprehensive training in the fundamental principles of inheritance and genome function across all living systems. The curriculum integrates molecular genetics, human genetics, evolutionary genetics, genomics, bioinformatics, and genetic epidemiology, preparing students to understand genetic mechanisms from molecular to population levels.

Skills: Students develop core competencies in experimental design, data analysis, bioinformatics tools, and scientific communication while gaining hands-on experience through laboratory courses, research opportunities, and course-based undergraduate research experiences. The program emphasizes critical thinking skills for evaluating genetic information and making informed, ethical decisions in an increasingly genetics-driven world.

Alignment with the University mission: The program directly supports the University of Arizona's mission to expand human potential and explore new horizons by preparing adaptive problem-solvers to tackle global challenges in healthcare, biotechnology, agriculture, and conservation. As Arizona's flagship land-grant institution, the university addresses critical workforce needs in a rapidly growing field while serving the state and region. The program embodies the university's commitment to innovation, research excellence, and developing leaders who will contribute to collective well-being through genetic discoveries and applications.

Complementary programming: The proposed B.S. in Genetics and Genomics program leverages existing strengths in the MCB and EEB departments, creating synergies that distinguish it from current offerings. While MCB offers a genetics sub-plan narrowly focused on human health applications and EEB incorporates evolutionary genetics within broader ecological studies, the proposed program provides a comprehensive, integrated approach to genetics and genomics that neither department currently offers independently. Importantly, the program is planned to be accompanied by an Accelerated Master's Program (AMP) in the near future, strengthening pathways into the University of Arizona's established Genetics

Graduate Interdisciplinary Program (GIDP) and complementing existing research initiatives across multiple colleges.

Why a new degree and not an emphasis: There is increasing market demand for genetics and genomics experts and the educational depth and integration requirements for developing such expertise requires a dedicated degree. A dedicated genetics and genomics program signals institutional commitment to this high-growth field, provides the specialized depth that employers increasingly demand, and creates a distinctive market position that can attract both students and industry partnerships.

Learning Outcomes and Assessment Plan:

LO #1 - Evaluate the structure, function, evolution, and mapping of genes and genomes across diverse biological scales and systems, and explain the application of genetics and genomics to real-world problems in medicine, biotechnology, and agriculture.

Concepts: Molecular genetics; human genetic variation and diseases; evolutionary genetics and comparative genomics; genetic epidemiology; multi-level genetic applications to medicine, agricultural and biotechnology.
Competencies: Understand gene and genome structure, function, and evolution; perform genetic analyses using gene editing, sequencing, and bioinformatics tools; apply genetic principles to real-world challenges in medicine, biotechnology, and agriculture; connect genetic mechanisms across molecular, cellular, organism, and population levels.
Assessment Methods: Senior exam in MCB 401B; and student exit survey.
Measures: MCB 401B instructor scoring of senior exam using a rubric; and responses on student exit survey.

LO #2 - Analyze experimental data in genetics, genomics, and related biological sciences.

Concepts: Genetic and genomic data characteristics and analyses methods; statistical methods for genetic analyses; inheritance patterns.
Competencies: Generate genetic data; analyze data using bioinformatic tools.
Assessment Methods: Assignments and exams in MCB 304, ECOL 323, and ECOL 326; senior exam in MCB 401B; MCB 401B instructor scoring of senior exam using a rubric; and student exit survey.
Measures: MCB 304, ECOL 323, and ECOL 326 instructors grading assignments and exams; and responses on student exit surveys.

LO #3 - Generate, explain, and present experimental data in genetics, genomics, or related biological sciences.

Concepts: Scientific method and experimental design; genetic and genomic data presentation and visualization; written and oral scientific communication.
Competencies: Perform and document experimental procedures; integrate and explain genetic information in multiple formats; write scientific texts; **c**reate effective data visualizations; present data with appropriate visual aids and explanations.
Assessment Methods: Lab reports in MCB 397D, MCB 422, and MCB 473, and research papers from mentored research experiences (MCB 392/492, 399/499, 399H/499H, 498/498H); and student exit survey.
Measures: MCB 397D, MCB 422, and MCB 473 instructors evaluating lab reports and research advisors evaluating research papers; and responses on student exit surveys.

LO #4 - Critically assess information and their sources in genetics, genomics, and related biological sciences to make informed, ethical decisions.

Concepts: Type and quality of information sources**;** ethics principles related to genetics.

Competencies: Evaluate information source credibility; assess information accuracy; use effective search strategies; apply ethical frameworks to evaluate information and justify decisions using evidence-based reasoning.
Assessment Methods: Homework, in-class case studies, and final project in MCB 404; and student exit survey.
Measures: MCB 404 instructor grading homework, case-studies, and final course project; and responses to student exit survey.

Projected Enrollment for the First Three Years:

Year 1: 20 students

Year 2: 40 students

Year 3: 60 students

Evidence of Market Demand:

Market demand for genetics and genomics graduates is exceptionally strong in Arizona and the Mountain West region, based on Lightcast labor market analysis performed using several CIP codes that are necessary to properly describe the proposed program (26.0801 – Genetics, General, 26.0802 – Molecular Genetics, 26.0806 – Human/Medical Genetics, 26.0807 – Genome Sciences/Genomics):

- Educational Gap: The Mountain West region lacks a dedicated program in genetics and genomics.
- Job Growth: Arizona projects a 41.5% growth rate for genetics and genomics-related occupations by 2032, significantly exceeding the national average of 27.1%.
- Employment Growth: Jobs increasing from 4,927 in 2022 to projected 6,972 by 2032.
- Compensation: Median annual salaries range from $86,736 to $102,336 in Arizona.
- Active Hiring: 304 total job postings (106 unique) from 59 different employers in Arizona, with median posting duration of 25 days indicating competitive hiring environment.
- Employer Diversity: Top employers span healthcare (Mayo Clinic, SpecialtyCare), biotechnology (Abbott Laboratories, Sonora Quest), engineering firms, educational institutions, and government agencies.

Similar Programs Offered at Arizona Public Universities:

Currently, no Arizona public universities offer an undergraduate degree specifically in Genetics and Genomics. Arizona State University offers an online B.S. in Biological Sciences with a concentration in Genetics, Cell and Developmental Biology, but this is not a dedicated Genetics/Genomics program and is offered only online. This creates a significant educational gap for students interested in this field.

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

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

The program is designed to leverage existing resources while creating efficiencies:

Personnel:

- Shared advising and teaching resources across MCB and EEB departments using existing advisors and faculty

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Infrastructure:

- Utilization of existing laboratory spaces and equipment for genetics and genomics in MCB and EEB
- Development of 2-3 new specialized courses by year 3

Financial Support:

Program costs are expected to be covered by tuition revenue. The strong job market and unique positioning suggest robust enrollment potential, ensuring financial sustainability.

