THE UNIVERSITY OF ARIZONA

NEW ACADEMIC PROGRAM – MAJOR
Preliminary Proposal Form

I. Program Details
   a. Name (and Degree Type) of Proposed Academic Program: Master of Science in Immunobiology (IMB)
   b. Academic Unit(s)/College(s): Department of Immunobiology/College of Medicine-Tucson
   c. Campus/Location(s): Main and AZ Online
   d. First Admission Term: Summer 2024
   e. Primary Contact and Email: phaffner@arizona.edu

II. Executive Summary (please provide no more than 5 bullets/sentences that sum up the rationale, demand, and uniqueness of your proposed major):
1) Master's in Immunobiology (IMB) will be a unique program encompassing, basic and clinical immunology, basic and clinical infectious diseases, including virology, bacteriology, mycology and parasitology), mechanisms of vaccines, molecular medicine and pathophysiology of immunologic and infectious diseases.
2) Graduates of IMB master's program would advance their knowledge and skills in the areas of immunobiology and will be in demand to further advance their carrier into a biomedical Ph.D., M.D, D.O. and other health related professional career.
3) Graduates of IMB master's would gain knowledge and skills to seek employment in research arena, including universities, federal and state institutes (NIH, CDC, FDA, State Health Department Labs), pharmaceutical industries (Pfizer, Merck, Schering-Plough etc.), biotechnology companies (Moderna, Genentech, Roche etc.).
4) IMB master's program will be a unique program in Arizona, as none of the Arizona universities offer this kind of program. And will not only be popular in this country but worldwide, including Amrita University, India (in waiting to start the dual degree program).
5) Market analysis report indicates that there is a huge demand for jobs in the areas of immunobiology field and many job opportunities are available because of the emerging and reemerging infectious diseases and use of immunological agents to treat and control many of the immunologic and infectious diseases.

III. Brief Program Description: The master's in immunobiology (IMB) program will be a unique program encompassing basic and clinical immunology, basic and clinical infectious diseases (including virology, bacteriology, mycology and parasitology), mechanisms of vaccines,

molecular medicine and pathophysiology of immunologic and infectious diseases. The goal of the program will be to educate and train students in the area of immunobiology so they are recruited as future scientists and academicians at institutions of higher studies, researchers and specialists in the growing pharmaceutical and biotechnology industries, and further obtain healthcare professional degrees (M.D., D.O, DDS, etc.) to meet the future demand of healthcare needs of the growing and aging population of Arizona and the United States. The IMB master's program will be multidisciplinary in nature and will offer course work and research in the areas immunologic, autoimmune and infectious diseases, vaccine and immunotherapy development strategies, molecular and genomic medicine and immunology of aging. The appeal of this program will not be limited to the United States but will be attractive to foreign universities. The program will be housed in the department of Immunobiology, College of Medicine, which has diverse teaching and research expertise in the areas of immunology, cancer immunology, immunotherapy, vaccine development, autoimmune diseases, viral, bacterial, fungal and parasitic infectious diseases, molecular medicine, tissue banking, etc.

IV. Program Rationale:

The rationale to revive the master's degree in immunobiology is because of the urgency and demand to produce specialists in the areas of immunobiology to fill the vacuum created due to emerging and reemerging infectious diseases leading to many new immune-mediated conditions, such as Long COVID and autoimmune and inflammatory diseases. In addition, the population of Arizona and the United States is aging, and understanding the biology and immunology of aging would require scientists and research specialists to work in industries and academic institutions to develop strategies to combat age-related illnesses. The IMB master's program will produce specialists, researchers, and aspirants to further their training through Ph.D., M.D., D.O and other professional programs. This programs fits with the mission of the College of Medicine and the University of Arizona to produce and train future physicians, scientist and academicians and establish collaboration with institutions of higher studies worldwide. The IMB master's program will complement some of the other master's programs at the College of Medicine, including Cellular & Molecular Medicine, Pharmacology and Physiological Sciences. No new resources, staff or faculty will be required at this time. The Master's in immunobiology (IMB) is different from traditional immunology, microbiology and/or immunology and microbiology because the area of IMB is a broader field which includes the biology and pathophysiology of the immune system and the role of the immunity in controlling malignancies and development of novel interventions in the treatment of malignancies, autoimmune diseases, hypersensitivities, infectious and inflammatory diseases, in addition to control of microbial infections and vaccinations covered in the traditional and focused areas of immunology and microbiology.

V. Projected Enrollment for the First Three Years:

Year 1	Year 2	Year 3
25-30	30-35	35-50

VI. Evidence of Market Demand: According to the job posting/demand reports, there is a projected increase in demand for program graduates over the next 10 years of around 20% for the region, and 12% for the nation.

VII. Similar Programs Offered at Arizona Public Universities: Masters in Immunobiology would be a unique program in the State of Arizona, as none of the Arizona Public or Private Universities offer a master's program in this area.

VIII. Resources

a. Summarize new resources required to offer the program:
At this time, no additional faculty, staff, equipment, or facilities would be needed, as we use existing courses and established faculty will be resourced to the new program.

IX. Required Signatures

a. Program Director/Main Proposer:

i. Signature: _____

ii. Name and Title: Nafees Ahmad, Ph.D., Professor of Immunobiology

iii. Date: October 30, 2023

b. Managing Unit/Department Head:

i. Signature: _____

ii. Name and Title: Janko Z. Nikolich, M.D., Ph.D., Professor & Head, Dept of Immunobiology

iii. Date: Nov 2, 2023

c. College Dean/Associate Dean:

i. Signature: _____

ii. Name and Title: Kevin F Moynahan, MD; Vice Dean, Education

iii. Date: Nov 6, 2023

Preliminary Proposal for IMB Master's Program

Final Audit Report 2023-11-03

Created:	2023-10-30
By:	Polly Haffner (phaffner@arizona.edu)
Status:	Signed
Transaction ID:	CBJCHBCAABAAxQDAk4GpOMI9ZSv63gtyYCz2IKVXR2v2

"Preliminary Proposal for IMB Master's Program" History

Document created by Polly Haffner (phaffner@arizona.edu)
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Preliminary Proposal for IMB Master's Program - signed

Final Audit Report 2023-11-06

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THE UNIVERSITY OF ARIZONA

OFFICE OF UNDERGRADUATE EDUCATION
Administration Building, 402
1401 E. University Blvd.
PO Box 210066
Tucson, AZ 85721-0066

To: Nafees Ahmad, Ph.D., Professor of Immunobiology

From: Greg Heileman, Ph.D., Vice Provost for Undergraduate Education

Date: January 24, 2024

Subject: Approval of Preliminary Proposal for a Master's in Immunobiology (IMB)

Thank you for submitting the preliminary proposal for a Master's in Immunobiology (IMB). The proposed academic program will educate and train students in the area of immunobiology so they are recruited as future scientists and academicians at institutions of higher studies, researchers and specialists in the grown pharmaceutical and biotechnology industries, and further obtain healthcare professional degrees to meet the future demand of healthcare needs of the growing and aging population of Arizona and the United States. We believe your ideas are sufficiently well developed that it now makes sense to advance through the stages of the formal academic program approval process.

Please proceed to the development of a full proposal, and do not hesitate to reach out to the Curricular Affairs Office for assistance with this process.

