

New Academic Program Workflow Form

General

Proposed Name: Medicine

Transaction Nbr: 00000000000048

Plan Type: Major

Academic Career: Undergraduate

Degree Offered: Bachelor of Science

Do you want to offer a minor? N

Anticipated 1st Admission Term: Fall 2021

Details

Department(s):

MDTC

DEPTMNT ID	DEPARTMENT NAME	HOST
0719	Pharmacology	Y

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

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

Plan admission types:

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

Non Degree Certificate (UCRT only): N

Other (For Community Campus specifics): N

Plan Taxonomy: 51.0000, Health Services/Allied Health/Health Sciences, General.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Bachelor of Science in Medicine Transcript: Y

Bachelor of Science in Medicine

Conditions for Admission/Declaration for this Major: 2.5 GPA required to join the major.

Requirements for Accreditation:N/a

Program Comparisons

University Appropriateness

The BS in Medicine aligns with the University of Arizona mission and strategic plan, specifically, Pillar II: Grand Challenges and aims to leverage 4th Industrial Revolution advancements and tackle critical problems at the edge of human endeavor. Students who complete this degree program can go on to confront pressing health and wellness challenges in our communities through interdisciplinary collaboration. Students will be prepared to bring wellbeing and the use of medical device technology to communities, improving health and quality of life. This degree has a strong focus on what it takes to become a health care provider, how to use medical information to create pathways for future medical care, medical science-based reasoning, healthcare management, medical technology, medical devices, medical supplies manufacturing, machine learning, medical/health informatics and environmental influences on health and medical care. Students educated in use of medical devices and the science of ¿bio-medical data¿ will be in high demand and can help to build a workforce capable of addressing grand challenges related to disease prevention and wellness. The University of Arizona is best location within the Arizona University System given the high caliber science, technology, engineering and research faculty and programs. Furthermore, as the only institution with a medical school, the University of Arizona is capable of providing coursework, student opportunity, and research experience that is unique for students who enroll in the BS in Medicine program. Finally, this program is consistent with the College strategic plan and will provide the curriculum of tomorrow by leveraging expertise, expanding interprofessional education opportunities, and focusing on the personalized learning journey of our students.

Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
1	Medical	BS	723	Arizona State	N

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
	Studies			University	
2	Health Sciences Allied Health	BS	33	Northern Arizona University	N

Peer Comparison

Chart included for reference.

While the programs offered at ASU and NAU are similar in nature, they do not provide the same amount of targeted coursework in the areas defined in the UArizona BS in Medicine program. The contribution of faculty and coursework from the College of Medicine at UA provides academic, internship and other extracurricular opportunities that are unmatched at the peer institutions listed. Furthermore, the UArizona program leverages interprofessional education (IPE) to best equip students for a variety of health science careers. While IPE may be included in other programs, it is not clearly defined.

Faculty & Resources

Faculty

Current Faculty:

INSTR ID	NAME	DEPT	RANK	DEGREE	FCLTY/%
04200288	Arthur Gmitro	2328	Professor	Doctor of Philosophy	.09
04301299	Roger Miesfeld	2536	Distinguished Prof	Doctor of Philosophy	.09
04707778	Paul Gordon	0704	Professor	Doctor of Medicine	.09
07002193	Helen Amerongen	0710	Professor	Doctor of Philosophy	.09
08103385	Nafees Ahmad	0707	Professor	Doctor of Philosophy	.09
09500879	Carol Gregorio	0710	Professor	Doctor of Philosophy	.09
09805509	Todd Vanderah	0719	Professor	Doctor of Philosophy	.10
10609280	Claudia Stanescu	1401	Assit. Prof	Doctor of Philosophy	.09
12600544	Tejal Parikh	0704	Assoc. Prof	Doctor of Medicine	.09
17003704	Robert Segal	0713	Prof. Pract.	Doctor of Medicine	.09
22072968	Alicia Allen	0704	Assit. Prof	Doctor of Medicine	.09

Additional Faculty:

Additional faculty will likely not be needed for the first and second year of the program. Additional faculty will be added based on the need for expertise in content areas outlined in the new courses proposed.

Current Student & Faculty FTE

DEPARTMENT	UGRD HEAD COUNT	GRAD HEAD COUNT	FACULTY FTE
0707	0	27	6.00
0710	0	11	7.00
0719	0	15	8.00
1401	970	0	10.00
2328	155	0	7.00

Projected Student & Faculty FTE

	UGRD HEAD COUNT			GRAD HEAD COUNT			FACULTY FTE		
DEPT	YR 1	YR 2	YR 3	YR 1	YR 2	YR 3	YR 1	YR 2	YR 3
0719	100	250	400	0	0	0	0.00	0.00	0.00

Library

Acquisitions Needed:

None

Physical Facilities & Equipment

Existing Physical Facilities:

Existing physical facilities and equipment are adequate for the program needs.

Additional Facilities Required & Anticipated:

N/a

Other Support

Other Support Currently Available:

Provost Investment Funds are available to support this program.

Other Support Needed over the Next Three Years:

- 2 Academic Advisors
- 1 Administrator
- 1 Educational/Technology Specialist

Comments During Approval Process

8/31/2020 4:56 PM

RGOMEZ

Comments

The COS has concerns about the duplicative nature of this program given that a number of programs already serve students preparing for paths to doctorates in medicine, pharmacy and dentistry. The COS also has concerns that the program does not adequately prepare students headed toward medical school.

9/21/2020 6:03 PM

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Comments

On behalf of the BS in Medicine working group:

The BS in Medicine is not duplicative in nature. It is designed in response to the existing situation in which many students entering from established programs struggle to succeed (particularly in medicine, since the pre-clerkship medical curriculum has been compressed from 2 years to 18 months – a nationwide trend). The faculty designers of the program teach health professions students, and it is based on their experience of direct teaching that a need for the program was identified. It is this experience that informs program design.

The proposed BS in medicine differs from existing programs in a number of important aspects including:

Courses are taught by faculty who also teach in health professions programs. This is tremendously important in design of content specifically tailored to prepare students for these programs.

Basic science is taught in a practical, clinical context using real patient cases and in some courses, real patient volunteers with informed consent, therefore preparing students to utilize content knowledge in practical settings.

Clinical faculty with responsibility for direct patient care are involved in designing and teaching courses, and therefore not only provide highly relevant content, they also give students direct access to professional role models and mentors.

All faculty, being closely involved themselves in the health professions as researchers, clinicians and/or health care educators are aware of the many challenges of health care practice -- including political, economic, and psychological challenges. As such they are in a strong position both to give students a realistic appreciation of the field as well as to prepare students to meet the challenges.

While we very much appreciate the high quality of existing programs and their utility in preparing many students for health sciences education (and in fact we will utilize existing courses in the COS, CSBS and other colleges), the existing programs are not adequately serving all students with capability for health science careers. The BS in Medicine is designed to address that lack. Given the approximately 10,000 applicants each year to the UA College of Medicine alone, and also considering the growing interest in all UA health profession programs, it is important that we do our utmost as a university to provide opportunity and prepare students from many backgrounds for success in these programs. The COM BS in Medicine is specifically designed to help achieve this goal.



**NEW ACADEMIC PROGRAM-UNDERGRADUATE MAJOR
ADDITIONAL INFORMATION FORM**

- I. **MAJOR DESCRIPTION** -provide a marketing/promotional description for the proposed program. Include the purpose, nature, and highlights of the curriculum, faculty expertise, emphases (sub-plans; if any), etc. The description will be displayed on the advisement report(s), [Degree Search](#), and should match departmental and college websites, handouts, promotional materials, etc.

[Bachelor of Science in Medicine](#) (CIP CODE – 51.0000, College of Medicine)

The Bachelor of Science in Medicine is a four-year degree program designed and delivered as a collaboration between clinicians, basic scientists and humanists, with focus on clinical reasoning and case-based learning. The program juxtaposes applied topics such as what it is to be a health care provider, clinical case analysis, medical ethics, professionalism, health care delivery to improve quality care, and hands-on experience through simulation, with topics in the human medical sciences, including advanced anatomical, biochemical, neurological, and physiological science, pathology of disease, mechanisms of treatment, and integrative therapies. This degree does not allow licensure to practice medicine.

Understanding and integrating medical technology in healthcare practice is critical the future of health care and is included in the degree program as an area of emphasis. The degree is designed to provide students with opportunities to learn about the application of personal medical devices in cutting-edge medical/healthcare research as well as educate student on the effective use of medical devices and biomedical data to evaluate disease presentations and/or disease risk factors and help understand therapy options.

The BS in Medicine is a multi-disciplinary degree program involving collaboration with UArizona programs in Engineering, Life Sciences, Applied Sciences and Technology, Social and Behavioral Sciences, Humanities, Nutritional Sciences, Nursing, Pharmacy and Public Health. The program provides a broad range of electives for in-depth study, including in biomedical engineering, bioinformatics, emergency medicine, aging in medicine, medical ethics, integrative medicine, history of medicine, and climate change as a factor in medical care.

Faculty involved in design and oversight of the program are clinicians and basic scientists who contribute significantly to professional health science programs at UArizona, especially Medicine. This faculty expertise insures that the BS in Medicine is and will remain carefully tailored to meet the needs of students seeking entry into professional healthcare programs and/or careers in allied health. Guided by the aforementioned faculty, students in the BS in Medicine program will develop knowledge and clinical reasoning skills useful in understanding their own health as well as in counseling and caring for others. Students will learn the use of

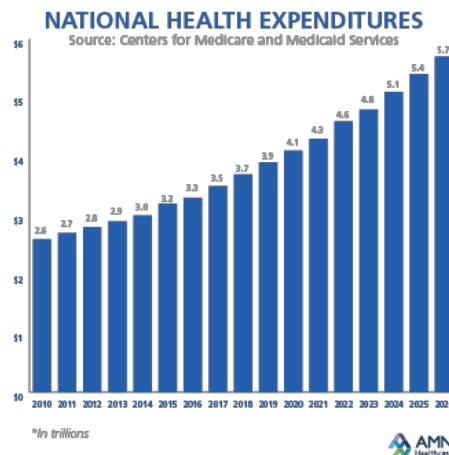
technological devices and virtual/telemedicine as healthcare tools as well as the medical content knowledge, and the hands-on skills using simulation and shadowing to prepare for the many and diverse health care jobs/careers available.

The purpose of the program is to advance student knowledge of human diseases/disorders, treatments, patient-professional interactions, clinical reasoning, medical health technology and cutting-edge research in medicine/health care. Students who graduate from the program will be well-prepared to: 1) enter careers directly in health care support positions; or 2) enter advanced degree programs in Human Medical and Health Sciences (i.e., medicine, nursing, nurse anesthetist, physical/occupational therapy, pharmacy, public health, physician assistant, clinical research, basic science research/tech, hospital lab tech, industry, etc.); or 3) become familiar with the basic science of human medicine as supportive to alternative careers (i.e., medical marketing, medical technology, medical law, biomedical engineering, medical business, medical administration, etc.). Yet, completion of this degree does not include licensure to practice medicine.

- II. **NEED FOR THE MAJOR/JUSTIFICATION**-describe how the major fulfills the needs of the city, state, region, and nation. Provide market analysis data or other tangible evidence of the need for and interest in the proposed major (and emphases, if applicable). This might include results from surveys of current students, alumni, and/or employers or reference to student enrollments in similar programs in the state or region. Include an assessment of the employment opportunities for graduates of the program for the next three years. Curricular Affairs can provide a job posting/demand report by skills obtained/outcomes/CIP code of the proposed major. Please contact the [Office of Curricular Affairs](#) to request the report for your proposal.

United States:

Healthcare consumes nearly one-fifth of the US economy with projections of job growth at >30% for the next 10 to 20 years¹. A powerful signal of rising demand for healthcare services and healthcare workers is how much money is projected to be spent on healthcare in the future. From 2010 to 2026 the amount spent on healthcare is projected to double reaching beyond \$5.7 trillion¹. Expenditures include payments for all healthcare costs, including pharmaceuticals, equipment and technology. Expenditures will rise for many reasons, but growing demand for the services of healthcare workers is a of the greatest significance.



Employment growth in the healthcare sector has been expanding since the end of the recession and continues to expand month over month according to the US Bureau of Labor Statistics Current Employment Statistics^{1,2}. Reports indicate healthcare job growth has been robust and graduates of our rigorous and relevant program will be in high demand, representing a specific and desired talent in the medical health care sector².

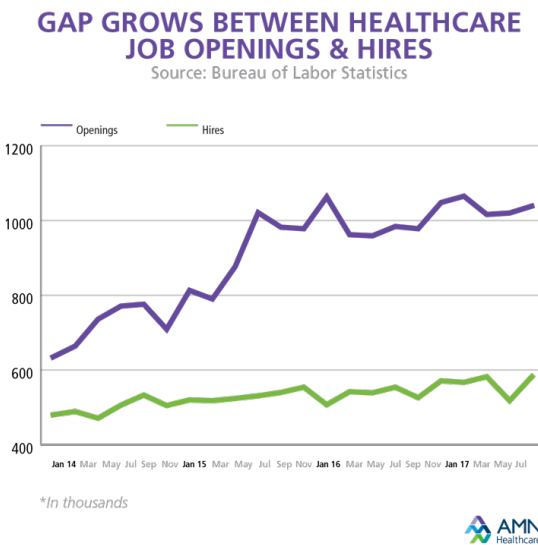
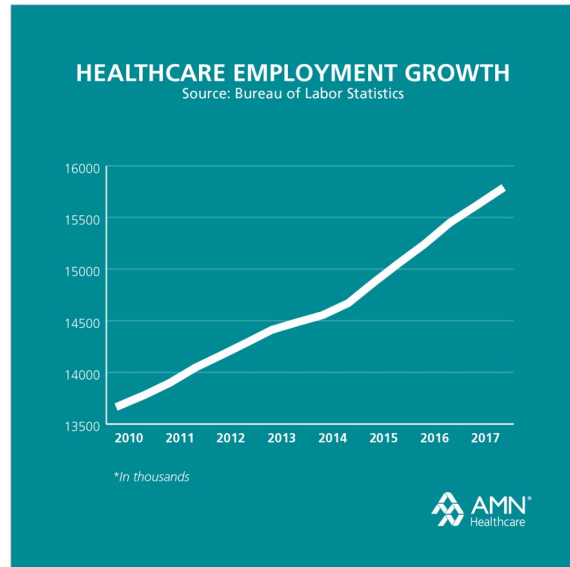
The need for well-trained healthcare professionals no doubt corresponds with larger demographic and population trends. Specifically, the aging of the US population will place greater demands on healthcare systems and services. By 2030 there will be 72 million elderly in the US, about 19% of the population^{1,2}.

State of AZ:

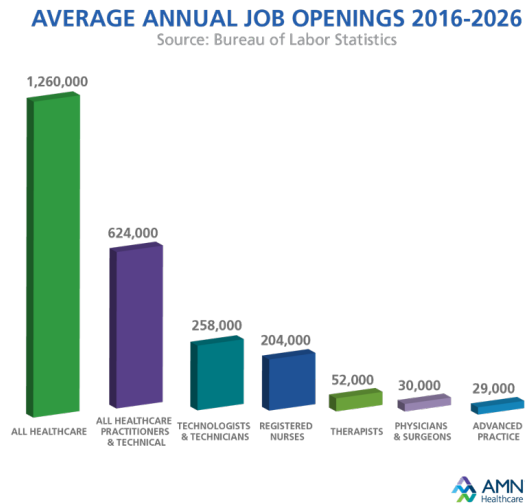
The state of Arizona is not insulated from the aforementioned trends and specific needs must be met in order to train, retain and grow the healthcare workforce within the state. Strategies to meet the growing demands include: increasing the number of health professions students and trainees that practice in Arizona after graduation through scholarships, loan repayment, tuition remission, and tax credits; recruiting licensed health professionals from other states and countries; enhancing the efficiency of care delivery through integration and inter- professional team based care; retaining the existing workforce – through retention incentives^{3,4,5}.

Alignment with UArizona Strategic Plan

The BS in Medicine aligns with the University of Arizona strategic plan, specifically, Pillar II: Grand Challenges and aims to leverage 4th Industrial Revolution advancements and tackle critical problems at the edge of human endeavor. Students who complete this degree program can go on to confront pressing health and wellness challenges in our communities through interdisciplinary collaboration. Students will be prepared to bring wellbeing and the use of medical device technology to communities, improving health and quality of life. This degree has



a strong focus on what it takes to become a health care provider, how to use medical information to create pathways for future medical care, medical science-based reasoning, healthcare management, medical technology, medical devices, medical supplies manufacturing, machine learning, medical/health informatics and environmental influences on health and medical care. Students educated in use of medical devices and the science of “bio-medical data” will be in high demand and can help to build a workforce capable of addressing grand challenges related to disease prevention and wellness.



A BS in Medicine will allow students to directly enter into the workforce including:

Healthcare Providers at nursing homes (33% projected growth by 2026),
 Home Health Aides (70% projected growth by 2026);
 Personal Care Aides (32% projected growth by 2026);
 Physical Therapist Aides (32% projected growth by 2026);
 Occupational Therapy Assistants (22% projected growth by 2026);
 Phlebotomists (20% projected growth by 2026);
 Health Administration-Health Care Management;
 Health Information Technologist;
 Medical Technologist;

A BS in Medicine along with advanced certification and/or a Master’s degree will allow students to enter the following careers:

Physician Assistants (40% projected growth by 2026);
 Licensed Practical and Vocational Nurses (LPN & LVN) (37% projected growth by 2026);
 Physical Therapist Assistants (30% projected growth by 2026);
 Medical Assistant s(28% projected growth by 2026);
 Operations Research Analysts (25% projected growth by 2026);
 Health Specialties Teachers–Postsecondary (22% projected growth by 2026);
 Occupational Therapists (25% projected growth by 2026);
 Perfusionist and Echo Technician;
 Radiation Therapist/Technologist;
 Radiologic and MRI Technologists;
 Medical Device Technologist;
 Pharmacy Technician Certificate;
 Surgical Technologists;
 Massage Therapists;

Medical Records and Health Information Technicians;
Dental Assistant;
Nuclear Medicine Technologist;
Dental Hygienists;
Diagnostics Medical Sonographers and Cardiovascular Technologists and Technicians;
Medical and Clinical Laboratory Technologists and Technicians;
Speech Therapy
Respiratory Therapy
Emergency Medical Training
Paramedics

A BS in Medicine along with advanced doctoral degree and licensure will allow students to enter into careers such as:

Physical Therapists (DPT);
Medical Physician (MD or DO),
Professor (PhD),
Pharmacists (PharmD),
Dentist (DDS),
Podiatrist (DPM),
Optometrist (OD),
Nurse Practitioners (RN) (41% projected growth by 2026) and (DNP)
Nurse Anesthetists,
Nurse Midwives,

The College of Medicine will be creating a unique “admittance to medical school from high school” for select students to encourage top high school performers in the State of AZ as well as Students with a diverse background to attend the UofA COM. The College of Medicine has created a unique “Accelerated Pathway to Medical Education, APME” which is a 7 year program for select high school students nationwide.

*<https://medicine.arizona.edu/admissions/accelerated-pathway-medical-education-apme>
The BS in Medicine is one program that would be available for students.*

References:

1. Future of Healthcare Jobs. Healthcare News. AMN Healthcare. Retrieved from:
2. Current Employment Statistics (CES) National. United States Bureau of Labor Statistics. Retrieved from [bls.gov/ces](https://www.bls.gov/ces/).
3. Tabor JA, Jennings N, Kohler L, Degan B, Derksen D, Campos-Outcalt D, Eng HJ. The Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse Midwives in Arizona: Arizona Area Health Education Centers and Center for Rural Health, University of Arizona, Tucson, 2014;138; . ;
4. Tabor JA, Eng HJ. Arizona Rural Health Workforce Trend Analysis 2007-2010. Tucson: Arizona Area Health Education Centers and Center for Rural Health, the University of Arizona, 2012;
http://crh.arizona.edu/sites/crh.arizona.edu/files/u25/AZ_Workforce_Trend_Analysis_2007-10_0.pdf.
5. Tabor JA, Jennings N, Kohler L, Degan B, Derksen D, Campos-Outcalt D, Eng HJ. Safety Net Health Care in Arizona 2015. Tucson (AZ): Arizona Area Health Education Centers and Center for Rural Health, University of Arizona, Tucson, 2016; 36.

III. **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.

Total units required to complete the degree	120
Upper-division units required to complete the degree	42
Foundation courses	
Second language	<i>Second Semester Proficiency</i>
Math	Moderate Math Strand
English	<i>(3-6 units)</i> ENGL 101 or 107 (3) ENGL 102 or 108 (3) or ENGL 109H (3)
General education requirements	<i>General Education: (21 units)</i> 2 courses/ 6 units- Tier I 150 (INDV) 2 courses/ 6 units-Tier I 160 (TRAD) 1 course/ 3 units-Tier II Arts 1 course/ 3 units-Tier II Humanities 1 course/ 3 units-Tier II Individuals and Societies
Pre-major? (Yes/No). If yes, provide requirements. Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	No
List any special requirements to declare or gain admission to this major (completion of specific coursework, minimum GPA, interview, application, etc.)	None
Major requirements	
Minimum # of units required in the major (units counting towards major units and major GPA)	52
Minimum # of upper-division units required in the major (upper division units counting towards major GPA)	47 (300 & 400 level courses)
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	<i>Statistics Requirement (3 units)</i> Choose one: MATH 163 Basic Statistics (3 units)

<p>required for the major). Courses listed must include prefix, number, units, and title. 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.</p>	<p>MATH 263 Introduction to Statistics and Biostatistics (3 units) SBS 200 Introduction to Statistics for the Social Sciences (4 units) BME 376: Biomedical Statistics (3 units) AREC 239 Introduction to Statistics and Data Analysis (4 units)</p> <p><u>General Sciences: (30 units)</u> CHEM 141 and 143/145 or CHEM 151 or General Chemistry I (4 units); CHEM 142 and 144/146 or CHEM 152 or General Chemistry II (4 units); PHYS 102/198 or PHYS 141/142 Physics I and Lab (4 units); CHEM 241A and 243A Organic Chemistry I and Lab (4 units); BIOC 384 Foundations in Biochem OR BIOC 385 Metabolic Biochemistry (3 units); MCB 181R Introduction to Biology (3 units) PSIO 201 Human Anatomy and Physiology I and Lab (4 units); PSIO 202 Human Anatomy and Physiology II and Lab (4 units);</p>
<p>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 email(s)/letter(s) of support from home department head(s) for courses not owned by your department.</p>	<p><u>Major Core: (33 units)</u> MED 101 Introduction to Medical Care (2 units) FCM 201 Being a Healthcare Professional (3 units) FCM 296 Seminar- Careers in Medical-Health Sciences (2 unit) CMM 459 & 461 Clinical Reasoning and Medical Case Based Learning (2 units) CMM 410 Human Histology: An Intro to Pathology (3 units) OR equivalent Histology, CMM 437, and 438 and 439 (1 unit each) PSIO 467 Endocrine Physiology (3 units) IMB 401 Medical Microbiology & Immunology (4 units) OR PSIO 431 Physiology of the Immune System (3 units) MED 441 Introduction to Medical Devices and Their Utilization (3 units) FCM 401 Medical Ethics and Professionalism (3 units) OR PSIO 411 Scientific Methods and Professional Ethics OR MED/PHIL 321 Medical Ethics (3 units) PHCL 412 Intro to Pharmacology (3 units) OR PCOL 406 Comprehensive Human Pharmacology (5 units) PATH 415 Mechanisms of Human Diseases (3 units) FCM 496D Disability Perspectives in Research, Policy, and Practice (3 units)</p> <p><u>Major Elective Areas: (19 units)- Emphases intended to assist in advising students</u> Emphases 1- Medical Technology; BME 477 Introduction to Bioinformatics (<i>instru consent reqd</i>) (3 units) BME 486 Biomaterial-Tissue Interactions PHCL 386 Intro to Tech Transfer in Medicine (3 units) CSC 250 Essential Computing for the Sciences CMM 441: Brightfield Microscopy (1 unit) CMM 446: Fluorescence Microscopy (1 unit) CMM 442: Fundamentals of Digital Imaging (1 unit) LAW 476A – Drug Discovery, Development, and Innovation to Reach the Marketplace (3 units) BME 4** Technology and Big Data in Individualized Care (3 units)</p>

	<p>SURG 401 Virtual Medical Care Training & Education in the Digital Age (2 units) FCM 4** Clinical Application of Medical Technology (3 units)</p> <p>Emphases 2- Basic Medical Sciences; BIOC 466 Biochemistry of Nucleic Acids CMM 401 Gross Anatomy (Summer course only) (4 units) CMM 437 Immunology Basics (1 unit) IMB 467 Cancer Immunology and Immunotherapy (3 units) IMB 465 Principles and Molecular Mechanisms of Microbe-Host Interactions (3 units) CMM 427 Pathophysiology Basics (1 unit) CMM 428 Pathophysiology of Integumentary, Respiratory & Digestive Systems (1 unit) CMM 429 Pathophysiology of Urogenital and Endocrine Systems (1 unit) CMM 404 Cell Biology of Disease (3 units) PHCL 445 Drugs of Abuse (3 units) PHCL 430 Pain (2 units) PHCL 444 Human Neurobiology Basics (1 unit) PHCL 331 Controversies in Pharmacology (3 units) PSIO 427 Metabolism and Disease (3 units) PSIO 450 Respiratory Physiology (3 units) PSIO 452 Digestive Physiology (3 units) PSIO 465 Systems Neurophysiology (3 units) PSIO 469 Human Reproductive Physiology (3 units) PSIO 485 Cardiovascular Physiology (3 units) PSIO 487 Physiology of Aging (3 units) PHCL 442 Human Performance Pharmacology (3 units) PCOL 410 Pharmacogenomics and Precision Medicine (3 units) PCOL 305 Drug Approval: The 3 Billion Dollar Bet (2 units) PCOL 355 Drug Delivery Systems (3 units) PCOL 350 ADME: How the Body Changes Drugs (3 units) CMM 444-6: Medical Embryology (1-3 units) New IMB 402 Medical Microbiology Basics (1 unit) New IMB 404 Medical Virology Basics (1 unit) MCB 301 Molecular Basis of Life (4 units) MCB 304 Molecular Genetics (4 units)</p> <p>Emphases 3-Medicine and Society; PHPM 310 Health Care in the U.S. (3 units) LAW 452 Health Law (3 units) LAW 478A - Legal and Regulatory Aspects of Healthcare Delivery (3 units) LAW 480A - Liability and Regulation of Healthcare Professionals (3 units) EHS 425-A Public Health Lens to Climate Change (3 units) FCM 496E Introduction to Population Health Management (3 units) PHPM 310 Health Care in the US" (3 units) FCM 302 Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations (3 units)</p>
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	<p>FCM 402/502 Addressing Health Disparities through Interprofessional Clinical-Community Collaboration (3 units) MED 318 The History of Medicine (3 units) HIST 373 Politics of Health and Medicine in the Americas: From Historical Roots to Contemporary Development (3 units) MED 319 The History of Medical Technology (2 units) MED 320 Parallel History of Medicine and Law (3 units) CMM 479 Art of Scientific Discovery (1 unit) HPS 433 Global Health (3 units) EHS 439A Outbreaks and Environmental Microbiology: Then to Now (3 units) EHS 420 Environmentally Acquired Illnesses (3 units) HIST 311 History of Epidemics (3 units)- Cross list as MED 311 HNRS 305 Narrative Medicine and Healthcare (3 units)</p> <p><u>Emphases 4- Integrative and Practice-Focused Medicine</u> FCM 301 Substance Misuse in Maternal and Child Health Populations (3 units) FCM 496A Advancements in Substance Misuse Research and Clinical Care Seminar (2 units) PSIO 497A Physiology of Mind-Body Interactions (3 units) IHM 401/501 Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing Stress & Mental Health (1 unit) FCM 424a-c Arts and Community Health Intercultural Perspectives and Applications Parts I-III (1-3 units) FCM 303 Difficult Conversations in Patient Care: The Art of Empathy (1 unit) EMD 197 – Emergency Medical Technician (4 units) EMD 350 – Advanced Emergency Medical Services Systems (3 units) NSC 2** Fundamentals of Precision Nutrition and Wellness (3 units) PHP 205 - Fundamentals of Telehealth (3 units) NSC 310 Principles of Human Nutrition in Health and Disease (3 units) AIS/MAS/MED 435 Mexican Traditional Medicine: An Overview of Indigenous Curing Cultures (3 units) MED 301 Healthcare Professional Well-being (1 unit)</p>
<p>Internship, practicum, applied course requirements (Yes/No). If yes, provide description.</p>	<p><i>Optional working towards required (to be phased in)</i> New MED 4** Clinical Applications of Medical Technology (2 units)(Marv Slepian & Vignesh Subbian) FCM 498 Community Health Field Training Experience (2 units) New PATH 4** Clinical Skills (path, pharm, phlebotomy, EKG, imaging, etc.) (2 units) (Mark Nelson) New FCM 4** Reflections on Clinical Medicine through Clinical Shadowing (Karyn Kohlman) New FCM/COPH 4** Community Health Field Training Experience (Ben Brady, Bridget Murphy, Ron Sorenson)</p>
<p>Senior thesis or senior project required (Yes/No). If yes, provide description.</p>	<p>No</p>
<p>Additional requirements (provide description)</p>	<p>No</p>

Minor (specify if optional or required)	Optional
Any double-dipping restrictions (Yes/No)? If yes, provide description.	Yes, major core courses not permitted to double-dip. Supporting coursework may double dip with other majors

*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.