Plan to Request Program Fee/Differentiated Tuition? YES (NO)

Specialized Accreditation? YES (NO)

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

I. MAJOR REQUIREMENTS

UNDERGRADUATE

Total units required to complete the degree	120
Upper-division units required to complete the degree	42
Foundation courses	
Second language	2nd Semester Proficiency
Math	
General education requirements	Entry Course (1 unit) UNIV 101 Introduction to the General Education Experience Second language (4 units) Complete 1 of the following (3 or 6 units): - ENGL 101 (3) First-Year Composition and ENGL 102 (3) First-Year Composition - ENGL 109H (3) Advanced First-Year Composition Exploring Perspectives (4 courses, 12 units) (one course from each domain required) -Artist -Humanist -Natural Scientist -Social Scientist Building Connections (3 courses, 9 units) Exit Course (1 unit) UNIV 301 General Education Portfolio
List any special requirements to declare or gain admission to this major (completion of specific coursework, minimum GPA, interview, application, etc.)	Minimum GPA of 2.0.
Major requirements	

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

Minimum # of units required in the major (units counting towards major units and major GPA)	44
Minimum # of upper-division units required in the major (upper division units counting towards major GPA)	32
Minimum # of residency units to be completed in the major	18
Required supporting coursework (courses that do not count towards major units and major GPA, but are required for the major). Courses listed must include prefix, number, units, and title. Include any limits/restrictions needed (house number limit, etc.). Provide course use form from home department for courses not owned by your department.	Complete 1 of the following (3-5 units): - MATH 122A (1) Functions for Calculus and MATH 122B (4) First-Semester Calculus - MATH 125 (3) Calculus I - MATH 119A (4) Mathematics of Biological Systems: a calculus-based approach Complete 1 of the following General Chemistry lecture and lab 2-semester sequences (8 units): - CHEM 141 (3) General Chemistry Lecture I: Quantitative and CHEM 143 (1) General Chemistry lab I: Quantitative, CHEM 142 (3) General Chemistry Lecture II: Quantitative and CHEM 144 (1) General Chemistry lab II: Quantitative - CHEM 151 (4) Chemical Thinking I, CHEM 152 (4) Chemical Thinking II - CHEM 161 (3) Honors Chemical Thinking I and CHEM 163 (1) Honors Fundamental Techniques of Chemistry, CHEM 162 (3) Honors Chemical Thinking II and CHEM 164 (1) Honors Fundamental Techniques of Chemistry - CHEM 181 (4) Majors General Chemistry I, CHEM 182 (4) Majors General Chemistry II Complete the following Organic Chemistry lecture and lab 2-semester sequence (8 units): - CHEM 241A (3) Lectures in Organic Chemistry and CHEM 243A (1) Organic Chemistry Laboratory I - CHEM 241B (3) Lectures in Organic Chemistry and CHEM 243B (1) Organic Chemistry Laboratory II

	Complete 1 of the following (3 units): - MATH 263 (3) Introduction to Statistics and Biostatistics - BIOS 376 (3) Introduction to Biostatistics Complete 1 of the following Physics 2-semester sequences (8 units) - PHYS 110 (4) Introductory Studio Physics I and PHYS 111 (4) Introductory Studio Physics 2 - PHYS 141 (4) Introductory Mechanics and PHYS 241 (4) Introductory Electricity and Magnetism
Major requirements. List all major requirements including core and electives. If applicable, list the emphasis requirements for each proposed emphasis*. Courses listed count towards major units and major GPA. Courses listed must include prefix, number, units, and title. Mark new coursework (New). Include any limits/restrictions needed (house number limit, etc.). Provide course use form from home department for courses not owned by your department.	Core (33 units): - MCB 195B (1) Genomic Medicine Colloquium or MCB 295E (1) Genetics, Ancestry, and Race - MCB 181R (3) Introduction to Molecular and Cellular Biology and MCB 181L (1) Introductory Biology Laboratory I - ECOL 182R (3) Introductory Biology II and ECOL 182L (1) Introductory Biology II Lab - MCB 284 (3) Applications of Cellular and Molecular Biology - MCB 304 (4) Molecular Genetics - MCB 305 (4) Cell and Developmental Biology - ECOL 323 (3) Human Genetics and Evolution - ECOL 326 (3) Genomics - MCB 404 (3) Bioethics (WEC) - MCB 401B (1) Genetics and Genomics Capstone (WEC) Research (3 units minimum), complete at least 1 of the following: - MCB 397D (3) Molecular Genetics of Plants – A Course-Based Undergraduate Research Experience - MCB 422 (3) Problem Solving with Genetic Tools (WEC) - MCB 473 (4) Recombinant DNA Methods and Applications (WEC) - MCB 392/492 (1-6) Directed Research - MCB 399/499 (1-6) Independent Study - MCB 399H/499H (1-6) Honors Independent Study - MCB 498H (3) Honors Thesis (WEC)

	Electives (11 units), complete 4-6 of the following for a total of at least 11 units: - NSC 375 (3) Diet, Genes and Disease - PLS 340 (3) Introduction to Biotechnology - PLS 340L (2) Biotechnology Laboratory - ECOL 346 (4) Bioinformatics - BIOC 384 (3) Foundations in Biochemistry - BIOC 385 (3) Metabolic Biochemistry - MCB 416A (3) Bioinformatics and Functional Genomics Analysis - MCB 442 (3) Human Genetics: Sex, Crime, and Disease - MCB 447 (3) Big Data in Molecular Biology and Biomedicine - MCB 480 (3) Introduction to Systems Biology - MCB 482 (3) Modeling Human Disease - ECOL 426 (3) Population Genetics - PLS 428R (3) Microbial Genetics (WEC) - PLS 428L (2) Microbial Genetics Laboratory (WEC) - WFSC 430 (3) Conservation Genetics - WFSC 430L (1) Conservation Genetics Lab - PLS 449A (3) Plant Genetics and Genomics - NROS 430 (3) Neurogenetics - CMM 520 (2) Clinical Cancer Genetics - CMM 521 (1) Molecular Diagnostics and Lab Testing A minimum of 3 units in the major must be Writing Emphasis Course (WEC).
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	No
Senior thesis or senior project required (Yes/No). If yes, provide description.	No
Additional requirements (provide description)	No
Minor (specify if optional or required)	Optional

Any restrictions on multiple use of courses (Yes/No)? If yes, provide description.	Yes, major core courses are not permitted to be used in a minor, except for MCB 181R/L and ECOL 182 R/L; and minor core courses are not allowed to be used in the major, except for MCB 181R/L and ECOL 182 R/L.

II. CURRENT COURSES

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Dept signed party to proposal? (Yes/No)
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.	Online	Yes
CHEM 142	3	General Chemistry Lecture II: Quantitative	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.	Online	Yes
CHEM 143	1	General Chemistry lab 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.	Online	Yes
CHEM 144	1	General Chemistry lab 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.	Online	Yes

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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, 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	Yes
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	Yes
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	Yes
CHEM 162	3	Honors Chemical Thinking II	CHEM 161 or department consent. Student must be active in the Honors College.	In-person	Yes
CHEM 163	1	Honors Fundamental Techniques of Chemistry	Concurrent enrollment or completion of CHEM 161. Must not have taken CHEM 141/143 or CHEM 151. Honors active.	In-person	Yes
CHEM 164	1	Honors Fundamental Techniques of Chemistry	CHEM 161 and CHEM 163 or department consent. Concurrent enrollment or completion CHEM 162. Honors active.	In-person	Yes
CHEM 181	4	Majors General Chemistry I	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 2yrs. Must not have taken CHEM 141/143, CHEM 141/145, CHEM 151, or CHEM 161/163.	In-person	Yes
CHEM 182	4	Majors General Chemistry II	CHEM 141/143 or 141/145 or 151 or 161/163 or 181 and (1 of: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ OR 1 from: MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or	In-person	Yes