CC: Ron Marx, Interim Senior Vice President for Academic Affairs and Provost
Liz Sandoval, Director, Curricular Affairs
Janko Nikolich, Professor & Head, Department of Immunobiology/College of Medicine - Tucson
Kevin Moynahan, Vice Dean, Education, Department of Medicine/College of Medicine – Tucson
Polly Haffner, Senior Program Coordinator, Department of Immunobiology/College of Medicine – Tucson

THE UNIVERSITY OF ARIZONA

New Academic Program Workflow Form

General

Proposed Name: Immunobiology

Transaction Nbr: 00000000000204

Plan Type: Major

Academic Career: Graduate

Degree Offered: Master of Science

Do you want to offer a minor? N

Anticipated 1st Admission Term: Fall 2024

Details

Department(s):

MDTC

DEPTMNT ID	DEPARTMENT NAME	HOST
0707	Immunobiology	Y

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

ONLN

LOCATION	DESCRIPTION
ONLN	Online

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

Plan admission types:

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

Non Degree Certificate (UCRT only): N

Other (For Community Campus specifics): N

Plan Taxonomy: 26.0508, Microbiology and Immunology.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Master of Science in Immunobiology

Transcript: Y Master of Science in Immunobiology

Conditions for Admission/Declaration for this Major:

Earned bachelor's degree in biological/biomedical sciences with at least 6 units of course work in immunology, immunobiology, microbiology, molecular biology, or virology, with 3.0 GPA.

Requirements for Accreditation:

N/A

Program Comparisons

University Appropriateness

This programs fits with the mission and strategic plan of the College of Medicine and the University of Arizona by producing and training future physicians, scientists and academicians in the areas of immunobiology to fill the vacuum created due to emerging and reemerging infectious diseases leading to many new immune-mediated conditions, such as Long COVID, and autoimmune and inflammatory diseases, and by establishing collaboration with institutions of higher studies worldwide. In addition, the population of Arizona and the United States is aging, and understanding the biology and immunology of aging would require scientists and research specialists to work in industries and academic institutions to develop strategies to combat age-related illnesses. It also aligns with the University of Arizona mission to provide higher education through online programs, including Arizona Online and Arizona International Campus. None of the other state institutions in Arizona have an immunobiology department, so it is appropriate for the U of A to house a program with this degree.

Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
1	Microbiology	MS	5	Arizona State in Tempe	Y

Peer Comparison

The proposed UA IMB Master's program aligns in some respect with the peer programs with emphasis in the areas of microbiology and immunology. However, UA IMB Master's program has several differences such as more emphasis on immunobiology, including the basic and clinical immunology courses, immunity and infection, and preventive vaccine mechanisms and strategies to use immunotherapy approaches for therapy and prevention. In addition, there is emphasis on more medically oriented course work such as Medical Virology and Medical Bacteriology, in addition to Human Immunology and Genetics and Genomic Medicine. Students will be better prepared to be part of work force in the areas of emerging and reemerging infectious diseases and handling pandemic like situations.
Our IMB Master's program is uniquely different from others in that it will be a fully online program that will attract students nationally and internationally, especially many non-traditional students who cannot afford to attend university in-person due to various reasons. More importantly, it will also attract those students who have already joined the workforce and want to advance their knowledge and skills (likely sponsored by their companies, institutions etc.) to move up higher in the ladder and advance their professional careers. There is already demand for our IMB master's program, as one of the universities in India, Amrita University, is waiting to enroll their master's students in a dual degree program. Several of the faculty involved in teaching courses have national and international reputations.

Resources

Library

Acquisitions Needed:

None

Physical Facilities & Equipment

Existing Physical Facilities:

Current facilities and equipment are adequate for the program, with the exception of a new computer for the director.

Additional Facilities Required & Anticipated:

New computer for the director.

Other Support

Other Support Currently Available:

Support currently available for the proposed program is adequate.

Other Support Needed over the Next Three Years:

Teaching assistance.

Comments During Approval Process

3/4/2024 4:07 PM

NIKOLICH

Comments
Approved.

3/4/2024 4:21 PM

ESANDMAR

Comments
Added UA Main-Tucson campus as requested by Vice Prov Greg Heileman in Preliminary Review meeting. Added approval of prelim proposal memo and updated add'l info form.

3/4/2024 4:23 PM

ESANDMAR

Comments
This degree exists but having program submit new proposal since existing is a non admit masters and that is being requested to change as well as over 50% of the existing coursework. Proposal includes new market data and rationale for updating content of program.

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

I. MAJOR REQUIREMENTS– complete the table below by listing the major requirements, including required number of units, required core, electives, and any special requirements, including emphases* (sub-plans), thesis, internships, etc. Note: information in this section must be consistent throughout the proposal documents (comparison charts, four-year plan, curricular/assessment map, etc.). Delete the EXAMPLE column before submitting/uploading. Complete the table in Appendix A if requesting a corresponding minor.

GRADUATE

Total units required to complete the degree	30
Pre-admissions expectations (i.e., academic training to be completed prior to admission)	Earned bachelor's degree in biological/biomedical sciences with at least 6 units of course work in the area of immunology, immunobiology, microbiology, molecular biology, biochemistry, or virology; statement of purpose
Major requirements. List all major requirements including core and electives. If applicable, list the emphasis requirements for each proposed emphasis*. 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.	Complete 9 units of core coursework: -IMB 501 (4) Medical Microbiology and Immunology -IMB 502 (1) Medical Microbiology Basics -IMB 504 (1) Medical Virology Basics -IMB 506 (3) Human Immunology Complete 15 units of electives from the following list: -CMM 503 (1) Human Molecular Genetics -CMM 504 (3) Cell Biology of Disease -CMM 527 (1) Pathophysiology Basics

	-CMM 528 (1) Pathophysiology of Integumentary, Respiratory, and Digestive Systems -CMM 529 (1) Pathophysiology of Urogenital and Endocrine Systems -CMM 533 (1) Molecular Medicine -CMM 534 (1) Genomic Medicine -CMM 535 (1) Genetic Medicine -CMM 536 (1) Cell Biology Basics -CMM 537 (10 Immunology Basics -CMM 547 (1) Histology Basics -CMM 550 (1) Inflammation & Immunopathology -MIC 528R (3) Microbial Genetics -IMB 505 (3) Human Medical Bacteriology (New) -IMB 580 (3) Human Medical Virology (New) **Complete 6 units of IMB 909 Master's Report** (Literature Survey Research). Upon completion, a written report must be submitted and approved.
Research methods, data analysis, and methodology requirements (Yes/No). If yes, provide description.	Yes. Students complete 12 units of theory and method in the field.
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	No.
Master thesis or dissertation required (Yes/No). If yes, provide description.	Yes. Students complete 6 units of master's report (literature survey research).

Additional requirements (provide description)	N/A
Minor options (as relevant)	N/A

*Emphases are officially recognized sub-specializations within the discipline. ABOR Policy 2-221 c. Academic Degree Programs Subspecializations requires all undergraduate emphases within a major to share at least 40% curricular commonality across emphases (known as "major core"). Total units required for each emphasis must be equal. Proposed emphases having similar curriculum with other plans (within department, college, or university) may require completion of an additional comparison chart. Complete the table found in Appendix B to indicate if emphases should be printed on student transcripts and diplomas.

II. CURRENT COURSES–using the table below, list all existing courses included in the proposed major. You can find information to complete the table using the UA course catalog or UAnalytics (Catalog and Schedule Dashboard> "Printable Course Descriptions by Department" On Demand Report; right side of screen). If the courses listed belong to a department that is not a signed party to this implementation request, upload the department head's permission to include the courses in the proposed program and information regarding accessibility to and frequency of offerings for the course(s). Upload letters of support/emails from department heads to the "Letter(s) of Support" field on the UAccess workflow form. Add or remove rows to the table, as needed.