IV. 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 rows to the table, as needed.

Course prefix and number (include cross-listings)	Units	Title	Course Description	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)
MATH 163 Equivalent to: (DATA 361, DATA 363, MATH 160, MATH 160-CC, MATH 163-CC, MATH 263, MATH 263-CC, MATH 361, MATH 363)	3	Basic Statistics	Organizing data: displaying distributions, measures of center, measures of spread, scatterplots, correlation, regression, and their interpretation. Design of experiments: simple random samples and their sampling distribution, models from probability, normal distributions, and normal approximations. Statistical inference: confidence intervals and hypothesis testing, t procedures and chi-square tests. Not intended for those who plan further studies in statistics. Except as per University policy on repeating a course, credit will not be given for this course if the student has credit in a higher level math course. Such students may be dropped from the course. Examinations are proctored.	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.	In-person	F, Sp	Y
MCB 181R Equivalent to: (BIOC 181R, ECOL	3	Introduction to Biology	Introduction to biology covers fundamental principles in molecular and cellular biology and basic genetics. Emphasis is placed on biological function at the molecular level, with a focus on the structure and regulation of genes, the	PPL 40+ or SAT I MSS 560+ or ACT MATH 24+ or one course from Math 108, 112, 113, 119A, 120R, 124,	In-person, online	F, Sp, Su	

181R, MCB 184, MCB 315, MIC 181R)			structure and synthesis of proteins, how these molecules are integrated into cells, and how these cells are integrated into multicellular systems. Examples stem from current research in bacteria, plants, and animals (including humans) in the areas of cell biology, genetics, molecular medicine and immunology.	122B, 125, 129, or 223.			
MATH 263 Equivalent to: DATA 361, DATA 363, MATH 160, MATH 160-CC, MATH 163, MATH 163-CC, MATH 263-CC, MATH 361, MATH 363		Introduction to Statistics and Biostatistics	Organizing data; distributions, measures of center and spread, scatterplots, nonlinear models and transformations, correlation, regression. Design of experiments: models from probability, discrete and continuous random variables, normal distributions, sampling distributions, the central limit theorem. Statistical inference; confidence intervals and test of significance, t procedures, inference for count data, two-way tables and chi-square procedures, inference for regression, analysis of variance. Examinations are proctored	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	In-person online (iCourse)	F, Sp, Su	Y
CHEM 141 and 143/145 or CHEM 151	4	General Chemistry I	Separate lab and lecture, both offered in-person and online (CHEM 141 and 143/145). There is also an in-person only integrated lecture-lab course. Both sequences are designed to develop a basic understanding of the central principles of chemistry	Credit is allowed for only one of these lecture/lab combinations: CHEM 105/106A, CHEM 141/143, CHEM 151 or CHEM 161/163.	In-person, online	F, Sp, Su	Y
CHEM 142 and 144/146 or CHEM 152	4	General Chemistry II	Separate lab and lecture, both offered in-person and online (CHEM 142 and 144/146). There is also an in-person only integrated lecture-lab course. Both sequences are continuations and designed to develop a basic understanding of the central principles of chemistry.	Credit allowed for only one of the these lecture/lab combinations: CHEM 105B/106B, CHEM 142/144, CHEM 162/164, or CHEM 152.	In-person, online	F, Sp, Su	Y
PHYS 102/198 or	4	Physics I	Introductory Physics. Topics include motion of particles in one and two dimensions, forces, Newton's laws, energy, momentum, angular	PHYS 102: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course	PHYS 102: In-person, online	PHYS 102 & PHYS 181: In-	Y

PHYS 141/142			momentum, and conservation laws, gravitation, fluids: Archimedes and Bernoulli, mechanical waves, sound, temperature, heat, heat engines, laws of thermodynamics. OR A first course in Newtonian mechanics; introduces freshman-level students to the statics and dynamics of point particles, rigid bodies, and fluids. Topics include vector algebra, projectile and circular motion, Newton's Laws, conservation of energy, collisions and conservation of momentum, rotational dynamics and conservation of angular momentum, statics, harmonic oscillators and pendulums, gravitation and Kepler's Laws, fluid statics and dynamics.	from MATH 108, 112, 113, 116, 119A, 120R, 122B, 125, 129, or 223 PHYS 141: MATH 122B, 124, or 125, or appropriate Math Placement Level	PHYS 141: In-person	person: F, Sp, Su PHYS 102 Online: F PHYS 141: F, Sp, Su	
AREC 239	4	Introduction to Statistics and Data Analysis	This is an introductory course in statistics and probability. This course deals with applied data analysis, probability concepts, and statistical inference including confidence intervals and hypothesis testing. Applications and examples will be drawn from life and social sciences.	PPL 60+ or MCLG 88+ or SAT I MSS 640+ or ACT MATH 26+ or one recent course from MATH 112, 113, 116, 122B, or 125	In-person	Sp	
CHEM 241A and CHEM 243A	4	Organic Chemistry I and Lab	General principles of organic chemistry.	CHEM 105B/106B or CHEM 142/144 or CHEM 152 or CHEM 162/164, completion Concurrent registration encouraged.	In-person	F, Sp, Su	Y
BME 376:	3	Biomedical Statistics	This course covers application of statistics to biomedical engineering and research. Topics include describing and summarizing biomedical data, study designs, probability distributions, diagnostic testing, and statistical inference for biomedical applications. All topics will involve use of R Statistical Computing Software	MATH 129 and Advanced standing	In-person	F	Y
BIOC 384	3	Foundations in Biochemistry	Structure and function of proteins, lipids, carbohydrates, and nucleic acids, with a focus on understanding the molecular function of essential biomolecules	MCB 181R and (CHEM 142 or CHEM 152 or CHEM 105B or CHEM 162) and (CHEM 241A or	In-person, online	F, W, Sp, Su	Y

				CHEM 242A or CHEM 246A)			
BIOC 385	3	Metabolic Biochemistry	Fundamentals of metabolism and nucleic acid biochemistry at the cellular and organismal levels, with a focus on key pathways and regulatory mechanisms	MCB 181R and (CHEM 142 or CHEM 152 or CHEM 105B or CHEM 162) and (CHEM 241A or CHEM 242A or CHEM 246A).	In-person, online	F, W, Sp, Su	Y
PSIO 201	4	Human Anatomy and Physiology I and Lab	Study of structure and function of the human body. Topics include basic anatomical and directional terminology; fundamental concepts and principles of cell physiology; histology; the integumentary, skeletal, muscular and nervous systems; special senses. Primarily for majors in physiology, biology, and health professions.		In-person	F, Sp, Su	Y
PSIO 202	4	Human Anatomy and Physiology II and Lab	Study of structure and function of the human body. Topics include basic anatomical and directional terminology; fundamental concepts and principles of cell physiology; histology; the integumentary, skeletal, muscular and nervous systems; special senses. Primarily for majors in physiology, biology, and health professions.	PSIO 201	In-person	F, Sp, SU	Y
CMM 4103	3	Human Histology: An Intro to Pathology	This course will provide pre-health science professions students (Medicine, Pharmacy, Nursing, Public Health) as well as students planning a career in biomedical research with essential background in functional morphology of human tissues and organs. Pathology examples will be used to help illuminate normal structure and function. The mode of instruction will be interactive lecture, including facilitated group study of virtual slides.	MCB 181 or equivalent or permission of instructor.	In-person	Su	Y
PSIO 431	3	Physiology of the Immune System	Focuses on physiology of the immune system, how it functions correctly, and some problems that occur when the immune system does not function properly (immunopathology).	PSIO 201 and PSIO 202 Grade C or better required	In-person, Online in summer	Sp, Su	Y
IMB 401	4	Medical Microbiology &	The molecular and biological characteristics of microorganisms of importance in human health and	Students should have taken undergraduate	In-person, online (iCourse)	Sp	Y

		Immunology	disease; the reaction of the host (immune system) to infectious agents and the mechanisms of host defense (immunity); molecular and cellular immunology and pathogenesis of infectious disease. This course will include areas such as immunology, virology, bacteriology, mycology, parasitology and infectious diseases.	courses such as microbiology, immunology, biochemistry, molecular biology or biology to enroll in this course.			
PSIO 411	3	Scientific Methods and Professional Ethics	This course will introduce students to the historical development of scientific scholarship and current controversies within the scientific community; various approaches to scientific methods and the application of these approaches to the natural sciences; elementary background knowledge of experimental design and the statistical procedures commonly used in physiological research; and important procedural, practical, and ethical issues pertaining to physiological research at a modern research university. The course will also provide practical personal experience in selected areas of professional analysis and communication	PSIO 201 and PSIO 202 Grade C or better required	In-person	F, Sp	Y
MED/PHIL 321	3	Medical Ethics	Ethical issues that arise in relation to medicine and health care: abortion, euthanasia, the allocation of scarce medical resources, socialized medicine, doctor-patient confidentiality, paternalism, etc.	2 courses from Tier One - Traditions/Cultures	In-person, online	F, W, Sp, Su	
PHCL 412	3	Intro to Pharmacology	Principles of how drugs act to produce changes within the body. Lectures will include the anatomy of physiology of body structures, with special emphasis on the processes that govern drug absorption, distribution, metabolism, and excretion. Other lectures will include the processes that establish and maintain intracellular electrical charge the membrane potential, nerve impulse conduction, how excitable tissue becomes excited or inhibited, and the mechanism(s) of drug action on such tissues.	1 course in Biochemistry	In-person, online	F	Y

FCM 201	3	Being a Healthcare Professional	Course offers an overview of our health care system in the larger context of our society. It includes the history of different health care fields, communication with patients, health disparities, discussion of health systems and policy issues, and interprofessional and cross-cultural care.	Two courses from Tier One, Individuals & Societies	Online , in-person	Sp	Y
FCM 496D	3	Disability Perspectives in Research, Policy, and Practice	This course will provide an introduction to how the lives of people with disabilities are framed by society through research, policy, and practice. Interdisciplinary in focus, the course will explore: 1) disability as conceptualized by society historically and in theory, policy and practice today; 2) the lived experience – disability over the lifespan; and 3) how research and policies inform practices in the field. Students will bring perspectives from their respective fields of study.	PSIO 201/202 highly reccomended	Online , in-person	F	Y
PATH 415	3	General Pathology	The course will deal with the basic reactions of cells and tissues to injury that underlie all disease processes and include cell injury and death, circulatory disturbances, inflammation and repair and disturbances of growth and neoplasia. concepts will be introduced in problem-based studies including 1) Definition of the process; 2) Pathogenesis and patho-genetic mechanisms important in the development of the process; 3) Morphologic characteristics that are useful for recognition of the process; 4) Clinical and pathophysiologic significance of the process; and 5) Physiologic and pathologic sequelae of the process.	Biology or Physiology (4 units) and Chemistry 4 units	On-line and in person	F	Y
BME 477	3	Introduction to Biomedical Informatics	Topics at the intersection of people, health information and technology.	ECE 175 or CSC 127A or CSC 110	On-line and in person	F	Y
BME 486	3	Biomaterial-Tissue Interactions	Biomaterials and their applications; protein-surface and blood-biomaterial interactions, inflammation, wound healing,	CHEM 151, or CHEM 103A, or CHEM 103A-CC, or CHEM 104A, or	On-line and in person	S	Y

			biocompatibility, implants and tissue engineering.	CHEM 105A, or CHEM 106A,			
CSC 250	4	Essential Computing for the Sciences	This course teaches essential computing skills for students in scientific disciplines. No prior background in programming is required. The content focuses on three computational skills: (i) basic programming in a scripting language such as Python, and knowledge of its supported data structures; (ii) facility with the UNIX operating system environment, including file structure, regular expressions, and job control; (iii) essential database skills, including database accession and interfacing through the SQL query language.	none	On-line	F, Sp	
CMM 441	1	Bright-Field Microscopy	This course will cover the fundamentals and theory of Bright-Field Microscopy. Students will learn image formation theory based on optical theory and diffraction as it relates to bright-field methods. The class will discuss several modes of bright-field microscopy, including standard bright-field, phase contrast, polarized light, and differential interference contrast microscopy.	MCB 181R	On-line	Sp	Y
CMM 446	1	Fluorescence Microscopy	This course will cover the fundamentals and theory of Fluorescence Microscopy. Students will learn image formation theory based on optical theory and light interactions. The class will discuss several modes of fluorescence microscopy, including: Wide-field fluorescence, Confocal microscopy, Convolution and deconvolution, Super-Resolution imaging. The content will conclude with a discussion of Imaging Ethics, as relates to fluorescence microscopy and as accepted by the world's scientific community.	MCB 181R	On-line	Sp	Y
CMM 442	1	Fundamentals of Digital Imaging	This course will cover the fundamentals and theory of Digital Imaging. Students will learn image resolution theory based on optical theory. Once the fundamentals have been covered, the class will discuss several aspects of Digital Imaging.	MCB 181R	On-line	Sp	Y

			The content will conclude with a discussion of Imaging Ethics, as relates specifically to digital imaging and as accepted by the world's scientific community. Digital imaging is a ubiquitous tool in biomedical research and in medical practice, therefore, students pursuing many fields in medicine will benefit from an understanding of this very versatile tool.				
BIOC 466	4	Biochemistry of Nucleic Acids	The biochemistry of nucleic acids including replication, repair, recombination, restriction of DNA, transcription, processing and translation of RNA, gene regulation and biochemical and genomic techniques to study these processes with a molecular emphasis. Designed primarily for majors and minors in biochemistry and chemistry.	BIOC462A	In-person, online	Sp	Y
CMM 410	4	Human Gross Anatomy	This course is an intensive, dissection-based survey of the gross structure of the human body. The course is intended for upper-level undergraduates (and graduate students, who will take the 501 version of the course) preparing for careers in biomedical sciences, biology teaching or anthropology. Daily labs will be student-directed opportunities for active learning and peer teaching. Exams will be both practical and written.	PSIO 201, PSIO 202	In-Person	Su	Y
CMM 437	1	Immunology Basics	The immune system integrates with all organ systems of the body, providing defense against pathogenic microorganisms and cancer, while contributing to homeostasis of many pathways throughout the body. This course, intended as an introduction to immunology, will provide essential background for medical and other health sciences students studying the immune system.	MCB 181R	On-Line	Sp	Y
IMB 465	3	Principles and Molecular Mechanisms of	Course covers the interactions that occur between microbes (bacteria, parasites and viruses) and their host that result in disease, commensalism or parasitism. Examples will be drawn from systems that have been	MCB 181R	On-Line, In-person	Sp	Y

		Microbe-Host Interactions	defined at the molecular/genetic levels, and viewed from the standpoints of microbe and host. Ideas will be presented in lecture format and class discussions of assigned literature.				
CMM 427	1	Pathophysiology Basics	This course will provide students with a foundational understanding of disease as a manifestation of disrupted physiology. Course content will include introductory cell physiology and disruption of homeostatic maintenance in disease processes associated with hematologic, cardiovascular and immune system. Principles will be illustrated using representative commonly occurring disorders and their treatments. This course is designed to compliment CMM 547, Histology Basics, which presents principles of cell and tissue organization of the human body.				Y
CMM 428	1	Pathophysiology of Integumentary, Respiratory & Digestive Systems	This course will provide students with a foundational understanding of disease as a manifestation of disrupted physiology. Course content will include an overview of normal physiology of integumentary, respiratory and digestive systems, as well as disruption of homeostatic maintenance in disease processes associated with these organ systems. Principles will be illustrated using representative commonly occurring disorders and their treatments. This course is designed to compliment CMM 548, Histology of Respiratory and Digestive Systems.				Y
CMM 429	1	Pathophysiology of Urogenital and Endocrine Systems	This course will provide students with a foundational understanding of disease as a manifestation of disrupted physiology. Course content will include an overview of normal physiology of urogenital and endocrine systems, as well as disruption of homeostatic maintenance in disease processes associated with these organ systems. Principles will be illustrated using representative commonly occurring disorders and their treatments. This				Y

			course is designed to compliment CMM 549, Histology of Urogenital and Endocrine Systems.				
CMM 404	3	Cell Biology of Disease	This team-taught course is designed to provide a solid introduction to graduate-level cell biology with an emphasis on how key pathways contribute to human disease. The course format consists of discussion-oriented lectures on key concepts in cell biology, with each concept linked to specific diseases caused by dysregulation of the relevant pathways. Course topics will be divided into broad cell biology themes with related diseases as "case studies" to illustrate the connection between cell biology and health.	biochemistry, molecular biology, and cell biology	On-Line, In-person	Su	Y
PHCL 445	3	Drugs of Abuse	Pharmacology and toxicology of abused drugs with emphasis on mechanisms of drug action, theories of addiction, and treatment approaches.	biochemistry, molecular biology,	On-Line, In-person	Sp	Y
PHCL	2	Pain, Neuropharmacology	Students will be introduced to the basic concepts of pain, neural pathways of touch/pain, and neuropharmacology. Students will be required to read research articles and describe the goal of the experiments and well as the techniques used in the manuscripts. Students will be exposed to current research occurring within the department. Students should interact by asking questions and answering questions during lectures. Concepts will include our current understanding of pain perception, pain pathways, and how pain may be perceived at higher cortical levels of the central nervous system (CNS). Students will be introduced to different categories of pain and medications currently used to inhibit pain.	biochemistry, PSIO 201 PSIO 202	On-Line, In-person	F	Y
PHCL 442	3	Human Performance Pharmacology	In this course, students can explore the pharmacology of purported performance enhancing drugs and supplements used by athletes and "weekend warriors". Lectures and course material will enable students	4 Units Physiology OR 4 Units Biology) and 4 Units Chemistry.	On-line, in person	F. Sp	Y

			to review the most discussed and relevant products as well as dismantle public misperception about the actual efficacy and risks associated with these products.				
PHCL 444	1	Human Neurobiology Basics	This course will cover the general anatomy and physiology of the human nervous system as well as some pathology and pharmacology.	PSIO 201 PSIO 202	On-line	F	Y
PHCL 331	3	Controversies in Pharmacology	This writing-intensive course offers students information about prominent and controversial topics in pharmacology. Ideas presented in this course may be new to students or they may represent a novel way of thinking about a topic. Narrated lecture presentations, videos, podcasts, news stories, and manuscripts will allow students to learn the science underlying such controversial events while encouraging an intellectual, ethics-based exploration of these concepts. Topics include, but are not limited to, lethal injection as capital punishment, health care provider conscience clauses to deny patient medications and services, human performance enhancement drugs, and FDA compassionate drug use programs.	MCB 181R	On-Line, In - person	F, Sp	Y
PSIO 427	3	Metabolism and Disease	Students will study the biochemical principles that govern metabolism in physiological and pathophysiological states. We will discuss the underlying biochemistry and cell biology of specific diseases that disrupt normal cellular physiology including metabolic diseases, cancer, diabetes, cardiovascular and neurodegenerative diseases. Course activities include lectures, classroom discussions and oral presentations and assessments include exams, presentations and discussions.	PSIO 201 PSIO 202	On-Line, In - person	F, Sp	Y
PSIO 452	3	Digestive Physiology	This course uses an integrative approach to introduce students to the structure and function of the digestive system, and will survey how the digestive system functions correctly, how it is regulated, and	PSIO 201 PSIO 202	On-Line, In - person	F, Sp	Y

			some problems that occur when it does not function properly.				
PSIO 450	3	Respiratory Physiology	This course will introduce students to the structure and function of the respiratory system, including lung structure and development, physiology of the pulmonary airways, lung fluid balance, pulmonary circulation, pulmonary mechanics, gas exchange, regulation of breathing, respiration in the neonate and cardiopulmonary interactions. Each topic will be addressed from the molecular to the systems level of organization, and respiratory system disease will be used as a framework for understanding basic physiology.	PSIO 201 PSIO 202	On-Line, In - person	Sp	Y
PSIO 465	3	Neurophysiology	This course is concerned with how systems of neurons operate together to perform a wide array of functions including the processing of sensory information and generation of motor behaviors. Relevant aspects of neuroanatomy will be covered and some neural diseases will be discussed. A brief review of cellular neurophysiology will be provided at the outset of the course.	PSIO 201 PSIO 202	On-Line, In - person	Sp	Y
PSIO 469	3	Human Reproductive Physiology	We will examine contemporary issues in the field of reproductive physiology with particular emphasis on clinical applications and societal concerns. The class structure is designed to encourage application of primary scientific literature and textbook hypotheses to real-world practice and exploration of new issues. Students are encouraged to bring recent articles, newspaper clippings, opinions, ideas and questions to class to promote active learning.	PSIO 201 PSIO 202	On-Line, In - person	Sp	Y
PSIO 485	3	Cardiovascular Physiology	Physiology principles of the heart, blood and peripheral vasculature, viewed in an integrative manner, from the cellular to the systems level.	PSIO 201 PSIO 202	On-Line, In - person	F, Sp	Y
PSIO 487	3	Physiology of Aging	In this course we will examine the processes of lifecycle development, normal and pathological aging, senescence, and death from an ecophysiological perspective. Course	MCB 184 or (MCB 181R and MCB 181L)] and (ECOL 182R and 182L) and [(PSIO 201	On-Line, In - person	F, Sp	Y

			objectives include understanding the impact of aging on major physiological systems; evaluation of relevant research papers form genetics, ecology, gerontology and geriatrics; understanding the role of the elderly in modern society; and analysis of selected eldercare controversies in the scientific, medical, and political communities.	and PSIO 202) and (PSIO 303A or 303B)]			
PCOL 473	3	Pharmacogenomics and Precision Medicine	This course will introduce the student to the field of pharmacogenomics, which involves measuring the subtle differences in the biological blueprint and its expression in different individuals, and from that drawing conclusions about the likelihood of that individual having a beneficial drug effect, no effect, or a toxic effect. That information is then used to guide the choice and dose of drugs for the patient.	PCOL 350 &. 406	On-Line, In-person		Y
CMM 443-5	1-3	Medical Embryology	This series of three one-credit online course swill provide pre health science professions students (Medicine, Pharmacy, Nursing, Public Health) as well as students planning a career in biomedical research with valuable background in the development of the human body. Clinical cases resulting from congenital malformations will be used as instructive comparisons to normal structure and function. The courses will complement study of gross anatomy and histology, and will help students in mastering other health science topics such as physiology and cell biology, as well as provide vocabulary that is useful in approaching the medical literature.		On-Line		Y
MCB 301	4	Molecular Basis of Life	The course encompasses foundational material for the study of Molecular and Cellular Biology. It will be one of three core courses required for the MCB major. The focus will be on the fundamental concepts governing the interaction of biological macromolecules required for the central dogma of molecular biology: DNA > RNA > protein.	MCB 181R and 181L; Prior completion of first-semester Organic Chemistry, CHEM 241A and 243A.	In person, On-line	Sp	

MCB 304	4	Molecular Genetics	This is the second course in a three part upper division series required for MCB majors. The course will cover the foundations of genetics and genomics: 1) how cells and organisms transmit information to the next generation, 2) how the phenotypes of cells and organisms are connected to the information encoded within a DNA template, and 3) how DNA sequencing and recombinant DNA technology can be used to sequence and analyze the entire set of DNA in cells. In the first half of the course, the topics will include the mechanisms of genetic transmission, basis of traits, genome replication, and gene expression. The focus of the second half of the course will be to synthesize our understanding of these fundamental processes and to explore their application to the analysis of a wide range of biological phenomena.	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	In-Person, On-Line	F	
PHPM 310	3	Health Care in the U.S.	This course describes the structure and function of the various private and public health care entities within the United States. Strengths and weaknesses related to cost, quality and access are analyzed. Basic economic theories that drive financing are also considered.	two courses from Tier One-Individuals/Societies	On-line	F	Y
LAW 452	3	Health Law	Description This is a survey of the four major parts of "Health Law": (1) Regulation, Finance, and Policy; (2) Medical Liability; (3) Bioethics; and (4) Public Health.	none	In-person, on-line	F	Y
CMM 479	3	The Art of Scientific Discovery	This is a lab and discussion course whose purpose is to develop your skills in solving problems encountered in scientific research. You will be challenged with difficult puzzles that each teach principles in scientific problem solving. You will also study by example from the history of scientific discoveries. Topics include observation and discovery from patterns, organizational problems, overcoming challenges, generalization, synthesis,	none	On-line	F	Y

			slippery logic, and heuristic reasoning.				
HPS 433	3	Global Health	This course introduces and examines major health & health-related challenges of developing, resource constrained and emerging nations, and discusses how individual countries and global health partners are finding solutions to address these challenges. Students will study and analyze a variety of health priorities among different populations, cultural settings and health systems in relation to global health goals and partnerships.	CPH 200 and CPH 309	In-person, on-line	F	Y
EHS 439A	3	Outbreaks and Environmental Microbiology: Then to Now	This course will examine historical and present day outbreaks and pathogens. Different pathogen control interventions that have been used to mitigate the outbreaks will also be explored.	none	In-person	S	Y
HIST 311 Cross-list as MED 311	3	History of Epidemics	Over the course of the semester, we will analyze how epidemic and infectious diseases created historical watersheds that have shaped our world history socially, politically, environmentally, and economically to the present day. We will also examine human responses to epidemics in artistic, cultural, and intellectual realms, and the ways in which politicians, medical doctors, national and international bureaucracies, religious personnel, scholars, and everyday women and men debated their philosophical and moral implications. The final weeks of the course analyze contemporary "pandemic preparedness" policy and responses to health threats including vaccine controversies, ebola, and H1N1.	None	In-person	S	Y
FCM 301	3	Substance Misuse in Maternal and Child Health (MCH)	The effects of addiction, substance use disorders, and other forms of substance misuse has many broad and persistent health effects in MCH populations. This course will cover the effects of several substances (including, but not limited to,	none	In-person, on-line	F	Y