			223.) Test scores expire after 2 yr. Can't have taken CHEM 142/144, 142/146, 152, 162/164.		
CHEM 241A	3	Lectures in Organic Chemistry	CHEM 142, CHEM 152, CHEM 162 or CHEM 182.	In-person	Yes
CHEM 243A	1	Organic Chemistry Laboratory I	CHEM 142/144 or CHEM 142/146 or CHEM 152 or CHEM 162/164 or CHEM 182, completion or concurrent enrollment in CHEM 241A, CHEM 242A or CHEM 246A.	In-person	Yes
CHEM 241B	3	Lectures in Organic Chemistry	CHEM 241A or CHEM 242A or CHEM 246A.	In-person	Yes
CHEM 243B	1	Organic Chemistry Laboratory II	Completion of (CHEM 243A or CHEM 247A) AND concurrent enrollment in or completion of (CHEM 241B or CHEM 242B or CHEM 246B). Credit allowed for only one of the following, CHEM 243B or CHEM 244B or CHEM 247B.	In-person	Yes
MATH 129	3	Calculus II	MATH 122B or 125 with grade of C or higher.	In-person	Yes
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. Test scores expire after 1 year. Some students may need to take Math 100, then Math 112 first.	In-person	Yes
BIOS 376	3	Introduction to Biostatistics	MATH 108 or MATH 112 or higher.	In-person, online	Yes
PHYS 110	4	Introductory Studio Physics I	PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 116, 119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 years. Must not have taken PHYS 102.	In-person	Yes

PHYS 111	4	Introductory Studio Physics 2	PHYS 110 or PHYS 141 or (PHYS 102 and PHYS 181). Must not have taken PHYS 103.	In-person	Yes
PHYS 141	4	Introductory Mechanics	MATH 122B, 124, or 125, or appropriate Math Placement Level.	In-person	Yes
PHYS 241	4	Introductory Electricity and Magnetism	PHYS 141 or PHYS 140 or PHYS 161H, including transfer and AP credit) and (MATH 129 or MATH 250A or appropriate Math Placement Level, including transfer and AP credit.	In-person	Yes
MCB 195B	1	Genomic Medicine Colloquium	Must be an MCB or Genetics & Genomics major freshman.	In-person	Yes
MCB 295E	1	Genetics, Ancestry, and Race	Must be MCB or Genetics & Genomics major.	In-person	Yes
MCB 181R	3	Introduction to Molecular and Cellular Biology	PPL 40+ or SAT I MSS 560+ or ACT MATH 24+ or one course from Math 108, 112, 113, 119A, 120R, 124, 122B, 125, 129, or 223. Test scores expire after 2 years.	In-person, online	Yes
MCB 181L	1	Introductory Biology Laboratory I	Prior completion or enrollment in MCB 181R.	In-person, online	Yes
ECOL 182R	3	Introductory Biology II	None indicated	In-person, online	Yes
ECOL 182L	1	Introductory Biology Laboratory II	Prior completion or enrollment in ECOL 182R.	In-person, online	Yes
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	Yes

MCB 305	4	Cell and Developmental Biology	MCB 181R, MCB 181L, MCB 182, CHEM 241/243, Math 124 or 125, and MCB 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	Yes
ECOL 323	3	Human Genetics and Evolution	ECOL 182L, ECOL 182R, and ECOL 335 are recommended.	Online	Yes
ECOL 326	3	Genomics	ECOL 182R and 182L.	In-person	Yes
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	Yes
MCB 397D	3	Molecular Genetics of Plants – A Course-Based Undergraduate Research Experience	Transfer Students / Juniors, MCB 181R/181L, ECOL 182R/182L, and CHEM 151/152 or CHEM 181/182.	In-person	Yes
MCB 422	3	Problem Solving with Genetic Tools	MCB 181R and 181L.	In-Person, online	Yes
MCB 473	4	Recombinant DNA Methods and Applications	MCB 181R and 181L, or MCB 184.	In-person	Yes
MCB 392	1-6	Directed Research	None indicated	In-person	Yes
MCB 492	1-6	Directed Research	None indicated	In-person	Yes
MCB 399	1-6	Independent Study	None indicated	In-person	Yes
MCB 499	1-6	Independent Study	None indicated	In-person	Yes

MCB 399H	1-6	Honors Independent Study	None indicated	In-person	Yes
MCB 499H	1-6	Honors Independent Study	None indicated	In-person	Yes
MCB 498H	3	Honors Thesis	Student must be active in the Honors College.	In-person	Yes
NSC 375	3	Diet, Genes and Disease	None indicated	Online	Yes
PLS 340, MCB 340, MIC 340	3	Introduction to Biotechnology	PLS 240 or MCB 181R or MIC 205 or an introductory course in biology.	In-Person	Yes
PLS 340L	2	Biotechnology Laboratory	Students should have completed the general chemistry series (CHEM 151/152), MCB181, and MIC 205 (Microbiology) or PLS/MCB/MIC 340 (Biotechnology) or equivalent courses.	In-Person	Yes
ECOL 346	4	Bioinformatics	ECOL 320 or ECOL 326 or MCB 304.	In-Person	Yes
BIOC 384	3	Foundations in 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	Yes
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	Yes
MCB 416A	3	Bioinformatics and Functional Genomics Analysis	MCB 181R and 181L, and basic statistical knowledge and programming experience.	In-Person	Yes

MCB 442	3	Human Genetics: Sex, Crime, and Disease	MCB 181R and MCB 304 or ECOL 320 or an equivalent upper-division genetics course.	In-Person	Yes
MCB 447	3	Big Data in Molecular Biology and Biomedicine	MCB 181R or equivalent, Math 263 or equivalent, Math 119A, 122B, or Math 125 or equivalent.	In-Person	Yes
MCB 480	3	Introduction to Systems Biology	MCB 181R, MCB 181L and MATH 129. One upper division biology/biochemistry course or consent of instructor.	In-Person	Yes
MCB 482	3	Modeling Human Disease	MCB 181R and 181L, and it is preferred that the students have successfully completed MCB 304 or MCB 305. Students who have not yet completed these courses may be enrolled with Instructor approval.	In-Person	Yes
ECOL 426	3	Population Genetics	ECOL 182R, ECOL 182L; and ECOL 320 or PLS 312. *Note: Instructor has agreed to accept MCB 304 as equivalent to ECOL 320 and PLS 312*.	In-Person	Yes
PLS 428R, ACBS 428R, PLP 428R, ECOL 428R, MIC 428R, ENVS 428R	3	Microbial Genetics	None indicated	In-Person	Yes
PLS 428L, ACBS 428L, PLP 428L, ECOL 428L, MIC 428L, ENVS 428L	2	Microbial Genetics Laboratory	ECOL 320, PLS 312 and PLS 428R. *Note: Instructor has agreed to accept MCB 304 as equivalent to ECOL 320 and PLS 312*.	In-Person	Yes

WFSC 430, ECOL 430, GENE 430	3	Conservation Genetics	ECOL 320, PLS 312, basic genetics class, or consent of instructor.	In-Person	Yes
WFSC 430L, GENE 430L	1	Conservation Genetics Lab	Concurrent enrollment in WFSC/GENE/ECOL 430 required.	In-Person	Yes
PLS 449A, ECOL 449A, GENE 449A, MCB 449A	3	Plants Genetics and Genomics	PLS 312 *Note: Instructor has agreed to accept MCB 304 as equivalent to PLS 312 and will be updating the catalog.*	In-Person	Yes
NROS 430	3	Neurogenetics	MCB 181R (required), NROS 310 (recommended).	In-Person	
CMM 520 *(420 pending)*	2	Clinical Cancer Genetics	MCB 181R, MCB 304, and junior or senior status.	In-Person	Yes
CMM 521 *(421 pending)*	1	Molecular Diagnostics and Lab Testing	MCB 181R, MCB 304, and junior or senior status.	In-Person	Yes