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)
IMB 501	4	Medical Microbiology and Immunology		Online In-person	F, Sp, Su Sp	Yes
IMB 502	1	Medical Microbiology Basics		Online	F, Sp, Su	Yes
IMB 504	1	Medical Virology Basics		Online	F, Sp, Su	Yes
IMB 506	3	Human Immunology		Online	F, Sp	Yes
CMM 503	1	Human Molecular Genetics		Online, in-person	F, Sp, Su	No
CMM 504	3	Cell Biology of Disease		Online, in-person	Su	No
CMM 527	1	Pathophysiology Basics		Online	F, Sp, Su	No

CMM 528	1	Pathophysiology of Integumentary, Respiratory, and Digestive Systems	CMM 527	Online, in-person	F, Sp, Su	No
CMM 529	1	Pathophysiology of Urogenital and Endocrine Systems	CMM 527	Online, in-person	F, Sp, Su	No
CMM 533	1	Molecular Medicine	CMM 503	Online	F, Sp, Su	No
CMM 534	1	Genomic Medicine	CMM 503 or upper-division-level molecular biology	Online	F, Sp, Su	No
CMM 535	1	Genetic Medicine	CMM 503	Online	F, Sp, Su	No
CMM 536	1	Cell Biology Basics		Online	F, Sp, Su	No
CMM 537	1	Immunology Basics		Online	F, Sp, Su	No
CMM 547	1	Histology Basics		Online	F, Sp, Su	No
CMM 550	1	Inflammation and Immunopathology		Online	F, Sp, Su	No
MIC 528R	3	Microbial Genetics		Online	Sp	No

III. **NEW COURSES NEEDED** – using the table below, list any new courses that must be created for the proposed program. If the specific course number is undetermined, please provide level (i.e., CHEM 4XX). Add rows as needed.

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status*	Anticipated first term offered	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)	Faculty members available to teach the courses
IMB 580	3	Human Medical Virology			S			Yes	Yes
IMB 505	3	Human Medical Bacteriology			D			Yes	Yes

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

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ADDITIONAL INFORMATION FORM

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IV. **FACULTY INFORMATION-** complete the table below. If UA Vitae link is not provided/available, add CVs to a Box folder and provide that link. UA Vitae profiles can be found in the UA directory/phonebook. Add rows as needed. Delete the EXAMPLE rows before submitting/uploading. **NOTE: full proposals are distributed campus-wide, posted on committee agendas and should be considered "publicly visible". Contact Office of Curricular Affairs if you have concerns about CV information being "publicly visible".**

Faculty Member	Involvement	UA Vitae link or Box folder link
Nafees Ahmad	Teach IMB 501, 502, 504, 505, 506, 580, Faculty Advisor	https://profiles.arizona.edu/person/nafees
David Baltrus	Teach MIC 528R	https://profiles.arizona.edu/person/baltrus
David Bear	Teach CMM 503, 533, 534, 535	https://profiles.arizona.edu/person/dbear
Haley O'Brien	Teach CMM 527, 550	https://arizona.box.com/s/1g495qbq1u37e6wjnxnawblrt9unlibs
Jayati Chakrabarti	Teach CMM 536	https://arizona.box.com/s/1g495qbq1u37e6wjnxnawblrt9unlibs
Stefanie Novak	Teach CMM 533, 535, 536	https://profiles.arizona.edu/person/smares
Lonnie Lybarger	Teach CMM 504, 536, 537, 547, 550	https://profiles.arizona.edu/person/lybarger
Gregory Rogers	Teach CMM 504	https://profiles.arizona.edu/person/gcrogers
Jared Churko	Teach CMM 504	https://profiles.arizona.edu/person/jchurko
Julie Ledford	Teach CMM 504	https://profiles.arizona.edu/person/jledford
Yana Zavros	Teach CMM 527, 528, 529	https://profiles.arizona.edu/person/yzavros

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ADDITIONAL INFORMATION FORM

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V. **GRADUATION PLAN –** provide a sample degree plan, based on your program that includes all requirements to graduate with this major and takes into consideration course offerings and sequencing. *Undergraduate programs: please complete Addendum D: 4-Year Plan for Degree Search. Use generic title/placeholder for requirements with more than one course option (e.g., Upper Division Major Elective, Minor Course, Second Language, GE).* Add rows as needed.

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
IMB 506	3	IMB 501	4	IMB 580	3	*IMB 505	3
IMB 502	1	CMM 534	1	IMB 909	3	IMB 909	3
IMB 504	1	CMM 536	1	CMM 535	1	CMM 550	1
CMM 503	1	CMM 547	1	CMM 527	1		
CMM 533	1	CMM 537	1				
Total	7	Total	8	Total	8	Total	7

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
Total	N/A	Total	N/A	Total	N/A	Total	N/A

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VI. Curriculum Map and Assessment Map - Complete this table as a summary of your learning outcomes and assessment plan, using these examples as a model. If you need assistance completing this table and/or the Curriculum Map, please contact the University Center for Assessment, Teaching and Technology. Attach your Curriculum Map here.

Program: MS Immunobiology

Learning Outcome #1: Students will acquire knowledge and skills in the area of immunobiology necessary for a career in immunobiology based biomedical sciences career in academic, public health and research, biotechnology and pharmaceutical industries.
Concepts: Training in Immunology, infectious diseases and molecular medicine courses.
Competencies: Study several advanced level courses in the immunobiology related disciplines to advance knowledge for applications.
Assessment Methods: This outcome will be assessed on the basis of weekly quizzes and midterm and final exams.
Measures: Direct measures will include rubric-scored grading on the weekly quizzes and mid-term and final exams. The performance on the weekly quizzes would provide progress assessment to both students and faculty. Students under performance would require intervention and guidance to achieve successful outcome.
Learning Outcome #2: Students will complete lecture-based courses in basic and clinical immunology, including applications in autoimmune and allergic diseases, immunotherapy and vaccine mechanisms and pathogenesis of infectious diseases (viral, bacterial, fungal and parasitic) and treatment and prevention, and molecular and genomic medicine courses.
Concepts: Knowledge gained in these courses will be applied in clinical scenarios and mechanistic approaches.
Competencies: Effectively utilize biomedical the knowledge in research data analysis, immunologic and infectious diseases mechanisms.
Assessment Methods: This outcome will be assessed in course performance based on exams and quizzes.
Measures: Direct measures will include objective grading of weekly quizzes and mid-term and final exams.
Learning Outcome #3: Students will perform literature survey-based research in the areas of immunobiology related applied disciplines such as autoimmune and hypersensitivities diseases, new platform for vaccines and immunotherapies development, mechanisms, treatments, and preventive vaccines for emerging and reemerging infectious diseases.
Concepts: Reading, analyzing, interpreting, and critiquing scientific research papers.
Competencies: Applying knowledge of immunological and infectious diseases basic and mechanistic approaches in analyzing published research data and statistical analysis and interpretation of results from theses research papers and developing a hypothesis driven research project for novel intervention strategies of various therapies and vaccines.
Assessment Methods: This outcome will be assessed in performing a literature-based research survey, developing a research project and writing a master's report.
Measures: Direct measures will include objective grading of the master's report by course instructor/director based on a rubric-scored on literature survey, hypothesis and aims and the proposal as well as writing competency. The grading would be pass or improvement.

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VII. PROGRAM ASSESSMENT PLAN- using the table below, provide a schedule for program evaluation 1) while students are in the program and 2) after completion of the major. Add rows as needed. Delete EXAMPLE rows.

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Students assessment of the courses and the program	Student Surveys and comments	Every semester, Data analysis
Faculty assessment of the courses and programs	Faculty surveys and comments	Every semester, Data analysis
Job Placement of the graduates	Alumni Surveys	Post-Graduation
Academic Program Review	Committee's reviews	Every 7 years

VIII. ANTICIPATED STUDENT ENROLLMENT-complete the table below. What concrete evidence/data was used to arrive at the numbers?