		Populations	tobacco, alcohol, marijuana, and opioids) on the psychological and physical wellbeing of women, infants, and children. We will also cover current clinical guidelines for treatments and expected treatment outcomes. The course will be especially useful to pre-health science professions students (including, but not limited to, medicine, pharmacy, nursing, public health) as well as students planning a career in addiction-related fields.				
FCM 496A	2	Advancements in Substance Misuse Research and Clinical Care Seminar	This seminar is a forum for presentation and discussion of original research findings, clinical advancements, and other topics as related to the treatment of addiction and substance use disorders. Each week students will read one related article, attend the seminar, participate in a discussion after the seminar, and prepare brief reflections on the each week's topic. Students also will take turns acting as the facilitator during the discussion. The course will be especially useful to pre-health science professions students (including, but not limited to, medicine, pharmacy, nursing, public health) as well as students planning a career in addiction-related fields.	none	In-person, on-line	F	Y
PSIO 497A	3	Physiology of Mind-Body Interactions	Students will explore the connections between their own mental/emotional processes and their physiological responses. As a result they will learn how to regulate their autonomic nervous system to reduce stress and improve performance.	PSIO 201 PSIO 202	In-person, on-line	Sp	Y
IHM 401	1	Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing	Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing Stress and Mental Health through an Integrative Lens is intended for graduate and upper division undergraduate students as an introduction to concepts and theories in mind-body medicine, the role of spirituality on health/wellness, and integrative	none	On-Line	F, Sp	Y

		ing Stress & Mental Health	approaches to support mental wellbeing. This course will provide students planning careers in the pre-health science professions as well as students planning a career in biomedical research, with a valuable grounding in one of the foundations of integrative health and medicine.				
EMD 197	4	Emergency Medical Technician	This workshop, EMD 197, provides the medical knowledge necessary to become an Emergency Medical Technician. EMD 197 will provide a brief introduction to EMS systems, the structure and history of EMS, and will focus on providing the fundamental knowledge necessary to become an EMT. With completion of EMD 197, students will have attained the required didactic training hours to meet the National Registry of Emergency Medical Technicians (NREMT) prescribed requirements for Emergency Medical Technicians (EMT).	BLS Provider CPR certification card is required prior the first day of class	In Person, On-Line	Sp, Su	Y
EMD 350	3	Advanced Emergency Medical Services Systems	This course will provide a broad overview of medical care provided by EMS services, the science behind EMS operations, and the legal framework under which out-of-hospital medical care is provided. Course topics will include the history and foundations of EMS, EMS systems, state and regional EMS systems, trauma systems, emergency departments and EMS, medical oversight and accountability, administration/management/27peration, system financing, communications, emergency medical dispatch, medical record documentation and EMS information systems, ambulance ground transport, inter-facility and specialty care transfer, air medical transport, EMS for children, rural EMS, disaster response, emergency medical care at mass gatherings, response to terrorist incidents and weapons of mass destruction, operational EMS, EMS and public health, research, EMS educational programs, EMS providers and system roles,	none	On-Line	F, Sp, Su	Y

			occupational health issues, medical-legal concerns in EMS, EMS research, Emergency Medical Treatment and Labor Act (EMTALA) and EMS.				
NSC 310	3	Principles of Human Nutrition in health and Disease	This course will provide a deeper understanding of the human body's nutrient requirements and utilization of those nutrients. The application of basic nutrition science principles in the selection of nutritional therapy for a wide variety of clinical disease states will also be investigated.	NSC 170C1 or NSC 101	In Person, On-Line	F, Su	Y
MAS/AIS/MED 435	3	Mexican Traditional Medicine: An Overview of Indigenous Curing Cultures (3 units)	A survey of various popular and Indigenous medicinal systems that fall under the rubric known as Mexican Traditional Medicine (MTM). Mexican scholar Carlos Viesca Treviño defines MTM as medicinal knowledge(s) that emanate from Mesoamerican world views and that have adapted to historical and social conditions in the Americas. This course will explore various expressions of MTM, with a special emphasis on Indigenous medicinal approaches to healing that exemplify both continuities and adaptations. We will compare across cultures some shared values in various Indigenous systems as well as how they are uniquely expressed in contemporary settings. We will also draw from the local knowledge holders of Indigenous populations from this region to compare various approaches in traditional medicine. This course will introduce students to the relationship between place, healing and cosmology in Indigenous-based cultures that maintain curing traditions and practices. We will explore the theories and philosophies that are used in MTM as well as applied knowledge and practices that are useful for self-care and community wellness.	None	In person	S	Y
EHS 420	3	Environmentally Acquired	Illnesses related to environmental exposures are on the rise but frequently misdiagnosed due to a lack of understanding of the	none	On-Line	Sp	Y

		Illnesses (3 units)	complexities of multiple hazard exposures and variable health outcomes. This course provides an overview of common and emerging Environmentally Acquired Illnesses (EAls) and explores the multitude of hazards, conditions, and predisposing factors related to human disease. Students will gain foundational knowledge of EAls and tools for environmental monitoring and mitigation as well as patient diagnosis and treatment options.				
PCOL 406	5	Comprehensive Human Pharmacology	Pharmacology is the study of how drugs change human physiology to prevent disease and to reduce/remove the impact of diseases. This course will present the basic principles of pharmacology, as well as instruction in the diverse mechanisms-of-action, and pharmacological effects (both desired and undesired!) of the major classes of drugs currently used to treat and prevent human diseases	PSIO 202, and CHEM 241A	in-person	F	Y
PCOL 310	2	Drug Approval: The 3 Billion Dollar Bet	Almost 60 billion dollars (2016) are spent annually on pharmaceutical research and development in the United States and almost 425 billion dollars (2015) are spent annually in drug purchasing. Drugs are key economic and therapeutic factors in the health care arena; yet, among patients and consumers the pharmaceutical industry lacks public trust and the process of drug approval is often shrouded in mystery. In this course we'll address the decisions drug manufacturers consider, including time, cost, risk and value in bringing as new drug product to market. We will explore how a new drug product is developed from concept to bedside.	ENGL 102	In Person	Fall	Y
PCOL 355	3	Drug Delivery Systems	The purpose of this course is to provide the student with a basis of understanding of pharmaceutical dosage forms. An overview of traditional and novel dosage forms will be presented along with a discussion on scientific and regulatory requirements necessary	CHEM 241B	In Person	Fall	Y

			to get a drug product approved. The course will emphasize the relationship between Physical Pharmacy (chemistry and physical science) and the pharmaceutical dosage form. Critical thinking and problem solving will be applied to the above principals				
PCOL 350	3	ADME: How the Body Changes Drugs	ADME, an acronym for absorption, distribution, metabolism, excretion, is often the determining factor in whether drugs generate the desired effect, or no effect, or a harmful effect. PCOL 350 provides students with a rounded education in the ways that the body changes the chemical form of drugs, as well as the ways that the body directs the movement of drugs over time, from administration through excretion.	PSIO 202, and CHEM 241B	In person	Fall	Y
LAW 478A	3	Legal and Regulatory Aspects of Healthcare Delivery	his course explains the different models and facility requirements for how health care is organized and delivered. Examples include the regulations that govern inpatient and outpatient treatment facilities, and the accreditation process with the Centre for Medicare and Medicaid Services. Additional topics include the regulation of tax-exempt hospitals with their associated community benefit role, and related health care statutes for providing access to care, including EMTALA. Advances in technology, such as the regulations around telemedicine and health information exchanges will be covered. The course concludes with innovative examples of improving health care delivery in the US.	none	On-line	Fall	Y
LAW 480A	3	Liability and Regulation of Healthcare Professionals	his course provides an overview of the professional licensure and compliance requirements for health professionals and describes the administrative, criminal and civil processes for non-compliance. Specific topics covered include: licensure requirements, scope of practice differentiation, obligations of providers to meet professional standards and duties of care, medical error and patient safety programs,	none	On-Line	Su	Y

			and professional claims litigation in both civil and criminal settings. The course concludes with training specifically designed for health professionals in the role of expert witnesses in litigation from the deposition process to trial.				
LAW 476A	3	Drug Discovery, Development, and Innovation to Reach the Marketplace	This course navigates the drug development path stretching across the pre-clinical and post-marketing divide from the full range of drug regulation, including drug discovery, innovative drug development tools, and the post-approval phase. Intellectual Property protection and evaluation will be covered, along with FDA-enforced market exclusivity and FDA-expedited review programs. The course concludes with international regulatory perspectives, including the European Medicines Agency, the costs involved to bring drugs through the clinical trials to market in the US and abroad, and how this affects future investment and strategy.	none	On-Line	Fall	Y
HIST 373	3	Politics of Health and Medicine in the Americas: From Historical Roots to Contemporary Developments	In this course we will examine the history of health - and health care - as well as the political dimensions of scientific research and medicine. Based on the understanding that health and health care are subject to political competitions on the nation state level and are mediated by changing global paradigms, we will use readings and class discussions to draw conclusions about citizenship rights in the Americas.	None	In-person	Fall, Spring	Y
HNRS 3053	3	Narrative Medicine and Healthcare	Through an interdisciplinary perspective, this course will investigate and evaluate the significance of Narrative Medicine and NVC (non-violent, or compassionate, communication) in the healthcare profession. Students will read, discuss, analyze, and reflect on the role of storytelling, role playing, visual and performing arts, and cultural awareness in contemporary medicine. Coursework will focus on appropriate communication between patients, caregivers, and practitioners, and in communities at large.	None	Hybrid	Spring	Y

			Emphasis will be on active student engagement, creative and analytic expression, and understanding and application of Narrative Medicine resources				
EHS 425	3	A Public Health Lens to Climate Change	How does a changing environment affect human health? What is the public health role in mitigating and addressing these implications? Why is a public health lens both relevant and necessary? Students in this course will directly interact with these questions and explore the fundamentals of global environmental change with a focus on climate change. Course topics include climate change, impacts on human health, policy development, adaptation and mitigation, health equity, and climate action co-benefits.	None	On-line	Spring	Y
PHP 205	3	Fundamentals of Telehealth	This course introduces students to the basic foundations of telehealth. In this course, students will learn about the human factors, technology, applications and administrative practices required for telehealth delivery. They will also be given the opportunity to disseminate telehealth information through written and verbal methods.	None	On-Line	Fall	Y
PHPM 310	3	Health Care in the US	This course describes the structure and function of the various private and public health care entities within the United States. Strengths and weaknesses related to cost, quality and access are analyzed. Basic economic theories that drive financing are also considered	For general education credit, two courses from Tier One-Individuals/Societies	Normally in class- COVID on-line	Spring	Y
IMB 402	1	Medical Microbiology Basics	This course will present basic concepts in the areas of microbiology, including bacteriology, virology, mycology and parasitology. It will also present the pathogenesis of medically important, viral, bacterial, fungal and parasitic diseases. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health profession students (Medicine, Dentistry, Nursing, Pharmacy, Public Health) as well as students planning a carrier in biomedical research.	Basic microbiology and immunology course	On-line,	Fall 2020	Y
FCM 302	3	Clinical Health Disparities in	Sexual and Gender Minority (SGM/LGBTQ) populations face disproportionate rates of health risks compared to the general population.	none	On-line	Fall 2020A	Y

		Sexual and Gender Minority (SGM) Populations	Compounding this problem are provider-level lack of knowledge and sensitivity around health issues facing SGM patients. This introductory course will review primary clinical health issues within SGM populations. Students will learn current best practices when working with SGM people and practical strategies to provide inclusive and culturally responsive care to SGM patients.				
IMB 404	1	Medical Virology Basics	This course will present basic concepts in the areas of human virology. It will also present the pathogenesis of medically important viral infectious diseases. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health profession students (Medicine, Dentistry, Nursing, Pharmacy, Public Health) as well as students planning a career in biomedical research	Basic Immunology course	On-line,	Spring 2020D	Y
EHS 425	3	A Public Health Lens to Climate Change	This course is designed to provide foundational knowledge in the various, complex mechanisms through which anthropogenic changes influence the health of the environment and subsequently human health. During this course, students will be introduced to key concepts including health risks associated with climate change and other human-mediated global environmental changes; local, regional, and national efforts underway to understand and manage the adverse impacts, and the factors influencing progress on this issue. Students will have the opportunity to engage with researchers and practitioners to learn about the current science as well as challenges and opportunities associated with identifying, managing, and addressing the health implications of climate change and other anthropogenic changes	none	On-line,	Spring 2021D	Y

V. **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 (ie CHEM 4**). Add rows as needed. Is a new prefix needed? If so, provide the subject description so Curricular Affairs can generate proposed prefix options.

Course prefix and number (include cross-listings)	Units	Title	Course Description	Prerequisites	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
MED 101	2	Introduction to Medical Care	This course will provide an overview of medical issues and systems within fields of medicine. The course is intended as an introduction to case-based problems and teach approaches to knowledge acquisition and problem solving that are basic for multiple professional fields within medicine. The course will provide students planning careers in the pre-health science professions (Medicine, Pharmacy, Nursing, Public Health, etc.), as well as students planning a career in biomedical research, policy work, advocacy. This will serve as well to promote health literacy and a familiarity with the issues of providing medical care at a personal through a professional through a public policy level. This course should serve as both a stimulus to foster further learning in these areas, as well as an introduction to basic medical and societal concerns. Integral to the course will be exploration of potential roles students may assume in the various realms of medical care.	none	hybrid	S	Fall 2021	F, Sp	Yes	Yes
MED 296	2	Careers in Medical-Health Sciences	This course is an introductory Core course in the BS in Medicine concentration. It will provide students an opportunity to gain insight into the various disciplines involved in medicine and health sciences. These will include Medicine, Nursing, Public Health, Pharmacy,	none	hybrid	S	Fall 2021	F, Sp	Yes	Yes

			Biomedical Engineering, Social Work, Psychology, Nutrition, Occupational/Physical Therapy and Law. Through an interactive format, students will be challenged with various patient cases to consider the role that each of these disciplines plays in the care of the patient.							
SURG 401	2	Virtual Medical Care Training & Education in the Digital Age	In this four-week 5 credit elective, Summer Session Course, the Arizona Telemedicine Program (ATP) and the Arizona Simulation Technology and Education Center (ASTECC) will use both individual and group interactive on-line formats to explore resources available to medical personnel and educators in the age of COVID-19, including: interactive virtual patients, on-line medical games, and virtual cadavers. Students will be taught how to critically analyze these resources in the context of healthcare learning objectives and be guided in applying on-line modules within a lesson plan. Students will also receive specific instruction in how to use telemedicine equipment to interview and examine patients.	None	In-person, online	S	Summer 2022	Summer 2 nd session	Yes	Yes
BME 4**	3	Introduction to Medical Devices and Their Utilization	This course will provide a broad overview of the field of medical devices. A context of medical practice will be framed at the outset including the evolution of the health encounter and the parallel emergence	PSIO 201, PSIO 202	On-line, in person	S	Spring 2022	Sp	Yes	Yes

			of medical devices. The evolutionary history of devices will be reviewed followed by detailed definition and understanding of the differences between devices vs. drugs vs. combinational systems. A generic approach to understanding how devices work will be provided to instill the rigor of the exactness needed and the standards utilized in bringing forward a true Medical device. ...							
MED 401	3	Medical Ethics and Professionalism	This course offers an overview of both medical ethics and professionalism, which are intimately intertwined in the practice of clinical medicine. Taught by experienced physician ethicists, this course will help students develop critical thinking skills needed to evaluate ethically complex situations encountered in medical practice. The student will begin by examining the history, development, major principles and core competencies in the field of medical ethics.	none	On-line, in person	S	Fall 2021	F, Sp	Yes	Yes
FCM 498	3	Field Training Experience in Community Health	This course is part of the BS in Medicine concentration. This course is a capstone experience that provides students with a hands-on approach to identify a community health need then developing and implementing a project	none	Hybrid	S	Fall 2021	F	Yes	Yes

			to address the need. The structure of the course will allow students to complete their field project over a 16 week period. Students will work in groups and be paired with organizations focused on addressing area health needs. Students will research the health needs of the community (using existing data sources such as community health needs assessments), identify a health need that they find of importance, then work with a community agency or internal U of A program to implement a project to address the need.							
FCM 496E	3	Introduction to Population Health Management	This course is part of the BS in Medicine concentration. It will provide students with an in-depth understanding of population health management and how to implement and manage these types of initiatives. Population health management is a growing area of importance within the health care field and providers are being expected to take the lead on these initiatives within the communities they serve. This broader perspective to health requires providers to take responsibility for improving the health status of an entire group of individuals. ...	none	On-line, in-person	S	Spring 2022	Sp	Yes	Yes
PHCL 386	3	Introduction to Tech Transfer in	Intellectual property (patents, copyrights, trademarks) are an increasingly critical part of university impact and medical translation.	none	On-line, in-person	S	Spring 2022	Sp	Yes	Yes

		Medicine	This introductory course is aimed at undergraduates in health sciences interested in exploring intellectual property and commercialization of medtech. Specific topics will include: the history and legislation that drive technology transfer; the role of a university's tech transfer office; types of intellectual property including patents and copyrights and what makes someone an inventor or contributor; and the entire translation process (with a focus on medtech) including patent and market analysis, patent application, licensing and more. ...							
FCM 402/502	3	Addressing Health Disparities through Interprofessional Clinical-Community Collaboration	This 3-unit summer session course engages students from a broad range of disciplines in: 1) examining methods of addressing health disparities through clinical-community collaboration; and 2) experiential learning through applying the multidisciplinary theories, methods, and approaches to particular case studies, as identified by partnering FCM programs. It is intended for students preparing for the health professions (e.g. physician, nurse) or the allied health professions (e.g. physical therapist,	none	In-person	S	Summer 2022	Su	Yes	Yes

			occupational therapist, social worker, dietician, clinical or community researcher). This course will explore the various models for understanding health disparities from a number of disciplinary perspectives, including policy, social science, psychology, social work, nursing, and medicine							
MED 318	3	The History of Medicine	This course will present an overview of the History of Medicine, beginning with the Egyptian Papyri, through the present. The course will present, generally in chronological order, concepts of health and disease. In addition, it will provide vocabulary that is useful in approaching the medical literature. The course will be especially useful to pre-health science professions students (Medicine, Pharmacy, Nursing, Public Health) as well as students who are interested in how Medicine relates to diverse cultures through History.	none	On-line, In-person	S	Fall 2021	F	Yes	Yes
MED 319	2	The History of Medical Technology	This course will examine the history of medical technology, beginning with early prosthetics, through early stethoscopes, and the development of X-rays, the Jarvik heart., etc., to present day technologies including imaging, sequencing, and robotic technology.	none	On-line, in-person	S	Spring 2022	Sp	Yes	Yes

FCM 303	1	Difficult Conversations in Patient Care: The Art of Empathy	This course will discuss how medical professionals deal with difficult patient discussion, how to address the family, patient rights and what types of things cannot be stated. How health care providers themselves deal with losses and when they have to be the ones to tell the family.	none	On-line, in-person	S	Spring 2022	Sp	Yes	Yes
NSC 2**	3	Fundamentals of Precision Nutrition and Wellness	This course is designed to teach the fundamental concepts of nutrition and wellness including disease prevention and wellness at an individual/population level through transformative advances in understanding the relationship between nutrition, lifestyle, genomics, metabolomics, and human evolution	None	In-person,	S	Spring 2022	F, SP, Su	Yes	Yes
MED 3**	3	Parallel History of Medicine and Law	This course is an overview of comparative history for the Bachelor of Science degree for Medicine or Law. The Parallel History of Medicine and Law is an opportunity for students to consider the chronological discovery, development and progression of medical knowledge compared to the advancement of laws and legal concepts within the same eras. The course reviews the circumstances of health and disease that occurs historical periods as	None	In Person and On-line	S	Spring 2022	Sp	Yes	Yes

			government, civil and individual rights.							
FCM 4**/5*	1	Arts and Community Health: Intercultural Perspectives and Applications: Part I – Foundation	This co-taught course provides an overview of how creative arts practices have been implemented to promote community health and wellness. Interdisciplinary in nature, the course draws on existing theoretical frameworks, practices, and research methods from both the arts and health sciences, and seeks to promote inter-professional dialogue about how to expand the contributions of creative arts in promoting healthy communities. This first course of a three part 1-credit course series focuses on the foundation of inclusive arts perspectives and applications from different disciplines	none	Hybrid	S	Fall 2021	F,Sp	Y	Y
FCM 4**/5*	1	Arts and Community Health: Part II – Focus on Disabilities and Client-Centered Practices	This co-taught course provides an overview of how creative arts practices have been implemented to promote community health and wellness. Interdisciplinary in nature, the course draws on existing theoretical frameworks, practices, and research methods from both the arts and health sciences and seeks to promote inter-professional dialogue about how to expand the contributions of creative arts in promoting healthy	none	Hybrid	S	Fall 2021	F,Sp	Y	Y

			communities. This second course of a three part 1-credit course series focuses on creative arts in the context of disabilities and client/person-centered perspectives and practices.							
FCM 4**/5*	1	Arts and Community Health:: Part III – Focus on Arts and Aging, Dementia & Brain Health	This co-taught course provides an overview of how creative arts practices have been implemented to promote community health and wellness. Interdisciplinary in nature, the course draws on existing theoretical frameworks, practices, and research methods from both the arts and health sciences and seeks to promote inter-professional dialogue about how to expand the contributions of creative arts in promoting healthy communities. This third course of a three part 1-credit course series focuses on creative arts in the context of aging, dementia, and brain health	none	Hybrid	S	Fall 2021	F,Sp	Y	Y
MED 301	1	Healthcare Professional Well-being	This course will explore the foundations of wellbeing, promoters of wellbeing, detractors from wellbeing, and the systemic and organizational issues that are unique to the healthcare system. Students will learn and practice strategies to build healthy resilience, manage chronic stress, prevent burnout, and practice mindfulness.	none	hybrid	S	Spring 2022	Sp. F	Y	Y

			This Healthcare Professional Wellbeing Course includes concepts and curriculum appropriate for learners interested in any health care career. There are three components of the course: online content (asynchronous), wellness behaviors practices and reflections (individual and asynchronous), weekly in person/zoom class (synchronous and mandatory attendance).							
MED 4**	3	Clinical Applications of Medical Technology	This course will describe and define the use of current medical technology including, personal devices, self-testing and the use of telemedicine/telecare.	none	On line	D	Fall 2022	F	Yes	Yes
PATH 4**	3	Clinical Skills	This course will teach students the skills of pathology including tissue slicing and staining, phlebotomy, pharmacology, reading an EKG and techniques for basic medical imaging.		On-line, in person	D	Spring 2023	Sp	Yes	Yes
FCM 4**	3	Reflections on Clinical Medicine through Clinical Shadowing	This course is intended to give students an in-person view of medical practice, through direct observation of health care professionals at work. Students will produce written reflections on their shadowing experience, presenting patient cases (maintaining confidentiality), clinical steps taken and personal evaluation.	none	Hybrid	D	Spring 2022	Sp	Yes	Yes

MED 4**	3	Skills for advancement; work place professionalism, resume writing, interviewing techniques, understanding HIPAA	This course will be taught by professional health care workers to help with building ones portfolio for a career in health care, how to act and what to expect in a professional health care atmosphere, give writing techniques at all levels (medical notes to writing papers, cases and grants) to understanding HIPAA laws.		On-line, in-person	D	Fall 2023	F	Yes	Yes
FCM 431	3	Creative Arts in Health, Healing & Wellness	This course focuses on the use of visual arts to promote the physical, cognitive, psychological, and emotional growth and health. Art expression is explored both as a form of non-verbal communication and as a healing agent. Students will be required to complete four major projects, read the texts, and other assigned readings. Topics for this course change annually to include special emphasis in issues related to children, adolescents, adults and older adults.	none	On-line	D	Spring 2022	Sp	Yes	Yes

*In development (D); submitted for approval (S); approved (A)
Subject description for new prefix (if requested). Include your requested/preferred prefix, if any:

NOTE: I have moved all approved courses to Section IV

VI. FACULTY INFORMATION- complete the table below. If UA Vitae link is not provided/available, attach a short CV (2-3 pages) to the end of the proposal or upload to the workflow form (in the “Letter(s) of Support” field). 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 “CV attached”
Todd Vanderah	Chair, organizing committee; Dept Head, Pharmacology	Todd Vanderah, PhD
Claudia Stanescu	Member, organizing committee; Physiology	Claudia Stanescu, PhD
Helen Amerongen	Member, organizing committee; Cellular and Molecular Medicine	Helen Amerongen, PhD
Paul Gordon	Member, organizing committee; Family and Community Medicine	Paul Gordon, MD
Tejal Parikh	Member, organizing committee; Family and Community Medicine	Tejal Parikh, MD
Arthur Gmitro	Member, organizing committee; Dept Head, Biomedical Engineering	Arthur Gmitro, PhD
Carol Gregorio	Dept Head, Cellular and Molecular Medicine; Executive Director, UArizona Health Sciences Global and Online, Assistant Vice Provost for Global Health Sciences Member, organizing committee	Carol Gregorio, PhD
Nafees Ahmad	Member, organizing committee; Immunobiology	Nafees Ahmad, PhD
Robert Segal	Member, organizing committee; Medicine	Robert Segal, MD
Alicia Allen	Member, organizing committee; Family and Community Medicine	Alicia Allen, MD
Roger Miesfeld	Member, organizing committee; Distinguished Professor, Chemistry & Biochemistry, Associate Dean, UA Global	Roger Miesfeld, PhD

VII. FOUR-YEAR PLAN – provide a sample four-year degree plan that includes all requirements to graduate with this major and takes into consideration course offerings and sequencing. Refer to [Degree Search](#) for examples. Use generic title/placeholder for requirements with more than one course option (e.g. Upper Division Major Elective, Minor Course, Second Language, GE Tier 1, GE Tier 2). 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
CHEM 141/143	4	CHEM 142/144	4	CHEM 241A/246A	3	Language I	4
ENGL 101/107/109H	3	ENGL 102	3	CHEM 243A/247A	1	PHYS 102	3

Tier 1 Gen Ed	3	MATH 263/376	3	Tier 1 Gen Ed	3	PHYS 181	1
MCB 181R	3	FCM 201	3	Tier 1 Gen Ed	3	Tier II Gen Ed	3
MED 101 intro	2	Tier 1 Gen Ed	3	PSIO 201	4	PSIO 202	4
				MED 296 seminar/career	2		
Total	15	Total	16	Total	16	Total	15

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
BIOC 384/385	3	CMM 410	3	FCM 496D	3	IMB 401/PSIO 431	3
Language II	4	BME 4** device	3	PHCL 412	3	Elective	3
CMM 459 & 461	2	MED 401 ethics	3	PATH 415	3	Elective	3
Tier II Gen Ed	3	Major Electives	3	Elective	3	Elective	4
Tier II Gen Ed	3	PSIO 467	3	Elective	3		
Total	15	Total	15	Total	15	Total	13

VIII. STUDENT LEARNING OUTCOMES AND CURRICULUM MAP—describe what students should know, understand, and/or be able to do at the conclusion of this major. Work with [Office of Instruction and Assessment](#) to create a curricular map using Taskstream. Include your curricular map in this section (refer to Appendix C for sample Curriculum Map generated using Taskstream).