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III. NEW COURSES NEEDED

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status*	Anticipated first term offered	Dept signed party to proposal? (Yes/No)
MCB 284	3	Applications of Cellular and Molecular Biology	MCB 181R	In-person	A	Spring 2027	Yes
MCB 401B	1	Genetics and Genomics Capstone	Genetics & Genomics majors only; completion of MCB 304 and 305, as well as ECOL 323 and 326.	In-person, online	D	Spring 2029	Yes

*In development (D); submitted for approval (S); approved (A)

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IV. FACULTY INFORMATION

Faculty Member	Involvement	UA Vitae link or Box folder link
Dr. Pascale Charest	Director of MCB Undergraduate and Master's Ed.	https://profiles.arizona.edu/person/pcharest
Dr. Guang Yao	Teach MCB 416A	https://profiles.arizona.edu/person/guangyao
Dr. Megha Padi	Teach MCB 195B	https://profiles.arizona.edu/person/mpadi
Dr. Ryan Gutenkunst	Teach MCB 295E, teach MCB 447	https://profiles.arizona.edu/person/rgutenk
Dr. Emily Dykstra	Teach MCB 181R, teach MCB 181L	https://arizona.box.com/s/wuwv0pbs4jnqloo79l22mh5ywpficavk
Dr. Corin Gray	Teach MCB 181R	https://profiles.arizona.edu/person/cvgray
Dr. Susan Hester	Teach MCB 181R, teach MCB 284, teach MCB 304, teach MCB 305, teach MCB 397D	https://profiles.arizona.edu/person/sdhester
Dr. Nicole Leitner	Teach MCB 181R, teach CB 284, teach MCB 304	https://profiles.arizona.edu/person/neleitner
Dr. Angel Pimentel	Teach MCB 181R, teach MCB 404	https://profiles.arizona.edu/person/pimen
Dr. Ramin Yadegari	Teach MCB 181R	https://profiles.arizona.edu/person/yadegari
Dr. Chad Park	Teach MCB 181L	https://profiles.arizona.edu/person/ckpark
Dr. Lisa Nagy	Teach MCB 305	https://profiles.arizona.edu/person/lnagy
Dr. Frans Tax	Teach MCB 397D	https://profiles.arizona.edu/person/fetax
Dr. Stephanie Capaldi	Teach MCB 422, teach MCB 473	https://profiles.arizona.edu/person/scapaldi
Dr. Lisa Elfring	Teach MCB 442	https://profiles.arizona.edu/person/elfring
Dr. George Sutphin	Teach MCB 442	https://profiles.arizona.edu/person/sutphin
Dr. Claire White	Teach MCB 447	https://arizona.box.com/s/wuwv0pbs4jnqloo79l22mh5ywpficavk
Dr. Andrew Capaldi	Teach MCB 480	https://profiles.arizona.edu/person/capaldi
Dr. Ross Buchan	Teach MCB 482	https://profiles.arizona.edu/person/rbuchan
Dr. Keith Maggert	Teach MCB 482	https://profiles.arizona.edu/person/kamaggert
Dr. Daijiang Li	Teach ECOL 182R	https://profiles.arizona.edu/person/djli
Dr. Bruce Walsh	Teach ECOL 182R	https://profiles.arizona.edu/person/jbwalsh
Dr. Kristin Michels	Teach ECOL 182R	https://arizona.box.com/s/wuwv0pbs4jnqloo79l22mh5ywpficavk
Dr. Hans Otto	Teach ECOL 182R	https://arizona.box.com/s/wuwv0pbs4jnqloo79l22mh5ywpficavk
Dr. Ryan Ruboyianes	Teach ECOL 182L	https://arizona.box.com/s/wuwv0pbs4jnqloo79l22mh5ywpficavk
Dr. Andres Vizzerra	Teach ECOL 323	https://arizona.box.com/s/wuwv0pbs4jnqloo79l22mh5ywpficavk
Dr. Jeremiah Hackett	Teach ECOL 326	https://profiles.arizona.edu/person/hackettj
Dr. Michael Barker	Teach ECOL 346	https://profiles.arizona.edu/person/msbarker
Dr. David Enard	Teach ECOL 426	https://profiles.arizona.edu/person/denard

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V. GRADUATION PLAN

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
ENGL 101	3	ENGL 102	3	CHEM 241A	3	CHEM 241B	3
MATH 122A/B or 125 or 119A	3-5	MATH 263 or BIOS 376	3	CHEM 243A	1	CHEM 243B	1
CHEM 151	4	CHEM 152	4	MCB 181R	3	2nd language	4
Exp. Perspectives Gen Ed.	3	ECOL 182R	3	MCB 181L	1	Building Conn. Gen Ed.	3
MCB 195B or 295E	1	ECOL 182L	1	2nd language	4	MCB 284	3
UNIV 101	1			ECOL 323	3		
Total	15-17	Total	14	Total	16	Total	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	4	MCB 305	4	MCB Lab or Honors Thesis I	3	Honors Thesis II or Upper Div. Free Elective	3
Exp. Perspectives Gen Ed.	3	Major Elective	3	MCB 404	3	MCB 401B	1
Building Conn. Gen Ed	3	Building Conn. Gen Ed	3	Major Elective	3	Major Elective	3
ECOL 326	3	UNIV 301	1	Upper Div. Free Elective	3	Major Elective	3
PHYS 110	4	PHYS 111	4	Upper Div. Free Elective	3	Upper Div. Free Elective	3
						Upper Div. Free Elective	3
Total	17	Total	15	Total	15	Total	16

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VI. LEARNING OUTCOMES AND CURRICULUM MAP

Learning Outcomes

Learning Outcome #1: Evaluate the structure, function, evolution, and mapping of genes and genomes across diverse biological scales and systems, and explain the application of genetics and genomics to real-world problems in medicine, biotechnology, and agriculture.
Concepts: Molecular genetics; human genetic variation and diseases; evolutionary genetics and comparative genomics; genetic epidemiology; multi-level genetic applications to medicine, agricultural and biotechnology.
Competencies: Understand gene and genome structure, function, and evolution; perform genetic analyses using gene editing, sequencing, and bioinformatics tools; apply genetic principles to real-world challenges in medicine, biotechnology, and agriculture; connect genetic mechanisms across molecular, cellular, organism, and population levels.
Assessment Methods: Senior exam in MCB 401B; and student exit survey.
Measures: MCB 401B instructor scoring of senior exam using a rubric; and responses on student exit survey.
Learning Outcome #2: Analyze experimental data in genetics, genomics, and related biological sciences.
Concepts: Genetic and genomic data characteristics and analyses methods; statistical methods for genetic analyses; inheritance patterns.
Competencies: Generate genetic data; analyze data using bioinformatic tools.
Assessment Methods: Assignments and exams in MCB 304, ECOL 323, and ECOL 326; senior exam in MCB 401B; MCB 401B instructor scoring of senior exam using a rubric; and student exit survey.
Measures: MCB 304, ECOL 323, and ECOL 326 instructors grading assignments and exams; and responses on student exit surveys.
Learning Outcome #3: Generate, explain, and present experimental data in genetics, genomics, or related biological sciences.
Concepts: Scientific method and experimental design; genetic and genomic data presentation and visualization; written and oral scientific communication.
Competencies: Perform and document experimental procedures; integrate and explain genetic information in multiple formats; write scientific texts; create effective data visualizations; present data with appropriate visual aids and explanations.
Assessment Methods: Lab reports in MCB 397D, MCB 422, and MCB 473, and research papers from mentored research experiences (MCB 392/492, 399/499, 399H/499H, 498/498H); and student exit survey.
Measures: MCB 397D, MCB 422, and MCB 473 instructors evaluating lab reports and research advisors evaluating research papers; and responses on student exit surveys.
Learning Outcome #4: Critically assess information and their sources in genetics, genomics, and related biological sciences to make informed, ethical decisions.