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Students	25	30	36	43	49

Data/evidence used to determine projected enrollment numbers:

Amrita is currently enrolling 25 students per year through the dual degree program, so those students would primarily make up the first year's enrollment. We used the market demand report to determine projected enrollment numbers. The report projects an increase in demand for program graduates over the next 10 years of about 20%.

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IX. ANTICIPATED DEGREES AWARDED- complete the table below, beginning with the first year in which degrees will be awarded. How did you arrive at these numbers? Take into consideration departmental retention rates. Use National Center for Education Statistics College Navigator to find program completion information of peer institutions offering the same or a similar program.

PROJECTED DEGREES AWARDED ANNUALLY					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Degrees	21	26	31	37	42

Data/evidence used to determine number of anticipated degrees awarded annually: We took the average retention rate over the last [reported] 3-year period from all of the schools that offer Master's degrees in the same or similar programs and multiplied our expected enrollment by that average.

THE UNIVERSITY OF ARIZONA

New Academic Program
PEER COMPARISON

Select three peers (if possible/applicable) for completing the comparison chart from ABOR-approved institutions, AAU members, and/or other relevant institutions recognized in the field. The comparison programs are not required to have the same degree type and/or title as the proposed UA program. Information for the proposed UA program must be consistent throughout the proposal documents. Minors and Certificates may opt to include only 2 peer comparisons.

Program name, degree, and institution	Proposed Immunobiology Master's Degree	Peer 1 Microbiology Master's Degree Arizona State University	Peer 2 Microbiology and Immunology Master's Degree University of Buffalo	Peer 3 Microbiology Master's Degree University of South Florida
Current number of students enrolled	[redacted]	5	14	8
Program Description	The master's in immunobiology (IMB) program will be a unique program encompassing basic and clinical immunology, basic and clinical infectious diseases (including virology, bacteriology, mycology and parasitology), mechanisms of vaccines, molecular medicine and pathophysiology of immunologic and infectious diseases. The goal of the program will be to educate and train students in the area of immunobiology so they are recruited as future scientists and academicians at institutions of higher studies, researchers and specialists in the	The MS in microbiology is designed to prepare students for careers in bacteriology, virology, mycology, immunology and oncology in academic institutions, government agencies or commercial entities. Students train broadly in microbiology, including microbial ecology and	Graduate training in the Department of Microbiology and Immunology provides education and research opportunities in each of our four core disciplines: bacterial pathogenesis, eukaryotic pathogenesis (parasitology and mycology), virology, and immunology. Research in these disciplines utilizes the latest tools in biochemistry, molecular biology, cell biology and	The mission of the Department of Molecular Biosciences (MB) is to prepare graduate students for various professional careers in academia, government or industry in the areas of Cell Biology, Microbiology, and Molecular Biology. We pursue excellence in the following programmatic research areas: genome integrity

	growing pharmaceutical and biotechnology industries, and further obtain healthcare professional degrees (M.D., D.O, DDS, etc.) to meet the future demand of healthcare needs of the growing and aging population of Arizona and the United States. The IMB master's program will be multidisciplinary in nature and will offer course work and research in the areas immunologic, autoimmune and infectious diseases, vaccine and immunotherapy development strategies, molecular and genomic medicine and immunology of aging. The appeal of this program will not be limited to the United States but will be attractive to foreign universities. The program will be housed in the department of Immunobiology, College of Medicine, which has diverse teaching and research expertise in the areas of immunology, cancer immunology, immunotherapy, vaccine development, autoimmune diseases, viral, bacterial, fungal and parasitic infectious diseases, molecular medicine, tissue banking, etc.	evolution, geomicrobiology, bacterial physiology and genetics, bacterial pathogenesis, metabolic engineering, immunology and vaccine development, and cancer biology. They receive advanced training in the study of microbes and their impact on humankind, disease and the environment. The tools they use range from nanotechnologies and genomics to mathematical models and satellite-based imaging. Students receive training in teaching as well as in basic, translational and use-inspired research with world-class faculty and collaborative research partners.	biophysics, to probe the interactions of microbes with their human hosts with the ultimate goal of reducing the public health impact of infectious diseases. Our broad curriculum and focused research training prepares students to succeed in nearly any area of microbiology and immunology.	and mechanisms of aging, bacterial pathogenesis and resistance, structural and computational biology.

Target Careers	Research arena, including universities, federal and state institutes (NIH, CDC, FDA, State Health Department Labs), pharmaceutical industries (Pfizer, Merck, Schering-Plough etc.), biotechnology companies (Moderna, Genentech, Roche etc.). Admission to postgraduate professional schools.	Professionals with tailored research training in specific directions, including microbial physiology, environmental microbiology, evolution and ecology, immunology, virology, and various aspects of modern molecular genetics are in demand in diverse sectors.	Career advancement in industry, government, or academic sectors. Admission to doctoral bioscience programs such as microbiology and immunology.	Professional careers in the areas of Cell Biology, Microbiology, and Molecular Biology.
Emphases? (Yes/No) List, if applicable	No	No	No	No
Minimum # of units required	30	30	30	30
Level of Math required (if applicable)	N/A	N/A	N/A	N/A
Level of Second Language required (if applicable)	N/A	N/A	N/A	N/A
Pre-Major? (Yes/No) If yes, provide requirements.	No	No	No	No
Special requirements to declare/gain admission? (i.e. pre-requisites, GPA, application, etc.)	Earned bachelor's degree in biological/biomedical sciences with 6 units of course work in immunology, immunobiology, microbiology, molecular biology, biochemistry, or virology with 3.0 GPA. Submit	Bachelor's or master's degree in the biological sciences, biochemistry or a closely related field	Earned bachelor's degree with GPA 3.0. Research experience.	Completed course equivalent to those required for the B.S. in Microbiology at U.S.F. Submit personal Essay. Complete Application for Teach Assistantship.

	statement of purpose/personal statement.	from a regionally accredited institution with 3.0 GPA. Submit personal statement.		
Internship, practicum, or applied/experiential requirements? If yes, describe.	Literature survey based research and preparation of master's report	No	All students required to present their research findings at the Annual Master's Student Research Symposium.	No

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 UA IMB Master's program aligns in some respect with the peer programs with emphasis in the areas of microbiology and immunology. However, UA IMB Master's program has several differences such as more emphasis on immunobiology, including the basic and clinical immunology courses, immunity and infection, and preventive vaccine mechanisms and strategies to use immunotherapy approaches for therapy and prevention. In addition, there is emphasis on more medically oriented course work such as Medical Virology and Medical Bacteriology, in addition to Human Immunology and Genetics and Genomic Medicine. Students will be better prepared to be part of work force in the areas of emerging and reemerging infectious diseases and handling pandemic like situations.

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.

Our IMB Master's program is uniquely different from others in that it will be a fully online program that will attract students nationally and internationally, especially many non-traditional students who cannot afford to attend university in-person due to various reasons. More importantly, it will also attract those students who have already joined the workforce and want to advance their knowledge and skills (likely sponsored by their companies, institutions etc.) to move up higher in the ladder and advance their professional careers. There is already demand for our IMB master's program, as one of the universities in India, Amrita

University, is waiting to enroll their master's students in a dual degree program. Several of the faculty involved in teaching courses have national and international reputations.

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?

   As described in #2, our online IMB Master's program will target the student population who cannot attend campus (in-person) because of their jobs, family, and financial reasons, but still want to obtain higher education and advance their professional careers. More importantly, it aligns with the one of the University of Arizona missions to provide higher education through online programs, including Arizona Online and Arizona International Campus. Several of the online IMB courses are in high demand nationally and internationally. The IMB master's program will be a unique program in Arizona, as none of the Arizona universities offer this kind of program. And it will not only be popular in this country but worldwide, including Amrita University, India (in waiting to start the dual degree program).