At the successful completion of this major, students will be able to

1. Demonstrate in-depth knowledge of the structure and function of the human body in health and disease including use of appropriate medical terminology, and apply this knowledge to evaluation of disease therapies (courses include)

- MED 101 Introduction to Medical Care - Required
- CMM 459 & 461 Clinical Reasoning and Medical Case Based Learning- Required
- CMM 410 Human Histology: An Intro to Pathology- Required
- PSIO 467 Endocrine Physiology
- IMB 401 Medical Microbiology & Immunology- Required
- PHCL 412 Intro to Pharmacology- Required
- PCOL 406 Comprehensive Human Pharmacology
- PATH 415 Mechanisms of Human Diseases- Required
- CMM 401 Gross Anatomy
- EMD 197 – Emergency Medical Technician

2. Demonstrate knowledge of the scope of medical device technology as well as the complex datasets generated and their application to the practice of precision medicine. (courses include)

- MED 296 Seminar- Careers in Medical-Health Sciences - Required
- BME 4** Introduction to Medical Devices and Their Utilization - Required

to be required under emphases **Med & Technology**

BME 477 Introduction to Bioinformatics to be required under emphases

BME 486 Biomaterial-Tissue Interactions

PHCL 386 Medical Tech Transfer

CSC 250 Essential Computing for the Sciences- to be required under emphases **Med & Technology New: Technology and Big Data in Individualized Care**

SURG 401 Virtual Medical Care Training & Education in the Digital Age

LAW 476A – Drug Discovery, Development, and Innovation to Reach the Marketplace- to be required under emphases **Med & Technology**

MED 4** Clinical Applications of Medical Technology

PHP 205 - Fundamentals of Telehealth

3. Describe social determinants of health including racial/ethnic disparities, and apply scientific evidence, best practices, and professional judgment to proposing strategies to mitigate negative impacts of social factors on health outcomes. (courses include)

FCM 496D Disability Perspectives in Research, Policy, and Practice- Required

New MED 401 Medical Ethics and Professionalism- Required

PHPM 310 Health Care in the U.S.-to be required under emphases **Med & Society**

FCM 496E Introduction to Population Health Management

EHS 420 Environmentally Acquired Illnesses - to be required under emphases **Med & Society**

FCM 302 Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations-to be required under emphases **Med & Society**

HNRS 305 Narrative Medicine and Healthcare

New FCM 402 Addressing Health Disparities through Interprofessional Clinical-Community Collaboration “In the Field Course”

PHP 205 - Fundamentals of Telehealth

HPS 433 Global Health

AIS/MAS/MED 435 Mexican Traditional Medicine: An Overview of Indigenous Curing Cultures

NSC 310 Principles of Human Nutrition in Health and Disease

FCM 301 Substance Misuse in Maternal and Child Health Populations

FCM 496A Advancements in Substance Misuse Research and Clinical Care Seminar

4. Demonstrate understanding of professional and ethical responsibility in independent and/or multidisciplinary team settings. (courses include)

New MED 296 Seminar- Careers in Medical-Health Sciences- Required

New FCM 401 Medical Ethics and Professionalism- Required

FCM 201 Being a Healthcare Professional – Required

PSIO 411 Scientific Methods and Professional Ethics to be required under emphases **Med & Society**

MED/PHIL 321 Medical Ethics to be required under emphases **Integrative and Practice-Focused Medicine**

LAW 480A - Liability and Regulation of Healthcare Professionals

IHM 401/501 Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing Stress & Mental Health to be required under emphases **Integrative and Practice-Focused Medicine**

New FCM 303 Difficult Conversations in Patient Care: The Art of Empathy
EMD 350 – Advanced Emergency Medical Services Systems
New MED 301 Healthcare Professional Well-being

5. Demonstrate skills needed to engage in life-long learning, including the ability to find and critically evaluate relevant information, and apply it to solving clinical problems. (courses include)

FCM 201 Being a Healthcare Professional- Required

PHCL 412 Intro to Pharmacology- Required

New BME 4** Introduction to Medical Devices and Their Utilization- Required

MED 4** Clinical Applications of Medical Technology

New FCM 4** Community Health Field Training Experience

New PATH 4** Clinical Skills (path, pharm, phlebotomy, EKG, imaging, etc.)

New FCM 4** Reflections on Clinical Medicine through Clinical Shadowing

CMM 459 & 461 Clinical Reasoning and Medical Case Based Learning to be required under emphases Integrative and Practice-Focused Medicine

HIST 311 History of Epidemics- Cross list as MED 311

CMM 479 Art of Scientific Discovery

PHCL 386 Intro to Tech Transfer in Medicine

SURG 401 Virtual Medical Care Training & Education in the Digital Age

IHM 401/501 Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing Stress & Mental Health

PHP 205 - Fundamentals of Telehealth

PHCL 430 Pain to be required under emphases Integrative and Practice-Focused Medicine

PCOL 410 Pharmacogenomics and Precision Medicine to be required under emphases Integrative and Practice-Focused Medicine

PCOL 355 Drug Delivery Systems

Curriculum Map:

BS Medicine Curriculum Map

Courses and Activities Mapped to BS Medicine Outcome Set

	Outcome				
	Outcome 1: Structure & Function Demonstrate in-depth knowledge of the structure and function of the human body in health and disease, including use of appropriate medical terminology, and apply this knowledge to evaluation of disease therapies.	Outcome 2: Medical Device Technology Demonstrate knowledge of the scope of medical device technology, as well as the complex datasets generated and their application to the practice of precision medicine.	Outcome 3: Social Determinants Describe social determinants of health, including racial/ethnic disparities, and apply scientific evidence, best practices, and professional judgment to proposing strategies to mitigate negative impacts of social factors on health outcomes.	Outcome 4: Professional & Ethical Responsibility Demonstrate understanding of professional and ethical responsibility in independent and/or multidisciplinary team settings.	Outcome 5: Life-Long Learning Demonstrate skills needed to engage in life-long learning, including the ability to find and critically evaluate relevant information, and apply it to solving clinical problems.
Courses and Learning Activities					
PHCL 412 Intro to Pharmacology	A				
PATH 415 Mechanisms of Human Diseases	A				
PSIO 467 Endocrine Physiology	A				
BME 4** Introduction to Medical Devices and Their Utilization		A			
FCM 496D Disability Perspectives in Research, Policy, and Practice			A		
MED 4** Medical Ethics and Professionalism				A	
CMM 459 Clinical Reasoning					A
CMM 461 Medical Case Based Learning					A
Legend : I Introduced P Practiced A Assessed					

IX. ASSESSMENT PLAN FOR STUDENT LEARNING- using the table below, provide a schedule for program assessment of intended student learning outcomes 1) while students are in the program and 2) after completion of the major. Add rows as needed. Delete **EXAMPLE** row.

X.

Learning Outcomes	Sources(s) of Evidence	Assessment Measures	Data Collection Points
Demonstrate in-depth knowledge of the structure and function of the human body in health and disease including use of appropriate medical terminology, and apply this knowledge to evaluation of disease therapies.	Demonstrated content knowledge	Embedded exam questions, Exit survey	PSIO 467 PATH 415 PHCL 412)
Demonstrate knowledge of the scope of medical device technology as well as the complex datasets generated and their application to the practice of precision medicine.	Demonstrated content knowledge	Course-embedded assessments	BME 4**
Describe social determinants of health including racial/ethnic disparities, and apply scientific evidence, best practices, and professional judgment to proposing strategies to mitigate negative impacts of social factors on health outcomes.	Pre-post knowledge of health disparities	Pre-post assessment of health disparities	FCM 496D
Demonstrate understanding of professional and ethical responsibility in independent and/or multidisciplinary team settings.	Pre-post knowledge of medical ethics and professionalism	Pre-post assessment of medical ethics and professionalism	MED 401 Medical Ethics and Professionalism OR PSIO 411 Scientific Methods and Professional Ethics OR MED/ PHIL 321 Medical Ethics (3)
Demonstrate skills needed to engage in life-long learning,	Skill at evidence-based decision making	Grading rubric for clinical case interpretation	CMM 459 & 461: Clinical Reasoning & Working Clinical Cases (2 units)

including the ability to find and critically evaluate relevant information, and apply it to solving clinical problems.			
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Learning Outcomes	Sources(s) of Evidence	Assessment Measures	Data Collection Points
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XI. 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)
<u>Program Evaluation</u> Length of time to graduation Student program assessment Academic Program Review	Department generated statistics Department Senior Exit Survey Student/Alumni Survey	Every Year During Spring semester of senior At graduation and as part of alumni survey
<u>Completion Evaluation</u> Job Placement Statistics Graduate/Professional Program Enrollment	Student/Alumni Survey/Social Media Reviewers' responses	At graduation and as part of alumni survey, 2, 5, 7 and every 7 years after that for APR

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

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
Number of Students	100	250	400	550	750

Data/evidence used to determine projected enrollment numbers:

Projected annual enrollment was determined using data from current UA programs including Pharmaceutical Sciences and the Physiology Medical Sciences Program for comparison. The Pharmaceutical Sciences was launched in fall 2019 with 16 students graduating in May of 2020 and current enrollment for FY21 is 288 confirmed majors. The Physiology Program had 1,526 enrolled in the Spring of 2020. Based on these two programs, we estimate that we would have 100 incoming freshmen and grow by 50 students a year, with around 750 in five years.

XIII. 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					
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
Number of Degrees	30	150	300	600	900

These numbers were derived based on the assumption that the trend in graduates will trail behind the estimated enrollment due to attrition and time to complete the requirements, which is expected to be 2-3 years.

XIV. PROGRAM DEVELOPMENT TIMELINE- describe plans and timelines for 1) marketing the major and 2) student recruitment activities.

Once approved, we would like the degree to be offered in the Fall of 2021. Many of the courses will be available via online. All new courses are currently being put together with a designated course director(s) identified and indicated above. We anticipate that all new course submissions will be complete by the Spring of 2021.

Once approved, marketing will begin immediately with dedicated staff in the Health Sciences and College of Medicine (Tucson and Phoenix) to advertise the major on their College and Department websites as well as social media often used for prospective students, parents, and employers. These include programs on Facebook, Snapchat, Pandora/Spotify, Google and online channels to generate requests for more information. The College of Medicine-T & P will reach out to offer this degree nation-wide via the AAMC and other health related professional societies. College advisors will host online recruitment events in Phoenix, Tucson, Flagstaff and rural areas of the State of Arizona. Live recruitment events will occur in Spring. Recruitment activities will include but are not limited to; 1) high school recruitment events including tabling at college fairs and presenting at high school student leadership conferences, 2) College of Medicine (T & P) will go to targeted high schools throughout AZ and select out of state colleges to promote UArizona and all majors including the NEW BS in Medicine, 3) advisors attend campus recruitment events (i.e., “Meet your Major Fair”), 4) health professionals will be asked to give Q&A on careers in their field, 5) events at community colleges across the state of AZ.

XV. DIVERSITY AND INCLUSION-describe how you will recruit diverse students and faculty to this program. In addition, describe retention efforts in place or being developed in order to retain students.

Both Colleges of Medicine (T & P) recruit diverse students through several practices: 1) the COM has its own dedicated Deputy Dean and Office dedicated to diversity and inclusion, 2) A diverse group of academic advisors and college level faculty and staff interact with students 3)

COM and all its departments are very proactive about ensuring that students of diverse backgrounds are reflected in relevant materials including for recruitment and marketing. There are student progress committees for retention efforts with members that reflect a diverse population.

The COM (T&P) have committees focused on diversity and inclusion; these committees offer professional development opportunities to staff and faculty on topics which advance perspectives on best practices for fostering an inclusive environment on campus. Faculty from diverse backgrounds are and will continue to be recruited through professional health care- and research-based strategies which search committee members learn at Faculty Recruitment Workshops provided by Victoria Murrain (*Deputy Dean, Diversity and Inclusion*) and Human Resources. Such strategies include writing position descriptions which speak to the unit’s commitment to diversity and inclusion and the value we place as a unit on joining diverse perspectives in departmental initiatives and curriculum as well as casting a very large net to advertise positions and assembling search committees with diverse representation.

XVI. ABOR REQUIREMENT: New Academic Program Request. This section is required by ABOR. Most of the information can be copied/pasted from completed sections above. Instructions/clarification for completing the table below, from ABOR, can be viewed/downloaded [here](#).

University: University of Arizona

Name of Proposed Academic Program: BS in Medicine
Academic Units: College of Medicine - Departments of Pharmacology, Cellular and Molecular Medicine, Physiology, Family Community Medicine, Immunobiology, Pathology, Biochemistry, Medicine, College of Engineering - Biomedical Engineering
Geographic Site: Tucson, Arizona
Instructional Modality: Online and in class
Total Credit Hours: 120
Proposed Inception Term: Fall 2021
Brief Program Description: The Bachelor of Science in Medicine is a four-year degree program designed and delivered as a collaboration between clinicians, basic scientists and humanists, with focus on clinical reasoning and case-based learning. The Program juxtaposes applied topics such as what it is to be a health care provider, clinical case analysis, medical ethics, professionalism, health care delivery to improve quality care, and hands-on experience through simulation, with topics in the human medical sciences, including advanced anatomical, biochemical, neurological, and physiological science, pathology of disease, mechanisms of treatment, and integrative therapies.
Learning Outcomes and Assessment Plan: <i>At the successful completion of this major, students will be able to</i>

1. Demonstrate in-depth knowledge of the structure and function of the human body in health and disease including use of appropriate medical terminology, and apply this knowledge to evaluation of disease therapies
2. Demonstrate knowledge of the scope of medical device technology as well as the complex datasets generated and their application to the practice of precision medicine.
3. Describe social determinants of health including racial/ethnic disparities, and apply scientific evidence, best practices, and professional judgment to proposing strategies to mitigate negative impacts of social factors on health outcomes.
4. Demonstrate understanding of professional and ethical responsibility in independent and/or multidisciplinary team settings.
5. Demonstrate skills needed to engage in life-long learning, including the ability to find and critically evaluate relevant information, and apply it to solving clinical problems.

Methods of Assessment

Embedded exam questions,
 Exit survey
 Pre-post assessment of health disparities
 Pre-post assessment of medical ethics and professionalism
 Grading rubric for clinical case interpretation

Projected Enrollment for the First Three Years:

Year 1 = 250
 Year 2 = 500
 Year 3 = 1000

Evidence of Market Demand:

Healthcare consumes nearly one-fifth of the US economy with projections of job growth at >30% for the next 10 to 20 years.
 A powerful signal of rising demand for healthcare services and healthcare workers is how much money is projected to be spent on healthcare in the future. More than doubling from 2010 to 2026, when it reaches beyond \$5.7 trillion, expenditures include payments for all healthcare costs, including pharmaceuticals, equipment and technology. Expenditures will rise for many reasons, but growing demand for the services of healthcare workers is a very significant reason.
 Healthcare employment growth has been thriving since the end of the recession. The US Bureau of Labor Statistics Current Employment Statistics has shown month after month growth in healthcare employment since 2013, when there were only small declines in three separate months, with the rest of the year showing monthly increases. After that year, healthcare job growth has been robust, reaching a single-month growth record of more than 45,000 new jobs filled.

Similar Programs Offered at Arizona Public Universities:

ASU - Medical Studies (BS)

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

2 Academic Advisors (1.0 FTE ea) as well as an approved plan to increase 1 academic advisor per every additional 200-300 students enrolled. This plan will allow for rapid escalation of student advisors based on the number of students enrolled.
 1 Director (1.0 FTE) and 1 Co-Director (0.5 FTE), upon escalation the co-Director will be approved at a (1.0 FTE)
 1 Educational/Technology Specialists (1.0 FTE) with a plan of one additional Educational/Technology Specialist for every 500 additional students enrolled.
 1 Staff (1.0 FTE) with a plan of one additional Staff hire for every 500 additional students enrolled.
 These positions are approved by leadership (see letters of support from Drs. Dake and Abecassis).

Program Fee/Differentiated Tuition Required? YES NO Estimated Amount:

Program Fee Justification:

Specialized Accreditation? YES NO

Accreditor:

Appendix A. Minor Requirements. Complete if requesting a corresponding minor. Delete **EXAMPLE** column before submitting.

Minimum total units required		EXAMPLE
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 <u>double-dipping restrictions</u> (Yes/No)? If yes, provide description.		

**Proposal Title: Development of a Bachelor of
Science in Medicine
Department: Pharmacology**

Personnel Salaries (includes salary and ERE)	FY2021	FY2022	FY2023
Staff	\$ 102,180	\$ 128,380	\$ 222,700
Faculty	\$ 65,500	\$ 163,750	\$ 245,625
Students	\$ -	\$ -	\$ -
Graduate	\$ -	\$ -	\$ -
Undergraduate	\$ -	\$ -	\$ -
Post-docs	\$ -	\$ -	\$ -
Other Professionals (list)			
	\$ -	\$ -	\$ -
Advertising/Outreach and Ops	\$ 10,000	\$ 15,000	\$ 20,000
Total Operating Expenses	\$ 177,680	\$ 307,130	\$ 488,325
Revenue			
Program Revenue*	\$ -	\$ 190,991	\$ 441,587
PIF	\$ 100,000	\$ 100,000	\$ -
Additional funds committed by Department, College, or Other Unit	\$ (77,680)	\$ (16,139)	\$ (46,738)

Personnel Assumptions:

	FTE			Salary
Staff				
Academic Advisor	1.00	1.00	1.50	\$52,000
Administrative Support		0.50	1.00	\$40,000
Educational/Technology Specialist	0.50	0.50	1.00	\$52,000
Faculty	0.20	0.50	0.75	\$250,000

***Program Revenue**

RCM Revenue	Y1	Y2	Y3	Y4	Y5	Enrollment	1,313	
Projected Enrollment (incremental)	100	150	150	150	200	Tax	0.3329	437.10
Projected Student Credit Hours	500	1,500	2,659	4,119	4,904	Net		875.90
Undergraduate Enrollment	0	87,590	131,385	131,385	131,385	SCH	310.00	
Student Credit Hours	0	103,401	310,202	549,832	851,891	Tax	0.3329	103.20
	0	190,991	441,587	681,218	983,276			206.80

From: [Vanderah, Todd W - \(vanderah\)](#)
To: [Gomez, Rebecca L - \(rgomez\)](#)
Subject: Detailed Budget
Date: Friday, December 4, 2020 2:11:55 PM

Hi Rebecca,

To prevent this from delaying things:

Academic Advisor (1.0FTE) Salary (\$120,00 - \$150,000 + ERE)

1 Co- Advisor (0.5 FTE) Salary (\$120,000 - 130,000 + ERE)

Initial 2 Academic Advisors (1.0 FTE ea) Salary for Experienced (\$75,000-\$95,000 + ERE) and Salary for Mid-level (\$55,000-\$65,000)

as well as an approved plan to increase 1 academic advisor per every additional 200-300 students enrolled. This plan will allow for rapid escalation of student advisors based on the number of students enrolled.

1 Educational/Technology Specialists (1.0 FTE) Salary (\$65,000-\$95,000 + ERE)

with a plan of one additional Educational/Technology Specialist for every 500 additional students enrolled.

1 Staff (1.0 FTE) Salary (\$50,000 - \$60,000 + ERE) with a plan of one additional Staff hire for every 500 additional students enrolled.

These positions are approved by leadership (see letters of support from Drs. Dake and Abecassis).

Todd W. Vanderah
Professor and Head
Department of Pharmacology
Co-Director of the MD/PhD Program
Director of the Comprehensive Pain and Addiction Center
University of Arizona, COM

Undergraduate Major Peer Comparison Chart - select two peers for completing the comparison chart from (in order of priority) [ABOR-approved institutions](#), [AAU members](#), and/or other relevant institutions recognized in the field. The comparison chart will be used to identify typically required coursework, themes, and experiences for majors within the discipline. The comparison programs are not required to have the same degree type and/or major name as the proposed UA program. Information for the proposed UA program must be consistent throughout the proposal documents.

Program name, emphasis (sub-plan) name (if applicable), degree, and institution	Proposed UA Program: BS Medicine	Peer 1: BS Medical Studies, Arizona State University	Peer 2: BS Health Sciences- Allied Health, Northern Arizona University
Current # of enrolled students		Information regarding program enrollment not provided	33
Major Description. Includes the purpose, nature, and highlights of the curriculum, faculty expertise, emphases (sub-plans; if any), etc.	The Bachelor of Science in Medicine is a four-year degree program designed and delivered as a collaboration between clinicians, basic scientists and humanists, with focus on clinical reasoning and case-based learning. The Program juxtaposes applied topics such as what it is to be a health care provider, clinical case analysis, medical ethics, professionalism, health care delivery to improve quality care, and hands-on experience through simulation, with topics in the human medical sciences, including advanced anatomical, biochemical, neurological, and physiological science, pathology of disease, mechanisms of treatment, and integrative therapies.	The medical studies BS program provides students with the opportunity to meet the prerequisites for a variety of health professions programs (medicine MD/DO programs, dentistry, physician assistant, pharmacy, occupational therapy, optometry and others) and prepares the student for required postgraduate entrance exams, including the revised MCAT. Students can customize the medical studies degree to meet the prerequisites of the health professions programs for which they intend to apply. Students have the opportunity to learn directly from health care providers who are currently practicing in the field, and they can select clinically related internships or electives during their junior year. This degree program integrates communication, ethics, critical thinking, teamwork and leadership, all of which are essential competencies for members of today's health care teams. https://chs.asu.edu/programs/medical-studies	The online B.S. Health Sciences Allied Health program provides an innovative "3+1" curriculum that prepares students to advance their careers in health-related fields. These programs are specifically designed for students who have completed their associate's degree in an allied health discipline from a regionally accredited program and who have successfully obtained the related professional license. Our programs provide students with foundational knowledge of health promotion, disease promotion concepts, and understanding of the interconnectedness of personal, family, organizational, community, and societal health. Our students will use this knowledge to work collaboratively to provide comprehensive patient-centered care. While completing this degree, students will expand their critical thinking, problem solving, and decision making skills and enhance their ability to communicate effectively with others in order to provide excellent care for their patients. We specialize in preparing students in enhancing

			<p>their careers with an understanding of the importance of leadership and inter-professional teamwork among health professionals, as well as skills to sustain personal health and well-being.</p> <p>https://nau.edu/health-sciences/allied-health-online/</p>
<p>Target careers</p>	<p>Healthcare Providers at nursing homes (33% projected growth by 2026), Home Health Aides (70% projected growth by 2026); Personal Care Aides (32% projected growth by 2026); Physical Therapist Aides (32% projected growth by 2026); Occupational Therapy Assistants (22% projected growth by 2026); Phlebotomists (20% projected growth by 2026); Health Administration-Health Care Management; Health Information Technologist; Medical Technologist; <u>A BS in Medicine along with advanced certification and/or a Master's degree will allow students to enter the following careers:</u> Physician Assistants (40% projected growth by 2026); Nurse Practitioners (RN) (41% projected growth by 2026); Licensed Practical and Vocational Nurses (LPN & LVN) (37% projected growth by 2026); Physical Therapist Assistants (30% projected growth by 2026); Medical Assistant (28% projected growth by 2026); Operations Research Analysts (25% projected growth by 2026); Health Specialties Teachers–</p>	<p>Positions could include:</p> <ul style="list-style-type: none"> • community health worker • project coordinator • research assistant • sales or marketing representative (e.g., medical device or pharmaceutical industry) <p>Students are well-prepared to pursue postgraduate health degrees, resulting in a career as a:</p> <ul style="list-style-type: none"> • chiropractor • dentist • naturopathic physician • optometrist • pharmacist • physician • physician assistant • podiatrist • public health professional 	<p>Diagnostic Medical Imaging and Therapy Medical Assisting Public Health Allied Health Physical Therapy Respiratory Care Surgical Technology Paramedic Care Fitness Wellness Nutritional and Food Physical Education</p>

	<p>Postsecondary (22% projected growth by 2026); Occupational Therapists (25% projected growth by 2026); Perfusionist and Echo Technician; Radiation Therapist/Technologist; Radiologic and MRI Technologists; Medical Device Technologist; Pharmacy Technician Certificate; Surgical Technologists; Massage Therapists; Medical Records and Health Information Technicians; Dental Assistant; Nuclear Medicine Technologist; Dental Hygienists; Diagnostics Medical Sonographers and Cardiovascular Technologists and Technicians; Medical and Clinical Laboratory Technologists and Technicians; Nurse Anesthetists, Nurse Midwife, Nurse Practitioners Speech Therapy Respiratory Therapy Emergency Medical Training Paramedics</p> <p><u>A BS in Medicine along with advanced doctoral degree and licensure will allow students to enter into careers such as:</u></p> <p>Physical Therapists (DPT); Medical Physician (MD or DO), Professor (PhD), Pharmacists (PharmD), Dentist (DDS), Podiatrist (DPM), Optometrist (OD), Nurse Practitioners (DNP)</p>		
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Total units required to complete the degree	120	120	120
Upper-division units required to complete the degree	42 Minimum	45 Minimum	30 Minimum
Foundation courses			
Second language		None	
Math	Moderate Math Strand 3 Units	Minimum 3 units (Pre-Calculus)	Minimum 3 (Quantitative Reasoning)
Pre-major? (Yes/No). If yes, provide requirements. Provide email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	No	No	Yes- To be admitted to this program, you must: <ul style="list-style-type: none"> • have or be currently pursuing an Allied Health Associate's degree through a regionally-accredited college • secure state certification or licensure upon completion of your Associate's degree • have a cumulative GPA of 2.5 or higher
List any special requirements to declare or gain admission to this major (completion of specific coursework, minimum GPA, interview, application, etc.)	None	Major GPA: 2.00 minimum Cumulative GPA: 2.00 minimum	A cumulative grade point average of at least 2.0 on all work attempted at Northern Arizona University
Major requirements			
Minimum # of units required in the major (units counting towards major units and major GPA)	52	60	30
Minimum # of upper-division units required in the major (upper division units)	47	45	30

counting towards major GPA)			
Minimum # of residency units to be completed in the major	18	30	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 email(s)/letter(s) of support from home department head(s) for courses not owned by your department.	<p><u>Statistics Requirement (3 units)</u> Choose one: MATH 163 Basic Statistics (3 units) MATH 263 Introduction to Statistics and Biostatistics (3 units) SBS 200 Introduction to Statistics for the Social Sciences (4 units) BME 376: Biomedical Statistics (3 units) AREC 239 Introduction to Statistics and Data Analysis (4 units)</p> <p><u>General Sciences: (30 units)</u> CHEM 141 and 143/145 or CHEM 151 or General Chemistry I (4 units); CHEM 142 and 144/146 or CHEM 152 or General Chemistry II (4 units); PHYS 102/198 or PHYS 141/142 Physics I and Lab (4 units); CHEM 241A and 243A Organic Chemistry I and Lab (4 units); BIOC 384 Foundations in Biochem OR BIOC 385 Metabolic Biochemistry (3 units); MCB 181R Introduction to Biology (3 units) PSIO 201 Human Anatomy and Physiology I and Lab (4 units); PSIO 202 Human Anatomy and Physiology II and Lab (4 units);</p>	None	Students can transfer up to 90 credits into the major
Major requirements. List all major	<p><u>Major Core: (33 units)</u> New MED 1** Introduction to Medical Health Care I (2 units)</p>	3.0 GPA required Occupational Therapy Professional	Take the following 30 units with a Grade of "C" or better in each course: <ul style="list-style-type: none"> • HS 300, HS 320, FW 321, HS