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Concepts: Type and quality of information sources; ethics principles related to genetics.
Competencies: Evaluate information source credibility; assess information accuracy; use effective search strategies; apply ethical frameworks to evaluate information and justify decisions using evidence-based reasoning.
Assessment Methods: Homework, in-class case studies, and final project in MCB 404; and student exit survey.
Measures: MCB 404 instructor grading homework, case-studies, and final course project; and responses to student exit survey.

*Explanation: **Concepts** are the topics that students will learn in the program. **Competencies** are the skills they will learn. A **learning outcome** is their ability to apply the skills to the topics, or to use the skills and the topics together, in an observable way. The **assessment method** is where students will demonstrate the learning outcome, and a **measure** is how data will be pulled from the assessment method. Include both a direct and indirect assessment method and measurement for each learning outcome. Competencies and the learning outcomes need to reflect higher level learning: consider using verbs from the Application, Analysis, Synthesis, and Evaluation columns from this list when writing learning outcomes: https://arizona.app.box.com/s/orx6coex8607hlmenrgl7dznhzjicpit. We recommend 3-5 Learning Outcomes for a degree program.*

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Curriculum Map

	MCB 181R/ 181L	ECOL 182R/ 182L	MCB 195B/ 295E	MCB 284	ECOL 323	MCB 304	MCB 305	ECOL 326	MCB 404	MCB 422/ 473/ 397D/ 498/ 498H
LO #1: Analyze and evaluate the structure, function, evolution, and mapping of genes and genomes across diverse biological scales and systems, and explain the application of genetics and genomics to real-world problems in medicine, biotechnology, and agriculture.	I	I	I	R	R	R	R	R		M
LO #2: Analyze experimental data in genetics, genomics, and related biological sciences.			I	I		R		R		M
LO #3: Generate, explain, and present experimental data in genetics, genomics, or related biological sciences.	I	I	I	R	R	R	R	R	R	M
LO #4: Critically assess information and their sources in genetics, genomics, and related biological sciences to make informed, ethical decisions.			I	R		R		R	M	R

Explanation: The curriculum map lists the required courses for the program and indicates where each LO will be introduced (I), reinforced (R), and mastered (M). This is important to show that you are including adequate teaching of the skills and concepts to support the LOs. Each row (LO) should have at least one I, R, and M in it. Usually (but not always) there is more than one R. Usually (but not always) there is only one I and one M. Generally, Is come first, followed by Rs, and Ms are last. Each column (class) should have at least one letter in it, but not every box needs to be filled in.

VII. PROGRAM ASSESSMENT PLAN

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Senior Exam	Score on items that are aligned with LO #1 and LO #2 in an exam using standardized assessment questions.	During senior year capstone course.
Exit Survey	Responses to questions asking graduating students how well the major prepared them to master the LO #1-LO #4.	During senior year capstone course.
Graduate School Admissions and Job Placement Statistics	Students/Alumni Survey.	At graduation and as part of alumni survey.
Academic Program Review	Reviewers' responses.	Every 7 years.

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VIII. ANTICIPATED STUDENT ENROLLMENT

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Students	20	40	60	60	60

Data/evidence used to determine projected enrollment numbers:

These projections are conservative estimates based on several factors:

- The complete absence of undergraduate programs in genetics in Arizona.
- The strong job market for genetics and genomics graduate, with a 41.5% 10-year growth rate and median annual salaries of $86,736 to $102,336 in Arizona.
- Growing student interest in genetics and genomics applications across healthcare, biotechnology, and environmental sectors.
- Interest expressed by current MCB majors.

IX. ANTICIPATED DEGREES AWARDED

PROJECTED DEGREES AWARDED ANNUALLY					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Degrees	15	30	45	45	45

Data/evidence used to determine number of anticipated degrees awarded annually: Estimated from the percentage of MCB students that graduate each year (~75%).

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Appendix A. Minor Requirements.

MINOR

Minimum total units required	18
Minimum upper-division units required	9
Total transfer units that may apply to the minor	9
List any special requirements to declare/admission to this minor (completion of specific coursework, minimum GPA, interview, application, etc.)	Minimum GPA of 2.00.
Minor requirements. List all minor requirements including core and electives. Courses listed must include course prefix, number, units, and title. Mark new coursework (New). Include any limits/restrictions needed (house number limit, etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	Core (8 units) - MCB 181R (3) Introduction to Molecular and Cellular Biology - MCB 195B (1) Genomic Medicine Colloquium or MCB 295E (1) Genetics, Ancestry, and Race - MCB 304 (4) Molecular Genetics Electives (10 units), choose from the following to complete a total of at least 10 units: - ECOL 323 (3) Human Genetics and Evolution - ECOL 326 (3) Genomics - MCB 397D (3) Molecular Genetics of Plants – A Course-Based Undergraduate Research Experience - MCB 422 (3) Problem Solving with Genetic Tools - MCB 473 (4) Recombinant DNA Methods and Applications - NSC 375 (3) Diet Genes and Disease - PLS 340 (3) Introduction to Biotechnology - PLS 340L (2) Biotechnology Laboratory - MCB 416A (3) Bioinformatics and Functional Genomics Analysis - MCB 442 (3) Human Genetics: Sex, Crime, and Disease - MCB 447 (3) Big Data in Molecular Biology and Biomedicine - MCB 480 (3) Introduction to Systems Biology - MCB 482 (3) Modeling Human Disease - ECOL 426 (3) Population Genetics - PLS 428R (3) Microbial Genetics - PLS 428L (2) Microbial Genetics Laboratory

	- WFSC 430 (3) Conservation Genetics - WFSC 430L (1) Conservation Genetics Lab - PLS 449A (3) Plant Genetics and Genomics - NROS 430 (3) Neurogenetics For Genetics-focused research: - MCB 399/499 (1-6) Independent Study - MCB 399H/499H (1-6) Honors Independent Study - MCB 392/492 (1-6) Directed Research - MCB 498 (3) Senior Capstone - MCB 498H (3) Honors Thesis
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	No
Additional requirements (provide description)	No
Any restrictions on multiple use of courses (Yes/No)? If yes, provide description.	Yes, 6 units need to be unique to this minor, i.e. cannot be used for any other major or minor within the same degree.

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Appendix A. Minor Requirements.