Comparison Chart for "Old" vs "New" IMB Master's Classes

Old Curriculum Heavy on research, in-person, 40 units, several courses became outdated and not offered.	New Curriculum Online program, online courses offering, courses modified or new courses developed with new emerging information.
Medical Microbiology MBIM 501A (3 units)	Medical Microbiology and Immunology IMB 501 (4 units) – REQUIRED
Medical Microbiology MBIM 501B (3 units)	Medical Microbiology Basics IMB 502 (1 unit)- REQUIRED Medical Virology Basics IMB 504 (1 unit) – REQUIRED
General Immunological Concepts MBIM 519 (4 units)	This course is offered by Animal and Biomedical Sciences (VSC519) and is not fully aligned with the goals of immunobiology maters program. A new course has been developed known as "Human Immunology IMB 506 (3 units)" - REQUIRED
Immunobiology (Cellular Immunology) MBIM 561 (3 units)	Not offered anymore. The following new updated courses aligned with the program will be offered. CMM 537 Immunology Basics (1 unit) CMM 550 Inflammation & Immunopathology (1 unit) CMM 536 Cell Biology Basics (1 unit)
Development of the Immune System MBIM 560 (4 units)	Not offered anymore. A new course more aligned with the program is being modified and developed known as "Human Medical Virology IMB 580 (3 units) will be offered
Tumor Immunology MBIM 562 (3 units)	Not offered anymore. A new course more aligned with the program is being modified and developed known as "Human Medical Bacteriology IMB 505 (3 units) will be offered
Research/Thesis MBIM 900/910 (18 units)	Research/Masters' Report IMB 909 (6 units)
Readings in Cancer Immunology MBIM 695C (1 unit)	Specific for cancer track, not offered. A new course more aligned with the program known as "Molecular Medicine CMM 533 (1 unit) will be offered
Research seminar MBIM 696A 1 unit	Due to online nature of IMB master's program, a new course aligned with the program CMM 547 Histology Basics (1 unit) will be offered
	To diversify the IMB master's program and prepare students for a biotechnology workforce, the following courses will be included. CMM 503 Human Molecular Genetics (1 unit), CMM 534 Genomic Medicine

Comparison Chart for "Old" vs "New" IMB Master's Classes

	(1 unit), CMM 535 Genetic Medicine (1 unit), CMM 527 Pathophysiology Basics (1unit)

MBIM (Microbiology and Immunology) became IMB (Immunobiology) in 2007

THE UNIVERSITY OF ARIZONA

COURSE USE/COLLABORATION/CONCERN FORM

Please use this form to notify other colleges that your proposed new program intends to use course(s) under their ownership; has identified potential avenues for interdisciplinary collaboration; and/or wants to hear their concerns about the creation of this program.

Note: Requesting college should provide this request to leadership in unit who owns courses. Responding unit should respond within 10 business days from receipt. Lack of response after the 10 business days is presumed approval.

FOR REQUESTING COLLEGE:

I. **Initiating College:** What college is requesting use of the course(s)? College of Medicine/Dept of Immunobiology

II. **Representative(s) making the request:** Who is representing the requesting college? Polly Haffner on behalf of Dr. Nafees Ahmad

III. **Planned proposed program:** What program will the requested course be a part of? Master's in Immunobiology

IV. **Planned program start date:** Enter date here Summer 2024

V. **Courses planned to be included, belonging to college / departments:** Plant Sciences/Microbiology

FOR REVIEWING COLLEGE:

1. PLP/MIC 528R **Yes** ☑ **No** ☐ **Conditionally** ☐**:** *Under what conditions?*

VI. **Parameters of Use (add rows as necessary):**

Undergraduate/Graduate

Course #	Units	Description of use (i.e., gen ed, major core, emphasis, elective/selective)
PLP/MIC 528R	*3*	*Elective*

VII. **Expected Yearly Enrollment (add rows as necessary):**

Course #	Units	Exp Enrollment for Yr 1	Exp Enrollment for Yr 2	Exp Enrollment for Yr 3
MIC 528R	3	12	15	15

THE UNIVERSITY OF ARIZONA

COURSE USE/COLLABORATION/CONCERN FORM

VIII. **Opportunities for Interdisciplinary Collaboration (leave blank if none):**

There is an opportunity for interdisciplinary collaboration both in teaching and research. Several students of ABS Medical Microbiology and Immunology track take this course and also do internship in the labs of this college.

IX. **Concerns about Proposed Program (leave blank if none):**

X. **Representative(s) reviewing request:** Who is representative reviewing the request? (Should be Associate Dean / Dean)

Signature: _____ Date: Nov 17, 2023

Michael Staten

Assoc. Dean, CALES

THE UNIVERSITY OF ARIZONA

BUDGET PROJECTION FORM

Name of Proposed Program or Unit: Immunobiology Masters

	Projected		
Budget Contact Person: Tammie Rippberger	1st Year 2024 - 2025	2nd Year 2025 - 2026	3rd Year 2026 - 2027
METRICS			
Net increase in annual college enrollment UG	N/A	N/A	N/A
Net increase in college SCH UG	N/A	N/A	N/A
Net increase in annual college enrollment Grad	25	30	36
Net increase in college SCH Grad	N/A	N/A	N/A
Number of enrollments being charged a Program Fee	25	30	36
New Sponsored Activity (MTDC)	N/A	N/A	N/A
Number of Faculty FTE	2	2	2
FUNDING SOURCES			
Continuing Sources			
UG AIB Revenue	-	-	-
Grad AIB Revenue	42,801	51,361	61,634
Program Fee Revenue (net of revenue sharing)	18,750	22,500	27,000
F and A AIB Revenues	-	-	-
Reallocation from existing College funds (attach description)	-	-	-
Other Items (attach description)	-	-	-
Total Continuing	$ 61,551	$ 73,861	$ 88,634
One-time Sources			
College fund balances	-	-	-
Institutional Strategic Investment	-	-	-
Gift Funding	-	-	-
Other Items (attach description)	-	-	-
Total One-time	$ -	$ -	$ -
TOTAL SOURCES	$ 61,551	$ 73,861	$ 88,634
EXPENDITURE ITEMS			
Continuing Expenditures			
Faculty	2,000	2,000	2,000
Other Personnel	-	-	-
Employee Related Expense	-	-	-
Graduate Assistantships	-	-	-
Other Graduate Aid	-	-	-
Operations (materials, supplies, phones, etc.)	1,000	1,000	1,000
Additional Space Cost	-	-	-
Other Items (attach description)	-	-	-
Total Continuing	$ 3,000	$ 3,000	$ 3,000
One-time Expenditures			
Construction or Renovation	-	-	-
Start-up Equipment	2,000	-	-
Replace Equipment	-	-	-
Library Resources	-	-	-
Other Items (attach description)	-	-	-
Total One-time	$ -	$ -	$ -
TOTAL EXPENDITURES	$ 3,000	$ 3,000	$ 3,000
Net Projected Fiscal Effect	$ 58,551	$ 70,861	$ 85,634

CALEB SIMMONS, PHD
EXECUTIVE DIRECTOR,
ONLINE EDUCATION

The Refinery
1600 E. Idea Lane
Tucson, AZ 85713
Ofc 520-621-3772

March 1, 2024

Subject: Arizona Online Support for the Immunobiology MS Program

I am writing in support of the Master of Science in Immunobiology program. 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 Immunobiology MS 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 Immunobiology MS program, 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 Immunobiology MS program represents a strategic step forward for Arizona Online, aligning with our mission to provide high-quality, accessible education.