<p>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 email(s)/letter(s) of support from home department head(s) for courses not owned by your department.</p>	<p>FCM 201 Being a Healthcare Professional (3 units) New MED 2** Seminar-Careers in Medical-Health Sciences (2 unit) CMM 459 & 461 Clinical Reasoning and Medical Case Based Learning (2 units) CMM 410 Human Histology: An Intro to Pathology (3 units) OR equivalent Histology, CMM 437, and 438 and 439 (1 unit each) PSIO 467 Endocrine Physiology (3 units) IMB 401 Medical Microbiology & Immunology (4 units) OR PSIO 431 Physiology of the Immune System (3 units) New BME 4** Introduction to Medical Devices and Their Utilization (3 units) New MED 4** Medical Ethics and Professionalism OR PSIO 411 Scientific Methods and Professional Ethics OR PHIL 321 Medical Ethics (3 units) PHCL 412 Intro to Pharmacology (3 units) OR PCOL 406 Comprehensive Human Pharmacology (5 units) PATH 415 Mechanisms of Human Diseases (3 units) FCM 496D Disability Perspectives in Research, Policy, and Practice (3 units)</p> <p><u>Major Elective Areas: (19 units)</u> Theme 1- Medical Technology; BME 477 Introduction to Bioinformatics (instructor consent required) (3 units) BME 486 Biomaterial-Tissue Interactions New 3** Medical Tech Transfer CSC 250 Essential Computing for the Sciences</p>	<p>Track</p> <p><u>CHS 260: Health Professions Terminology</u> <u>PSY 341: Developmental Psychology (SB)</u> <u>PSY 366: Abnormal Psychology (SB)</u> <u>SOC 400: Perspectives on Aging (SB) or SOC 410: Race, Medicine, and the Body (L) or SOC 418: Aging and the Life Course (SB & H) or SOC 424: Women and Health (SB) or SOC 426: Social Inequality (SB) or SOC 427: Sociology of Health and Illness (SB)</u></p> <p>Optometry Professional Track</p> <p><u>MAT 251: Calculus for Life Sciences (MA)</u> <u>MIC 205: Microbiology (SG) AND MIC 206: Microbiology Laboratory (SG)</u> <u>PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ)</u> <u>PHY 112: General Physics (SQ) AND PHY 114: General Physics Laboratory (SQ)</u></p> <p>Pharmacy Professional Track</p> <p><u>COM 225: Public Speaking (L)</u> <u>MAT 251: Calculus for Life Sciences (MA)</u> <u>MIC 205: Microbiology (SG) AND MIC 206: Microbiology Laboratory (SG)</u> <u>PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ)</u></p> <p>Medicine (MD/DO) Professional Track</p> <p><u>BIO 340: General Genetics</u> <u>MIC 205: Microbiology (SG) AND MIC 206: Microbiology Laboratory (SG)</u> <u>PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ)</u> <u>PHY 112: General Physics (SQ) AND PHY 114: General Physics Laboratory (SQ)</u></p> <p>Dentistry Professional Track</p> <p><u>PHY 111: General Physics (SQ) AND PHY 113: General Physics Laboratory (SQ)</u></p>	<p>404, HS 410 (15 units)</p> <ul style="list-style-type: none"> • HS 390W which meets the junior-level writing requirement (3 units) • HS 460C which meets the senior capstone requirement (3 units) • Any other Health Sciences (HS) or Fitness Wellness (FW) courses at the 300-level or higher (9 units) <p>HS 200 is a requisite for other courses that are required for this degree. You may transfer in an equivalent or be able to count it toward your general elective credit if taken at Northern Arizona University.</p>
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	<p>CMM 441: Brightfield Microscopy (1 unit) CMM 446: Fluorescence Microscopy (1 unit) CMM 442: Fundamentals of Digital Imaging (1 unit) LAW 476A – Dru (3 units)g Discovery, Development, and Innovation to Reach the Marketplace New: Technology and Big Data in Individualized Care New SURG 4** Virtual Medical Care Training & Education in the Digital Age</p> <p><u>Theme 2-</u> Basic Medical Sciences; BIOC 466 Biochemistry of Nucleic Acids CMM 401 Gross Anatomy (Summer course only) (4 units) CMM 437 Immunology Basics (1 unit) IMB 467 Cancer Immunology and Immunotherapy (3 units) IMB 465 Principles and Molecular Mechanisms of Microbe-Host Interactions (3 units) CMM 427 Pathophysiology Basics (1 unit) CMM 428 Pathophysiology of Integumentary, Respiratory & Digestive Systems (1 unit) CMM 429 Pathophysiology of Urogenital and Endocrine Systems (1 unit) CMM 404 Cell Biology of Disease (3 units) PHCL 445 Drugs of Abuse (3 units) PHCL 430 Pain (2 units) PHCL 444 Human Neurobiology Basics (1 unit) PHCL 331 Controversies in Pharmacology (3 units) PSIO 427 Metabolism and Disease (3 units) PSIO 450 Respiratory</p>	<p>PHY 112: General Physics (SQ) AND PHY 114: General Physics Laboratory (SQ) MIC 205: Microbiology (SG)</p> <hr/> <p>Physician Assistant (PA) Professional Track</p> <hr/> <p>CHS 260: Health Professions Terminology BIO 340: General Genetics MIC 205: Microbiology (SG) MIC 206: Microbiology Laboratory (SG)</p>	
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	<p>Physiology (3 units) PSIO 452 Digestive Physiology (3 units) PSIO 465 Systems Neurophysiology (3 units) PSIO 469 Human Reproductive Physiology (3 units) PSIO 485 Cardiovascular Physiology (3 units) PSIO 487 Physiology of Aging (3 units) PHCL 442 Human Performance Pharmacology (3 units) PCOL 410 Pharmacogenomics and Precision Medicine (3 units) PCOL 305 Drug Approval: The 3 Billion Dollar Bet (2 units) PCOL 355 Drug Delivery Systems (3 units) PCOL 350 ADME: How the Body Changes Drugs (3 units) CMM 444-6: Medical Embryology (1-3 units) New IMB 4** Medical Microbiology Basics (1 unit) New IMB 4** Medical Virology Basics (1 unit) MCB 301 Molecular Basis of Life (4 units) MCB 304 Molecular Genetics (4 units)</p> <p>Theme 3-Medicine and Society: PHPM 310 Health Care in the U.S. (3 units) LAW 452 Health Law (3 units) LAW 478A - Legal and Regulatory Aspects of Healthcare Delivery (3 units) LAW 480A - Liability and Regulation of Healthcare Professionals (3 units) New CMM 3** Health, Medical Care and Climate Change (3 units) New FCM 4** Introduction</p>		
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	<p>to Population Health Management (3 units) New FCM 4** Introduction to the Organization & Delivery of Health Services in the US (3 units) FCM 302 Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations (2 units) New FCM 4** Addressing Health Disparities through Interprofessional Clinical-Community Collaboration “In the Field Course” (1-3 unit) New MED 2** The History of Medicine (3 units) New MED 3** The History of Medical Technology (2 units) CMM 479 Art of Scientific Discovery (1 unit) HPS 433 Global Health (3 units) EHS 439A Outbreaks and Environmental Microbiology: Then to Now (3 units) EHS 420 Environmentally Acquired Illnesses (3 units)</p> <p><u>Theme 4- Integrative and Practice-Focused Medicine</u> FCM 301 Substance Misuse in Maternal and Child Health Populations (3 units) FCM 496A Advancements in Substance Misuse Research and Clinical Care Seminar (2 units) PSIO 497A Physiology of Mind-Body Interactions (3 units) IHM 401/501 Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing Stress & Mental Health (1 unit) New FCM 4** Creative Arts in Health, Healing & Wellness (3 units) New MED 4** Difficult Conversations in Patient</p>		
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	<p>Care: The Art of Empathy (1 unit)</p> <p>EMD 197 – Emergency Medical Technician (4 units)</p> <p>EMD 350 – Advanced Emergency Medical Services Systems (3 units)</p> <p>New NSC 2** Fundamentals of Precision Nutrition and Wellness (3 units)</p> <p>NSC 310 Principles of Human Nutrition in Health and Disease (3 units)</p>		
<p>Internship, practicum, applied course requirements (Yes/No). If yes, provide description.</p>	<p>Internship recommended</p>	<p>Internship recommended</p>	<p>No</p>
<p>Senior thesis or senior project required (Yes/No). If yes, provide description.</p>	<p>No</p>	<p>No</p>	<p>Yes- Capstone HS460C- This capstone course will focus on conceptual understanding of leadership and interprofessional teamwork and the analysis and synthesis of these concepts as observed in practice settings. While students will still engage in targeted observation in various practice settings (minimum of 24 clock hours required). Arrangements for observation experiences will NOT occur prior to the beginning of the course, as the requirements for these experiences will be introduced within the course. In addition to other course requirements such as quizzes and reflective discussions on selected course topics, students will produce a summative portfolio of important concepts and skills acquired throughout the degree program.</p> <p>HS 460C will require a Certificate of Eligibility from an advisor who will make sure you have met the requirements and will enroll you in the course. Degree progression plans should ensure that students</p>

			leave general electives as the preferred courses to be taken with HS 460C. If necessary, 400-level courses may be taken concurrently with the capstone. ALL other HS courses must be completed prior to the semester of the capstone.
Additional requirements (provide description)	None	None	None
Minor (specify if optional or required)	Optional	Optional	Required

*Note: comparison of additional relevant programs may be requested.

April 30, 2020

Todd W Vanderah
Professor and Head
Pharmacology, COM - T

Dear Todd:

In our roles as Dean and Deputy Dean for Education, we write in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine.

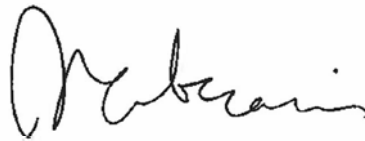
This new Bachelor of Science in Medicine degree will help grow the overall number of students coming to UArizona as well as those enrolling on-line. In addition, several College/Department/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities.

Sincerely,



Kevin F. Moynahan, MD
Deputy Dean, Education
Professor, Medicine



Michael M.I. Abecassis, MD MBA
Dean, College of Medicine - Tucson
Professor, Departments of Surgery & Immunobiology

KFM/al

Office of the Department Chair
Department of Medicine



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P.O. Box 245035
Tucson, AZ 85724
Tel: 520.626.6349
Fax: 520.626.2919
<http://deptmedicine.arizona.edu>

May 9, 2020

Todd W Vanderah, Ph.D.
Professor and Head
Pharmacology, College of Medicine
University of Arizona Health Sciences

Dear Todd:

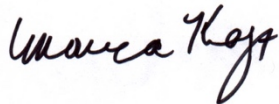
In my role as Professor and Chair, Department of Medicine, I am writing in strong support of the College of Medicine- Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Medicine and the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several Department faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincerely,



Monica Kraft, MD
The Robert and Irene Flinn Professor of Medicine
Chair, Department of Medicine, College of Medicine-Tucson
Deputy Director, Asthma and Airway Diseases Research Center
University of Arizona Health Sciences



THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Molecular & Cellular Biology

Joyce Schroeder, PhD
Professor and Department Head
1007 E Lowell St
Tucson, AZ 85721
Telephone: (520) 621-7563
joyces@email.arizona.edu

Todd Vanderah, PhD
Head, Department of Pharmacology

May 8, 2020

Dear Todd,

After consultation with the faculty in my department, we cannot support this proposal to establish an undergraduate major in Medicine.

We are enthusiastic about several goals of the proposed major, particularly serving important audiences that are not well served by existing curricula. Medicine is indeed a growing industry in the country and the state, and the University is lacking in applied medicine coursework for students who will not pursue more advanced degrees. A new major focused on those students could be very beneficial to the University.

Unfortunately, in its current form, the proposed major is overly broad and ineffective in providing rigorous and appropriate preparation (i.e., too little for some and too much for others). While the new major is likely to appeal to many students preparing for healthcare careers, a fatal flaw is that it aims to serve students with very different needs using a single core curriculum. In essence, it under-prepares those headed for doctorates in fields such as medicine or pharmacy, while at the same time it overwhelms those headed for technical careers such as phlebotomy and massage therapy. In addition, as proposed a focal audience for the major is students whose goal is to pursue doctoral work in medicine, pharmacy, or dentistry. These students are already more than well served by multiple other majors on campus. The need for such a duplicative program is unclear and harms the overall educational experience on campus.

Training students for doctoral programs in medicine and health is not an area on campus that is under, or inappropriately, served. Students interested in further doctoral study are currently served by programs in Biology, MCB, Biochemistry, Neuroscience, and Physiology. The Medicine and Society theme is encompassed by the Care, Health & Society major offered by Sociology, and Anthropology offers a BS in Human Biology. These majors have all carefully developed curricula that fit the needs of students bound for professional programs in health and medicine. In MCB, we have spent years refining our pre-health curricula to ensure these students are competitive when applying to professional degrees and successful when they get there. We have recently developed an online program to reach additional students with similar career goals. We track the ever-changing requirements to enter professional schools, as well as the competencies needed to succeed on gate-keeping tests into post-bac programs. In addition, we have dedicated substantial time and research into developing and assessing methods to teach students to problem-solve and think creatively; these methods are incorporated into all our coursework. This type of focused attention to the diverse needs and requirements for student success is not transparent in the BS in Medicine proposal. Given the already fierce competition for this limited pool of students, this proposal to build yet another program to compete for the same students makes no sense fiscally and undermines the entire program to support pre- meds that currently exists on campus.

Importantly, the new BS in Medicine is lacking key requirements for many students. The General Science core of the proposed BS in Medicine major includes intensive foundational coursework in organic chemistry, physics and biochemistry, all necessary for medical school admission. The proposed curriculum lacks any required coursework in genetics or cell biology - both are required for admission to medical school. Genetics is among a long list of potential electives in the Basic Medical Sciences theme in the proposed major, but without careful advising, many students aiming for doctoral work in medicine will leave the major unprepared. Similarly, courses in organismal and evolutionary biology are not even available as electives, again missing a key aspect of biological education necessary for medical school admissions. In summary, the proposed curriculum does not include course work required to prepare students for admission to professional programs, and thus it does not serve well those students headed for doctoral work.

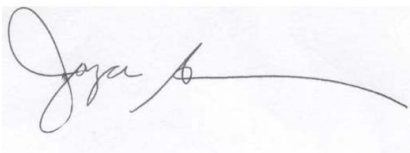
On the other hand, the intense science courses in the core curriculum are unnecessary for many of the students the major intends to serve. For example, the proposal highlights the need for more personal care aids, phlebotomists, and massage therapists. These students do not need organic chemistry, physics and biochemistry for their future goals, and the inclusion of such coursework in the core is likely to set many students up for failure or discourage some from entering the field. In short, the proposed curriculum serves many students in the target audience poorly, by including too many intensive science courses. For these students, we suggest that a certificate mechanism that students could couple with their existing majors might be more appropriate.

Beyond the curriculum itself, we are also concerned about the educational experience for students in the major. The scope of the proposed major is ambitious, with intent to encompass nearly 1000 students within a few years. Particularly given the curriculum issues highlighted above, those students will require careful one-on-one advising. Our Department and the College of Science have spent years developing a highly qualified and competent advising team that is keenly aware of the needs of the diverse student body we serve at the University of Arizona. We are concerned that a team of only two new advisors will struggle to advise so many students who are pursuing drastically different career goals.

We appreciate the goals of colleagues on the Medical campus to expand their undergraduate offerings, but the current proposal is not the way to do it. It is attempting to address too many student audiences and consequently it does not serve any of them optimally. It is also duplicative of existing efforts on campus, which creates needless confusion for the students and conflict among departments.

We are excited to work with our colleagues in the College of Medicine to improve education for students interested in medical and health related careers. But we urge that the current proposal be tabled and that a more targeted program be developed that focuses on students with unmet needs.

Sincerely,

A handwritten signature in black ink, appearing to read "Joyce", followed by a long horizontal flourish.

Joyce

May 14, 2020

Joyce Schroeder, PhD
Professor and Department Head
Molecular and Cellular Biology
College of Science
The University of Arizona

Re: *Response to letter sent by MCB on May 8th, 2020*

Dear Joyce,

Thank you for acknowledging the need for applied medicine courses for undergraduate education. This new major will provide exposure to these fields for students who do not plan to pursue advanced degrees, while also providing needed exposure and preparation for students who plan to pursue advanced degrees to help them succeed once enrolled in an advanced degree.

The broad nature of this major is intended to allow for personalization/customization for students who would like to pursue any medical or health related field.

We politely disagree that the BS in Medicine underprepares those headed for doctoral degrees. The pre-major course work required is similar in rigor to what is required in other life science majors at the UArizona. By customizing the electives, students can fulfill the requirements for entry into professional degree programs and pursue areas of interest as they make decisions about their future career paths. The number of credits required in the BS in Medicine is analogous if not greater than in other life science majors, thus providing ample preparation for advanced degrees. In addition, we are preparing a required internship that will entail a "hands-on" experience that will be geared towards a student's career ambitions; including doctoral and professional degrees.

Although we recognize that students who would like to pursue advanced degrees currently have alternative options at the University, the BS in Medicine program would provide unique courses and opportunities that other majors do not currently provide. The current majors offered at the University each provide a different focus in preparing students by emphasizing various areas of basic sciences needed for advanced degrees. The BS in Medicine will provide an additional path with a different focus, engaging clinical faculty in teaching undergraduate students, having clinical faculty share valuable career experiences and knowledge, thus adding a unique component that is not currently offered in such a direct and robust fashion. Our major plans are to use evidence based best practices in teaching and learning.

In addition, the major goal of the BS in Medicine degree is to attract *new* students from across Arizona, out-of-state and internationally rather than compete for the same pool of students. UAHS has committed funds to ensure that adequate and dynamic advertising, outreach and recruitment occur in order to increase the pool of students attending the UArizona. In partnership with the UA Global Administration team there is strong commitment by the faculty to prepare this BS in Medicine curriculum as part of the necessary global education mission. This mission has been identified as critical in aiding the entire University and will reach international students that may not have the ability to travel to the US.

Regarding the required courses included in this major, we have carefully surveyed and considered the requirements for medical school, and actively sought guidance from our own medical school curriculum director to confirm that the proposed program meets the admissions requirements. We included cell biology and genetics as elective options for students pursuing that path and we would be happy to include courses offered by MCB, including genetics, if your department gives approval for us to use these courses. Students will be provided with guidance on the elective courses that would best fit their chosen career path. Although

some courses in Biology are not included in our program, we are providing a different focus and an alternate path for students by offering other electives, making our major unique. In order to avoid course duplication, we have utilized many of the pre-existing courses across the campus with letters of support from the different departments.

We agree with the required need for careful one-on-one advising. Our current proposal includes two (2) academic advisors of which the current NACADA guidelines state that the ratio of advisor to students not exceed 1:400. Our designated academic advisors, and one educational specialist are expected to cover the one-on-one advising with a proposed ramp up as needed based on student numbers. We expect to hire additional advisors, educational specialists and staff as needed to support and guide students as, and if, the major grows over time. We also will be engaging a full time specialist with Global Education/on-line education in collaboration with the UA Global Office.

As we all are aware, the programs at UArizona are world class and students choose our science programs because of the expertise of our faculty, opportunities for student research and exposure to collaborative learning experiences that are unique to our campus. We too are excited to work with our colleagues in the College of Science and many other colleges and departments across the campus to meet these important expectations. It is our hope that we can utilize the experience, knowledge and teaching abilities of the many faculty in the Colleges of Medicine, Nursing, Pharmacy and Public Health, Engineering and others to advance and improve education for students interested in much needed medical and health related careers.

With best regards,



Todd Vanderah, PhD
Department Head, Pharmacology
Co-Director, MD/PhD Dual Degree Program
Professor, Pharmacology
Professor, Anesthesiology
Professor, Neurology
Professor, BIO5 Institute
Professor, Neuroscience – GIDP
Professor, Physiology - GIDP
COM University of Arizona
Director of the Comprehensive Pain and Addiction Center
Email: vanderah@email.arizona.edu
Office phone: (520) 626-7801



Biomedical Engineering
College of Engineering

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P.O. Box 210020
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(520) 621-5420
Fax: (520) 621-2130
<http://www.bmengr.arizona.edu>

Todd W. Vanderah, Ph.D.
Professor and Head
Pharmacology, COM

Dear Todd:

In my role as Department Head of Biomedical Engineering at the University of Arizona I am writing to state my support for the College of Medicine - Tucson proposal for a new Bachelor of Science in Medicine.

One core course for the new curriculum entitled *Introduction to Medical Devices and Their Utilization* will be developed and taught by BME faculty. Two existing BME courses, BME 476 – Introduction to Biomedical Informatics, and BME 486 - Biomaterial Tissue Interactions, will serve as technical elective for the proposed major. These two courses are housed within the Department of Biomedical Engineering and taught by BME faculty members. The department offers these courses regularly and is able to accommodate the anticipated increased enrollment generated from the new degree program.

The BME faculty working at the interface of technology and medicine are uniquely qualified to contribute to this new program.

I believe there is an urgent need to provide multiple strong educational pathways for students who wish to pursue careers in biomedicine. The BS in Medicine could fill a gap in current discipline-based pathways and allow faculty across multiple departments develop improved pedagogy for training the next generation of healthcare professionals.

Sincerely,

A handwritten signature in blue ink that reads 'Arthur F. Gmitro'.

Arthur F. Gmitro, Ph.D.
Professor and Head Department of Biomedical Engineering
Professor of Optical Sciences and Medical Imaging
University of Arizona



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

Andrei Sanov
Professor and Interim Department Head

Chemistry & Biochemistry (CBC)
sanov@arizona.edu

1306 East University Blvd.
Old Chemistry (OC) 221B
The University of Arizona
Tucson, AZ 85721-0041
Tel: (520) 621-5672

April 22, 2020

To Whom It May Concern:

In my role as Interim Department Head of Chemistry and Biochemistry, I am writing in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Chemistry and Biochemistry the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several faculty members in our department are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities.

Sincerely,

Andrei Sanov, PhD
CBC Department Head





THE UNIVERSITY OF ARIZONA
COLLEGE OF MEDICINE TUCSON

**Family & Community
Medicine**

Office of the Department Chair

Alvernon Administrative Offices
655 N. Alvernon Way, Suite 228
PO Box 210491
Tucson, Arizona 85711
Office: 520.626.7864
Fax: 520.626.2030
fcm.arizona.edu

April 22, 2020

University of Arizona Office of the Provost
Administration Building 512
PO Box 210066 Tucson, AZ 85721-0066

To Whom It May Concern:

In my role as Dept. Chair for Family and Community Medicine am writing in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Family and Community Medicine (DFCM) and the Department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program. In addition, DFCM has unique clinical and community engagement programs that will be leveraged to create outstanding educational experiences for students, as well as the capacity to offer courses for on-line instruction.

Several of our DFCM faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincere regards,

Myra L. Muramoto, MD, MPH, FAAFP
Professor and Chair, Family and Community Medicine
Professor, Public Health, Mel & Enid Zuckerman College of Public Health



April 30, 2020

Dr. Todd W. Vanderah
Professor and Head
Pharmacology, COM

Dear Todd:

In my role as Department Head in the Physics Department, I am writing in strong support of the College of Medicine - Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Physics Department and the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several College/Department/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincerely,



Sumit Mazumdar
Professor and Head
Physics Department
College of Science



Nicholas A. Delamere Ph.D.
Professor and Head
College of Medicine
Department of Physiology
PO Box 245051



Tucson, Arizona 85724-5051
(520) 6626-6425
FAX (520) 626-2382
Email: delamere@arizona.edu
URL: www.physiology.arizona.edu

April 22, 2020

Professor Todd Vanderah,
Head, Department of Pharmacology.

Re. BS in Medicine.

Dear Todd,

I am writing this letter in support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine.

Several required courses in the proposed major are taught by the Department of Physiology. The Department will support the enrollment of Medicine majors in these courses. We anticipate being able to accommodate the extra enrollment generated by this new degree program.

The Department of Physiology faculty includes a number of experts in the scholarship of education, engagement and program assessment. These faculty members are uniquely qualified to contribute to the new BS as teachers and leaders.

You and I, along with our faculty colleagues, recognize the need for the University of Arizona to provide a range of different educational pathways for undergraduate students. The proposed BS in Medicine is an interesting addition to the current offerings.

Sincerely,

A handwritten signature in blue ink, appearing to read "Nicholas A. Delamere". The signature is fluid and cursive, with a long horizontal stroke at the end.

Nicholas A. Delamere, Ph.D.
Professor and Head
Department of Physiology

April 22, 2020

Todd W. Vanderah
Professor and Head
Department of Pharmacology
University of Arizona, COM

To Whom It May Concern:

In my role as Professor and Chair am writing in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Pathology and the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several College/Department/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincerely,



Achyut Bhattacharyya, MD
Professor and Chair
Department of Pathology

JANKO NIKOLICH-ZUGICH, MD, Ph.D. 1656 E. Mabel Street
Head, Department of Immunobiology P.O. Box 245221
Co-Director, Arizona Center on Aging Tucson, AZ 85724-5221
Bowman Professor in Medical Research Tel: (520) 626-6409
College of Medicine Fax: (520) 626-6477



April 22, 2020

Todd W. Vanderah, Ph.D.
Professor and Head
Department of Pharmacology
College of Medicine
University of Arizona

To Whom It May Concern:

In my role as Bowman Professor and Head of the Department of Immunobiology, I am writing in strong support of the College of Medicine- Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Immunobiology, including IMB 401, IMB 402, IMB 404, IMB 548, IMB 565 and other cross departmentally-listed common courses. These courses are offered regularly and several of them will be offered as online options. We will be able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several faculty members of the department are leaders in their fields and are uniquely qualified to contribute to the program.

More importantly, there is an urgent need to provide new educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities.

Sincerely,

nikolich@email.arizona.edu
Appts/Admin: Ms. Lori Wieland, 520/626-9025; lwieland@email.arizona.edu



OFFICE OF THE SENIOR VICE PRESIDENT FOR HEALTH SCIENCES

May 1, 2020

Todd W. Vanderah
Professor and Head
Department of Pharmacology
University of Arizona College of Medicine

Dear Todd:

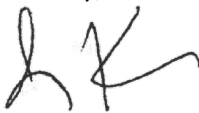
In my role as Senior Associate Vice President for the University of Arizona Health Sciences, I am writing to voice my strong support for the proposal to develop a new Bachelor of Science in Medicine in the College of Medicine — Tucson.

An undergraduate degree in medicine is an idea whose time has come, and the University of Arizona is well-positioned to take the lead. The innovative program will perfectly complement existing undergraduate programs by giving students the opportunity to explore multiple career options while gaining a base of knowledge in the health sciences. Not every student interested in health care wants to go to medical school; this program will serve students by giving them the foundational learning needed to chase their dreams in a way that can be tailored to their interests, whether that is as a professional health care worker, health care lawyer or medical business administrator.

Courses listed as required for the proposed major are housed in colleges across the university, creating a curriculum that gives students a solid background in human medical science while also focusing on applied topics such as medical technology and patient interaction. This program will be particularly valuable in increasing student diversity by allowing students from underrepresented groups the chance to immerse themselves in an educational environment that focuses on health sciences and promotes clinical reasoning and case-based learning. Students will gain the tools they need to succeed from faculty members who are leaders in their fields and uniquely qualified to contribute to the program.

Finally, the potential for courses in the Bachelor of Science in Medicine program to be taught online makes it easily translatable for use in the University of Arizona's international programs, including our strong network of micro-campuses. The College of Law's new undergraduate law degree is the first of its kind in the U.S. and is already highly successful. It is time for the College of Medicine – Tucson to follow suit by offering students a Bachelor of Science in Medicine.

Sincerely,



Irving L. Kron, MD
Senior Associate Vice President, Health Sciences
Professor, Surgery

April 29, 2020

Todd W Vanderah
Professor and Head
Pharmacology, COM

Dear Todd:

In my role as Chair, Department of Emergency Medicine, I am writing in strong support of the College of Medicine- Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Emergency Medicine and the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several College/Department/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities.

Sincerely,



Samuel M. Keim, MD, MS
Professor and Chair
Department of Emergency Medicine
Professor of Public Health
Mel and Enid Zuckerman College of Public Health
The University of Arizona
sam@aemrc.arizona.edu



DEPARTMENT OF CELLULAR
& MOLECULAR MEDICINE

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Ofc: 520-626-6084
Fax: 520-626-2097

<http://cmm.arizona.edu>

April 22, 2020

To Whom It May Concern:

In my role as Professor and Head of the Department of Cellular and Molecular Medicine (CMM) am writing in strong support of the College of Medicine- Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of CMM. The department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several CMM faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincerely,



Carol C. Gregorio, PhD
Department Head, Cellular and Molecular Medicine
Interim Executive Director for UArizona Health Sciences Global
Online Assistant Vice Provost for Global Health Sciences
Co-Director, Sarver Heart Center
Director, Molecular Cardiovascular Research Program
Professor, Cellular and Molecular Medicine
Professor, Molecular and Cellular Biology
Professor, BIO5 Institute



May 2, 2020

Todd W. Vanderah
Professor and Head
Department of Pharmacology
University of Arizona College of Medicine

Dear Dr. Vanderah,

In my role as the Senior Vice President for Health Sciences, I am writing to offer my full support of the College of Medicine – Tucson's proposal for a new Bachelor of Science in Medicine.