MINOR

Minimum total units required	18
Minimum upper-division units required	9
Total transfer units that may apply to the minor	9
List any special requirements to declare/admission to this minor (completion of specific coursework, minimum GPA, interview, application, etc.)	Minimum GPA of 2.00.
Minor requirements. List all minor requirements including core and electives. Courses listed must include course prefix, number, units, and title. Mark new coursework (New). Include any limits/restrictions needed (house number limit, etc.). Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	Core (8 units) - MCB 181R (3) Introduction to Molecular and Cellular Biology - MCB 195B (1) Genomic Medicine Colloquium or MCB 295E (1) Genetics, Ancestry, and Race - MCB 304 (4) Molecular Genetics Electives (10 units), choose from the following to complete a total of at least 10 units: - ECOL 323 (3) Human Genetics and Evolution - ECOL 326 (3) Genomics - MCB 397D (3) Molecular Genetics of Plants – A Course-Based Undergraduate Research Experience - MCB 422 (3) Problem Solving with Genetic Tools - MCB 473 (4) Recombinant DNA Methods and Applications - NSC 375 (3) Diet Genes and Disease - PLS 340 (3) Introduction to Biotechnology - PLS 340L (2) Biotechnology Laboratory - MCB 416A (3) Bioinformatics and Functional Genomics Analysis - MCB 442 (3) Human Genetics: Sex, Crime, and Disease - MCB 447 (3) Big Data in Molecular Biology and Biomedicine - MCB 480 (3) Introduction to Systems Biology - MCB 482 (3) Modeling Human Disease - ECOL 426 (3) Population Genetics - PLS 428R (3) Microbial Genetics - PLS 428L (2) Microbial Genetics Laboratory

	- WFSC 430 (3) Conservation Genetics - WFSC 430L (1) Conservation Genetics Lab - PLS 449A (3) Plant Genetics and Genomics - NROS 430 (3) Neurogenetics For Genetics-focused research: - MCB 399/499 (1-6) Independent Study - MCB 399H/499H (1-6) Honors Independent Study - MCB 392/492 (1-6) Directed Research - MCB 498 (3) Senior Capstone - MCB 498H (3) Honors Thesis
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	No
Additional requirements (provide description)	No
Any restrictions on multiple use of courses (Yes/No)? If yes, provide description.	Yes, 6 units need to be unique to this minor, i.e. cannot be used for any other major or minor within the same degree.

THE UNIVERSITY OF ARIZONA

New Academic Program
PEER COMPARISON

Program name, degree, and institution	B.S. in Genetics and Genomics University of Arizona	B.S. in Genetics and Genomics Michigan State University	B.S. in Genetics and Genomics University of Wisconsin – Madison
Completions for last two years, MAJORS only (can be found on market data report)	[redacted]	AY 2022-2023 – 76 graduates AY 2023-2024 – 81 graduates AY 2024-2025 – 49 graduates	Fall 2023 – 24 graduates Spring 2024 – 76 graduates Fall 2024 – 18 graduates Spring 2025 – 105 graduates
Program Description	The B.S. in Genetics and Genomics is an interdisciplinary program that provides students with comprehensive training in the fundamental principles of inheritance and genome function across all living systems. The curriculum integrates molecular genetics, human genetics, evolutionary genetics, genomics, bioinformatics, and genetic epidemiology, preparing students to understand genetic mechanisms from molecular to population levels. Students develop core competencies in experimental design, data analysis, bioinformatics tools, and scientific communication while gaining hands-on experience through laboratory courses, research opportunities, and course-based undergraduate research experiences. The program emphasizes critical thinking skills for evaluating genetic information and	The objective of the Bachelor of Science degree program with a major in genetics and genomics is to provide a broad foundation in science, with emphasis in genetics and genomics. Although the majority of the course work is prescribed, students have an opportunity to tailor their degree program to their own interests within the field by choosing a suitable course combination from a slate of options. In addition to the general degree requirements of the College of Natural Science, the undergraduate program in genetics and genomics encompasses fundamental training in chemistry, mathematics, physics, and biology. This foundation provides the prerequisites for undertaking the basic courses in	This program explores how genetic material shapes life — from the cellular level to the population level — and prepares students to solve some of society's most pressing challenges in the fields of medicine, biotechnology, biomedical research, and agriculture. Genetics and genomics are at the heart of many important issues of the day, including genetic testing, genetic therapies, genome sequencing, evolution, and the genetic engineering of humans, plants, and animals. Students who major in genetics and genomics take courses in biology, chemistry, physics, statistics, and introductory genetics, and then delve into specialized genetics topics focused on humans, plants, populations, cancer, biological development, neurology, and

	making informed, ethical decisions in an increasingly genetics-driven world. The program directly supports the University of Arizona's mission to expand human potential and explore new horizons by preparing adaptive problem-solvers to tackle global challenges in healthcare, biotechnology, agriculture, and conservation. As Arizona's flagship land-grant institution, the university addresses critical workforce needs in a rapidly growing field while serving the state and region. The program embodies the university's commitment to innovation, research excellence, and developing leaders who will contribute to collective well-being through genetic discoveries and applications. The proposed B.S. in Genetics and Genomics program leverages existing strengths in the MCB and EEB departments, creating synergies that distinguish it from current offerings. While MCB offers a genetics sub-plan narrowly focused on human health applications and EEB incorporates evolutionary genetics within broader ecological studies, this dedicated program provides a comprehensive, integrated approach to genetics and genomics that neither department currently offers independently. The program will strengthen pathways into the university's	genetics and genomics. In order to increase the flexibility of the program, and to provide additional intellectual stimulation, students are encouraged to participate in mentored independent research for at least two, and ideally three or more, semesters. Independent research is available to both Honors College and other students, and often culminates with a report written in manuscript style or a presentation or seminar by the student. This research may fulfill part of the department's capstone course requirement for the bachelor's degree with a major in genetics and genomics.	epigenetics. They gain laboratory research experiences by taking laboratory courses and conducting independent research projects in faculty labs. The genetics and genomics major provides a solid foundation for careers in medicine, public health, research, life sciences, agriculture, biotechnology, education, law, and science communication — in the private, public, and non-profit sectors. Many students choose to pursue graduate and professional studies, including research-focused PhD programs, medical school, veterinary school, and law school. Alumni go onto be physicians, medical directors, genetic counselors, epidemiologists, research scientists, data analysts, plant breeders, veterinarians, professors, teachers, attorneys, and science writers.

	established Genetics Graduate Interdisciplinary Program (GIDP) and complement existing research initiatives across multiple colleges.		
Target Careers from Market Data Report	Biotechnology, pharmaceuticals, healthcare, medicine, genetic counseling, forensics, agriculture, conservation, patent law, science policy, and science communication.	Research, industry, public health, medicine, dentistry, forensic, and clinical laboratory science.	Medicine, public health, research, life sciences, agriculture, biotechnology, education, law, and science communication.
Emphases? (Yes/No)	No	No	No
Minimum # of units required	120	120	120
Special requirements to gain admission to program?	GPA of 2.00	GPA of 2.00	None
UG - Level of Math required	Substantial: Calculus II or Biostatistics	Substantial: Calculus II or Statistics	Substantial: Calculus with Algebra and Trigonometry II and Statistics or Data Science Modeling
UG - Level of Second Language required	2nd semester proficiency	None	None

Internship, practicum, or applied/experiential requirements? If yes, describe.	Students must complete at least 3 units of research	Students must complete at least 2 units of research	Students must complete at least 2 units of research
Additional requirements	At least 3 units of tier II writing requirement	At least 3 units of tier II writing requirement And a research Capstone	At least 3 units of tier II communication requirement And At least 3 units of tier II quantitative Reasoning And 3 units of Ethnic Studies And At least 3 units of course- or research-based Capstone

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.