Sincerely

Caleb Simmons, Ph.D. MBA
Executive Director, Arizona Online

CUES Distinguished Fellow
Professor, Religious Studies

THE UNIVERSITY OF ARIZONA

BUDGET PROJECTION FORM

Name of Proposed Program or Unit: Immunobiology Masters

Budget Contact Person: Tammie Rippberger	Projected 1st Year 2024 - 2025	2nd Year 2025 - 2026	3rd Year 2026 - 2027
METRICS			
Net increase in annual college enrollment UG	N/A	N/A	N/A
Net increase in college SCH UG	N/A	N/A	N/A
Net increase in annual college enrollment Grad	25	30	36
Net increase in college SCH Grad	N/A	N/A	N/A
Number of enrollments being charged a Program Fee	25	30	36
New Sponsored Activity (MTDC)	N/A	N/A	N/A
Number of Faculty FTE	2	2	2
FUNDING SOURCES			
Continuing Sources			
UG AIB Revenue	-	-	-
Grad AIB Revenue	42,801	51,361	61,634
Program Fee Revenue (net of revenue sharing)	18,750	22,500	27,000
F and A AIB Revenues	-	-	-
Reallocation from existing College funds (attach description)	-	-	-
Other Items (attach description)	-	-	-
Total Continuing	$ 61,551	$ 73,861	$ 88,634
One-time Sources			
College fund balances	-	-	-
Institutional Strategic Investment	-	-	-
Gift Funding	-	-	-
Other Items (attach description)	-	-	-
Total One-time	$ -	$ -	$ -
TOTAL SOURCES	$ 61,551	$ 73,861	$ 88,634
EXPENDITURE ITEMS			
Continuing Expenditures			
Faculty	-	-	-
Other Personnel	-	-	-
Employee Related Expense	-	-	-
Graduate Assistantships	2,000	2,000	2,000
Other Graduate Aid	-	-	-
Operations (materials, supplies, phones, etc.)	1,000	1,000	1,000
Additional Space Cost	-	-	-
Other Items (attach description)	-	-	-
Total Continuing	$ 3,000	$ 3,000	$ 3,000
One-time Expenditures			
Construction or Renovation	-	-	-
Start-up Equipment	2,000	-	-
Replace Equipment	-	-	-
Library Resources	-	-	-
Other Items (attach description)	-	-	-
Total One-time	$ -	$ -	$ -
TOTAL EXPENDITURES	$ 3,000	$ 3,000	$ 3,000
Net Projected Fiscal Effect	$ 58,551	$ 70,861	$ 85,634

THE UNIVERSITY OF ARIZONA

NEW ACADEMIC PROGRAM – MAJOR
Preliminary Proposal Form

Please complete the following information. Brief summaries are sufficient, and the completed document should be only 3-4 pages. Italicized instructions can be deleted before submitting this form.

I. Program Details
   a. Name (and Degree Type) of Proposed Academic Program: Master of Science in Immunobiology (IMB)
   b. Academic Unit(s)/College(s): Department of Immunobiology/College of Medicine-Tucson
   c. Campus/Location(s): Main and AZ Online
      Note: *if UA Online is a desired option, please complete the form here to begin their review process. Listing it here does not guarantee it will be an approved program for the ONLN campus.*
   d. First Admission Term: Summer 2024
   e. Primary Contact and Email: phaffner@arizona.edu

II. Executive Summary (please provide no more than 5 bullets/sentences that sum up the rationale, demand, and uniqueness of your proposed major):
1) Master's in Immunobiology (IMB) will be a unique program encompassing, basic and clinical immunology, basic and clinical infectious diseases, including virology, bacteriology, mycology and parasitology), mechanisms of vaccines, molecular medicine and pathophysiology of immunologic and infectious diseases.
2) Graduates of IMB master's program would advance their knowledge and skills in the areas of immunobiology and will be in demand to further advance their carrier into a biomedical Ph.D., M.D, D.O. and other health related professional career.
3) Graduates of IMB master's would gain knowledge and skills to seek employment in research arena, including universities, federal and state institutes (NIH, CDC, FDA, State Health Department Labs), pharmaceutical industries (Pfizer, Merck, Schering-Plough etc.), biotechnology companies (Moderna, Genentech, Roche etc.).
4) IMB master's program will be a unique program in Arizona, as none of the Arizona universities offer this kind of program. And will not only be popular in this country but worldwide, including Amrita University, India (in waiting to start the dual degree program).
5) Market analysis report indicates that there is a huge demand for jobs in the areas of immunobiology field and many job opportunities are available because of the emerging and reemerging infectious diseases and use of immunologicals to treat and control many of the immunologic and infectious diseases.

III. Brief Program Description: The master's in immunobiology (IMB) program will be a unique program encompassing basic and clinical immunology, basic and clinical infectious diseases (including virology, bacteriology, mycology and parasitology), mechanisms of vaccines,

molecular medicine and pathophysiology of immunologic and infectious diseases. The goal of the program will be to educate and train students in the area of immunobiology so they are recruited as future scientists and academicians at institutions of higher studies, researchers and specialists in the growing pharmaceutical and biotechnology industries, and further obtain healthcare professional degrees (M.D., D.O, DDS, etc.) to meet the future demand of healthcare needs of the growing and aging population of Arizona and the United States. The IMB master's program will be multidisciplinary in nature and will offer course work and research in the areas immunologic, autoimmune and infectious diseases, vaccine and immunotherapy development strategies, molecular and genomic medicine and immunology of aging. The appeal of this program will not be limited to the United States but will be attractive to foreign universities. The program will be housed in the department of Immunobiology, College of Medicine, which has diverse teaching and research expertise in the areas of immunology, cancer immunology, immunotherapy, vaccine development, autoimmune diseases, viral, bacterial, fungal and parasitic infectious diseases, molecular medicine, tissue banking, etc.

IV. Program Rationale:

The rationale to revive the master's degree in immunobiology is because of the urgency and demand to produce specialists in the areas of immunobiology to fill the vacuum created due to emerging and reemerging infectious diseases leading to many new immune-mediated conditions, such as Long COVID and autoimmune and inflammatory diseases. In addition, the population of Arizona and the United States is aging, and understanding the biology and immunology of aging would require scientists and research specialists to work in industries and academic institutions to develop strategies to combat age-related illnesses. The IMB master's program will produce specialists, researchers, and aspirants to further their training through Ph.D., M.D., D.O and other professional programs. This programs fits with the mission of the College of Medicine and the University of Arizona to produce and train future physicians, scientist and academicians and establish collaboration with institutions of higher studies worldwide. The IMB master's program will complement some of the other master's programs at the College of Medicine, including Cellular & Molecular Medicine, Pharmacology and Physiological Sciences. No new resources, staff or faculty will be required at this time. The Master's in immunobiology (IMB) is different from traditional immunology, microbiology and/or immunology and microbiology because the area of IMB is a broader field which includes the biology and pathophysiology of the immune system and the role of the immunity in controlling malignancies and development of novel interventions in the treatment of malignancies, autoimmune diseases, hypersensitivities, infectious and inflammatory diseases, in addition to control of microbial infections and vaccinations covered in the traditional and focused areas of immunology and microbiology.

V. Projected Enrollment for the First Three Years:

Year 1	Year 2	Year 3
25-30	30-35	35-50

VI. Evidence of Market Demand: According to the job posting/demand reports, there is a projected increase in demand for program graduates over the next 10 years of around 20% for the region, and 12% for the nation.

VII. Similar Programs Offered at Arizona Public Universities: Masters in Immunobiology would be a unique program in the State of Arizona, as none of the Arizona Public or Private Universities offer a master's program in this area.

VIII. Resources

a. Summarize new resources required to offer the program:
$2000 dollars for a new computer, and up to $2000 per year for a teaching assistant.
No additional faculty or facilities would be needed, as we use existing courses and established faculty will be resourced to the new program.