There is an urgent need to provide new educational pathways to students who choose the University of Arizona. Several existing pre-med programs allow students to begin their education in health care at the University of Arizona, but those programs are often in specific areas of interest with an end goal of obtaining admission to medical school. This undergraduate program will offer incoming students a multi-disciplinary look at the medical field while providing them with a foundation of knowledge in human medical science, new medical technology and health care practice that will prepare them for a diverse range of careers.

The program will provide a launching point for students to explore a variety of job opportunities in the medical industry and in complementary fields. Graduates of the program will be prepared to enter the workforce in health care support positions or continue their education in a graduate or professional degree program. The program also provides a baseline understanding the basic science of human medicine for students who wish to practice in law, business or other areas.

The proposed Bachelor of Science in Medicine will allow departments to leverage new and existing courses in novel ways and provide much-needed enrollment opportunities for students at the University of Arizona. In the Health Sciences, we are committed to promoting and supporting this first-of-its-kind program, as it aligns with our strategic goal of offering new, relevant educational degrees and certificate programs in a changing world.

Sincerely,

Michael D. Dake, MD
Senior Vice President
University of Arizona Health Sciences



May 1, 2020

Todd W Vanderah
Professor and Head
Pharmacology, COM

Dear Todd,

In my role as Department Head, I am writing in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine. Several courses listed as required for the proposed major are housed within the Department of Pharmacology and Toxicology. The department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program. In addition, several faculty members in my department are leaders in their fields and are uniquely qualified to contribute to the program. Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities.

Sincerely,

Xinxin Ding, Ph.D
Professor and Head
Department of Pharmacology and Toxicology
xding@pharmacy.arizona.edu



THE UNIVERSITY OF ARIZONA

Mel & Enid Zuckerman
College of Public Health

Roy P Drachman Hall
1295 N Martin Avenue
P.O. Box 245210
Tucson, AZ 85724-5210
Tel: (520) 626-3589
Fax: (520) 626-8009

Division of Community, Environment and Policy

April 29, 2020

Todd W Vanderah
Professor and Head
Pharmacology, COM

Dear Todd:

In my role as Professor and Chair am writing in strong support of the College of Medicine- Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Department of Community, Environment and Policy and the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

In addition, several College/Department/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincerely,

Kelly A. Reynolds, PhD
Professor & Chair, Community, Environment and Policy
Director, Environment, Exposure Science and Risk Assessment Center (ESRAC)
ESRAC: www.ESRAC.arizona.edu





THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE

Mathematics

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

May 1, 2020

Executive Director
Academic/Curricular Affairs
University of Arizona

RE: Bachelor of Science in Medicine

Dear colleagues,

I am writing to express the support of the Department of Mathematics for the proposed new Bachelor of Science major in Medicine to be offered by the College of Medicine – Tucson. In particular, the Math Department has no objections to the inclusion of the following courses as electives for the new degree:

MATH 163 (Basic Statistics)

MATH 263 (Introduction to Statistics and Biostatistics)

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

Sincerely,

Douglas Ulmer
Professor and Head

May 5, 2020

Delivered electronically

Todd W. Vanderah
Professor and Head
Pharmacology, COM

Re: Letter of Support for B.S. in Medicine

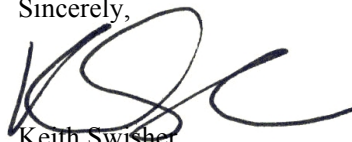
Dear Todd:

The College of Law writes in strong support of the College of Medicine - Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed for the proposed major are housed within the College of Law, and the College of Law offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program. These courses include: Law 452 - Health Law; Law 478A - Legal and Regulatory Aspects of Healthcare Delivery; Law 480A - Liability and Regulation of Healthcare Professionals; and Law 476A - Drug Discovery, Development, and Innovation to Reach the Marketplace. In addition, the College of Law faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, there is a pressing need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities.

Sincerely,



Keith Swisher
Professor of Legal Ethics
Director, B.A. in Law and MSL Programs



**DEPARTMENT OF NUTRITIONAL SCIENCES
COLLEGE OF AGRICULTURE AND LIFE SCIENCES**

Shantz Building
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Tucson, AZ 85721

Tel: 520-621-1187
Fax: 520-621-9446

<http://nutrition.cals.arizona.edu>



May 12, 2020

Todd W Vanderah
Professor and Head
Pharmacology, COM

Dear Todd:

In my role as Head of the Department of Nutritional Sciences I am writing in strong support of the College of Medicine- Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Head of the Department of Nutritional Sciences and the department offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

Many of our Department faculty members are leaders in their fields and are uniquely qualified to contribute to the program.

Finally, and most importantly, there is an urgent need to provide educational pathways to students. The BS in Medicine will allow departments to leverage existing and new courses in novel ways and provide much needed enrollment opportunities

Sincerely,

A handwritten signature in black ink that reads 'Scott Going'.

Scott Going
Professor and head
Department of Nutritional Sciences
College of Agriculture & Life Sciences



THE UNIVERSITY OF ARIZONA
College of Medicine
Tucson

DEPARTMENT NAME

Building Name & Number
Street Address (or PO Box if
necessary)

PO Box #####

City, ST 12345-1234

Ofc: 000-000-0000

Fax: 000-000-0000

URL

May 16, 2020

Todd W Vanderah
Professor and Head
Pharmacology, COM

Dear Todd:

In my role as Interim Director of the Writing Program am writing in support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medicine.

Several courses listed as required for the proposed major are housed within the Writing Program within the Department of English. The Writing Program offers these courses regularly and is able to accommodate the anticipated enrollment generated from this new degree program.

Sincerely,

Rochelle L. Rodrigo, Ph.D.
Interim Director Writing Program
Associate Professor of Rhetoric, Composition, and the Teaching of English
Continuing Status, Department of English



Core issues to address in revising the proposal for the B.S. in Medicine:
(Responses to the revised proposal are in blue text)

Ability to meet demand of this new major

This is within our purview on CAAC because of the potential size and rapid growth of the program and downstream budgetary issues.

- _Please flesh out your budgetary plan for leadership. We strongly advocate support for a full-time Director and co-Director (Letters of support from the COM would be helpful).
- _Please convey your budgetary plan for escalating the hiring of support staff and student advisors if enrollment exceeds projections. Letters of support would be helpful here as well.

See Section XVI ABOR Requirement: New Resources Required?

We have included a Director and Co-Director (*full support for Director (1.0 FTE) and 0.5 FTE for co-Director with expansion to 1.0 FTE depending on growth/enrollment*) along with a plan for escalation of student advisors, staff and education/technical specialist based on student enrollment. Letters of support are now added from Senior Vice President of the Health Sciences and from the Dean of the COM-Tucson. As an example of the dedication to the UG programs under the COM-T, there has been a recent part time (0.4 FTE) hire of a faculty member from the Department of Physiology to help with our undergraduate programs. This is in addition to supporting the faculty/staff/etc. in the Department of Physiology in the COM-T.

Ability to support the program's unique perspective in educating students

The first two bullet points are critical because they speak to how your program will prepare students differently than other pre-health majors

- Please update where courses are in development and that you have instructors lined up to teach these courses (proposals often convey this information even if not stated directly in the instructions)

We have updated course Directors (in red on application next to each new course) and are finalizing the new course syllabi. The syllabi are being collected for all new courses for submission by the end of December. Several required courses are new and are already offered including (i.e., FCM 201, CMM 410, PSIO 467, IMB 401, MED/PHIL 321, PCOL 406, PSIO 411, PSIO 431, PHCL 412, PATH 415/515, FCM 496D)

- Please convey more information about how students will obtain experience, not just classroom-based discussion, but case-based and clinical reasoning beyond classroom-based discussions, as well as how many students in the major will be able to participate. It doesn't seem feasible to provide clinical on-site experiences for a large number of undergraduates given the necessity of adequate faculty:student ratios and student credentialing that may be required by clinical sites. Or perhaps the primary method for giving hands-on experience is through the capstone type course?

The courses outlined include multiple case-based and clinical reasoning sessions that include 'non-didactic' activities. For example, FCM 201 "Being a Healthcare Professional" (3 units) directed by Dr. Paul Gordon (MD) has **All** 'lectures' use think-pair-share with the use of 'clickers'



November 20, 2020

University of Arizona College Academic Administrators Council
Attention: R. John Koshel, CAAC Chair

Dear Dr. Koshel and College Academic Administrators Council Members:

I am very supportive of the proposal for a new Bachelor of Sciences Degree Program in Medicine. This BS in Medicine program will offer students additional options for earning a degree in the health sciences. I believe these new opportunities will increase student enrollment while increasing the pipeline of students able to fill the demand of healthcare workers in the State. In addition, I expect the program will increase the number of students interested in moving into our professional health-care programs.

I am very aware that there may be a large number of students enrolling into this program. As such, the program will require significant support in terms of staff, student advisors and faculty. Over the past two years we have been steadily increasing our support for student education, including new hires of staff and faculty as well as investing in infrastructure (both on-line and in class) to support undergraduate and graduate education.

Based upon an anticipated large student enrollment into the BS in Medicine program, I pledge to support the needs of the program by working with the Deans of the College of Medicine (Tucson and Phoenix) to ensure appropriate resources are available to support student success and that faculty have dedicated time for both creation and delivery of courses. Our support extends to the Health Sciences Simulation Lab, where we will offer a unique opportunity for “hands-on learning” and support for the clinical opportunities that we want to provide for students.

The distinctive curricular offerings - clinical opportunities, shadowing, simulation, “in-field” studies, etc. - all take significant support and organization, but together they provide a very special experience that utilizes our health care professionals to teach students in a health care professional work environment. We have every intention of creating a “top-notched” BS program that attracts students from all over the State as well as nationally.

For these reasons, I am fully committed to provide financial and infrastructural support of the BS in Medicine program.

Sincerely,

Michael D. Dake, MD
Senior Vice President for Health Sciences

for continuous student involvement, incorporates two panel discussions which focus on questions from students, there is an Interdisciplinary case conference with the other colleges in the Health Sciences, an interprofessional panel discussion based on cases with student input. In addition, this course as well as the design of other courses includes a ‘Group project’ as well as several small groups working on medical cases related to social determinants of health, health disparities and career in health inequities. These projects are presented by each group to the entire class. Finally, this course offers sessions on ‘How Clinicians Think’ which covers multiple fundamentals of clinical reasoning. Under non-COVID times, the course has had access to ‘live’ patient presentations with all intentions of having this return when given permission.

As pointed out by CAAC, our introductory courses will not offer a ‘hands on clinical experience’ simply due to the expected size but will require an ‘off-site’ clinical related report that will require students to investigate, interview, volunteer, etc. at their choice of clinical setting. This can be as wide as the business side of medicine, the direct practice of medicine, nursing, physical therapy, dentistry, retirement-home care, integrative medicine practice, medical law, medical tech, medical device engineering, medical software-design, etc. There will be classroom times of case-based instruction and instructor-led clinical reasoning, for example in a grand rounds format. When the time is appropriate, patient guests, and other guests in the medical field will be invited to a classroom to give students a chance to experience the many careers in medicine. We are currently taking advantage of patient videos for learning opportunities that allow for great discussion in medical care. These videos often involve the family of patients, the clinical team that is taking care of the patients and the environment surrounding care (i.e., insurance, tools, devices, medications, long-term therapy, ethical-issues, health inequities, etc.). As a new simulation lab comes on board in the Health Sciences, we will have small group cases for students to participate with ‘hands-on’ clinical learning.

All our courses and directors of these new courses are required to have ‘clinical experiences’ -- for example, paper cases, video cases, patient and/or health professional guest speakers, shadowing of health professionals, patient simulator technology, etc. -- built in to course curricula. Each course director is challenged with creating new modalities in teaching clinical experiences.

- Recommendation: Color coding in your table of major requirements to better convey how courses support your learning objectives (unless you can think of a better way to convey this information). This will help the committee better see how well you support your learning objectives across the program.

See Section VIII STUDENT LEARNING OUTCOMES AND CURRICULUM MAP

Courses under each of the Learning objectives include required courses as well as added elective courses in each of the themes.

Issues regarding UA Global/name of degree

We find it a plus that this program will aid students in learning medical terms in English and provide pathways for obtaining employment in international hospitals – but crucial to balance these pluses against students and families misunderstanding the level of medical training the degree confers, that the degree does not lead to licensure.

It will be stated clearly in all materials that are used to describe the Program as well as materials used for advertisement/recruitment that the BS in Medicine Program will not include licensure to practice medicine. This will be noted on the website and in all forms of public information including all materials used for UA Global.

Collaborations across the university

You state that you would like to work collaboratively with other programs to allow robust options for students interested in medical education and medical careers. We think this is essential to a larger plan to bring more undergraduates overall to the university. We would love to have more discussion of the topics below.

- Dual degrees
- Certificates: Might certificates be developed later, in areas such as those related to the 4 tracks
- Minors for majors in the life sciences to obtain experience in case-based reasoning, clinical training and other aspects of your program

Thanks for these suggestions. We have already started communication with educational directors in multiple colleges including Applied Humanities (i.e., we are working on a separate emphasis in the BA in Humanities and medicine). Additionally, we have opened discussion in the Applied Sciences and Technology degree program regarding added courses and emphasis.

We are excited to offer dual degree programs with other majors such as Physiology, Molecular and Cellular Biology, Nutritional Sciences, Biochemistry, Law, Care Health and Society, American Indian Studies, Information-Science-Technology, and Spanish.

We will begin work on organizing a minor following successful application for the full Bachelor of Science.

It is also our intent to begin work on offering a certificate that includes more of our “hands on” courses and clinical shadowing/experiences. The certificate will be based on fulfilling a certain number of unit hours in courses that give exposure to clinician/patient interactions and help develop clinical problem solving skills.

We are continuing to reach out to others across campus to develop areas of emphasis under degree programs, share in courses, grow our areas of emphasis, work with other programs for dual degree offerings, etc. We believe that our faculty and college have something to offer that will aid in many of the programs across campus.



THE UNIVERSITY OF ARIZONA
College of Medicine
Tucson

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OFFICE OF THE DEAN

November 18, 2020

University of Arizona College Academic Administrators Council
Attention: R. John Koshel, CAAC Chair

Dear Dr. Koshel and College Academic Administrators Council Members:

Thank you for your thoughtful review of the proposed new Bachelor of Sciences Degree Program in Medicine. The premise of the BS in Medicine program is to offer students additional options towards careers in the health sciences, particularly as healthcare providers given the current and predicted shortages both locally in the state of Arizona as well as nationally. We believe that while there may be some risk of overlap with other such offerings, this potential risk is greatly offset by the high likelihood of attracting additional students to UArizona, offering them a more direct exposure and pathway towards becoming healthcare professionals. We strongly believe that by offering this additional option to students in pursuit of these careers in the context of existing programs, there will be an opportunity to expand access to professional careers in this space at UArizona.

We are keenly aware of issues that have been raised regarding this particular offering. For instance, concerns have been raised regarding the possibility of high enrollment that would require significant support in staff, student advisors and faculty as well as other resources. In the past year, we have been steadily increasing the infrastructure for student education, especially for our non-MD undergraduate students, including the hiring of a director for this group of students within the structure of our vice-dean for education, Dr. Kevin Moynahan. These additional hires are designed support both on line and in class educational activities. As we have planned adding resources to this infrastructure, we have taken into consideration mechanisms to flex these up as needed in response to high enrollment in these programs, including the proposed new offering. On behalf of the COM-T, as the person ultimately responsible for making sure our educational programs are successful, I can assure you that we will continue to be responsive to the needs of these programs as they grow with respect to staff, student advisors, faculty, etc. As an example, based on my discussions with the BS in Medicine Design Committee, we plan to provide support for student advisors at approximately one advisor for every 200 to 300 students enrolled. Also, I will be working with several department chairs in the COM-T to help provide salary and other support for their faculty including dedicated time for creating and delivering course content and oversight. Our support will underscore the importance of “hands on learning” and of exposure to clinical opportunities that form part of the uniqueness of this offering. Our overarching goal is to include exposure of students to clinical settings, opportunities to shadow clinical providers, simulations of clinical situations, ‘in-field’ studies, and participation in activities of medical and other healthcare professional societies. These activities will require specific and significant support and organization that leverages daily activities of our clinical faculty and their work environment. In addition, to further provide strength and depth to the offering, we will be working with deans and associate education deans in other Health Science colleges,

as well as other colleges across campus to create new collaborations as well as expanding existing collaborations to develop areas of emphasis in their respective BA/BS programs. We will be working to develop combinations of dual majors, a minor in medicine that may be desirable of other BA/BS programs and to work on a certificate of clinical experiences that may add to students goals of careers in the health-related professions. In fact, we have already initiated several conversations with other colleges towards this end.

In summary, I would like to assure the committee that the COM-T will make every effort to make sure that the BS in Medicine becomes a 'top-notched' program that attracts students from the state of Arizona, the rest of the nation, as well as from the international community. While I am sure we will experience a 'learning curve' in the process, I am confident that we will ultimately create a superior offering that we can all be proud of. I will certainly provide the necessary support to make this a highly successful venture and remain highly supportive of this initiative.

Once again, thank you for your consideration, and I am available to answer any questions you might have.

Respectfully,

A handwritten signature in cursive script, appearing to read "M. Abecassis".

Michael M.I. Abecassis, MD, MBA
Dean, College of Medicine – Tucson
Professor, Departments of Surgery and Immunobiology

BS in Med Undergraduate Course	Course Name	Syllabus Status	Proposed Course Number	# of units	Notes
	Introduction to Population Health Management	Final	FCM 496E	3 units	Submitted
	Medical Ethics and Professionalism	Final	FCM 401	3 units	Submitted
	Careers in Medical Health Sciences	Final	FCM 296 - Seminar	2 units	Submitted
	History of Medicine	Final	MED 318	3 units	Submitted
	History of Medical Technology	Final	MED 319	3 units	Submitted
	Community Health Field Training Experience	Final	FCM 498	3 units	Course was re-submitted for 3 units (originally 2)
	Addressing Health Disparities through Interprofessional...	Final	FCM 402/502	3 unit summer course	Submitted
	Introduction to Medical Care	Final	MED 101	2 units	Submitted
	Healthcare Professional Well-being	Final	MED 301	1 unit	Submitted
	Virtual Medical Care Training & Education	Final	SURG 401	2 units	Submitted
	Intro to Tech Transfer	Final	PHCL 386	3 units	Submitted
	Difficult Conversations in Patient Care	Final	FCM 303	1 unit	Submitted
	Parallel History of Medicine & Law	Final	MED 320	3 units	Submitted
	Introduction to Medical Devices and Their Utilization	Final	MED 441	3 units	Submitted
	Arts and Community Health: Intercultural Perspectives and Applications: Part I – Foundation	Final	FCM424a	1 unit	Submitted
	Arts and Community Health: Intercultural Perspectives and Applications: Part II – Focus on Disabilities and Client-Centered Practices	Final	FCM424B	1 unit	Submitted
	Arts and Community Health: Intercultural Perspectives and Applications: Part III – Focus on Arts and Aging, Dementia & Brain Health	Final	FCM 424C	1 unit	Submitted

Major Core Degree Requirements:

Syllabi Completed and “On The Books”

FCM 201 *Being a Healthcare Professional* (3 units) (Paul Gordon)
CMM 459 & 461 *Clinical Reasoning and Medical Case Based Learning* (2 units)(Ray Runyan PhD)
CMM 410 *Human Histology: An Intro to Pathology* (3 units) (Helen Amerongen)
OR equivalent *Histology*, CMM 437, and 438 and 439 (1 unit each)
PSIO 467 *Endocrine Physiology* (3 units)(Dawn Coletta and Randi Weinstein)
IMB 401 *Medical Microbiology & Immunology* (4 units) (Nafees Ahmad)
OR PSIO 431 *Physiology of the Immune System* (3 units) (Zoe Cohen)
PHCL 412 *Intro to Pharmacology* (3 units)(Sally Dickinson)
OR PCOL 406 *Comprehensive Human Pharmacology* (5 units) (Richard Vaillancourt)
PATH 415 *Mechanisms of Human Diseases* (3 units) (Mark Nelson)
FCM 496D *Disability Perspectives in Research, Policy, and Practice* (3 units) (Ron Sorensen)

Syllabi Completed and Submitted to UACCESS for new course approval

MED 101 *Introduction to Medical Care* (2 units) (Julia Jernberg, MD, Randy Horwitz MD)
FCM 296 *Seminar- Careers in Medical-Health Sciences* (2 unit) (Patricia Lebensohn MD, Paul Gordon MD)
FCM 401 *Medical Ethics and Professionalism* (Patricia Mayer MD and Violet Siwik MD)
additional option PSIO 411 Scientific Methods and Professional Ethics
additional option MED/PHIL 321 Medical Ethics (3 units)
MED 441 *Introduction to Medical Devices and Their Utilization* (3 units)(Marvin Slepian MD, PhD)

Major Core Degree **Elective** Requirements:

Emphases 1- Medical Technology;

Syllabi Completed and “On The Books”

BME 477 *Introduction to Bioinformatics* (instructor consent required) (3 units)
BME 486 *Biomaterial-Tissue Interactions*
CSC 250 *Essential Computing for the Sciences*
CMM 441: *Brightfield Microscopy* (1 unit)
CMM 446: *Fluorescence Microscopy* (1 unit)
CMM 442: *Fundamentals of Digital Imaging* (1 unit)
LAW 476A *Drug Discovery, Development, and Innovation to Reach the Marketplace* (3 units)

Syllabi Completed and submitted to UACCESS for new course approval

PHCL 386 Intro to Tech Transfer in Medicine (3 units)
SUG 401 Virtual Medical Care Training & Education in the Digital Age (2 units)

Syllabi Completed and in the process of being reviewed for submission

BME 4** Technology and Big Data in Individualized Medical Care (Fuad Rahman PhD , Marvin Slepian MD, PhD)
MED 4** Clinical Applications of Medical Technology (Janet Corral PhD, Julia Jernberg MD)

Emphases 2- Basic Medical Sciences;

Syllabi Completed and “On The Books”

BIOC 466 Biochemistry of Nucleic Acids
CMM 401 Gross Anatomy (Summer course only) (4 units)
CMM 437 Immunology Basics (1 unit)

IMB 467 Cancer Immunology and Immunotherapy (3 units)
IMB 465 Principles and Molecular Mechanisms of Microbe-Host Interactions (3 units)
CMM 427 Pathophysiology Basics (1 unit)
CMM 428 Pathophysiology of Integumentary, Respiratory & Digestive Systems (1 unit)
CMM 429 Pathophysiology of Urogenital and Endocrine Systems (1 unit)
CMM 404 Cell Biology of Disease (3 units)
PHCL 445 Drugs of Abuse (3 units)
PHCL 430 Pain (2 units)
PHCL 444 Human Neurobiology Basics (1 unit)
PHCL 331 Controversies in Pharmacology (3 units)
PSIO 427 Metabolism and Disease (3 units)
PSIO 450 Respiratory Physiology (3 units)
PSIO 452 Digestive Physiology (3 units)
PSIO 465 Systems Neurophysiology (3 units)
PSIO 469 Human Reproductive Physiology (3 units)
PSIO 485 Cardiovascular Physiology (3 units)
PSIO 487 Physiology of Aging (3 units)
PHCL 442 Human Performance Pharmacology (3 units)
PCOL 410 Pharmacogenomics and Precision Medicine (3 units)
PCOL 305 Drug Approval: The 3 Billion Dollar Bet (2 units)
PCOL 355 Drug Delivery Systems (3 units)
PCOL 350 ADME: How the Body Changes Drugs (3 units)
CMM 444-6: Medical Embryology (1-3 units)
IMB 402 Medical Microbiology Basics (1 unit) (Nafees Ahmad)
IMB 404 Medical Virology Basics (1 unit) (Nafees Ahmad)
MCB 301 Molecular Basis of Life (4 units)
MCB 304 Molecular Genetics (4 units)

Emphases 3-Medicine and Society;

Syllabi Completed and "On The Books"

PHPM 310 Health Care in the U.S. (3 units)
LAW 452 Health Law (3 units)
LAW 478A - Legal and Regulatory Aspects of Healthcare Delivery (3 units)
LAW 480A - Liability and Regulation of Healthcare Professionals (3 units)
EHS 425-A Public Health Lens to Climate Change (3 units)(Mona Arora)
FCM 302 Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations (2 units) (Uma Nair)
HIST 373 Politics of Health and Medicine in the Americas: From Historical Roots to Contemporary Development (3 units)
CMM 479 Art of Scientific Discovery (1 unit)
HPS 433 Global Health (3 units)
EHS 439A Outbreaks and Environmental Microbiology: Then to Now (3 units)
EHS 420 Environmentally Acquired Illnesses (3 units)
HIST 311 History of Epidemics (3 units)- Cross list as MED 311
HNRS 305 Narrative Medicine and Healthcare (3 units)

Syllabi Completed and submitted to UACCESS for new course approval

FCM 496E Introduction to Population Health Management (3 units) (Ron Sorensen MS, MA)
FCM 402/502 Addressing Health Disparities through Interprofessional Clinical-Community Collaboration (3 unit) (Armin)
New MED 318 The History of Medicine (3 units) (Robert Segal MD)

New MED 319 The History of Medical Technology (2 units) (Robert Segal MD)

New MED 320 Parallel History of Medicine and Law (3 units)

Emphases 4- Integrative and Practice-Focused Medicine

Syllabi Completed and "On The Books"

FCM 301 Substance Misuse in Maternal and Child Health Populations (3 units)

FCM 496A Advancements in Substance Misuse Research and Clinical Care Seminar (2 units)

PSIO 497A Physiology of Mind-Body Interactions (3 units)

IHM 401/501 Integrated Health & Medicine Foundation: Mind-Body-Spirit: Addressing Stress & Mental Health (1 unit)

EMD 197 – Emergency Medical Technician (4 units)

EMD 350 – Advanced Emergency Medical Services Systems (3 units)

PHP 205 - Fundamentals of Telehealth (3 units) (Gail Barker)

NSC 310 Principles of Human Nutrition in Health and Disease (3 units)

AIS/MAS/MED 435 Mexican Traditional Medicine: An Overview of Indigenous Curing Cultures (3 units)

Syllabi Completed and submitted to UACCESS for new course approval

FCM 242a Arts and Community Health: Intercultural Perspectives and Applications: Part I – Foundation (1 unit) (Yumi Shirai, MD, Jennie Gubner MD)

FCM 424b Arts and Community Health: Intercultural Perspectives and Applications: Part II – Focus on Disabilities and Client-Centered Practices (1 unit) (Yumi Shirai, MD, Jennie Gubner MD)

FCM 424c Arts and Community Health: Intercultural Perspectives and Applications: Part III – Focus on Arts and Aging, Dementia & Brain Health (1 unit) (Yumi Shirai, MD, Jennie Gubner MD)

NSC 2** Fundamental of Precision Nutrition and Wellness (3 units)

FCM 498 Community Health Field Training Experience (2 units) (Ron Sorenson)

FCM 303 Difficult Conversations in Patient Care: The Art of Empathy (1 unit) (Gordon MD & Lebensohn MD)

MED 301 Healthcare Professional Well-being (1 unit) (Mari Anoushka Ricker MD & Patricia Lebensohn MD)

Optional working towards required (to be phased in due to more hands-on courses)

New PATH 4** Clinical Skills (path, pharm, phlebotomy, EKG, imaging, etc.) (2 units) (Mark Nelson)

New FCM 4** Reflections on Clinical Medicine through Clinical Shadowing (Karyn Kohlman)

New FCM/COPH 4** Community Health Field Training Experience (Ben Brady, Bridget Murphy, Ron Sorenson)

New MED 4** Skills for advancement and work place professionalism in medicine (Zoe Cohen, Tejal Parikh)

March 15, 2021

Dear Members of the Undergraduate Council,

We write this letter to express our unified objection to the proposal from the College of Medicine for a B.S. in Medicine. As you can see from the signatures at the end of the letter, we represent a significant number of the departments within the College of Science.