   The proposed B.S. in Genetics and Genomics program strongly aligns with both Michigan State University and University of Wisconsin-Madison programs in several key areas:

   - All three programs require extensive prerequisite coursework in the same fundamental areas: biology, chemistry (including organic chemistry), physics, and mathematics/statistics.
   - Each program features a core Genetics curriculum covering molecular genetics, genomics, and specialized genetics topics, followed by upper-level specialized coursework. All integrate molecular, cellular, organismal, and population-level approaches to Genetics education.
   - All three programs mandate hands-on research experience.
   - The programs share similar educational goals of developing students' abilities to understand genetic principles, conduct research, communicate scientific findings, and apply ethical reasoning to genetic issues.
   - The programs prepare students for identical career paths: graduate study (PhD programs), professional schools (medical, veterinary), and careers in biotechnology, healthcare, agriculture, and research. All three emphasize preparation for genetic counseling, research science, medicine, and data analysis careers.
   -

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 proposed program stands out from the peer programs in several key ways:

   - It incorporates big data analysis in the current, rapidly developing AI-assisted era into its curriculum.
   - It represents a collaboration between Molecular and Cellular Biology (MCB) and Ecology and Evolutionary Biology (EEB) departments, creating molecular-to-population level integration that differs from MSU's microbiology/immunology focus or UW-Madison's traditional genetics department structure.
   - It includes a mandatory bioethics course (MCB 404) as a core requirement with writing emphasis, ensuring ethical reasoning is central to the curriculum rather than optional.

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 program's design directly serves Arizona's underserved student population - as the only dedicated undergraduate Genetics program in Arizona and the Mountain West region (where only 8 genetics degrees were awarded in 2023, none in Arizona). This fills a critical void, allowing students to pursue Genetics education without traveling 550-1,000 miles to other states.
- The program's contemporary focus aligns perfectly with Arizona's exceptional job growth in Genetics/Genomics (41.5% by 2032 vs. 27.1% national average) and strong employer demand (304 job postings from 59 employers).
- The interdisciplinary MCB-EEB collaboration maximizes existing faculty resources and expertise at the University of Arizona while creating unique synergies. This approach is more efficient than building a traditional single-department genetics program and leverages the University's established research strengths across multiple biological disciplines.
- The program's broad applications across biotechnology, medicine, agriculture, and conservation directly align with the University of Arizona's land-grant mission to serve state workforce needs and address societal challenges.
- The integration of AI-assisted approaches and big data analysis prepares students for the rapidly evolving Genetics job market, making them more competitive than graduates from traditional programs. This modern approach attracts students seeking cutting-edge education rather than conventional Genetics training.
- The program's innovation and contemporary focus align with the University of Arizona's identity as a forward-thinking research institution that "expands human potential and explores new horizons," differentiating it from more traditional programs at established Genetics departments.

These differences make the program particularly well-suited for Arizona students who want modern, interdisciplinary Genetics training without leaving the region, while positioning the University of Arizona as the premier Genetics education provider in the Mountain West.

THE UNIVERSITY OF ARIZONA

BUDGET PROJECTION FORM

Name of Proposed Program or Unit:

	Projected		
Budget Contact Person: Pascale Charest	**1st Year** 2026 - 2027	**2nd Year** 2027 - 2028	**3rd Year** 2028 - 2029
METRICS			
Net increase in annual college enrollment UG	10	20	40
Net increase in college SCH UG	210	360	760
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			
FUNDING SOURCES			
Continuing Sources			
UG Revenue	44,100	78,200	167,600
Grad Revenue			
Program Fee Revenue (net of revenue sharing)			
F and A Revenues			
Reallocation from existing College funds (attach description)			
Other Items (attach description)			
Total Continuing	**$ 44,100**	**$ 78,200**	**$ 167,600**
One-time Sources			
College fund balances			
Institutional Strategic Investment			
Gift Funding			
Other Items (attach description)			
Total One-time	**$ -**	**$ -**	**$ -**
TOTAL SOURCES	**$ 44,100**	**$ 78,200**	**$ 167,600**
EXPENDITURE ITEMS			
Continuing Expenditures			
Faculty			
Other Personnel			-
Employee Related Expense		-	-
Graduate Assistantships			
Other Graduate Aid			
Operations (materials, supplies, phones, etc.)			
Additional Space Cost			
Other Items (attach description)			
Total Continuing	**$ -**	**$ -**	**$ -**
One-time Expenditures			
Construction or Renovation			
Start-up Equipment			
Replace Equipment			
Library Resources			
Other Items (attach description)			
Total One-time	**$ -**	**$ -**	**$ -**
TOTAL EXPENDITURES	**$ -**	**$ -**	**$ -**
Net Projected Fiscal Effect	**$ 44,100**	**$ 78,200**	**$ 167,600**

COURSEWORK - BA MCB

	Courses	MCB	EEB	Other COS	Tot COS
Year 1	MATH 122A/B or 119A			5	
	MATH 129/263 or BIOS 376			3	
	CHEM 151/152			8	
	ECOL 182R/182L		4		
	MCB 195B or 295E	1			
Total Yr1		**1**	**4**	**16**	**21**
Year 2	CHEM241A/243A			4	
	CHEM241B/243B			4	
	MCB181R/181L	4			
	ECOL 223		3		
	MCB 284	3			
Total Yr2		**7**	**3**	**8**	**18**
Year 3	MCB 304	4			
	MCB 305	4			
	ECOL 326		3		
	PHYS 110			4	
	PHYS 111			4	
Total Yr3		**8**	**3**	**8**	**19**
Year 4	MCB lab or honors thesis I	3			
	MCB 404	3			
Total Yr4		**6**	**0**	**0**	**6**
PROGRAM TOTAL		**22**	**10**	**32**	**64**

AIB Model Drivers

	SCH	ENROLL
FY27*	201	371
FY28	205	378
FY29	209	386

FY26 & 27 pulled from AIB model published final YE-FY23

Yearly 2% increase projected

22 June 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The Department of Neuroscience supports the B.S. in Genetics and Genomics and agree to have the following course included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
NROS 430	3	Neurogenetics	Elective

This course is offered at least once a year and has the capacity to enroll any additional students in the B.S. in Genetics and Genomics. Please feel free to contact me if you have any questions.

Sincerely,

Konrad Zinsmaier, Ph.D.
Professor and Department Head

22 June 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The Department of Cellular and Molecular Medicine supports the B.S. in Genetics and Genomics and agree to have the following courses included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
CMM 520	2	Clinical Cancer Genetics	Elective
CMM 521	1	Molecular Diagnostics and Lab Testing	Elective

Both courses are offered at least once a year, and we will increase their capacity to allow up to 5 additional students in the B.S. in Genetics and Genomics. Please feel free to contact me if you have any questions.

Sincerely,

Haley O'Brien, PhD
Associate Professor and Associate Head for Education
Department of Cellular and Molecular Medicine

Signing on behalf of:
Sakthivel Sadayappan, PhD, MBA
Professor and CMM Department Head

22 June 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The Department of Epidemiology and Biostatistics supports the B.S. in Genetics and Genomics and agrees to have the following course included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
BIOS 376	3	Introduction to Biostatistics	One of 3 courses for Math requirement

This course is offered at least once a year and has the capacity to enroll any additional students in the B.S. in Genetics and Genomics. Please feel free to contact me if you have any questions.