IX. Required Signatures

a. Program Director/Main Proposer:

Nafees Ahmad

i. Signature: _____

ii. Name and Title: Nafees Ahmad, Ph.D., Professor of Immunobiology

iii. Date: October 30, 2023

b. Managing Unit/Department Head:

i. Signature: _____

ii. Name and Title: Janko Z. Nikolich, M.D., Ph.D., Professor & Head, Dept of Immunobiology

iii. Date: Mar 11, 2024

c. College Dean/Associate Dean:

i. Signature: Kevin F Moynahan

ii. Name and Title: Kevin F Moynahan, MD, Vice Dean, Education

iii. Date: Mar 11, 2024

Preliminary_Proposal_IMB Master's_CA ready

Final Audit Report 2024-03-12

Created:	2024-03-11
By:	Polly Haffner (phaffner@arizona.edu)
Status:	Signed
Transaction ID:	CBJCHBCAABAAkzjH5xxZP56xoruUpQwJdpZQgtqDwm_D

"Preliminary_Proposal_IMB Master's_CA ready" History

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Agreement completed.
2024-03-12 - 1:44:27 AM GMT

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ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

I. **MAJOR REQUIREMENTS**– complete the table below by listing the major requirements, including required number of units, required core, electives, and any special requirements, including emphases* (sub-plans), thesis, internships, etc. Note: information in this section must be consistent throughout the proposal documents (comparison charts, four-year plan, curricular/assessment map, etc.). Delete the EXAMPLE column before submitting/uploading. Complete the table in Appendix A if requesting a corresponding minor.

GRADUATE

Total units required to complete the degree	30
Pre-admissions expectations (i.e., academic training to be completed prior to admission)	Earned bachelor's degree in biological/biomedical sciences with at least 6 units of course work in the area of immunology, immunobiology, microbiology, molecular biology, biochemistry, or virology; statement of purpose
Major requirements. List all major requirements including core and electives. If applicable, list the emphasis requirements for each proposed emphasis*. 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.	Complete 9 units of core coursework: -IMB 501 (4) Medical Microbiology and Immunology -IMB 502 (1) Medical Microbiology Basics -IMB 504 (1) Medical Virology Basics -IMB 506 (3) Human Immunology Complete 15 units of electives from the following list: -CMM 503 (1) Human Molecular Genetics -CMM 504 (3) Cell Biology of Disease -CMM 527 (1) Pathophysiology Basics

	-CMM 528 (1) Pathophysiology of Integumentary, Respiratory, and Digestive Systems -CMM 529 (1) Pathophysiology of Urogenital and Endocrine Systems -CMM 533 (1) Molecular Medicine -CMM 534 (1) Genomic Medicine -CMM 535 (1) Genetic Medicine -CMM 536 (1) Cell Biology Basics -CMM 537 (10 Immunology Basics -CMM 547 (1) Histology Basics -CMM 550 (1) Inflammation & Immunopathology -MIC 528R (3) Microbial Genetics -IMB 505 (3) Human Medical Bacteriology (New) -IMB 580 (3) Human Medical Virology (New) Complete 6 units of IMB 909 Master's Report (Literature Survey Research). Upon completion, a written report must be submitted and approved.
Research methods, data analysis, and methodology requirements (Yes/No). If yes, provide description.	Yes. Students complete 12 units of theory and method in the field.
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	No.
Master thesis or dissertation required (Yes/No). If yes, provide description.	Yes. Students complete 6 units of master's report (literature survey research).

Additional requirements (provide description)	N/A
Minor options (as relevant)	N/A

*Emphases are officially recognized sub-specializations within the discipline. ABOR Policy 2-221 c. Academic Degree Programs Subspecializations requires all undergraduate emphases within a major to share at least 40% curricular commonality across emphases (known as "major core"). Total units required for each emphasis must be equal. Proposed emphases having similar curriculum with other plans (within department, college, or university) may require completion of an additional comparison chart. Complete the table found in Appendix B to indicate if emphases should be printed on student transcripts and diplomas.

II. CURRENT COURSES–using the table below, list all existing courses included in the proposed major. You can find information to complete the table using the UA course catalog or UAnalytics (Catalog and Schedule Dashboard> "Printable Course Descriptions by Department" On Demand Report; right side of screen). If the courses listed belong to a department that is not a signed party to this implementation request, upload the department head's permission to include the courses in the proposed program and information regarding accessibility to and frequency of offerings for the course(s). Upload letters of support/emails from department heads to the "Letter(s) of Support" field on the UAccess workflow form. Add or remove rows to the table, as needed.

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)
IMB 501	4	Medical Microbiology and Immunology		Online In-person	F, Sp, Su Sp	Yes
IMB 502	1	Medical Microbiology Basics		Online	F, Sp, Su	Yes
IMB 504	1	Medical Virology Basics		Online	F, Sp, Su	Yes
IMB 506	3	Human Immunology		Online	F, Sp	Yes
CMM 503	1	Human Molecular Genetics		Online, in-person	F, Sp, Su	No
CMM 504	3	Cell Biology of Disease		Online, in-person	Su	No
CMM 527	1	Pathophysiology Basics		Online	F, Sp, Su	No

CMM 528	1	Pathophysiology of Integumentary, Respiratory, and Digestive Systems	CMM 527	Online, in-person	F, Sp, Su	No
CMM 529	1	Pathophysiology of Urogenital and Endocrine Systems	CMM 527	Online, in-person	F, Sp, Su	No
CMM 533	1	Molecular Medicine	CMM 503	Online	F, Sp, Su	No
CMM 534	1	Genomic Medicine	CMM 503 or upper-division-level molecular biology	Online	F, Sp, Su	No
CMM 535	1	Genetic Medicine	CMM 503	Online	F, Sp, Su	No
CMM 536	1	Cell Biology Basics		Online	F, Sp, Su	No
CMM 537	1	Immunology Basics		Online	F, Sp, Su	No
CMM 547	1	Histology Basics		Online	F, Sp, Su	No
CMM 550	1	Inflammation and Immunopathology		Online	F, Sp, Su	No
MIC 528R	3	Microbial Genetics		Online	Sp	No

III. **NEW COURSES NEEDED** – using the table below, list any new courses that must be created for the proposed program. If the specific course number is undetermined, please provide level (i.e., CHEM 4XX). Add rows as needed.

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status*	Anticipated first term offered	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)	Faculty members available to teach the courses
IMB 580	3	Human Medical Virology			S			Yes	Yes
IMB 505	3	Human Medical Bacteriology			D			Yes	Yes

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

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To be used once preliminary proposal has been approved.

IV. **FACULTY INFORMATION-** complete the table below. If UA Vitae link is not provided/available, add CVs to a Box folder and provide that link. UA Vitae profiles can be found in the UA directory/phonebook. Add rows as needed. Delete the EXAMPLE rows before submitting/uploading. **NOTE: full proposals are distributed campus-wide, posted on committee agendas and should be considered "publicly visible". Contact Office of Curricular Affairs if you have concerns about CV information being "publicly visible".**

Faculty Member	Involvement	UA Vitae link or Box folder link
Nafees Ahmad	Teach IMB 501, 502, 504, 505, 506, 580, Faculty Advisor, Other Immunobiology faculty members will also teach in these courses (team taught courses)	https://profiles.arizona.edu/person/nafees
David Baltrus	Teach MIC 528R	https://profiles.arizona.edu/person/baltrus
David Bear	Teach CMM 503, 533, 534, 535	https://profiles.arizona.edu/person/dbear
Haley O'Brien	Teach CMM 527, 550	https://arizona.box.com/s/1g495qbq1u37e6wjnxnawblrt9unlibs
Jayati Chakrabarti	Teach CMM 536	https://arizona.box.com/s/1g495qbq1u37e6wjnxnawblrt9unlibs
Lonnie Lybarger	Teach CMM 504, 536, 537, 547, 550	https://profiles.arizona.edu/person/lybarger
Gregory Rogers	Teach CMM 504	https://profiles.arizona.edu/person/gcrogers
Jared Churko	Teach CMM 504	https://profiles.arizona.edu/person/jchurko
Julie Ledford	Teach CMM 504	https://profiles.arizona.edu/person/jledford
Yana Zavros	Teach CMM 527, 528, 529	https://profiles.arizona.edu/person/yzavros

V. **GRADUATION PLAN –** provide a sample degree plan, based on your program that includes all requirements to graduate with this major and takes into consideration course offerings and sequencing. *Undergraduate programs: please complete Addendum D: 4-Year Plan for Degree Search. Use generic title/placeholder for requirements with more than one course option (e.g., Upper Division Major Elective, Minor Course, Second Language, GE).* Add rows as needed.