Through the process of shared governance, we have now all had the opportunity to review the proposal before your committee. Prior to now, many of us were not made aware of this proposal. We object to the B.S in medicine because of the damage that it will likely inflict upon our college and most importantly upon the students we serve.

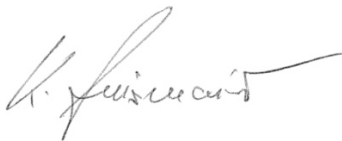
As a college we take our role in preparing pre-health students very seriously. Several of our departments directly prepare majors for careers in health care and the majority of our units play a role in educating students for careers in this area. We have appended a modified list of these careers to this letter[#].

We have spent decades refining our curricula, teaching methods and support structures to meet the needs of these students. We have great concern that the proposed B.S in Medicine will undermine the efforts by directly competing for enrollment with College of Science, as the CoS currently has 5814 students self-identifying as Pre-health. At a time in which we and our students are struggling to recover from a pandemic, we would like to see UArizona colleges work together, rather than creating redundant programs that work against each other.

We also share a concern that the proposed B.S. in Medicine major is not well-designed to meet students' needs. There are numerous issues that have been pointed out to you in other letters. Chief among these are a lack of coherence in a program attempting to serve diverse career paths and a lack of a demonstrated preparation to support the needs of diverse undergraduate students. Another concern raised by members of our community, but not included in previous letters, is that the proposed B.S. in Medicine does not represent good value for students and parents*.

As scientists, we are by nature enthusiastic about innovation. However, this proposed major carries with it undue harm to both our established majors as well as the students it proposes to educate. We urge you to oppose the creation of this redundant major that we fear will harm our students as well as the world-class departments in the College of Science.

Sincerely,



Konrad E. Zinsmaier
Professor and Interim-Head
Department of Neuroscience



Pélagie M. Beeson, Ph.D.
Professor and Head
Department of Speech, Language, and Hearing
Sciences



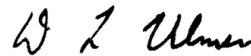
Michael Worobey
Professor and Head
Department of Ecology and Evolutionary Biology



Buell T. Jannuzi
Head, Department of Astronomy
&
Director, Steward Observatory



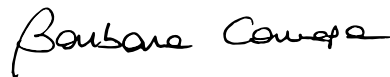
Lee Ryan, Ph.D.
Professor and Head,
Psychology Department
Assoc. Director, McKnight Brain Institute



Douglas Ulmer
Professor and Head
Department of Mathematics



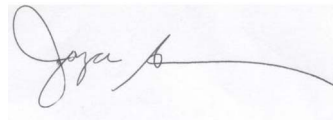
Thomas Meixner
Professor and Head,
Hydrology and Atmospheric
Sciences



Barbara Carrapa
Professor and Head
Department Head of Geosciences



Mary Peterson
Professor and Director
Cognitive Science Program



Joyce Schroeder
Professor and Head
Molecular and Cellular Biology



Timothy D. Swindle
Professor
Department Head and Director
Department of Planetary Sciences and Lunar and Planetary Laboratory



David Lowenthal
Professor and Interim Head
Department of Computer Science

Specifically, the Departments of Ecology and Evolutionary Biology, Molecular and Cellular Biology, Neurosciences, and Biochemistry play a significant role in educating future physicians, dentists, physical therapists, genetic counselors and other careers that require graduate training in addition to a solid background in science and mathematics. The Departments of Psychology and Speech, Language, and Hearing Sciences prepare majors including, but not limited to clinical researchers, physicians, nurses, healthcare administrators, healthcare analysis, health care workers for in-home services, senior living communities, and child/adolescent care facilities, health specialty teachers, occupational therapists, speech-language pathologists, and audiologists.

* One concern is that the “Basic Medical Sciences” track that many students will choose will not lead to competitive salaries for those who do not gain acceptance to medical school, in comparison to students graduating with a 4-year degree in science. Given the acceptance rate of 6.8% in the top 115 ranked U.S. medical programs (2018 U.S. News & World Report) we are concerned for those students who would earn a B. S. in Medicine degree, rather than a science degree. According to O*NET, of the occupations listed in the proposal for graduates with a BS in Medicine, all but medical and health services managers make \$44,000 or less and do not require a 4-year degree (range \$25,280 - \$44,000 for healthcare aid provider, physical therapist aid, occupational therapist aid, phlebotomist, medical records and health information technicians). Medical technologists require a 4-year degree and make \$49,850 annually but medical and health services managers with potential to earn annual salaries of \$100,980 require administrative training. The remaining occupations require additional graduate training. In contrast, students with BS degrees in the life sciences and chemistry earn annual salaries of \$65,000 and upwards (e.g., agricultural & food scientist \$65,160, environmental scientist and specialist \$71,360, microbiologist \$75,360, chemist \$77,630, bioinformatics scientist \$82,220).



THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

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March 15, 2021

To the members of the Faculty Council,

I have had the opportunity to review the proposal to establish a BS in Medicine from the College of Medicine. I am deeply concerned that this proposal includes measures that would discriminate against diverse students and fails to include program supports aimed at including and retaining students from diverse backgrounds. Given our Hispanic Serving Institution status and the priority UArizona has given to retaining undergraduates, particularly those from diverse backgrounds, I would urge the Council to reject the proposal in its current form.

My perspective comes from my role as the Faculty Director for Diversity and Inclusion in the UArizona Graduate College and as one of the founders of Arizona Science Engineering and Math Scholars (ASEMS), a program for UArizona undergraduates that helps retain and graduate STEM majors from groups that are underrepresented in graduate and health care professional degrees. In addition, I am appointed as a tenured Professor in the Department of Molecular and Cellular Biology in the College of Science.

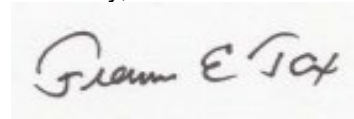
What follows are specific details of concern:

- 1) The BS in Medicine program will require a 3.0 GPA to be admitted to the program (p.1 of the proposal). This GPA requirement will have a disproportionately negative impact on the success of students from diverse backgrounds. Many UArizona freshman struggle in their first year or two but the number of DEW (D grade, E grade, W-withdrawal) in beginning STEM courses (Calculus, Chemistry) is much higher for first generation and/or high financial need students. Many of these students, who often come from Arizona's poorly performing public education system, may fall below a 3.0 for a semester, and thus would be ineligible to continue in the major. The proposal also stipulates that students cannot apply to be readmitted to the major (p.1). This will negatively impact retention. Should students earn sufficient grades to move their GPA above a 3.0 (as many do), they would not be eligible for readmission.
- 2) The BS in medicine will not accept transfer students into the program (p.1). Typically, transfer students are more diverse in their ethnicity than freshman, and more than 70% come from community colleges, who are more likely to be first generation college students or students with high financial need. It seems arbitrary and discriminatory to deny access to any UArizona major to transfer students.
- 3) The proposal fails to adequately describe program supports recognized as important to foster success in groups under-represented in health sciences (African American, Hispanic and Native American). Common program supports for inclusive programs typically include peer mentors, pathways to be involved in research early in their education, cohort building programs or classes, peer tutoring, and clubs and social programs that promote science identity. The proposal includes a brief mention of "student progress committees" but no explanation of what these are and how they function; the proposal mentions an overall "humanist" approach but fails to deliver on any specifics on how this approach will function to create a sense of belonging to diverse students that will positively affect their academic success.

It is important that we create programs and majors that are accessible to all motivated and interested students. A BS in Medicine would nominally be attractive to many diverse students, as medicine and human health are professions that enable students to find concrete ways to contribute to the welfare of their home communities.

It surprises me that a program with a plan to market to diverse students and their families fails to address retention issues and common academic barriers faced by these students.

Sincerely,

A handwritten signature in black ink on a light gray background. The signature reads "Frans Tax" in a cursive, slightly slanted script.

Dr. Frans Tax
Faculty Director, Graduate College Office of Diversity and Inclusion and
Professor of Molecular and Cellular Biology
1007 E. Lowell.
Tucson, AZ 85721



THE UNIVERSITY OF ARIZONA
COLLEGE OF SCIENCE
Molecular & Cellular Biology

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March, 15, 2021

Dear fellow UGC members,

I am writing this letter as the UGC representative of the College of Science. I will be with the Policies Subcommittee on Tuesday, but I wanted you to have my perspective when reviewing the proposal for a B.S in Medicine from the College of Medicine. I have spoken with my colleagues in the College of Science and many have substantial concerns about the new major. In the application you already have, you may view a letter from Joyce Schroeder, Department Chair of Molecular and Cellular Department as well as a brief note from Rebecca Gomez, Associate Dean, Student Academic Success, College of Science. I will forward any additional letters as they become available to me.

Concerns regarding the new degree revolve around two issues.

First, the B.S. in medicine (in particular Emphasis 2) is duplicative to other pre-health majors on campus. Through existing majors, students can focus in different areas of science in preparation for health careers. Currently, in the College of Science, the Department of Ecology and Evolutionary Biology has 491 students with a B.S. in Biology with an Emphasis in Biomedical Sciences. The Department of Molecular and Cellular Biology has 512 students, typically about 45% of these intend to pursue a career in medicine. Some of these students (153) have added the Emphasis in Genetics and Human Health that this department started in Fall 2018. Other College of Science programs regularly train students for careers in healthcare, but do not have a specified pre-health emphasis, including the Departments of Neurosciences and Biochemistry. For example, a survey of recent graduates with a B.S. in Biochemistry suggests that 33% entered health fields, with the majority of these attending medical school. In the College of Medicine, the Physiology Department enrolls over 1, 500 students, the large majority of whom are pre-health. With many existing choices for pre-health majors, it does not make sense to develop a new major that will directly compete with existing majors. It is also important to note that significant resources were used over many years to build the infrastructure needed to adequately support UArizona pre-health students.

Second, there is significant concern that development of this new degree through the College of Medicine is not in students' best interest. Three of the five departments proposing the new major currently have no undergraduate majors. There is concern that these departments are not prepared to meet the challenge of retaining undergraduate students, particularly the diverse students that our university is dedicated to supporting. Further, the curriculum outlined is not well-designed to prepare students for specific health careers that are targeted by the new major. In general, these issues point to an overall weakness of the proposal with regards to preparing undergraduate students.

I expand further upon these issues in the list of specific concerns below (listed roughly in order of materials within the proposal).

1. The new major will not allow transfer students. This does not seem to be in line with efforts on campus to reach all Arizona students and diversity on our campus.



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COLLEGE OF SCIENCE

Molecular & Cellular Biology

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2. Proposers suggest without evidence that there is an insufficient inflow of prepared undergraduates into medical school. This is loosely tied in the proposal to a national need for more health care professionals. Elsewhere in the proposal, it is stated that the COM receives 10,000 applications per year. The acceptance rate for the UA medical school is about 7%. It is unclear how increasing the capacity for training undergraduate students for medical school will address this problem. Would not an increase in the capacity for training of physicians better meet this need?
3. The B.S. in medicine aims to prepare students for multiple careers. However, these careers have wide-ranging requirements and pathways. For example, how does the current degree relate to students within our established pathways in nursing? The focus on “health care” positions in general is confusing and misleading.
4. The proposal states that the major will directly prepare students to enter the workforce as home health aides, physical therapist aids, phlebotomists, etc. These are not careers for which a 4-year degree is required. Why would students pay for a B.S. degree to enter one of these fields?
5. Emphasis 2, “Basis Medical Sciences” seems to be the pathway intended for pre-medical students. However, the plan listed here does not include all the coursework needed for a student to enter medical school. The major includes only the first semester of introductory biology (leaving out the accompanying lab). The major does not require calculus or genetics. The major does not require or recommend a basic course in cell biology. All of these are either required or recommended by most medical schools and are also important for students to have the required knowledge and skills to succeed on the MCAT exam. Existing pre-health majors are carefully designed so that students completing the major will have what is needed (knowledge, skills, and coursework) to apply for medical school.
6. An examination of the sample 4-year plan reveals a lack of 300 level courses (the last 4 semesters include only 400 level courses within the major). This may be because many of the suggested upper-division courses are currently offered within the COM as dual enrollment for undergraduate and graduate students. This again suggests a lack of emphasis on undergraduate education in the proposing departments.
7. The proposal suggests that a 1.0 FTE director will oversee this large new program. It is not stated who that director will be.
8. The Diversity and Inclusion section (page 52) lists some existing structures in the COM to address these needs in general. However, the proposal seems to be lacking any specific plans for support structures to recruit and retain underrepresented students. This is of particular concern given the lack of diversity in medicine and our mission as a Hispanic Serving Institution. Nationally, less than 6% of physicians identify as Hispanic. <https://www.aamc.org/data-reports/workforce/interactive-data/figure-18-percentage-all-active-physicians-race/ethnicity-2018>
9. The learning outcomes for the proposed major (page 49) are very broad and do not seem to be designed to ensure that students are prepared for medical school admissions, including the MCAT examination. By examining the MCAT requirements



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<https://students-residents.aamc.org/applying-medical-school/article/whats-mcat-exam/#cars> one can see that the learning outcomes of the BS in medicine are not well aligned. By contrast the existing major in Molecular and Cellular Biology is well suited to prepare students for this examination. A few sample MCAT requirements and aligned MCB degree learning outcomes are shown below.

MCAT: Foundational Concept 1

Biomolecules have unique properties that determine how they contribute to the structure and function of cells, and how they participate in the processes necessary to maintain life.

- Content Category 1B: Transmission of genetic information from the gene to the protein

MCB Learning Outcome: Explain the role of and mechanisms by which the genome and its products generate biological structures and phenotypes including human disease

MCAT: Skill 2. Scientific Reasoning and Problem-solving

- Reason about scientific principles, theories, and models.
- Analyzing and evaluating scientific explanations and predictions.

MCB Learning Outcome: Understand and/or build models that generate testable hypotheses about biological processes.

MCAT: Skill 4: Data-based Statistical Reasoning

- Interpret patterns in data presented in tables, figures, and graphs.
- Reasoning about data and drawing conclusions from them.

MCB Learning Outcome: Read and interpret primary scientific literature in cell and molecular biology, linking the experimental results to prior understanding of biological processes.

MCB Learning Outcome: Apply quantitative strategies to analyze and understand biological processes.

10. In her letter, Dr. Schroeder suggests that the new B.S will likely compete with existing programs for the same pool of students. In his response, Dr. Vanderah states that the goal of the new B.S. is to attract new students to UArizona. Plans are presented to advertise and market the program, but no data are presented in the proposal to suggest that the program will indeed reach a new pool of students.

I hope that the academic programs subcommittee, and full UGC, will seriously consider the outlined concerns with this proposal. Based on my previous work on the academic programs subcommittee, I know that you take your work seriously and dedicate considerable time to making sure new programs are in our students' best interest. By writing this letter, I do not wish to stall the progress of our great university. I understand that an innovative idea like a "B.S. in Medicine" might bring new students to UArizona. However, in my opinion a viable solution must ensure that existing programs are not gutted by competition with new programs and, most importantly, that new programs building on best practices and existing knowledge in an effort to do what is best for our students.

Sincerely,

Molly S. Bolger, Ph.D.

March 15, 2021

The following letter and supporting documentation outline multiple concerns I have with the Bachelor of Science in Medicine. Namely, the proposed degree program is misrepresentative and misleading in that it does not provide students with the coursework, training, or credentials needed to enter many healthcare support careers or health professional programs upon completion. The proposed program fails to meet the basic educational requirements set by state licensing boards for careers or jobs such as 'massage practitioner', and falsely suggests that completing the program will qualify students to obtain vocational licenses without additional training or experience. Additionally, there are potential ABOR policy violations associated with this proposal that I would like to bring to the attention of review committees prior to their approval.

Please let me know if you have any questions regarding the attached points of concern and/or supporting documentation.

Sincerely,



Dr. Michael Worobey
Department Head
Louise Foucar Marshall Science Research Professor
Ecology and Evolutionary Biology



Points of Concern

- 1) **ABOR Policy 2-221** stipulates that an academic degree program is “identified by a specific degree title and a specific major subject matter area. The name of the major must reflect accurately the skills, competencies, and knowledge to be attained in the course of studies.”

The proposed degree is titled *Bachelor of Science in Medicine*, however the Classification of Instructional Programs (CIP) code provided in the proposal categorizes it as a *General Health Services/Allied Health/Health Sciences* (CIP 51.0000) program. In North America, the only awardable degree in Medicine is an MD, and the CIP code listing for Medicine (CIP 51.1201) specifies the title pertains exclusively to this degree-level and program.

► **Detail for CIP Code 51.0000**

Title: Health Services/Allied Health/Health Sciences, General

Definition: A general, introductory, undifferentiated, or joint program in health services occupations that prepares individuals for either entry into specialized training programs or for a variety of concentrations in the allied health area. Includes instruction in the basic sciences, research and clinical procedures, and aspects of the subject matter related to various health occupations.

IPEDS CIP: <https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=87605>

► **Detail for CIP Code 51.1201**

Title: Medicine (MD)

Definition: A program that prepares individuals for the independent professional practice of medicine, involving the prevention, diagnosis, and treatment of illnesses, injuries, and other disorders of the human body. Includes instruction in the basic medical sciences, clinical medicine, examination and diagnosis, patient communications, medical ethics and law, professional standards, and rotations in specialties such as internal medicine, surgery, pediatrics, obstetrics and gynecology, orthopedics, neurology, ophthalmology, radiology, clinical pathology, anesthesiology, family medicine, and psychiatry.

IPEDS CIP: <https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88805>

The proposed Bachelor’s-level program in Medicine does not confer a professional health or medical degree, nor will it prepare students to practice professional medicine independently upon graduation. The required coursework and curriculum provide a general introduction to health services occupations and prepares students for entry into specialized (i.e. accredited) training programs in allied health. Therefore, an accurate name for the proposed major should instead align with its CIP code title that best reflects the skills and knowledge imparted by the program (i.e. Bachelor of Science in Health Services, Allied Health, etc.).

- 2) The proposed degree title also runs the risk of misleading international students, in particular UA Global students who start coursework abroad and intend to finish their degree in the US. It is common for institutions outside of the United States and Canada to award bachelor's degrees in medicine—typically ‘Bachelor of Medicine’ or ‘Bachelor of Medicine, Bachelor of Surgery’ degrees—which are professional degrees conferred upon completion of a graduate-level medical program and considered equivalent to a ‘Doctor of Medicine (MD)’ degree (and also a ‘Doctor of Osteopathic Medicine’ degree in the US).



- ▶ Bachelors degrees in medicine are currently awarded in institutions in 51 foreign countries, 21 of which host one or more UA Global Microcampuses (**Table 1**).
 - ▶ Google search results for “Bachelor in Medicine” indicate that bachelors degrees in medicine are offered only in institutions outside of North America (**Table 2**).
 - ▶ **ECFMG Medical Education Credentials Guide:** <https://www.ecfm.org/certification/reference-guide.html>
- 3)** According to **ABOR Policy 2-223** all new academic programs must be approved by UA governing committees and ABOR before the program may be publically announced. In violation of this policy, the Bachelor of Science in Medicine is already advertised on UA Global’s website as a Major option under the Health Sciences degree path.
- ▶ **UA Global, Health Sciences – Potential Majors:** <https://everywhere.arizona.edu/health-sciences>
- 4)** The proposal inaccurately states that "students graduating from the program will be well-prepared to enter advanced degree programs in Human Medical and Health Sciences" and "a BS in Medicine along with advanced doctoral degree and licensure will allow students to enter into careers such as: Physical Therapists (DPT), Medical Physician (MD or DO), Professor (PhD), Pharmacists (PharmD), Dentist (DDS), Podiatrist (DPM), Optometrist (OD), Nurse Practitioners (DNP)."

Major requirements for the degree program exclude many courses required for admission to professional health programs (**Table 3**). Extensive supplemental coursework and/or an additional undergraduate degree would be required for a BS Medicine graduate to qualify for admission to multiple of the programs listed.

- ▶ Under the “Program Comparisons” section of the proposal, ASU’s Bachelor of Science in Medical Sciences is listed as a peer program for comparison. The ASU program contains all prerequisite courses for admission to health professional programs, whereas the proposed UA BS Medicine program does not.

ASU Medical Studies (BS) – Major Map:

<https://webapp4.asu.edu/programs/t5/roadmaps/ASU00/NHMEDBS/null/ALL/2020?init=false&nopassive=true>

- 5)** The proposal states that the BS in Medicine “along with advanced certification and/or a Master’s degree” will allow students to enter into ~30 health services careers, however the degree doesn’t provide the minimum educational requirements necessary for admission to most advanced healthcare services degree programs (**Table 4**), nor will graduates of the program be eligible to sit for many of the certification exams required to practice or pursue careers in allied health. Approximately two-thirds of the healthcare services careers listed in the proposal would require additional education or training, such as a postsecondary non-degree award (1-year) or Associate’s degree (2-years) from an institution with a specialized or programmatic accreditation (**Table 5**).
- ▶ The “ABOR Requirement” section of the proposal indicates that no specialized accreditations will be sought for the program. However, University of Arizona has only two accreditations that are applicable to the proposed BS in Medicine program: an institutional accreditation from the Higher Learning Commission (HLC), and specialized/programmatic accreditation in Perfusion.
- CHEA Accreditation UA:** <https://www.chea.org/university-arizona>



Table 1. Countries with insitutions that grant bachelor's degrees in medicine.

*** UA Global Microcampus location**

*Australia	Hong Kong	Myanmar	*Malaysia
Bahrain	*India	*Nepal	*Sri Lanka
*Bangladesh	*Iraq	New Zealand	Sudan
Barbados	*Ireland	*Nigeria	Tanzania
Botswana	Jamaica	*Pakistan	Trinidad and Tobago
*Brazil	*Jordan	Papua New Guinea	Uganda
Colombia	Kenya	*Philippines	Ukraine
*China	Kuwait	Samoa	*United Arab Emirates
*Egypt	Lebanon	Saint Kitts and Nevis	*United Kingdom
Fiji	Libya	*Saudi Arabia	Vanuatu
*Gambia	Malawi	Sierra Leone	Zambia
Ghana	Malaysia	Singapore	*Zimbabwe
Guyana	*Mauritius	South Africa	

ECFMG Reference Guide for Medical Education Credentials:

<https://www.ecfm.org/certification/reference-guide.html>

Table 2. Google search results for "Bachelor in Medicine"

<p>University of Oradea, Romania</p> <p>Universitas Gadjah Mada, Indonesia</p> <p>Ualikhhanov University, Kazakhstan</p> <p>University of Morón, Brazil</p> <p>Batterjee Medical College, Saudi Arabia</p> <p>Universidade Cidade de São Paulo, Brazil</p> <p>Brunel University London, United Kingdom</p> <p>Queen Mary University of London, Malta</p> <p>International Medical University, Malaysia</p> <p>University of Bologna, Italy</p> <p>University of Birmingham, United Kingdom</p> <p>Lakshveer Overseas Solution, Malaysia</p> <p>Mkhitar Gosh Armenian-Russian International University, Armenia</p>
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HealthCareStudies:

<https://www.healthcarestudies.com/Bachelor/Medicine/>

Educations.com:

<https://www.educations.com/search/bachelors-degree-medicine?q=Bachelor%20in%20Medicine>

TABLE 3. Professional health program prerequisite courses excluded from BS Medicine major requirements

Professional Health Program	Prereq Courses Excluded	Program Admission Requirements
Dentist (DDS)	MCB 181L, ECOL 182R, ECOL 182L, CHEM 241B, CHEM 243B, PHYS 103 & 182 or PHYS 241, MIC 205A, MIC 205L	https://thecenter.arizona.edu/pre-health/pre-dentistry
Medical Physician (MD or DO)	MCB 181L, ECOL 182R, ECOL 182L, CHEM 241B, CHEM 243B, PHYS 103 & 182 or PHYS 241	https://thecenter.arizona.edu/pre-health/pre-medicine
Nurse Practitioners (DNP)	FSHD 117 or FSHD/EDP/PSY 200, MIC 205A, NSC 170 or NSC 101 or NSC 310	https://www.nursing.arizona.edu/academics/doctor-nursing-practice-dnp/admissions
Optometrist (OD)	MCB 181L, ECOL 182R, ECOL 182L, CHEM 241B, CHEM 243B, PHYS 103 & 182 or PHYS 241, MIC 205A, MIC 205L	https://thecenter.arizona.edu/pre-health/pre-optometry
Pharmacist (PharmD)	MCB 181L, ECOL 182R, ECOL 182L, CHEM 241B, CHEM 243B, MIC 205A, MIC 205L, ECON 200, COMM 119	https://thecenter.arizona.edu/pre-health/pre-pharmacy
Physical Therapist (DPT)	MCB 181L, ECOL 182R, ECOL 182L, MIC 205A, MIC 205L, PSY 150A1 or PSY 101, PSY 200, PSY 381, PHYS 103 & 182 or PHYS 241	https://thecenter.arizona.edu/pre-health/pre-physical-therapy
Podiatrist (DPM)	MCB 181L, ECOL 182R, ECOL 182L, CHEM 241B, CHEM 243B, PHYS 103 & 182 or PHYS 241	https://thecenter.arizona.edu/pre-health/pre-podiatry
Professor (PhD)	Coursework likely not sufficient for admission to most PhD programs	NA

TABLE 4. Advanced healthcare services program prerequisite courses excluded from BS Medicine major requirements

Healthcare Services Program	Prereq Courses Excluded	Program Admission Requirements
Occupational therapist (OT)	PSY 150A1 or PSY 101, PSY 200, PSY 381; additional 3-6 Semester Hours Each of Sociology, Anthropology, Humanities, and Medical Terminology.	https://thecenter.arizona.edu/pre-health/pre-occupational-therapy
Nurse anesthetist, nurse midwife, & nurse practitioner (APRN)	FSHD 117 or FSHD/EDP/PSY 200, MIC 205A, NSC 170 or NSC 101 or NSC 310. Minimum score of 75 on HESI Admissions Assessment Exam.	https://www.nursing.arizona.edu/mepn-admissions
Nurse Practitioner (BSN)	FSHD 117 or FSHD/EDP/PSY 200, MIC 205A, NSC 170 or NSC 101 or NSC 310	https://www.nursing.arizona.edu/bsn
Physician Assistant (PA)	MCB 181L, ECOL 182R, ECOL 182L, MIC 205A, MIC 205L, PSY 150A1 or PSY 101, PSY 200, PSY 381; additional 30-40 units of Biology, Chemistry, and/or Physics required for some programs.	https://thecenter.arizona.edu/pre-health/pre-physician-assistant

TABLE 5. Healthcare services careers that require a degree or postsecondary non-degree award from an accredited institution in order to be eligible to apply for professional certification/licensure

Career	Degree/Award Required	Program Duration	Accrediting Agency	Requirements to Practice
Dental Hygienist	Associate's Degree	2 yrs	CODA	https://www.medicaltechnologyschools.com/dental-hygienist
Diagnostic Medical Sonographer	Associate's Degree	2 yrs	CAAHEP	https://www.medicaltechnologyschools.com/ultrasound-technician
Health Information Technician	Postsecondary nondegree award	1 yr	AHIIM	https://www.medicaltechnologyschools.com/health-information-technology
Licensed Practical and Vocational Nurse (LPN, LVN)	Postsecondary nondegree award	1 yr	CCNE	https://www.bls.gov/ooh/healthcare/licensed-practical-and-licensed-vocational-nurses.htm
Radiation Therapist	Associate's degree	2 yrs	AART, JRCERT	https://www.medicaltechnologyschools.com/radiation-therapist
Radiologic Technologist	Associate's Degree	2 yrs	AART, JRCERT	https://www.medicaltechnologyschools.com/radiologic-technologist
Medical and Clinical Laboratory Technician	Associate's Degree	2 yrs	NAACLS, ABHES	https://www.medicaltechnologyschools.com/medical-lab-technician/mlt-ascp-certification
MRI Technologist	Associate's Degree	2 yrs	AART, JRCERT	https://www.medicaltechnologyschools.com/mri-technologist
Nuclear Medicine Technologist	Associate's Degree	2 yrs	JRCNMT	https://www.medicaltechnologyschools.com/nuclear-medicine-technologist
Physical Therapist Assistant	Associate's Degree	2 yrs	CAPTE	https://www.medicaltechnologyschools.com/physical-therapist-assistant
Occupational Therapy Assistant	Associate's Degree	2 yrs	AOTA	https://www.bls.gov/ooh/healthcare/occupational-therapy-assistants-and-aides.htm#tab-4
Paramedic	Associate's Degree	2 yrs	CoAEMSP	https://www.medicaltechnologyschools.com/emt
Respiratory Therapist	Associate's Degree	2 yrs	CAAHEP	https://www.medicaltechnologyschools.com/respiratory-therapist
Surgical Technologist	Postsecondary nondegree award	1 yr	CAAHEP	https://www.medicaltechnologyschools.com/surgical-technologist

March 26, 2021

RE: Letter of Response to the Letters of Opposition to the BS in Medicine Program.