Sincerely,

Kacey Ernst, Ph.D., MPH
Professor and Department Chair

UAPhysics
THE UNIVERSITY OF ARIZONA
College of Science

Department of Physics
College of Science

1118 E. Fourth Street
P.O. Box 210081
Tucson, Arizona 85721
Tel: (520) 621-6820
Fax: (520) 621-4721
www.physics.arizona.edu

Prof. Shufang Su
Tel : 520-621-5540
E-mail : shufang@email.arizona.edu

June 22, 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The Department of Physics supports the B.S. in Genetics and Genomics and agrees to have the following courses included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
PHYS 110	4	Introductory Studio Physics I	One of 2 options for Physics I requirement
PHYS 111	4	Introductory Studio Physics 2	One of 2 options for Physics 2 requirement
PHYS 141	4	Introductory Mechanics	One of 2 options for Physics 1 requirement
PHYS 241	4	Introductory Electricity and Magnetism	One of 2 options for Physics 2 requirement

All courses are offered at least once a year and have the capacity to enroll any additional students in the B.S. in Genetics and Genomics. Please feel free to contact me if you have any questions.

Best Regards,

Shufang Su
Head, Professor of Physics
University of Arizona

THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
COLLEGE OF MEDICINE TUCSON
Chemistry
& Biochemistry

Craig Aspinwall, Ph.D.
Professor and Department Head
Chemistry & Biochemistry (CBC)
aspinwal@ arizona.edu

1306 East University Blvd.
Old Chemistry 345
Tucson, AZ 85721-0041
Tel: (520) 621-5672

June 23, 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The Department of Chemistry and Biochemistry supports the B.S. in Genetics and Genomics and agrees to have the following courses included in the program:

Course number	Units	Title	Type of coursework in the proposed program
CHEM 141	3	General Chemistry Lecture I: Quantitative	Required supporting, 1 of 4 options
CHEM 142	3	General Chemistry Lecture II: Quantitative	Required supporting, 1 of 4 options
CHEM 143	1	General Chemistry lab I: Quantitative	Required supporting, 1 of 4 options
CHEM 144	1	General Chemistry lab II: Quantitative	Required supporting, 1 of 4 options
CHEM 151	4	Chemical Thinking I	Required supporting, 1 of 4 options
CHEM 152	4	Chemical Thinking II	Required supporting, 1 of 4 options
CHEM 161	3	Honors Chemical Thinking I	Required supporting, 1 of 4 options
CHEM 162	3	Honors Chemical Thinking II	Required supporting, 1 of 4 options
CHEM 163	1	Honors Fundamental Techniques of Chemistry	Required supporting, 1 of 4 options
CHEM 164	1	Honors Fundamental Techniques of Chemistry	Required supporting, 1 of 4 options
CHEM 181	4	Majors General Chemistry I	Required supporting, 1 of 4 options
CHEM 182	4	Majors General Chemistry II	Required supporting, 1 of 4 options
CHEM 241A	3	Lectures in Organic Chemistry	Required supporting
CHEM 243A	1	Organic Chemistry Laboratory I	Required supporting
CHEM 241B	3	Lectures in Organic Chemistry	Required supporting
CHEM 243B	1	Organic Chemistry Laboratory II	Required supporting
BIOC 384	3	Foundations in Biochemistry	Elective
BIOC 385	3	Metabolic Biochemistry	Elective

All courses are offered at least once a year and have the capacity to enroll any additional students in the B.S. in Genetics and Genomics. Please feel free to contact me if you have any questions.

Sincerely,

Craig Aspinwall, Ph.D.

THE UNIVERSITY OF ARIZONA

School of Natural Resources and the Environment
College of Agriculture, Life and Environmental Sciences

1064 E. Lowell St, ENRII
P.O. Box 210137
Tucson, AZ 85719
Telephone: (520) 621-7255
Fax: (520) 621-8801
nature.arizona.edu

22 June 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The School of Natural Resources & the Environment supports the B.S. in Genetics and Genomics and agrees to have the following courses included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
WFSC 430	3	Conservation Genetics	Elective
WFSC 430L	1	Conservation Genetics Lab	Elective

The lecture is offered at least once a year and has the capacity to enroll any additional students in the B.S. in Genetics and Genomics. The lab currently is not offered, but we have a new professor working towards developing it and we expect to offer it again in the near future. We will have the capacity in this class to include the Genetics and Genomics students once it is up and running again. Please feel free to contact me if you have any questions.

Sincerely,

Kathryn E. Stoner, PhD
Director and Professor
School of Natural Resources and the Environment

THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Mathematics

617 N. Santa Rita Avenue
Tucson, Arizona 85721
www.math.arizona.edu

June 25, 2025

Dr. Pascale Charest, Associate Professor
Department of Molecular & Cellular Biology
University of Arizona

RE: Bachelor of Science in Genetics and Genomics

Dear Dr. Charest,

I am writing to express the support of the Department of Mathematics for the proposed new Bachelor of Science degree in in Genetics and Genomics to be offered by your department. In particular, the Department of Mathematics supports the inclusion of the following courses as options for the mathematics requirement for the new degree:

MATH 129 (Calculus II), and
MATH 263 (Introduction to Statistics and Biostatistics).

We expect to offer these course each fall and spring, and if there are at most 60 students per cohort, we expect to be able to accommodate the additional students without any difficulties. Normal prerequisites and registration priorities will apply.

Sincerely,

D L Ulmer

Douglas Ulmer
Professor and Head

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE, LIFE & ENVIRONMENTAL SCIENCES
Nutritional Sciences
& Wellness

SCHOOL OF NUTRITIONAL SCIENCES AND WELLNESS

Shantz Building
1177 E. 4th Street
PO Box 210038
Tucson, AZ 85721-0038
Ofc: 520-621-1187
https://nutrition.cales.arizona.edu/

28 July 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

The School of Nutritional Sciences & Wellness supports the B.S. in Genetics and Genomics and agrees to have the following course included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
NSC 375	3	Diet, Genes and Disease	Elective

This course is offered at least once a year and has the capacity to enroll any additional students in the B.S. in Genetics and Genomics. Please feel free to contact me if you have any questions.

Sincerely,

Ken Wilund

Ken Wilund, Ph.D.
Professor and Director
School of Nutritional Sciences and Wellness

THE UNIVERSITY OF ARIZONA

School of Plant Sciences
College of Agriculture, Life
and Environmental Sciences
520.621.1977 Telephone

1140 E. South Campus Drive
P.O. Box 210036
Tucson, Arizona 85721-0036
520.621.7186 Fax
https://spls.arizona.edu/

22 June 2025

Dr. Pascale Charest
Associate Professor
Director of MCB Undergraduate and Master's Education
Department of Molecular & Cellular Biology
College of Science

Dear Dr. Charest,

After review, the School of Plant Sciences supports the B.S. in Genetics and Genomics and agrees to have the following courses included in the program:

Course number	**Units**	**Title**	**Type of coursework in the proposed program**
PLS 312	4	Animal and Plant Genetics	Elective
PLS 340	3	Introduction to Biotechnology	Elective
PLS 340L	2	Biotechnology Laboratory	Elective
PLS 428R	3	Microbial Genetics	Elective
PLS 428L	2	Microbial Genetics Laboratory	Elective
PLS 449A	3	Plants Genetics and Genomics	Elective

All courses are offered at least once a year and have the capacity to enroll additional students in the B.S. in Genetics and Genomics. We note that several courses may be transitioning in their roles given our international programs and shifts in required vs. elective status, but we anticipate that we will accommodate students well and will stay in close contact about any updates.

Please feel free to contact me if you have any questions.

Sincerely,

Betsy Arnold, Ph.D.
Professor and Interim School Director
School of Plant Sciences