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
IMB 506	3	IMB 501	4	IMB 580	3	*IMB 505	3
IMB 502	1	CMM 534	1	IMB 909	3	IMB 909	3
IMB 504	1	CMM 536	1	CMM 535	1	CMM 550	1
CMM 503	1	CMM 547	1	CMM 527	1		
CMM 533	1	CMM 537	1				
Total	7	Total	8	Total	8	Total	7

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
Total	N/A	Total	N/A	Total	N/A	Total	N/A

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VI. Curriculum Map and Assessment Map - Complete this table as a summary of your learning outcomes and assessment plan, using these examples as a model. If you need assistance completing this table and/or the Curriculum Map, please contact the University Center for Assessment, Teaching and Technology. Attach your Curriculum Map here.

Program: MS Immunobiology

Learning Outcome #1: Students will demonstrate knowledge and skills in immunobiology by analyzing and interpreting the core concepts immunity and infection central to a career in academia, public health and research organizations, biotechnology and pharmaceutical industries.
Concepts: Reviewing concepts from course material, slides, lecture videos, textbooks, research articles and databases.
Competencies: Integrating the basic science principles into mechanistic and clinical condition applications in the immunobiology related disciplines to advance knowledge for real world problems solution.
Assessment Methods: This outcome will be assessed on the basis of weekly quizzes, midterm and final exams and written reports (direct) and exit survey (indirect).
Measures: Direct measures will include rubric-scored grading by the instructor on the weekly quizzes and mid-term and final exams. The performance on the weekly quizzes would provide progress assessment to both students and faculty. Students under performance would require intervention and guidance to achieve successful outcome.
Learning Outcome #2: Students will apply their knowledge of clinical immunology and infectious diseases to develop and analyze treatment and prevention strategies related to immunologic diseases, immunotherapy and mechanisms of vaccines, and pathogenesis of infectious diseases (viral, bacterial, fungal and parasitic).
Concepts: Mechanisms of immunologic and infectious diseases and action of immunotherapies and vaccines.
Competencies: Effectively utilize biomedical the knowledge in research data analysis, immunologic and infectious diseases mechanisms.
Assessment Methods: This outcome will be assessed in course performance based on exams and quizzes (direct) and exit surveys (indirect).
Measures: Direct measures will include objective grading of weekly quizzes and mid-term and final exams and written reports.
Learning Outcome #3: Students will perform literature survey-based research in the areas of immunobiology related applied disciplines such as autoimmune and hypersensitivities diseases, new platform for vaccines and immunotherapies development, mechanisms, treatments, and preventive vaccines for emerging and reemerging infectious diseases.
Concepts: Reading, analyzing, interpreting, and critiquing scientific research papers.
Competencies: Applying knowledge of immunological and infectious diseases basic and mechanistic approaches in analyzing published research data and statistical analysis and interpretation of results from theses research papers and developing a hypothesis driven research project for novel intervention strategies of various therapies and vaccines.

Assessment Methods: This outcome will be assessed in performing a literature-based research survey, developing a research project and writing a master's report and exit survey (indirect)
Measures: Direct measures will include objective grading of the master's report by course instructor/director based on a rubric-scored on literature survey, hypothesis and aims and the proposal as well as writing competency. The grading would be pass or improvement.

VII. PROGRAM ASSESSMENT PLAN- using the table below, provide a schedule for program evaluation 1) while students are in the program and 2) after completion of the major. Add rows as needed. Delete EXAMPLE rows.

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Students assessment of the courses and the program	Student Surveys and comments	Every semester, Data analysis
Faculty assessment of the courses and programs	Faculty surveys and comments	Every semester, Data analysis
Job Placement of the graduates	Alumni Surveys	Post-Graduation
Academic Program Review	Committee's reviews	Every 7 years

VIII. ANTICIPATED STUDENT ENROLLMENT-complete the table below. What concrete evidence/data was used to arrive at the numbers?

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Students	25	30	36	43	49

Data/evidence used to determine projected enrollment numbers:

Amrita is currently enrolling 25 students per year through the dual degree program, so those students would primarily make up the first year's enrollment. We used the market demand report to determine projected enrollment numbers. The report projects an increase in demand for program graduates over the next 10 years of about 20%.

IX. ANTICIPATED DEGREES AWARDED- complete the table below, beginning with the first year in which degrees will be awarded. How did you arrive at these numbers? Take into consideration departmental retention rates. Use National Center for Education Statistics College Navigator to find program completion information of peer institutions offering the same or a similar program.

PROJECTED DEGREES AWARDED ANNUALLY					
	1st Year	2nd Year	3rd Year	4th Year	5th Year
Number of Degrees	21	26	31	37	42

Data/evidence used to determine number of anticipated degrees awarded annually: We took the average retention rate over the last [reported] 3-year period from all of the schools that offer Master's degrees in the same or similar programs and multiplied our expected enrollment by that average.

Appendix A. Minor Requirements. Complete if requesting a corresponding minor.

MINOR

Minimum total units required	N/A
Minimum upper-division units required	
Total transfer units that may apply to the minor	
List any special requirements to declare/admission to this minor (completion of	

specific coursework, minimum GPA, interview, application, etc.)	
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.	
Internship, practicum, applied course requirements (Yes/No). If yes, provide description.	
Additional requirements (provide description)	
Any double-dipping restrictions (Yes/No)? If yes, provide description.	

Appendix B. Emphasis Print Information-if applicable, complete the table below to indicate if proposed emphases should be printed on transcript and diploma. Add rows as needed. Note: emphases are displayed on transcript and diplomas as " _____ Emphasis".

Emphasis	Print on transcript	Print on diploma
N/A		

IMB Master's Curriculum Map

Courses	Intended Student Learning Outcomes		
	Students will acquire knowledge and skills in the area of immunobiology necessary for a career in immunobiology based biomedical sciences career in academic, public health and research, biotechnology and pharmaceutical industries LO1	Students will complete lecture-based courses in basic and clinical immunology, including applications in autoimmune and allergic diseases, immunotherapy and vaccine mechanisms and pathogenesis of infectious diseases (viral, bacterial, fungal and parasitic) and treatment and prevention, and molecular and genomic medicine courses -LO2	Students will perform literature survey-based research in the areas of immunobiology related applied disciplines such as autoimmune and hypersensitivities diseases, new platform for vaccines and immunotherapies development, mechanisms, treatments, and preventive vaccines for emerging and reemerging infectious diseases LO3
IMB 501	R/M	R	R
IMB 502	I	I	I
IMB 504	I	I	I
IMB 506	I	R/M	R
IMB 909	R		M
Electives	I/R	I/R	R

Key: "I"=Introduced; "R"=reinforced and opportunity to practice; "M"=mastery at the senior or exit level; "A"=assessment evidence collected for program-level decision making