Thank you for the comments related to the proposed BS in Medicine Program. We have addresses each of the comments from the four letters that we received.

1) Letter by the Graduate College, ODI, Dr. Fran Tax:

a) The BS in Medicine program will require a 3.0 GPA to be admitted to the program (p.1 of the proposal). This GPA requirement will have a disproportionately negative impact on the success of students from diverse backgrounds.

Response: *We have changed the GPA requirements to 2.20*

b) The BS in medicine will not accept transfer students into the program (p.1) nor readmits.

Response: *We have changed this to allow transfer students and readmits.*

c) The proposal fails to adequately describe program supports recognized as important to foster success in groups under-represented in health sciences (African American, Hispanic and Native American).

Response: *The Colleges of Medicine-Tucson (COM-T) recruit diverse students through several practices: 1) the COM has its own dedicated Deputy Dean and Office dedicated to diversity and inclusion in which we are above the national numbers for medical schools (UACOM-T at 4.6%; Nationwide is at 0.2% (2016-2020)¹, 2) A diverse group of academic advisors and college level faculty and staff interact with students 3) COM-T and all its departments are very proactive about ensuring that students of diverse backgrounds are reflected in relevant materials including for recruitment and marketing. There are student progress committees for retention efforts with members that reflect a diverse population.*

Student Recruitment *of diverse students will include outreach to high schools of all types throughout Arizona by direct emails, advertising using flyers, social media and setting up zoom conferences. At first this may sound overwhelming (approx. 250 high schools in Pima county alone) but we just completed a test-run of this with our new Accelerated Pathway to Medical Education (APME) program in which we recruited high school students from all over the state including schools enriched with American Indian/Native Alaskan and Hispanic/Latinx students. We also will be working with several faculty leads including Dr. Agnes Attaki, Director of INMED, Dr. Athena Ganchorre Executive Director of Curriculum and Integrative Learning, Dr. Francisco Moreno Associate Vice President of Diversity and Inclusion, Dr. Victoria Murrain Vice Dean of Diversity, Equity and Inclusion, Dr. Michelle Ortiz Director of Diversity Equity and Inclusion, Dr. Carlos Gonzales Assistant Dean of Curricular Affairs and several of our current and former URM students of the COM to reach URM enriched high schools. Our Students in programs like Medicine, Physiology, Emergency Medicine and Graduate Programs are tremendous assets in reaching high school URM students. Our new Director of Baccalaureate programs (Zoe Cohen) at COM-T has been involved with recruitment and retention efforts in these other programs and is expected to also be involved with recruitment into the proposed BS in Medicine Program. We will be collaborating with Pre-health Professions Advising, cultural centers, and Thrive Center to recruit diverse students into the program. We have explicit commitment to the values of diversity, equity, and inclusion on our COM-T program's website.*

Student Retention Plans: *All efforts from administration, faculty, staff and senior students will help retain students. When high school or transfer students matriculate to the BS in Medicine Program, a primary goal of the Office of Student Affairs (OSA), Office of Diversity, Equity and Inclusion (ODEI) and the Administration is to ensure that all students have the necessary resources and support to successfully navigate their journey, complete their BS education, and go on to either a productive/successful job and/or advanced education or training for a career. Intentional efforts will extend longitudinally throughout their undergraduate years to support their academic decisions and challenges that occur along the way, via Academic Advisors, Program Directors, peer-to-peer groups, ODEI, and OSA. Academic advisors, the Associate Director and Director of the BS in Medicine Program will be available to provide the needed guidance and mentoring to overcome inevitable challenges that will occur along the way with goal of enabling them to continue to progress to successful completion of the program. Retention we believe entails having the students at the beginning of their journey work with and/or volunteer with faculty in areas of career interest including performing clinical and*

preclinical research. Peer mentoring² will also be incorporated to assist in supporting goals including developing self-efficacy, sense of belonging, and perceived worth or relevance of the curriculum³. The COM-T has between 900 to 1000 faculty with the majority already engaged or wanting to participate in the education of undergraduates. The UAHS and COM-T are dedicated to having a physical common location for the students, and to create groups that include Health Sciences students to enable our undergrads to have more contact with the students of medical and health professions in order to build and nurture a future vision for the undergrads and mentoring relationships with current seniors and professional students on campus. FAQs will be established on the BS in Medicine website that will be answered by staff, administration, and faculty. Each student will have required meetings with academic advisors to discuss and continually update their academic progress and career development. The OSA has learning specialists that will need to expand as the BS in Medicine comes on board and will be available to all students. Knowing many students are independent and may be more on-line (in a virtual learning environment) we will provide an electronic model of longitudinal support and guidance for students that also entails career advising and job opportunities. The University offers multiple workshops and outreach to help retain students and we will engage in all mechanisms used by other BS and BA programs at the UArizona. Our OSA and Academic Advisors (often the contact person) will be made aware of the many programs available to make students feel invited including ethnic/diversity groups, disability groups, hobby groups, community outreach groups, intramural sports, social and techie groups, organized activities, events and wellness programs, etc. The COM office of ODEI provides effective mentoring and networking opportunities to help make students comfortable during training including BNGAP-Building the Next Generation of Physician Leaders <http://bngap.org/about-us/>.

For **Faculty** the COM-T has committees focused on diversity and inclusion; these committees offer professional development opportunities to faculty on topics which advance perspectives on best practices for fostering an inclusive environment on campus. Faculty from diverse backgrounds will continue to be recruited through professional health care- and research-based strategies which search committee members learn at Faculty Recruitment Workshops provided by Dr. Victoria Murrain (Deputy Dean, Diversity and Inclusion) and Dr. Michelle Ortiz (Director of Diversity Equity and Inclusion) as well as by Human Resources. We have current practices that train faculty in creating inclusive classrooms, as well as encourage participation in monthly events hosted by COM-T including forums and lectures hosted by the Office of Diversity, Equity and Inclusion. There is a requirement that all faculty engage in at least six hours of professional development relating to DEI every year.

Our process for **faculty recruitment**: Crafting a job description that motivates URM applicants to apply is important in order to gain a large pool of applicants that will allow for more diversity and inter-personal comparisons. Research has indicated that use of “masculine” words in job descriptions deter women from interest in a position⁴. For example, words like “strong research and writing skills” versus “proficient research and writing skills” will often have women second guessing whether the job fits their personality. Promoting the use of gender decoders⁵ to help create more equitable job descriptions has been utilized by some UArizona colleges and will be implemented across colleges when crafting job descriptions for the BEST-I Excel Cohort. All job advertisements include a UArizona diversity statement that is aspirational and uses a broad perspective of diversity to encourage UBR applicants⁶. We utilize a wide range of targeted advertising for UBRs, including the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS), AAMC Group on Diversity and Inclusion listserv, Association for Women in Science, Executive Leadership in Academic Medicine (ELAM), National Hispanic Medical Association, National Medical Association and others. We will utilize Minoritypostdoc.com, and use Twitter, where these positions can be highlighted by identifying hashtags such as #BlackandSTEM, #NativeinSTEM, #NativeScience, #LatinXinSTEM, #MarginSci, and #DiversityinSTEM⁷. Furthermore, using evidence-based studies^{9,10}, we will have faculty actively reach out to promising postdoctoral UBR candidates confirming the institutional support and the cultural building taking place. We currently have and will encourage more faculty and search committee members to attend meetings focused on underrepresented scientists, such as the annual SACNAS meeting and the Annual Biomedical Research Conference for Minority Students. We will have search committee members and the Center Directors for Pain and Aging directly contact postdoctoral fellows that have MOSAIC K99/R00 Awards, are part of the Howard Hughes Medical Institute Hanna H. Gray Fellowship, are part of the Burroughs Welcome Postdoctoral Enrichment Program, as well as contact the diversity and inclusion committees of scientific societies¹¹. We will search databases that act as an interactive platform connecting historically marginalized individuals in STEM to academic and professional opportunities^{7,8}.

Faculty Retention Plans: to provide resources, an inclusive environment, leadership positions and placement on committees that help make future decisions for the institution. Start-up and retention funding will be provided and based

on the faculty applicant's research. The COM-T has recently implemented an incentive plan for research and is now working on incentive for teaching and service that is built to retain faculty and to provide direct resources for their independent mission. The COM-T also provides communication groups, workshops and a faculty lounge that all are methods to make faculty feel supported and respected.

- 1) https://www.aamc.org/system/files/2019-11/2019_FACTS_Table_B-3.pdf
- 2) Vincent Tinto, Through the Eyes of Students *Journal of College Student Retention: Research, Theory & Practice*, First Published December 11, 2015
- 3) Juan I. Venegas-Muggli, Carolina Barrientos, Fernando Álvarez, The Impact of Peer-Mentoring on the Academic Success of Underrepresented College Students, *Journal of College Student Retention: Research, Theory & Practice*, First Published March 4, 2021
- 4). Gaucher D, Friesen J, Kay AC (2011). Evidence that gendered wording in job advertisements exists and sustains gender inequality. *J Pers Soc Psychol* 101, 109–128.e.g.
- 5) <http://gender-decoder.katmatfield.com>
- 6) Molly Carnes, Eve Fine, Jennifer Sheridan, Promises and Pitfalls of Diversity Statements: Proceed With Caution, 2019 *Academic Medicine*, Jan;94(1):20-24. doi: 10.1097/ACM.0000000000002388
- 7) www.caiselist.com
- 8) www.minoritypostdoc.org/index.html
- 9) Peek ME, Kim KE, Johnson JK, Vela MB (2013). “URM candidates are encouraged to apply”: a national study to identify effective strategies to enhance racial and ethnic faculty diversity in academic departments of medicine. *Acad Med* 88, 405–412;
- 10) Stewart AJ, Valian V (2018). *An Inclusive Academy: Achieving Diversity and Excellence*, Cambridge, MA: MIT Press.
- 11) https://mighty.citadel.edu/root/images/cti/pdf/resources/teaching_learning_resources/foundations_of_learning/35914-aaf-equity-inclusion.pdf

2) Letter by the Ecology & Evolutionary Biology, College of Science, Dr. Michael Worobey, Department Head:

a) the proposed degree program is misrepresentative and misleading in that it does not provide students with the coursework, training, or credentials needed to enter many healthcare support careers or health professional programs upon completion.

Response: *We have organized the potential for jobs into three categories in our proposal: jobs available after the degree is obtained; jobs/careers available upon further certification; and jobs/careers available after further degree requirements. In order to mitigate against any perception of misrepresenting or misleading students, which is absolutely not our intent, we will provide details for each type of job/career/certificate/advanced degree requirements available on our website and in our offices for academic advisors. We greatly appreciate this comment; in response, our team is actively putting together all credentials for the jobs listed in the proposal as well additional potential career pathways that we will make available to both students and to academic advisors.*

b) The proposed program fails to meet the basic educational requirements set by state licensing boards for careers or jobs such as ‘massage practitioner’, and falsely suggests that completing the program will qualify students to obtain vocational licenses without additional training or experience. Additionally, there are potential ABOR policy violations associated with this proposal that I would like to bring to the attention of review committees prior to their approval.

Response: *As stated above – careers like ‘massage practitioner’ are listed on our application under the title “A BS in Medicine along with advanced certification and/or a Master’s degree will allow students to enter the following careers:”. Thus, we believe that we provide contextual information related to additional requirements set by licensing boards to avoid the perception that completing the proposed BS in Medicine alone would be sufficient without additional training or experience. Thus, we will do everything we can to help our potential students complete this degree and move forward to jobs, as well as to future certifications, and advanced degrees. Our office will work with students to make sure they know what credentials are required for entry into careers of interest, as well as information regarding where advanced training is available and the credentials earned. Our office will do everything to help students graduate and move into jobs, certificate programs and advanced degree programs. We do not believe that our proposal is in violation of any ABOR policies and would welcome elaboration on this point beyond our response.*

3) Letter by Molecular & Cellular Biology, College of Science, Dr. Molly Bolger

a) B.S. in medicine (in particular Emphasis 2) is duplicative to other pre-health majors on campus.

Response: *While there may be some inherent overlap with other pre-health majors on campus, our core courses are unique and not duplicative and will help advance students that select emphasis 2. We have specifically made efforts not to duplicate courses offered by other programs, and we expect that all departments/colleges will share in the student education process. Several of our courses, such as human-pathology, -histology, -advanced medical immunobiology and -pharmacology are not offered under any major and will aid students wanting to pursue medicine, physician assistant, and additional advanced medical related degrees. In addition, our core courses in introduction to medicine, being a healthcare provider and careers in medical health sciences are unique to this degree. Moreover, many faculty teaching in the program will be healthcare providers themselves, thus giving students a direct window in some future careers.*

b) Significant concern that development of this new degree through the College of Medicine is not in students' best interest. Three of the five departments proposing the new major currently have no undergraduate majors. There is concern that these departments are not prepared to meet the challenge of retaining undergraduate students, particularly the diverse students that our university is dedicated to supporting. Further, the curriculum outlined is not well-designed to prepare students for specific health careers that are targeted by the new major.

Response: *We appreciate the comment but we would propose that the premise of the BS in Medicine is in fact to provide students with a different exposure and experience more targeted to a career in the health professions, and thus have the "student's best interest" absolutely in mind. Thus, we specifically disagree with the sentiment that the COM-T development of a BS in Medicine degree is not in students' best interest. We in the COM-T have a large undergraduate physiology program, a new Emergency medicine program, a professional undergraduate program and multiple graduate programs in which the students' interest is put forth as a top priority that continues to grow based on the desire of faculty wanting to teach and mentor undergraduate students. We cannot think of a better group of faculty that practice full- and part-time medicine to teach and mentor future students. Our faculty take on a practice of caring for others and have already demonstrated this desire to care for undergraduates based on the faculty wanting to create new courses, teach in courses and mentor students. As detailed in the response above to Dr. Fran Tax, we have extensive programs in place to foster success in DEI students. Also as stated above, we have recruited a new Director of Baccalaureate Programs who will be focused on our undergraduate students.*

c) The new major will not allow transfer students

Response: *We will allow transfer students; the application has been changed to reflect this.*

d) Proposers suggest without evidence that there is an insufficient inflow of prepared undergraduates into medical school. This is loosely tied in the proposal to a national need for more health care professionals. Elsewhere in the proposal, it is stated that the COM receives 10,000 applications per year. The acceptance rate for the UA medical school is about 7%. It is unclear how increasing the capacity for training undergraduate students for medical school will address this problem. Would not an increase in the capacity for training of physicians better meet this need?

Response: *We are proposing an alternate pathway to the health professions, including but not limited to medicine, physician assistant, nursing, etc. Many of these professions are experiencing national shortages. Our proposed pathway is more focused to these professions, and in many cases will be taught by healthcare providers. Statistics about COM-T admissions, as well as those of other UArizona health-related training programs only represent a very small component of our ultimate premise, which is to prepare students at UArizona for training in these health professions here and elsewhere. Thus, we are hoping to attract students to begin their healthcare education here with a pluripotent differentiation here and elsewhere. In general, the basic sciences in the medical school are being pushed to the undergraduate campuses due to increased time for clinical training in medical schools and a corresponding decrease in time devoted to teaching basic sciences. There are topics that lack depth and are best taught by professionals in these fields including topics such as pathology, histology, pharmacology and immunobiology. We agree with the need for increased capacity for training physicians, yet the number of students is controlled by a national accreditation. The proposal of a BS in medicine will not only introduce students to the practice of medicine (FCM 296) but will also present how medicine-related fields may be excellent alternatives to medicine, for example courses such as MED 101, and will also give students a feel for being a health care provider (FCM 201). Clinical reasoning courses will aid in understanding how health care providers make choices in health care management (CMM 459 & 461).*

e) The B.S. in medicine aims to prepare students for multiple careers. However, these careers have wide-ranging requirements and pathways. For example, how does the current degree relate to students within our established pathways in nursing? The focus on “health care” positions in general is confusing and misleading.

Response: *The purpose of the degree is to help students understand and know the multiple career options and to provide them with the necessary background to be able to differentiate into different healthcare professions. Far too often students enter college with a very limited scope of the careers available in medical care. We believe that working with our partners and faculty in the COM-T as well as the CON, COP, COPH and COM-P, we will help provide students with courses that will aid in future jobs and careers.*

f) The proposal states that the major will directly prepare students to enter the workforce as home health aides, physical therapist aids, phlebotomists, etc. These are not careers for which a 4-year degree is required. Why would students pay for a B.S. degree to enter one of these fields?

Response: *Although not all the potential jobs/careers listed in the proposal require a BS degree currently, we believe this trend is changing rapidly in that employers of such jobs are preferring applicants with BS degrees. In addition, the BS degree is desired for promotion in many of these starter jobs and also allows for “job changes or job pivot” when employees seek a change in their career. Also, our proposal allows for students to enter a pathway towards a specific healthcare career while also allowing them to differentiate to a different career. We agree that if a student already knows their career choice, and this does not require a BS, it would make little or no sense for them to apply to this program, and therefore they would be unlikely to enroll in the BS in Medicine program*

g) Emphasis 2, “Basis Medical Sciences” seems to be the pathway intended for pre-medical students. However, the plan listed here does not include all the coursework needed for a student to enter medical school. The major includes only the first semester of introductory biology (leaving out the accompanying lab). The major does not require calculus or genetics. The major does not require or recommend a basic course in cell biology. All of these are either required or recommended by most medical schools and are also important for students to have the required knowledge and skills to succeed on the MCAT exam. Existing pre-health majors are carefully designed so that students completing the major will have what is needed (knowledge, skills, and coursework) to apply for medical school

Response: *The BS in medicine has all the courses that are required for the UArizona colleges of medicine as well as many other schools across the country. The MCAT and many schools do not require calculus or genetics (although a basic genetics course is highly recommended). The necessary chemistry/biochemistry courses, physics, molecular biology and physiology are all required (see general sciences, general eds and electives). We have organized a course load that caters not only to medicine but also to alternative careers in medical related jobs/careers with plenty of options for students to dovetail their education towards the future. Our student advisors will work with students to best fit their future career desires, presenting many options. Our Interim Director, Dr. Zoe Cohen (permanent once the degree is approved), is very knowledgeable of the medical school requirements (currently on the committee for setting requirements), knowledgeable regarding requirements of other medical schools as well as courses that help prepare for the MCAT. Not every course is required under this degree since medical school is not the only option the degree is focused on. However, there are several emphases that require students to do 19 units that will aid in their preparation for the MCAT and prerequisites for advanced degree programs. The BS in Medicine, like the other pre-health majors, will carefully design courses so that students completing the major will have what is needed (knowledge, skills, and coursework) to apply for medical school as well as other jobs, certificates and/or advanced degree programs. Some overlap of courses will be expected given UA policies that dictate UG programs, as well as the course approval process which discourages the creation of duplicative courses. Rather than forcing through new courses that might be duplicative of existing courses, the BS in Medicine program is designed to provide for equitable enrollment opportunities that include existing courses. Rather than draw students away from these fundamental courses, the program seeks to provide additional opportunities to leverage these courses. This is in service to the students, which should be the guiding principle of all those associated and intimately involved in curriculum development. Encouragement of dual degrees would be an advantage to multiple programs.*

h) An examination of the sample 4-year plan reveals a lack of 300 level courses (the last 4 semesters include only 400 level courses in the major). This may be because many of the suggested upper-division courses are currently offered within the COM as dual enrollment for undergraduate and graduate students. This again suggests a lack of emphasis on undergraduate education in the proposing departments.

Response: Although there are fewer 300 level courses, there are some in each of the emphases that are choices to all students. More 300 level courses can be offered and designed as needed.

i) The proposal suggests that a 1.0 FTE director will oversee this large new program. It is not stated who that director will be.

Response: The Interim Director has already been hired, Dr. Zoe Cohen. She is titled interim until we have full approval for this program. Currently Dr. Zoe Cohen is the director of our APME and Honors to Medical School (HEAP) Programs. In addition, the Dean of the COM-T, along with support by the UAHS leadership, will hire an Associate Director for the BS in Medicine program.

j) The Diversity and Inclusion section (page 52) lists some existing structures in the COM to address these needs in general. However, the proposal seems to be lacking any specific plans for support structures to recruit and retain underrepresented students. This is of particular concern given the lack of diversity in medicine and our mission as a Hispanic Serving Institution. Nationally, less than 6% of physicians identify as Hispanic. <https://www.aamc.org/data-reports/workforce/interactive-data/figure-18-percentage-all-active-physicians-race/ethnicity-2018>

Response: Please see response above under Dr. Frans Tax letter.

k) The learning outcomes for the proposed major (page 49) are very broad and do not seem to be designed to ensure that students are prepared for medical school admissions, including the MCAT examination. By examining the MCAT requirements <https://students-residents.aamc.org/applying-medical-school/article/whats-mcat-exam/#cars> one can see that the learning outcomes of the BS in medicine are not well aligned. By contrast the existing major in Molecular and Cellular Biology is well suited to prepare students for this examination. A few sample MCAT requirements and aligned MCB degree learning outcomes are shown below.

Response: We agree that MCB is well in line for preparing students for the MCAT. Our Learning Outcomes are intended to be broad in order to help guide students towards different avenues of health/medical-related careers, including but not limited to medicine. The vast majority of students applying to medical schools do not get in, and it is important that students be aware of and prepared for pursuing alternative training and careers in healthcare professions.

l) In her letter, Dr. Schroeder suggests that the new B.S will likely compete with existing programs for the same pool of students. In his response, Dr. Vanderah states that the goal of the new B.S. is to attract new students to UArizona. Plans are presented to advertise and market the program, but no data are presented in the proposal to suggest that the program will indeed reach a new pool of students.

Response: We have every intention in creating a larger pool of students at the UArizona. It is a unique program in the US, and as such, we believe it will cast a wide net. These students can attend any of our medical and health related BS and BA programs. In working with the UAHS and main campus advertising, we intend to use all of the programs in medicine and health to increase enrollment of students from across the state and the nation. This BS in Medicine program, along with its unique courses, will add to our existing programs, strengthening the UArizona as the destination for gaining an education that can result in medical-related careers. Other universities (ASU, NAU, GCU, Creighton-in 2021) that lack a Medical College and the talented faculty that the UArizona has to offer, have proceeded to offer BS degrees in Medical Sciences. We intend to reach out to the high school programs in Arizona to inform students that the UArizona has multiple medical and health related programs that will prepare them for jobs, advanced degree programs and careers that other universities may lack. Medical and Health related careers is one of the largest growing sectors in the future economy and the UArizona should use this, and its many medical faculty to grow the student population. We have recently been meeting with advertising (main campus, UAHS, College) to organize a state and nationwide plan of advertising. Recently with our APME program (Accelerated Pathway to Medical Education) we reached out to over 140 high schools and setup zoom meetings to inform high school students about our early acceptance into medical school, with tremendous success. This direct contact with high school classrooms, teachers and administrators reached an exciting buzz and application process that we feel can be more broadly applied to our BS and BA programs at the UArizona. Upon approval, marketing will begin immediately with dedicated staff in the Health Sciences and College of Medicine (Tucson and Phoenix) to advertise the major on their College and Department websites as well as social media often used for prospective students, parents, and employers. These include programs on Facebook, Snapchat, Pandora, Google and online channels to generate requests for more information. The College of Medicine-T & -P will reach out to offer this degree nation-wide via the AAMC and other health related professional societies. College advisors will host

online recruitment events in Phoenix, Tucson, Flagstaff and rural areas of the State of Arizona. Live recruitment events will occur in Spring. Recruitment activities will include but are not limited to; 1) high school recruitment events including zoom connections, tabling at college fairs and presenting at high school student leadership conferences, 2) College of Med (T & P) will go to targeted high schools throughout AZ and select out of state colleges to promote UArizona and all majors including the NEW BS in Medicine, 3) advisors attend campus recruitment events (i.e., "Meet your Major Fair"), 4) health professionals will be asked to give Q&A on careers in their field, and 5) events at community colleges across the state of AZ.

4) Letter from Scientists in the College of Science

a) ...damage that it will likely inflict upon our college and most importantly upon the students we serve. As a college we take our role in preparing pre-health students very seriously. Several of our departments directly prepare majors for careers in health care and the majority of our units play a role in educating students for careers in this area. We have appended a modified list of these careers to this letter#. We have spent decades refining our curricula, teaching methods and support structures to meet the needs of these students. We have great concern that the proposed B.S in Medicine will undermine the efforts by directly competing for enrollment with College of Science, as the CoS currently has 5814 students self-identifying as Pre-health. At a time in which we and our students are struggling to recover from a pandemic, we would like to see UArizona colleges work together, rather than creating redundant programs that work against each other.

Response: *We appreciate that the other programs have refined their curricula and teaching methods to prepare pre-health students. This does not preclude the creation of new programs that offer new curricula and teaching from additional faculty. The BS in Medicine will utilize many of these courses as a shared curriculum and shared students with a goal of increasing enrollment and options for achieving a bachelor's degree at the UArizona. The addition of the BS in Medicine would attract a greater pool of students to the UArizona and therefore provide a larger enrollment pool that all departments would inevitably benefit from. Even if students were to significantly enroll in the BS in Medicine program, the design of the program is such that these students will interface and interact with the Colleges and Departments earlier in their academic journey, thus these departments will still be able to engage in their teaching missions and the charge of the land grant institution as a whole. Moreover, the BS in Medicine will offer students an alternate pathway to a career in the health/medical professions taught in large part by medical and health providers in an environment and with role models in those professions.*

c) We also share a concern that the proposed B.S. in Medicine major is not well-designed to meet students' needs. There are numerous issues that have been pointed out to you in other letters. Chief among these are a lack of coherence in a program attempting to serve diverse career paths and a lack of a demonstrated preparation to support the needs of diverse undergraduate students. Another concern raised by members of our community, but not included in previous letters, is that the proposed B.S. in Medicine does not represent good value for students and parents.

Response: *These concerns are addressed above in responses to other letters. Moreover, we believe that students and their parents will be the ultimate judges as to whether this program provides good value or not. While we can all speculate, whether the program is successful or not will ultimately depend on its merits and on whether students and parents will perceive its differentiating value.*

Sincerely,



Todd W. Vanderah, Ph.D.

Professor & Head of Pharmacology, COM University of Arizona